

Inaccessible Island Nature Reserve Management Plan



Peter G. Ryan and James P. Glass

Government of Tristan da Cunha

2001



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**Government of Tristan da Cunha,
Edinburgh, Tristan da Cunha**

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This management plan for the Inaccessible Island Nature Reserve takes account of the provisions of the Tristan da Cunha Conservation Ordinance, 1976, as amended (1984, 1986 and 1997), and the Tristan da Cunha Fishery Limits Ordinance, 1983, as amended (1991, 1992, 1997).

A draft of the management plan was made available for comment to the Tristan community, members of the Gough Island Nature Reserve Advisory Committee, the Foreign and Commonwealth Office, London, and H.E. the Governor of St Helena. This plan is a modified version of that draft, having been altered in the light of observations made.

The management plan is dedicated to the people of Tristan da Cunha for their foresight in conserving Inaccessible Island. The plan and associated visit to Inaccessible Island in 1999–2000 was funded by the World Wide Fund for Nature, United Kingdom.

(The term ‘Administrator’ when used in the plan means the person appointed by H.E. the Governor of St Helena to administer the Government of Tristan da Cunha.)

Approval

This management plan was approved by the Government of Tristan da Cunha in Council at its 290th meeting on 28 February 2001. The decision was reported in the Government Gazette, bringing the management plan into effect, on 5 March 2001.

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Foreword

by **Brian Baldwin**

Administrator, Tristan da Cunha

Of all the islands of the Tristan Group, Inaccessible, befitting its name, is now the least disturbed by man. As the human population of the world expands almost without check, places such as Inaccessible are few and far between and under constant threat from alien invasion. It is important, therefore, that, where physical isolation offers a defence against such encroachment, these places should be carefully managed and protected both for research, and the enlightenment and enjoyment of current and future generations.

I am, therefore, pleased to welcome this carefully constructed management plan for Inaccessible Island. Not only can it serve the ideals mentioned above, but it will also guide and encourage the Tristan islanders in their efforts to protect their unique islands. The well-being of Tristan's community is based on sustainable harvests from the sea, which can only be achieved by careful management of all the features which contribute towards an ecological balance between the needs of Tristan's human inhabitants and the natural world surrounding them.

The Tristan Government will continue to do all it can to secure this balance on which both sides ultimately are interdependent.

My thanks go to the authors of the plan and to the Island Council for approving its implementation.



*Brian Baldwin
Administrator
Tristan da Cunha
September 2000*

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Special thanks are due to Mr Brian Baldwin, Administrator of Tristan da Cunha during 1998–2001, for constant enthusiasm and support. He also kindly allowed access to the Tristan Government archives and unpublished material. Many people on Tristan helped realise the visit to Inaccessible Island in 1999/2000, especially the team that built and transported the hut to Blenden Hall.

The following people helped in the preparation of the management plan in a number of ways: Tim Andrew, Helen Barber-James, Peter Best, Steven Chown, John Cooper, Richard Dean, Mike Fraser, Alan Gardiner, Conrad Glass, Norman Glass, Niek Gremmen, Martin Holdgate, Sue Milton, Coleen Moloney, Koos Roux, Nigel Wace and Barry Watkins, as well as the many Tristan islanders who supported the fieldwork. John Cooper, Coleen Moloney and Felicia Stoch are especially thanked for their careful proof-reading of the management plan.

Peter Ryan conducted this work while on sabbatical leave; he is grateful to the University of Cape Town for this opportunity.

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1

Summary

Inaccessible Island is one of three main islands in the Tristan da Cunha archipelago in the central South Atlantic. It is uninhabited, and is a British Possession, forming part of the Overseas Territory of Tristan da Cunha. In 1997, Inaccessible Island and its surrounding waters out to 12 nautical miles were proclaimed a Nature Reserve in terms of the Tristan da Cunha Conservation Ordinance (1976, as amended 1997).

Although utilised by humans in the past, Inaccessible Island remains in a largely pristine condition and is one of the few temperate oceanic islands free of introduced mammals. It is home to some 300 native plants and animals, including two birds, eight plants and at least ten invertebrates found nowhere else. The island also

supports more than 70 other plant and animal species restricted to the Tristan–Gough island group. Very little is known of the microscopic biota. More than 250 species have been recorded from the marine environment surrounding the island, including 60 species endemic to Tristan–Gough. Consequently Inaccessible Island is a resource of great conservation and scientific research significance.

This management plan sets guidelines for controlling human activities in order to conserve Inaccessible Island’s indigenous biota and natural environment to the greatest degree possible.

Principal management objectives for the Inaccessible Island Nature Reserve are:

1. To conserve and maintain the indigenous biological diversity, including genetic diversity, species diversity and the diversity of ecological processes.
2. To minimise interference with natural processes and the destruction or degradation of natural features through human actions. This includes *inter alia* preventing the introduction of animals, plants, other organisms or their propagules.
3. To maintain scenic features and geological structures and processes.
4. To restore and rehabilitate, where feasible, damage due to local human actions.
5. To protect historic sites and artefacts without conflicting with objectives 1–4.
6. To promote an awareness through education of the intrinsic value, significance and vulnerability of Inaccessible Island and its biota.
7. To promote research relevant to objectives 1–6, and allow research not in conflict with these objectives.

These objectives do not affect any current use of Inaccessible Island by Tristan islanders. It is intended that well-managed access to the island continues to be allowed for Tristan residents, and that responsible, sustainable exploitation of marine resources be permitted in the waters of the Nature Reserve.

This management plan for the Inaccessible Island Nature Reserve has been produced in conjunction with the Tristan da Cunha Government. It consists of two main sections: a description and resource inventory, and management policies with guidelines for manage-

ment. Appendices include a bibliography, copies of relevant legislation, lists of scientific visits and the main biota, as well as visitor guidelines and application and reporting forms for visitors.

Implementation of the plan rests with the Administrator and Island Council of Tristan da Cunha. Specialist advice on the application and revision of the management plan, as well as with environmental management of and research at Inaccessible Island, is available from a group of international experts.

Introduction

Inaccessible Island in the South Atlantic Ocean is one of the least disturbed temperate oceanic islands in the world, and is largely free of the effects of human activities and introductions (Wace & Holdgate 1976). It is one of three main islands in the Tristan da Cunha archipelago. Administratively, Inaccessible forms part of the United Kingdom's Overseas Territory of Tristan da Cunha. It is uninhabited, and the only current economic activity is fishing for Tristan Rock Lobster *Jasus tristani* around the island.

Inaccessible Island, and the waters to 12 nautical miles (22.2 km) from shore, were declared a Nature Reserve on 27 February 1997 in terms of the Tristan da Cunha Conservation Ordinance (1976, as amended 1997; Appendix 2). This status confers considerable protection upon the island and its biota. The aim of this management plan is to formalise further the protocols for managing human activities at Inaccessible Island.

Dingwall (1995) highlighted the need for management plans for Subantarctic and adjacent cool temperate islands. The decision to produce a management plan for Inaccessible Island resulted from informal discussions in the late 1990s between the Administrator of Tristan da Cunha, Brian Baldwin, the Chief Islander and Head of the Natural Resources Department at Tristan, James Glass, and Peter Ryan, conservation biologist from the University of Cape Town and Honorary Tristan Conservation Officer. This is the second management plan for an island in the Tristan-Gough group, with one for Gough Island having been adopted in 1993 (Cooper & Ryan 1994). The management plan for the Inaccessible Island Nature Reserve is simi-

lar to that for the Gough Island Wildlife Reserve (renamed a Nature Reserve in 1997), but there is one key difference. Since the publication of the Gough Island Management Plan, Tristan has established a Natural Resources Department, providing the appropriate personnel and infrastructure (including a fisheries patrol vessel) to implement the plan. Tristan also now has an internet connection, which greatly enhances outside communication with the management agency on the island.

Funding for the production of this management plan was provided by the World Wide Fund for Nature, United Kingdom. An essential part of the preparation of the management plan was a three-month research expedition to Inaccessible Island by Peter Ryan and Coleen Moloney from November 1999 to February 2000. This built on information obtained during a six-month expedition to the island ten years previously (October 1989–March 1990). Support for the 1999/2000 field season was received from WWF-UK and the National Geographic Society. The visit formed part of Peter Ryan's sabbatical leave from the University of Cape Town.

We reviewed the scientific and historical literature relating to Inaccessible Island, and a bibliography is appended (Appendix 1). The management plan consists of two main sections: a description and resource inventory, and management policies with guidelines for management. The first draft of the management plan was submitted for comment in March 2000. The final version was accepted by the Tristan da Cunha Government on 28 February 2001.



Plate 1. Inaccessible Island from the west.

Description and resource inventory

3.1 National and conservation status

Inaccessible Island (37°18'S, 12°41'W) is a cool-temperate island of volcanic origin in the central South Atlantic Ocean, midway between the southern tip of Africa and South America (Figure 1). It is one of three main islands in the Tristan da Cunha archipelago. Nightingale Island, with its adjacent islets Middle (or Alex) and Stoltenhoff, lies 20 km to the southeast, and the main island of Tristan lies 40 km to the northeast. Gough Island, 400 km south-southeast of the Tristan group, is the nearest other land, and shares many animals and plants with the Tristan archipelago.

Inaccessible Island, together with Tristan, Gough and Nightingale islands, plus offshore islets and rocks, form the United Kingdom Overseas Territory of Tristan da Cunha. It is administered by an Administrator (appointed by the UK Government on a three-year basis) and elected Island Council. Tristan, together with St Helena and Ascension islands, constitute St Helena and Dependencies. With a permanent population of some 300 people, Tristan is considered too small to become independent. The island has achieved economic self-sufficiency, and its status as a UK Overseas Territory is unlikely to change (Royle 1995).

Inaccessible Island, its islets and waters out to 12 nautical miles, were declared a Nature Reserve in 1997 under the Tristan da Cunha Conservation (Amendment) Ordinance, 1997 (Appendix 2b). All native animals and plants are protected. The importation of alien animals and plants is prohibited, as is any agricultural or horticultural activity. Construction of any infrastructure (huts, aeriels, etc.) requires a permit.

Waters within 200 nautical miles (370 km) of the islands are protected by the Tristan da Cunha Fishery Limits Ordinance of 1983 (as amended 1991, 1992 & 1997; Appendix 3). This area was declared a whale sanctuary in March 2001. Fishing rights within 50 nautical miles of the coastline currently are restricted to a single concession holder, subject to quota controls, a size limit and a closed season for the main target species, the Tristan Rock Lobster *Jasus tristani* (section 3.11.1). Restrictions also have been placed on the catching of fin fish. The presence of a fisheries patrol vessel based at Tristan and the initiation of observer programmes aboard licensed vessels have gone a long way to controlling fishing practices. However, illegal, unreported and unregulated (IUU) fishing activities are known to persist within the 200-nautical-mile zone (Roscoe 1979, Ryan & Cooper 1991; section 3.11.1).

3.2 General description and access

Inaccessible Island is rhomboidal in shape, approximately 5.7 km east–west and 4.6 km north–south, with an area of some 14 km² (Figure 2). It is intermediate in size between Tristan (96 km²) and Nightingale (4 km², including the offshore islets). Inaccessible is characterised by steep cliffs around the entire coastline (Plate 1), and an undulating plateau that rises from some 100 m at the eastern end (Harold's Plain) to over 500 m at the western end. Swale's Fell, the highest point, was esti-

mated to be 511 m (Siddall 1985), but may be almost 600 m. There has been substantial slumping along the plateau edge on the northwestern side of the island (Dunne 1941, Plate 2).

The island's plateau is dissected by several watercourses that terminate in spectacular waterfalls down the coastal cliffs. The largest catchment, draining more than a quarter of the island, reaches the coast at the Waterfall, at the eastern end of the northeast coast (Plate 3). The only area of level land at sea level is between Blenden Hall and West Point (Plate 4). Narrow raised platforms occur beneath the cliffs along the northeast coast north of the Waterfall and Salt Beach (Plate 5). Boulder beaches are found along much of the shoreline. There are several wave-washed offshore rocks within 500 m of the main island and one vegetated stack, Cave Rock (Plate 6).

Access is by sea; there are no wharves or jetties for ships, but mooring buoys for Tristan's fishery patrol vessel, *Wave Dancer*, have been established off the Waterfall and Blenden Hall (Figure 2). Safe anchorages generally occur off the eastern, leeward coast of the island.

Landing on the island is by permit only, issued by the Administrator. Under westerly wind and swell conditions, landing from small inflatable boats or dinghies can often take place at the Waterfall or Salt Beach on the northeast coast. However, there is no easy access to the plateau from these sites. The other main landing beach is at Blenden Hall, near the west point of the island (Plate 7). This beach is less protected, and requires relatively calm seas and winds from the south or east. The two main routes to the plateau, the East and West Roads, ascend the cliff behind Blenden Hall.

Two rock lobster vessels, currently the *Kelso* and *Edinburgh*, fish around the island for several months throughout the year. Each ship has a small fleet of 4–6 fishing boats that sets traps close inshore. They are not permitted to land, but fishing boats have been wrecked ashore. There is no landing strip for fixed-wing aircraft. Helicopter landings have been made at Blenden Hall and on the plateau edge at the top of the West Road.

Tristan can only be reached by sea. The Royal Mail Ship *St Helena* visits Tristan once a year (January), and a South African research and supply vessel, the *SA Agulhas*, operated by the Department of Environmental Affairs & Tourism as part of the South African National Antarctic Programme, visits Tristan each spring (September–November) en route to Gough Island. The two fishing vessels also offer berths to visitors, and an increasing number of cruise ships now call at Tristan.

3.3 History

3.3.1 Discovery and naming

The Tristan islands were first sighted by the Portuguese Admiral Tristão d'Acunha in May 1506. He was on the sailing route from Europe to the East, which crossed the North Atlantic to the Brazilian coast, then used the prevailing westerly winds between 35–40°S to cross the South Atlantic. The Dutch probably were the first to explore the possibility of using the

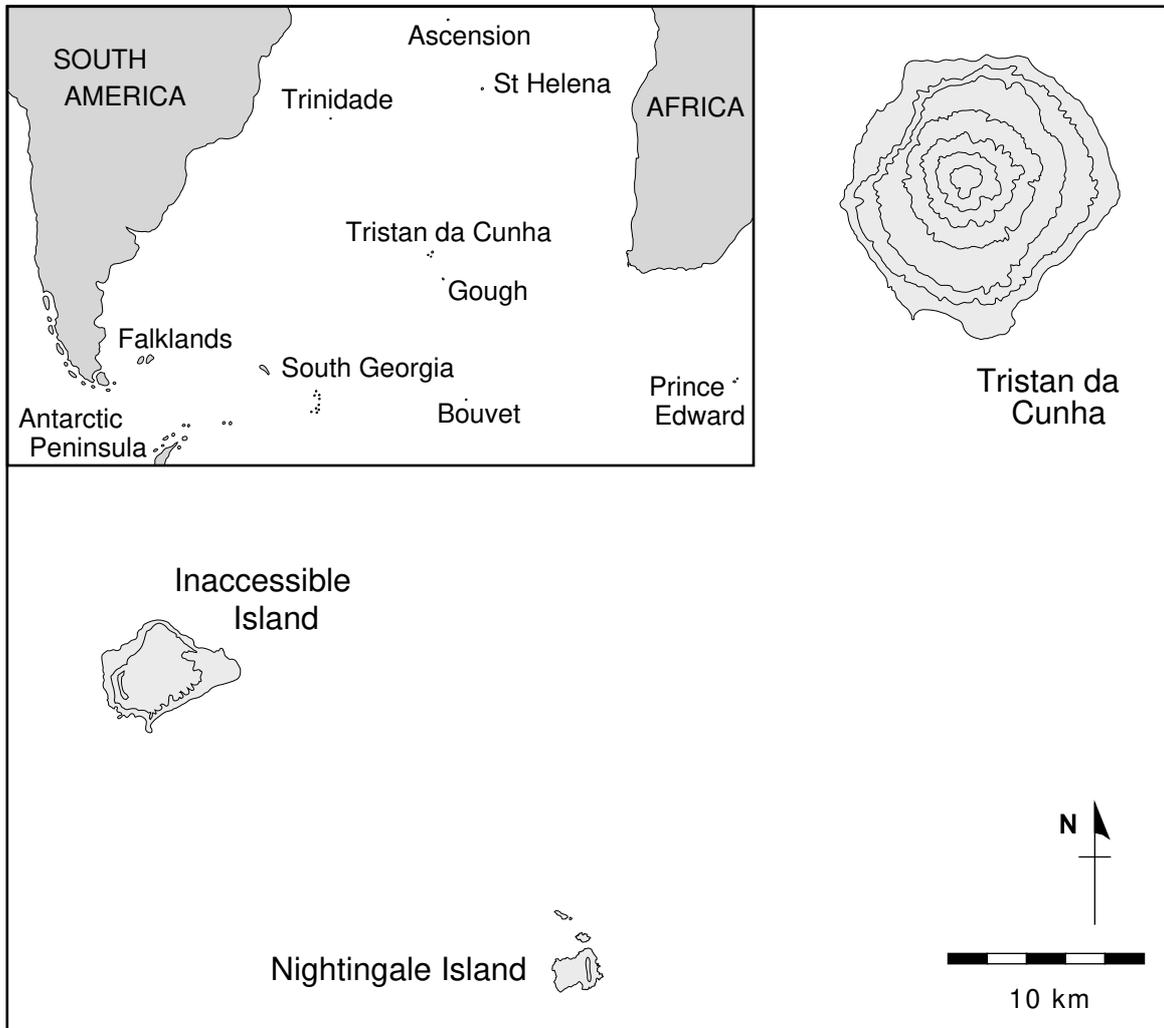


Figure 1. The position of Tristan da Cunha in the South Atlantic Ocean, and Inaccessible Island in the Tristan group. Contour interval approximately 300 m.

islands as a source of fresh water and food, with the *Heemstede* spending eight days at Tristan in 1643. This success stimulated the Dutch East India Company to mount an expedition to explore the islands.

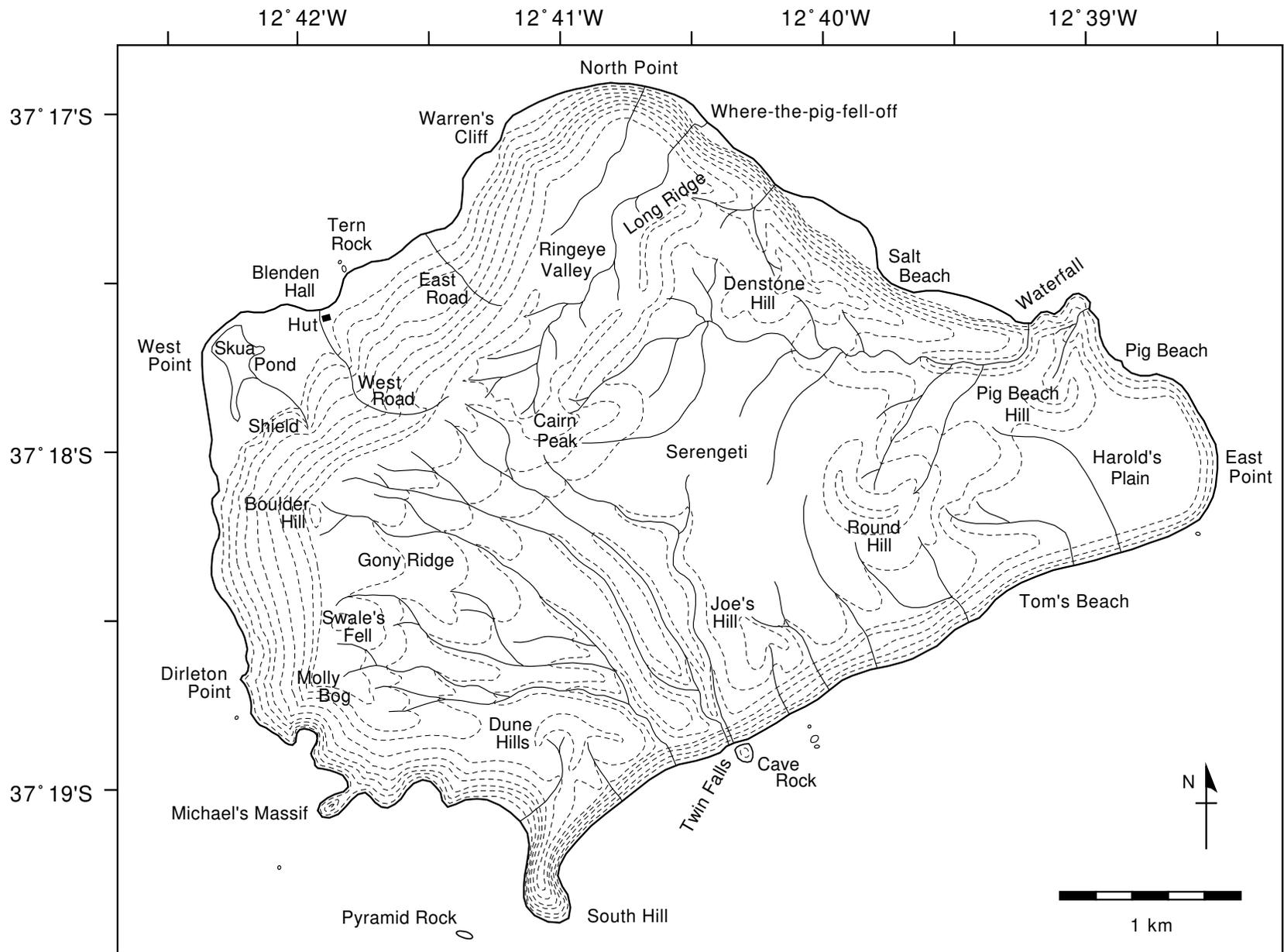
The *'t Nachtglas* sailed from the Cape on 22 November 1665, and sighted Inaccessible Island, which they named *Nachtglas Island*, on 4 January 1666 (Brander 1940). The following three days were spent ashore at the east shore of the island, where seals were killed and 'dry sticks' collected, before moving on to Tristan. Finding no safe anchorage at either of these islands, nor at Gebrooken Island (= Nightingale), the *'t Nachtglas* returned to the Cape. Subsequent visits by Dutch vessels in 1669 and 1696 did little to change matters, although the first landing at Nightingale Island took place in 1696.

In the mid-18th century the British and French took an interest in the islands. Nightingale Island was renamed in 1760 by the British Captain Gamaliel Nightingale, and Inaccessible (L'île Inaccessible) in 1767 by Captain d'Etchevery from the French corvette *Etoile du Matin*. The name Inaccessible apparently alludes to the near-vertical cliffs that restrict access to the island's interior rather than to the difficulty of landing. In fact, d'Etchevery landed at all three Tristan islands. These names remain in use, despite Jonathon Lambert's proclamation in 1811 that the Tristan islands were to be renamed the Islands of Refreshment, with Inaccessible called Printard Island, and Nightingale called Lovel Island.

3.3.2 The colonisation of Tristan

Despite plans in the late 18th century to colonise Tristan, or use it as a penal colony, it was the advent of commercial sealing that finally resulted in more than fleeting visits by passing vessels (Wace 1969). American sealers from the *Industry* collected 5600 fur seal skins in seven months at Tristan in 1790, and probably visited the other islands, including Inaccessible. In addition to killing seals, these early visitors collected fresh water and food (birds, eggs, fish and plants such as the wild celery *Apium australe*), and introduced a number of organisms, including pigs, goats and potatoes. Goats were already on Tristan in 1790 and when Aubert Dupetit Thouars visited Tristan in 1793 he found lettuce and turnips in abandoned gardens (Brander 1940).

During the 20 years from 1790, sealing gangs were based at the islands for varying periods. Finally, in December 1810, Jonathan Lambert from Salem, Massachusetts, and two companions settled on Tristan. Within a year they were growing a wide variety of vegetables in some five hectares under cultivation (Wace & Holdgate 1976). Lambert drowned in 1813, but one of his companions, Thomas Currie, remained at Tristan until after the islands were annexed by Britain in 1816. Currie died shortly thereafter, but when the British garrison withdrew in November 1817, William Glass, his wife and two children, and two colleagues were given permission to remain at Tristan.



Description and resource inventory

Figure 2. Inaccessible Island (modified from Siddall 1985). Contour interval approximately 50 m.



Plate 2. Slumping along the northwest scarp of Inaccessible, from the top of the West Road.

Tristan has been inhabited ever since, apart from a brief period from 1961–1963 when a volcanic eruption next to the settlement caused the residents to flee to Britain. The population has remained at close to 300 people for the last 20 years.

3.3.3 Shipwrecks, sealing and farming

Little is recorded about activities at Inaccessible Island during the early days of the colony at Tristan, but the island achieved notoriety with the wreck of the *Blenden Hall* in July 1821. The East Indiaman was carrying families of British officers serving in India. All but two crew members made it ashore safely, but the survivors were marooned on Inaccessible Island for four months before a makeshift boat reached Tristan. Conditions were bleak and food scarce, especially during the winter months when few birds or seals occur at the island (Plate 8). The crew did not all support the stranded women and children's plight, causing a scandal at the time (Greig 1847, Lockhart 1930). Two other vessels were wrecked at Inaccessible Island in the 19th century: the *Shakespeare* in 1883 and the *Helen S. Lea* in 1897 (Crawford 1941), but fortunately no rats or mice found their way ashore.

Sealing by both the new colonists and visiting sealing ships continued at least sporadically at Inaccessible during the early 19th century. This led to some conflict, with the islanders accusing visiting sealers of killing more seals than they could use 'to prevent our taking them' (letter by William Glass in Gane 1932). Sealers also stole and burnt material salvaged from the *Blenden Hall* by the islanders and stored on Inaccessible. Skins of Subantarctic Fur Seals *Arctocephalus tropicalis* were the initial target for sealers, with Southern Elephant Seals *Mirounga leonina* killed for their oil.

From 1830–1870 the community on Tristan thrived, with large numbers of vessels, especially whalers, calling to trade flour and other commodities for fresh produce (Wace & Holdgate 1976, Munch 1979). The Tristan islanders visited Inaccessible Island annually at least during the 1850s and 1860s (Green 1960), primarily for seals, but also to collect driftwood and to hunt goats and pigs, which had been introduced in the 1820s (section 3.8.4).

The best-documented sealing visit to Inaccessible Island was that of the German Stoltenhoff brothers, who spent almost two

years on the island from November 1871 (Richards 1873, Stoltenhoff 1895, Rosenthal 1952). By then seal numbers were greatly reduced, and the enterprise failed. The Stoltenhoffs were eventually relieved from the island by the *Challenger Expedition* in October 1873, but they made many useful observations (section 3.3.5).

From the 1870s, the numbers of ships visiting Tristan dwindled, greatly reducing the market for Tristan produce (Wace & Holdgate 1976). Regular visits by Tristan islanders to Inaccessible Island continued into the 1890s, but by then the goats had been hunted out and seals had virtually disappeared (Bosanquet 1876, Marsten 1897). For example, only one seal was killed in 1893 (Gamble 1897).

Tristan gradually switched from a farming and trading community to one of subsistence crofters. Stocking levels on Tristan increased, leading to overgrazing and occasional severe mortality. Barrow (1910) reported that, of a total of 700 cattle, 400 died in winter 1906. The situation was exacerbated by the introduction of rats *Rattus rattus* from the wreck of the *Henry B. Paul* in 1882. The rats caused havoc with crops on the island. As a result, the Tristan islanders started to consider the grazing potential of the other islands. Sheep were introduced to Inaccessible prior to 1904 (Pearce 1904), and bullocks were taken across to be fattened at Salt Beach (Rogers 1927).

Following the loss of a lifeboat with 15 men in 1885, Tristan's population fell by almost half to only 50 people. There was concern for the well-being of the residents, and vessels were sent from the Cape to assess the situation. Polls were taken among the residents to determine whether they wanted to be removed from the island. In the end, they remained at Tristan, but the viability of other commercial resources was explored. H.M.S. *Odin* collected guano samples from both Inaccessible and Nightingale islands in 1904, and suggested that guano could be a useful source of income for the island (Pearce 1904). Prior to this the islanders had collected guano from Nightingale at the request of a trading vessel, but the vessel was wrecked and so failed to return to collect the load (Watt-Jones & Cobb 1903). Other commercial ventures, such as fish curing and farming, failed because of the lack of a harbour and the long distance to markets.

By the 1920s, Tristan islanders were making three to four visits to Inaccessible Island each year to collect birds, eggs and



Plate 3. The Waterfall at the east end of the island, where the coastal cliffs are lowest. This is the largest river on the island, and has carved a series of deep valleys with two large waterfalls before reaching the coastal cliffs. The old settlement and pine trees are visible at the base of the cliff to the right of the Waterfall.



Plate 4. The coastal lowland at West Point viewed from the top of the West Road. Blenden Hall Bay and the old hut is on the right, with Skua Pond and Wilkins' Copse in the centre.



Plate 5. Salt Beach, flanked by coastal slumps, viewed from the scarp above the Waterfall, looking towards North Point.

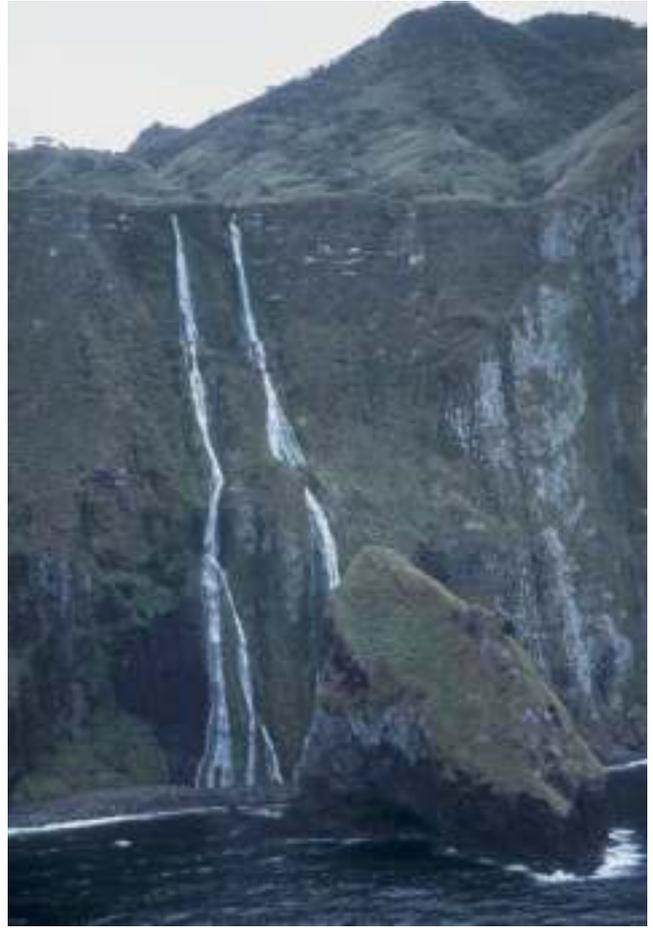


Plate 6. Cave Rock, near the Twin Falls on the southeast coast, is the only vegetated stack.



Plate 7. The landing beach at Blenden Hall on a calm day, looking east to Warren's Cliff.

driftwood, and to harvest sheep and cattle placed on the island (Rogers 1927). This activity culminated in the formation of a 'settlement' at the Waterfall in 1936, spurred on by the island's missionary at that time, Rev. Harold Wilde. A group of 14 young islanders spent six months at Inaccessible, building a hut (Plate 9) and store, and planting crops such as potatoes (Anon. 1937a, Christophersen 1940). Although initial reports were optimistic (Anon. 1937a,b), crop yields were poor and the venture foundered within two years (Mackay 1963). By 1940 the islanders had switched most of their attention to Nightingale Island as a source of birds and eggs (Wace & Holdgate 1976), and visits to Inaccessible became less and less frequent.

Links with the outside world increased in the 1940s. A small naval garrison was stationed at Tristan from 1942, and an expatriate Administrator was appointed in 1949, a year that also saw the start of commercial fishing for rock lobster. Since the 1940s the islanders have made only occasional visits to Inaccessible Island to collect apples, driftwood and other stranded debris, and guano, although some birds and eggs also were taken. The last pigs, sheep and cattle were removed from the island in the 1950s (section 3.8.4). From the 1980s the island has been visited primarily during research visits (Appendix 4) or to service the Denstone hut at Blenden Hall (Plate 10). Since 1996, the presence of a fishery patrol vessel at Tristan has made it easier to reach Inaccessible, and an annual visit is now made to collect apples.

There have been few ship wrecks at Inaccessible Island this century. A fishing boat from the *Hekla* sank off the island in 1987, drowning one of the crew (Anon. 1987a). Another fishing boat wrecked at Blenden Hall in 1997, with the two crew spending the night ashore before being rescued by a helicopter from the *SA Agulhas*. The yacht, *Halcyon*, was wrecked at Blenden Hall in 1993, after breaking loose from its mooring at Sandy Point, Tristan, and being abandoned. The crew had a pet monkey which was subsequently put down as there were no



Plate 9. The remains of the hut from the 1936 'settlement' of Inaccessible. The interior of the hut is overgrown by introduced *Brassica rapa*, with the introduced pine trees in the background.



*The foraging party,
attacking the Sea Elephant.*

Plate 8. A sketch from Greig's account of the wreck of the Blenden Hall, showing crewmen attacking a rather fanciful elephant seal.

veterinary papers for importing it onto Tristan (Anon. 1993). This incident highlights the potential problems posed by yachts. At least three illegal landings from yachts are known to have occurred at Tristan and Nightingale islands during the 1990s.

3.3.4 Lobster fishery

Following exploratory fishing in 1948, a commercial fishery for Tristan Rock Lobster commenced in 1949 at Inaccessible Island and the other islands in the Tristan group (Roscoe 1979). Fishing initially used hoop nets set by dinghies that were deployed from the fishing vessel *Pequena* (Anon. 1948, Heydorn 1969). Lobster were either canned in the factory built at Tristan in 1950 or frozen aboard ship. The first factory was destroyed by the 1961 eruption, but a new factory was built in 1966.

All fishing is conducted by a single concession holder; initially the Tristan Development Company, then Tristan Investments, a subsidiary of the South Atlantic Islands Development Corporation, from 1963–1996. From 1969, in addition to setting traps from dinghies and motor boats, long lines of traps were deployed from the fishing vessels, allowing fishing in deeper and rougher waters (Roscoe 1979, Pollock 1994). Catch per unit effort (CPUE) indices started to fall in the 1970s, resulting in a minimum size limit (70 mm carapace length) being imposed in 1982–83. A quota system, implemented by annual Total Allowable Catches (TACs) for each island, was introduced in 1991, although these were only adhered to from 1993. Premier Fishing took over the concession in 1997, and



Plate 10. The Denstone Expedition and the newly constructed hut at Blenden Hall in 1982 (courtesy Denstone Expeditions Trust).

after restructuring of Premier it is now run by Ovenstones. Current fishing practices at Inaccessible Island are described in section 3.11.1.

Although the concession holder is no longer allowed to land at Inaccessible and the other uninhabited islands, Tristan Investments used buildings at the Waterfall for storing lobster packing boxes in the 1960s and also frequently landed to resupply their vessels with fresh water (Wace & Holdgate 1976). Use of these facilities ceased in the mid-1970s, when islanders went across and dismantled the storage hut. However, some debris from this period remains, including corrugated-iron roof sheets and plastic water piping. In the past, Rockhopper Penguins *Eudyptes chrysocome*, albatrosses and sharks were caught for use as bait (Wace & Holdgate 1976, Roscoe 1979), as were locally caught fin fish. Clubs were found ashore at Salt Beach, indicating that penguins were collected from colonies at Inaccessible (Richardson 1984). Currently all bait used at Inaccessible Island has to be imported (section 3.11.1). Illegal fishing by foreign ships when licensed ships are absent remains a problem (Anon. 1987b, Cooper et al. 1995).

3.3.5 Research activities

Appendix 4 lists the 30 visits to Inaccessible Island from which scientific records have been published. Many of these visits have been brief (most less than one day), and most visits were restricted to the coast (Ryan et al. 1994). As a result the island's natural history remains little studied. There has been no systematic research sponsored by a single agency (e.g. a national research agency; section 3.11.2).

The first observations of note were made by the Stoltenhoff brothers, who related their findings to the *Challenger* Expedition (Richards 1873, Stoltenhoff 1895). Despite spending only one day at Inaccessible (Moseley 1879), the *Challenger* collected a large amount of material, and remains the main source of information for some taxa (e.g. some benthic marine organisms). The brief visit of the *Quest* Expedition in 1922 made further discoveries, but the first intensive investigation was by the Norwegian Scientific Expedition in 1937–1938. The natural scientists on the Expedition spent more than two weeks

based at Blenden Hall in February–March 1938 (Christopher 1947). Much basic knowledge of the island's fauna and flora dates to this survey. It also provided the first investigation of the island's geology (Dunne 1941).

During the next 45 years, research visits were either brief (e.g. Royal Society Expedition, Conservation Survey) or conducted on an *ad hoc* basis by expatriates based at Tristan. This pattern changed in 1982–83, when the Denstone Expedition visited the island. This expedition, led by Michael Swales, a teacher at Denstone College and a member of the 1955–56 Gough Island Scientific Survey, resulted in the first ground-based survey of the island (Siddall 1985). Many of the place-names from the interior of the island date from this survey. The Denstone Expedition also made significant contributions to the knowledge of the island's birds (Fraser et al. 1988, 1992, 1994) and freshwater diatoms and palaeoecology (Preece et al. 1986).

The hut constructed by the Denstone Expedition at Blenden Hall (Plate 10) was taken over by the Tristan Government as a refuge and a base for further scientific research (Anon. 1985). This facilitated visits by a variety of South African-based researchers, resulting in a better understanding of the island's birds (especially land birds) and vegetation (Appendix 4). Automated weather stations were deployed by the South African Weather Bureau on the edge of the plateau at the top of the West Road in 1986 (Anon. 1986) and near the coast at Blenden Hall from 1992 to 1996 (Anon. 1992, 1994).

3.4 Bathymetry and geology

The Tristan da Cunha islands form part of a chain of volcanic seamounts which extends westward from the Walvis Ridge towards the mid-Atlantic Ridge. They rise steeply from the surrounding seabed, which is more than 3000 m deep (Baker et al. 1964). Inaccessible and Nightingale share a common base, but are separated by a channel more than 500 m deep. There is no evidence that the islands have ever been linked, even during glacial maxima when sea levels were up to 100 m lower than at present (Gass 1967). Tristan is separated from the other two islands by a channel more than 2000 m deep (Baker et al. 1964). Inaccessible has the largest coastal shelf, with the area

less than 100 fathoms (183 m) estimated to be 124 km², compared with 71 km² for Tristan and 38 km² for Nightingale and adjacent islets (Roscoe 1979).

Inaccessible Island is a shield volcano, comprising thin basaltic flows interspersed by layers of ash, cinders and scoria (Dunne 1941, Baker et al. 1964). These flows slope down towards the east, at roughly the same angle (5°) as the current plateau. They are overlain in places (e.g. Harold's Plain) by more gently sloping, thicker layers of trachybasalts. Subsequent volcanic activity has resulted in intrusive trachyte dykes, domes and plugs. These lavas cooled more slowly and tend to be more erosion resistant than the basalt and pyroclastic layers. The plugs and domes are exposed on the western side of the island as South Hill, Pyramid Rock, Michael's Massif (Plate 11) and the Shield, a large dome behind Skua Pond. Finally, there has been more recent volcanic activity resulting in four parasitic cinder cones on the plateau: Round Hill, Joe's Hill, Denstone Hill and Pig Beach Hill. Of these, Round Hill is the best preserved, still retaining the classic cone shape, only breached to the east.

Inaccessible lies at the eastern end of a 150-m deep submarine plateau, that extends some 10 km west of the island (Ollier 1984). This, together with the structure described above, suggests that the island is the remnant of a large volcano, similar to Tristan, that had its main centre to the west of the current island (Baker et al. 1964, Gass 1967, but Ollier 1984 inferred a more complex structure). Gass (1967) estimated the original island was some 16 km across and over 2200 m high. More than 90% of the original island has since been removed by marine erosion, predominantly from the west (the direction of the prevailing winds and seas). The slumping along the northwestern edge of the plateau is direct evidence of this marine erosion (Plate 2). The submarine plateau surrounding the current island is in part built from the more than 100 km³ of eroded material.

The oldest rocks from Inaccessible, collected from the lowest lavas in the main flows behind Salt Beach, date to 2.9 (± 0.3) million years (Gass 1967). Other lavas at the same site date to 1.43 million years, suggesting that the main island building phase occurred 2–3 million years ago, with subsequent activity resulting in the intrusive trachytes and more recent parasitic cones (Ollier 1984). This places Inaccessible as intermediate in age between Nightingale (at least 18 million years old; Gass 1967) and Tristan (200 000 years old; McDougall & Ollier 1982). However, all three islands have had eruptions within the last 400 000 years (Gass 1967, Ollier 1984).

The soils at Inaccessible Island have not been studied. Informal observations suggest that the soils are poorly developed, with a deep layer of peat covering much of the island. Mineral soils are coarse and are largely restricted to beneath the coastal cliffs, where frequent slumping and good drainage slows the formation of peat.

3.5 Oceanography

Sea-surface temperatures at Tristan are 15–19°C in summer and 13–15°C in winter (Andrew et al. 1995). Monthly average temperatures are lowest in August and highest in March. This seasonal variation, coupled with analysis of surface fronts using satellite imagery, has been interpreted as resulting from the movement of the Subtropical Convergence (STC) north and south of the Tristan islands. However, salinity of surface water samples collected at Tristan during 1988–1990 are almost all typical of Subtropical rather than Subantarctic waters, suggesting that the island generally lies to the north of the STC (Andrew et al. 1995).

The seasonal variation in sea-surface temperature appears to result primarily from heating of surface waters in spring and summer, resulting in a marked thermocline at a depth of around

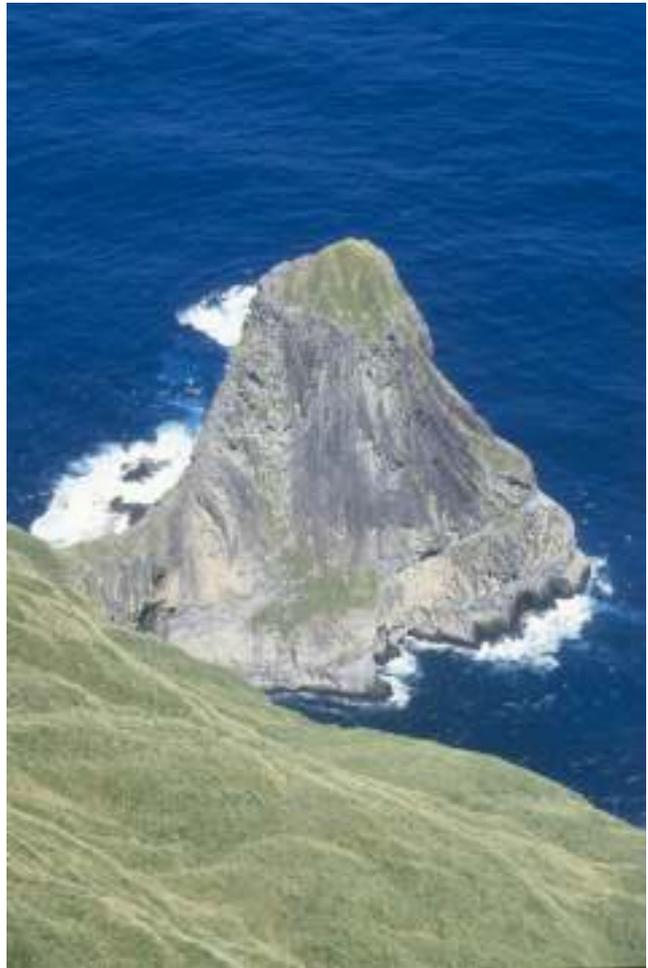


Plate 11. Michael's Massif, one of the exposed trachyte plugs on the southwest coast of Inaccessible.

50 m (Andrew et al. 1995). Subsequent cooling occurs when storms break down the thermocline, resulting in vertical mixing of the water column. The formation of a warm surface layer in summer probably enhances primary production, especially at and south of the STC, because it provides a stable environment for phytoplankton growth in the nutrient-rich Subantarctic waters (Allanson et al. 1981).

Ocean currents are from the west, associated with the prevailing winds, and average 0.5 knots (Baker et al. 1964). The islands experience semi-diurnal tides with a small amplitude: 0.5–0.8 m during spring tides, and 0.2–0.4 m at neap tides.

3.6 Climate

At 37°S, Inaccessible Island lies on the northern edge of the westerly wind belt known as the 'roaring forties', and has a cool-temperate, oceanic climate. There have been few weather observations at Inaccessible Island (Roux et al. 1992). The automatic weather station erected on the plateau in 1986 blew down within days, and data from the station deployed at Blenden Hall from 1992–1995 were only used for real-time forecasting and were not archived (J.R. van der Merwe, South African Weather Bureau, in litt.). The climate is similar to that at Tristan (Höflich 1984).

At Tristan, mean annual air temperature near sea-level is 14.5°C, with relatively little seasonal or diurnal variation (Wace 1990, Figure 3). Extreme air temperatures near sea-level are 3–24°C, with monthly means of daily minima and maxima 9.3 and 13.7°C in midwinter (August), and 15.9 and 20.6°C in midsum-

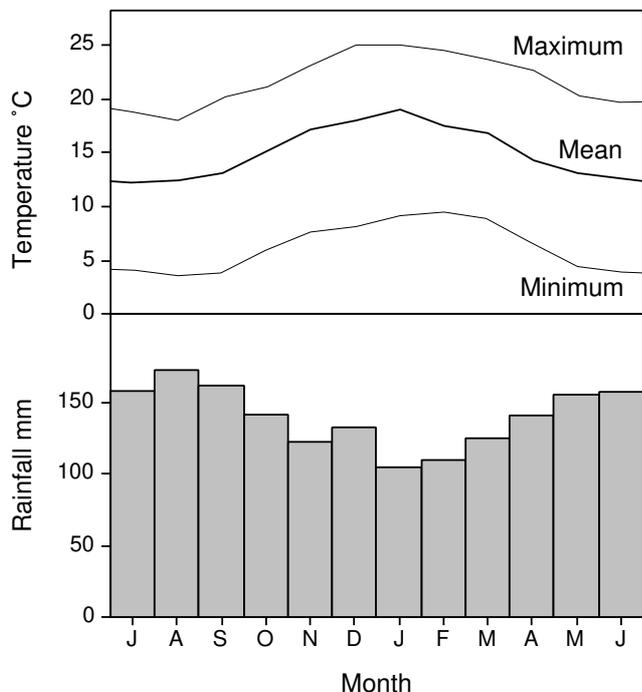


Figure 3. Mean monthly air temperatures and rainfall near sea-level at Tristan (from Höflich 1984).

mer (February). The mean daily temperature range is 4–5°C, and mean relative humidity is 80% (Höflich 1984).

Frontal rain falls throughout the year (Figure 3) linked to the passage of cyclonic depressions. The annual average rainfall near sea-level on the north coast of Tristan is 1671 mm, with little inter-annual variation. Cold fronts are most frequent in winter, resulting in a slight winter peak in precipitation (56%

of the annual average). Mean monthly rainfall in summer (October–March) at Tristan is 121 mm, whereas that in winter (April–September) is 157 mm. Some rain events are very severe, with up to 180 mm falling in one day (Höflich 1984).

Precipitation at higher altitudes is greater than at sea-level; limited records from summer 1989–90 suggest rainfall at the top of the West Road on Inaccessible (500 m) was at least a third higher than that recorded at sea level <1 km away (Roux et al. 1992). This difference results in part from the orographic clouds that form over the island. Typically, the cloud base is 250–500 m, although occasionally it descends virtually to sea-level. Clouds covered the western plateau of Inaccessible on 50% of days in summer 1989–90, and the frequency is likely to be greater in winter.

The prevailing winds are from the west, but veer to the east prior to the passage of a front. Mean wind speed at Tristan is 10 m.s⁻¹, with a tendency for stronger winds in winter; gales blow on 2% of summer days, compared with 10% of winter days (Höflich 1984). Wind strength typically increases with altitude, and can be exceptionally strong on exposed ridges.

The climate at Tristan has remained relatively constant during the last 20 000 years (Preece et al. 1986). The islands were not glaciated during the last glacial period (Hollin & Schilling 1981), and models of oceanographic conditions in the South Atlantic during the last glacial maximum 18 000 years ago suggest that the Subtropical Convergence remained approximately where it lies today (Morley & Hays 1979). Sea-surface temperatures, which play a major role in determining the climate of the islands, were apparently little changed during either the most recent glaciation (CLIMAP 1976) or the last interglacial period (CLIMAP 1984). Further support for a constant climate over the last 10 000 years comes from pollen analyses in peat cores (Hafsten 1960a,b, Preece et al. 1986). There are no data on climate change or the impact that global warming may have on the island and its biota.

TABLE 1. The diversity of terrestrial plants at Inaccessible Island

Numbers in parentheses are numbers recorded from the Tristan group. Adapted from Wace & Dickson 1965, Jorgensen 1977, Groves 1981, Roux et al. 1992, Roux 1993a,b, Appendix 5.

Taxon	Endemic species and subspecies*				Native*	Introduced	Total
	Inaccessible		Tristan–Gough group				
	Species	Subsp.	Species	Varieties			
Flowering plants							
Dicotyledons	0	1	8 (10)	2 (2)	22 (25)	17 (76 ⁺)	39 (101 ⁺)
Monocotyledons	0	0	14 (19)	3 (3)	19 (25)	9 (44)	28 (69)
Gymnosperms	0	0	0		0 (0)	1 (6)	1 (6)
Ferns	1	0	13 (17)	5 (5)	29 (33)	0 (0)	29 (33)
Mosses	3	0	15 (64)		40 (149)	0 (0)	40 (149)
Liverworts	1	0	7 (22)		70 (160)	0 (0)	70 (160)
Lichens	3	0	3 (4)		33 (78)	0 (0)	33 (78)
Total	8	1	60 (136)	10 (10)	213 (470)	27 (126⁺)	240 (596⁺)

* Numbers are inclusive; Inaccessible endemics are also counted as Tristan endemics, and all endemics are counted as native species.

⁺ Minimum estimate; many more introduced species occur on Tristan than are listed by Groves 1981.

Note: freshwater algae have not been studied other than diatoms (section 3.7.4). Fungi, not technically plants, have been little studied; 25 species have been reported from Inaccessible Island, of 91 species recorded from the Tristan group (Wace & Dickson 1965). Their origins and endemicity are not known.



Plate 12. The pepper tree *Peperomia berteriana tristanensis* is endemic to the lower Waterfall River.

3.7 Vegetation

The macro-vegetation of Inaccessible Island has been described by Roux et al. (1992). The vascular plants are fairly well known (Appendix 5), but cryptogams (mosses, liverworts and lichens) are much less well known, with all published accounts relating to the collections by the Norwegian Expedition in 1938 (Wace & Dickson 1965, Jorgensen 1977). More recent collections have been made (e.g. more than 50 lichen samples from the Denstone Expedition, Fraser et al. 1983), but have not been identified. Some groups (e.g. most crustose lichens and algae other than diatoms) have not been worked on at all.

The flora is typical of southern cool-temperate oceanic islands (Moore 1971), with a relatively low species diversity, and a large preponderance of ferns and cryptogams. Even allowing for the limited collecting, cryptogams make up 67% of the 213 native species (Table 1). Eight species are only known from Inaccessible Island, but seven belong to poorly sampled groups (three lichens, three mosses and one liverwort) and the only vascular plant (the fern *Elaphoglossum gracilifolium*) is a cryptic taxon; all may occur at other islands in the Tristan group. However, Inaccessible supports at least 60 of the approximately 136 plant species restricted to the Tristan group (45%, Table 1). Allowing for limited sampling at Inaccessible Island, especially of cryptogams, this number could be considerably greater. Of the better known vascular plants, 35 of 46 (76%) species endemic to Tristan–Gough occur at Inaccessible, as do all 10 endemic varieties (Table 1). One endemic subspecies, the biogeographically intriguing pepper tree *Peperomia berteriana tristanensis* (Valdebenito et al. 1990), is restricted

to the Waterfall River on Inaccessible Island (Plate 12). Endemism is greatest among monocots (primarily grasses Poaceae), ferns and mosses (Table 1), but this may reflect differences in the knowledge of these taxa.

The origins of the flowering plants are primarily southern South American or circumpolar Subantarctic (Wace & Dickson 1965, Groves 1981), although there are some African affinities (e.g. the island tree *Phyllica arborea*, Milton et al. 1993). Ferns and cryptogams also show mostly South American and sub-Antarctic affinities, but share many more species with southern Africa (Wace & Dickson 1965, Jorgensen 1977). Several plant species are restricted to the Tristan group and the cool-temperate islands in the southern Indian Ocean, Isles Amsterdam and St Paul, possibly as a result of dispersal by seabirds (Wace & Dickson 1965).

Analysis of pollen samples in peat cores from Skua Pond and Dick's Bog suggests that there has been little change in the vegetation for at least the last 8000 years (Preece et al. 1986). Pollen from a peat sample dated as more than 40 000 years old also was similar to more recent samples. These results confirm analyses of cores from other islands in the Tristan group (Hafsten 1960a,b). The only evidence of a different past vegetation are samples of unidentified subfossil wood (also >40 000 years old) found in old slips at Warren's Cliff near the North Point of Inaccessible (Preece et al. 1986).

Four vegetation types occur at Inaccessible (Figure 4):

3.7.1 Tussock grassland

Tussock grassland dominates the coastal lowlands and seaward cliffs up to 200–500 m. It also occurs in a few places on the edge of the plateau (e.g. Where-the-pig-fell-off, the valley above the Waterfall and above South Hill). The tussock grass *Spartina arundinacea* is the dominant species, often forming impenetrable, virtually monospecific stands up to 3 m high (Plate 13). On dry, well-drained ridges and in marshy sites the tussocks are less dense, allowing space for other species. Those characteristic of ridges and slopes include the ferns *Blechnum penna-marina*, *B. australe*, *Rumohra adiantiformis*, *Elaphoglossum laurifolium* and *E. succisifolium*, as well as the berry-bush *Empetrum rubrum* and hen berry *Nertera depressa*. Marshy areas support *Amauropelta bergiana*, *Carex insularis*, *Hydrocotyle capitata*, *Rumex frutescens* (pig dock) and *Scirpus sulcatus* in addition to *Spartina*.

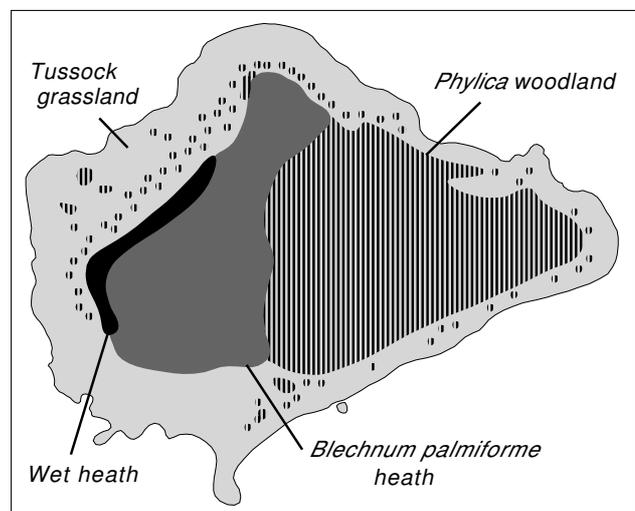


Figure 4. The distribution of vegetation types at Inaccessible Island (adapted from Roux et al. 1992).



Plate 13. Barry Watkins fighting through a dense stand of *Spartina* tussock at Blenden Hall.

On some steep, exposed slopes on the drier western coast, tussock grass *Spartina* is virtually absent, and is replaced by a short, fern-dominated community, *Blechnum penna-marina* heath (Roux et al. 1992). In addition to *B. penna-marina*, common species include *Acaena sarmentosa* (dogcatcher), *Elaphoglossum* spp., *Empetrum rubrum* (berrybush), *Lycopodium diaphanum* (devil's fingers), *Nertera depressa* (hen berry) and

Uncinia brevicaulis. The only tree native to the island, the island tree *Phylica arborea*, occurs singly or in small copses amongst tussock grassland, typically on better-drained sites.

Marine erosion results in fairly frequent landslips, slumps and rockslides along the coast. These disturbed sites are colonised by native species such as *Scirpus bicolor*, *Apium australe* (celery) and *Pelargonium grossularioides* as well as many introduced species, including *Conyza albida*, *Holcus lanatus*, *Plantago major*, *Pseudognaphalium luteo-album* (muckweed), *Rumex obtusifolius* (dock), *Stellaria media*, *Sonchus oleraceus* (sow thistle), *Veronica serpyllifolia* and *Vulpia bromoides*. The daisy *Cotula moseleyi*, previously thought restricted to Nightingale Island, was found at two sites in tussock grassland associated with seabird colonies.

3.7.2 Fern bush

Fern bush occupies most of the plateau of Inaccessible Island, with two forms segregated altitudinally. The lower-lying, eastern plateau is characterised by *Phylica arborea* bush (Plate 14), whereas the higher, western plateau supports *Blechnum palmiforme* heath (Plate 15).

The island tree *Phylica arborea* is a fine-leaved, evergreen tree that can attain heights of up to 8 m in sheltered situations, but is more typically semi-procumbent, with a 3–5 m canopy. The branches support dense growths of epiphytic lichens, mosses and some ferns, particularly at altitudes where orographic cloud is frequent. Where canopy cover is dense there is little understorey, but in more open woodland there is a dense understorey dominated by ferns such as *Ctenitis aquilina*, *Histiopteris incisa* (bracken), *Blechnum palmiforme*, *Elaphoglossum laurifolium* and *Asplenium obtusatum*. Three *Nertera* species and a variety of sedges, grasses and mosses also grow under the canopy in places. Clearings support these species, plus *Acaena sarmentosa* and *Empetrum rubrum*.

The bogfern *Blechnum palmiforme* is the other species characteristic of fern bush. It has a trunk-like stem up to 0.3 m in diameter, and although it can grow up to 2 m in sheltered spots, it is typically 0.5–1 m tall, with an apical array of stiff, cycad-like fronds. It occurs commonly in *Phylica arborea* bush, but



Plate 14. Closed-canopy *Phylica* woodland on the eastern plateau of Inaccessible provides a sheltered micro-climate for fungi and other understorey organisms.



Plate 15. Bogfern heath on the western plateau is a largely uniform stand of bogferns *Blechnum palmiforme*, interspersed with procumbent *Phylica arborea*.

is the dominant plant over much of the central and western plateau, forming a community called *Blechnum palmiforme* heath (Roux et al. 1992). Strong winds in this area reduce *Phylica* to a procumbent mat <0.5 m high (Plate 15). These wind-cropped *Phylica* plants seldom flower.

Within *Blechnum palmiforme* heath, bogferns tend to be evenly spaced, with their canopies touching or overlapping. *Acaena sarmentosa* often forms dense mats between the bogferns, with a variety of ferns and angiosperms growing on the bogfern stems and in the gaps between stems. Common species include *Elaphoglossum* spp., *Hymenophyllum* spp. (filmy ferns), *Eriosorus cheilanthoides*, *Grammitis magellanica*, *Vittaria vittarioides*, *Lycopodium diaphanum*, *Apium australe* (celery), *Nertera depressa*, ridge grass *Calamagrostis des-champsii* and the sedges *Carex thouarsii*, *Scirpus bicolor* and *Uncinia meridensis*. The endemic *Elaphoglossum gracili-folium* is locally common in this vegetation type.

3.7.3 Wet heath

Wet heath is a diverse community, containing species found in virtually all other vegetation types. It is fairly short (<0.5 m high), and at Inaccessible Island is restricted to the high, western edge of the plateau (Plate 16). The dominant species are dogcatcher *Acaena sarmentosa*, sedges (*Carex* spp., *Scirpus* spp. and *Uncinia* spp.) and grasses (*Agrostis* spp. and *Des-champsia* spp.). Other common vascular plants include *Apium australe*, *Blechnum palmiforme*, *B. penna-marina*, *Ctenitis aquilina*, *Elaphoglossum* spp., *Empetrum rubrum*, *Gnaphalium thouarsii* (cow pudding grass), *Hydrocotyle capitata* and *Nertera assurgens*. *Cardamine glacialis* and *Ranunculus caroli* are scarce, but are only found in this vegetation type.

Wet heath is the vegetation type that probably was most affected by grazing by introduced herbivores (principally sheep, section 3.8). It supports the second-largest array of introduced plant species after tussock grassland, and large areas are infested with the introduced grass *Holcus lanatus*. Other, more transient alien species include *Poa annua*, *Rumex obtusifolius* (dock) and *Cerastium fontanum*.

3.7.4 Bogs and stream courses

Two bog communities occur at Inaccessible: *Scirpus sulcatus* and *Sphagnum* bogs (Roux et al. 1992). *Sphagnum* bogs are restricted to the plateau, where they occur in hollows with impeded drainage. Most are entirely dominated by the moss *Sphagnum* cf. *recurvum*, with few other species except around the edges. Typical species associated with these bogs include *Carex insularis*, *C. thouarsii* and *Scirpus sulcatus*. Dick's Bog, a typical *Sphagnum* bog, is described in detail by Preece et al. (1986).

Scirpus sulcatus bogs occur both on the plateau (e.g. Molly Bog) and on the coastal lowland between West Point and Blenden Hall. Skua Pond, near West Point, is by far the largest example (see Preece et al. 1986 for a description). Most endemic Spectacled Petrels *Procellaria conspicillata* breed in association with *Scirpus* bogs on the western plateau (Plate 17). The birds are responsible for forming and maintaining these bogs (Ryan & Moloney 2000). *Scirpus* bogs are characterised by a floating mat of *Scirpus sulcatus*. Other species include *Callitriche christensenii*, *Carex insularis*, pig dock *Rumex frutescens* and *Azolla filiculoides* (coastal bogs only). Many bogs are invaded by the introduced grass *Holcus lanatus*.

Stream banks lack a distinct community, but three endemic grasses are virtually restricted to this habitat on the plateau: *Agrostis magellanica laeviuscula*, *Glyceria insularis* and *Polypogon mollis*. Introduced plants disperse along streams, with floods creating openings for them to become established. Dock *Rumex obtusifolius* is the most widespread alien, but the grass *Holcus lanatus* is a more serious problem as it appears to be able to exclude native vegetation, forming dense stands along entire stretches of stream bank. The grass *Aira caryophyllea* also is common on boulders.

Very little is known about the freshwater algal communities at any of the Tristan islands (Wace & Holdgate 1965). Filamentous algae occur in many streams and pools, but have not been studied. The diatom floras of Dick's Bog, a *Sphagnum* bog on the plateau (13 species), and Skua Pond (68 species), are described by Preece et al. (1986). All but one species found in



Plate 16. Wet heath vegetation, forming a narrow band along the western scarp at the top of the West Road. The pale patch on the right is a single species stand of the introduced grass *Holcus lanatus*.

Dick's Bog also occurred in Skua Pond. Diatoms from lower sediments at Skua Pond were typical of brackish water, but more recent sediments are dominated by freshwater forms, reflecting a reduction in marine influence in the bog since it first formed. Most diatom species recorded have widespread ranges, but three species were previously only known from the main island of Tristan (Carter 1966), and one was only known from an island in the New Hebrides (Preece et al. 1986)!

3.7.5 Introduced plants

Introduced or 'alien' plants are those species whose arrival at the islands results from human activities. In most cases, this is fairly easy to assess, but there are exceptions. For example, Groves (1981) considered that the localised creeper *Calystegia tuguriorum* probably was native, but this was questioned by Roux et al. (1992). Some 27 introduced plant species occur at



Plate 17. A *Scirpus sulcatus* bog (foreground) forms down-slope from a line of Spectacled Petrel ('Ringeye') burrows in bogfern heath on the western plateau, with an Atlantic Yellow-nosed Mollymawk chick on the right.

TABLE 2. The diversity of terrestrial and freshwater animals at Inaccessible Island

Numbers in parentheses are numbers recorded from the Tristan group. Adapted from von Keler 1951, 1960, Holdgate 1965, Preece et al. 1986, Fraser et al. 1988, Ryan et al. 1990, Kensley 1994, Bartsch 1995 and unpubl. data.

Taxon	Endemic species*		Native*	Introduced and ?introduced	Total
	Inaccessible	Tristan–Gough group			
Mammals (breeding ashore)	0	0	2 ¹ (2)	0 (2)	2 (4)
Birds (breeding)					
Land birds	1 ²	4 (6)	4 (6)	0 (0)	4 (6)
Seabirds	1	5 (5) ³	20 (22)	0 (0)	20 (22)
Insects					
Beetles (Coleoptera)	7	12 (22)	13 (23)	4 (20)	17 (43)
Flies (Diptera)	2	8 (17)	11 (28)	4 (17)	15 (45)
Moths (Lepidoptera)	0	3 (7)	4 (12)	2 (10)	6 (22)
Bugs (Hemiptera)	0	1 (1)	2 (2)	4 (13)	6 (15)
Thrips (Thysanoptera)	1	1 (1)	1 (1)	1 (1)	2 (2)
Psocoptera	0	0 (0)	0 (0)	1 (6)	1 (6)
Other orders	0	0 (1)	0 (1)	0 (17)	0 (18)
Parasitic species	2?	2 (3)	11 (24)	0 (2)	11 (26)
Arachnids					
Pseudoscorpions	0	1 (1)	1 (1)	0 (0)	1 (1)
Mites and ticks (Acarina)	0	0 (0)	2 (6)	0 (2)	2 (8)
Spiders (Araneida) ⁴	?	?	?	? (4)	? (4)
Myriapods	0	0 (0)	0 (0)	3 (7)	3 (7)
Crustaceans	1	1 (2)	4 (7)	1 (1)	5 (8)
Snails (Mollusca)	0	1 (8)	1 (8)	0 (3)	1 (11)
Earthworms (Annelida)	0	0 (0)	0 (2)	1+ ⁵ (9)	1 (11)
Nemertean worms	0	1 (1)	1 (1)	0 (0)	1 (1)
Flatworms (Platyhelminthes)	0	0 (0)	0 (1)	0 (0)	0 (1)
Total	15	40 (75)	77 (147)	21 (114)	98 (261)

* Numbers are inclusive; Inaccessible endemics are also counted as Tristan endemics, and all endemics are counted as native species.

⁺ Excludes domestic species on Tristan. Invertebrates listed as of doubtful origin (Holdgate 1965) are lumped with introduced species.

¹ Southern Elephant Seals visit Inaccessible but no longer breed there.

² In addition to the endemic Inaccessible Rail, the three other landbirds are endemic subspecies.

³ Atlantic Petrel not proven to breed at Inaccessible. This figure treats Great Shearwater as a breeding endemic.

⁴ No spiders have been identified from Inaccessible, despite being common there. The spiders of Tristan as a whole are poorly known.

⁵ Earthworms were common at the island from at least 1989; they have not been identified, but are almost certainly introduced.

Inaccessible Island, although two species have not been recorded for some time and may have died out (Appendix 5). Other species cultivated at the island in the past have subsequently disappeared. For example, the Stoltenhoffs had a crop of cabbage and radish as well as potatoes when they were relieved by H.M.S. *Challenger*.

Most introduced species derive originally from Europe, but are now widespread weeds (Wace 1967); all also occur on Tristan (Groves 1981). Some species were introduced deliberately for human consumption (e.g. potatoes have been present from at least 1871), whereas others were introduced accidentally (Wace 1967). Some of the latter species have been at the island for many years; the *Challenger* Expedition recorded sow thistles *Sonchus oleraceus* and sorrel dock *Rumex acetosella* at Salt Beach in 1873 (Moseley 1879, Wace 1967).

Most introduced plants are limited to the areas around the main landing sites (Blenden Hall and the Waterfall), old human habitations, or along adjacent beaches and paths. Some are very localised and pose no immediate threat to the native vegetation (e.g. apple, pine and willow trees). Virtually all species require disturbance of the natural vegetation to become established, and are thus common on slumps and rock falls as well as along

stream banks, and at sites disturbed by birds (e.g. albatross nests). Only two species are widespread on the island plateau: dock *Rumex obtusifolius* and the grass *Holcus lanatus*. The latter species is the most serious alien plant, as it appears to have the ability to exclude native species.

Those alien plants that persist only in disturbed areas probably pose no long-term threat to the native vegetation. However, flax *Phormium tenax* (Plate 18) has the potential to alter the vegetation of the island radically (Wace & Holdgate 1976) and every attempt should be made to control and eliminate this species. It is currently largely restricted to the cliff northwest of the Waterfall, but several plants have spread onto the plateau above this cliff, and one plant is found well upstream on Waterfall River. Other localised aliens (e.g. *Agrostis gigantea*, *Brassica rapa*, *Cynodon dactylon*) should be eradicated where possible to avoid possible future problems.

3.8 Fauna

Like the flora, Inaccessible Island's terrestrial fauna is characterised by a relatively low species diversity and a high degree of endemism (Holdgate 1965). Almost one fifth (14 of 75; 19%)



Plate 18. A large flax *Phormium tenax* clump in flower near the old settlement at the Waterfall.

of native species are restricted to Inaccessible, and 39 (52%) are endemic to the Tristan group (Table 2). There are few introduced species relative to Tristan, and all are invertebrates. Birds dominate the vertebrate fauna, in terms of diversity, number and biomass. Reptiles, amphibians, freshwater fish and terrestrial mammals are absent from the island, and there also are gaps in the invertebrate fauna (Holdgate 1965). A feature of the fauna is a number of flightless species of both birds and insects.

3.8.1 Native mammals

Only two mammals occur at Inaccessible Island, Subantarctic Fur Seals *Arctocephalus tropicalis* and Southern Elephant Seals *Mirounga leonina*. Both species were abundant breeding species at the end of the 18th century, but were extirpated by sealing during the 19th century. Elephant seals remain rare, with typically single animals coming ashore. There is no evidence of breeding, but given sporadic breeding at Tristan (Anon. 1988), it may occur occasionally at Inaccessible.

Fur seals have returned to the island following their virtual extirpation (Plate 19). A complete survey in November 1999 estimated 100 bulls and 500 cows and immatures, with the greatest concentrations in the east (Pig Beach) and southwest (Dirleton Point to South Hill). However, by mid-December the coast between Dirleton Point and North Point alone supported 150 bulls and almost

500 cows and immatures, suggesting a much larger peak breeding population (in November this area had only 10 bulls and 40 other seals). This is a marked increase from the numbers present on the island in 1989–90. Pups are born in December at sheltered sites along the entire coast.

3.8.2 Seabirds

A total of 44 bird species has been recorded from Inaccessible Island, of which 24 are known or are thought to breed at the island. The vast majority of breeding birds are seabirds; 16 species definitely breed, and four others probably or possibly breed at the island (Appendix 6). Most seabirds have Subantarctic affinities, either being species that also breed at Subantarctic islands farther south, or having closely related congeners that do so. The only species with a tropical affinity is the Brown Noddy or 'Woodpigeon' *Anous stolidus*. Censuses of breeding bird numbers are problematic, particularly for the 13 species which nest in burrows (petrels, shearwaters, diving petrels and storm petrels), but conservative population estimates are summarised in Appendix 6.

One seabird breeds only at Inaccessible Island: the Spectacled Petrel or 'Ringeye' (Plate 20; Ryan 1998). It is confined to the higher parts of the island plateau (Figure 5). The breeding population in 1982–83 was estimated to be approximately 1000 pairs (Fraser et al. 1988), and with an estimated 700 birds killed each year by long-line fisheries off Brazil (Olmos et al. 2000), there was concern for the future of the species (Ryan 1998). Fortunately the population remains reasonably healthy; a complete survey in December 1999 estimated 3000–4000 pairs (Ryan & Moloney 2000). Despite this, the species is listed as Critical (BirdLife International 2000).

Inaccessible also is one of only two breeding localities for the Tristan Albatross or 'Gony' *Diomedea dabbenena*, although the island supports only 2–3 pairs (Plate 21), with some 2000 pairs breeding at Gough Island (Ryan et al. 2001). An estimated 200 pairs bred on Inaccessible Island in the 1870s, but they were eaten by wild pigs (Stoltenhoff 1952) and humans (Mackay 1963). By 1938 only two pairs remained (Hagen 1952), and the population has remained at 2–3 pairs until 2000 (Fraser et al. 1988, Ryan & Moloney 2000). The small population size may contribute to low recruitment through birds failing to land at the right part of the island and getting trapped in dense vegetation (Ryan et al. 1990). Tristan Albatrosses formerly bred at Tristan,



Plate 19. A Subantarctic Fur Seal *Arctocephalus tropicalis* bull.



Plate 20. A Spectacled Petrel or 'Ringeye' *Procelfaria conspicillata* with a well-developed spectacle. This feature is visible even on downy chicks.

but were extirpated there through human exploitation. It is listed as Endangered (BirdLife International 2000).

Three other seabirds are wholly or virtually restricted as breeding species to the Tristan–Gough group of islands: the Atlantic Yellow-nosed Mollymawk or 'Mollie' *Thalassarche chlororhynchos*, Atlantic Petrel *Pterodroma incerta* and Great Shearwater or 'Petrel' *Puffinus gravis* (Plate 22). Inaccessible supports perhaps the smallest population of Yellow-nosed Mollymawks of the four islands (Richardson 1984), and there is some evidence that the population has decreased in size from 1989 to 1999. However, together with Nightingale, Inaccessible is the most important breeding site for Great Shearwaters, with a population of at least two million pairs (Ryan & Moloney 2000). It is unclear whether Atlantic Petrels breed at the island; few ornithologists have visited the island when this winter-breeding species is present.

In addition to the Tristan Albatross and Spectacled Petrel, three species that breed at Inaccessible Island are listed as threatened in the global Red Data Book: Rockhopper Penguin (Plate 23), Sooty Albatross *Phoebastria fusca* and Atlantic Petrel are all listed as Vulnerable (BirdLife International 2000). The Atlantic Yellow-nosed Mollymawk is Near Threatened (BirdLife International 2000). Inaccessible supports 10% of the global population of Northern Rockhopper Penguins *E. c. moseleyi* (Cooper et al. 1990, Ryan & Moloney 2000), which breed at nine colonies around the island (Figure 5). Much smaller proportions of the other two Vulnerable seabird species occur at Inaccessible. Numbers of burrow-nesting seabirds are poorly known throughout the Southern Ocean islands (Croxall et al. 1984, Croxall 1991), but Inaccessible Island probably supports globally important populations for several other species, such as Soft-plumaged Petrel *Pterodroma mollis* and White-bellied Storm Petrel *Fregetta grallaria* (Ryan & Moloney 2000).

Despite the importance of the seabird populations, there have been virtually no studies of their ecology since the Norwegian Expedition (Hagen 1952). The

Subantarctic Skua *Catharacta antarctica* is the only seabird that feeds on the island. Some 100 pairs breed (Ryan & Moloney 2000), and more than 100 non-breeding birds aggregate in 'clubs', awaiting an opening in one of the breeding territories. Skuas eat large numbers of burrowing petrels and occasionally take land-birds (Fraser 1984c, Ryan & Moloney 1991b). The two tern species only visit the island in summer. They feed on small fish, mostly caught in coastal waters. Other species that forage close to the island include Common Diving Petrels *Pelecanoides urinatrix* and White-faced Storm Petrels *Pelagodroma marina* (at least when feeding chicks).

The other seabirds feed farther offshore, mostly outside the boundaries of the Inaccessible Island Nature Reserve. Prey taken varies considerably between species, but consists of

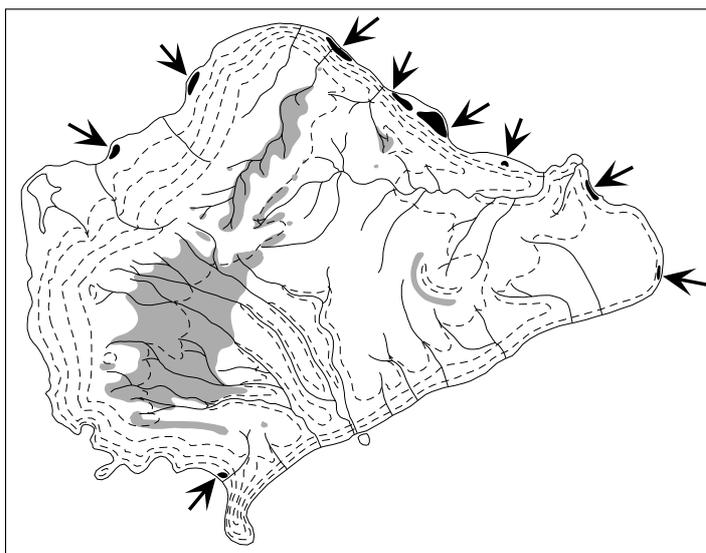


Figure 5. The distribution of Northern Rockhopper Penguin colonies (arrowed) and Spectacled Petrel colonies (shaded) at Inaccessible Island (after Ryan & Moloney 2000).



Plate 21. A Tristan Albatross or 'Gony' *Diomedea [exulans] dabbenena* chick shortly before fledging. This was the only chick raised on the island in 1999/2000.

various fish, crustaceans and squid (Hagen 1952). Although these species mostly forage outside the reserve, they play an important role in the island's terrestrial ecology. They import large amounts of nutrients and energy from marine systems in the form of guano, moulted feathers, egg shells and carcasses. Trampling, burrowing, and surface nest-building also create

openings in the vegetation, assisting the maintenance of plant diversity, but also promoting the spread of alien plants. *Poa annua*, *Holcus lanatus* and *Rumex obtusifolius* are often found at bird-disturbed sites.

Breeding seabirds also import pollutants from distant foraging areas, resulting in contamination of the terrestrial ecosystem. This is evidenced by the large amount of plastic carried in seabird stomachs (Ryan 1987a), but also includes heavy metal and persistent organochlorine pollution (Muirhead & Furness 1988, Ryan et al. 1988). Plastic fragments imported by seabirds are frequent at Inaccessible Island, and are liberated in large numbers when seabirds are killed by skuas (Ryan & Fraser 1988).

In addition to the 20 breeding species, 15 other seabird species have been recorded ashore or in the surrounding waters of Inaccessible Island, 10 of which are regular non-breeding visitors (Appendix 6). Only five shore- and land-bird vagrants have been recorded, many fewer than nearby Tristan (Richardson 1984). Other vagrants probably occur fairly regularly, but are less likely to be detected at Inaccessible Island owing to the paucity of observers and the great predation risk posed by Subantarctic Skuas.

3.8.3 Landbirds

The only native terrestrial vertebrates are four bird species: the Inaccessible Island Rail *Atlantisia rogersi* (Plate 24), Tristan Thrush or 'Starchy' *Nesocichla eremita* (Plate 25) and two species of bunting, Tristan *Nesospiza acunhae* (Plate 26) and Wilkins' *N. wilkinsi*. All are restricted to the Tristan archipelago. The rail is endemic to Inaccessible Island, and the other three are endemic subspecies. The rail is renowned as the smallest extant flightless bird. It is listed as Vulnerable, because it occurs at only one site and would be especially susceptible to introductions of mammals such as rats, cats or even mice (BirdLife International 2000).

The buntings are of scientific interest as an example of adaptive radiation. The Tristan Bunting is a dietary generalist, whereas the large-billed Wilkins' Bunting is a specialist feeding on the fruits of the island tree *Phylica arborea*. Both bunting species also occur at Nightingale Island, although the populations at the two islands, currently recognised as distinct subspecies, differ markedly and could be considered separate species.



Plate 22. A Great Shearwater or 'Petrel' *Puffinus gravis* on its nest.



Plate 23. An adult Rockhopper Penguin or 'Pinnamin' *Eudyptes chrysocome*, showing the exaggerated head tassels that are characteristic of the northern form *moseleyi*.

The situation at Inaccessible Island is complex, with two colour forms of Tristan Bunting resulting from dietary differences between birds feeding on the plateau (where *Nertera* fruits are abundant) and in tussock grassland (Ryan et al. 1994). Although the colour differences are environmentally induced, birds breed assortatively and morphological differences correlated with differences in the food environment occur between the two forms (Ryan 1992). Tristan and Wilkins' buntings co-occur at the coast, but interbreed to form a hybrid swarm in *Phylica arborea* bush on the eastern plateau (Ryan et al. 1994). Recent observations suggest the hybrid zone is expanding, which may lead to the formation of a single, endemic bunting species on Inaccessible.

Tristan Buntings formerly occurred at Tristan, but became extinct there sometime in the 19th century. The exact cause of the extinction is uncertain. It probably was a combination of habitat destruction (loss of tussock grassland) and introduction of predators, but the bunting probably was extinct before the introduction of rats in 1882. Attempts to reintroduce buntings to Tristan have failed (von Willemoes Suhm 1876). Both buntings are listed as Vulnerable (BirdLife International 2000). They nest on or close to the ground, and would be susceptible to introduced mammalian predators such as rats and perhaps mice. Wilkins' Bunting is especially vulnerable as it has a small population and is reliant on a single resource: fruit of the island tree *Phylica arborea*. Introduction of a pathogen that adversely



Plate 24. A female Inaccessible Rail *Atlantisia rogersi*. This species is only found at Inaccessible.



Plate 25. An adult Tristan Thrush or 'Starchy' *Nesocichla eremita gordoni*.



Plate 26. A lowland male Tristan Bunting or 'Canary' *Nesospiza acunhae* feeding on *Spartina* seedheads at Blenden Hall.

affects the island tree or its production of fruit would be potentially catastrophic for Wilkins' Bunting.

The Tristan Thrush or 'Starchy' is found at all three islands in the archipelago, but in greatly reduced numbers at Tristan. Different subspecies are found at each island (Elliott 1954, 1957), with the nominate race from Tristan most distinct (Hagen 1952). In the past, birds from the other islands have been returned to Tristan as pets or to supplement the local population; this practice should be disallowed (Richardson 1984). The Tristan Thrush is listed as Near Threatened (BirdLife International 2000).

The ecological importance of the terrestrial birds is poorly known. The rail is largely insectivorous, and what is known of its biology is summarised by Fraser et al. (1992). The thrush has a tongue adapted to consume egg contents (Lowe 1923), but it is an opportunist, with a catholic diet, including invertebrates, fruits, carrion and even adult storm-petrels (Ryan & Moloney 1991a, Fraser et al. 1994). Tristan Buntings and thrushes probably play an important role in seed dispersal, particularly of *Nertera depressa* and *Empetrum rubrum*. The rail and thrush occur throughout the island. Tristan Buntings are most abundant in tussock grassland and in wet heath, and Wilkins' Buntings typically occur in tussock grassland close to *Phyllica* trees.

3.8.4 Introduced vertebrates

Currently, there are no introduced vertebrates at Inaccessible Island, but at least five domestic mammal and one bird species were present at various times.

Two pigs *Sus scrofa* swam ashore from the wreck of the Blenden Hall in 1821 (Greig 1847), and pigs were fairly common on the island when the Stoltenhoffs arrived in 1871. The Stoltenhoffs killed many of the pigs, but found their meat rank, which they attributed to the pig's diet of seabirds and their eggs (Stoltenhoff 1895). Tristan Albatross and Rockhopper Penguins were specifically identified as birds eaten by the pigs (Stoltenhoff 1895). By the time the Stoltenhoffs left the island in 1873 only a few pigs remained, mostly boars. However, pigs persisted on Inaccessible and were hunted by the Tristan islanders until at least 1895 (Marsten 1897). Wild pigs probably died out before the 1930s (Booy 1957). Domestic pigs were taken to the island during the attempt to settle Inaccessible in 1936 (Anon. 1937b), and as recently as the early 1950s four pigs were released on the western plateau (Lindsay Repetto pers. comm.), but all were removed shortly thereafter.

Goats *Capra hircus* were introduced to the island from Tristan in the 1820s (Munch 1945). In 1871 a herd of 23 roamed the plateau, but these were all killed by 1873 (Stoltenhoff 1895), and apparently were not reintroduced. Their impact on the vegetation is unknown, but on Tristan they had a greater impact than sheep, killing island trees by eating the bark (Elliott 1957).

Sheep *Ovis aries* were introduced from Tristan sometime before 1904 (Pearce 1904). Three were eaten by the crew of *Forget-Me-Not* in 1906 (Green 1960). The island was stocked with sheep at various times from the 1920s (Rogers 1927) to 1955, when all remaining sheep were shot (Flint 1967, Wace & Holdgate 1976). They grazed on the western plateau (Wace & Holdgate 1976), probably favouring wet heath vegetation with its high proportion of grasses and forbs relative to other vegetation types.

Cattle *Bos taurus* were taken to the island to be fattened in the 1920s (Rogers 1927). Wild cattle, descendants of animals introduced during the 1936 settlement attempt, were finally shot in the 1950s (Flint 1967, Wace & Holdgate 1976). All cattle apparently were kept on the coastal strip at Salt Beach, and were restrained by the sheer cliffs from reaching other parts of the

island. They appear to have had little lasting impact on the tussock grassland.

The Stoltenhoffs took three dogs *Canis familiaris* to Inaccessible in 1871. These soon ran wild and caused havoc in the penguin colonies, eating many birds. Eventually the Stoltenhoffs shot all three (Stoltenhoff 1895). In 1906 another dog, left by Tristan islanders, was found on the island by the crew of the *Forget-Me-Not* (Green 1960). A wild dog also was rumoured to be on the island in the 1920s (Rogers 1927).

'Poultry' were introduced to Inaccessible Island during the attempted settlement of the island in 1936 (Anon. 1937b), but there is no record of the numbers or types of birds involved, nor how long they remained on the island.

3.8.5 Invertebrates

Terrestrial and freshwater invertebrates have been little studied at Inaccessible Island. Many samples were collected by two entomologists during a three-week visit in 1989, but few results have been published. Based on earlier collections, 58 free-living species have been recorded (Table 2), but many taxa are poorly represented, and the true number of species is likely to be much greater. At least two wasp species were collected in 1999–2000, but there are no previous records of this order from the island (Holdgate 1960, 1965, Wace & Holdgate 1976).

Twelve parasitic invertebrates have been recorded from birds at the island (Anastos 1954, Jordan 1954, Clay 1957, Table 2), including two species of feather lice (Mallophaga: *Pseudomenopon rowani* and *Rallicola zumpti*) apparently restricted to the Inaccessible Rail (von Keler 1951, Clay 1957).

Assessing the level of endemism among the invertebrate fauna is confounded not only by the limited collection at Tristan, but also by the poor knowledge of the invertebrate fauna of temperate South America, which is where most species originated (Holdgate 1965). At least 10 free-living invertebrate species are only found at Inaccessible Island, and an additional 18 species probably are restricted to the Tristan–Gough islands (Holdgate 1965, Table 2).

There are at least two examples of adaptive radiations that are of considerable evolutionary and biogeographic interest. The flightless drosophilid flies in the genus *Scaptomyza* have conspecific forms on widely separated islands (Hackman 1959, Williamson 1981). Of the eight species known from the Tristan–Gough group, five occur on Inaccessible, and two are restricted to the island. The radiation of listroderine weevils is even more impressive, with 11 species found in the Tristan–Gough group (Brink 1948, Kuschel 1962). All but one of these species is endemic to a single island, with Inaccessible supporting five endemic species.

Of the 58 free-living terrestrial invertebrates so far identified from Inaccessible Island, 12 are introduced, and a further nine possibly are introduced (Table 2). Alien species include earthworms, slugs, woodlice, millipedes and centipedes, all groups that are not represented in the native invertebrate fauna. The centipede *Lithobius melanops* and the millipede *Cylindroiulus latestriatus* are widespread on the island (Wace & Holdgate 1976). The woodlouse *Porcellio scaber*, slugs and earthworms were not recorded from Inaccessible by Holdgate (1965), but are now abundant and widespread on the island (pers. obs.). Virtually nothing is known about the consequences of these recent alterations to the invertebrate fauna at Inaccessible Island. Despite suppositions that alien species have largely occupied vacant niches at the island (Holdgate 1965, Wace & Holdgate 1976), it is probable that further investigation will show there have been changes in the abundance of native invertebrate species. Nutrient cycling and peat-formation processes may also be affected.

3.9 Marine and littoral biota

The marine and littoral environment of Inaccessible Island is less well known than is the terrestrial environment. With the exception of whales, fish and rock lobsters, virtually everything that is known results from sampling undertaken by the Norwegian Expedition in 1938 (Table 3). The only recent marine work at the island was a series of 10 dives made from the *Hekla* in 1989 to sample rock lobster and their potential prey (Pollock 1991).

Some 258 species have been recorded, including five seaweeds apparently restricted to Inaccessible Island, although further collecting may find them at other islands (Table 3). Sixty species endemic to the Tristan islands have been recorded from Inaccessible, almost half of which are red seaweeds (Table 3). Other taxa with more than five endemic species are polychaete worms, amphipods and copepods.

Southern Right Whales *Eubalaena australis* visit the waters off Inaccessible Island in very small numbers from June–October. This species was reduced drastically by whaling during the 19th century. The recovery of the population was set back when further exploitation occurred during 1961–62 when Tristan was evacuated due to the 1961 eruption (Best 1988). False Killer Whales *Pseudorca crassidens* (Mackenzie 1986), Humpback Whales *Megaptera novaeangliae*, Dusky Dolphins *Lagenorhynchus obscurus* and beaked whales (possibly Tasman Beaked Whales *Tasmocetus shepherdi*) have been sighted in the island's waters. A Sperm Whale *Physeter macrocephalus* was stranded at Blenden Hall prior to 1982. Other species of cetaceans are likely to occur within the waters of the Nature Reserve from time to time.

The Tristan Rock Lobster *Jasus tristani* is the best-studied marine organism (e.g. Heydorn 1969, Roscoe 1979, Pollock 1981, 1991), because it is the target species for a commercial fishery. Relevant aspects of its biology are summarised in section 3.11.1. The octopus *Octopus vulgaris* is caught as a bycatch of the lobster fishery. At present, exploitation of fin fish is limited to subsistence use by fishers from the rock lobster fishery. Until 1993, fin fish were caught for bait in the rock lobster fishery, but since then bait has been imported from Cape Town (section 3.11.1).

Andrew et al. (1995) summarised the fish fauna of Tristan da Cunha; 25 species have been recorded from Inaccessible waters, with a further 17 species likely to occur (Appendix 7). Neritic species typical of shelf waters comprise 27 of the 42 species (19 of 25 definitely recorded from the island). The only fish endemic to the Tristan group, the klipfish *Bovichtus diacanthus*, is abundant at Inaccessible. Many species are shared with Isles Amsterdam and St Paul in the southern Indian Ocean. Together with Tristan and Gough, these islands form the West Wind Drift Islands Province (Andrew et al. 1995).

Commonly caught fish include Fivefinger *Acantholatris monodactylis*, Soldier *Helicolenus mouchezi*, Bluefish *Hyperoglyphe antarctica*, Stumpnose *Schedophilus velaini*, Snoek *Thyrsites atun*, Horse Mackerel *Trachurus longimanus*, False Jacopever *Sebastes capensis* and Steambras *Polyprion oxygeneios*. The species composition of the fish catch has remained constant since the 1930s, suggesting that the community is not over-exploited (Cooper et al. 1995). However, most species are resident at the islands, and the small area of shallow water around the islands, coupled with slow growth rates, renders many species susceptible to over-fishing (Andrew et al. 1995).

Pollock (1991) describes the littoral marine environment at Inaccessible and Nightingale islands. The shallow sub-tidal zone (0–3 m) is characterised by a turf of short, tufty seaweeds, possibly maintained by the heavy wave action that excludes grazers such as sea-urchins. Deeper water is dominated by the kelp *Laminaria pallida*, with a relatively barren understory

TABLE 3. The diversity of marine organisms at Inaccessible Island

Numbers in parentheses are numbers recorded from the Tristan archipelago (excludes Gough).

Taxon	Endemic species		Total	Source
	Inaccessible	Tristan da Cunha		
Mammals (Cetaceans)	0	0 (0)	6 (10)	pers. obs.
Fish ¹	0	1 (1)	42 (44)	Andrew et al. 1995
Sea-squirts (Ascidians)	0	2 (3)	4 (6)	Millar 1960
Crustaceans				
Crabs and lobsters (Decapoda)	0	1 (1)	1 (2)	Holthuis & Sivertsen 1960
Barnacles (Cirripedia)	0	0 (0)	1 (1)	Holthuis & Sivertsen 1960
Sandhoppers (Amphipods)	0	5 (8)	23 (44)	Stephensen 1949
Copepods (inshore only)	0	5 (8?)	21 (32)	Wiborg 1960
Sea-spiders (Pycnogonida)	0	1 (2)	3 (5)	Stock 1954
Mollusca				
Bivalves (Pelecypods)	0	5 (6)	7 (10)	Soot-Ryen 1960
Other orders	0	?	4 (4)	Moseley 1879, Pollock 1991
Bryozoa	0	0 (0)	12 (13)	Vigeland 1958
Polychaete worms	0	6 (7)	22 (46)	Day 1954
Flatworms (Turbellaria)	0	0 (0)	2 (2)	Westblad 1952
Urchins and starfish (Echinoderms)	0	0 (3?)	2 (14)	Mortensen 1940
Corals and anemones (Cnidaria)	0	2 (2)	6 (6)	Carlgren 1941
Seaweeds (macro-algae)				
Green algae (Chlorophyceae)	0	1 (1)	7 (15)	Baardseth 1941
Brown algae (Phaeophyceae)	1	2 (3)	13 (21)	Baardseth 1941
Red algae (Rhodophyceae)	4	29 (45)	47 (89)	Baardseth 1941
Diatoms	?	?	11 (88)	Cleve-Euler 1949
Blue-green algae (Cyanophyceae)	0	0 (2)	24 (43)	Lindstedt 1960
Total	5	60 (92)	258 (495)	

¹ The Klipfish *Bovichtus diacanthus* is restricted to Tristan and Gough. Only 23 fish species definitely from Inaccessible waters; others recorded from off the other Tristan islands and are thus likely to occur off Inaccessible at least occasionally.

dominated by coralline algae. The giant kelp *Macrocystis pyrifera* grows in waters 8–40 m deep, and its buoyant fronds create a characteristic zone of calmer water around much of the island. *Laminaria* persists as an understory species beneath the *Macrocystis*. Macro-invertebrates are generally scarce, with sea-urchins *Arbacia dufresnii* and whelks *Argobuccinum* sp. most conspicuous. The large barnacle *Megabalanus isolde* is common on vertical faces subject to heavy wave action.

Little is known about the interactions among the marine biota. Rock lobsters consume sea urchins, whelks and barnacles, as well as calcareous coralline and other algae. They are preyed upon by the octopus and several species of fish (Roscoe 1979, Pollock 1991). The larger fish are primarily piscivorous, but also feed on cephalopods, salps and invertebrates (Andrew & Hecht 1992, Andrew et al. 1995).

3.10 Resource significance

Exploitable resources are divided into renewable and non-renewable resources. No non-renewable resources of economic significance such as minerals are known to occur within the Inaccessible Island Nature Reserve.

3.10.1 Renewable resources

The most important renewable resources currently being exploited are rock lobster and octopus (section 3.11.1). Fin fish are a potentially important resource, but are susceptible to over-exploitation (Andrew et al. 1995). Currently they are only

exploited for non-commercial purposes. The catch rate (6 kg/person/hour) and stable species composition suggests that fin fish stocks are in a healthy state (Cooper et al. 1995).

Resources on the island that potentially could be used include seals, seabirds and their eggs, penguin guano, driftwood and other flotsam and jetsam that washes ashore, and apples from the few groves of introduced apple trees. The island has very limited agricultural potential, and any attempts to either cultivate crops or reintroduce livestock would conflict directly with the island's status as a Nature Reserve. Collection of animals and plants for research purposes, for museum collections and for zoological and botanical gardens should be strictly controlled.

At present, the only regular activity by Tristan islanders at Inaccessible is an annual visit in March to collect apples at Salt Beach and Blenden Hall. The orchards are well established and have not spread. The Ordinance declaring Inaccessible Island a Nature Reserve specifically allows Tristan residents free access to both Inaccessible and Gough islands to collect guano and driftwood (Tristan da Cunha Conservation (Amendment) Ordinance 1997; Appendix 2b).

3.10.2 Other resources

Inaccessible Island, with its many endemic species, large populations of birds, spectacular scenery and little-modified environment, is worthy of World Heritage status (Chown et al. 2001). The island is a globally important resource for conservation, scientific study, tourism, and educational and inspirational purposes. It has limited historical significance (section 3.3),

because few, if any, relics remain from more than 50 years ago. The island is sufficiently close to Tristan to lack any significant strategic value in its own right.

There is potential for well-managed tourism, given the scenic nature of the island and its unique biota. Brief visits (less than one day) by small groups landed by small boats on the north-east shore (the Waterfall or Salt Beach) are feasible. However, there is no infrastructure (e.g. landing jetties, airstrip, accommodation ashore) that could aid in the case of emergencies, such as groups being stranded ashore, or group members being injured ashore. Also, extreme care would have to be taken not to introduce any new organisms (especially rodents) to the island.

Educational uses for the island (e.g. production of films) are possible, but limited infrastructure ashore is a restricting factor.

3.11 Human activities and infrastructure

Present activities at Inaccessible are restricted to inshore commercial fishing for rock lobster and octopus (the latter as a by-catch of the lobster fishery), limited non-commercial fin fishing from rock lobster vessels, collection of apples and occasionally other resources (e.g. driftwood) by Tristan residents, and research on the island's natural history (biology and geology).

3.11.1 Current fishing practices

The rock lobster fishery is operated currently by Ovenstones Agencies (Pty) Ltd, Cape Town, under a five-year concession that commenced in 1997. This awards sole fishing rights for Tristan Rock Lobster and octopus within 12 nautical miles of the islands. Consequently, all lobster fishing off Inaccessible Island occurs within the Nature Reserve. There is provision for a five-year extension to the concession, subject to the agreement of both parties.

For quota and reporting purposes, the fishing year starts on 1 September. No fishing is allowed in July–August, when female rock lobsters are in berry. Two ships, the *Kelso* and *Edinburgh*, fish at the uninhabited islands, with only one ship allowed at an island at a time. Owing to the closed season and often early attainment of Total Allowable Catches (TACs), ships are not always present. Illegal fishing by 'poachers' is known to take place at Inaccessible Island (Anon. 1987b, Cooper et al. 1995), despite the stiff penalties that can be imposed (fines of up to £2 million and confiscation of vessels, gear and catches, Appendix 3). Poachers are thought to monitor radio communications to know when it is safe to enter Tristan waters.

Most fishing occurs off the west coast of Inaccessible, where there is an extensive submarine plateau (section 3.4). Traps are set in water up to 200 m deep, although most fishing occurs shallower than 130 m (Roscoe 1979). Fishing from the ships uses long-lines, each with 20 baited, metal traps. These are supplemented with traps set from two-man power boats (4–6 from each vessel; Plate 27). Since 1993/94 all bait used at the uninhabited islands has had to be brought in from outside Tristan waters. Frozen hake *Merluccius* spp. heads are currently imported from Cape Town for bait.

Rock lobster at Inaccessible grow more slowly than at the other Tristan islands (Pollock 1981). Because qualitative observations suggested that the prey base is similar at Inaccessible and Nightingale, where growth rates are fastest, Pollock (1991) inferred that density dependent factors were responsible for the slower growth rate. A more favourable substratum at Inaccessible is thought to provide cover for young lobster from predatory fish, leading to greater survival and hence greater competition. One consequence of the slower growth rate at Inaccessible is that animals attain sexual maturity at a smaller



Plate 27. A power boat being hauled aboard the *Hekla* (now *Edinburgh*) off Nightingale in 1989.

size (50% of females mature with a carapace length of 57 mm at Inaccessible, compared with 59 mm at Nightingale; Pollock 1991). This is substantially smaller than the minimum size limit for the fishery (see below).

Lobster catches for all the islands combined peaked at around 800 tonnes per year in the early 1970s, but then remained roughly constant at 400–450 tonnes from 1977–78 to 1990–91 (Pollock 1994). From the mid 1970s to early 1980s, catch per unit effort (CPUE) fell by roughly a half. As a result a minimum size limit (70-mm carapace length) was imposed from 1 August 1983 (prior to this, the only limit was trap mesh size which had to be large enough to allow small lobster to escape). Since then, CPUE at Inaccessible Island has stabilised at 2–3 kg per trap hauled (Pollock 1994).

Since 1991/92, annual quotas (TACs) have been set for each island by the Tristan Government, through its Natural Resources Department. The TAC for Inaccessible has remained around 60 tonnes. This amount is caught each year, and thus the TAC does restrict the catch at Inaccessible. Pollock (1994) concluded that the current control measures (minimum size limit and TAC) should ensure long-term sustainability of the fishery.

Octopus has formed a by-catch of the rock lobster fishery since 1991. Separate figures for the catch at Inaccessible are not available. It is not known what effect removal of this rock lobster predator may be having on the inshore environment.

Crew on the lobster vessels are allowed to catch fin fish for consumption aboard ship and for limited, non-commercial purposes. Officers may take 10 kg (packed weight) and crew 5 kg



Plate 28. The new research hut, built at the site of the Denston Hut at Blenden Hall in January 2000, with the hut construction team led by Lindsay Repetto (in the door). *Left to right:* Peter Ryan, Terence Green, Gary Repetto, Matthew Green, Jimmy Rogers and Graham Rogers.

on each trip. A minimum size limit of 250 mm for Fivefinger applies to all fish caught from boats, but not to shore-based fishing.

The lobster fishery causes some deleterious effects on seabirds (Ryan 1991). At least some of the mitigation measures identified have been adopted to reduce seabird mortalities. These relate mainly to reducing deck lights at night. Some rubbish (e.g. cardboard bait boxes) is dumped from fishing vessels while fishing at the islands (Ryan 1991, pers. obs.).

Illegal drift-net fishing for tuna has taken place in Tristan's 200-nautical mile Exclusive Economic Zone, resulting in incidental mortality of penguins and other marine organisms (Ryan & Cooper 1991). Since 1992, licences have been issued for long-lining and trawling in waters 50–200 nautical miles from the islands. These activities take place well outside the boundaries of the Inaccessible Island Nature Reserve, but have potential impacts on the seabirds and seals that breed on the island (Glass et al. 2000).

3.11.2 Research and other activities

Research at Tristan is handicapped because it does not fall under the aegis of any national research agency (e.g. British Antarctic Survey). As a result, most research efforts have been motivated by individuals. Only limited research took place at Inaccessible Island prior to 1982 (Appendix 4). Most visits were of short duration, and few researchers visited the island plateau (Ryan et al. 1994). The Denstone Expedition spent three months ashore in 1982–83, and produced the first shore-based map of the island as well as investigating many aspects of the island's natural history and palaeobotany (Fraser et al. 1983, Siddall 1985, Preece et al. 1986). The Denstone hut at Blenden Hall (Plate 10) acted as a catalyst for further research activity.

In 1987, 1988 and 1989, the South African National Antarctic Programme (SANAP) supported research activities logistically during the spring visit of the *SA Agulhas*. Groups of 3–7

researchers accompanied by Tristan guides visited Inaccessible for 2–3 weeks each spring to investigate the island's geology, plants, insects and birds. In 1989, Peter Ryan and Coleen Moloney remained at Tristan and later returned to Inaccessible for four months to continue research into the endemic landbirds. Since then there have been only brief visits to deploy and recover automated weather stations until summer 1999/2000, when a new hut was built and Peter Ryan and Coleen Moloney again visited the island for three months.

Little research has been undertaken on the marine systems around Inaccessible Island. Fisheries observers collect data on rock lobsters and other animals caught by the commercial fishery. Publications reporting research at Inaccessible Island are listed in Appendix 1.

With the acquisition of the fishery patrol vessel and several inflatable boats, Inaccessible is becoming easier for Tristan residents to visit. At present, personnel from the Natural Resources Department visit in autumn to collect apples from Blenden Hall and Salt Beach.

An increasing number of cruise ships visit Tristan each year. Tourists were landed at Nightingale Island for the first time in 1995 (Anon. 1995), and now several vessels land tourists there each year. Requests have been made to land at Inaccessible Island, but no permits have been issued. To date, no tourists have landed at the island.

3.11.3 Infrastructure

The only permanent structure on Inaccessible Island is a hut at Blenden Hall (Plate 28). A prefabricated wooden hut was erected approximately 50 m above the beach at Blenden Hall in October 1982 by the Denstone Expedition (Fraser et al. 1983, Plate 10). It slowly deteriorated, and in January 2000 was replaced by a smaller hut built on the same site. This hut is available for *bona fide* research and related activities.

Management objectives

Inaccessible Island is a globally important site for biological conservation, supporting a large number of endemic species as well as many other species restricted to the Tristan da Cunha archipelago. It is also one of the few temperate oceanic islands free of introduced mammals. Consequently its conservation value greatly exceeds all other values. The Inaccessible Island Nature Reserve should be managed as a Strict Nature Reserve/ Wilderness Area (IUCN Category I), with emphasis on the

conservation and scientific study of its indigenous biota and ecological processes, as well as of its geological and scenic features. Visitors to the Inaccessible Island Nature Reserve should cause as little disturbance to the indigenous biota and natural environment as possible. Steps should be taken to redress past human impacts, where feasible.

The key management objectives are, in order of importance:

1. To conserve and maintain the indigenous biological diversity, including genetic diversity, species diversity and the diversity of ecological processes.
2. To minimise interference with natural processes and the destruction or degradation of natural features through human actions. This includes *inter alia* preventing the introduction of animals, plants, other organisms or their propagules.
3. To maintain scenic features and geological structures and processes.
4. To restore and rehabilitate, where feasible, damage due to local human actions.
5. To protect historic sites and artefacts without conflicting with objectives 1–4.
6. To promote an awareness through education of the intrinsic value, significance and vulnerability of the Inaccessible Island Nature Reserve and its biota.
7. To promote research relevant to objectives 1–6, and allow research not in conflict with these objectives.

These objectives do not affect any current use of Inaccessible Island by Tristan islanders. It is intended that well-managed access to the island continue to be allowed for Tristan residents,

and that responsible, sustainable exploitation of marine resources be permitted in the waters of the Nature Reserve.



Plate 29. A Sooty Albatross or 'Peeo' *Phoebastria fusca* on the top of the coastal cliffs below Round Hill with South Hill in the distance.

5

Management policies and implementation guidelines

5.1 Legal protection

Policy: To provide adequate legal protection for Inaccessible Island to ensure that the key objectives of the management plan are achieved.

Implementation: The legal authority controlling the Inaccessible Island Nature Reserve is the Administrator of Tristan da Cunha, acting in consultation with the Island Council (collectively termed the Tristan Government). General provisions are stipulated in the Tristan da Cunha Conservation Ordinance of 1976, as amended, and the Tristan da Cunha Fishery Limits Ordinance of 1983, as amended (Appendices 2 & 3). These Ordinances (hereafter termed the Conservation Ordinance and Fisheries Ordinance) are adequate to achieve management objectives, but the maximum penalties for contraventions of the Conservation Ordinance (section 13) should be increased.

Several international conventions are relevant to the management of Inaccessible Island: the Convention on Biological Diversity, the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), the Convention on Trade in Endangered Species of Fauna and Flora (CITES), the International Convention for the Prevention of Pollution from Ships (MARPOL) and various United Nations-sponsored agreements (e.g. the Food and Agriculture Organization request for nations to produce National Plans of Action for reducing incidental catch of seabirds in longline fisheries; FAO 1999). The Tristan Government recognises its obligations to these conventions, and undertakes to ensure that they are fulfilled wherever feasible. When necessary, outside expertise will be called upon to help meet Tristan's international obligations.

5.2 Administration

Policy: The Tristan Government will provide administrative and support services to implement the management plan, including issuing visitor permits and controlling human activities.

Implementation: As the legal authority responsible for the Inaccessible Island Nature Reserve, the Tristan Government, acting through the Tristan Natural Resources Department, is responsible for administering the Inaccessible Island Nature Reserve according to the objectives and guidelines of this management plan. This requires:

- ❑ Controlling human access to the Nature Reserve through the issuing of entry permits;

- ❑ Evaluating applications for permission to visit the Nature Reserve (Appendix 8);
- ❑ Limiting human activities within the Nature Reserve to those permitted in terms of the management plan;
- ❑ Preventing, as far as possible, illegal entry into the Nature Reserve;
- ❑ Ensuring that visitors fully comply with reporting requirements following visits to the island (section 5.10, Appendix 9);
- ❑ Keeping records of all visits and activities within the Nature Reserve (including those by Tristan Government employees and Tristan residents);
- ❑ Consulting, where necessary, with conservation and environmental specialists regarding management issues that arise; and
- ❑ Using all means at the disposal of the Tristan Government to ensure that biological diversity within the Nature Reserve is conserved.

Entry permits must be issued in writing for applicants outside Tristan, but verbal permission can be granted by the Administrator or his/her representative for Tristan residents to enter the Nature Reserve.

Appendix 8 is an application form for a permit to enter the reserve and to conduct research or other activities. Decisions on whether to issue permits must be made on the basis of the guidelines of the management plan, but the Tristan Government may take such expert advice as deemed necessary to judge applications. A fee may be charged for the processing and issuing of permits.

The Tristan Government should provide advice on and, where possible, assist with transport to the Nature Reserve for approved visits (section 5.8).

5.3 Protection and management of biota

Policy: Any disturbance or exploitation of native organisms shall be strictly controlled, and only be allowed to take place on a sustainable basis. Research relevant to conservation management will be promoted, because achieving the primary objective of protecting the full spectrum of biological diversity at Inaccessible Island requires a sound understanding of the structure and functioning of the island's ecosystems.

Implementation: The killing or disturbance (including capture or picking) of native animals and plants is prohibited in terms of the Conservation Ordinance unless a permit is granted. The following are valid reasons for permits to be granted:

- ❑ *Bona fide* scientific monitoring or research activities, as approved by the Tristan Government (section 5.15);
- ❑ Commercial exploitation of rock lobster *Jasus tristani* and octopus *Octopus vulgaris* in terms of current fishing licences and prevailing regulations (section 3.11.1);
- ❑ Subsistence exploitation of fin fish by fishing licence holders and Tristan residents, subject to prevailing regulations (section 3.11.1).

Written permits must be issued for applicants outside Tristan, but verbal permission for Tristan residents to fish may be granted by the Administrator or his/her representative. Collection of apples by Tristan residents does not require a permit as apples are not a native species. Driftwood and other flotsam and jetsam washed ashore also may be collected, but dead wood of the island tree *Phylica arborea* or other native plants may not be collected without a permit, because this would interfere with the natural decomposition process.

Research priorities to allow better management of the Nature Reserve include:

- ❑ Inventories of poorly known groups of organisms;
- ❑ Monitoring of vegetation dynamics, especially introduced species;
- ❑ Studies of the impacts of introduced species;
- ❑ Identification of effective control measures for introduced organisms; and
- ❑ Better understanding of ecological relationships and identification of key species in ecological processes.

These points are elaborated on in the following sections.

5.4 Control of introduced organisms

Definition: Introduced or ‘alien’ organisms are any organisms that occur outside their natural range as a result (wholly or in part) of human actions or activities. Introduced species can become naturalised and be assimilated into natural ecosystems, but they remain aliens and subject to management actions.

Policy: To eradicate or control, where feasible (or deemed necessary), introduced species already at Inaccessible Island. Special efforts should be made to contain and eradicate newly arrived or localised species before they have a chance to spread widely on the island. Species known to have a major impact on native systems (either at Inaccessible Island or in similar island ecosystems) should receive the highest priority for action.

Where eradication or control is not feasible at present, studies to establish safe, effective control measures should be promoted, as should studies of the impacts of introduced species on native species and ecosystems. Monitoring of the status of introduced species should be undertaken on a regular basis. This will also help to detect any new introductions.

Implementation: The Tristan Government will attempt to secure funding to tackle specific problems, or to promote research and monitoring of introduced species. Likely sources of funds include the Environmental Fund for Overseas Territories (EF-OT) or the planned Overseas Territories Global Environment Facility (OT-GEF). Control measures and monitoring can be carried out by the Tristan Natural Resources Department in collaboration with experts on control measures.

The most important short-term goals are to:

- ❑ Eradicate flax *Phormium tenax* from the cliffs next to the Waterfall and adjacent plateau;
- ❑ Assess the impact of *Holcus lanatus* and other alien plants on the native flora; and
- ❑ Establish the diversity of introduced macro-invertebrates, and assess their impact on native systems.

Consideration also should be given to removing other localised alien plant species at the site of the old settlement at the Waterfall (e.g. *Brassica rapa*, *Cynodon dactylon*). *Brassica* appears to have spread fairly markedly during the 10 years from 1989–99, and should be eradicated before it becomes difficult to do so. All large plants were weeded in November 1999 and again in February 2000.

The small number of pine and willow trees at the Waterfall and Salt Beach are exempt, because of their cultural and historical interest (section 5.7). However, they should be monitored to ensure that no seedlings become established. If seedlings are found in future, they should be removed and the decision not to remove the established plants should be reviewed. Apple trees are exempt because of their value to the Tristan community.

Visitors to the island should attempt to minimise the transport of alien organisms or seeds when travelling around the island. Paths should be followed where possible, and efforts made to clean boots and clothing before leaving areas with large numbers of alien species (the coast, especially at Blenden Hall and the Waterfall, and the western plateau rim).

Regular inspections at 3–5 year intervals should be made to check the status of alien species at the island. This monitoring is essential to identify changes in status (e.g. from non-invasive to invasive) as well as to identify new introductions and to assign new control and research priorities.

5.5 Preventing the introduction of new alien species

Policy: Because introduced species pose the greatest threat to the native animals and plants and the functioning of terrestrial ecosystems, every effort should be made to prevent the introduction by humans of new species. This includes animals, plants, micro-organisms and their propagules. The number of introduced species in reserves generally is a direct function of the number of visitors. Consequently the minimum number of landings should be made at Inaccessible Island.

Implementation: Landing is by permit only (section 5.8). All stores, clothing, equipment, construction and other materials taken to the island should be suitably cleaned and/or fumigated, and sealed to prevent subsequent contamination. Personnel from the Tristan Natural Resources Department or Tristan Conservation Officers must inspect all materials being taken onto the island to ensure they are clean and free of seeds and other propagules. It is the responsibility of all visitors to ensure that they have all their equipment inspected; no materials may be landed without first being inspected.

Special attention needs to be paid to personal clothing and camping equipment, building materials (especially sand) and dry food stores (which can contain weevils and other insects). As little as possible sand and gravel should be imported to the island, and any unused material should be removed or stored in securely sealed containers. Ideally it should be steam-treated to kill any seeds or other propagules. Visitors to the island must be made aware of the need to clean their clothing and camping

equipment to remove any mud and seeds before going ashore. Wheels of helicopters landing on the island should be cleaned thoroughly, immediately before departing for the island.

No live plants or animals may be taken to the island¹. With the exception of washed potatoes, no fresh produce may be taken to the island. Wastes from potatoes must be either removed from the island or disposed of at sea (section 5.11). No fresh or frozen poultry products (meat or eggs) may be landed due to the risk of introducing diseases to the native birds.

Rodents pose the greatest single threat to the island's biota. Consequently, equipment stored on Tristan or other places that have rodent populations should be inspected carefully before transportation to Inaccessible Island. Containers should be repacked shortly before leaving for Inaccessible to ensure that no rodents have gained entry.

All vessels visiting the Inaccessible Island Nature Reserve must have been certified free of rodents at their last port of call. Rat guards should be fitted to all mooring lines from the time the certificates are issued, to ensure vessels remain rodent free. Certificates must be presented at Tristan before proceeding to Inaccessible Island, and vessels must be available to be inspected on request throughout the duration of their visit. Vessels must anchor at least 200 m from shore, and no wharves or jetties constructed to allow mooring directly onto the island. These requirements apply equally to vessels visiting the waters of the Nature Reserve, even if no landing is intended. Vessels entering the Reserve should carry equipment to trap or poison any rodents found aboard.

5.6 Extinctions, *ex situ* conservation and translocation

Policy: If local extinction occurs as a result of natural processes only, no attempt should be made to reintroduce the species. However, if extinction results (wholly or in part) from human activities or introduced species, the primary objective should be to re-establish populations on Inaccessible Island as soon as possible.

Removal of individuals of native species for *ex situ* conservation purposes in zoological or botanical gardens is permissible if there are compelling reasons to do so. Such reasons include:

- Conservation of threatened species, if there is a real threat of local extinction, and *ex situ* conservation is seen as the last viable option;
- Educational and/or scientific purposes, provided the numbers of individuals removed are negligible, and have no impact on the future survival of the species.

To conserve genetic differences between island populations, transfer of native species between islands should not be permitted. In the absence of evidence to the contrary, all island populations should be treated as genetically distinct entities. The release of rehabilitated individuals of native species also should not be permitted, because of the risks of introducing diseases and other organisms. However, both actions could be considered if there is a specific conservation goal such as re-introducing populations that have become locally extinct as a result of human activities.

Implementation: Given compelling scientific evidence that one or more species or populations at Inaccessible Island face local extinction, permission may be granted to capture some or all remaining individuals for *ex situ* conservation in a reputable zoological or botanical garden. If human activities contributed to the extinction, removal for *ex situ* conservation should be contingent on an action plan for attempting to re-establish the population as soon as the proximal cause of the population decline has been resolved. The need for rapid action is to limit possible genetic changes that could result from being maintained *ex situ*.

Less strict controls are required for non-destructive collection of tissue samples for *ex situ* conservation purposes. Translocations approved for compelling conservation reasons might require a period of quarantine to ensure no pathogens or diseases are transferred.

5.7 Historical conservation

Policy: To record and conserve sites that have cultural or historical significance. Sites or artefacts predating the commencement of the commercial fishery (1949) are deemed to be of historical interest.

Implementation: There are few known sites, but an inventory of historical sites, including the remains of shipwrecks, is required. Visitors to the Nature Reserve are not allowed to collect artefacts or disturb sites with cultural or historical significance, unless as part of an approved research programme. The Tristan Government may require artefacts that would otherwise be lost or seriously damaged to be removed and conserved in the Tristan Museum or other suitable institutions. The two willow trees at Salt Beach (planted to supply ribs for longboats) and the three pine trees at the Waterfall are protected as they have cultural significance to the islanders.

5.8 Access

Policy: To control access to the Nature Reserve by regulating the number of visitors, to define approved landing sites and to provide guidelines for walking on the island.

Implementation: All visitors to the Nature Reserve require permission from the Tristan Government (section 5.2). Any emergency landing without permit must be reported as soon as possible to the Tristan Government. Written permits must be issued to all non-Tristan residents, but a blanket permit can be issued to fishing permit holders to enter the waters of the Nature Reserve. An application form for permits is appended (Appendix 8). Tristan residents only require verbal permission from the Administrator to visit the island, but all goods and materials taken to the island must be inspected by a Conservation Officer before leaving Tristan.

Landing on Inaccessible Island is via boat or helicopter. Landings should be restricted to Blenden Hall (boats and helicopters; Plates 30 & 31) or the Waterfall and Salt Beach (boats). Landings from boats at other sites (e.g. Tom's Beach) should be limited to legitimate monitoring or research purposes. Any accidental strandings or wrecks must be reported to the Tristan Government as soon as possible.

¹One exception would be new fruit trees to replace old orchards, provided they are transported without soil and are sprayed to remove any pathogens (insects, fungi, etc.).



Plate 30. Launching a small inflatable boat from the bay at Blenden Hall in 2000.

Helicopter landings are restricted to the accommodation zone (Section 5.9), but landings at other parts of the island, including on the plateau, can be made provided the Tristan Government is convinced of their conservation merit. Overflights by helicopters or fixed wing aircraft should be limited. Aircraft not involved in deploying personnel or equipment for approved visits should remain 500 m offshore or fly at an altitude of at least 1000 m above the island to minimise disturbance of breeding birds and seals. No flying should take place between dusk and dawn.

On the island, all access is by foot; no powered vehicles may be used. Where possible, people should follow established paths to avoid trampling the vegetation and bird burrows. Disturbance of the native vegetation along paths promotes erosion and creates openings for alien plants, so as few paths as possible should be used. People leaving areas with large numbers of alien plants (the coast and wet heath) should rinse mud and seeds from their boots.

5.9 Zoning

Policy: To define zones where different activities are allowed, thus focusing human impacts on specific areas of the Nature Reserve.

Implementation: Four zones are recognised within the Inaccessible Island Nature Reserve:

5.9.1 Accommodation zone

This is the only zone where permanent structures can be erected. It is restricted to the immediate area around the hut at Blenden Hall (*ca.* 0.5 ha centred on the hut, extending from the head of Blenden Hall Bay to the stream west of the hut, and



Plate 31. A helicopter from the SA *Agulhas* deploying personnel and equipment at the Blenden Hall hut in 1988.



Plate 32. The campsite used in 1999/2000 near the river junction west of Denstone Hill (38°17.6'S, 12°40.4'W).

inland 30 m behind the hut, Plates 4 and 28). If the Tristan Government decides to erect a further structure at the Waterfall, the area around this structure also would become part of the accommodation zone. No more than ten people may overnight in the accommodation zone, except under exceptional circumstances.

All structures within the accommodation zone require the approval of the Tristan Government before erection. Buildings should be limited to the minimum required for logistic support of research and monitoring teams visiting the island. No permanent aeriels should be erected, because of their impact on night-birds (burrowing petrels that visit the island at night). Redundant structures should be removed with as little disturbance as possible, and their sites rehabilitated. Remote monitoring equipment not essential for the management of Inaccessible Island (e.g. automatic weather stations) should be placed on Tristan.

5.9.2 Natural zone

This is the zone accessible to day visitors to the island. Tourism and visits to collect apples, guano and driftwood are restricted to this zone, which comprises the coast and adjacent coastal lowlands at Blenden Hall, the Waterfall and Salt Beach. It excludes Skua Pond and the nearby stand of island trees (Wilkins' Copse, Plate 4) at Blenden Hall, which form part of the wilderness zone because of their sensitive nature. Penguin colonies (Figure 5) also are excluded from 1 September to 31 January. No more than 100 people may enter this zone on a single day.

5.9.3 Wilderness zone

The rest of the island other than the accommodation and natural zones comprises the wilderness zone. Access to the wilderness zone is not allowed other than for approved monitoring, research or educational purposes. No more than 10 people may enter this zone on any given day. Overnight camping in the wilderness zone is only allowed under permit, and should ideally occur at existing camp sites (Plate 32). No permanent structures may be erected other than long-term monitoring markers (section 5.10.1), but temporary structures may be used during research or educational field work (section 5.10.2).

5.9.4 Marine zone

The marine zone consists of the seas surrounding Inaccessible Island and its islets from the low-water mark to 12 nautical miles (22.2 km) offshore. Fishing is by permit only. All vessels entering the marine zone must first visit Tristan, present rodent-free certificates, and clear customs, immigration and harbour controls. Vessels may not deliberately approach whales and dolphins closer than 100 m. No refuse may be dumped at sea (section 5.12). At night, deck lighting should be kept to a minimum to reduce the risk of bird strikes (nocturnal birds colliding with the vessel, section 5.14).

5.10 Allowed activities

Policy: To define allowed activities that are compatible with the management objectives of the Nature Reserve, and to establish reporting procedures by all visitors. Five activities are considered:

5.10.1 Monitoring

Environmental monitoring, together with research, is the most important activity on Inaccessible Island, as it provides feedback on the success of management policies. It will also assess any changes related to long-term climatic change. In addition to ongoing monitoring of fishery resources, the following key factors need monitoring:

- The number of visitors to the island, with a record of the dates and lengths of stay, areas visited and routes used, as well as any activities that might impact on the biota (e.g. control measures against alien plants);
- The distributions and abundances of alien plants and animals (including searches for new alien species);
- Population sizes (or indicators thereof) of key species at the island: Spectacled Petrels, Tristan Albatrosses, Rockhopper Penguins, Atlantic Yellow-nosed Mollymawks and Subantarctic Fur Seals;

- ❑ Vegetation structure and dynamics; and
- ❑ Pollution levels (e.g. the frequency of oiling, entanglement and ingestion of plastic, hooks or other artefacts by seabirds and seals).

The monitoring of alien plants, key vertebrate populations and vegetation dynamics requires dedicated visits at regular intervals (at least every five years). Baseline data already exist for alien plants and bird populations, but an inventory of alien invertebrates is required. Long-term monitoring of vegetation structure requires quantitative assessment of fixed plots, which require the erection of permanent markers.

Monitoring will be conducted under the aegis of the Tristan Natural Resources Department, which will also keep records of all visits to the island.

5.10.2 Research and education

Scientific research and the production of educational materials such as documentary films are important activities within the Nature Reserve. They must be of a benign nature, with as little impact as possible. Priority will be given to research projects that contribute to the environmental management of the Nature Reserve. This includes studies on the island's birds and seals that assess impacts acting beyond the limits of the Nature Reserve (e.g. use of remote sensing to assess foraging ranges of seabirds to provide guidelines to reduce mortality from long-line fishing).

Research and educational programmes may be conducted in all four zones in the Nature Reserve, but should concentrate on the natural zone where possible. Temporary structures (e.g. tents and hides, marker poles, quadrats, traps, etc.) may be erected in the natural and wilderness zones only during the period of visits. Such structures should not obstruct seals, birds or the flow of water.

People wishing to work in the Nature Reserve must have relevant expertise and proven ability to deliver the products from proposed projects (see Appendix 8). They must also demonstrate environmental responsibility and have the ability to work under rigorous field conditions. A report on each visit (Appendix 9) must be provided to the Tristan Natural Resources Department within three months of leaving the island.

5.10.3 Terrestrial resource use

Terrestrial resource use is restricted to collecting driftwood and other stranded debris, guano from penguin colonies, and apples from the apple groves at Blenden Hall and Salt Beach. These activities are limited to Tristan residents and resources collected may not be used for commercial purposes. Such visits should be of the shortest duration possible, and visitors should remain within the natural zone. All such visits must be reported to the Tristan Natural Resources Department, including the number of people ashore, areas visited, and an estimate of the amount of resources removed. No other agricultural activities are permitted, including grazing livestock or cultivating crops.

5.10.4 Marine resource use

The marine resources of the Nature Reserve must be managed so as to prevent any irreversible change in the marine environment and its biota. No exploitation of marine resources may take place without a permit.

Commercial fishing for rock lobster and octopus is restricted to a single permit holder, and current controls exercised by the Tristan Natural Resources Department (minimum size limit, setting of a Total Allowable Catch, and a closed season) are

sufficient to ensure sustainable use of the lobster resource (section 3.11.1). Only residents of Tristan may also fish for lobster, and this is restricted to subsistence use.

Fin fishing is limited to non-commercial use, typically for immediate consumption. Fish may only be caught with hooks and lines. Non-residents of Tristan may not fish without the permission of the Tristan Government. Fivefingers *Acantholatris monodactylus* caught from vessels must be at least 250 mm total length.

5.10.5 Tourism

Currently, tourist visits to the Inaccessible Island Nature Reserve are restricted to the marine zone. General regulations pertaining to this zone are summarised in section 5.9. Several cruise ships visit the island's waters each year to view the spectacular coastal scenery. Inshore inspections by groups of tourists on boats launched from ships also are allowed. Cruise ships may not visit the Nature Reserve at night owing to the risk of bird strikes (section 5.14).

Landing small groups of tourists on the island for brief visits may be considered, provided strict controls are implemented. The following is a minimum set of requirements for tour groups landing on the island:

- ❑ All visiting groups must be accompanied by Tristan guides, with at least one guide for every eight visitors;
- ❑ Tristan guides have the right to cancel landings or to cut short visits ashore if they consider sea and/or weather conditions to be unsuitable;
- ❑ No more than 100 people may be landed at any time (including guides and tour group leaders);
- ❑ Landing may only take place at the Waterfall or Salt Beach on the northeast coast of the island;
- ❑ Landings may only take place from small boats (not helicopters);
- ❑ No overnight visits are allowed, and tourists must be taken off the island if weather or sea conditions deteriorate;
- ❑ Visitors must remain in the natural zone (the coast and adjacent lowlands, section 5.9);
- ❑ All clothing and boots must be cleaned thoroughly before landing to remove mud and seeds;
- ❑ Rubber boots should be worn by all visitors to facilitate cleaning and inspecting;
- ❑ No food may be taken ashore, other than emergency provisions (dry rations);
- ❑ No smoking is allowed ashore;
- ❑ No littering;
- ❑ Tourists must remain within 20 m of guides at all times;
- ❑ Tourists may not deliberately approach within 10 m of elephant seals or within 5 m of fur seals and birds; and
- ❑ Use of tapes to call out birds (e.g. Inaccessible Rail) must be kept to the absolute minimum.

In addition, tour companies wishing to land passengers must have a sound record of environmental responsibility. They must also have adequate experience of landing tourists on exposed boulder beaches. Tour group leaders must be fully aware of the requirements of the management plan, and it is their responsibility to ensure that tourists are informed of the relevant regulations. Tourists must be informed of the absence of infrastructure on the island, including the lack of toilet facilities.

A landing fee will be levied for each passenger and crew member who goes ashore. Funds raised will go into a conservation fund for Inaccessible Island. The Tristan Natural Resources Department will maintain records of all tourist visits to the Nature Reserve.



Plate 33. Marine litter washed up on the exposed western side of Inaccessible.

5.11 Use of hazardous materials

Policy: To control the use of certain hazardous or toxic substances at Inaccessible Island. Restrictions are required on the use, storage and disposal of radioactive materials, pesticides and herbicides, firearms and explosives, fuels and other noxious chemicals.

Implementation: Radioactive substances may only be imported under permit, and be restricted to the use of small quantities of short-lived isotopes for approved scientific research. They should only be used in the accommodation zone unless there are compelling reasons to waive this restriction. All used radioactive materials and wastes are to be removed from the Nature Reserve as soon as possible. A detailed report on the use and disposal of all radioactive material used must be made to the Tristan Government within three months of completing field work.

The importation and use of pesticides and herbicides also requires written permission from the Tristan Government. Exemption is granted for short-lived, pyrethrin-based insecticides which may be used when essential in the hut at Blenden Hall or in vessels offshore.

The use of other products that can have lasting environmental impacts is to be limited wherever possible. Used freons and halons from refrigerators, freezers and fire extinguishers should be removed from the Nature Reserve for recycling or disposal at home ports. Aerosols should be 'ozone-friendly' and biodegradable detergents and cleaning and disinfectant agents should be used whenever possible.

Liquid fuels (petrol, diesel, paraffin) and lubricants should only be used in the accommodation and marine zones, and can only be stored ashore during approved visits. All reasonable precautions must be taken to ensure that no fuel is spilled into the environment. No ship-to-ship transfers of fuel may take place within the Nature Reserve. Accidental spillages of more than 20 litres of fuel at sea or 5 litres ashore must be reported to the Tristan Government as soon as possible.

With the exception of safety and rescue flares, the use of fire-arms or explosives anywhere within the Nature Reserve is only allowed under exceptional situations and then only with the approval of the Tristan Government.

5.12 Waste management

Definition: Wastes are defined as products generated by humans and their activities in the Nature Reserve. Litter washing ashore from distant sources is not subject to the same controls as locally generated refuse and other wastes. Artefacts from before 1949 are considered to have historical value and are treated in section 5.7.

Policy: To avoid the accumulation of wastes in the Nature Reserve, and remove old wastes generated since 1949. All persistent wastes (e.g. plastics, glass, metals, concrete) and toxic wastes (e.g. used oil, photographic and other chemicals, radioactive wastes) must be removed from the Nature Reserve. Small quantities of burnable waste (wood and paper) can be incinerated provided this is well controlled (section 5.13). Small amounts of kitchen wastes and sewage can be disposed of at sea or in the inter-tidal zone at the accommodation zone. Waste reduction (i.e. removal of excess packaging), prior to entering the reserve, is encouraged, but must not increase the risk that rodents and other organisms are carried to the island.

Implementation: Most existing wastes are concentrated at the main landing sites. Disused building materials and refuse should be removed from Blenden Hall and the Waterfall. Large amounts of litter are washed ashore, especially on the western coast (Plate 33). Most of this litter derives from South America or from vessels operating outside the Nature Reserve. It is not feasible to collect and remove the large volumes involved, but sporadic clean-ups might be warranted, especially if seals and birds become entangled in stranded litter on a regular basis.

Solid wastes generated ashore must be sorted into three categories, and disposed of as follows:

- Plastics, metals, glass and other persistent wastes must be packed into sealed containers for removal from the Nature Reserve;
- Wood and paper can either be removed from the reserve or burnt, provided fires are restricted to the lower beach in the accommodation zone on calm days, and that fire control measures are available (section 5.13); and
- Limited quantities of food waste can be dumped at sea or from the beach in the accommodation zone. Feeding of wildlife is prohibited.

In the marine zone, Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL) applies. In terms of this convention, only macerated food wastes may be dumped within 12 nautical miles of land. However, this does not apply to the release of under-size rock lobster and the dumping of other fishery bycatch.



Plate 34. The stream used for drinking water and washing where it emerges onto the beach at Blenden Hall.

As long as few people visit the island, sewage and grey water from the accommodation zone can be disposed of in the intertidal zone, where heavy wave action ensures rapid dilution. A pit toilet may be erected in the accommodation zone provided care is taken not to contaminate the water supply; drinking water is collected from where the stream west of the hut joins the beach (Plate 34).

5.13 Fire prevention

Policy: To minimise the risk of runaway fires burning the vegetation or peat. Fires have burnt parts of Inaccessible Island at least twice, in 1872 and 1909. The latter fire reportedly burned for a month (Hagen 1952).

Implementation: No open fires are allowed except for small fires on the boulder beach in the accommodation zone at Blenden Hall (Plate 35). They must be at least 5 m from the nearest vegetation, must only be lit on calm days, and must be attended at all times by people with fire-fighting equipment (e.g. several large buckets of water). All coals must be doused thoroughly. No fires are allowed at night.

No smoking is allowed during day visits to the island. Longer-term visitors may smoke in the accommodation zone provided all used matches and cigarette ends are disposed of carefully.

Exhaust fumes from generators pose a fire risk if they vent onto the ground or vegetation. Consequently exhausts must be vented upward and away from vegetation. Safety and rescue flares may only be used in genuine emergencies and every effort made to ensure that any flares used do not start fires.

5.14 Avoiding bird strikes

Policy: Nocturnal seabirds are disoriented by lights at night. The policy objectives are to reduce to a minimum all exposed lights in the Nature Reserve and to assist birds affected by lights.

Implementation: Windows in the hut at Blenden Hall and port-holes on visiting ships must have effective blackout blinds. These blinds must be used as a matter of course. Only the minimum necessary amount of external lighting is allowed on ships. Tourist vessels are not allowed to enter the Nature Reserve in the dark. Extra precautions must be taken to turn off or dim external lights once birds are seen to be attracted to the lights. Bird strikes are most likely to occur on misty nights.

Birds affected by lights on ships must be collected as soon as possible, and be released away from lights once their eyes have become accustomed to the dark (10–15 minutes). Dark recesses on ships where affected birds gather should be covered where possible to avoid birds accumulating (Ryan 1991).

5.15 Collection of specimens

Policy: To control the collection of specimens and scientific samples through a permit system.

Implementation: Collecting of all living and non-living samples for scientific purposes requires a permit from the Tristan Government (Appendix 8). For living organisms, non-destructive sampling is preferred. Special motivation is required for destructive sampling. All applications must be accompanied by written approval from the applicant's scientific ethics committee confirming the humane nature of the proposed research techniques. Sample size must be the minimum required and must not exceed 20 individuals or 1% of the island population, whichever is the lesser number. It is the responsibility of the person undertaking collections to ensure that all relevant quarantine measures and permit requirements (e.g. CITES) are complied with when exporting samples.

5.16 Preservation of specimens and archives

Policy: To ensure that specimens and data collected in the Nature Reserve are accessible for future researchers and other interested parties.

Implementation: Requirements attached to permits to conduct research and collect specimens must include that permit holders:

- ❑ Deposit all remaining specimens in museums or other public institutions at the end of their study; and
- ❑ Submit to the Tristan Government two copies of all publications, reports, lists of specimens, and other relevant documents, including maps and charts, that deal with the Inaccessible Island Nature Reserve.

Archives should be established on Tristan and at least one other centre. All visitors should complete a brief report summarising their activities on the island (section 5.10.2, Appendix 9).

5.17 Information and education

Policy: All people visiting the Nature Reserve must be aware of the conservation and scientific value of the reserve, and be familiar with the regulations designed to protect its resources.

Because of the remoteness of Inaccessible Island, only a relatively small number of people will be able to visit the reserve. Accordingly, efforts should be made to publicise the Nature Reserve and its conservation importance through various media.

Implementation: The management plan is designed to provide sufficient information for visitors to understand the reasoning behind specific regulations. Efforts must be made to ensure that it is widely distributed (e.g. to fishing companies, tour companies and guides, ship's captains, yacht clubs, etc.).

People applying for permits to enter the reserve must declare that they are aware of the stipulations of the plan and agree to abide by them (Appendix 8). However, day visitors (especially tourists), entering the reserve under a group permit, may not have the time or inclination to read the entire management plan. Should tourism be allowed at the island, all visitors must be briefed thoroughly on the reserve's conservation importance and the key regulations controlling their activities in the reserve. Such briefing must take place before landing and is the responsibility of the group leader. Only if this measure fails to effect appropriate behaviour among visitors should information signs be erected at landing sites, because such signs detract from the wilderness experience. A brief list of guidelines (Appendix 10) should be supplied by group leaders to all participants before going ashore.

Informing the broader public of Inaccessible Island can be achieved through popular articles and the production of documentary films. Researchers visiting the reserve are encouraged to write popular accounts of their findings so that they are available to the broadest possible audience.

5.18 Revision of management plan

Policy: The management plan for Inaccessible Island should be revised regularly to ensure that it remains relevant for any changes in prevailing conditions.

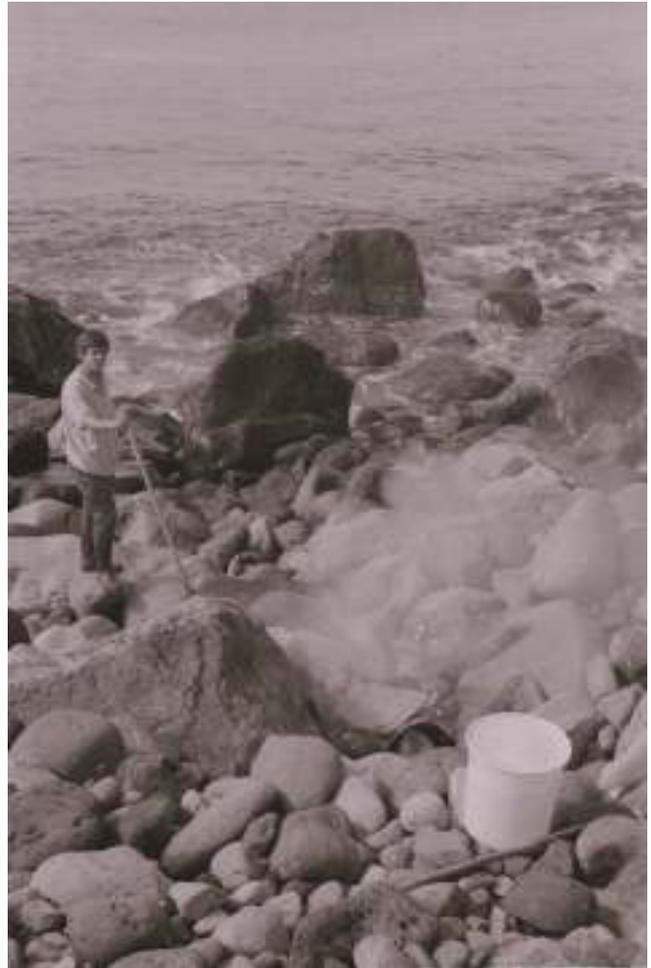


Plate 35. Burning paper and wood refuse on the boulder beach at Blenden Hall on a calm day. The fire is attended constantly, and there is a large bucket of water on hand.

Implementation: The Tristan Government should institute reviews and revisions of the management plan on a regular basis (e.g. every five years). Changes in conditions at Inaccessible, or improved knowledge about the island and its ecosystems, necessitate these revisions. The Tristan Government can issue new regulations which will apply in addition to or in place of those listed in the current management plan. Revised plans or amended texts should be available as published, public documents.

5.19 Availability of management plan

Policy: The management plan should be freely available, although a small charge may be levied.

Implementation: Copies of the management plan are available from the Administrator, Tristan da Cunha, South Atlantic (via Cape Town) (hmg@cunha.demon.co.uk), or from the Overseas Territories Department, United Kingdom Foreign and Commonwealth Office, London SW1 2AH, United Kingdom.

References

Only references not in Appendix 1 are listed here.

- ALLANSON, B.R., HART, R.C. & LUTJEHARMS, J.R.E. 1981. Observations on the nutrients, chlorophyll and primary production of the Southern Ocean south of Africa. *S. Afr. J. Antarct. Res.* 10: 3–14.
- ANON. 1995. MS *Explorer* first on Nightingale. *Tristan Times* 2/95: 4–5.
- ANON. 1988. Elephant seals pup at Boat-harbour Bay. *Tristan Times* (new series) 30: 3.
- CARTER, J.R. 1966. Some fresh water diatoms of Tristan da Cunha and Gough Island. *Nov. Hedw.* 11: 443–483.
- CLIMAP. 1976. The surface of ice-age earth. *Science* 191: 1131–1137.
- CLIMAP. 1984. The last inter-glacial ocean. *Quaternary Res.* 21: 123–224.
- COOPER, J. & RYAN, P.G. 1994. *Management plan for the Gough Island Wildlife Reserve*. Government of Tristan da Cunha, Tristan da Cunha.
- CROXALL, J.P. (ed.) 1991. Seabird status and conservation: a supplement. *Int. Council Bird Preserv. Tech. Publ.* 11: 1–308.
- CROXALL, J.P., EVANS, P.G.H. & SCHREIBER, R.W. (eds) 1984. Status and conservation of the world's seabirds. *Int. Council Bird Preserv. Tech. Publ.* 2: 1–778.
- DINGWALL, P.R. (ed.) 1995. *Progress in conservation of the Subantarctic islands*. IUCN, Gland, Switzerland.
- FAO. 1999. International plan of action for reducing incidental catch of seabirds in longline fisheries. FAO, Rome.
- GLASS, N., LAVARELLO, I., GLASS, J.P. & RYAN, P.G. 2000. Longline fishing at Tristan da Cunha: impacts on seabirds. *Atlantic Seabirds* 2: 49–56.
- HAFSTEN, U. 1960a. Pleistocene development of vegetation and climate in Tristan da Cunha and Gough Island. *Arbok Univ. Bergen, Mat.-Naturw. Ser.* 20: 1–48.
- HAFSTEN, U. 1960b. The Quaternary history of vegetation in the South Atlantic islands. *Proc. R. Soc. Lond. B* 152: 516–529.
- HELYER, P. & SWALES, M.K. 1998. *Bibliography of Tristan da Cunha*. Anthony Nelson, Oswestry.
- HÖFLICH, O. 1984. Climate of the South Atlantic Ocean. Pp. 1–195 in van Loon, H. (ed.) *World survey of climatology. Vol. 15. Climates of the oceans*. Elsevier, Amsterdam.
- HOLLIN, J.T. & SCHILLING, D.H. 1981. Late Wisconsin–Weichselian mountain glaciers and small ice-caps. Pp. 179–226 in Denton, G.H. & Hughes, T.J. (eds) *The last great ice-sheets*. John Wiley, New York.
- MCDUGALL, I. & OLLIER, C.D. 1982. Potassium-argon ages from Tristan da Cunha, South Atlantic. *Geol. Mag.* 119: 87–93.
- MOORE, D.M. 1971. Southern oceanic wet heathlands (including Magellanic moorlands). Pp. 489–497 in Specht, R.L. (ed.) *Ecosystems of the world. 9A Heathland and related shrubland*. Elsevier, Amsterdam.
- MORLEY, J.J. & HAYS, J.D. 1979. Comparisons of glacial and inter-glacial oceanographic conditions in the South Atlantic from variations in calcium carbonate and radiolarian distributions. *Quaternary Res.* 12: 396–408.
- MUIRHEAD, S.J. & FURNESS, R.W. 1988. Heavy metal concentrations in the tissues of seabirds from Gough Island, South Atlantic Ocean. *Mar. Pollut. Bull.* 19: 278–283.
- OLMOS, F., BASTOS, G.C.C. & NEVES, T.D.S. 2000. Estimating seabird bycatch in Brazil. *Second International Conference on the Biology and Conservation of Albatrosses and Other Petrels, Honolulu*. (abstract, p. 48).
- ROYLE, S.A. 1995. Economic and political prospects for the British Atlantic Dependent Territories. *Geogr. J.* 161: 307–321.
- RYAN, P.G. 1987. The incidence and characteristics of plastic particles ingested by seabirds. *Mar. Environ. Res.* 23: 175–206.
- RYAN, P.G., CONNELL, A.D. & GARDNER, B.D. 1988. Plastic ingestion and PCBs in seabirds: is there a relationship? *Mar. Pollut. Bull.* 19: 174–176.
- RYAN, P.G. & COOPER, J. 1991. Rockhopper Penguins and other marine life threatened by driftnet fisheries at Tristan da Cunha. *Oryx* 25: 76–79.
- WACE, N.M. 1990. World thermal climates and the concepts of seasonality and continentality in climate classification. *Erdkunde* 44: 237–259.
- WATT-JONES, H.L. & COBB, F.F. 1903. Steps taken to obtain information at Tristan da Cunha. Pp. 12–20 in Further correspondence relating to the Island of Tristan da Cunha. Prime Ministers Department, Cape of Good Hope, Cape Town.
- WILLIAMSON, M. 1981. *Island populations*. Oxford University Press, Oxford.

Appendix 1

Bibliography of Inaccessible Island

Excludes minor references in the grey literature as well as secondary citations, such as summations of already published data in handbooks. Helyer & Swales (1998) provide a bibliography of Tristan.

- ABBOTT, I. 1978. The significance of morphological variation in the finch species on Gough, Inaccessible and Nightingale Islands, South Atlantic Ocean. *J. Zool., Lond.* 184: 119–125.
- ANASTOS, G. 1954. Description of a tick, *Ixodes percavatus* Neumann, 1906, from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 27: 1–4.
- ANDREW, T.G. & HECHT, T. 1992. The feeding biology of *Acantholatris monodactylus* (Pisces: Cheilodactylidae) at Tristan da Cunha and Gough Island, South Atlantic Ocean. *S. Afr. J. Antarct. Res.* 22: 41–49.
- ANDREW, T.G. & HECHT, T. 1996. Age and growth of the soldier, *Sebastes capensis* (Pisces: Scorpaenidae) at Tristan da Cunha and Gough Island, South Atlantic Ocean. *J. Zool., Lond.* 238: 215–135.
- ANDREW, T.G., HECHT, T., HEEMSTRA, P.C. & LUTJEHARMS, J.R.E. 1995. Fishes of the Tristan da Cunha group and Gough Island, South Atlantic Ocean. *Ichthyol. Bull. J.L.B. Smith Inst. Ichthyol.* 63: 1–43.
- ANON. 1937a. Tristan da Cunha in 1937. *Geogr. Mag.* (Oct 1937): 25–50.
- ANON. 1937b. The past three years. *Tristan da Cunha Newsletter* (publ. by the Society for the Propagation of the Gospel in Foreign Parts).
- ANON. 1948. Exclusive report on the Tristan da Cunha fishing industry expedition. *S. Afr. Shipping News Fishing Ind. Rev.* 3(4): 33–37.
- ANON. 1985. Island Council. *Tristan Times* 5/85: 2.
- ANON. 1986. Inaccessible Island. *Tristan Times* 5/86: 4.
- ANON. 1987a. Fisherman lost at Inaccessible. *Tristan Times* 3/87: 3.
- ANON. 1987b. Alleged poaching incident. *Tristan Times* 3/87: 3.
- ANON. 1992. Shipping. *Tristan Times* 5/92: 1.
- ANON. 1993. The yacht *Halcyon*. *Tristan Times* 1/93: 8–9.
- ANON. 1994. New automatic weather station for Inaccessible. *Tristan Times* 2/94: 4.
- ARNELL, S. 1958. Hepatics from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 42: 1–76.
- BAARDSETH, E. 1941. The marine algae of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 9: 1–173.
- BAKER, P.E., GASS, I.G., HARRIS, P.G. & LE MAITRE, R.W. 1964. The volcanological report of the Royal Society Expedition to Tristan da Cunha, 1962. *Phil. Trans. R. Soc. Lond.*, A 256: 439–578.
- BARROW, K.M. 1910. *Three years in Tristan da Cunha*. Skeffington, London.
- BARTSCH, I. 1995. A new subspecies of the freshwater halacarid mite *Lobohalacarus weberi* (Romijn and Viets) (Halacaridae, Acari) from a southern Atlantic ocean island. *Ann. Cape Prov. Mus. (nat. Hist.)* 19: 171–180.
- BEIER, M. 1955. Pseudoscorpione von Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 35: 1–4.
- BEINTEMA, A.J. 1972. On the occurrence of *Anous tenuirostris* on Tristan da Cunha. *Ardea* 60: 222–223.
- BEINTEMA, A.J. 1973. *Anous tenuirostris* on Tristan da Cunha, a correction. *Ardea* 61: 191.
- BEST, P.B. 1988. Right Whales *Eubalaena australis* at Tristan da Cunha – a clue to the ‘non-recovery’ of depleted stocks? *Biol. Conserv.* 46: 23–51.
- BIRDLIFE INTERNATIONAL. 2000. *Threatened birds of the world*. Lynx Edicions & BirdLife International, Barcelona & Cambridge.
- BOOY, D.M. 1957. *Rock of exile: a narrative of Tristan da Cunha*. Dent, London.
- BOSANQUET, G.S. 1876. *Diamond*, at sea... Pp. 5–10 (no. 5, inclosure 2) in Correspondence relating to the Island of Tristan da Cunha. Prime Ministers Department, Cape of Good Hope, Cape Town.
- BOURNE, W.R.P. 1976. Seabirds and pollution. Pp. 403–502 in R. Johnston (ed.) *Marine pollution*. Academic Press, London.
- BRANDER, J. 1940. *Tristan da Cunha 1506–1902*. Allen & Unwin, London.
- BRINK, P. 1948. Coleoptera of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 17: 1–123.
- BROEKHUYSEN, G.J. & MACNAE, W. 1949. Observations of the birds of Tristan da Cunha Islands and Gough Island in February and early March 1948. *Ardea* 37: 97–113.
- BRUNTON, E.V. 1994. *The Challenger Expedition, 1872–1876: a visual index*. Natural History Museum, London.
- CAMPBELL, G. 1876. *Log letters from the Challenger*. Macmillan & Co., London.
- CAMPBELL SMITH, W. 1930. Petrography of the Tristan da Cunha group. Pp. 72–87 in *Report on the geological collections made during the voyage of the Quest on the Shackleton–Rowett Expedition to the South Atlantic & Weddell Sea in 1921–1922*. British Museum (Natural History), London.
- CARLGRÉN, O. 1941. Corallimorpharia, Actiniaria, and Zooantharia. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 8: 1–12.
- CHEVALLIER, L.U.C., REX, D.C. & VERWOERD, W.J. 1992. Geology and geomorphology of Inaccessible Island, South Atlantic. *Geol. Mag.* 129: 1–16.
- CHINA, W.E. 1958. Hemiptera of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 43: 1–8.
- CHOWN, S.L., RODRIGUES, A.S.L., GREMMEN, N.J.M. & GASTON, K.J. 2001. World Heritage status and the conservation of Southern Ocean islands. *Conserv. Biol.* 15: 550–557.
- CHRISTENSEN, C. 1940. The Pteridophytes of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 6: 1–25.
- CHRISTOPHERSEN, E. 1940. *Tristan da Cunha, the lonely isle*. Cassell, London.
- CHRISTOPHERSEN, E. 1944. New phanerogams from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 11: 1–15.
- CHRISTOPHERSEN, E. 1947. A short account of the expedition. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 20: 1–24.

- CHRISTOPHERSEN, E. 1968. Flowering plants from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 55: 1–29.
- CHRISTOPHERSEN, E. & SCHOUB, G. 1942. Meteorological observations. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 10: 1–24.
- CLAY, T. 1957. Mallophaga from Tristan da Cunha. Part I. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 40: 1–5.
- CLEVE-EULER, A. 1949. Littoral diatoms from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 18: 1–34.
- CLIFF, R.A., BAKER, P.E. & MATEER, N.J. 1991. Geochemistry of Inaccessible Island volcanics. *J. Volcan. Geotherm. Res.* 33: 325–326.
- COLLAR, N.J. & STUART, S.N. 1985. *Threatened birds of Africa and related islands. The ICBP/IUCN Red Data Book*. 3rd edition. Int. Council for Bird Preserv. & IUCN, Cambridge.
- COOPER, J. & FRASER, M.W. 1986. Bird ringing at the Tristan da Cunha islands, 1982–1985. *S. Afr. J. Antarct. Res.* 16: 38–40.
- COOPER, J., RYAN, P.G. & ANDREW, T.G. 1995. Conservation status of the Tristan da Cunha islands. Pp. 59–70 in P.R. Dingwall (ed.) *Progress in conservation of the Subantarctic islands*. IUCN, Gland, Switzerland.
- COTT, H.B. 1953. The exploitation of wild birds for their eggs. *Ibis* 95: 421–441.
- CRAWFORD, A.B. 1941. *I went to Tristan*. Hodder & Staughton, London.
- CRAWFORD, A.B. 1982. *Tristan da Cunha and the roaring forties*. Charles Skilton, Edinburgh & London.
- DAY, J.H. 1954. The Polychaeta of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 29: 1–35.
- DEAN, W.R.J., MILTON, S.J., RYAN, P.G. & MOLONEY, C.L. 1994. The role of disturbance in the establishment of indigenous and alien plants at Inaccessible Island, South Atlantic Ocean. *Vegetatio* 113: 13–23.
- DENNIS, R.W.G. 1955. Ascomycetes from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 36: 1–10.
- DES ABAYES, H. 1940. De specibus generis lichenum cladoniae ex insulis Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 4: 1–6.
- DICKIE, G. 1874. Algae from Tristan d'Acunhae and Inaccessible Island, collected by H.N. Moseley, M.A. *J. Linn. Soc., Bot.* 14: 384–387.
- DICKSON, J.H. 1965. The biological report of the Royal Society Expedition to Tristan da Cunha, 1962. Part 1. General introduction. *Phil. Trans. R. Soc. Lond.*, B 249: 259–271.
- DIXON, H.N. 1960. Mosses of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 48: 1–49.
- DUNNE, J.C. 1941. Vulcanology of the Tristan da Cunha group. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 2: 1–145.
- ELLIOTT, H.F.I. 1953. The fauna of Tristan da Cunha. *Oryx* 2: 41–53.
- ELLIOTT, H.F.I. 1954. On two new races and an undescribed variety from the Tristan da Cunha group. *Bull. Br. Orn. Club* 74: 21–24.
- ELLIOTT, H.F.I. 1957. A contribution to the ornithology of the Tristan da Cunha group. *Ibis* 99: 545–586.
- ENTICOTT, J.W. & O'CONNELL, M. 1983. The distribution of the spectacled form of the White-chinned Petrel *Procellaria aequinoctialis conspicillata* in the South Atlantic Ocean. *Br. Antarct. Surv. Bull.* 66: 83–86.
- FLINT, J.H. 1967. Conservation problems on Tristan da Cunha. *Oryx* 9: 28–32.
- FRASER, M.W. 1983. The Denstone Expedition to Inaccessible Island. *Cormorant* 11: 69–73.
- FRASER, M.W. 1984a. New and rarely recorded species from the Tristan da Cunha group. *Bull. Br. Orn. Club* 104: 154–155.
- FRASER, M.W. 1984b. Inaccessible. *Br. Trust Orn. News* 130: 8.
- FRASER, M.W. 1984c. Foods of Subantarctic Skuas on Inaccessible Island. *Ostrich* 55: 192–195.
- FRASER, M.W. 1989. The Inaccessible Island Rail: smallest flightless bird in the world. *Afr. Wildl.* 43: 14–19.
- FRASER, M.W. 1990. The birds of Inaccessible Island. Part I: seabirds. *Afr. Wildl.* 44: 347–353.
- FRASER, M.W. 1990. The birds of Inaccessible Island. Part II: landbirds. *Afr. Wildl.* 45: 20–23.
- FRASER, M.W. & BRIGGS, D.J. 1992. New information on the *Nesospiza* buntings at Inaccessible Island, Tristan da Cunha, and notes on their conservation. *Bull. Br. Orn. Club* 112: 191–205.
- FRASER, M., GILFILLAN, D., HALL, N., HOLT, R., MATEER, N., PREECE, R., SIDDALL, C., SWALES, M., WOOLLEY, J. & DOWSETT, D. 1983. Denstone Expedition to Inaccessible Island. *Denstonian Suppl.*, 60 pp. Denstone College, Uttoxeter.
- FRASER, M.W., RYAN, P.G. & WATKINS, B.P. 1988. The seabirds of Inaccessible Island, South Atlantic Ocean. *Cormorant* 16: 7–33.
- FRASER, M.W., DEAN, W.R.J. & BEST, I.C. 1992. Observations on the Inaccessible Island Rail *Atlantisia rogersi*: the world's smallest flightless bird. *Bull. Br. Orn. Club* 112: 12–22.
- FRASER, M.W., RYAN, P.G., DEAN, W.R.J., BRIGGS, D.J. & MOLONEY, C.L. 1994. Biology of the Tristan Thrush *Nesocichla eremita*. *Ostrich* 65: 14–25.
- FRENCH, G.A. 1977. *Africa Pilot, Vol. II*. Hydrographic Dept., Taunton, Somerset.
- FREY, R. 1954. Diptera brachycerca und Sciaridae von Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 26: 1–55.
- GAMBLE, E.H. 1897. Report on Tristan da Cunha. Pp. 16–17 (Enclosure 22) in Further correspondence relating to the Island of Tristan da Cunha. Prime Ministers Department, Cape of Good Hope, Cape Town.
- GANE, D.M. 1924. A new flightless bird: the rail of Inaccessible Island. *Illustr. Lond. News* (30 Aug. 1924).
- GANE, D.M. 1932. *Tristan da Cunha: an empire outpost and its keepers*. Allen & Unwin, London.
- GANE, D.M. 1933a. Early records of Tristan da Cunha: the discovery in New London. The Settlement's beginnings – an island constitution at the outset. *United Empire* 24(10): 589–598.
- GANE, D.M. 1933b. Early records of Tristan da Cunha: the discovery in New London. II. Tributes from the shipwrecked. *United Empire* 24(11): 651–658.
- GASS, I.G. 1967. Geochronology of the Tristan da Cunha group of islands. *Geol. Mag.* 104: 160–170.
- GREEN, L.G. 1960. *Eight bells at Salamander*. Howard Timmins, Cape Town.
- GREENWAY, J.C. Jr. 1958. *Extinct and vanishing birds of the world*. American Committee for International Wildlife Protection, New York.
- GREIG, A.M. 1847. *Fate of the Blenden Hall, East Indiaman, bound to Bombay: with an account of her wreck, and the sufferings and privations endured by the survivors, for six months, on the desolate islands of Inaccessible and Tristan d'Acunha, in Lat. 37°29' South, Long. 11°45' West (from a journal kept on the islands and written with the blood of the penguin)*. W.H. Colyer, New York.
- GROVES, E.W. 1981. Vascular plant collections from the Tristan da Cunha group of islands. *Bull. Br. Mus. Nat. Hist. (Bot.)* 8: 333–420.
- HACKMAN, W. 1959. On the genus *Scaptomyza* Hardy (Diptera, Drosophilidae). *Acta Zool. Fenn.* 97: 3–73.
- HAGEN, Y. 1952. The birds of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 20: 1–248.
- HAGEN, Y. 1982. Migration and longevity of Yellow-nosed

- Albatrosses banded at Tristan da Cunha in 1938. *Ornis Scand.* 13: 247–248.
- HEYDORN, A.E.F. 1969. The South Atlantic rock lobster *Jasus tristani* at Vema Seamount, Gough Island and Tristan da Cunha. *Investl Rpt Div. Sea Fish. S. Afr.* 73: 1–20.
- HOLDGATE, M.W. 1960. The fauna of the mid-Atlantic islands. *Proc. R. Soc. Lond.*, B 152: 550–567.
- HOLDGATE, M.W. 1965. The fauna of the Tristan da Cunha islands. *Phil. Trans. R. Soc. Lond.*, B 249: 361–424.
- HOLDGATE, M.W. 1969. Biological work on Tristan da Cunha Island, Nightingale Island, Inaccessible Island and Gough Island, 1968. *Polar Rec.* 14: 661–662.
- HOLTHUIS, L.B. & SIVERTSEN, E. 1960. The Crustacea Decapoda, Mysidacea and Cirripedia of the Tristan da Cunha archipelago. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 52: 1–55.
- HOOPER, S. 1968. Cyperaceae from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 54: 1–9.
- JEEKEL, C.A.W. 1954. Diplopoda of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 32: 1–9.
- JORDAN, H.E.K. 1954. Siphonaptera. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 30: 1–2.
- JORGENSEN, P.M. 1977. Foliose and fruticose lichens from Tristan da Cunha. *Norske Videnskaps-Akademi (Naturv. Klasse Skrifter)* 36: 1–40.
- JORGENSEN, P.M. 1979. The phytogeographical relationships of the lichen flora of Tristan da Cunha, South Atlantic Ocean (excluding Gough Island). *Can. J. Bot.* 57: 2279–2282.
- JORSTAD, I. 1947. Parasitical micromycetes from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 14: 1–32.
- KENSLEY, B. 1994. Redescription of *Iais elongata* Sivertsen & Holthuis, 1980, from the South Atlantic Ocean (Crustacea: Isopoda: Asellota). *Proc. Biol. Soc. Wash.* 107: 274–282.
- KUSCHEL, G. 1962. The Curculionidae of Gough Island and the relationships of the weevil fauna of the Tristan da Cunha group. *Proc. Linn. Soc., Lond.* 173: 69–78.
- LAMB, I.M. 1940. The lichen genus *Placopsis* in Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 3: 1–4.
- LAWRENCE, R.F. 1955. Chilopoda of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 39: 1–13.
- LINDSTEDT, A. 1960. Marine Cyanophyceae from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 50: 1–30.
- LOCKHART, J.G. 1930. Blenden Hall: *the true story of a shipwreck, a casting away and life on a desert island*. Philip Allan, London.
- LOWE, P.R. 1923. Notes on some land birds of the Tristan da Cunha group collected by the *Quest* Expedition. *Ibis* 5: 511–529.
- LOWE, P.R. 1927. Natural history specimens collected by Mr and Mrs Rogers on Tristan da Cunha and Inaccessible and Nightingale islands and now at the British Museum (Natural History). Pp. 209–213 in R.A. Rogers *The lonely island*. Allen & Unwin, London.
- LOWE, P.R. 1928. A description of *Atlantisia rogersi*, the diminutive and flightless rail of Inaccessible Island (South Atlantic) with some notes on flightless rails. *Ibis* Ser. 12, 4: 99–131.
- MACKENZIE, C. 1986. Nightingale whales. *Tristan Times* 2/86: 5.
- MACKAY, M. 1963. *Angry island*. Arthur Baker, London.
- MANTON, I. & VIDA, G. 1968. Cytology of the fern flora of Tristan da Cunha. *Proc. R. Soc. Lond.*, B 170: 361–379.
- MARR, J.W.S. (SCOUT) 1923. *Into the frozen south*. Cassell, London.
- MARSTEN, G.M. 1897. H.M.S. *Widgeon* at sea ... Pp. 21–23 (Enclosure 33) in Further correspondence relating to the Island of Tristan da Cunha. Prime Ministers Department, Cape of Good Hope, Cape Town.
- MATEER, N.J. 1985. Tristan da Cunha: an intriguing archipelago in the South Atlantic. *Bull. Assoc. N. Dakota Geogr.* 35: 53–64.
- MATHEWS, G.M. & GORDON, J.G. 1932. The birds of Tristan da Cunha. *Novit. Zool.* 38: 13–48.
- MILLAR, R.H. 1960. Ascidians from the Tristan da Cunha group of islands. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 53: 1–15.
- MILLER, J.A. 1964. Age determinations made on samples of basalt from Tristan da Cunha and other parts of the Mid-Atlantic Ridge. *Phil. Trans. R. Soc. Lond.*, A 256: 565–569.
- MILTON, S.J., RYAN, P.G., MOLONEY, C.L., COOPER, J. & MEDeiros, A.C. JR. 1993. Disturbance and demography of *Phyllica arborea* (Rhamnaceae) on the Tristan–Gough group of islands. *Bot. J. Linn. Soc.* 111: 55–70.
- MORISON, G.D. 1958. Thysanoptera of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 47: 1–5.
- MORTENSEN, T. 1940. Echinoderms of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 7: 1–12.
- MOSELEY, H.N. 1875. Notes on plants collected in the islands of the Tristan d'Acunha group. *J. Linn. Soc., Bot.* 14: 377–384.
- MOSELEY, H.N. 1879. *Notes by a naturalist. An account of observations made during the voyage of H.M.S. Challenger*. Macmillan, London.
- MUNCH, P.A. 1945. Sociology of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 13: 1–331.
- MUNCH, P.A. 1979. Sail traffic on Tristan da Cunha during the mid-nineteenth century. *Amer. Assoc. Polar Philatelists Monogr. Ser.* 1: 1–28.
- MURPHY, R.C. 1936. *Oceanic birds of South America*. Vol. 1. Macmillan, New York.
- NICOLL, M.J. 1909. *Three voyages of a naturalist*. Witherby & Co., London.
- OLDFIELD, S. 1987. *Fragments of paradise. A guide for conservation action in the U.K. Dependent Territories*. British Association of Nature Conservationists and Pisces Publications, Oxford.
- OLLIER, C.D. 1984. Geomorphology of the South Atlantic volcanic islands. Part I: the Tristan da Cunha group. *Z. Geomorphol.* 28: 367–382.
- OLSON, S.L. 1973. Evolution of the rails of the South Atlantic Islands (Aves: Rallidae). *Smithsonian Contr. Zool.* 152: 1–53.
- PEARCE, H.L.D. 1904. Extract from a letter of proceedings of H.M.S. *Odin*, dated 3rd February 1904. Pp. 9–12 (no. 11) in Correspondence relating to the Island of Tristan da Cunha. Prime Ministers Department, Cape of Good Hope, Cape Town.
- PEARMAN, J.V. 1958. Psocoptera. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 45: 1–3.
- PENRITH, M.J. 1967. The fishes of Tristan da Cunha, Gough Island and the Vema Seamount. *Ann. S. Afr. Mus.* 49(22): 523–549.
- PILLANS, N.S. 1943. The genus *Phyllica* Linn. *J. S. Afr. Bot.* 8: 1–164.
- POCOCK, R.I. 1893. Report on the Myriopoda of the *Challenger* Expedition. *Ann. Mag. Nat. Hist.* 6(11): 121–142.
- POLLOCK, D.E. 1981. Population dynamics of rock lobster *Jasus tristani* at the Tristan da Cunha group of islands. *Fish. Bull. S. Afr.* 15: 49–66.
- POLLOCK, D.E. 1991. Spiny lobsters at Tristan da Cunha, South Atlantic: inter-island variations in growth and population structure. *S. Afr. J. Mar. Sci.* 10: 1–12.
- POLLOCK, D.E. 1994. The fisheries for two *Jasus* species of the south-east Atlantic and for *Palinurus gilchristi* off the southern Cape coast of South Africa. Pp. 91–102 in B.F. Phillips,

- J.S. Cobb & J. Kittaka (eds) *Spiny lobster management*. Fishing News Books, Blackwell, Oxford.
- POLLOCK, D.E. & GOOSEN, P.C. 1991. Reproductive dynamics of the two *Jasus* species in the South Atlantic region. *S. Afr. J. Mar. Sci.* 10: 141–147.
- POLLOCK, D.E. & ROSCOE, M.J. 1977. The growth at moulting of crayfish *Jasus tristani* at Tristan da Cunha, South Atlantic. *J. Cons. Perm. Int. Explor. Mer.* 37: 144–146.
- PREECE, R.C., BENNETT, K.D. & CARTER, J.R. 1986. The Quaternary palaeobotany of Inaccessible Island (Tristan da Cunha group). *J. Biogeogr.* 13: 1–33.
- RAND, A.L. 1955. The origin of landbirds of Tristan da Cunha, Nightingale and Inaccessible Islands. *Fieldiana Zool.* 37: 139–166.
- RAPOPORT, E.H. 1970. Collembola of Tristan da Cunha, Nightingale and Inaccessible Islands. *Nytt. Mag. Zool.* 18: 23–32.
- REYNE, J.H. 1954. Scale insects (Coccoidea). *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 31: 1–2.
- RICHARDS, R. 1873. Two years on Inaccessible. *Cape Monthly Mag. Ser. 2* 7: 321–337.
- RICHARDSON, M.E. 1984. Aspects of the ornithology of the Tristan da Cunha group and Gough Island, 1972–1974. *Cormorant* 12: 122–201.
- RIS LAMBERS, D.H. 1955. Aphididae of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 34: 1–5.
- ROBERTS, A. & KIRBY, J. 1948. On a collection of birds and eggs from the Tristan d'Acunha Islands, made by John Kirby. *Ann. Transvaal Mus.* 21: 55–62.
- ROGERS, R.A. 1927. *The lonely isle*. Allen & Unwin, London.
- ROSCOE, M.J. 1979. Biology and exploitation of the rock lobster *Jasus tristani* at the Tristan da Cunha islands, South Atlantic, 1949–1976. *Investl Rpt Sea Fish. Branch S. Afr.* 118: 1–47.
- ROSENTHAL, E. 1952. *Shelter from the spray*. Cape Times, Parow.
- ROTHSCHILD, W. 1928. Exhibit of egg and skin of *Atlantisia rogersi*. *Bull. Br. Orn. Club* 48: 121–124.
- ROUX, J.P. 1991. A new species of *Elaphoglossum* (Pteridophyta: Lomariopsidaceae) from the Tristan da Cunha island group, central South Atlantic. *S. Afr. J. Bot.* 57: 234–235.
- ROUX, J.P. 1993a. The genus *Asplenium* L. (Aspleniaceae: Pteridophyta) in the Tristan–Gough Island Group. *Kew Bull.* 48: 79–97.
- ROUX, J.P. 1993b. *Elaphoglossum* Schott ex J. Smith (Lomariopsidaceae: Pteridophyta) in the Tristan da Cunha, Gough and Marion Island groups. *Bot. J. Linn. Soc.* 112: 203–222.
- ROUX, J.P., RYAN, P.G., MILTON, S.J. & MOLONEY, C.L. 1992. Vegetation and checklist of Inaccessible Island, central South Atlantic Ocean, with notes on Nightingale Island. *Bothalia* 22(1): 93–109.
- ROWAN, A.N., ELLIOTT, H.F.I. & ROWAN, M.K. 1951. The 'spectacled' form of the Shoemaker *Procellaria aequinoctialis* in the Tristan da Cunha group. *Ibis* 93: 169–174.
- ROWAN, M.K. 1951. The Yellow-nosed Albatross *Diomedea chlororhynchos* Gmelin at its breeding grounds in the Tristan da Cunha group. *Ostrich* 22: 139–155.
- ROWAN, M.K. 1952. The Greater Shearwater *Puffinus gravis* at its breeding grounds. *Ibis* 94: 97–121.
- ROWAN, M.K. 1965. Regulation of seabird numbers. *Ibis* 107: 54–59.
- ROWAN, M.K. & ROWAN, A.N. 1955. The fishes of Tristan da Cunha. *S. Afr. J. Sci.* 52: 129.
- RYAN, P.G. 1987a. The origin and fate of artefacts stranded on islands in the African sector of the Southern Ocean. *Environ. Conserv.* 14: 341–346.
- RYAN, P.G. 1987b. In search of the Inaccessible Rail and other insular pursuits. *Excellence* 4 (3): 61–64.
- RYAN, P.G. 1988. Expedition to Inaccessible Island. *Tristan Times* 3/88: 4.
- RYAN, P.G. 1991. The impact of the commercial lobster fishery on seabirds at the Tristan da Cunha islands, South Atlantic. *Biol. Conserv.* 57: 1–12.
- RYAN, P.G. 1992. The ecology and evolution of *Nesospiza* buntings. Unpubl. Ph.D. thesis, Univ. of Cape Town (300 pp).
- RYAN, P.G. 1998. The taxonomic and conservation status of the Spectacled Petrel *Procellaria conspicillata*. *Bird Conserv. Int.* 8: 223–235.
- RYAN, P.G. 2000. Separating albatrosses: Tristan or Wandering? *Africa: Birds & Birding* 5(4): 35–39.
- RYAN, P.G. In press. Morphological heritability among a hybrid bunting complex: *Nesospiza* at Inaccessible Island. *Condor*
- RYAN, P.G. & FRASER, M.W. 1988. The use of Great Skua pellets as indicators of plastic pollution in seabirds. *Emu* 88: 16–19.
- RYAN, P.G. & MOLONEY, C.L. 1991a. Tristan Thrushes kill adult White-bellied Storm Petrels. *Wilson Bull.* 103: 130–132.
- RYAN, P.G. & MOLONEY, C.L. 1991b. Prey selection and temporal variation in the diet of Subantarctic Skuas at Inaccessible Island, Tristan da Cunha. *Ostrich* 62: 52–58.
- RYAN, P.G. & MOLONEY, C.L. 2000. The status of Spectacled Petrels *Procellaria conspicillata* and other seabirds at Inaccessible Island. *Mar. Orn.* 28: 93–100.
- RYAN, P.G. & MOLONEY, C.L. in press. Breeding behaviour, clutch size and egg dimensions of *Nesospiza* buntings at Inaccessible Island, Tristan da Cunha. *Ostrich*
- RYAN, P.G., MOLONEY, C.L. & WATKINS, B.P. 1989a. Concern about the adverse effect of introduced mice on Island Tree *Phylica arborea* regeneration. *S. Afr. J. Sci.* 85: 626–627.
- RYAN, P.G. & WATKINS, B.P. 1988. Accumulation of stranded plastic objects and other artefacts at Inaccessible Island, central South Atlantic Ocean. *S. Afr. J. Antarct. Res.* 18: 11–13.
- RYAN, P.G., WATKINS, B.P. & MOLONEY, C.L. 1988. Return to Inaccessible. *Tristan Times* 5/88: 4.
- RYAN, P.G., WATKINS, B.P. & SIEGFRIED, W.R. 1989b. Morphometrics, metabolic rate and body temperature of the small flightless bird: the Inaccessible Island Rail. *Condor* 91: 465–467.
- RYAN, P.G., DEAN, W.R.J., MOLONEY, C.L., WATKINS, B.P. & MILTON, S.J. 1990. New information on seabirds at Inaccessible Island and other islands in the Tristan da Cunha group. *Mar. Orn.* 18: 43–54.
- RYAN, P.G., MOLONEY, C.L. & HUDON, J. 1994. Color variation and hybridization among *Nesospiza* buntings on Inaccessible Island, Tristan da Cunha. *Auk* 111: 314–327.
- RYAN, P.G., COOPER, J. & GLASS, J.P. 2001. The population status and conservation of the Tristan Albatross. *Bird Conserv. Int.* 11: 33–46.
- SAUNDERS, H. 1881. On the Laridae collected during the expedition. *Rep. Sci. Res. Voy. H.M.S. Challenger, 1873–1876; Zool.* 2: 133–140.
- SCHWARZ, E.H.L. 1905. Rocks of Tristan d'Acunha, brought back by H.M.S. *Odin* in 1904 with their bearing on the question of the permanence of the ocean basin. *Trans. S. Afr. Phil. Soc.* 16: 9–51.
- SCLATER, P.L. 1881. On the birds collected on the Atlantic islands and Kerguelen islands, and on the miscellaneous collections. *Rpt Sci. Res. H.M.S. Challenger, 1873–1876; Zool.* 2: 110–117.
- SIDDALL, C.P. 1985. Survey of Inaccessible Island, Tristan da Cunha group. *Polar Rec.* 22: 528–531.
- SINGER, R. 1955. Agaricales from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 38: 1–4.
- SIVERTSEN, E. 1945. Fishes of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 12: 1–52.
- SIVERTSEN, E. & HOLTHUIS, L.B. 1980. The marine isopod

- crustacea of the Tristan da Cunha archipelago. *Gunneria* 35: 1–128.
- SKOTTSBERG, C. 1946. *Peperomia berteriana* miq. and *P. tristanensis* Christoph., and interesting case of disjunction. *Meddelanden Från Göteborgs Botaniska Trädgård*. 16: 251–288.
- SOOT-RYEN, T. 1960. Pelecypods from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 49: 1–47.
- SOUTHERN, H.N. 1951. The status of *Procellaria conspicillata*. *Ibis* 93: 174–179.
- SPRY, W.J.J. 1876. *The cruise of H.M.S. Challenger*. Sampson Low, Marston, Searle & Rivington, London.
- STENHOUSE, J.H. 1924. Notes on rare land birds from Tristan d'Achunha in the Royal Scottish Museum. *Scottish Naturalist* 147: 93–96.
- STEPHENSON, K. 1949. The Amphipoda of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 19: 1–61.
- STOCK, J.H. 1954. Pycnogonida from Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 33: 1–13.
- STOLTENHOFF, F. 1895. The story of Frederick Stoltenhoff. Pp. 70–78 in W.J.J. Spry *The cruise of H.M.S. Challenger*. Sampson Low, Marston, Searle & Rivington, London.
- STOLTENHOFF, F. & STOLTENHOFF, G. 1873. Two years on Inaccessible Island. *Cape Monthly Mag.* 7 (Dec.): 321–337.
- STRESEMANN, E. 1953. Birds collected by Capt. Dugald Carmichael on Tristan da Cunha 1816–1817. *Ibis* 95: 146–147.
- SWALES, M.K., SIDDALL, C.P., MATEER, N.J., HALL, H.N., PREECE, R.C. & FRASER, M.W. 1985. The Denstone Expedition to Inaccessible Island. *Geogr. J.* 151: 347–350.
- SWIRE, H. 1938. *The voyage of the Challenger*. Golden Cockerel Press, UK.
- THOMSON, C.W. 1877. *The voyage of the Challenger, 1873–1876. Vol. 2, the Atlantic*. Macmillan, London.
- THOMSON, C.W. & MURRAY, J. 1889. Report on the scientific results of the voyage of H.M.S. *Challenger*: Physics and Chemistry, Vol. II. *Rep. Scient. Res. H.M.S. Challenger, 1873–76* 2 (4): 1–180.
- TYRON, A.F. 1966. Origin of the fern flora of Tristan da Cunha. *Br. Fern Gaz.* 9: 269–276.
- VALDEBENITO, H.A., STUESSY, T.F. & CRAWFORD, D.J. 1990. Synonymy in *Peperomia berteriana* (Piperaceae). Results in biological disjunction between Pacific and Atlantic Oceans. *Brittonia* 42: 121–124.
- VAN RYSSSEN, W.J. 1976. *The birds of the Tristan da Cunha group and Gough Island*. University of Cape Town, Cape Town.
- VIBERT DOUGLAS, G. 1930. Topography and geology of the Tristan da Cunha group. Pp. 67–71 in *Report on the geological collections made during the voyage of the Quest on the Shackleton–Rowett Expedition to the South Atlantic & Weddell Sea in 1921–1922*. British Museum (Natural History), London.
- VIETTE, P.E.L. 1952. Lepidoptera. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 23: 1–19.
- VIGELAND, I. 1958. Bryozoa of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 44: 1–17.
- VINCENT, J. 1966. *Red data book, Vol. 2 – Aves*. IUCN, Switzerland.
- VINCENT, J. 1979. *Red data book, Vol. 2: Aves* (revised ed.). IUCN, Switzerland.
- VON KELER, S. 1951. Zwei neue Mallophagenarten von *Atlantisia rogersi*. *Z. Parasitenk.* 15: 34–56.
- VON KELER, S. 1960. On some Mallophaga of seabirds from the Tristan da Cunha group and Dyer Island. *J. Ent. Soc. Sthn Afr.* 15: 204–238.
- VON WILLEMÖES-SUHM, R. 1876. Observations made during the earlier part of the voyage of H.M.S. *Challenger*. *Proc. R. Soc. Lond.* 24: 569–585.
- VOOUS, K.H. 1962. Notes on a collection of birds from Tristan da Cunha and Gough Island. *Beaufortia* 9(99): 105–114.
- WACE, N.M. 1966. Last of the virgin islands. *Discovery* 27 (2): 36–42.
- WACE, N.M. 1967. Alien plants in the Tristan da Cunha islands. *IUCN Publ. (new ser.)* 9: 46–60.
- WACE, N.M. 1969. The discovery, exploitation and settlement of the Tristan da Cunha islands. *Proc. R. Geogr. Soc. Austr.* 70: 11–40.
- WACE, N.M. 1977. Man–environment interactions in the Tristan–Gough islands 1976. Unpubl. MS (addendum to Wace & Holdgate 1976)
- WACE, N.M. & DICKSON, J.H. 1965. The terrestrial botany of the Tristan da Cunha islands. *Phil. Trans. R. Soc. Lond.*, B 249: 273–360.
- WACE, N.M. & HOLDGATE, M.W. 1976. Man and nature in the Tristan da Cunha Islands. *Int. Union Conserv. Nature and Natural Resources Monogr.* 6: 1–114.
- WACE, N.M. & OLLIER, C.D. 1984. Biogeography and geomorphology of South Atlantic islands. *National Geogr. Soc. Res. Rpt* 16: 733–758.
- WATERHOUSE, C.O. 1884. Coleoptera collected during the the expedition of H.M.S. *Challenger*. *Ann. Mag. Nat. Hist.* 5(13).
- WATKINS, B., RYAN, P., CHEVALLIER, L., AYLIFFE, J., GLASS, A. & GREEN, J. 1988. Scientists from the Cape visit Inaccessible Island. *Tristan da Cunha Newsl.* 2: 2.
- WESTBLAD, E. 1952. Turbellarians of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 21: 1–8.
- WIBORG, K.F. 1960. Marine copepods of Tristan da Cunha. *Res. Norw. Sci. Exped. Tristan da Cunha 1937–1938* 51: 1–44.
- WILD, F. 1923a. The voyage of the *Quest*. *Geogr. J.* 61: 73–108.
- WILD, F. 1923b. *Shackleton's last voyage. The story of the Quest*. Cassell, London.
- WILD, J.J. 1878. *At anchor: a narrative of experiences afloat and ashore during the voyage of H.M.S. Challenger*. Marcus Ward & Co., London.
- WILKINS, G.H. 1923. Report of the birds collected during the voyage of the *Quest* (Shackleton–Rowett Expedition) to the southern Atlantic. *Ibis* 5:474–511.
- WINTERBOTTOM, J.M. 1976. Keytel's birds from Tristan da Cunha. *Ostrich* 47: 69–70.
- WOOLLEY, J. 1994. *Deliver me from safety*. Wilton 65, York.

Appendix 2

Tristan da Cunha Conservation Ordinance, 1976

Tristan da Cunha, No. 1 of 1976
Made 2nd April, 1976.
Published in the Gazette: 2nd April, 1976.
Date of Commencement: As provided in section 1(2)

AN ORDINANCE

to make provision for the conservation of the fauna and flora of Tristan da Cunha.

Enacted by the Governor of St. Helena and its Dependencies.

1. (1) This Ordinance may be cited as the Tristan da Cunha Conservation Ordinance, 1976.
- (2) This Ordinance shall come into operation on such day as the Administrator shall notify to the public, in such manner as he may consider best for that purpose.
2. (1) In this Ordinance unless the context otherwise requires:
 - “Administrator” means the Administrator of Tristan da Cunha;
 - “Administrator in Council” means the Administrator acting after consultation with the Island Council;
 - “Animal” means any member of the animal kingdom;
 - “Bird” means any member of the class Aves at any stage of the life cycle and includes eggs;
 - “Island Council” means the Island Council of Tristan da Cunha;
 - “Mammal” means any member of the class mammalia;
 - “Plant” means any member of the plant kingdom;
 - “Resident of Tristan da Cunha” means a person born in Tristan da Cunha Islands, the husband, wife or child of any such person and any person who has lived on the main island of Tristan da Cunha for a period of at least one year immediately preceding the date of the event in issue or, as the case may be, the act or omission of which complaint is made but not including in that period any period during which his residence was authorised by a permit;
 - “Territorial waters” means a zone having for its inner boundary the low water line on the coast of the land area of Tristan da Cunha Islands or any part thereof or any other baseline from which the territorial waters are measured and for its seaward boundary a line each point on which is three nautical miles from the nearest point on the aforesaid inner boundary and includes the air space above that zone as well as the seabed and the sub-soil thereof;
 - “Tristan da Cunha Islands” means the main island of Tristan da Cunha, Gough Island, Inaccessible Island, Nightingale Island, Middle Island, Stoltenhoff Island and the islets belonging to any of those islands.
- (2) In this Ordinance
 - (a) any reference to a land area includes the area of the territorial waters of that land area; and
 - (b) a reference to a native animal or to a native plant shall be interpreted as meaning an animal or plant the presence of which in Tristan da Cunha Islands resulted from natural process of dispersal of the species to which the animal or plant belongs.
3. (1) No person shall wilfully within Tristan da Cunha Islands
 - (a) set fire to any vegetation except for agricultural or horticultural purposes;
 - (b) spread, discharge or dump any noxious chemical except within a building or in a place approved by the Administrator for the disposal of such materials;
 - (c) spread by spray or other means any insecticide or pesticide except within a building or tent or for agricultural or horticultural purposes and except within the settlement of Edinburgh in the main island of Tristan da Cunha for public health purposes.
- (2) No person shall wilfully within Tristan da Cunha Islands except with a permit and in accordance with the terms thereof
 - (a) import any kind of live animal or plant not native to Tristan da Cunha Islands;
 - (b) liberate or disseminate any kind of live animal or plant not native to Tristan da Cunha Islands except in an area used for agricultural or horticultural purposes;
 - (c) engage in any action causing disruption of the soil or vegetation other than soil or vegetation in a garden or area used for agricultural or horticultural purposes.
- (3) No person shall wilfully within Gough, Inaccessible, Nightingale, Middle or Stoltenhoff Islands, islets belonging to Tristan da Cunha or in any area in the main island of Tristan da Cunha for the time being declared to be a sanctuary under section 5 of this Ordinance except with a permit and in accordance with the terms thereof construct any house, hut, shed, jetty, landing strip, road or runway or erect any mast, pole, aerial beacon or any other installation or undertake any agricultural or horticultural activity.
- (4) No person, not being a resident of Tristan da Cunha, shall in Inaccessible Island, except with a permit and in accordance with the terms thereof, wilfully pick, cut down, uproot or destroy any native plant.
4. Within the main island of Tristan da Cunha the birds and mammals specified in the First Schedule to this Ordinance

are hereby declared to be protected species and no person shall, except with a permit and in accordance with the terms thereof, wilfully kill, capture or molest any bird or mammal of any species so specified.

5. (1) The Administrator in Council may at any time declare any area of the main island of Tristan da Cunha to be a sanctuary.
- (2) Within any sanctuary under this Ordinance no person shall, except with a permit and in accordance with the terms thereof, wilfully kill, capture or molest any native bird or native mammal.
6. Within Inaccessible, Nightingale, Middle and Stoltenhoff Islands and islets belonging to Tristan da Cunha
 - (1) No person, not being a resident of Tristan da Cunha, shall, except with a permit and in accordance with the terms thereof, wilfully kill, capture or molest or attempt to kill, capture or molest any native bird or native mammal;
 - (2) No resident of Tristan da Cunha shall, except with a permit and in accordance with the terms thereof, wilfully, kill, capture or molest or attempt to kill, capture or molest any native bird or native mammal other than of a species specified in the Second Schedule of this Ordinance.
7. (1) Gough Island is hereby declared to be a wildlife reserve.
- (2) Within a wildlife reserve no person shall, except with a permit and in accordance with the terms thereof,
 - (a) wilfully kill, capture or molest any native bird or any native mammal;
 - (b) pick, cut down, uproot or destroy any native plant.
8. (1) The Administrator in Council may from time to time vary
 - (a) the first and second schedules to this Ordinance by adding or deleting any species of bird or mammal;
 - (b) the areas declared to be sanctuaries on the main island of Tristan da Cunha
- (2) Notice of any variation proposed to be made under subsection (1) of this section shall be posted publicly in such place in the Settlement of Edinburgh as the Administrator may direct and any resident of the main island of Tristan da Cunha who objects to the proposed variation shall be entitled within one calendar month of the posting aforesaid to give notice in writing addressed to the Administrator and delivered to his office that he objects to the proposed variation giving his reasons for such objection.
- (3) The Administrator in Council shall as soon as practicable consider any objection under subsection (2) of this section and the Administrator shall decide thereafter whether the proposed variation shall or shall not be made and if he decides that the variation shall be made it shall come into force three calendar months after the date on which the Administrator so decides otherwise the proposed variation shall lapse.
9. (1) The Administrator may issue a permit to any person named in the permit
 - (a) to do any of the things forbidden to be done without a permit by the provisions of this Ordinance;
 - (b) to take for commercial purposes the number of seals (*Arctocephalus tropicalis*) specified in the permit provided that the person to whom the permit is issued is an employee of the South Atlantic Islands Development Corporation or its subsidiary Tristan Investments (Pty.) Ltd. and provided also that the permit shall lapse forthwith if that person ceases to be such an employee.
- (2) A person to whom a permit is granted under paragraph (b) of subsection (1) of this section shall inform the Administrator within one month after the date of the expiry of the permit of the number of seals of each sex taken under the permit and shall if required to do so produce for inspection by the Administrator or person authorised by the Administrator in that behalf the skins or other products retained by the permit holder.
- (3) A person to whom a permit has been granted under paragraph (a) of subsection (1) of this section or to whom oral permission has been given under subsection (4) of this section shall inform the Administrator from time to time and not later than one month after the date of the expiry of the permit or of the period specified when oral permission was given of anything he has done under the permit or oral permission, including the number of each species of bird or mammal taken by him by virtue of the permit or oral permission.
- (4) A resident of Tristan da Cunha may for himself or for another resident but not for a person who is not a resident of Tristan da Cunha do any of the things forbidden to be done without a permit by sections 4, 5 or 6 of this Ordinance for which he has first obtained the oral permission of the Administrator or of the person authorised under subsection (6) of this section and of the Chief Islander: Provided that any native bird or native mammal taken under oral permission may not be disposed of to any person who is not a resident of Tristan da Cunha and provided that in any proceedings under this Ordinance in which a person claims that he has been given oral permission as aforesaid it shall be for that person to prove that he had such permission.
- (5) A permit issued under this section or oral permission given under this section shall be for a period and shall be restricted to such area, in consideration of such payments and subject to such restrictions, terms and conditions as may be included in the permit or specified when the oral permission is granted.
- (6) The Administrator may authorise a person to act on his behalf under this section either generally or for purposes specified in the authorisation.
10. Except to the extent to which it conflicts with any rights granted to the South Atlantic Islands Development Corporation by the Crown Agents for Overseas Governments and Administrations acting for and on behalf of the Governor of St. Helena the provisions of this Ordinance shall apply to the said Corporation and its employees and its subsidiary Tristan Investments (Pty) Limited and its employees.
11. Records shall be kept by the Administrator or by his direction of all permits granted and all permission given including particulars of the period and conditions thereof and of all activities conducted and of the numbers of each species of bird and mammal taken under permits issued or under oral permission given under the provisions of section 9 of this Ordinance and such records shall be made available for inspection by any member of the Island Council.
12. Any person who has in his possession any animal or plant which under section 3 of this Ordinance may not be imported, liberated or disseminated or has in his possession any native bird or native mammal killed or captured in con-

travention of this Ordinance shall be guilty of an offence and the animal, plant, native bird or native mammal shall be disposed of as the Administrator may direct.

13. (1) Any person who contravenes or attempts to contravene any of the provisions of section 3, section 4, subsection (2) of section 5, section 6 or subsection (2) of section 7 of this Ordinance or does not give the information required by subsection (2) or (3) of section 9 of this Ordinance shall be guilty of an offence.
- (2) Any person guilty of an offence referred to in section 12 or in subsection (1) of this section shall be liable
- (a) if a resident of Tristan da Cunha, for a first offence to a fine not exceeding five pounds and for a second or subsequent offence a fine not exceeding fifteen pounds;
- (b) if not a resident of Tristan da Cunha, for a first offence to a fine not exceeding twenty pounds and for a second or subsequent offence to a fine not exceeding one hundred pounds.
- (3) In any proceedings under this Ordinance in which it is alleged that an animal or plant is or is not a native animal or a native plant the Court shall presume that the animal or plant is a native animal or a native plant unless the Court is satisfied the presence in Tristan da Cunha Islands of the species to which the plant or an animal belongs probably resulted from deliberate or accidental introduction by man.
14. Where any person has been convicted of an offence under section 13 of this Ordinance
- (a) any animal, plant or product thereof which has been the subject of such conviction shall be forfeited to the Administrator and the Court may, in addition to any penalty that may be imposed, order any firearm, machine, instrument, trap, net apparatus, article or material which has been used in the commission or concealment of the offence to be forfeited also to the Administrator;
- (b) any such animal, if native to Tristan da Cunha Islands, shall, if alive, be released whenever possible in its appropriate habitat; and
- (c) any such animal, if not native to Tristan da Cunha Islands and any such animal, if of a kind the import of which is contrary to subsection (2) of section 3 of this Ordinance or if its release would be impracticable or if it is dead or inanimate, and any plant and anything forfeited to the Administrator under this Ordinance shall be disposed of as directed by the Administrator and if such animal, plant or thing as is referred to in this paragraph is sold, the proceeds thereof shall be applied for the benefit of and accrue to the funds of Tristan da Cunha.
15. (1) The provisions of this Ordinance may be enforced by conservation officers who for that purpose shall have the powers conferred by the next succeeding section of this Ordinance.
- (2) The Administrator may appoint any person to be a conservation officer and every member of the police force shall also be a conservation officer.
16. A conservation officer shall have and may exercise the following powers
- (a) he may arrest without warrant or other process any person whom he has reasonable grounds to suspect of having committed an offence under this Ordinance;
- (b) he may seize and detain pending its production in Court any animal, plant or thing in respect of which he has reasonable grounds to suspect that an offence under this Ordinance has been committed or which appears to him may be required as evidence in proceedings in respect of an offence or may have been used in connection with the commission or concealment of such an offence;
- (c) for the purpose of exercising his powers under this section he may go aboard any vessel within Tristan da Cunha Islands and make such search thereof and such enquiries of any person thereon as he deems necessary to ascertain whether any offence under this Ordinance has been committed and to establish any fact relating thereto;
- (d) if he suspects that there is on a vessel within Tristan da Cunha Islands any person whom he reasonably suspects of having committed an offence under this Ordinance, he may board that vessel and may bring that person before a competent Court and may detain him until the alleged offence has been adjudicated upon;
- (e) if he reasonably suspects that any vessel which is within Tristan da Cunha Islands has been used in the commission of an offence under this Ordinance, he may board the vessel and may require the crew thereof in accordance with any directions given by him to bring the vessel to the nearest or most convenient port and the conservation officer may detain the vessel and crew until such suspected offence has been adjudicated upon by a competent Court.
17. No action shall lie against a conservation officer in respect of any act done or omitted to be done by him in the exercise or purported exercise of his powers under this Ordinance if there shall have been reasonable cause for such act or omission.
18. Any person who obstructs a conservation officer acting in the exercise of his powers under this Ordinance or who refuses or neglects to comply with any requisition or direction lawfully made or given by a conservation officer or who refuses or neglects to answer any question lawfully asked by a conservation officer under this Ordinance shall be guilty of an offence and shall be liable to a fine not exceeding fifty pounds or to imprisonment for a term not exceeding three months or to both such fine and imprisonment.
19. For all purposes of and incidental to the trial and punishment of any person in respect of an offence under this Ordinance and to proceedings and matters preliminary or incidental to or consequential on his trial or punishment and for all purposes of and incidental to the jurisdiction of any Court or of any constable or conservation officer with reference to such offence, the offence shall be deemed to have been committed either in the place in which it was actually committed or in any place in which the offender may for the time being be found.
20. The Wild Life (Tristan da Cunha) Protection Ordinance is hereby repealed.
- Schedule I: Protected birds and mammals on Tristan da Cunha (Main Island)**
- Tristan Thrush or Starchy *Nesocichla eremita*
 Tristan Gallinule and Gough Island Gallinule or Island Cock
Gallinula nesiotis and *Gallinula nesiotis comeri*
 Wandering Albatross *Diomedea exulans*

Fur Seals *Arctocephalus* species (all species)
 Elephant Seal *Mirounga leonina*
 Southern Right Whale *Eubalaena australis*

Sooty Albatross or peeo *Phoebetria fusca*
 Rockhopper Penguin *Eudyptes crestatus*

Second Schedule: Species permitted to be taken by residents of Tristan da Cunha on Inaccessible, Nightingale, Middle and Stoltenhoff Islands without a permit

Given under the hand of the Governor and the Public Seal of St. Helena at the Castle, Jamestown, this 2nd day of April, 1976.

Great Shearwater or petrel *Puffinus gravis*

C.B. KENDALL, Government Secretary.

Legal Notice No. 2 of 1984

**TRISTAN DA CUNHA
 THE CONSERVATION ORDINANCE 1976
 THE CONSERVATION (PROTECTED BIRDS) (AMENDMENT) ORDER 1984**

In exercise of the powers conferred upon the Administrator in Council by section 8 of the Tristan da Cunha Conservation Ordinance the following Order is hereby made:

1. This order may be cited as the Conservation (Protected Birds) (Amendment) Order 1984 and shall come into effect on 6 December 1984.
2. Schedule I to the Conservation Ordinance 1976 is amended as follows
 - (a) By the addition of the following birds to the list of those protected on Tristan da Cunha (Main Island):

Rockhopper penguin *Eudyptes crestatus*
 Yellow-nosed albatross or molly *Diomedea chlororhynchos*
 Sooty albatross or peeo *Phoebetria fusca*
 Grey or brown petrel or pediunker *Adamastor cinereus*
 Broad-billed prion or night-bird *Pachyptila vittata*
 Schlegel's petrel or white-breasted black haglet *Pterodroma incerta*
 Great-winged petrel or black haglet *Pterodroma macroptera*
 Soft-plumaged petrel or night-hawk *Pterodroma mollis*
 Little or Dusky shearwater or whistler *Puffinus assimilis*
 White-bellied storm petrel or storm pigeon *Fregetta grallaria*
 Antarctic or Swallow-tailed tern or kingbird *Sterna vittata*
 Noddy tern or wood pigeon *Anous stolidus*

- (b) By the deletion of the following bird from the list of those protected on Tristan da Cunha (Main Island):

Tristan Gallinule or Gough Island Gallinule or Island Cock *Gallinula nesiotis* and *G. nesiotis comeri*

Made by the Administrator in Council this 6th day of September 1984.

C. F. REDSTON, Administrator.

Legal Notice No. 1 of 1986

**TRISTAN DA CUNHA
 THE CONSERVATION ORDINANCE
 THE CONSERVATION (PROTECTED BIRDS) AMENDMENT ORDER 1984**

In exercise of the powers conferred upon the Administrator in Council by Section 8 of the Tristan da Cunha Conservation Ordinance the following Order is hereby made:

1. Schedule II to the Conservation Ordinance 1976 is amended as follows

By the deletion of Sooty Albatross or Peeo *Phoebetria fusca* as a species permitted to be taken by residents of Tristan da Cunha on Inaccessible, Nightingale, Middle and Stoltenhoff Islands. This species is hereby granted full protection throughout the Tristan da Cunha Islands.

Made by the Administrator in Council this 1st day of July 1986.

R. PERRY, Administrator.

Appendix 2b

Tristan da Cunha Conservation (Amendment) Ordinance, 1997

Tristan da Cunha, No. 3 of 1997
Enacted: 27th February, 1997.
Date of Commencement: On Publication.
Published in the Gazette: 27th February, 1997.

AN ORDINANCE

To amend the Tristan da Cunha Conservation Ordinance, 1976

Enacted by the Governor of St. Helena and its Dependencies.

1. Short title

This Ordinance may be cited as the Tristan da Cunha Conservation (Amendment) Ordinance, 1997.

2. Interpretation

In this Ordinance the “principle Ordinance” means the Tristan da Cunha Conservation Ordinance, 1976.

3. Section 2 amended

Section 2 of the principle Ordinance is amended

- (a) by omitting “authorised by a permit” from the definition “Resident of Tristan da Cunha” and substituting “authorised by a permit issued under the Entry Control (Tristan da Cunha) Ordinance, 1977”; and
- (b) by omitting “three nautical miles” from the definition “Territorial waters” and substituting “12 nautical miles”.

4. Section 3 amended

Section 3 of the principle Ordinance is amended by inserting after subsection (2) the following subsections

- “(2A) A person must not export from the Tristan da Cunha Islands a live native animal except under the authority of a permit and in accordance with its conditions.
- (2B) Notwithstanding section 9, the Administrator has no power to issue a permit for the purpose of subsection (2A) unless
 - (a) the Island Council has approved the issue of the permit; and
 - (b) the Administrator has been satisfied that the animal is being exported solely for scientific purposes.”

5. Section 6 amended

Section 6 of the principle Ordinance is amended by omitting “Inaccessible”.

6. Section 7 replaced

- “7. Gough and Inaccessible islands declared nature reserves
 - (1) Gough and Inaccessible islands are declared to be Nature Reserves.
 - (2) Within a Nature Reserve a person must not, except with a permit and in accordance with its terms
 - (a) wilfully kill, capture or molest a native animal; or
 - (b) pick, cut down, uproot or destroy a native plant.
 - (3) Nothing in subsection (2) shall prohibit or restrict the following:

- (a) a resident of Tristan da Cunha from visiting a Nature Reserve for the purpose of collecting guano and driftwood from its beaches; and
- (b) a person entering the waters of the Nature Reserve for a purpose authorised by a fishing licence issued in accordance with the provisions of the Tristan da Cunha Fishery Limits (Licensing of Fishing) Order, 1983.”

7. Section 9 amended

Section 9 of the principle Ordinance is amended by omitting subsections (1), (2) and (3) and substituting the following subsections

- “(1) The Administrator may issue a permit to authorise a person named in the permit to do anything forbidden by this Ordinance to be done without a permit.
- (2) A person (a) authorised by a permit issued under subsection (1); or (b) to whom oral permission has been given under subsection (4), must inform the Administrator from time to time but not later than one month after expiry of the permit or oral permission of anything that has been done under the permit or oral permission including the number of each species of bird or mammal taken.”

8. Section 10 repealed

Section 10 of the principle Ordinance is repealed.

9. Section 13 amended

Section 13(1) of the principle Ordinance is amended by omitting “subsection (2) or (3) of section 9” and substituting “subsection (2) of section 9”.

10. First Schedule amended

The First Schedule to the principle Ordinance is amended by omitting the heading “*Schedule 1*” and substituting “*First Schedule*”.

Given under the hand of the Governor and Public Seal of St. Helena at the Castle, Jamestown this 27th day of February 1997.

J.G. PERROTT,
Chief Secretary.

Appendix 3

Tristan da Cunha Fishery Limits Ordinance, 1983

Tristan da Cunha, No. 1 of 1983
Enacted: 17th March, 1983.
Published in the Gazette: 17th March, 1983.
Date of Commencement: As provided in section 1

AN ORDINANCE

to define the fishery limits of Tristan da Cunha and to make provision for the regulation of fishing within those limits and for other matters connected therewith

Enacted by the Governor of St. Helena and its Dependencies.

1. (1) This Ordinance may be cited as the Tristan da Cunha Fishery Limits Ordinance, 1983.

(2) This Ordinance shall take effect on such day as the Administrator shall notify to the public in such manner as he may consider best for that purpose.
2. (1) In this Ordinance, except where the context otherwise requires

“fishing boat” means any vessel of whatever size, and in whatever way propelled, which is for the time being employed in fishing operations or any operations ancillary thereto;
“foreign fishing boat” means a fishing boat which is not
(a) registered in Tristan da Cunha; or
(b) owned by a person who is ordinarily resident in Tristan da Cunha;
“master” means, in relation to a fishing boat, the person for the time being in command or in charge of that fishing boat or in charge of the fishing operations on board that fishing boat or, if there is no such person, any person for the time being on board that fishing boat;
“miles” means international nautical miles of 1,852 metres;
“sea fish” includes shellfish, salmon and migratory trout, and “sea fishing” has a corresponding meaning;
“shellfish” includes crustaceans and molluscs of any kind and includes any part of a shellfish and any (or any part of any) brood, half-ware or spat of shellfish and any spawn of shellfish, and the shell, or any part of the shell of a shellfish;
“Tristan da Cunha” means the Island of Tristan da Cunha, Gough Island, Nightingale Island and Inaccessible Island;
“Tristan fishing boat” means any fishing boat which is not within the definition of a foreign fishing boat given above.
3. Notwithstanding any reference to fishery limits or cognate expressions in any other Ordinance the Tristan da Cunha fishery limits extend to 200 miles from the baseline from which the breadth of the territorial waters adjacent to Tristan da Cunha is measured.
4. (1) The Governor may by order designate any country and, in relation to it, areas within Tristan da Cunha fishery limits in which, and descriptions of sea for which, fishing boats registered in that country may fish.

(2) A foreign boat not registered in a country for the time being designated under subsection (1) shall not enter Tristan da Cunha fishery limits except for a purpose recognised by international law or by any convention concerning Tristan da Cunha and the government of the country to which the boat belongs, and any such boat which enters those limits for such a purpose
(a) shall return outside the limits as soon as the purpose has been fulfilled; and
(b) shall not fish or attempt to fish while within the limits.

(3) A foreign fishing boat registered in a country designated under subsection (1) shall not fish or attempt to fish within Tristan da Cunha fishery limits except in an area and for descriptions of fish for the time being designated under this section in relation to that country.

(4) At any time when a foreign fishing boat is in an area within Tristan da Cunha fishery limits and either
(a) it is prohibited by this section from fishing in that area at all; or that area at all; or
(b) it is permitted under this section to fish only for certain descriptions of fish,
then its fishing gear, or so much of the gear as is not required for permitted fishing, shall be stowed in accordance with practice, or where specified, in accordance with an order made by the Governor.

(5) If this section is contravened in the case of any fishing boat
(a) the master of the boat is liable on summary conviction to a fine not exceeding £5,000 or conviction on indictment to a fine;
(b) the court may on convicting him of an offence under this section order the forfeiture of any fish or fish gear found in the boat or taken or used by any person from the boat.

- (6) The foregoing provisions of this section do not prohibit or restrict fishing by fishing boats registered in a foreign country in any area with respect to which special provision is made by any arrangement between the Government of St. Helena and the government of that foreign country for fishing by such boats for the purpose of scientific research or fishery surveys.
5. (1) The Governor may by order provide
- that in any specified area within Tristan da Cunha fishery limits, fishing by fishing boats (whether Tristan fishing boats or foreign) is prohibited unless authorised by a licence granted by the Administrator;
 - that in any specified area outside those limits fishing by Tristan fishing boats is prohibited unless so authorised.
- (2) Such an order may apply to fishing generally in the specified area or to fishing
- for a specified description of sea fish;
 - by a specified method;
 - during a specified season of the year or other period; or
 - in the case of an order under subsection (1)(a), by fishing boats registered in a specified country, and whether the order is general or limited in scope it may provide for exceptions from the prohibition contained in it.
- (3) Where any fishing boat is used in contravention of any prohibition imposed by an order under this section, the master, the owner and the charterer (if any) are each guilty of an offence under this subsection.
- (4) An order under this section may authorise the making of a charge for a licence.
- (5) A licence under this section shall be granted to the master, owner or charterer and may authorise fishing generally or may confer limited authority by reference to, in particular
- the area within which fishing is authorised;
 - the periods, times or particular voyages during which fishing is authorised;
 - the descriptions and quantities of fish which may be taken;
 - The method of sea fishing; or
 - the specific vessel or vessels, or number of vessels to be used.
- (6) A licence under this section may authorise fishing either unconditionally or subject to such conditions as appear to the Administrator to be necessary or expedient for the regulation of sea fishing, and in particular a licence may contain conditions
- as to the landing of fish or parts of fish taken under the authority of the licence; or
 - as to the use to which the fish taken may be put; and if a licence condition is broken the master, the owner and the charterer (if any) of the vessel concerned in such breach are each guilty of an offence under this subsection.
- (7) The Administrator, in granting a licence under this section, may require the master, the owner and the charterer (if any) of the vessel or vessels provided for in the licence to provide him with such statistical information as he may direct, and a person who fails to comply with such a requirement is guilty of an offence under this subsection.
- (8) A licence under this section
- may be varied from time to time; and
 - may be revoked or suspended, if this appears to the Administrator to be necessary or expedient for the regulation of sea fishing.
- (9) If a licence is varied, revoked or suspended the Administrator may, if he considers it appropriate in all the circumstances of the case, refund the whole or part of any charge made for the licence.
- (10) The Administrator may not delegate his licensing powers under this section.
6. (1) The provisions of this Ordinance shall be enforced by sea fishery officers, and for that purpose sea fishery officers shall have the powers set out in section 7 of this Ordinance.
- (2) The following persons shall be sea fishery officers, that is to say, every officer appointed in that behalf by the Administrator, and every member of the Tristan da Cunha Police Force.
7. A sea fishery officer or any person authorised by him, may exercise the following powers with respect to any fishing boat fishing or which he reasonably suspects may have fished within the fishery limits of Tristan da Cunha as defined by this Ordinance
- he may go aboard the fishing boat;
 - he may require the master, the crew or any of them to produce any certificate of registry, licence, official log-book, official paper, article of agreement, and any other document relating to the fishing boat or to the crew or any member thereof, or to any person on board the fishing boat which is in their respective possession or control on board the fishing boat;
 - he may master the crew of the fishing boat;
 - he may require the master to appear and to give an explanation concerning the fishing boat and any crew or any other person on board the fishing boat, and any document mentioned in paragraph (b) of this section;
 - he may make any examination or enquiry which he deems necessary to ascertain whether any provisions of the Tristan da Cunha (Export of Goods) Ordinance 1951, the Export and Import Control Ordinance 1976 or this Ordinance have been contravened;
 - in the case of any person who appears to him to have committed any such contravention, he may, without summons, warrant or other process, take the offender and the fishing boat in respect of which it appears to him there has been a contravention together thereof to the Island of Tristan da Cunha until the alleged contravention has been adjudicated upon.
8. (1) No civil or criminal action shall lie against a sea fishery officer in respect of any action omitted to be done by him in exercise of his powers under this Ordinance if there shall have been reasonable cause for such act or omission.
- (2) If any person obstructs a sea fishery officer when acting in the exercise of his powers under this Ordinance, or refuses or neglects to comply with any requisition or direction lawfully made or given by, or to answer any question lawfully asked by, a sea fishery officer in pursuance of this Ordinance, such person shall be guilty of an offence and shall be liable in summary conviction to a fine not exceed-

ing £100 or to imprisonment for a term not exceeding three months or to both such fine and imprisonment.

(3) In this section, references to a sea fishery officer shall be deemed to include references to any person authorised by him for the purposes of section 7 of this Ordinance.

9. (1) Every person who commits an offence against this Ordinance or any order made hereunder, for which and powers of no other penalty is specifically provided shall be liable to a fine not exceeding £1,000.

(2) In respect of offences charged under this Ordinance or under any order made hereunder, and notwithstanding the second and third sentences of section 4 of the Police (Ascension) Ordinance as applied to Tristan da Cunha by the Tristan da Cunha Ordinances (Application) Ordinance, a Magistrate is hereby given extended jurisdiction to impose any fines up to those specified as maxima.

10. If any fine or amount of costs is adjudged to be due by the master, owner or charterer of any fishing boat in respect of

any contravention of the provisions of this Ordinance, the court may order that in default of payment forthwith, the defendant shall give security for payment of the amount due, and if such security to the satisfaction of the court is not given, the court may order the detention of the fishing boat concerned with the contravention, and such fishing may accordingly be detained at the Island of Tristan da Cunha until sufficient amount due is paid or until sufficient security shall be given to the satisfaction of the court.

11. The Tristan da Cunha Fish (Export) Ordinance 1967 and the Fishery Limits (Tristan da Cunha) Ordinance 1968 are hereby repealed.

Given under the hand of the Governor and the Public Seal of St. Helena at the Castle, Jamestown, this 17th day of March, 1983.

P. DALE,
Government Secretary.

Legal Notice No. 1 of 1983.

**TRISTAN DA CUNHA
THE TRISTAN DA CUNHA FISHERY LIMITS ORDINANCE, 1983
THE TRISTAN DA CUNHA FISHERY LIMITS (LICENSING OF FISHING) ORDER, 1983**

In exercise of the powers conferred upon the Governor by section 5 of the Tristan da Cunha Fishery Limits Ordinance, 1983 (hereinafter called "the Ordinance") the following order is hereby made:

1. This order may be cited as the Tristan da Cunha Fishery Limits (Licensing of Fishing) Order, 1983 and shall notify to the public in such manner as he may consider best for the purpose.
2. Fishing by fishing boats defined by section 2 of the Ordinance within the Tristan da Cunha fishery limits as set out in section 3 of the Ordinance is prohibited unless authorised by a licence (hereinafter called "a fishing licence") granted by the Administrator.
3. The form and duration of a fishing licence shall be determined by the Administrator in each case and such licence may authorise fishing either unconditionally or subject to such conditions as appear to the Administrator to be necessary or expedient for the regulation of sea fishing as defined by section 2 of the Ordinance.
4. A charge may be made for each fishing licence of such sum as may be determined by the Administrator.
5. The prohibition contained under section 2 of this order shall not apply to the taking and processing of such descriptions of fish as may be authorised by the Administrator
 - (a) by any inhabitant or resident of Tristan da Cunha for local consumption or use; or
 - (b) by any vessel for consumption by the passengers and crew; or
 - (c) for scientific purposes.

Made this 17th day of March 1983.

P. DALE, Government Secretary.

Appendix 3b

Tristan da Cunha Fishery Limits (Amendment) Ordinance, 1991

Tristan da Cunha, No. 2 of 1991
Enacted: 27th June, 1991.
Date of Commencement: 27th June, 1991.
Published in the Gazette: 1st July, 1991.

AN ORDINANCE

to revise certain penalties contained in the Tristan da Cunha Fishery Limits Ordinance, 1983

Enacted by the Governor of St. Helena and its Dependencies.

Citation and Commencement

1. This Ordinance may be cited as the Tristan da Cunha Fishery Limits (Amendment) (No. 2) Ordinance, 1991, and shall be read as one with the Tristan da Cunha Fishery Limits Ordinance, 1983, (hereinafter referred to as the principal Ordinance), and shall come into force on the 1st day of July, 1991.

Amendment of Section 1

2. Section 4(5)(a) of the principal Ordinance is amended by substituting the figures “£2,000,000” for the figures “£100,000”.

Amendment of Section 5

3. Section 5(11)(a) of the principal Ordinance is amended by substituting the figures “£2,000,000” for the figures “£100,000”.

Given under the hand of the Governor and the Public Seal of St. Helena at the Castle, Jamestown, this 27th day of June, 1991.

[M.S. Hone]
Chief Secretary.

Appendix 3c

Tristan da Cunha Fishery Limits (Amendment) Ordinance, 1992

Tristan da Cunha, No. 1 of 1992
Enacted: 29th April, 1992.
Date of Commencement: 29th April, 1992.
Published in the Gazette: 29th April, 1992.

AN ORDINANCE

to amend the Tristan da Cunha Fishery Limits Ordinance, 1983, so as to provide that the licensing powers of the Administrator in relation to foreign fishing vessels may also be exercised by the Governor¹

Enacted by the Governor of St. Helena and its Dependencies.

Citation and Commencement

1. This Ordinance may be cited as the Tristan da Cunha Fishery Limits (Amendment) Ordinance, 1992, and shall come into force on the 29th day of April, 1992.

foreign fishing vessels and, for this purpose, all references to the Administrator in this section and any order made hereunder shall be deemed to be references to the Governor also.”

Amendment of the Tristan da Cunha Fishery Limits Ordinance, 1983

2. Section 5 of the Tristan da Cunha Fishery Limits Ordinance, 1983, is amended by the addition of the following subsection:
“(11) Notwithstanding anything contained in this section the Governor may exercise all or any of the Administrator’s licensing powers under this section in relation to

Given under the hand of the Governor and the Public Seal of St. Helena at the Castle, Jamestown, this 29th day of April, 1992.

M.S. HONE,
Chief Secretary.

¹ EXPLANATORY NOTE

(This note is not part of the Ordinance.)

This Ordinance amends the existing law so as to enable the Governor, as well as the Administrator, to deal with the licensing of foreign fishing vessels.

Appendix 3d

Tristan da Cunha Fishery Limits (Amendment) Ordinance, 1997

Tristan da Cunha, No. 3 of 1997
Enacted: 27th February, 1997.
Date of Commencement: On Publication.
Published in the Gazette: 27th February, 1997.

AN ORDINANCE

To amend the Tristan da Cunha Fishery Limits Ordinance, 1983

Enacted by the Governor of St. Helena and its Dependencies.

1. Short title

This Ordinance may be cited as the Tristan da Cunha Fishery Limits (Amendment) Ordinance, 1997.

2. Interpretation

In this Ordinance the “principal Ordinance” means the Tristan da Cunha Fishery Limits Ordinance, 1983.

3. Section 2 amended

Section 2 of the principal Ordinance is amended by repealing the definition “**sea fish**” and substituting the following definitions

“‘**sea fish**’ means a marine animal, other than a mammal or bird, and includes a shell fish;

‘**sea fishing**’ means

- (a) the catching or taking of sea fish; or
- (b) an operation or activity where the catching or taking of sea fish
 - (i) is intended; or
 - (ii) as a direct result of the operation or activity is likely”.

4. Section 4 repealed

Section 4 of the principal Ordinance is repealed.

5. Section 5 amended

Section 5 of the principal Ordinance is amended by repealing subsection (3) and substituting the following subsection “Where a fishing boat is used in contravention of a prohibition imposed by an order under this section

- (a) the master, owner and the charter (if any) are each guilty of an offence and liable on conviction to a fine not exceeding £250,000; and
- (b) the court may on convicting the master, owner or any charterer order the forfeiture of the fishing boat, its gear and stores, and any fish found in the boat or taken or used by a person from the boat.”

6. New section 5A

The principal Ordinance is amended by inserting after section 5 the following section

“**5A Types of licences**

- (1) A licence granted under section 5 in respect of a fishing boat shall be either
- (a) A commercial Fishing Licence either (Full) or (Part Time); or

(b) A Recreational or Research Fishing Licence.

(2) The Administrator shall not grant a Commercial Fishing Licence in respect of a fishing boat unless he has been satisfied by the applicant for the license that the boat is to be operated by a person who

- (a) in the case of an application for a Commercial Fishing Licence (Full)
 - (i) receives at least 90% of his income from fishing; or
 - (ii) spends at least 90% of his working time fishing; or
- (b) in the case of an application for a Commercial Fishing Licence (Part Time)
 - (i) receives at least 30% but less than 90% of his income from fishing; or
 - (ii) spends at least 30% but less than 90% of his working time fishing.”

7. Section 8 amended

Section 8 of the principal Ordinance is amended

- (a) by repealing subsection (i); and
- (b) by repealing from subsection (2) “£100” and substituting “£10,000”.

8. Section 9 amended

Section 9 of the principal Ordinance is amended by repealing “£1000” and substituting “£10,000”.

9. New sections 10A and 10B

The principal Ordinance is amended by adding after section 10 the following sections

“10A Protection of the Crown, etc.

(1) No action lies against the Crown, its servants or agents for anything done or omitted to be done in good faith in the exercise or purported exercise of any power or duty under this Ordinance.

(2) Without prejudice to the generality of subsection (1), no action lies against the Crown, its servants or agents for the loss of, or any damage caused to, any fishing boat while in possession of the Crown, or its servants or agents, by virtue of this Ordinance unless negligence on the part of the Crown, or its servants or agents, is proved.

“10B Regulations

The Governor may make regulations necessary or conven-

ient for the purposes of this Ordinance and may, in particular, make regulations

- (a) prohibiting or restricting the carriage of any prescribed fishing gear or equipment on fishing boats within Tristan da Cunha's fishing limits;
- (b) imposing fines, not exceeding £10,000, for any breach of the regulations."

Given under the hand of the Governor and Public Seal of St. Helena at the Castle, Jamestown, this 27th day of February 1997.

J.G. PERROTT,
Chief Secretary.

Appendix 4

Visits to Inaccessible Island resulting in scientific publications

Expedition/Observer	Date	Duration*	Publications
F. & G. Stoltenhoff	1871–73	690	Richards 1873, Stoltenhoff 1895, 1952
H.M.S. <i>Challenger</i>	1873	1	Dickie 1874, Moseley 1875, 1879, von Willemoes-Suhm 1876, Thomson 1877, Sclater 1878, Saunders 1881, Waterhouse 1884, Pocock 1893
H.M.S. <i>Odin</i>	1904	1	Pearce 1904, Schwarz 1905
P.C. Keytel	1907–09	?	Winterbottom 1976
R.Y.S. <i>Quest</i>	1922	1	Lowe 1923, Marr 1923, Wilkins 1923, Campbell Smith 1930, Vibert Douglas 1930, Viette 1952
H.M. Rogers	1922–26	1	Lowe 1927, 1928, Rogers 1927, Mathews & Gordon 1932
P. Lindsay	1927–28	?	Rothschild 1928, Rand 1955
A.G. Partridge	1929–33	?	Rowan et al. 1951
R.R.S. <i>Discovery</i>	1933	1?	Holdgate 1965
Norwegian Expedition	1938	17	Christensen 1940, Des Abeyes 1940, Lamb 1940, Mortensen 1940, Baardseth 1941, Carlgren 1941, Dunne 1941, Christophersen & Schou 1942, Christophersen 1940, 1944, 1947, 1968, Munch 1945, Sivertsen 1945, Skottsberg 1946, Jorstad 1947, Brink 1948, Cleve-Euler 1949, Stephensen 1949, Hagen 1952, 1982, Viette 1952, Anastos 1954, Day 1954, Frey 1954, Jeekel 1954, Jordan 1954, Reyne 1954, Stock 1954, Beier 1955, Dennis 1955, Lawrence 1955, Ris Lambers 1955, Singer 1955, Clay 1957, Arnell 1958, China 1958, Morison 1958, Pearman 1958, Vigeland 1958, Dixon 1960, Holthuis & Sivertsen 1960, Lindstedt 1960, Millar 1960, Soot-Ryen 1960, Wiborg 1960, Hooper 1968, Jorgensen 1977, 1979
J. Kirby	1945–46	?	Roberts & Kirby 1948
Fishing company studies (M.K. & A.N. Rowan)	1948–50	ca. 20	Broekhuysen & Macnae 1949, Rowan et al. 1951 Rowan 1951, 1952, 1965
R. Upton	1950–51	?	Rand 1955
H.F.I. Elliott	1950–52	?	Elliott 1953, 1954, 1957
N. Scheer	1958–60	?	Voous 1962
Royal Society Expedition	1962	2	Baker et al. 1964, Baird et al. 1965, Holdgate 1965, Wace & Dickson 1965
H.M.S. <i>Protector</i>	1966	?	Dickson 1967, Manton & Vida 1968
Conservation survey	1968	?	Holdgate 1969, Wace 1969, Wace & Holdgate 1976
M.E. Richardson	1972–74	4	Richardson 1984
N.M. Wace & C.D. Ollier	1976	1?	Wace 1977, Ollier 1984, Wace & Ollier 1984
Denstone Expedition	1982–83	88	Fraser 1983, 1984a,b,c, 1990, Fraser et al. 1983, 1988, 1992, 1994, Collar & Stuart 1985, Mateer 1985, Siddall 1985, Swales et al. 1985, Preece et al. 1986, Ryan & Fraser 1988, Cliff et al. 1991, Fraser & Briggs 1992
Percy FitzPatrick Institute	1984	1	Ryan 1987a
SA Weather Bureau	1986	1	Anon. 1986
1st South African Expedition	1987	16	Ryan 1987b, 1988, Ryan & Watkins 1988, Ryan et al. 1989b, Chevallier et al. 1992
2nd South African Expedition	1988	23	Ryan et al. 1988, 1989a, Ryan 1998
Biological oceanography	1989	0 [§]	Pollock 1991
3rd South African Expedition	1989–90	125	Ryan et al. 1990, 1994, Roux 1991, 1993a,b, Ryan & Moloney 1991a,b, 1992, Roux et al. 1992, Milton et al. 1993, Dean et al. 1994, Kensley 1994, Bartsch 1995, Ryan 1998
SA Weather Bureau	1992	1	Anon. 1992
SA Weather Bureau	1994	1	Anon. 1994
Percy FitzPatrick Institute	1999–2000	98	Ryan 2000, Ryan & Moloney 2000, Ryan et al. 2001, Ryan in press, Ryan & Moloney in press

* Duration of visit in days; those for which the duration is unknown (?) probably were only a few days.

§ Ten dives were made from the *Hekla* to sample rock lobsters and their potential prey species.

J.H. Flint, school teacher at Tristan 1963–65, is listed as having visited Inaccessible Island in 1966 (Wace & Holdgate 1976, Fraser et al. 1988), but apparently only visited Nightingale Island (Flint 1967).

Appendix 5

Annotated list of vascular plants from Inaccessible Island

(after Roux et al. 1992, Roux 1993a,b, and comments by Gerhard Jakubowsky)

Species	Habitat [#]	Status and distribution (Tristan common names in brackets)
Pteridophyta (ferns and club mosses)		
<i>Adiantum poiretii</i>	(W)	Rare; known from sites on the northern cliffs at 400 m and in waterfalls at sea level near East Point.
<i>Eriosorus cheilanthoides</i>	F W	Common above 250 m in sheltered microhabitats, especially in open <i>Phylica</i> woodland.
+ <i>Vittaria vittarioides</i>	F W	Common above 200 m, typically growing on boulders and under <i>Phylica</i> woodland.
+ <i>Asplenium alvarazense</i>	F W	Fairly common; found beneath dense stands of <i>Ctenitis aquilina</i> above 300 m.
+ <i>Asplenium insulare</i>	F W T	Fairly common in sheltered sites, under boulders or other vegetation at all elevations (formerly treated as <i>A. erectum</i>).
<i>Asplenium obtusatum</i>	F W T	Endemic variety <i>crassum</i> . Common, often forming dense stands in fern bush; also frequent on cliffs; occurs throughout.
<i>Asplenium platybasis</i>	F W	Endemic variety <i>subnudum</i> . Similar in general appearance to <i>A. obtusatum</i> , with which it occurs above 250 m.
+ <i>Athyrium medium</i>	F W	Fairly common in wet, sheltered sites, mostly above 200 m, but down to 100 m above the Waterfall. Deciduous.
<i>Ctenitis aquilina</i>	F W T	Common on the plateau, where it is dominant in wet heath and forms dense stands in <i>Phylica</i> woodland.
+ <i>Elaphoglossum campylolepium</i>	W F	Restricted to streams and boulder-fields lower down. Uncommon; in association with <i>E. succisifolium</i> above 400 m.
* <i>Elaphoglossum gracilifolium</i>	F	Common, forming large stands with <i>E. laurifolium</i> in bogferns <i>B. palmiforme</i> heath above 350 m.
<i>Elaphoglossum hybridum</i>	F W	Fairly common in shaded sites on rock faces and stems of bogferns above 300 m.
+ <i>Elaphoglossum laurifolium</i>	F W T	Common throughout, typically in more sheltered sites than <i>E. succisifolium</i> ; forms dense stands under <i>Phylica</i> woodland.
+ <i>Elaphoglossum obtusatum</i>	W F	Uncommon. Limited to overhanging boulders and rock faces above 350 m.
+ <i>Elaphoglossum succisifolium</i>	W F T	Common throughout, occurring on rock faces and on the stems of bogferns <i>B. palmiforme</i> .
<i>Azolla filiculoides</i>	B	Common in Skua Pond and at other bogs and seeps between North Point and South Hill.
<i>Blechnum australe</i>	T F	Fairly common in sheltered sites; largely restricted to coastal cliffs, up to 350 m (mostly below 200 m); only known from the plateau above the Waterfall.
+ <i>Blechnum palmiforme</i>	F T W	[Bogfern] Abundant on the plateau; fairly common on well-drained sites on the coastal slopes and lowlands, but absent from steep cliffs.
<i>Blechnum penna-marina</i>	T F W	Common throughout, forming dense stands on well-drained sites on the western side of the island.

Species	Habitat	Status and distribution (Tristan common names in brackets)
<i>Rumohra adiantiformis</i>	T	Fairly common on western coastal slopes, typically below 200 m (rarely to 400 m); scarce on the east coast.
<i>Histiopteris incisa</i>	F T W	Endemic variety <i>carmichaeliana</i> . [Bracken] Occurs throughout; abundant in fern bush, forming dense stands (e.g. on Harold's Plain), but scarce in other habitats. Deciduous.
<i>Hypolepis rugosula</i>	W F T	Endemic variety <i>villosa-viscida</i> . Occurs widely on the plateau, reaching sea level at the Waterfall; typically associated with bird burrows.
<i>Grammitis magellanica</i>	F W T	Fairly common above 200 m on rock faces and stems of bogferns <i>B. palmiforme</i> .
+ <i>Hymenophyllum aeruginosum</i>	F W T	Common above 200 m, chiefly on stems of bogferns <i>B. palmiforme</i> , but also on sheltered rock faces.
<i>Hymenophyllum peltatum</i>	F W T	Fairly common; prefers moister, more sheltered sites than <i>H. aeruginosum</i> .
<i>Trichomanes angustatum</i>	T	Scarce; recorded from shaded, wet rocks under tussock grass <i>Spartina</i> .
+ <i>Huperzia insularis</i>	W F	Fairly common above 250 m, typically in short, open vegetation.
+ <i>Lycopodium diaphanum</i>	F W T	[Devil's fingers] Common throughout, preferring open areas and one of the first species to colonise recently disturbed areas.
<i>Amauropelta bergiana</i>	W F T B	Endemic variety <i>tristanensis</i> . Fairly common on the plateau; restricted to streams and bogs below 200 m.
Spermatophyta (seed-bearing plants)		
Gymnospermae		
<i>Pinus caribea</i>	(T)	Introduced. [Christmas tree] Three trees at the hut at the Waterfall; produce cones but no seedlings.
Monocotyledones		
+ <i>Carex insularis</i>	B W	Common in wet situations throughout and in wet heath; larger than <i>C. thouarsii</i> with drooping flower spikes.
+ <i>Carex thouarsii</i>	W F B T	Occurs throughout. Two varieties recognised: <i>recurvata</i> grows in drier areas and is smaller than <i>thouarsii</i> , which is restricted to the plateau.
<i>Mariscus congestus</i>	B (T)	Introduced. [Old bull grass] Restricted to marshy areas east of Blenden Hall; has decreased in abundance since 1989–90.
+ <i>Scirpus bicolor</i>	W F T	Found throughout. Highly variable; two varieties described: <i>virens</i> is larger, forming tussocks along the coast and on the plateau, and <i>bicolor</i> , which is common in bird-trampled areas.
+ <i>Scirpus sulcatus</i>	B W T F	Two varieties: <i>moseleyanus</i> and <i>sulcatus</i> . Abundant at wet sites, forming dense stands at bogs. Occurs less commonly away from water. Larger than <i>S. bicolor</i> .
<i>Uncinia brevicaulis</i>	W F T	Endemic variety <i>brevicaulis</i> . Common on the plateau, but restricted to shaded spots at sea level, where smaller with fewer, smaller seeds. Largest <i>Uncinia</i> .
<i>Uncinia compacta</i>	W F	Endemic variety <i>elongata</i> . Restricted to shaded sites on the plateau down to 200 m. Intermediate sized, but with a dwarf form on rock faces.
<i>Uncinia meridensis</i>	W F	Common on the plateau, often forming dense stands in open vegetation; smallest of the three <i>Uncinia</i> species.
<i>Phormium tenax</i>	T (F)	Introduced. [Flax] Common on the cliff west of the Waterfall; in 1999, more than 200 plants were counted, greatly increased from 25 in 1990. Nine plants were found on the plateau edge, where there was only one in 1990. One plant was found well upstream on Waterfall River near Round Hill.
+ <i>Agrostis carmichaelii</i>	W T F	Fairly common on rocks, landslides and steep slopes.

Species	Habitat	Status and distribution (Tristan common names in brackets)
<i>Agrostis gigantea</i>	(T)	Introduced. Restricted to the old hut at the Waterfall.
+ <i>Agrostis holdgateana</i>	W F	Fairly common on the plateau and upper slopes, where it is the largest tussock-forming <i>Agrostis</i> species.
<i>Agrostis magellanica</i> [§]	F	Endemic variety <i>laeviuscula</i> . A large, robust grass found along stream banks on the higher plateau (Swales Fell–Denstone Hill).
+ <i>Agrostis media</i>	W F	Fairly common; forms short tussocks on the plateau and upper slopes, especially in steep, open areas.
<i>Agrostis stolonifera</i>	(T)	Introduced. Largely restricted to watercourses, especially waterfalls, where it forms dense mats in the spray zone. Fairly widespread in the eastern rivers.
+ <i>Agrostis trachychlaena</i>	T	Only recorded from Inaccessible by the Norwegian Expedition, growing on damp rocks shaded by tussock grass <i>Spartina</i> .
+ <i>Agrostis wacei</i>	W	Small, wiry grass restricted to open, exposed areas and stream banks on the western plateau and upper slopes.
<i>Aira caryophyllea</i>	T W	Introduced. Fine, feathery grass found at disturbed sites, especially on rocks. Occurs patchily throughout the island, often along streams.
+ <i>Calamagrostis deschampsiiiformis</i>	F W	Common on ridges on the upper plateau, especially the upper slopes of Dune Hills; less common on the lower, eastern plateau among open <i>Phyllica</i> woodland.
<i>Cynodon dactylon</i>	(T)	Introduced. Restricted to a 30×5 m stand on the beach fringe in front of the old hut at the Waterfall. Low seed set may limit its spread.
+ <i>Deschampsia christophersenii</i>	F W	A few records from high ridges on the plateau; easily confused with <i>Calamagrostis</i> and possibly overlooked.
+ <i>Deschampsia mejlandii</i>	W	A large grass found only on the highest ridges of the western plateau.
+ <i>Glyceria insularis</i>	W F B	Found on the plateau, along streams and in boggy areas, down to 150 m at the Waterfall. Occurs away from watercourses along the western rim of the island.
<i>Holcus lanatus</i>	T W F	Introduced. [Farm grass] Second most widespread alien plant, occurring commonly on the coast and along stream banks on the plateau. Forms single species stands along the western plateau edge in areas previously favoured by sheep.
<i>Poa annua</i>	W (T)	Introduced. Fairly common along the high western rim of the plateau, extending down to sea-level at bird-disturbed areas. <i>Poa pratensis</i> (introduced) may occur at the old hut at the Waterfall.
+ <i>Polypogon mollis</i>	W	Scarce; restricted to stream banks on the higher plateau.
<i>Spartina arundinacea</i>	T W F	[Tussock grass] Abundant on coastal slopes, where it forms almost impenetrable stands up to 2.5 m high in places. Less common on the plateau, especially in lower-lying areas.
<i>Vulpia bromoides</i>	T F W	Introduced. Fairly common on slips on the western cliffs and along the West Road; also in isolated patches on the plateau, and rarely at sea level.
Dicotyledones		
<i>Apium australe</i>	W F T	[Celery] Common throughout. Two forms occur: typical island celery, and a taller, less aromatic form with purplish leaf stalks, which is largely restricted to the plateau, especially among tussock grass <i>Spartina</i> .
<i>Centella asiatica</i>	(T)	Introduced. Reported from the hut at the Waterfall in 1962, but not recorded since then.

Species	Habitat	Status and distribution (Tristan common names in brackets)
<i>Hydrocotyle capitata</i>	W B T F	Common throughout in damp or shaded sites.
<i>Chevreulia sarmentosa</i>	T	Only recorded from a talus slope at Blenden Hall by the Norwegian Scientific Expedition in 1938.
<i>Conyza albida</i>	T (F W)	Introduced. Locally common on slips and other disturbed areas east of Blenden Hall and around the Waterfall, with scattered records from other sites on the island. Appears to have decreased in abundance since 1989–90.
* <i>Cotula moseleyi</i>	T	Previously thought to be restricted to Nightingale Island, several plants were found in the penguin colony at Salt Beach, and others on the plateau edge above Warren's Cliff.
* <i>Gnaphalium thouarsii</i>	W F (T)	[Cow pudding grass] Common on the plateau in disturbed areas (slips, bird nests). Reaches 250 m on the western cliffs, but to sea level at the Waterfall.
<i>Lagenophora nudicaulis</i>	F	Fairly common on the plateau above 200 m where it typically grows on bogfern <i>B. palmiforme</i> stems.
<i>Pseudognaphalium luteo-album</i>	T (W)	Introduced. [Muckweed] Locally fairly common on slips and other disturbed areas east of Blenden Hall (to 400 m) and the Waterfall. Appears to have decreased in abundance since 1989–90.
<i>Sonchus oleraceus</i>	T (W F)	Introduced. [Sow thistle] Common around the coast and up the West Road to below the western plateau rim. Virtually absent from the plateau.
<i>Brassica rapa</i>	(T)	Introduced. [Rape seed] Restricted to the immediate vicinity of the hut at the Waterfall, but numbers of plants had increased markedly from 1990, with many seedlings. All large plants were weeded in November 1999.
<i>Cardamine glacialis</i>	W	Scarce; only found from the southern slopes of Swale's Fell to south of Molly Bog.
<i>Raphanus sativus</i>	(T)	Introduced. Recorded from Salt Beach in 1938 by the Norwegian Expedition; may have since died out.
* <i>Callitriche christensenii</i>	B W	Common throughout in streams and bogs, either forming a floating mat or on wet ground; often in pools at the entrance to Spectacled Petrel burrows.
<i>Cerastium fontanum</i>	W F	Introduced. Fairly common in disturbed areas along the western edge of the plateau, and on slips adjacent to the West Road. Scarce elsewhere.
<i>Chenopodium ambrosioides</i>	T	Endemic variety <i>tomentosum</i> . [Island tea] Fairly common in warm, dry spots along the coastal cliffs, to sea level at Salt Beach and the Waterfall.
<i>Calystegia sepium</i>	T (F)	Mostly found on along the coastal cliffs up to 200 m, with a small patch on the plateau above Waterfall Gulch. Distribution patchy and similar to many alien species (Blenden Hall, the Waterfall and Joe's Hill).
<i>Calystegia tuguriorum</i>	(T)	Possibly introduced. Restricted to a small area between Tern Rock (Blenden Hall) and the East Road.
<i>Empetrum rubrum</i>	F T (W)	[Berrybush] Common throughout in open, well-drained areas; also abundant in marshy fern bush on Harold's Plain.
<i>Pelargonium grossularioides</i>	T	Fairly common at disturbed sites up to 200 m on coastal cliffs. Absent from the plateau, but a few occur on the cliff edge above the Waterfall.
<i>Oxalis corniculata</i>	(T F)	Introduced. Reported to be spreading rapidly at Salt Beach in 1873, but now scarce and local at sites between Pig Beach Hill and Salt Beach.
<i>Peperomia berteriana</i>	(F)	Endemic subspecies <i>tristanensis</i> . [Pepper tree] Uncommon, restricted to stream-banks of Waterfall River and its tributaries from 150–300 m.

Species	Habitat	Status and distribution (Tristan common names in brackets)
<i>Plantago major</i>	T B (W)	Introduced. Common along the coast, on slips and around the edges of bogs. Occurs up the West Road and below the western rim of the plateau, but absent from the plateau in 1999–2000.
<i>Rumex acetosella</i>	(F)	Introduced. [Sorrel dock, sour grass] Collected at Salt Beach in 1873 but not this century; currently only known from two isolated sites on the eastern plateau.
<i>Rumex frutescens</i>	T B W	[Pig dock] Common along the coast, in low-land bogs and streams, and up to 500 m in wet heath.
<i>Rumex obtusifolius</i>	T W F	Introduced. [Dock] The most widespread alien plant; occurs at moist sites along the coast, and at bird-disturbed areas and along streams on the plateau.
* <i>Ranunculus caroli</i>	W	Scarce; found only in damp sites from Boulder Hill to Molly Bog on the high western edge of the plateau. Species identification uncertain as no flowers found.
<i>Phylica arborea</i>	F T	[Island tree] Common from the coast to 450 m, but plants stunted in exposed sites above 300 m. Reaches at least 8 m high on the eastern plateau, where it forms closed-canopy woodland. Restricted to better-drained sites in coastal tussock.
* <i>Acaena sarmentosa</i>	W F T	[Dogcatcher] Common above 200 m, extending to the coast in places along streams. Abundant in wet heath; less common in fern bush where it mostly occurs in areas disturbed and fertilised by birds.
* <i>Acaena stangii</i>	W (F)	Fairly common above 400 m, often on rock faces. Has smaller leaves than <i>A. sarmentosa</i> with 9 (not 11) leaflets, and the fruits have few, short barbs.
<i>Malus domestica</i>	T (W)	Introduced. [Apple tree] Small groves of apple trees are planted behind Blenden Hall and north of the penguin colony at Salt Beach. Isolated plants occur on the plateau at the West Road. Apparently not invasive.
* <i>Nertera assurgens</i>	W F T	Common on the plateau, especially in wet heath; reaches sea level at Salt Beach. Has larger leaves than <i>N. depressa</i> with crenulate edges; prefers wetter sites.
<i>Nertera depressa</i>	F T W	[Hen berry] Common in open sites throughout, but scarce in wet heath; often epiphytic on bogfern stems.
* <i>Nertera holmboei</i>	F	Fairly common; restricted to the plateau, typically growing under bogferns or <i>Phylica</i> woodland. Has large, dark green, entire leaves (cf. <i>N. assurgens</i>).
<i>Salix babylonica</i>	(T)	Introduced. [Willow tree] Restricted to Salt Beach, where two trees grow in tall <i>Spartina</i> tussock.
<i>Veronica serpyllifolia</i>	T (W)	Introduced. Fairly common on slips above Blenden Hall, along the West Road and patchily along the western plateau rim to Boulder Hill.
<i>Physalis peruviana</i>	?	Introduced. The only Tristan record is one collected at Inaccessible in 1938 by the Norwegian Expedition. None collected since then; probably extinct.
<i>Solanum nigrum</i>	T (W)	Introduced. [Blackberry] Localised and uncommon, occurring at slips and disturbed areas from Blenden Hall to the East Road and at the Waterfall.
<i>Solanum tuberosum</i>	T	Introduced. [Potato] Restricted to the area around the hut at the Waterfall.

T = tussock grassland, F = fern bush, W = wet heath, B = bogs.

Codes listed in decreasing order of abundance; those in parentheses are highly localised.

* Endemic to Inaccessible Island.

+ Endemic to Tristan–Gough islands.

§ Previous records of *Agrostis goughensis* (Roux et al. 1992) apparently were misidentified specimens of *A. magellanica* (G. Jakubowsky in litt.).

Appendix 6

Birds recorded from Inaccessible Island

(after Richardson 1984, Fraser et al. 1988, 1992, 1994, Ryan et al. 1990,
Ryan & Moloney in press)

Species	Common name (Tristan name)	No. breeding pairs/status
Breeding species		
<i>Eudyptes chrysocome moseleyi</i>	Northern Rockhopper Penguin (Pinnamin)	30 000
* <i>Diomedea [exulans] dabbenena</i>	Tristan Albatross (Gony)	2–3
* <i>Thalassarche chlororhynchos</i>	Atlantic Yellow-nosed Mollymawk (Molly)	1 100
<i>Phoebastria fusca</i>	Sooty Albatross (Peeoo)	500
<i>Pachyptila vittata</i>	Broad-billed Prion (Nightbird)	>50 000
* <i>Procellaria conspicillata</i>	Spectacled Petrel (Ringeye)	3–4 000
<i>Procellaria cinerea</i>	Grey Petrel (Pediunker)	probably breeds
* <i>Pterodroma incerta</i>	Atlantic Petrel (White-breasted Black Haglet)	may breed
<i>Pterodroma macroptera</i>	Great-winged Petrel (Black Haglet)	may breed
<i>Pterodroma mollis</i>	Soft-plumaged Petrel (Littlest Whitebreast, Whistler)	>10 000
<i>Lugensa brevirostris</i>	Kerguelen Petrel (Blue Nighthawk)	>100
<i>Puffinus gravis</i>	Great Shearwater (Petrel)	>2 000 000
<i>Puffinus griseus</i>	Sooty Shearwater	may breed
<i>Puffinus assimilis</i>	Little Shearwater (Whistler, Nighthawk)	>5 000
<i>Fregatta grallaria</i>	White-bellied Storm Petrel (Stormpigeon)	>50 000
<i>Pelagodroma marina</i>	White-faced Storm Petrel (Skipjack)	>5 000
<i>Pelecanoides urinatrix</i>	Common Diving Petrel (Flying Pinnamin)	>1 000
* <i>Atlantisia rogersi</i>	Inaccessible Rail (Little Island Cock)	8 400
<i>Catharacta antarctica hamiltoni</i>	Subantarctic Skua (Seahen)	80
<i>Sterna vittata</i>	Antarctic Tern (Kingbird)	100
<i>Anous stolidus</i>	Common Noddy (Woodpigeon)	50
* <i>Nesocichla eremita gordonii</i>	Tristan Thrush (Starchy)	850
* <i>Nesospiza acunhae acunhae</i>	Tristan Bunting (Canary)	10 000
* <i>Nesospiza wilkinsi dunnei</i>	Wilkins' Bunting (Big Canary)	2 000
Non-breeding visitors (NB) and vagrants (V)		
<i>Eudyptes chrysolophus</i>	Macaroni Penguin	V
<i>Thalassarche melanophris</i>	Black-browed Mollymawk (Cape Molly)	NB
<i>Phoebastria palpebrata</i>	Light-mantled Sooty Albatross	V
<i>Macronectes giganteus</i>	Southern Giant Petrel (Stinker, Nellie, Boneshaker)	NB
<i>Macronectes halli</i>	Northern Giant Petrel (Stinker, Nellie, Boneshaker)	NB
<i>Fulmarus glacialis</i>	Southern Fulmar (Snow Gull)	NB
<i>Daption capense</i>	Pintado Petrel	NB
<i>Pachyptila desolata</i>	Antarctic Prion	NB
<i>Procellaria aequinoctialis</i>	White-chinned Petrel (Cape Hen, Shoemaker)	NB
<i>Calonectris diomedea</i>	Cory's Shearwater	NB
<i>Oceanites oceanicus</i>	Wilson's Storm Petrel	NB
<i>Garrodia nereis</i>	Grey-backed Storm Petrel	NB
<i>Fregata</i> sp.	Unidentified frigatebird	V
<i>Egretta alba</i>	Great White Egret	V
<i>Egretta thula</i>	Snowy Egret	V
<i>Porphyryla martinica</i>	American Purple Gallinule (Guttersnake)	V
<i>Calidris fuscicollis</i>	White-rumped Sandpiper	V
<i>Larus dominicanus</i>	Kelp Gull	V
<i>Sterna paradisaea</i>	Arctic Tern	V
<i>Hirundo rustica</i>	Barn Swallow	V

* Endemic to Inaccessible Island.

+ Endemic to the Tristan–Gough group.

Appendix 7

Fish recorded from the waters off Inaccessible Island

(after Andrew et al. 1995, J.P. Glass pers. obs.)

Species	Common name (Tristan name)	Status*	Habitat
Fish recorded from Inaccessible Island			
<i>Notorhynchus cepedianus</i>	Broad-nose Seven-gill Shark	C	shelf
<i>Etmopterus princeps</i>	Great Lanternshark	R	oceanic
<i>Prionace glauca</i>	Blue Shark	C	oceanic
<i>Sphyrna mokarran</i>	Great Hammerhead Shark	U	oceanic
<i>Bassanago nielsenii</i>	Hairy Conger Eel	C	shelf
<i>Lampadena dea</i>	Lanternfish	U	oceanic
<i>Physiculus karrerae</i>		C	shelf
<i>Cheilopogon pinnatibarbatulus</i>	Small-head Flyingfish	C	oceanic
<i>Scomberesox saurus</i>	Saury	C	oceanic
<i>Centriscomps obliquus</i>	Banded Snipefish (Piper)	U	shelf
<i>Notopogon lillieii</i>	Round Bellowsfish (Piper)	C	shelf
<i>Helicolenus mouchezi</i>	Soldier	C	shelf
<i>Sebastes capensis</i>	False Jacopever (Soldier)	A	shelf
<i>Polyprion oxygeneios</i>	Wreckfish (Steambras)	C	shelf
<i>Lepidoperca coatsii</i>		U	shelf
<i>Pseudopentaceros richardsoni</i>	Pelagic Armourhead	U	shelf
<i>Trachurus longimanus</i>	Southern Horse Mackerel (Mackerel)	C	shelf
<i>Acantholatris monodactylus</i>	Fivefinger	A	shelf
<i>Latris lineata</i>	Striped Trumpeter (Funnyfish)	U	shelf
<i>Mendosoma lineatum</i>		C	shelf
<i>Nelabrichthys ornatus</i>	Tristan Wrasse (Concha)	A	shelf
* <i>Bovichtus diacanthus</i>	Klipfish	A	shelf
<i>Thyrssites atun</i>	Snoek	C	shelf
<i>Hyperoglyphe antarctica</i>	Southern Butterfish (Bluefish)	C	shelf
<i>Schedophilus velaini</i>	Oval Driftfish (Stumpnose)	C	shelf
Fish recorded from other islands in the Tristan archipelago (Tristan and Nightingale)			
<i>Isurus oxyrinchus</i>	Short-fin Mako	U	oceanic
<i>Torpedo nobiliana</i>	Atlantic Electric Ray	U	shelf
<i>Gnathophis capensis</i>	Southern Conger Eel	U	shelf
<i>Vinciguerria poweriae</i>		U	oceanic
<i>Maurollicus inventionis</i>		U	oceanic
<i>Gaidropsaurus novaezelandiae</i>	Comb Rockling	C	shelf
<i>Lophotus lacepede</i>	Crestfish	R	oceanic
<i>Beryx decadactylus</i>	Beryx	R	shelf
<i>Brama australis</i>	Pomfret	R	shelf
<i>Emmelichthys nitidus</i>	Southern Rover	R	shelf
<i>Naucrates ductor</i>	Pilotfish	U	oceanic
<i>Seriola lalandi</i>	Giant Yellowtail (Cape Mackerel)	U	shelf
<i>Remora remora</i>	Shark Remora	U	oceanic
<i>Lepidopus caudatus</i>	Buttersnoek	R	oceanic
<i>Allothunnus fallai</i>	Slender Tuna	R	oceanic
<i>Arnoglossus capensis</i>	Cape Flounder (Sole)	U	shelf
<i>Mola</i> sp.	Sunfish	U	oceanic

* A = abundant, C = common, U = uncommon, R = rare.

+ Endemic to waters surrounding Tristan–Gough islands.

Appendix 8

Application for a permit to visit and/or conduct research in the Inaccessible Island Nature Reserve

Please furnish the following information as fully as possible and submit to:

The Administrator, Tristan da Cunha, South Atlantic
(via Cape Town, South Africa)
Fax +871 6820 87158
E-mail: hmg@cunha.demon.co.uk

Note that fees are charged for permits to visit Inaccessible Island.

Name

Address and contact details (e-mail if available)

Home institution/affiliation (if any)

Reason to visit Inaccessible Island: **Research, Education, Tourism or Other** (specify)

Dates and duration of proposed visit

Number of people and their ages

Proposed means of transport to the nature reserve

Proposed landing site(s) and areas/zones to be visited on the island (if applicable)

If the planned visit is for research or educational purposes, please answer the following questions:

What is the aim of the proposed research/educational project? Give broad objectives and relate them to past and current related research efforts.

What products will result from the proposed project? Will the products be sold in any way?

What benefit will the proposed project have for the conservation management of Inaccessible Island, if any?

Could the project be conducted elsewhere? If so, justify your preference for Inaccessible Island.

What does the proposed project entail? Outline your planned field work.

If the project requires collection of samples for removal from the island, specify the types and numbers of samples to be collected, and the collection method. Specify where the samples will be housed (museum or other institution) after completion of the project.

Will the project require the erection of temporary structures (hides, markers, beacons, etc.)? If so, specify numbers, type and proposed location(s).

Will the project require camping away from the accommodation zone (Blenden Hall)? If so, specify where and for how long you intend camping.

Will the project require the use of radioactive materials or hazardous chemicals? If so, specify types, amounts to be used, their purpose, and plans for their transport, storage and disposal.

What funds are available for your project, and from what sources?

Declaration (repeat in full):

I, (applicant's name), declare that the above information is complete and correct. I and other members of my party are in good health, and we accept that any loss or injury resulting from our visit is not the responsibility of the Tristan Government. We are conversant with the objectives and regulations of the Inaccessible Island management plan and agree to abide by them fully.

Signed: Dated:

Witnessed: Dated:

Annexures. Please attach the following:

1. Brief curriculum vitae, outlining experience relevant to visiting Inaccessible Island. Researchers should provide a list of recent, relevant publications; film makers a list of recent films produced.
2. Letter of approval from your institution's animal ethics committee if you intend handling or collecting animals in the nature reserve.

Appendix 9

Reporting form for all visits to the Inaccessible Island Nature Reserve

Within three months of leaving the Nature Reserve, please complete this form and return to:

The Administrator, Tristan da Cunha, South Atlantic
(via Cape Town, South Africa)
Fax +871 6820 87158. E-mail: hmg@cunha.demon.co.uk

Name:

Address and home institution/affiliation:

E-mail and/or phone and fax:

Reason for visit to Inaccessible Island:

Number of people in party:

Duration and dates of visit:

Means of transport:

Landing sites:

Overnight sites (number of nights at each):

.....

Areas visited and routes used (please illustrate on a map of the island,
distinguishing well-worn paths used regularly from casual usage):

.....

Any comments on the state of paths?

List all specimens collected and details of where they will be deposited:

.....

List any animals handled:

.....

List any incidental mortality caused by your activities:

.....

Alien control measures implemented (if any):

Were all temporary markers or other structures removed? If not, please give details:

Was all waste material removed from the island? If not, please give details:

.....

Any other comments:

Please remember to send two copies of all papers/films/other publications arising from your visit to Tristan.

Appendix 10

Brief guidelines for day visitors to Inaccessible Island

This document highlights the major guidelines stipulated by the management plan that are relevant for casual, day visitors to Inaccessible Island. It is designed to be handed out to day visitors before departure to the island. However, it is not comprehensive and leaders of groups must be conversant with the full requirements of the management plan.

Inaccessible Island is home to the world's smallest flightless bird and several other animals and plants that are found nowhere else. The people of Tristan recognised the island's great importance by making it a nature reserve in 1997. But the island and its inhabitants are always at risk from the accidental introduction of 'alien' animals and plants that could seriously affect the island's native species. There are no rats or mice on the island – if these vermin ever reached the island it would probably mean the end of the flightless rail. But even much smaller things could cause serious problems. For example, a stray seed on a sock or boot could introduce a new grass that may overrun the native vegetation. Similarly, a microscopic spore from a fungus could greatly reduce the fruit crop from the island trees which are the staple diet of the rare Wilkins' Buntings. For this reason it is very important that all visitors to Inaccessible Island follow these simple steps:

- 1. Make sure that your clothing and other equipment are free of seeds. Be especially careful with shoes, socks and velcro fasteners. Scrub the soles of your boots to remove any mud and empty your pockets before going ashore.**
- 2. Pack all food and equipment into clean containers immediately before leaving for Inaccessible Island. Don't leave containers standing around where a mouse or rat could stow away. Ensure that all ships and boats are rodent free.**
- 3. No fresh produce can be taken to Inaccessible, because insects and other bugs are easily carried in this way. Your clothing and equipment must be inspected by staff from Tristan's Natural Resources Department before landing.**
- 4. Remain with your Tristan guide at all times, and remain on paths – alien plants already on the island are spread by humans.**
- 5. No animals may be killed or disturbed, and no native plants may be picked or damaged (including dead wood). In general, move slowly and do not approach within 5 m of birds and fur-seals, or 10 m of elephant seals (of course, it's alright if the birds come closer to you!)**
- 6. Relics dating to before 1950 should not be disturbed or removed from the island. No rocks or 'souvenirs' other than beach litter (e.g. fishing floats) may be removed from the island.**
- 7. Fires and smoking are not permitted – tussock burns easily!**
- 8. Please do not litter. All wastes must be removed from the island.**

