ENVIRONMENTAL INSPECTION, GOUGH ISLAND WILDLIFE RESERVE, OCTOBER - NOVEMBER 1997

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Summary of New Recommendations

1. All clothing returned by takeover personnel to DEAT stores must be cleaned and inspected before re-issue, by hand, to ensure that no plant propagules are transported from the mainland or any of the DEAT islands via the Velcro patches and pockets of the foul weather gear, woollen gloves, socks, or mud stuck to the soles of the gumboots.
2. The various team leaders should be made aware of the regulations of the Management Plan by the Voyage Co-ordinator at a planning meeting prior to departure. It is the responsibility of the team leaders then to pass these on to the personnel in their contingents. Amongst other things, the fishing regulations at Tristan and Gough should also be brought to the attention of the team leaders at this meeting.
3. An intensive rodent-trapping exercise should be conducted at the dockland warehouse a week before departure of the relief voyage vessel. All cargo should preferably be stored inside the warehouse in order to minimise the risk of contamination by wind-blown plant propagules.
4. One vessel, instead of two, should preferably be used for the relief voyage.
5. The old wooden helipad should be monitored to assess the extent to which the underlying polystyrene will be exposed by the degrading surface planking. If polystyrene starts becoming exposed to the environment, a plan to remove it and return it to the mainland should be implemented.
6. The PWD proposals to (a) use expanded cement cylinders in place of steel points for driving the

foundation pole columns, and (b) fill the entire foundation pole column with cement to strengthen it, should be considered by GIWRAC.

7. All building sand and cement needed for the purposes described in (6) above should be sterilised (cement by irradiation, sand by steamcleaning), and certification of this presented to the Conservation Officer before the material is taken ashore at Gough Island. Cement should be mixed on a secure surface, which can later be removed from the island.
8. The foundation poles of structures that are dismantled should be removed as a matter of routine. Expensive equipment need not necessarily be required to do this.
9. The PWD proposal to use creosote-treated timber, or moulded plastic, as support beams for the catwalks should be considered by GIWRAC.
10. The emergency radio shack and its connecting catwalk should be removed.
11. The new diesel incinerator should be placed at the site of the current incinerator.
12. An expert assessment of the peat slip of December 1996 (near the crane) and the risk it constitutes to the emergency generator shack, southernmost diesel tanks, catwalk and other buildings in the vicinity should it expand, is required. A general appraisal of the security of the other structures at the station with respect to future peat slips is also needed.
13. The ship-based hose should be pressure tested and certification of this presented to the Conservation Officer before departure of the relief voyage vessel.
14. When considering the shore-based fuel hose option, cognisance must be taken of the large storm swells that occur at Gough during winter and the general problems of maintaining a shore-based facility over a ship-based facility. A facility that is permanently under cover or can be removed to the ship after use would be best.

Previous Recommendations

The following recommendations made previously (Roux 1996, Wace 1996) are supported:

1. The immediate area surrounding the PWD store in Wingfield should be kept clear of weeds, and the area swept regularly in order to remove loose plant propagules.
2. A small, removable wind sock should be installed at the new helipad.
3. The few remaining wooden-framed catwalks should be replaced with galvanised metal-framed units.
4. When the diesel tanks are sandblasted, a tent should be erected around the tank in order to collect fragments of paint, rust and metal. This debris should be returned to the mainland.
5. Paths, ropes and ladders around the island should continue to be monitored by the teams, and maintained in a condition such that risk of serious erosion is minimised.
6. New teams should be instructed in the Management Plan and the island's biota during team training in Pretoria, preferably by biologists with experience of the island.

Introduction

I visited Gough Island during the 1997 annual relief voyage to conduct the seventh environmental inspection in terms of the Gough Island Wildlife Reserve Management Plan (Cooper & Ryan 1994). The outbound voyage was aboard the m.v. *S.A. Agulhas*, and the return aboard the South African Navy vessel, *S.A.S. Outeniqua*. Owing to mechanical problems aboard the *S.A. Agulhas* the voyage was delayed considerably. These delays and committed sailing dates for Antarctica in early December meant that takeover period at Gough was very short (12 days), and that two ships had to be used to complete the takeover. The delays also prevented the original inspector, Sir Martin Holdagate, from joining the voyage, thus I was appointed at short notice to conduct the environmental inspection. Accompanying me was Sgt. Conrad Glass, Tristan da Cunha Chief of Police and Conservation Officer.

The *S.A. Agulhas* departed Cape Town on 24 October 1997, arriving at Tristan da Cunha on 30 October, where she remained until 3 November offloading cargo, before reaching Gough on 4 November. She departed Gough shortly after offloading was completed. The *S.A.S. Outeniqua* arrived at Gough on 14 November, when crayfish was loaded from the Premier Fishing vessel *Edinburgh*. On 15 and 16 November *S.A.S. Outeniqua* loaded cargo from the island. We sailed for Tristan on the morning of 16 November, but had to return on 17 November, after picking up passengers at Tristan, in order to fix faulty satellite communications equipment. The *S.A.S. Outeniqua* departed Gough again on 18 November and arrived at Cape Town on Saturday 22 November 1997.

During the outbound voyage to Tristan I had opportunity to discuss conservation issues with the incoming Acting Administrator Mr Brian Money. On Tristan, and again from Tristan to Gough aboard the *S.A. Agulhas*, I also had opportunity to meet with the outgoing Administrator Mr Brendan Dalley. We discussed a broad range of issues pertaining to conservation in the Tristan Islands, and I was able to seek his advice on a number of matters.

Ships, Stores and Warehouses

Prior to our departure from Cape Town I introduced myself telephonically to the DEAT Voyage Co-ordinator, Mr. Sam Oosthuizen. He advised me that de-ratting certificates were available for the DEAT Paarden Eiland stores, and the *S.A. Agulhas*. He had also advised the captain of the *S.A.S. Outeniqua* Captain Errol Lochner of the de-ratting stipulations of the Gough Island Management Plan, including having rat guards in place at all times while the ship was alongside. On 22 October I called Captain Lochner who assured me the rat guards were in place, and that they would be until the ship's departure.

S.A. Agulhas

In addition to being de-ratted (certificate appended), the galley of the vessel was fumigated for cockroaches shortly before departure. The fitting of rat guards while berthed has been a problem over the years. This year when I first visited the vessel (morning of 21 October) the rat guards were not fitted, but this was apparently because she was due to be moved that morning to 'A' berth, and had been delayed. On 22 October at 'A' berth the rat guards were in place. Rat guards were taken down in preparation for departure on 23 October, but numerous delays that day meant we only sailed on the morning of the 24th. Rat guards were re-fitted overnight.

I inspected the holds of the *S.A. Agulhas* during the voyage from Tristan to Gough. Most of the cargo was offloaded at Tristan, so I was therefore able to look for signs of rodents throughout most of the available hold space. A number of food items potentially attractive to a rodent (empty yoghurt containers, tomatoes, spilled sugar) were carefully checked for signs of rodents (faeces, etc.), but none was found.

S.A.S. Outeniqua

An inspection certificate declaring the vessel rodent-free is appended. Captain Lochner re-assured me that rat guards were in place the whole time the vessel was berthed, but I was unable to check this since I was aboard the *S.A. Agulhas* and on Gough while she was berthed.

Using two vessels for the 1997 relief voyage was unavoidable, given the mechanical problems the *S.A. Agulhas* experienced in the months prior to departure. However the use of two vessels is undesirable from an environmental point of view, since the risk of alien introductions to Gough is doubled, and rodent-free verification of the second vessel is difficult when the inspector is already at sea or on the island.

Surprise inspections of the stores and warehouses at Wingfield, Paarden Eiland and the Table Bay docks were conducted.

Public Works Department (PWD) Stores, Wingfield

Dr Peter Ryan conducted an inspection of the PWD stores. Bait trapping for rodents was conducted in September 1997 by Kilpest Co., who certified (appended) the accessible portions of the stores to be free from rodent infestation. No signs of rodents were observed during the inspection. The orange steel containers used to transport equipment and materials were inspected and found to be clean inside and outside. All equipment and materials were stored inside, under cover. The problem of weeds growing in cracks in the concrete apron outside the stores (Wace 1996) had however not been addressed. To eradicate and prevent weeds taking hold in the immediate surrounds of the warehouse should be a reasonably cheap and easy task to perform, and given the generally highly invasive nature of these plants it is recommended that this matter be given attention.

Department of Environmental Affairs and Tourism (DEAT) Stores, Paarden Eiland

I visited the DEAT stores on 21 October 1997. Food continues to be packed in wooden "koskassies", but these are then loaded, along with all other materials and supplies, into steel containers. This policy should continue, since it is more difficult for a prospecting rodent to gain access to a steel container than to a wooden koskassie. Also, the containers are virtually airtight so that a trapped rodent would probably dehydrate or suffocate before reaching Gough. About a dozen loaded containers yet to be transported to the docks were inspected on the outside (including the forklift ports) for signs of plants and invertebrates e.g. spiders, cobwebs and any potential propagules e.g. seeds, eggs. Although some of the containers were a little dusty and dirty, there was no soil attached to any and no signs of any propagules, plants or invertebrates.

The rodent-trapping stations of SWAT Pest Control Co. were evident at a number of sites around the stores. No signs of rodents (droppings etc.) were found, as confirmed by the SWAT Service Report (appended).

DEAT have instituted a new cost-saving policy with respect to the issuing of clothing to takeover personnel. Whereas previously clothing was kept by personnel, all issue must now be returned. Before it is re-issued the clothing is inspected and washed. This is good news from an environmental perspective, since it diminishes the chances of contamination among the mainland and the DEAT islands by repeat visitors (some clothing is suitable for use privately on the mainland e.g. gumboots, foul weather gear). It is however essential that particular attention be paid to cleaning the foul weather gear, which has a number of Velcro patches and pockets, socks, woollen gloves, and gumboots. Many plant propagules e.g. *Acaena* sp. seeds are adept at clinging to soft and adhesive materials, and others are easily transferred via mud stuck in the crevices of the soles of gumboots. This makes transfer between Marion and Gough a real risk since most clothing (especially outer wear) will now be re-used. I therefore recommend that, in addition to washing, all foul weather gear, socks and woollen gloves, and gumboots be inspected (and cleaned of propagules if necessary) by hand before re-issue.

Overall I was satisfied with the precautions and attitude displayed by DEAT staff with respect to environmental precautions. At a planning meeting some months prior to departure Mr Oosthuizen alerted representatives of PWD, Sea Fisheries Research Institute (agents and managers for the *S.A. Agulhas*), and South African Air Force (SAAF) to the prescriptions of the management plan. It is recommended that this become a routine event prior to Gough takeovers, since the team leaders ultimately are individually responsible for the personnel in their contingents, and timely advisement and reiteration of regulations prevents problems further down the track.

'A' berth warehouse, Table Bay docks

I visited the warehouse on the evening of 21 October 1997. The warehouse was clean (no signs of spilled food or other items attractive to rodents), and I could find no signs of rodents. However no pest control procedures were employed, and I was informed by a representative of Table Bay Marine that none had been for many years. A stevedore stated that there were a great many rats in the area, presumably referring to the docks as a whole. Daytime inspections are certainly not ideal for gauging

the presence of nocturnal animals.

When I visited loading was taking place, with most of the Gough cargo already aboard the *S.A. Agulhas*, except the steel pieces for the new helipad. The warehouse contained only the cargo for Tristan, packed in wooden crates. A prospecting rodent would have no difficulty in getting inside one of these wooden crates. The steel helipad pieces were not inside the warehouse when I visited, but lying on the quay and alongside the warehouse. Although there were no weeds growing in the immediate vicinity, it is advisable to store all cargo under cover to prevent possible contamination by wind-blown plant propagules.

DEAT are not responsible for the 'A' berth warehouse, but it represents a 'weak link' in the chain of alien prevention. Since no precautions are taken to control rodents at 'A' berth it would be very easy for a rat to be transported to the Tristan Islands aboard a rat-free vessel in a wooden Tristan crate. Obviously a rat-free dockland is the best way to lower the probability of this happening, but this would be impractical and nearly impossible to achieve. Trapping year-round at 'A' berth would also most likely be prohibitive. I therefore recommend an intensive pest control exercise at the warehouse and in the surrounding area for environmentally sensitive voyages such as Gough (and Marion), for the week preceding cargo storage and loading. This would lower the local vermin population, and lessen the chances of a stray rodent getting aboard the vessel or into cargo destined for the island. Given that pest control is now practised at DEAT and PWD stores, and on board the voyage vessels, it would be sad to see this good work undone by a rodent problem at a dockland transit warehouse.

Gough Island Meteorological Station

Upon arrival at Gough the station was visited by an inspection team comprising the Voyage Co-ordinator and other DEAT personnel, the PWD leaders, the ship's doctor, Sgt. Glass and myself. I was impressed by the neatness of the station and surrounds, and by how well established the vegetation surrounding the station was. In an examination of the surrounds I found only a few items of discarded rubbish, mostly directly under the station and in the immediate vicinity of the incinerator. It was obvious that the Gough 42 (G42) team had gone to considerable trouble to preserve a pristine appearance as much as possible around the station.

Inside the station was clean and well-kept. During the year 591 house mice (*Mus musculus*) were trapped and destroyed in the station. No rats were observed during the year by G42 members. All windows in the station had working light-proof blinds fitted. At an orientation meeting shortly after arrival at Gough all takeover personnel were alerted, among other things, to the problem of bird strikes at the station if blinds were not drawn after dark. Generally people were responsible during takeover about keeping blinds drawn, and I observed no bird strikes over the period. During the year the G42 team did, however, report a few occasions when large numbers of birds had either been lured to the station or when strikes had occurred. In order to minimise this the team reported keeping all outside lighting to a minimum, including switching the catwalk lights off and using torches instead.

The ground outside the upper air building that had previously been contaminated (Wace 1996)

with discarded aluminium pellets and potassium hydroxide (from the backup system for inflating weather balloons with hydrogen) was showing signs of recovery with *Histiopteris* fern covering a large portion of the previously affected area.

During the inspection of the station I granted permission to land containers and materials for the construction of the new helipad and the new water tank tower alongside the existing structures. This, and the subsequent work on these structures, lead to some localised damage and trampling of the vegetation, especially immediately around the water tower. One Island Tree *Phylica arborea* was also damaged. Other than damage to this particular tree I do not consider damage to the vegetation elsewhere to be sufficient to merit concern. Judging by how rapid and luxurious the summer growth is, all signs of damage should have disappeared by this time next year. Nevertheless, as a precaution, I instructed the new team to inspect these disturbed sites regularly, and weed any alien species if they took hold.

Food

The following vegetables were offloaded this takeover: pumpkin, gem squash, onions, garlic, carrots, washed potatoes, courgettes, cucumbers, tomatoes, apples, lemons, grapefruit, pears and oranges. No leafy vegetables were sent ashore. Many of the tomatoes were already rotten, with fungal mould growing on them. Weevils continue to be a problem in the flour and mealie meal in the pantry. This has been observed previously (e.g. Andrew 1994), but the situation is unlikely to be remedied until cost-effective irradiation facilities are available to sterilise the foodstuffs safely. Only deboned chicken was brought ashore, in order to minimise the risk of introducing Newcastle Disease. A few whole frozen turkeys were also brought ashore.

Takeover personnel and affiliations

A list of the personnel that remained on the island for the duration of takeover follows. Other than the Executive Officer of the *S.A.S. Outeniqua*, there were no day visitors from either the *S.A. Agulhas* or the *Outeniqua*.

Department of Environmental Affairs and Tourism (including Weather Bureau).....6
Public Works Department.....11
South African Air Force.....9
Ship's doctor.....1
Gough 42 team.....5
Gough 43 team.....6
Tristan Islander.....1
Environmental Inspector.....1
Chaplain.....1
Total **41**

Normally the SAAF and doctor are ship-based and would return to the mainland along with the *S.A. Agulhas*, but since she was unable to return to the mainland in time for transfer to the *S.A.S. Outeniqua*, permission was granted by the Administrator of Tristan, Mr. Brian Money, for these personnel to remain on Gough. The SAAF assisted the PWD considerably with their work on the island, which was valuable given the very short takeover period and the large amount of work needing to be done.

Helipad

The existing wooden structure has warped and become unsafe in recent years. Consequently, during this takeover construction was started on a new steel helipad. The new helipad is smaller than the wooden one, and is being built in the corner of the existing structure on raised steel piping sunk into the peat by a pile-driver. Most of the new helipad frame was completed this takeover. The landing platform will be built next takeover.

Currently the feeling is that the wooden structure should be left to degrade underneath the steel one, rather than creating a window of disturbance for alien plants to take root by removing it. This merits further consideration, however, since the old helipad, 900 m^2 in extent, is 'floated' on a 30 - 40 cm thick bed of polystyrene above a thin layer of fiberglass. Should the wooden surface of the helipad degrade before the underlying polystyrene does (likely), or before it is totally overgrown by vegetation (also likely), a potential maximum of approximately 270 m^3 of polystyrene will be exposed to the environment. Any amount of exposed polystyrene is environmentally unacceptable, given aesthetic considerations and the risk it poses to scavenging birds e.g. Brown Skuas *Catharacta antarctica*. Fortunately the wooden helipad surface is still in a reasonably good state, so it is not necessary to take action immediately in this regard, but I recommend that the old helipad be monitored over the course of the next few seasons in order to determine the extent to which, if at all, the polystyrene will be exposed. Should it become clear that any polystyrene will be exposed, a plan to remove systematically the planking and polystyrene, package it and return it to the mainland, should be adopted.

This season a number of containers and most of the steel for the new helipad were landed alongside the old structure. This, and the subsequent work, damaged a small area of *Histiopteris* fern vegetation. I asked the new team to monitor this area carefully and weed any alien plants, especially *Sonchus* sp. thistles and *Rumex* sp. docks, from this area should they take root.

Nowadays no concrete is used in the erection of new structures at Gough. Rather all structures are raised on steel poles driven by pile-driver down to bedrock. The distance from surface to bedrock is sometimes over 10 metres, and requires a number of poles to be connected together, with a steel 'point' at the base which receives the force from the pile-driver and drags the poles down with it. Because of the depth of the peat, the pile-driver has to strike the pole column a great number of times in order for the base pole to reach bedrock. This places stress upon the welds connecting the point to the base pole, and it can happen that the point is knocked free. According to PWD civil engineer Johan Lexow, when this occurs the pole column will not be securely rooted, and the structure risks subsidence at a later stage. A better alternative to using steel points is to fill partially the bottom of the base pole with dry cement, which can easily be expanded to form a solid cylinder. This cylinder cannot be knocked free. Even more secure anchorage can be achieved by filling the entire pipe column with cement. This also combats later weakening of the column if the connecting pieces rust.

I recommend that the cement and sand be sterilised (cement by irradiation, sand by steamcleaning) to prevent possible introduction of plant propagules to the island. PWD are aware of this risk, and have already undertaken to follow correct sterilisation procedures. Certification of the sterilisation should be presented to the Environmental Officer before the material is taken ashore. Additionally, if any mixing of cement is undertaken, it should be done on a secure surface that can later be removed from the island.

Currently no formal provision is made at Gough to remove the foundation poles when structures are dismantled. Usually the poles are hammered flush with the surface of the peat, and occasionally sawn off below the surface. Filling the pipe column with cement would not compromise this current policy of leaving the column *in situ*, but should removal of the columns become standard practice there is little doubt that cement-filled pipes would be considerably more difficult to remove than would cement-free ones. Leaving foundation poles *in situ* does not seriously compromise environmental standards, but it is desirable to remove them where possible. Expensive equipment may not be needed for this - during the dismantling of a structure in the early 1990s many foundation poles were removed by team members by hand, by applying sufficient leverage using a long pole, a large monkey wrench and a wooden plank (J. Cooper, pers. comm.). I recommend that PWD adopt this as routine practice.

Water tank platform

This takeover the old wood plank structure was entirely removed and replaced with a better-looking and more secure steel one. The old foundation poles were sawn off approximately 50cm below the peat surface, and the new foundation poles sunk using the pile-driver. Considerable damage to the vegetation immediately underneath and around the platform resulted from the work. I asked the new team to monitor this area for alien plants, as at the helipad. One *P. arborea* tree was partially destroyed by an unsecured empty water tank being blown away by helicopter downdraft during offloading of materials.

During construction of the water tank and helipad it was necessary to work at night. The construction sites were illuminated by spotlight to make this possible. The lights clearly attracted birds

on some evenings, but an effort was made to keep them directed downwards to minimise this problem. Whether or not any extra fatalities from Brown Skua *C. antarctica* predation occurred because of the spotlights is not known, but no fatalities from birds striking buildings were observed.

Catwalks

Overall the catwalks were in good condition. No catwalks were replaced this takeover, and only the little-used walkway from the food store to the cliff edge above the diesel staging-tank is still laid with the old wooden-framed diamond-shaped type. Although most catwalks are all steel, they still rest on timber sleepers and supporting trusses. Some of this timber is showing signs of degradation, and will need to be systematically replaced during following takeovers. Johan Lexow has suggested that the lifespan of this timber would be lengthened if it was treated with creosote. The timber would be treated on the mainland, and no creosote would be applied on the island. Alternatively, moulded plastic beams could be used. Modern plastics can be extremely durable and strong, but whether hardened plastics resist ultraviolet degradation to the same extent that creosote-treated timber resists rotting is unclear. I recommend that GIWRAC consider these alternatives and suggest a suitable course of action.

Emergency radio shack

This takeover the HF equipment in the emergency shack, and the WE (West-East) longwire running from the hut, were removed. This hut is not in a good condition, and now no longer serves a purpose. It is recommended that it and the catwalk linking it to the helipad-station catwalk be removed. The foundation poles driven into the peat should be removed in their entirety as described above.

Radio antennae

In addition to the emergency radio shack longwire, this takeover the large rhombic array and the main backup WE longwire and its supporting mast and stays were also dismantled or removed. Three of the rhombic masts were felled and left on the ground for removal next year (the telescopic joints had oxidised fast and thus dismantling was not possible), but the fourth mast and all the antenna wire and staywires were taken off the island.

A new wide-band HF antenna has been erected seaward of the incinerator, near the site of the mast of the old backup WE longwire. The new mast is 4 m high, and the antenna 40 m long, with the antenna wires running obliquely to the ground on either side of the mast. Four triangular flags were fixed with clamps to each of the four staywires to increase their visibility to birds. The HF radio system now serves as backup alone, since all communications to the mainland are routed preferentially via the satellite system. Regular non-essential HF (and VHF) communications with Tristan and the Premier Fishing vessel in Gough waters took place in 1996/97.

Incinerator

The current incinerator is scheduled to be replaced by a larger, more efficient and cleaner-burning

diesel incinerator next takeover. A minimum capacity of 1 m^3 is recommended. The new incinerator cannot stand outside as the current one does, and will need a shelter erected around it. It is probably best that the new incinerator be placed where the current one stands, since a large concrete base is in place there already, and the area is one of the most disturbed areas at the station.

Peat slips

In December 1996 a large peat slip occurred on the southern side of the catwalk leading down to the point, and just below the shack housing the emergency generator, which also operates the crane. The slip destroyed the catwalk leading from the point to the crane observation point, and the rear wall is less than 5 m from the emergency generator shack. The wall is approximately 3.5 m high, and the entire slip is approximately 25x25 m. This slip constitutes a significant threat to the station at present, given its extent and the likelihood of the rear wall receding and engulfing the shack (and perhaps the catwalk and southernmost diesel tanks), in the process.

In 1992 the Archway collapsed unexpectedly, and over the years large peat slips have occurred within sight of the station but none as close as the one in December 1996. It is a priority that the station be examined by a professional experienced with peat and its stability, perhaps a geologist or soil scientist, with special attention given to the seaward buildings, especially the food store (which also houses the emergency base), and the two generator shacks. Another large slip in this area could have calamitous consequences and, although it is unlikely that existing structures can be reinforced to cope with a large slip, a knowledge of the mechanics of peat slips and the underlying rock topography is essential for the planning of any new structures. I therefore recommend, as a matter of urgency, that a suitably qualified professional examine the December 1996 slip and the rest of the station's surrounds next takeover.

Two suggestions have been made to help stave off the threatened collapse of the emergency generator shack. Firstly, the rear wall of the slip could be levelled off to reduce the gradient. To achieve an optimal gradient of 1 in 2 however, would mean removing the shack completely. Secondly, large steel pins or pipes could be driven into the base of the wall and anchored to pins further inland. A retaining wall could then be built at the rear wall, using the pins as anchorage. Both schemes have shortcomings. Levelling off the ground would mean destroying a large area of vegetation, and exposing the underlying peat. Alien plant infestation could be expected to occur in the exposed area. The shack would most likely have to be moved with this scheme anyway. The second scheme relies heavily on the pins being securely anchored in bed rock (depth to rock unknown), and not distorting or bowing under pressure from the peat should another slip occur. I suggest that GIWRAC consider these schemes (and any others), and, in consultation with PWD, recommend a course of action.

Fuel pumping

Approximately 140 000 litres of polar diesel were pumped ashore on 6 November. Conditions were excellent for pumping, and other than a small spill (< 5 litres) onto the rocks at the coupling point at

the base of the cliff, no other spills occurred. Approximately 40 litres of dripped diesel were caught at the coupling point in an oil container. Transfer would be aided by extending and improving the coupling point at the base of the cliff. Since fuel pumping presents a major environmental risk, it is very important that before the Gough takeover the couplings between the sections of the hose are carefully inspected and the hose is pressure-tested to 6 bar, at least, by an engineering firm. Certification of this should be presented by the *S.A. Agulhas* to the Conservation Officer before fuel pumping commences.

Previously it was recommended that DEAT install a shore-based hose (Wace 1996), similar to the one at Tristan. Unlike the ship-based hose, a shore-based hose consists of a single long piece of piping (no sections coupled together) stored on a large reel. A shore-based hose can be more robust than a ship-based one and, because it has far fewer couplings, presents less of an environmental risk. But situating the hose on the island would likely make maintenance of the fixture more difficult than if it where ship-based. Placement of the reel and coupling system would have to be carefully considered, given the huge waves that strike the coastal cliffs during winter storms. During takeover the G42 team showed me a boulder (estimated mass >5 tonnes) at Admiral's Cove which was displaced 3 m by 12 m-high storm swells. To safeguard the reel and coupling fittings from general corrosion and storm damage it would therefore have to be either entirely removable (and stored in the PWD shed, or onboard ship until the following takeover), or placed, if not on top of the cliff at the same level as the crane, at least where the current staging tank is. Until these points can be satisfactorily addressed, I recommend continuing with the existing ship-based system under condition that the fuel hose pipe be pressure-tested before takeover.

Solid and liquid wastes and pollutants

The G42 team leader reported no chemical, oil or fuel spills for the past year other than a small amount of diesel that leaked from a container outside the upper air building, which killed approximately 3 m^2 of alien *Agrostis stolonifera* grass. This area was sprayed with dispersant and covered with soil from elsewhere.

All plastics, glass, tins and other metals, and toxic chemicals including engine oil and photographic chemicals were packaged and returned to the mainland for disposal. Spill trays were also installed this takeover under the generator engines, as suggested by Roux (1996), to catch fuel and oil spillages. No plastics or other potentially harmful combustibles were incinerated during takeover, and I was assured that none had been during the year. Only paper, wood and other paper-based products, including packaging, and poultry products were incinerated.

As recommended by Wace (1996), the waste water and sewage pipe leading into Skivvygat was lengthened in an attempt to prevent blowback into the surrounds. This has not solved the problem, though, and during strong easterly winds blowback still occurs. Although it seems unlikely that lengthening the pipe further will completely prevent blowback, further attempts should be made to resolve this unsanitary situation. Perhaps extending the pipe even further down, until it is directly above the pool at the bottom of Skivvygat, will diminish the blowback. I recommend that DEAT consider this.

No leaks were observed in any of the sewage pipes, nor any of the other 'grey water' plumbing leading from the station to Skivvygat.

Marine

During the year G42 reported that they had neither seen nor heard (by radio) poachers in Gough waters. One team member made a collection of beach debris from beaches close to the station. Some of the items recovered include plastic cooldrink and other bottles, polystyrene pieces, fishing floats and line. Spanish and Oriental (probably Japanese) lettering was identified on some of the items, and the provenance of one of these was Brazil ("Industria Brasileira").

During the year some of the G42 team members completed censuses of Subantarctic Fur Seals *Arctocephalus tropicalis*. Only two adult Fur Seals were seen with entanglements during the year; neither of the entanglements was removed. No oiled birds were found at the station or seen on any of the beaches, nor were any entangled birds seen.

Sgt. Glass took the opportunity to inspect the fishery aboard the Premier Fishing vessel *Edinburgh* for three days during takeover. He recorded the catch taken (crayfish *Jasus tristani*, and octopus and fin-fish bycatch), sizes, fishing sites and depth, as well as monitoring other provisions of the Sea Fisheries and Conservation ordinances. The total whole crayfish catch for the period 11 - 13 November was 3641 kg (ship and boats included). Sixty-nine female 'berry' crayfish were caught during this period, but all were thrown back, as were the only three undersized (< 70 mm) crayfish. Eight octopus were also caught during Sgt. Glass' inspection period, and the total catch of octopus from 1 October until 13 November was 138 kg. Other bycatch included False Jacopever *Sebastes capensis* and some starfish, crabs and whelks. As stipulated in the Management Plan, the *Edinburgh*, *S.A. Agulhas* and *S.A.S. Outeniqua* all had dimmed lights at night whilst off Gough, to prevent birds from being lured to, and possibly striking, the vessel. Sgt. Glass observed no rubbish being thrown overboard of the *Edinburgh* during his inspection period.

The G42 team attempted to fish for the table during the year, but reported catching only False Jacopever. Fishing aboard the *S.A. Agulhas* and *S.A.S Outeniqua* took place at Tristan and Gough under permit from the Administrator. The terms of the permit were that fishing was to be for personal consumption only (and in Gough Island Wildlife Reserve waters for immediate or near-immediate consumption alone). Initially this was not clear to some of the takeover personnel aboard the *S.A. Agulhas*, some of whom expected to be able to remove unlimited numbers of fin-fish from the Tristan and Gough waters. In consultation with each other, this situation was dealt with appropriately by the various takeover team leaders. In future, to prevent personnel from overstepping the terms of the permit, and to make it clear that a different set of conditions apply once in Gough Island Wildlife Reserve waters, I recommend that the team leaders be made aware of the regulations (including minimum size limits) at the planning meeting held prior to departure by the DEAT Voyage Co-ordinator (see earlier), and that the Conservation Officer emphasises the regulations during his/her onboard slide presentation and talk.

Erosion

Two routes have been used over the years to reach Tafelkoppie from the station. Both are in a bad state, with extensive mud pools and erosion along much of the way. A third route, up the valley on the southern side of the current 'Ruin Ridge' route, was attempted this takeover. This route looks to be less prone to developing the mud pools typical of the other two routes and should be used in preference to the others. It is hoped that the others will recover in time, as do the paths on the coastal plane close to the station. The paths leading to Seal Beach, Swemgat, Snoekgat and Admiral's Cove are all in good condition.

Aliens

During the past year efforts were made by the G42 team to weed *Sonchus* sp. thistles from around the station. During takeover I weeded approximately 20 plants in the Skivvygat/incinerator area, a few alongside the catwalks around the station, and another plant up at the helipad. A plant was also removed and destroyed at Snoekgat and another in Goneydale. *Rumex* docks are too widespread for weeding to make any difference. No potatoes *Solanum tuberosum* were seen at the station, but the new team have been advised to look out for them and *Sonchus* sp. thistles and weed them when encountered. At the site of the recent peat slip near the crane point, *Rumex* docks are already well established in the exposed peat.

The sites of the lower and upper magnetometer huts were visited towards the end of takeover. The lower hut site is well overgrown by *Histiopteris* fern, but *Rumex* docks were also present here. Both *Rumex* and *Sonchus* were present at the site of the upper magnetometer hut, as well as the common alien grass species *Poa annua*, *Agrostis stolonifera* and *Holcus lanatus*. Six *Sonchus* thistles were weeded and destroyed from this site. Other than these, no other aliens such as the *Senecio burchellii* and *Conyza floribunda* present until at least 1993 (Fraser 1993) were observed.

Conservation education

During the outbound voyage I presented a slide show and talk on Gough Island and the management plan. This was well-attended, except by PWD. On the island I had a separate informal meeting with PWD and explained some of the provisions of the management plan, and what scientific biological monitoring programmes are being conducted at Gough.

Ms Sarien Lategaan of G43 volunteered to act as an unofficial conservation officer for the following year. I instructed her in what alien plants occur on the island, and which species to weed when encountered. Specimens of some of the common plants occurring around the station were pressed during takeover, and Ms Lategaan subsequently collected additional specimens to be sent home with the Premier Fishing vessel *Edinburgh*. During takeover I also had the opportunity to discuss conservation-related subjects with most of the G43 team, both in the station and also on walks and whilst completing monitoring of Yellow-nosed Albatross *Thalassarche chlororhynchos* in the study

colony.

Yellow-nosed and Wandering Albatross monitoring

Mr Pieter Van der Wal of Gough 42 and I continued the monitoring work on Yellow-nosed Albatross *T. chlororhynchos* that was started in the early 1980s. Some difficulties were encountered with breeding birds missing colour bands, and in some cases not having metal rings either. Maps of last year's and this year's nests were made, and some new breeders metal-ringed. This study has continued for many years largely thanks to the efforts of volunteers from the teams. It is hoped that it can continue for a number of years more, since the dataset is now approaching sufficient size for important questions concerning these long-lived birds to be answered. Mr Andre Combrink of G43 volunteered to take charge of the study for the following year.

During an overnight trip to Tafelkoppie and Goneydale, Wandering Albatross *Diomedea exulans* chicks were ringed and counted in both areas. Three chicks were ringed on Tafelkoppie, and 54 in Goneydale. A total of 74 chicks was counted in Goneydale, but this figure should be consider a minimum count since the south-western portion of the area was not exhaustively searched. Anecdotal evidence suggests that Wandering Albatross may be in decline at Gough Island, but population trends are impossible to ascertain definitively since no baseline data, other than a few chick counts late in the year, exists for the entire island population or even a substantially large subset thereof. Counts of breeding attempts in January, after laying, in Goneydale and follow-up counts of chicks must therefore be considered a priority. Mr Glen Roberts, team-leader for G43, volunteered to take charge of the Wandering Albatross work for 1997/98. He has agreed to attempt a complete census of incubating birds in Goneydale in January 1998.

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