

GOUGH ISLAND WILDLIFE RESERVE

Third Annual Environmental Inspection

October 1993

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EXECUTIVE SUMMARY

I undertook an environmental inspection of the Gough Island Wildlife Reserve in October 1993. The inspection was at the request and on behalf of the Administrator of Tristan da Cunha and the United Kingdom Foreign and Commonwealth Office. It was carried out in terms of the Gough Island Wildlife Reserve Management Plan (GIWRMP; Cooper & Ryan 1993), which came into force on 22 October 1993. The inspection took place during the annual takeover of the South African meteorological station. Events of environmental interest on the voyages to and from the island are appended.

The outgoing Gough meteorological team had afforded high priority to environmental matters. It should be congratulated on its efforts to minimise littering and pollution within and around the station buildings and to remove alien plants from the environs. Repairs and maintenance carried out during the takeover included improvements which will make the facility environmentally more acceptable.

The benefits of removal of redundant structures must be balanced against the disturbance caused by the operation. Screening with natural materials and revegetating are preferable options in the case of the concrete base of the Upper Magnetometer Hut.

The South African Department of Environment Affairs and the South African Weather Bureau propose to install a new satellite communications system, possibly in January 1994. In terms of the GIWRMP, the proposal will have to be submitted to the Tristan government for consideration. The feasibility of installing a Yaggi transceiver as a backup to the satellite system should be investigated. Such a transceiver would be environmentally more acceptable than the present aerial arrays which cause seabird mortality and are aesthetically displeasing.

Solid waste management includes separation of glass, plastic, metal, paper, wood and organic components. Glass, metal and, for the first time this year, plastic are returned to the mainland. Wood and paper are incinerated, but should be stored and returned to the mainland. A compressor should be installed to crush and bale plastic, paper and cardboard. Incineration should be restricted to alien plants and poultry products. Organic waste is untreated and dumped into the sea. A down-pipe would reduce wind-dispersal of lighter fractions from the main sewerage outfall.

Polystyrene and other lightweight plastic-derived materials are still used for packaging. Biodegradable materials should be used. Plastic pollution at the meteorological station is otherwise well under control, following the spirit of the Environmental Protocol to the Antarctic Treaty. "Thousands" of plastic bags or separator sheets washed ashore from the Tristan Investments fishing vessel *Hekla* some time during the year. Persistent rubbish was dumped overboard from the m.v. *S.A. Agulhas* on the outward and return voyages.

Precautions were taken to prevent spillage during the pumping ashore of oil. Slicks were reported by observers aboard m.v. *S.A. Agulhas*. No birds were seen to be contaminated as a result

and the outgoing team reported that no oiled birds were seen during the year. Oil leaked or was discharged from the m.v. *S.A. Agulhas* on the return voyage to Cape Town.

Spent aluminium pellets were excavated from a dump and crated for removal, completing the task commenced during the 1992 takeover. Some pellets remain, but further excavations should not be attempted and the area should be allowed to revegetate.

The use of domestic chemicals requires attention. Washing powders and liquids are flushed untreated into the drains. Such substances should be phosphate-free and biodegradable. Kitchen rolls and toilet paper should be chlorine-free. The use of disinfectant releasers in toilet cisterns should be discontinued.

Installation of new window blinds has reduced light-pollution and helped to prevent "night strikes" by nocturnal birds. New blinds have not yet been fitted to all windows, however, and the material and positioning of the new blinds does not completely eliminate leakage of light. Effective blinds should be fitted to the remaining windows in the main base and to the workshop windows. The catwalk lights to the helipad should be replaced with lower, self-supporting ones, as recommended in 1992.

Rat guards were not in place on the m.v. *S.A. Agulhas* mooring ropes prior to sailing. This is the third year in succession in which this precaution has been neglected. Rubbish stacked near and over mooring ropes while docked could attract rats and allow them easy access aboard, thence to Gough Island. No signs of rats were found at the meteorological station. It is presently "mouse free" following a concerted trapping campaign by the outgoing team and a rigorous policy of keeping doors closed and blocking up possible entrances.

Sealed packets of farinaceous foods in the pantry and stores were infested with weevils. Such foods should be irradiated before shipment. Fresh produce brought ashore appeared to be free of invertebrates but was heavily contaminated with moulds.

No new species of alien plant were recorded, and *Senecio burchelli* and *Conyza floribunda*, introduced in 1982, may have been eliminated. It was too early in the season to confirm this, however, as germination and resprouting were just beginning. The outgoing team had undertaken a major weeding campaign of *Sonchus oleraceus* around the station. Unfortunately, the team had also weeded out the endemic *Cotula goughensis*, mistaking it for *Senecio burchelli*. Reference drawings and descriptions of native and alien plants should be made available.

The soft terrain and high rainfall contribute to erosion. Catwalks could be installed where paths are deeply rutted. These could be made of plastic wood-substitute rather than galvanised metal.

Sightseeing and photography of wildlife cause considerable disturbance to fur seal and penguin colonies. Great care must be taken to minimise such disturbance, and visitors should be accompanied by guides (the outgoing meteorological team, for example) familiar with the area and the susceptibility of animals to disturbance. Through-access to Seal Beach should be

prohibited during the breeding season.

Summary of recommendations

1. Each meteorological team should be given a copy of the Gough Island Wildlife Reserve Management Plan (GIWRMP). Explanation of and familiarisation with the plan should be incorporated into team training prior to departure for Gough. A copy of the management plan should be housed permanently in the meteorological station's library.
2. The environmental inspector should give a conservation talk to all visitors (short- and long-term) to Gough and any other interested parties on the m.v. *S.A. Agulhas* on the voyage from Cape Town.
3. To minimise light-attraction of birds, all remaining Venetian blinds in the meteorological station should be replaced by blackout roller blinds. The latter should be of a thicker material than those installed during this takeover and should be broader or fitted closer to the walls to prevent light leakage. Blinds should also be fitted in the workshop.
4. The lights alongside the catwalk to the helipad should be replaced by low-wattage bulbs with globe shades on low poles. The upper half of the globes should be blacked out to minimise unnecessary upward illumination.
5. Transfer of cargo between vessels within Gough Island Wildlife Reserve waters and on- and offloading should take place only in daylight. Lights should be extinguished if birds are attracted to them.
6. The automatic weather station anemometer should be relocated onto the roof of the meteorological station and/or its wire stays flagged to reduce bird strikes.
7. The feasibility should be investigated of installing a Yaggi transceiver in place of the existing aerial arrays as a back-up to the proposed HF satellite installation. The existing rhombic aerials and V-beam could then be removed in their entirety.
8. Incineration of wastepaper and wood should be phased out. The open incinerator should be removed and the enclosed incinerator should be retained for burning poultry remains and alien plants.
9. A compressor should be installed to crush and bale waste paper and plastic for storage and subsequent removal from the island. Wood should be strapped or crated for removal.
10. Phosphate-free, biodegradable washing powders and detergents, and chlorine-free toilet rolls and paper towels should be used. Use of slow-release disinfectants in toilet cisterns should be discontinued. Insecticides and other biocides should not be used on the island. Aerosols should be "ozone-friendly".
11. Consideration should be given to importing only irradiated and sterile-packaged fresh fruit and vegetables.

12. Farinaceous products should be irradiated before packing to eliminate flour weevils.
13. Water-filter gravel must be screened and inspected for alien plant material (particularly seeds) and invertebrates before packing. It should be sealed in bags and an "alien-free" certificate must be issued prior to loading on board ship.
14. Poultry remains should be incinerated and not dumped in the sea, as is the current practice.
15. Single-file catwalks, possibly comprising plastic wood substitute, could be laid along eroded paths to Seal Beach and the water supply.
16. Visitors to fur seal and penguin breeding should be accompanied by a knowledgeable guide to minimise disturbance. Seal Beach should be visited from the north entrance only and visitors should not walk up the south bank.
17. By-catch of octopus by Tristan Investments vessels at Gough Island should be scientifically investigated to determine sustainability and effects on other biota and biological processes.
18. The fin-fish catch at Gough Island by Tristan Investments vessels should be monitored to assess levels of removal.
19. Rat guards should be fixed to mooring ropes on the m.v. *S.A. Agulhas* prior to sailing. Rubbish should not be stacked on the quay in contact with mooring ropes or anywhere near the ship.
20. Non-biodegradable waste should not be dumped from m.v. *S.A. Agulhas* at any time. This is in direct contravention of Annex V of the International Convention for the Prevention of Pollution from Ships (Marpol), to which South Africa is a signatory.
21. The environmental inspection should be repeated annually in its present form at the time of the meteorological relief voyage.

Recommendations made in previous environmental inspectors' reports which have not yet been taken up, or which have been acted upon only in part by the authorities are numbers 4, 6, 8, 11, 12, 14, 17, 19 and 20 of the above.

GOUGH ISLAND ENVIRONMENTAL INSPECTION

Introduction

In October 1993 I undertook an environmental inspection of the Gough Island Wildlife Reserve at the request and on behalf of the Administrator of Tristan da Cunha and the United Kingdom Foreign and Commonwealth Office and in terms of the Gough Island Wildlife Reserve Management Plan (GIWRMP; Cooper & Ryan 1993). This report should be read in conjunction with the two previous inspection reports (Ryan 1991a; Cooper 1992a) and the GIWRMP. Events of environmental interest on the voyages to and from the island on m.v. *S. A. Agulhas* are detailed in Appendix 1.

I was present at Gough Island between 3 and 20 October 1993 during the annual takeover of the South African Meteorological Station at Transvaal Bay. The 27 persons accommodated in the meteorological station for the takeover and their affiliations were as follows:

South African Department of Environment Affairs	2
South African Weather Bureau	2
South African Department of Public Works and Land Affairs (PWLA)	6
South African Air Force Radio Technicians	2
South African Air Force Dental Surgeon	1
Outgoing meteorological team (Gough 38)	6
Incoming meteorological team (Gough 39)	6
Chef	1
Tristan da Cunha Conservation Officer	1
<u>Total</u>	<u>27</u>

One member of the outgoing meteorological team, two technicians from the South African Weather Bureau and a chaplain spent nights ashore at either end of the takeover period. Members of the Department of Environment Affairs' Helicopter Flight and the ship's medical doctor came ashore but did not stay overnight.

CONDITION OF THE METEOROLOGICAL STATION

I inspected the meteorological station and associated buildings before unloading of cargo. The building interiors were spotlessly clean and, with their immediate environs, free of litter. Environmental responsibility was afforded high priority by the outgoing team, and this was reflected in the high standard of the station.

STRUCTURES

Superfluous structures and materials

The outgoing meteorological team had gathered and stored superfluous and obsolete building materials, including creosoted wooden poles (formerly intended as supports for the planned

feeder line to the rhombic aerial), tubular metal poles and other items. This material was removed to the mainland.

Unused structures and the desirability and feasibility of removing them are as follows:

Metal and concrete base and metal strainer poles which supported an aerial southwest of the meteorological station. The strainer poles and the metal parts of the foundation should be removed. The concrete should be removed to ground level, and the foundation left to be revegetated.

The obsolete coaxial cable leading from the site of the Upper Magnetometer Hut. This is underground for much of its length. Where possible, sections should be removed by cutting them at each exposed end and pulling them through the peat, but not out through the surface. The remainder could be removed through narrow incisions made in the peat with a sharp spade. Care should be taken to minimise disturbance of the vegetation.

Four metal poles at Blechnum Bridge (two on either side of the bridge) serve no purpose and should be removed. Two metal poles with hawsers near the helipad should be removed. Lengths of cable, wood and a metal support should be removed from near the V-beam antenna.

The foundations of the Upper Magnetometer (removed in 1992) were inspected. In my opinion, it would cause less environmental damage to leave them intact than to attempt removal. The latter would involve trampling and disturbance of surrounding vegetation and erosion of the access path. It also would expose the buried sand which may harbour alien seeds. An acceptable alternative would be screening of the concrete with boulders and soil from the stream bank to encourage recolonisation by natural vegetation. Boulders and soil are naturally deposited and washed away by flooding (Ryan 1993); their removal would thus constitute a temporary disturbance of the stream bank.

The site of the Lower Magnetometer, removed in 1992, was inspected and found to be overgrown with indigenous vegetation.

Existing structures

The outgoing meteorological team reported that an ancillary watertank, from which the lid had been blown, contained "about 40" dead Subantarctic Skuas *Catharacta antarctica* and two live ones (which were released). Water tanks and other large receptacles should be checked regularly to prevent a repeat of such an incident.

Seabirds continue to collide with the aerials and supporting stays of masts. On three occasions I witnessed Subantarctic Skuas colliding with the anemometer guys. Dead nocturnal seabirds were found beneath this structure, but it is impossible to say whether these were the result of collisions, or predation by skuas, or both. Nevertheless, attention should be given to reducing the number of guys or "flagging" them to make them more conspicuous to birds, but so as not to interfere with the functioning or efficiency of the instrument. Alternatively, the

anemometer could be resited on the roof of the meteorological station, as previously suggested (Cooper 1992a).

Construction and maintenance activities

The PWLA team did not undertake major building operations, but upgraded and maintained existing structures. Fire reels and hoses were renewed, sections of catwalk replaced, repairs made to the walls of the Upper Air Building, new blinds fitted and carpet tiles and linoleum laid in the main base. New diesel- and hydrogen generators were installed. Those items made redundant in consequence were removed from the island.

The leader of the PWLA team, Mr I. Robertson, asked for my advice regarding the safety of the crane-operator's observation point. This formerly was sited on the Archway which collapsed in April, 1992. It now comprises a platform on the peninsula which constituted the landward edge of the Archway. The latter provided a "flying buttress" support for what now remains. The upper section of the peninsula is a conglomerate of soil and rubble, the lower is rock in which there are fracture lines directly below the platform. A nearby section of cliff recently has collapsed into the sea; a closer section is in the process of splitting off and could collapse at any time. I therefore informed Mr Robertson that, in my opinion, the peninsula was not safe and a proper assessment by a qualified person (civil engineer) would be required. The proposed strengthening of the existing observation platform would involve the addition of a small number of scaffolding poles sunk into the soil. This should not have a negative environmental effect.

I was also consulted by Mr Robertson with regard to the siting of a Telkom satellite communications installation. The site proposed is an area of level ground approximately 5 x 5 m² adjacent to the Upper Air Building and is dominated by alien vegetation (mainly grasses and Large-leaved Dock *Rumex obtusifolius*). However, the installation may need to be 30 m from the building. This would involve the removal of indigenous vegetation including at least one Island Tree *Phylica arborea*. I informed Mr Robertson that it would be preferable to use the site dominated by alien plants. In terms of the GIWRMP, new installations require the permission of the Administrator, who may refer the matter to GIWRAC.

The proposed satellite installation would replace the present V-beam and HF aerial arrays, which would be retained as a back-up. The aerial arrays have long been of concern as the cause of avian mortality, as well as being aesthetically unsatisfactory. An alternative which may be both economically and environmentally more acceptable is a Yaggi transceiver. This resembles a large television aerial, comprising a central strut upon which elements are fixed at right angles to form a grid. The assembly can be custom made and the range of frequencies can be widened by adding traps to the elements. The transceiver would have a radius of about six metres, need not be more than three metres above the ground and could be located near the radio room. The present aerial loses about 80% of its efficiency because of the distance (400 m) along which signals are cabled. If a Yaggi system was acceptable, a priority once the new system is established would be the removal of the existing aerial arrays. It is recommended

that the South African authorities investigate this option and present their findings to the Administrator.

I was also informed of proposals to replace the wooden helipad with one of galvanized tubing and catwalk sections. In terms of the management plan, this requires the approval of the Administrator. When removing the wooden helipad care must be taken with materials liable to disintegrate on handling. The wadding beneath the present structure is stripping away at the exposed base, tangling with the vegetation and becoming incorporated into the peat. The existing helipad presently requires repairs; an advantage of a metal structure would be low maintenance. A factor which must be taken into account when planning the new helipad is that the vegetation beneath will need to be prevented from growing through the mesh.

WASTE MANAGEMENT

The practice of separating waste for appropriate disposal continues. Metal and glass are crushed and crated for removal to the mainland, paper and wood are incinerated. Organic matter (food and human waste) is untreated and dumped into the sea via Skivvygat.

Incineration of wood and paper during the takeover was supervised and a fire hose kept at the ready. These precautions prevented burning of the vegetation or peat surrounding the incinerator (which occurred in 1992; Cooper 1992a). Under windy conditions, however, most of the ash was blown out of the fire and into the surrounding vegetation. Laminated paper products such as milk cartons and plastic bags containing the paper waste also were burnt. There is a case for incinerating paper and cardboard food-containers, such as milk cartons, which can become malodorous and pose a potential health hazard if stored. However, such containers are laminated, and release toxic gases when burnt. Milk containers and similar packaging should, therefore, be thoroughly washed before being compressed and stored. This may be onerous during takeover, when many are used, but should not be a problem during the rest of the year. Waste generated during takeover can be removed at the end of that period, so the inconvenience of retaining milk cartons, etc. would be slight. The ideal policy which should be aimed at, as noted in previous environmental inspectors reports, is "garbage in, garbage out". In effect, paper and paper-based products and wood should be incinerated only when used to ignite other permissible materials to be burnt, such as lighting barbecue (braai) fires and destroying poultry products (see below) and alien plants.

At present, the enclosed incinerator is used only as a store for matches and petrol. If paper is baled and removed, the large-mesh incinerator and its concrete stand should be dismantled and removed. The enclosed incinerator should be retained and used for burning permissible substances. Ashes should be removed and stored dry for removal to the mainland.

The outgoing meteorological team collected litter (mainly empty food tins) which had accumulated at camp sites in the island's interior. Five crates of material were transported out by

helicopter at the end of takeover and shipped to South Africa.

Untreated food waste includes poultry products (eggshells and chicken bones etc). In a previous report (Cooper 1992a) it was recommended that poultry products be incinerated to avoid the risk of introducing avian diseases. I recommend that this procedure be instituted.

Sewage

The sewerage pipe from the main base to Skivvygat leaked at one joint. An inspection cover was missing and raw sewage had spilled out into and fouled an area of 1.5 m² of natural vegetation. The wooden "X" supports are old and decaying and should be replaced. Breaks in the supports have led to spillages of sewage in previous years (Cooper 1992a). The entire length of the pipe should be checked on at least a weekly basis.

Where the pipe enters Skivvygat there is no down turn. Under windy conditions liquid and lighter fractions are blown into the surrounding vegetation. A down pipe should be fitted to ensure that waste is carried well down into the pit.

The supports for the Emergency Base sewerage pipe are collapsing where the pipe turns down at its outfall. This has put increased pressure on an angled joint, which is detaching from the main pipe. This pipe is used far less than that of the main base, but should also be checked on a regular basis.

POLLUTION

Oil

Pumping of ca 150,000 litres of diesel from the m.v. *S.A. Agulhas* to the meteorological station's tanks took place between 09h45 and 14h50 on 17 October. Before pumping commenced the pipe was found to be leaking and was replaced. Pumping took place thereafter under relatively calm conditions and at a slow rate (ca 35,000 litres per hour) to minimise the risk of leakage. Steps taken to prevent accidental spillage were strict. These included blowing air through the pipe on three occasions to clear out residual diesel after pumping had finished. No leaks were recorded at the island, but an observer aboard the m.v. *S.A. Agulhas* reported slicks from the ship at 14h20 (0.5 x 10m), 14h50 (eight slicks of 0.5 x 2 m) and 15h10 (10 m x ship's length). The last mentioned occurred when the pipe was being brought back aboard. No birds were seen to be contaminated at the time.

The meteorological station diesel tanks were checked for leaks and all valves were replaced by the PWLA team. Any leakage or spillage is treated with *Biosafe* a biodegradable "environment-friendly" dispersant for use where regeneration of vegetation is required (information supplied by Mr I. Robertson). The PWLA team considered that the tanks were secure and leakproof and that it was unnecessary to take further precautions. Use of chemical dispersants requires approval from the Administrator and I recommend that, in accordance with previous inspector's reports,

drip- and spill-trays be installed under the tanks to guard against mechanical failure and human error.

An oil slick caused by a leaking fuel pump on a launch from the crayfishing boat *Tristania II* was reported during takeover.

The outgoing team reported that no oiled birds had been found during the year.

Chemicals

Spent aluminium pellets (used for generating hydrogen for weather balloons) were excavated from beside the Upper Air Building. These were crated and removed from the island. These arose from spillage from a chute used formerly to transport spent pellets to a hole (now largely filled in) near Skivvygat. The pellets occupied some 10 m² to a depth of 75 cm. Many pellets still remain in the peat, but the benefits of excavating what are essentially inert, button-sized pieces of metal are likely to be outweighed by disturbance to the soil and vegetation. Spent pellets currently are crated and removed to the mainland for appropriate disposal.

A small spillage of aluminium pellets and caustic soda occurred on the edge of the concrete apron by the crane during testing of the new hydrogen generator. The resultant tarry mix threatened to seep into adjoining vegetation and was cleaned up and containerised for removal.

An unidentified liquid leaking from the back of the flammables shack was seeping into the surrounding vegetation. An area of vegetation, about 2 m x 0.75 m, had died off. The origin of the liquid should be established and appropriate steps taken to prevent further leakage. Old and rusting drums of fuels and lubricants were removed to the mainland at the end of takeover.

Canisters of insecticide in the pantry did not have lids. These and a number of other products (air freshener and oven cleaner) were not "ozone friendly". In terms of the GIWRMP, biocides should not be used on the island. All insecticides should, therefore, be removed to the mainland. Washing powder, textile conditioner and washing-up liquid were not phosphate-free or biodegradable. Toilet- and kitchen rolls were not chlorine free. The use of slow release disinfectants in toilet cisterns should be discontinued.

The lid of a bottle of chloroform in the laboratory was broken and the contents had evaporated. Laboratory chemicals should be appropriately stored and checked periodically.

Plastic

The outgoing team reported that "thousands" of Tristan Investments plastic bags or separator sheets were washed up on Quest Beach during a visit by the crayfishing boat *Hekla*. The team were unable to provide a date or give a more accurate figure for the number of articles washed ashore. Such items must be stored or secured to prevent them being blown or washed

overboard.

Plastic bags and jubilee clips were removed from the river bed about 500 m below the Upper Magnetometer site. These presumably were remnants of the April 1991 deluge (Ryan 1991a, 1993) or more recent maintenance of the water supply. The river bed to its mouth at Seal Beach should be periodically searched and any litter removed.

The plastic sacks containing the cement foundations of the crane are disintegrating where exposed to the light. The foundations should be repaired and allowed to revegetate and loose plastic gathered up for appropriate disposal.

Plastic strapping and other packaging was collected on an on-going basis as cargo was unloaded and unpacked. At the end of each day the PWLA team gathered up any remaining material. This was crated and shipped back to the mainland.

The outgoing team reported three instances of Subantarctic Fur Seals *Arctocephalus tropicalis* entangled in plastic strapping. Two seals were released apparently unharmed, the third had deep wounds and was in a weak condition and was destroyed humanely.

Fragile equipment and spares are packed in lightweight plastic-derived materials. These are difficult to contain and blow away when crates are opened out of doors on windy days. Biodegradable packaging, such as shredded paper, should be used instead, and care taken to minimise wind-bourne littering.

Lights

The impact of "light attractions" of birds was addressed with the replacement of some of the Venetian blinds with black roller blinds. These were easier to operate than the Venetian blinds and admitted less light. As such, they constitute a considerable improvement over the Venetian blinds. However, the material was not opaque and the fixtures stood out from the wall allowing light to escape through gaps at each side. A thicker material should, therefore, be employed and the blinds made wider or fixtures used which eliminate gaps. During the takeover, the PWLA team was requested to black-out the workshop windows when birds were attracted to the lights. Plastic and hardboard were used to this effect. Blinds should, therefore, also be fitted to the workshop windows and the door closed after dark.

A policy of turning off all unnecessary lights on misty nights or whenever birds were colliding with the buildings was enforced during the year. During takeover, work in the radio room and workshops continued after dark to allow maintenance and repairs to be carried out in the relatively short time allowed to visiting technicians. Visitors and the new team must, therefore, be acquainted with the problems of "nightstrikes" and the steps necessary to minimise their impact.

In an attempt to assess the mortality of birds involved in nightstrikes (either from injuries sustained through collision with buildings or other structures, or predation by skuas) I captured and ringed all birds which appeared to be attracted to

the lights (fluttering against windows, colliding with walls and falling down to the catwalks). This was carried out for the duration (about one hour) of a "nightstrike" on one evening. The birds were held briefly and ringed by the light of a weak hand-torch. The opportunity was also taken to familiarise the new team with the bird species. The birds were then released at the place of capture by placing them on the vegetation at the side of the catwalk. With the verbal permission of the Administrator, the following birds were ringed:

Atlantic Petrel	<i>Pterodroma incerta</i>	2
Softplumaged Petrel	<i>P. mollis</i>	9
Broadbilled Prion	<i>Pachyptilla vittata</i>	33
Whitefaced Stormpetrel	<i>Pelagadroma marina</i>	1
Greybacked Stormpetrel	<i>Garrodia nereis</i>	1
Common Diving Petrel	<i>Pelecanoides urinatrix</i>	1
<u>Total</u>		<u>47</u>

The next morning and on each subsequent day I checked the area and inspected all corpses, including those eaten by skuas. No ringed birds were found. Whereas this does not rule out increased mortality due to nightstrikes, it indicates that birds attracted to the lights were not, at least in this case, doomed to predation by skuas. However, the sample was very small (relative to the high numbers of birds which occur in the vicinity of the station) and the results should be taken as no more than indicative.

There are nine "street lamps" along the catwalk to the helipad. The lights are about 2 m off the ground and guyed with heavy nylon line. Although this facility is used only under emergency conditions, the lights and their guys are a potential hazard to nocturnal birds. As recommended in the 1992 inspection report, these lights should be replaced by low-standing, self-supporting ones, similar to those already installed on the catwalk between the meteorological station and the stores.

It was reported that many birds (mainly Broadbilled Prions) came aboard the m.v. *S.A. Agulhas* as she was anchored off Milford Bay. The birds were attracted to lights burning on the poop deck from where fishing took place until the early hours. On the morning of 19 October, when the ship steamed round to Transvaal Bay, a member of the crew was seen to throw overboard at least two bird corpses from the hold covers below the bridge. Lights should be extinguished immediately if birds are attracted to them.

Bridge spotlights were kept burning on *Tristania II* until 02h00 on 20 October during the transferral of frozen rock lobsters to the m.v. *S.A. Agulhas*. Bad weather had prevented loading during the day. Every effort should be made to carry out such operations during daylight. The harmful effects on seabirds of powerful lights on vessels at the Tristan islands and Gough is discussed by Ryan (1991b).

FIRES

Braaivleis (barbecue) fires were lit at Swimgat and Tern Cove during the year. Although precautions were taken to avoid accidentally igniting the peat or vegetation, there is always a risk that such fires could rekindle if not properly extinguished or if the wind rises or changes direction suddenly. In terms of the GIWRMP, fires are not permitted anywhere other than in the incinerators and the enclosed braai area in the base.

Flares were fired on at least two occasions during the year. Apart from the danger of misleading any passing vessels (however unlikely this may be), this activity poses a risk of peat fires should the burning flare land in the vegetation. Flares should be fired only in a genuine emergency and care taken to ensure that they do not land ashore, as recommended in the GIWRMP.

ALIEN ORGANISMS

Mammals

The foodstore and pantry were inspected prior to the new supplies coming ashore. No signs of rats *Rattus* sp. were found. No signs of House Mice *Mus musculus* were found in the meteorological station. A trapping campaign had resulted in the catching of "hundreds" of mice, and a strict policy of keeping doors closed and blocking up potential points of entry had resulted in mice not being seen in the station for some months (although they still are abundant outside). Gaps between the floor supports and corrugated-metal walls in the food store would provide entry points for mice. In the interests of hygiene these should be blocked up. No signs of rats or mice were found in oncoming cargo.

Invertebrates

The most likely source of alien invertebrates is via the importation of fresh produce. The following fresh produce was brought ashore: potatoes, pumpkins, gem-squash, cucumbers, garlic, onions, carrots, tomatoes, paw-paws, pineapples, bananas, apples, oranges, lemons. I inspected samples (all the contents of at least two containers) of all imported fruit and vegetables. No invertebrates were found, although leaves on apple stalks had been chewed by leaf-cutting insects. All apples were thus checked and any leaves removed and bagged. One crate of pineapples was brought ashore. Although the fruits themselves were apparently free of aliens, the configuration of the leaves is such that detection of small insects would be difficult. I therefore cut off the leaves, bagged them and returned them to the ship. It is recommended that pineapples are not brought ashore in future. Carrots had had their leaves removed before shipping, but most or all were rotten and probably inedible, so there seemed little justification in bringing them ashore.

I requested that the chef scrutinise all fresh produce where possible and retain any insects and report them to me. At the end of the takeover he informed me that he had checked vegetables

as he was preparing them, but had not found any invertebrates.

Leafy vegetables such as spinach, and brassicaceous species (cauliflower, cabbage) could be vectors of alien invertebrates (and have been in previous years; Ryan 1991). In terms of the GIWRMP, bringing these ashore is not permitted. I recommend that the feasibility be investigated of irradiating fresh produce and transporting it to the island in sealed, sterile containers. If this is not practical or economical, then consideration should be given to allowing only the importation of produce, such as apples, which can be packaged and stored without going mouldy and on which alien invertebrates may be relatively easily detected.

Live weevils and flour beetles were found in open and sealed containers of farinaceous products in the pantry. Specimens were collected and preserved for identification. Although unlikely to become established outside the buildings, their presence is undesirable. Additionally, if these animals can get ashore then potentially harmful species may also be accidentally imported in the same way. Weevils and flour beetles have persisted for at least three years in the pantry, despite attempts to eliminate them. Eradication is feasible only at source (manufacturer or packer) and consideration should be given to irradiating all such products before packing for shipment to Gough.

Micro-organisms

All boxes or bags of fresh produce contained items which were mouldy to one degree or another (generally squashed or damaged items at the bottom of packages). Oranges were the worst affected, and apples the least, but no produce checked was entirely free of infection. It is thus inevitable that mould spores were introduced to the island.

Plants

The Gough 38 team undertook a major weeding campaign in January 1993 to eliminate milk thistles *Sonchus* from the immediate environs of the station. "Thousands" of plants were uprooted and incinerated. Although commendable, such control measures have a localised and temporary effect only, and many plants were resprouting or germinating on my visit. It is clear that *Sonchus*, and other species, are firmly established on the island and only likely to be controlled by biological methods, as yet uninvestigated.

Mowing along the edges of the catwalks and around the buildings encourages vigorous regrowth of *Sonchus*, *Rumex* and *Plantago*. The resultant multi-branched plants may have greater flower and, consequently, seed production. Such aliens should not be mown but be carefully weeded out, roots and all, and incinerated.

Many *Sonchus* plants were growing from loose brickwork and concrete at the base of structures such as the Inflammables Shack. These plants should be weeded out carefully and any resultant cracks or crumbling of the fabric immediately repaired, not least to prevent recolonisation.

The Upper Magnetometer site was inspected on four occasions for alien plants. About 120 large (up to a metre tall) *Sonchus* plants were removed. Otherwise, there is some recolonisation by indigenous species. This was the site of introduction, in 1982, of new aliens, two of which (*Senecio burchellii* and *Conyza floribunda*) became established and survived until at least 1991. Neither of these species was recorded in 1993 and it might be concluded that the systematic weeding programmes of the intervening years have successfully eradicated them. However, the takeover takes place before much germination/resprouting has occurred, and the possibility exists that these plants still are extant. The incoming team was encouraged to weed out known aliens and report any plant which was unfamiliar and, therefore, potentially alien. The outgoing meteorological team unfortunately weeded out many "hundreds" of endemic *Cotula goughensis* in mistake for *S. burchellii*. It is recommended that illustrations and descriptions of alien and indigenous plants be lodged at the meteorological station.

The river from the Upper Magnetometer site to Seal Beach was walked on two occasions and checked for alien plants. This stretch may harbour *Senecio burchellii* and *Conyza floribunda* plants whose seeds may have been washed down from the site of the Upper Magnetometer (Ryan 1993). No sign was found of these two species, although the river banks and "flood plain" were dominated by the alien grasses *Holcus lanatus* and *Agrostis stolonifera*. The area should be inspected each takeover and throughout the year for aliens.

There were about 200 plants of *Plantago major* growing where aluminium pellets had been excavated from beside the Upper Air Building, demonstrating that alien plants are pernicious colonisers of disturbed ground. Disturbance of the peat and vegetation during building operations or other activities should be kept to a minimum.

I checked two of a consignment of ten 40 kg bags of water-filter gravel brought from South Africa. Both bags contained fragments of plant material including seeds. The two bags were then resealed and the whole lot sent back to the m.v. *S.A. Agulhas* for shipment to the mainland. In future, filter gravel should be thoroughly screened and an "alien free" certificate obtained before it is imported to Gough.

EROSION

Sections of the path to Seal Beach and the Yellow-nosed Albatross *Diomedea chlororhynchos* study colony were eroded to a depth of 50-75 cm. These were difficult to negotiate, especially after rain when they filled up with water to a depth of 20 - 30 cm. Consequently, new paths had been established as diversions. The footpath to the water supply was deeply rutted in places, and alternative routes were taken, leading to the creation of more paths and further erosion. Consideration should be given to installing single-file catwalks over the most badly eroded sections. To make them more aesthetically acceptable, these could be constructed of Polywood wood substitute, a recycled,

weatherproof plastic (details from Conserwood, PO Box 23993, 7735 Claremont, RSA, or Nampak Polywood, PO Box 1013, 7534 Oakdale). If suitable (and not slippery in the wet), this material would also be easier to transport than the galvanized metal catwalk sections and can be cut into the appropriate lengths and shapes.

Erosion was evident on Ruin Ridge where even a single footstep can remove the overlying vegetation (largely mossy) from the underlying rock. Walkers do keep to ridges where possible, but diversions around rocks and other obstacles means that trampling and erosion are inevitable. The GIWRMP recommends that access to the island's interior be permitted only via the Golden Highway, but that alternative routes be investigated to allow this main route to recover. Paths should be inspected annually to assess levels of erosion or recovery.

In the valley between Tafelkop and South Peak footprints have persisted and vegetation not recovered from previous years. Care should be taken to avoid *Sphagnum* bogs and other wet areas, such as Tafelkop, where the fragile, sodden vegetation is highly susceptible to trampling (GIWRMP, Section 5.15).

FISHING

Snoek *Thyrsites atum* and Bluefish *Hyperoglyphe perciforma* were caught by line from the base of the cliffs within the logistic zone during the year. Snoek, Bluefish and False Jacopever *Sebastes capensis* were caught during takeover. No figures are available.

An agreement was reached between the Department of Environment Affairs and the Administrator which allowed fishing from the m.v. S.A. *Agulhas* while at anchor off Tristan and Gough. This practice had been disallowed in recent years. The following fish were caught by hand line from the m.v. S.A. *Agulhas* at Gough on 3 October and between 15 and 19 October: 48 Bluefish, 93 Snoek and four Fivefingers *Acantholatris monodactylus*. The management plan (Section 5.4.2) recommends that fishing be prohibited from vessels other than those of the concession holder.

Fifteen Tristan Rock Lobsters *Jasus tristani* were given to the meteorological station by the crew of one of *Tristania II's* launches on 12 October. All exceeded the minimum permissible size of 70 mm (mean carapace length = 91.1 mm; range 71 - 140 mm).

VISITORS AND ECOTOURISM

On the second last day of the takeover, a number of personnel from m.v. S.A. *Agulhas* came ashore. In conjunction with members of the outgoing meteorological team, I accompanied small parties (three to four) around sites of interest and took them to see fur seals and penguins at Seal Beach and nesting albatrosses on the perimeter of the Yellow-nosed Albatross study colony. It was found that any visit to Seal Beach, however disciplined and however small the group, resulted in considerable disturbance to the animals there. At Seal Beach small numbers of seals on the middle shore left the beach and went into the sea; those

remaining were confined to the top of the beach below the cliffs. Although many continued dozing or interacting with each other, some did appear stressed. When seals were disturbed on the grassy south bank of the stream, they came hurriedly down the slopes through the penguin colony. At least one penguin egg was crushed by a seal. It was reported to me that a visit to the Admirals at the beginning of the takeover resulted in at least one Rockhopper Penguin egg being taken by a skua when the incubating penguin was disturbed from its nest.

Much can be gained from exposing visitors to the wildlife of the island. Nevertheless, great care must be taken to ensure that disturbance to wildlife is kept to a minimum. A fixed route should be established which avoids the penguin nesting colonies and allows seals free and unhindered access to the sea along the routes that they would take under normal circumstances. Visits should be of a short duration, and undertaken at the discretion of a knowledgeable leader who should accompany all visitors. The exit/entrance path at the south side of Seal Beach should be closed off during the breeding season so that seals are not channelled through the penguin colony in their efforts to get to the sea when disturbed by human visitors.

VAGRANT ANIMALS

Birds

A Macaroni Penguin *Eudyptes chrysolophus* and two Cattle Egrets *Bubulcus ibis* were seen at Seal Beach on 19 March and 1 May 1993, respectively. The Macaroni Penguin is an addition to the Gough Island avifauna (Cooper & Ryan 1993).

Insect

A large moth, species as yet undetermined, was attracted to lights at the meteorological station in January 1993 following a westerly gale. The specimen was collected and donated to the South African Museum in Cape Town. Interestingly, a similar moth, probably of the same species, was collected at Edinburgh Settlement, Tristan da Cunha in January (P. D. Johnson pers comm). The specimen is now in the Tristan Museum.

LONG-TERM ENVIRONMENTAL MONITORING

Long-term monitoring of Yellow nosed and Wandering Albatross *Diomedea exulans* nesting colonies was continued. The most significant finding was the breeding of a Yellow nosed Albatross which had been ringed as a chick in 1985. This is the first time that the age at first breeding has been determined for the South Atlantic population of the species since the study commenced in 1982.

The Wandering Albatross colony at Tafelkop was visited and the two surviving chicks ringed. Unfortunately, poor weather and logistical problems prevented a visit to Gonydale. The new meteorological team has been briefed and will hopefully visit the

colony and ring the chicks before the end of the year. It is recommended that this monitoring be continued, particularly in view of the current interest in the long-term effects of climatic change on biological processes and biota (Cooper 1992b).

ACKNOWLEDGEMENTS

I thank the Administrator, Mr Philip Johnson, for making my visit possible and for his help and advice. Mr Willie Stranix and the Gough 38 team provided specialist information and details of the year's events. The South African Department of Environmental Affairs provided logistical support and I thank, in particular, the voyage co-ordinator, Mr Koos Pauw, for his help and support. I am grateful to Mr John Cooper and Dr Peter Ryan for their briefing for the inspection and for their comments on this manuscript.

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Appendix I

Summary of events on the voyage to and from Gough Island

Cape Town - Tristan da Cunha

The m.v. *S.A. Agulhas* left Cape Town harbour at 17h00 of 23 September 1993. At no time between 11h30 and sailing were rat guards in position on the mooring ropes. A large pile of rubbish was stacked, and added to, over the mooring bollards and where the mooring ropes were looped over these. This rubbish could have attracted and harboured rats which would then have had easy access to the ship.

Two large black plastic bags of non-degradable rubbish, including clear plastic bags, laminated cartons and drink cans were dumped overboard from the poop deck at 17h20 on 24 September.

On the outward voyage I spoke to Mr C.W.A. Dickason, Managing Director of Tristan Investments Pty (which holds the fishing concession for the Tristan da Cunha group and Gough Island). I learnt from him that the "by catch" of octopus was worth about US\$50,000 in the first year of operations and continued to be an important source of income to his company, particularly in the light of declining rock lobster catches. Previously, octopus had been killed and thrown back into the sea when caught in crayfish traps (octopus is a predator of rock lobster). The effects of removing octopus on other biota and biological processes at Gough is unknown. Nor is it known at what levels the octopus can be sustainably harvested. Mr Dickason also described the finfish catch by his fishermen at Gough Island. This catch is an unofficial "perk" for the crew and is not monitored. Crew members are permitted four 30 kg boxes each.

I discussed the long-term Yellow-nosed Albatross (Molly) study colony at Tristan (established by the island's Education Officer Mr Richard Grundy, and myself in 1982) with Police Sergeant Conrad Glass, who was returning to Tristan from St Helena. Sergeant Glass expressed his enthusiasm for the project and his intention to continue it. He also would motivate for the penguins and seal counts, which he initiated last year, to be included in his job description as a police officer and in his capacity as a Tristan da Cunha Conservation Officer.

At the request of the voyage co-ordinator, Mr Koos Pauw, I gave a talk, illustrated with slides, on the natural history, conservation and environmental problems at the Tristan da Cunha group and, particularly, Gough Island. The voyage co-ordinator asked that all visitors to Gough be present at the talk. The talk was also attended by the majority of the remainder of the passengers and some members of the ship's crew. The talk highlighted the exceptional importance of the islands in world conservation. I underlined the need to maintain those islands least modified by man (Gough, Inaccessible and Nightingale) in their near-pristine condition. The steps necessary to prevent pollution and the importation of alien organisms were described. It is recommended that the environmental inspector gives such a talk at least on

the outgoing voyage to visitors to Gough and at any other time if requested.

Tristan da Cunha

The m.v. *S.A. Agulhas* arrived at Tristan at 06h00 on 29 September. Offloading of passengers and cargo started that day. I met the Administrator, Mr Philip Johnson, on 30 September and discussed the forthcoming environmental inspection of Gough. Mr Johnson also requested that I carry out a Fisheries Inspection of crayfish scheduled to be transferred between the Tristan Investments fishing boats and the m.v. *S.A. Agulhas* while at Gough. This I agreed to do.

A wide variety of conservation and environmental matters was discussed with Mr Jimmy Glass, Head of Natural Resources. He briefed me on the proposed fisheries inspection during the transferral of Tristan Rock Lobster from Tristan Investments fishing vessels to m.v. *S.A. Agulhas* at Gough. We also discussed the monitoring of finfish caught by Tristan Investments as a "perk" for their fishermen. Mr Glass was concerned that although self-imposed limits were set by the company, this unofficial exploitation resulted in large amounts of fish being removed with no control or monitoring.

I discussed with Mr Ian Lavarello, Radio Operator, the Molly study detailed above. Mr Lavarello undertook to provide details of the previous season's breeding success and birds ringed to the scientific co-ordinator of the project, Mr John Cooper (Tristan da Cunha Conservation Officer, and Antarctic Research Officer at the Percy FitzPatrick Institute of African Ornithology at the University of Cape Town).

I also met with Mr Derek Rogers, Agricultural Officer, who asked me to identify the earwigs (Dermaptera) which had become abundant in recent years, particularly in the agricultural stores and island shop. He asked me if they were likely to pose a health hazard or become a horticultural pest and, if so, what steps could be taken to control them. I undertook to have specimens identified and follow up his enquiries with the appropriate authorities in Cape Town.

During offloading, loose or broken wooden, plastic and cardboard packaging was removed and thrown into the sea from Tristan barges on many occasions. Some large black plastic bags blew off the deck of the m.v. *S.A. Agulhas* into the sea during offloading. A fuel leak was reported from one of the government barges, causing a slick.

Inaccessible Island

I made a request to the voyage co-ordinator and, via him, the Administrator to accompany a team to Inaccessible Island on 29 September. The request was refused because the full complement of passengers on the helicopter had been chosen. However, adverse weather conditions prevented the scheduled flight to the island. Subsequently, I was able to accompany the rescheduled trip on 1 October. I undertook an environmental inspection at

the Denstone Expedition Hut at Blenden Hall and along a stretch of coastline to West Point. The results of this inspection are contained in a separate document to be submitted to the Administrator.

Tristan - Gough Island

The m.v. *S.A. Agulhas* left Tristan at 13h00 on 2 October and arrived at Gough early the following morning. Offloading took the whole day and the m.v. *S.A. Agulhas* left thereafter for the positioning of weather buoys in the south Atlantic. Between 3 and 20 October I undertook an environmental inspection of the weather station and environs.

Gough Island - Tristan - Cape Town

The m.v. *S.A. Agulhas* returned to Gough on 17 October, but unfavourable weather prevented onloading until the following afternoon. Transferral of rock lobster from *Tristania II* took place on the night of 19/20 October under very windy conditions. I was unable to get across to either ship to make a fisheries inspection. Once on the m.v. *S.A. Agulhas* it would not be possible to reseal boxes of rock lobster opened for inspection. On my arrival at Tristan, I informed the Administrator and Head of Natural Resources of the situation and they decided that the inspection should fall away on this occasion.

Onloading was completed on 20 October and we sailed for Tristan at midday, arriving there the following morning. We left for Cape Town at 11h00 on 22 October. I repeated the environmental talk on the return voyage. This was attended by about 30 passengers, including the Administrator and Mrs Johnson, and some members of the crew.

On the return voyage oil was leaking or discharged from aft starboard of the m.v. *S.A. Agulhas* from at least 12h50 until 13h15 on 25 October. Over this period the slick became some 50 - 70 m wide and would have been about 10 km in length by the time the leak/discharge stopped (the ship was travelling at 12.6 knots at the time). The incident was reported to the bridge at 12h50, but the source of the oil was not determined.

Dumping of non-degradable rubbish (including plastic bags, soft-drink cans, laminated milk cartons and ribbed plastic juice bottles) took place from the poop deck of the m.v. *S.A. Agulhas* at 11h15 on 27 October. The incident was reported to the bridge.

The m.v. *S.A. Agulhas* docked in Cape Town at 22h00 on 27 October.