

# ANNUAL ENVIRONMENTAL INSPECTION REPORT, GOUGH ISLAND WILDLIFE RESERVE, SEPTEMBER 2005

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## SUMMARY

### *Actions Required and Recommendations*

1. Rodent bait stations should be routinely placed in the cargo holds of the *S.A. Agulhas* as a further precaution against bringing rats to Gough Island. Action: Smit Marine
2. Ensuring that all DEAT containers packed and sent to Gough Island are propagule free remains an issue that needs to be improved. Thorough cleaning and fumigation of containers immediately prior to packing is recommended, along with a system to verify this. Action: DEAT.
3. The activity and procedures to ensure that fuel pumping proceeds without incident need to be improved and it is recommended that all shore-based operations in fuel pumping be the responsibility of NDPW, who have the skills and knowledge to undertake, maintain and repair all of the equipment in the operation. Procedures need to be in place to ensure that there is sufficient fuel hose in the water to prevent unnecessary strain on the coupling joints if there is a strong current running or changing weather conditions cause the *S.A. Agulhas* to drag anchor, and it is recommended that a small boat with dispersants onboard is in the water during the whole time of fuel pumping. Action: Smit Marine, DEAT and NDPW
4. Equipment for dealing with a fuel leak on shore and at-sea is currently inadequate, and the procedure on how a major leak should be dealt with is not established. Necessary equipment and clear guidelines for dealing with a major leak need to be established and put in writing for all parties to have access to. Action: DEAT and GIWRAC.
5. Procedures for dealing with "oiled" birds and mammals need to be established so that appropriate action can be undertaken during the takeover and by personnel in the over-wintering team. Action: GIWRAC
6. Consideration needs to be given to alternative methods of food waste and sewage disposal in "Skivvy Gat". Action: GIWRAC

### *Progress Made*

1. Publication of the clear SANAP takeover manual again helped inform all team leaders of the environmental issues involved with Gough Island
2. The removal of all waste and discontinuing the use of the incinerator on the island during 2004/05 proved successful and this practice should be continued.
3. The repair made in the 2004 takeover to the old helipad has successfully prevented further leakage of polystyrene into the environment.
4. Discussion of areas for helicopter flying operations and the map produced prevented any flights in areas of Gough Island where major concentrations of breeding penguins, albatrosses or seals occur.
5. Two biological researchers and two *Sagina* eradication workers make up part of the incoming Gough 51 team, and their actions should increase knowledge on the impacts and ecology of introduced housed mice and promote the control and containment of *Sagina procumbens*.
6. John Wilson from Gough 51 has been appointed as the 2005/06 conservation officer.

### *Acronyms used:*

DEAT – Department of Environmental Affairs and Tourism

SANAP – South African National Antarctic Programme

NDPW – National Department of Public Works

GIWRAC – Gough Island Wildlife Reserve Advisory Committee

### **ACTITIVIES PRIOR TO SAILING**

Richard Cuthbert arrived in Cape Town two days prior to the scheduled sailing date. Inspections were made at DEAT Antarctic & Islands Directorate's Paarden Eiland stores, the NDPW stores and the *S.A. Agulhas*. Rodent poison-bait stations were found at **Paarden Eiland, however the general condition of the store for the second year in a row was not fully satisfactory, with rubbish (including spilled food) lying on the floor, and open containers.** The NDPW stores were very clean with rodent bait found in all rooms. Containers in both stores appeared clean and washed down. Rat control certificates were available for both Paarden Island and NDPW stores. Fumigation took place on the *S.A. Agulhas* prior to sailing and inspection of the ship found the food stores, galley, and holds to be exceptionally clean with rodent bait stations and insect light traps in place. Rat guards were in place on hawsers, although again it was noted that some had rotated so that they were ineffective, and in addition the hawsers from the *S.A. Agulhas* were overlapping and touching hawsers of other vessels moored alongside where it is unknown how well rodents are controlled.

### **ACTIVITIES ABOARD THE S.A. AGULHAS**

An environmental talk was given by Richard Cuthbert on board the *S. A. Agulhas* to all personnel going ashore at Gough Island and to interested Tristan passengers. Aspects of the island's wildlife and management plan were outlined and information given on avoiding alien introduction, waste treatment, black-out procedures, avoiding

disturbance of wildlife and path erosion. A group leaders meeting was held aboard ship, and when environmental matters relating to the takeover were discussed, no problems were encountered during this meeting.

A boot-washing “ceremony” was held on the helipad prior to the arrival at Tristan da Cunha. This was required for all Gough personnel visiting Tristan and was recommended to all Tristan passengers and Tristan Islanders to help prevent introducing more species to Tristan da Cunha. The event was well attended by all. A second compulsory boot-washing ceremony was held on the morning prior to the arrival at Gough Island. This event was attended by all personnel visiting Gough, and the co-operation of all takeover personnel was appreciated. Clothing and boots were generally clean although it was again noted that even clean and sealed clothing from DEAT sometimes contained seeds and plant material – particularly in Velcro material of waterproof jackets and trousers. **Outdoor clothing that does not contain Velcro would greatly reduce the risk and cleaning efforts needed to ensure clothing is propagule free. DEAT are making an effort to ensure that new clothing bought for island work is free of Velcro (S. Durand pers com.)**

The helicopter hanger was inspected on the 4/9/2004 and was clean with rodent poison-bait in place. Both CHC helicopters were checked and found to be very clean. The light trap in the helicopter hanger had captured at least 100 insects and the continued use of this light is recommended. The dry food stores and freezers were inspected on the 5/9/2004 and were very clean. Dry food stores all contained rodent bait stations and insect light traps. Cargo holds 1, 2 and 3 were inspected on the voyage down and found to be very clean. While the holds were clean, potatoes that are transported to Gough and Tristan (as food and seed crops respectively) were in open containers to ensure they did not become mouldy, presenting a readily available food resource to rodents if any were aboard. **As was the case last year, no rodent bait stations were found in the cargo holds and it is again recommended that bait stations be provided in the holds as an extra precaution: Action Smit Marine.**

## **CARGO OFFLOADING**

Positioning of cargo containers was agreed upon by Richard Cuthbert, Erik Buenk (DCO) and Kim Gierdien (NDPW Group Leader), and took place at the helipad, crane point, the brown store, chemical store, upper-air building and beside the freezers. All areas were inspected for the introduced weed *Sagina*, and were clean apart from the crane point area, where small patches of *Sagina* were found growing between cracks in the concrete. These areas were cleaned by Richard Cuthbert and Niek Gremmen on the afternoon and evening of the 19/09/05 prior to cargo offloading. The crane point area was inspected after containers were lifted and back-loaded to the *S.A. Agulhas*. *Sagina* was found growing in cracks underneath the previous years containers. Cargo loading at crane point was postponed until after the whole area was treated with boiling water. **The cooperation of DEAT in altering flight operations to fit this in is appreciated.**

Two boxes of food were dropped from cargo nets (one been sent to the island and one returning to the SA Agulhas) during flying operations. These both contained “meat” and both were dropped at sea.

## CONTAINER AND CARGO INSPECTION

All DEAT containers flown were clearly marked with a “G” and were dedicated Gough Island cargo, apart from one Antarctic container as agreed upon between Erik Buenk and the Richard Cuthbert prior to departure. This container had only been used at the SANAE base and had not been deployed to Marion. Blue NDPW containers were not island specific and it is **again recommended that NDPW have dedicated containers for Gough, Marion and Antarctic operations. It is also recommended that metal strops and ropes for flying operations should also be island dedicated.**

All NDPW containers and building equipment were inspected and found to be very clean. Prior to departure these containers had been washed down and the insides and seals vacuumed to ensure they were as clean as possible.

All DEAT containers and their contents were inspected during unpacking and found to be clean, apart from six containers which were dirty with cob-webs, spiders eggs, feathers and considerable numbers of fly pupae (unknown species). Two of these containers were fumigated with “fumitabs” (Gamma BHC 440g/Kg) and left sealed for 3-4 hours. The other 4 containers held food stores and were sprayed thoroughly with the insecticide (“Doom”) and left sealed for 1 hour. It was ensured that as many of these containers as possible were used for back-loading of cargo, however 4 containers had to remain on the island to be used for waste storage for the over-wintering team. These containers were thoroughly cleaned and hosed down with boiling water from the Sagina boiler. All equipment and food packed within containers was clean on inspection. **Action and safeguards to ensure that all DEAT containers and equipment sent to the Gough Island is clean is clearly required. Thorough cleaning and fumigation of containers immediately prior to packing is recommended: Action DEAT.**

## FUEL PUMPING

Four attempts were made to complete fuel pumping, with pumping taking place on the 21, 22, 23 and completed on the 30 September. Fuel pumping operations did not go smoothly during this takeover. Three separate leaks were found on the first day of pumping and the attempt was stopped at 13:00. Two of these leaks were on land, the first at a valve on the top metal section of pipe 10m from where it comes up from the metal scaffolding ladder; this section was removed and replaced with a straight pipe. The second leak was on a join of the onshore fuel-hose. The third and most serious leak was on the coupling on the end of the hose from the ship. This hose was brand new, but it appears the join was incorrectly fitted at manufacture. During pressure testing the ship drifted and the hose became taut, pulling the hose off the coupling (narrowly avoiding seriously injuring one of the team). The ca. 10m plastic/rubber cover of the fuel hose that protects it from the shore was lost at sea. Effort to repair and pump fuel again took place on the 22nd, however the new coupling on the ship's hose was put on with a 90degree bend, and this created problems with kinking in the hose that prevented fuel from being pumped efficiently and only 10,600 litres were pumped in the day. Pumping again took place on the morning of the 23rd September. Sea condition deteriorated over the morning and the *S.A. Agulhas* dragged anchor

causing the hose to rip from both the onshore station and the ship. Diesel pumping had ceased prior to this, however the hose was still partially full of diesel when the incident happened, and it is estimated that a maximum spillage of 800 litres of diesel occurred at sea. The choppy sea conditions meant that this diesel was soon broken up and no diesel was observed to reach the shore. No dispersants were sprayed at sea as the priority was to recover the hose on board ship while it still retained diesel. Fuel pumping was finally completed on the 31st when 50,000 litres were pumped ashore. Two minor leaks (ca. 0.5 and 1 litre) occurred on shore during the day.

The difficulties involved in fuel pumping during the 2005 takeover could easily have resulted in major diesel spills if actual pumping was in operation when the hose ripped from the onshore and ship attachment points on the 21 and 23rd, and it was mostly luck that prevented injury and a serious environmental incident. The procedures for setting up fuel pumping and for dealing with major leaks are not properly established and the following recommendations are made:

- **Responsibility for fuel pumping activities on shore should be undertaken by one organization, as the current situation (shared between NDPW, DEAT and the new and old Gough teams) is unclear. It is recommended that NDPW take charge of these procedures as they fully understand the operation and are best equipped to deal with any repairs that might be needed to allow pumping to proceed**
- **A monitoring boat equipped with dispersants should be in the water at all times during diesel pumping, and if it is too rough for this small boat to be at sea then it is too rough for pumping**
- **Sufficient fuel pipe from the *S.A. Agulhas* to the shore needs to be in the water to allow more “give” in the system and prevent the hose from being ripped from the anchor points if there is a strong tide pulling on the hose or if the ship drags anchor**
- **Attachment points should be placed on the fuel hose so that any strain on the fuel hose is on these points and not on the coupling joints to the ship or the onshore pipe**
- **The flexible fuel pipe on shore is old and perishing and contains a joint that leaks. A new fuel pipe that is long enough to connect from the first onshore pumping point to the metal fuel pipe (with no joins) is needed for the next takeover**
- **Pressure gauges on shore at the first concrete pumping station will enable personnel onshore and on the *S.A. Agulhas* to detect if there is a blockage or constriction in the fuel pipe**
- **Equipment to deal with anything but minor leaks onshore is currently inadequate, and sufficient absorbent mats and dedicated containers that can be sealed should be available for catching spills**
- **A manual and full procedures for dealing with a major spill on shore or at sea needs to be established to enable all parties to respond to a spill in the most appropriate manner. Outside expert guidance should be sort in connection with this.**

Reports on the diesel spill and the faulty fuel hose have been prepared by the Master of the *S.A. Agulhas* and are available from Smit Marine (Report Numbers: DAGU-2005-019 and DAGU-2005-020).

## OTHER POLLUTION

The Gough 50 team did a good job at keeping the base and the surrounding area free from rubbish and pollution. These areas were very tidy on arrival at Gough Island and the annual “chicken run” produced little in the way of waste or pollution.

Separate to fuel pumping, a diesel leak occurred on land from the day-tank of the *Sagina* boiler. This occurred when the top section of metal pipes were tested for leaks by NPWD after the new section of pipe was put in to replace the leak at the valve. The two valves on the inline to the *Sagina* day-tank were both open, and diesel overflowed the day-tank onto the ground. It is unclear why both valves were open and who had opened them. It is estimated that at least 100 litres of diesel was spilled, as an area of ground (ca 5 x 5 m) beneath the tank was soaked with fuel and diesel had run over 20m down over crane point. The area of affected ground was sprayed with boiling water from the *Sagina* boiler to disperse the fuel and the concrete of crane point was again sprayed. The spill occurred on ground that is dominated by introduced grasses and then spilled onto soil and over the crane point in areas where *Sagina* is a problem, hence there was negligible impact on the vegetation or soil as these areas are already regularly sprayed with herbicides or treated with boiling water. One broad-billed prion *Pachyptila vittata* was found covered in diesel oil, as the one burrow in the vicinity of the day tank was flooded with diesel. The bird was washed thoroughly in hot soapy water, and despite being in very weak condition when it was found it survived the following 24 hours before it was released. **Procedures for treating and cleaning oiled birds and mammals on Gough Island are not clear and a manual of action and the necessary cleaning equipment needs to be in place: Action GIWRAC.**

## BUILDING AND CONSTRUCTION WORK

The major construction work undertaken outside in the 2005 takeover was the placing of new piles and wooden beams under the brown store. Richard Cuthbert was consulted prior to this and agreed that there would be no environmental impact in this area. After consultation with the CO, NPWD cleared away tussocks and vegetation that were forcing the metal pipe away from the cliffs on the vertical scaffold section. NPWD also welded a new section of pipe to repair a corroded hole in the fuel pipe, 2 NPWD staff were on hand with fire extinguishers during this process and immediately dealt with a small flare up of *Spartina* grass during welding. The area was doused in water following the completion of welding. The end of the sewage pipe from E-base had been blown back on to land during the year, and this was repaired during takeover. It was noticed that the sinks and showers in E-base drained directly onto the ground, rather than connecting with the main sewage down pipe. It is recommended that these areas are properly plumbed and be connected to the sewage pipe during the 2006 takeover. **The actions of all NDPW staff in co-operating with the CO and taking environmental issues seriously on Gough Island is much appreciated.**

## ASSESSING CONDITION OF THE OLD HELIPAD

Attention had been drawn to the old helipad the previous year because of the amount of polystyrene fragments that were leaking from around the piles and rotting timbers. In order to prevent and reduce further leakage of polystyrene from the old platform all holes in the platform and around the new **piles were sealed up with tin-sheeting by NDPW during the 2004 takeover period. Inspection of the helipad in this takeover revealed no leakage of polystyrene in the surrounding area, and the previous years actions of have prevented this pollution.** This is a short-term solution, and the old helipad will continue to slowly rot and at some point in the future (within 10 years?) its removal is likely to be required. **The state and condition of the old helipad should continue to be monitored during each takeover period to see if it is deteriorating.**

## FLYING OPERATIONS

All flying operations during the 2005 takeover were undertaken by CHC helicopters. The helicopters and hangar were inspected on the voyage down and found to be very clean. The skids of the helicopter were washed down after flight operations on Tristan before flying operations at Gough. Prior to flying at Gough the CHC team leader (Captain Andre Stroubel) sought advice from Richard Cuthbert on the agreed upon flying areas for Gough Island. These have not been formerly defined, but the management plan stipulates that flights away from the meteorological station “must not cause excessive disturbance to seals and birds”, that shore areas containing breeding seals and penguins “be avoided during breeding seasons” and overflights be “kept to a minimum”. The 2004 Takeover Manual further stipulates that a “vertical and horizontal distance of 200 meters is to be kept from any known bird colonies”. A map of recommended flight and no-flight areas was agreed upon, with boundary line of 200 meters set around Gough Island for all flying. No flight areas included areas of beach known to hold breeding populations of Southern Elephant Seals, or areas with large numbers Rockhopper Penguins. It was agreed that flight operations inland would be for reasons of scientific or logistic purposes only and that inland flying would take the shortest possible route. The provisional flying map is illustrated (see Appendix 1). All flying operations during the takeover were within the agreed flight zones and the professional actions of CHC are commended.

One container was successfully flown and placed in Gonydale for the use of the fieldworkers in the coming year.

One Antarctic Skua was killed at the helipad on the 03/10/2005 as the helicopter was flying containers back to the ship. The Skua flew inter the rotors and was killed instantly. While regrettable, the numbers of Skuas that hang around the helipad mean that the occasional bird will be struck, and it is difficult to prevent this.

## INTRODUCED PLANTS AND *SAGINA PROCUMBENS*

Efforts to control *Sagina procumbens* were limited during the past year on Gough Island, due to limited personnel willing to assist the team's conservation officer and a lack of rope and climbing skills. The arrival during this takeover of Dr Niek Gremmen and a dedicated 2-person team (Ivan Green and Given Moreku) who will be present for 6 months to tackle introduced *Sagina* will hopefully bring this species fully under control and contain the area where *Sagina* is established. During the takeover period *Sagina* was again found growing on the crane point area, and these plants were dealt with prior to flying operations. *Sagina* was found growing in all areas where it was previously found, from the diesel pumping area around to "Sagina Kloof", however, while it was present here, most plants were relatively small and only a few were likely to have flowered the previous season. *Sagina* was again found growing in small patches in the same steep rock crevasse in Snoek Gat that was discovered during September 2004. A full report on the *Sagina* situation is provided by Dr Niek Gremmen (see Appendix 2).

Before fuel pumping a pathway was thoroughly checked and cleared of *Sagina*. This path was then marked with ropes forming a boundary line on either side. All personnel involved in fuel pumping were requested to remain within the marked area, to avoid coming in to contact with known *Sagina* areas and spreading *Sagina* into other areas around the diesel pumping site. This procedure again worked well, by marking the safest and most obvious route to the diesel pumping area and avoiding unnecessary trampling in *Sagina* areas. It is recommended that this practice be continued

Another introduced species, the grass *Arrhenatherum elatius* was noted by Niek Gremmen to be growing in a small patch (ca. 10 x 10m) in front of the outside door from the laboratory. This grass was not found in any other areas around the base, and because of its ability to spread and become dominant in sub-Antarctic environments it is proposed to eradicate this grass if it is not found more widely across the island. Detailed recommendations of action have been left by Niek Gremmen for the conservation officer to follow in the control of this species (see Appendix 3).

The area of sand near the site of the dismantled "German Hut" was again checked for introduced species. Three species are growing here: *Holcus lanatus*, *Poa annua* and *Sonchus sp.* After discussion with Niek Gremmen, it was decided that the best course of action is to let these plants become established in this sand. The three grasses are widely established on the island, and allowing them to become established here will have no impact on the island and will prevent other more harmful species (e.g. *Sagina*) from growing at the site.

The sites where two containers had been situated in Gonydale and Waterfall Camp in 1999-2001 were inspected for introduced species, with none being found in either area.

## PATHS AND EROSION

The amount of walking was relatively small over the year, with most trips around Seal Beach and the yellow-nosed albatross monitoring colony, and some visits to Gonydale

and Tafelkop (Table 1). The majority of paths were walked and inspected by Richard Cuthbert during the takeover period. The Tafelkop path via The Golden Highway path is now quite overgrown (and hard to follow!), and shows very little signs of the extensive erosion that was present in 2000 and 2001. The Golden Highway route is still the recommended route to Tafelkop and South Peak. The standard path to Gonydale now follows the route past Prion Cave and up through the Hummocks. This path is quite clear to follow and is eroded in places. However, because the gradient of this route is mostly shallow, there are none of the erosion problems that used to occur on the Tafelkop paths. Footprints and some erosion is still visible in some of the remoter areas of the island, particularly in areas of mires and bogs (e.g. around Waterfall Camp, Sea Hen Crag and across Albatross Plain). The main areas where erosion still exists is on the steep ridge from Michael's Col to South Rowett, and this area is taking a long time to recover despite very limited walking in this past year

No major peat slips were observed during the year, with only two relatively small slips seen on steep gullies along the new Gonydale path.

Ropes down to Seal Beach and Tumbledown were in a fair condition, however the rope to The Admirals is now missing >8 rungs in crucial areas and is unsafe to use. All takeover personnel and the new team were advised on this, and unless abseiling equipment is used, then **a new rope-ladder needs to be put in to safely access this area.**

**Table 1.** Number of trips made to various destinations on Gough Island during 2003/2004, sorted for base personnel, bird related research and during takeover. Units are number of people walking each route, with round trips recorded as one trip.

Area	Base Personnel	Bird Study	2005 Takeover
Admirals/Snoekgat	2	-	21
Dam area	6	-	10
Gonydale	14	-	12
Prion Cave area	-	-	8
Richmond Hill area	-	-	-
Rowetts and beyond	2	-	6
Seal beach/yellownose colony	22	14	47
Serengeti	-	-	-
Tafelkop/South Peak	5	-	7
The Glen/Sophora Glen	-	-	-
Tumbledown	5	-	3

## Waste Management

Management of waste of the island was successfully undertaken by the Gough 50 team and all paper, cardboard, plastic, glass and metal was stored in separate containers for return to South Africa. The incinerator was not used during the 2004/05 year and during the 2005 takeover (except for burning feminine hygiene materials)

and this is again recommended practice for the incoming Gough 51 team. The chef during the 2005 takeover proved very good (at producing exceptional meals!) in limiting the amount of food waste during the takeover period, with approximately half a black bin of food waste produced each day. Previous takeovers have produced more than 2 containers of food waste a day and the chef's efficiency in limiting waste is appreciated.

Some simple steps would increase the efficiency of waste management on Gough Island and the ability for this waste to be recycled on return to South Africa. Steps include rinsing bottles and cans, properly separating glass items by removing metal or plastic tops, emptying paper and tin waste from plastic bags in the containers, and crushing all tins and plastic to compact waste. More detailed recommendations on waste management will be provided to DEAT and GIWRAC by Raina Kutranov, an MSc student from the University of Pretoria studying waste management on SANAP bases.

Disposal of food waste and sewage is an area that could be improved on Gough Island. Currently, food and sewage are disposed of in "Skivvy Gatt", however this area is an open cave and stagnant pool that is around 10m above normal high water sea levels and more than 30m inland from the sea. Thus, it is only swept clean during exceptional storms, and currently this sewage and food waste provides a potential steady food resource for mice, skuas and giant petrels. Relocating sewage pipes and a shoot for food waste could relatively easily be undertaken so that food and sewage fall straight into the sea where they would be effectively and swiftly dispersed. This could take place in the area of cliffs near to Crane Point, that drop vertically ca 20 m in to the sea. Consideration and the feasibility and cost of this should be undertaken.

All eggs supplied and sent ashore were marked as having been irradiated. Inspection of potatoes found them to be washed and clean, although unloading of these from the container should have occurred with the EI present. As agreed last year, potato peelings were frozen with bone and egg waste. No other fresh produce was taken ashore.

## **BIRD STRIKES**

No bird strikes were observed at the base during the takeover period and all base personnel were conscious of the need to close blinds at dusk and avoid excess lighting. One Atlantic Petrel was found near an open door on one night of the takeover. The bird was unharmed and released near the helipad. The blinds fitted in the new room area (FDFFF) are very thin and let through a lot of light, which will attract birds on dark misty nights. **Thicker blinds are required in this room: Action DEAT.**

## **RECREATIONAL FISHING**

Approval for recreational fishing in Gough and Tristan waters was received from Mike Hentley the Administrator of Tristan da Cunha, on the condition that fish be consumed aboard the vessel and not taken back to South Africa. Fishing took place on

the ship when it was anchored off Tristan da Cunha and Gough Island. Fresh fish was consumed aboard the *S.A. Agulhas* on several occasions and following approval from the Administrator fish was transferred to Gough Island for consumption by the takeover team.

## **CONSERVATION OFFICER AND RESEARCH**

John Wilson of the Gough 51 team has been appointed as the conservation officer for 2005/2006. The annual duties of the over-wintering conservation officer have been modified to take in to account new procedures for dealing with wastes and introduced species. The new recommended annual duties are detailed in Appendix 4.

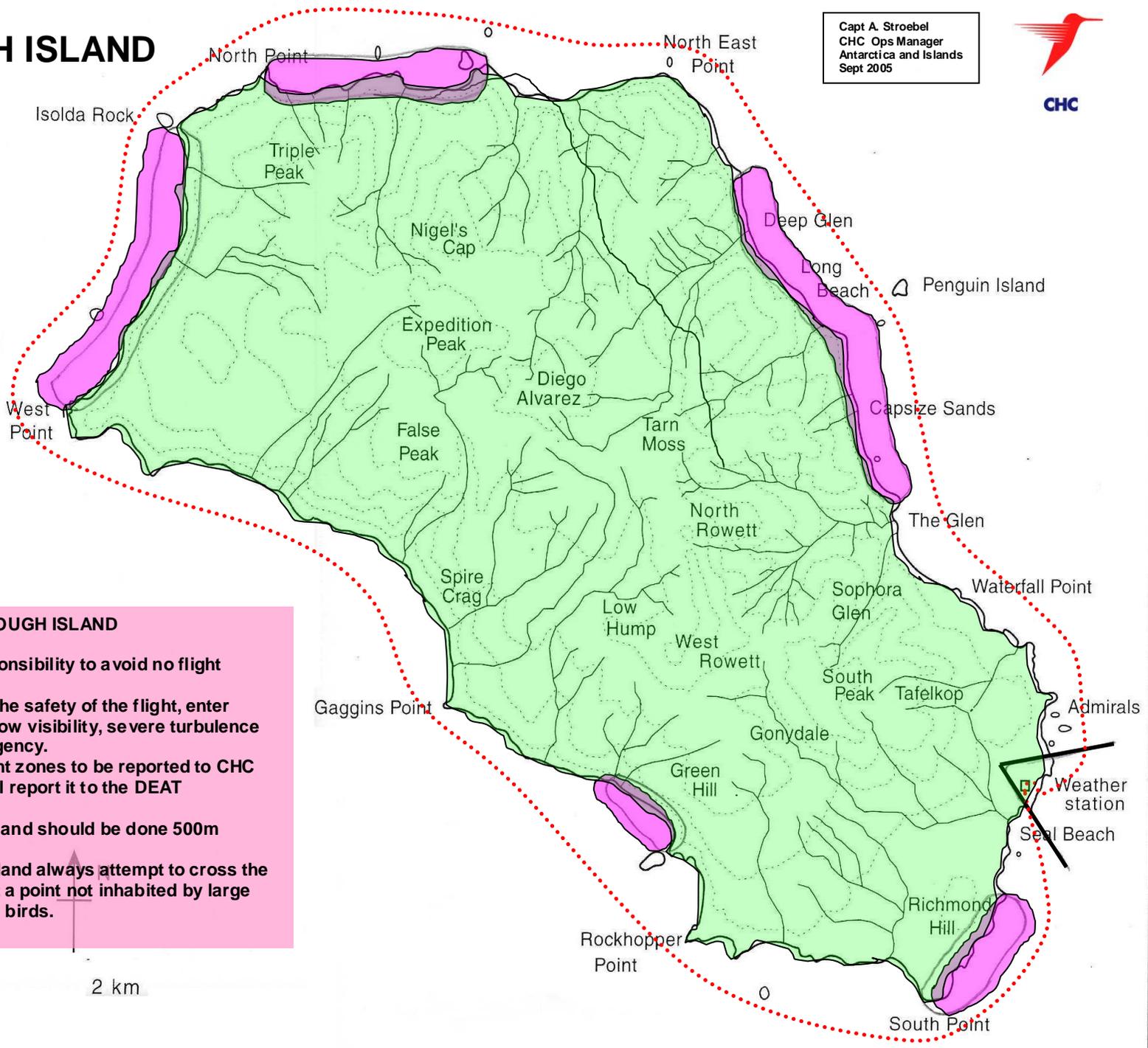
Two biologists (Marie-Helene Burle and John Wilson) are part of the new team on Gough, and they will be undertaking long-term monitoring work on the birds and research on the breeding and population biology of introduced mice and their impact on breeding birds. Procedures for bird monitoring and mice research and a full work plan were set up during the 2005 takeover. The mice and bird research are part of a wider plan to assess the feasibility of eradicating or controlling mice on Gough Island.

## **Acknowledgements**

We would like to thank the following for their help in making the 2005 Environmental Inspection a successful one: Erik Buenk, Sandra Durand, Kim Gierden, Niek Gremmen (particularly for his help with diesel pumping), Erica Sommer, Raina Kutranov, the Master, officers and crew of the *S. A. Agulhas*; the National Department of Public Works; the Gough 50 and 51 teams; CHC helicopters; the South African Weather Service; the Tristan da Cunha Administrator Mike Hentley; and the Department of Environmental Affairs & Tourism.

# GOUGH ISLAND

Capt A. Stroebel  
CHC Ops Manager  
Antarctica and Islands  
Sept 2005



**NO FLIGHT ZONES GOUGH ISLAND**

It is the Captains responsibility to avoid no flight Zones at all times.  
The Captain may, for the safety of the flight, enter these zones to avoid low visibility, severe turbulence or for any other emergency.  
All entries into no flight zones to be reported to CHC Ops Manager, who will report it to the DEAT Conservation Officer.  
Routing around the island should be done 500m offshore.  
If routing to a point inland always attempt to cross the coast at 90 degrees at a point not inhabited by large colonies of animals or birds.

## Appendix 2

# Gough Island *Sagina* Eradication Program 2005-2007

Report on the startup of the program, September 2005

### Introduction

Invasion by plants or animals from elsewhere poses the biggest threat to the native wildlife of islands. The unique native vegetation and fauna of many islands have been destroyed by a relatively small number of introduced animal or plant species.

Gough Island is a Wildlife Reserve, and a World Heritage Site. Its main purpose is the conservation of the native plants and animals, many of which do not occur anywhere in the world outside the Tristan Islands, or even are completely restricted to Gough. The conservation of the native wildlife and plant life is covered by major international treaties, e.g. the Convention on Biodiversity. The United Kingdom is responsible for maintaining Gough Island in a pristine state, and South Africa, which leases a small part of the island for the weather station, has this same responsibility. This places the responsibility to prevent any introductions of plants, animals, fungi, insects, etc. on the departments involved, e.g. DEAT, and it's personnel on the island. This responsibility also involves the eradication of invasive species that are found on the island.

In 1998 a new weed has been found on Gough, the Procumbent Pearlwort, *Sagina procumbens*. *Sagina* is a known invasive of natural habitats at other islands in the Southern Ocean, including at the South African Prince Edward Islands where it is continuing to spread aggressively. Its spread on Gough Island throughout the whole vegetated area in time if left untreated is considered certain. Such a spread will greatly alter the natural vegetation pattern and is likely to have severe effects on other biota present on the island, especially the invertebrate fauna.

The seriousness of this invasion was quickly recognised, and the Gough 44 and 45 teams managed to contain the *Sagina* invasion to the coastal area near the Weather Station, by removing all *Sagina* plants they found, and by spraying with herbicides. After the survey of the *Sagina* distribution in September 1999 by Niek Gremmen the Gough 45 team eradicated most of the *Sagina* plants in the area, and kept a continuous watch on the area. Whenever new *Sagina* plants were found, they removed them immediately, and kept the plants and attached soil in strong plastic bags for removal from the island. Personnel from the Tristan da Cunha Department of Natural Resources did more work in January/February 2000.

The largest problem with eradicating *Sagina* is that not only all plants have to be found and removed, but that also something has to be done to prevent new plants from coming up from the seeds present in the soil. Therefore the removal or destruction of the seeds in the soil is an essential part of the *Sagina Eradication Program*. Heat is the most effective way to do this. The Gough teams were not equipped for this. Therefore in May/June 2000 a four man team arrived on Gough to make an all-out

attempt to eradicate *Sagina* on the island, by destroying the seeds which were present in the soil.

By June 2000 all *Sagina* plants had been removed from the island, and in all areas where a large seedbank in the soil was suspected, this seedbank was destroyed. Inevitably, however, some seeds remained, and some new *Sagina* plants did come up now and again. To prevent the plants from producing new seeds, and building up a new seedbank in the soil, they had to be removed or killed before they were fruiting. This work has relied completely on voluntary input by members of the teams manning the Weather Station. For some years this has worked well, but at other times the necessary expertise and interest appeared to be lacking. For this the teams can not be blamed, it goes with completely relying on the voluntary effort of a very small population of people (the usual complement at the Gough Island Weather Station consists of 6 people: three meteorologists, one diesel mechanic, one radio technician, and one medical orderly. During some years some biologists are added to the team for specific biological research.)

It has been clear that to rely for the follow-up of the first eradication effort on voluntary input from such a small number of people did not result in a reliable continuation of the eradication program. *Sagina* seemed to be on the increase again, and without a serious effort it would undoubtedly spread away from the area of introduction. Therefore funding was secured for a second major attempt at eradication. The present project will run for two years. During this time not only all *Sagina* and as much of its seedbank on Gough must be destroyed, but also a permanent solution has to be found for the continuation of the monitoring and eradication work after these two years. The latter work is not expected to be very time-consuming, but does require specialised skills and there must be an incentive for people to do it, i.e. it should be part of someone's responsibility, e.g. as part of their job description.

### **The present project**

The present project entails an intense eradication effort over the next two years. To this end two dedicated personnel will be based at the Gough Island Weather Station for a period of six months from September 2005 to March 2006, and for a similar period one year later.

### **Report on the work for September 2005**

#### *Logistics*

Personnel and equipment was transported from Capetown to Gough Island by RS Agulhas, departing on 9 September and arriving at Gough Island in the afternoon of 19 September 2005. On the way to Gough team member Ivan Green was picked up at Tristan da Cunha. All equipment was brought ashore in the days after our arrival, and everything has arrived safely and in working order. Because the *Sagina* eradication personnel is part of the weather station complement, we had also to perform duties

related to the offloading, unpacking and storing of the stores brought to the island for the operation of the station for this year. Additionally we were involved in diesel-pumping operations, and in conservation-related work. The latter included instructing the base personnel in the precautions to be taken to prevent further spread of *Sagina* from the logistic zone.

### *Survey of area*

Immediately on arrival the concrete platform, known as crane platform, where containers were to be landed by helicopter, was inspected for the presence of *Sagina*. Several patches of *Sagina* were present, growing in cracks in the concrete. These were removed, together with all soil that could be scratched out of these cracks. The area was subsequently treated with boiling water, to kill any seeds that had remained behind. There was also *Sagina* present on the bare soil around the crane platform, but it was decided to leave this area undisturbed until all helicopter flying had ceased. After the containers were lifted at the end of the take-over the area was again treated with boiling water before a new set of waste-containers was placed in this area.

The area around the weather station and the areas in which *Sagina* was found previously were inspected, as well as the coastal areas from the weather station to Seal Beach in the south and Snoekgat in the north, including both these areas. Also the paths leading away from base were inspected.

In addition relatively recent landslides on slopes inland from the weather station were searched, both on lowland slopes leading up to Tafelkop, as well as the erosion gulleys on the east slope of South Peak.

*Sagina* still appears to be confined to the area around the weather station, although it has spread during the last five years from the coastal rocks area at Skivvygat to the coastal area at Snoekgat, a distance of ca 175 m.

In most areas *Sagina* was appreciably less abundant than it was five years ago. No large areas dominated by *Sagina* were found this time. The largest *Sagina* patch was less than 0.5 m<sup>2</sup>.

A number of soil samples was taken, where possible close to sites sampled in 2000, to see if the abundance of *Sagina* seeds has changed. The results of the germination experiments will only be available in a few months time.

### *Training of personnel*

Given and Ivan have practiced the use of the different techniques for the removal of plants and soil, the sterilising of the soil, the use of the boiler, and the searching of the area. In addition Given has been training Ivan in rope safety techniques. He will continue this training over the next period.

### *Workplan*

After our inspection of the area and based on the available material, we have drawn up a work plan for the next 5-6 months. During this period the whole area will be

thoroughly cleared of Sagina, and the soil in all infested sites will be removed and/or sterilised, using hot water, or blowtorches. In addition the Sagina sites will be sprayed with pre-emergence herbicide. The work plan is added as an appendix to this report.

#### *Acknowledgements*

We are grateful to the South African Department of Environmental Affairs and Tourism for their very positive and helpful assistance in the logistics for this program, and for the hospitality of our personnel on the Gough Island Weather Station.

A special thanks to Nole Green, dieselmechanic, for repairing the Sagina project hot water boiler.

Gough Island, 3 October 2005

Niek Gremmen  
Given Moreku  
Ivan Green

*Appendix. . Work plan September 2005 - March 2006*

### APPENDIX 3

## *Arrhenatherum elatius*, an introduced grass at Gough Island

At the site of the Weather Station at Gough Island a Northern European species of grass was found in the late 1990s (see specimens in the Gough Island herbarium). This grass seems to occur in a small patch in front of the outside door at the laboratory.

This grass has been introduced to several Southern Ocean Islands, by accident or design, and on Kerguelen has shown the ability to spread and become dominant in areas it has invaded. It would make sense to eradicate it on Gough Island before it spreads to other areas.

The species is not listed in any of the published species lists of the island. Because there have not been botanists on the island during summer for a very long time, and this grass is easily overlooked when only vegetative, it may have been present for quite some time already. The first collections were made by Christine Hänel in 1998/99.

My suggestion is the following:

1. Monitor the patch of grass in front of the lab door over summer, and document what you see by taking pictures of the area at least monthly, and collect the different grass species you find when they are flowering. Compare the species you see with the herbarium specimens, or with drawings in the British floras available in the island library. Collect some specimens for the herbarium, and to be sent to some other herbaria as well (e.g. the National Botanical Institute).
2. Once you have seen *Arrhenatherum*, and are able to recognise it, keep an eye out for it in other areas.
3. If you find it is restricted to the Weather Station area, mark the area where it occurs, and document this on a map of the area. Then spray it with Glyphosan or 2,4D-Amine, both available for the Sagina program. Document the effects. Spraying is best done when the plants are growing actively, or when they are relocating to their root system, i.e. at the end of summer.

Gough Island, 3 October 2005

Niek Gremmen

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## APPENDIX 4

### ANNUAL DUTIES OF THE OVER-WINTERING CONSERVATION OFFICER

These duties are to be performed and/or coordinated by the over-wintering Conservation Officer. The over-wintering Conservation Officer is encouraged to consult with the GINR advisory committee, the out-going Conservation Officer, any biologists present on the team and any other contact persons provided at the end of this document.

#### Alien Species

1. The logistic zone, as well the entire area where *Sagina procumbens* has been recorded, should be searched thoroughly at at least two-month intervals during the summer (September to March) and three-month intervals during the winter. Any seedlings detected should be recorded and treated according the procedures set out in Niek Gremmen's "Manual for monitoring and eradication of invasive weeds". Detailed notes should be made in the "Sagina log-book".
2. The over-wintering team should be reminded of the importance of washing their boots before and after leaving the logistic zone, in order to prevent assisting the spread of alien plants.
3. The over-wintering team should be reminded to wash their boots immediately, if they step off the catwalks within the logistic zone.
4. Areas where *Sagina* has been recorded should be clearly marked and avoided, except when absolutely necessary. In this case shoes should be washed thoroughly immediately afterwards.
5. Monitor and weed the introduced grass *Arrhenatherum elatius* growing outside the laboratory door as detailed by Niek Gremmen and search for this grass elsewhere on the island.

#### Indigenous Species

1. The over-wintering team should be reminded to not disturb animals in any way, especially when they are breeding.
2. Bird strike should be minimized by turning off all outside lights and by keeping blinds drawn after dark. On misty nights, interior lights should also be kept to the minimum.
3. Birds that do hit the base and are stunned should be collected in a container (beware of packing too many birds into a container) and released further away (>50 m) from the base, once they have recovered and during the night. Do not release them on the helipad as this is where skuas congregate.

#### Path Degradation and Peat Slips

1. The over-wintering team should be reminded of the danger of causing unnecessary peat slips through irresponsible hiking routes.
2. All recreational hikes and commuting hikes (for scientists) should be restricted to approved hiking paths as far as possible.
3. A register of all walks should be kept by the Conservation Officer, for safety reasons, as well to quantify the impact on various paths.
4. The state of all hiking paths should be assessed regularly and modifications suggested to the GINR Advisory Committee.

5. Record any major peat slips that occur on the island during the year.

### **Visits by Ships**

1. All visits are strictly regulated by the Administrator of Tristan da Cunha, who should be contacted for permission prior to landing any visitors or parcels. The exception is in the case of medical emergencies. In this case, DEAT and the Administrator of Tristan da Cunha should still be notified at the earliest possible opportunity (preferably prior to landing).
2. In the cases of approved visits and medical emergencies, the protocol for visiting ships should be followed.

### **Waste Management at Base and Field Camps**

1. The Conservation Officer must ensure that waste is separated and contained and/or disposed of as prescribe by the GINR management plan.
2. Burnables are now to be returned to South Africa and the incinerator should not to be used during the year.
3. Special attention and precaution should be given to the storage of hazardous wastes.
4. Any serious chemical or fuel spills should be quantified and reported to the GINR Advisory Committee and DEAT within 24 hours.

### **Other Activities**

1. The Conservation Officer will ensure that no human-made structures are erected on the island without an Environmental Impact Assessment (EIA) and approval from the GINR Advisory Committee.
2. The Conservation Officer should make detailed notes (including date, time and location) of any incidences of deleterious effects to the environment that could possibly be human-related (e.g. animals entangled in debris or oiled).
3. Monitoring of the Yellow-nosed (Base) & Tristan (Tafelkop) Albatross study colonies, following procedures set out in instructions in Gough Laboratory.
4. Collect and record debris washed up at Seal Beach.
5. Recycle all dry paper and cardboard. Record times the incinerator is used (if at all) in the year.
6. Ensure meat bones, prune pips and potato peelings go into poultry waste container.
7. Remove and boil potato plants (including tubers) growing at "Skivvygat", in the courtyard of the base and elsewhere.
8. Weed out thistles as seen around base and anywhere away from coast before flowering.
9. Record ship / yacht visits (date, time, names etc.) and any evidence of poaching vessels.
10. Check pantry and food store for presence of invertebrates, especially weevils in flour, pasta etc. Collect specimens in alcohol. Fumigate if necessary.
11. Collect any "odd" invertebrates seen in base, including moths etc.
12. Keep an approximate record of number of mice killed in and around base.
13. Record all "night bird strikes" (on buildings).
14. Record all birds killed by hitting aials, stays, etc. and keep corpses.

***Amended by Richard Cuthbert***

***5 October 2005***

**CONTACT PERSONS**

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