Initial Environmental Evaluation for the eradication of rodents from Greene Peninsula, South Georgia*

South Georgia Heritage Trust

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*to be read in conjunction with 'Environmental Impact Assessment for the eradication of rodents from the island of South Georgia' of the same date.

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1 INTRODUCTION

Greene Peninsula is one of 19 identified rat-infested treatment zones on South Georgia, bounded by glaciers, mountains and the sea (Appendix 5 of SGHT 2010). Greene Peninsula will be treated in Phase 1 of the South Georgia Habitat Restoration project, together with the Thatcher Peninsula and two smaller areas either side of Mercer Bay. Greene Peninsula will be treated as first priority. Subsequent phases of the operation will eradicate rats from other discrete areas, leading to complete clearance of South Georgia over a period of several years.

This first phase of the eradication will allow for the evaluation and optimisation of the proposed operational procedures in the challenging conditions of South Georgia and will allow monitoring of the impacts on non-target species and vegetation which will inform the subsequent phases of the operation.

The location of Greene Peninsula on the north-east coast of South Georgia at the southern end of Cumberland East Bay, near to the main operating base for the eradication project at Grytviken and King Edward Point (KEP), means that baiting operations, associated logistics and post eradication monitoring should be relatively straightforward. Also, the terrain on the Peninsula is not too steep and there are no large concentrations of breeding seabirds.

Rats on Greene Peninsula are genetically distinct from those in adjacent areas, indicating no previous intermingling of populations. This means that they are an isolated population and that once eradicated, reinvasion by another local population would not occur unless there were significant changes glacier termini allowing rat access.

Greene Peninsula is a less-visited area and it has a wide range of habitats, is an important breeding area for a number of bird species and has a good representation of native plants. The area is isolated from other rat infested areas by water, major glaciers and mountains, so following successful rat eradication, the wildlife and plants would be able to recover, restoring the conservation value of this site.

This Initial Environmental Evaluation (IEE) assesses the site specific environmental impacts of the rat eradication operation on Greene Peninsula. It should be read in conjunction with the island-wide Environmental Impact Assessment for the eradication of rats from South Georgia (SHGT, 2010).

2 DESCRIPTION OF PROPOSED ACTIVITY

2.1 Proposed eradication methodology

The Greene Peninsula baiting zone is shown as the shaded area in Figure 1. Grytviken will be used as the main operating base. The flight distance from Grytviken to the northern point of Greene Peninsula is 5 km over Moraine Fjord. The flight approach line is shown in Figure 2.

Greene Peninsula is bounded by Harker Glacier and Nordenskjold Glacier. The area available to rats is 4107 ha of which around 21% is vegetated and 79% is unvegetated ice-free terrain (Poncet and Poncet, 2010).

Two helicopters will spread bait using methodology described in SGHT 2010b. This will take an estimated 26 hours of flying time and will require around 12.3 tonnes of bait. The eradication operation could therefore be undertaken in 2 days of good weather.

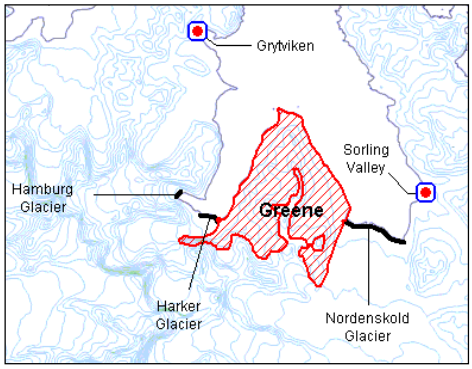

Figure 1 Map to show Greene Peninsula baiting area (from Poncet and Poncet, 2009).

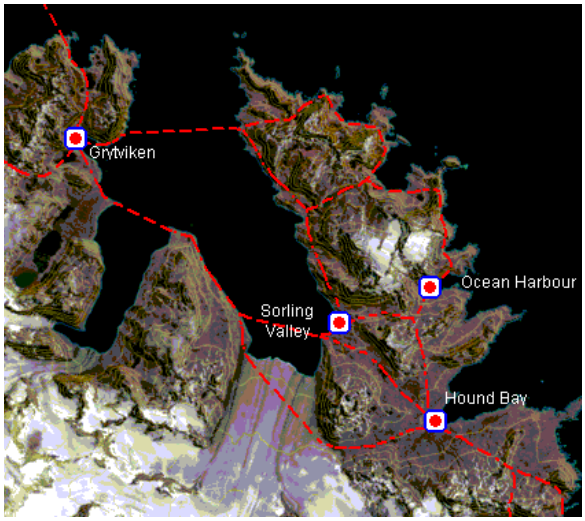

Figure 2. Map to show flight lines for gaining access to Greene Peninsula for helicopter bait spreading (from Poncet and Poncet, 2009).

Prior to the baiting, accurate boundaries of the zone will be mapped. Detailed flight lines are therefore not available at this time. All areas will be overflown and there will be two flights over coastal vegetated areas.

Hand spreading of baits will be undertaken in and around the field hut at Dartmouth Point and offshore wrecks and islands (e.g. Aniline Island, see Figure 3).

2.2 Monitoring work and use of field hut at Dartmouth Point

The field hut at Dartmouth Point is used from time to time by researchers and visitors from King Edward Point. Members of the eradication team will travel to Dartmouth Point hut by harbour launch or helicopter prior to the bait spreading. They will capture a number of South Georgia pintail and possibly speckled teal ducks and fit them with VHF transmitters. They will also lay bait in and around the hut at the time of the aerial bait spread. The transmitters will be relocated around 10 days after the bait spreading to evaluate the fate of the ducks. Any dead birds will be preserved for assessment. Monitoring for the presence of rat sign will not be undertaken until a subsequent season.

3 STATE OF THE ENVIRONMENT

3.1 Location

Greene Peninsula is situated on the mid north-east coast of South Georgia (see Figure 3). It is bounded by Moraine Fjord and Cumberland Bay East. To the south it is bounded by the Nordenskjöld Glacier, Paget Glacier and Harker Glacier.

Greene Peninsula is some 8km north to south and 2-8km east to west, tapering to the north.

Figure 3. Location of Greene Peninsula

3.2 Landforms, glaciology and hydrology

Greene Peninsula is situated to the north of the Allardyce Range, which is a high, glaciated mountain range which acts as a permanent barrier to rats. Within the proposed treatment area, the terrain reaches a height of 591m above sea level, but the mountains rise sharply inland to over 1000m and eventually to South Georgia's highest peak, Mt Paget (2933m). The central ridge is gently undulating and has some areas of permanent ice and snow.

There are four streams and one freshwater lake and numerous small tarns on Greene Peninsula. Topography is fairly gradual, with a steeper area to the south of the Harker Glacier. Harker Glacier is the weaker barrier to rats, though the glacier front is still in deep water and is not retreating much. The size of glacier and lack of rat habitat on west side make it an effective barrier. Should the Harker Glacier barrier fail, the Hamberg Glacier may hold fast as it is still in deep water. However, this glacier is retreating significantly.

Greene Peninsula is bounded on the east by the Nordensköld Glacier, which is a huge glacier with a sound glacier front in deep water across its entire width. However, it has also ablated and retreated significantly in recent years.

3.3 Flora

Greene Peninsula is recorded as being one of the most diverse areas for native vegetation on South Georgia, with 24 species (of the 25 taxa recorded on South Georgia) being recorded in the area (McIntosh and Walton, 2000). This is significantly

more than found at other important ecological areas on South Georgia. It also has significant diversity of cryptogrammic (lower) plant species, with 146 species of mosses, liverworts and lichens, amongst the highest diversity recorded for discrete areas (McIntosh & Walton 2000).

A thorough survey of Greene Peninsula vegetation was carried out during a 3-year environmental baseline inventory survey in 1999-2002 (Scott and Poncet, 2003). This report maps out the different vegetation types on the Peninsula. Vegetation is concentrated around the coast and includes extensive Festuca grasslands unique on South Georgia. Tussac grass forms narrow fringes along most of the coastline, with two more extensive areas at the northern end of the Peninsula (Scott and Poncet, 2003).

The eradication of rats from Greene Peninsula is expected to have a significant positive effect on the vegetation of the area and will enhance the conservation value of this site.

Figure 4. Map showing topography, hydrology & vegetation of Greene Peninsula (taken from British Antarctic Survey/GSGSSI: http://www.sggis.gov.gs/).

3.4 Fauna

There are no terrestrial mammals apart from rats on Greene Peninsula. There are also no penguin colonies.

Greene Peninsula has low bird biodiversity with only 6–10 breeding species recorded (McIntosh and Walton, 2000). These are summarised in Table 1.

Table 1. Known breeding birds on Greene Peninsula

Known breeding bird species	Comments	Reference
Kelp gulls	Nesting sites in Dartmouth Point area	Scott and Poncet, 2003
South Georgia pintail	Recorded in low numbers	A. Martin, pers. comm..
Speckled teal	Likely that they nest on Greene; may be	Poncet et al., 2002

	a key location for these birds	
Light-mantled sooty albatross	Nesting sites in tussac grass in Dartmouth Point area. IUCN: near-threatened	Scott and Poncet, 2003
White-chinned petrel	Present in a few small breeding colonies. IUCN: Vulnerable	Martin et al., 2009
Northern giant petrel	Population of 5 pairs (1999)	Patterson et al., 2008
Southern giant petrel	Population 50 pairs (1999)	Patterson et al., 2008

Further details of these birds, their diet and breeding cycles and populations and distribution on South Georgia are given in the island-wide EIA.

3.5 Visitor sites

There are no tourist visitor sites on Greene Peninsula and it is not a well-visited area. The hut at Dartmouth Point is used occasionally by scientists and visitors from KEP.

3.6 Conservation Status

Greene Peninsula has no designation in the Protected Area policies described in the *South Georgia: Plan for Progress* (Pasteur and Walton, 2006).

However, it is designated as an Area of Special Conservation Value in the *South Georgia Low flying Avoidance Manual*. Landing any aircraft on Greene Peninsula is permitted only with special permission from the Commissioner of GSGSSI.

3.7 Heritage sites and buildings

There is a two berth hut, built for biological researchers in 1976 at Dartmouth Point (54°18'S, 36º27'W), which is on the northern tip of Greene Peninsula. This hut is still used by visitors. There are also sealing/whaling hut ruins near to the researcher's hut and a bunker on the summit of the Dartmouth Point escarpment, which may be from the 1982 invasion. The remains of the wrecked fishing vessel *Moresko I* (2003) lie off the coast towards Moraine Fjord. See Appendix 1 for further details.

Additional baiting at the hut, ruins and the bunker will be undertaken concurrently with the aerial eradication.

4 EVALUATION OF ENVIRONMENTAL EFFECTS OF RAT ERADICATION FROM GREENE PENINSULA

The environmental impacts of the proposed eradication of rats from South Georgia are described in the island-wide EIA. Key issues relating to the Greene Peninsula eradication zone are discussed below.

4.1 Effects of monitoring activities on the environment

In order to manage the risk to South Georgia pintails and speckled teal on South Georgia, a study of the effects of the aerial brodifacoum baiting on ducks on Greene and Thatcher Peninsulas is proposed (see Section 2.2 above and EIA Appendix 4).

The monitoring activities will require the researchers to capture ducks and attach the transmitters. This will cause disturbance to the birds, but this will be temporary and best practice will be followed. The research work may also cause some trampling of vegetation as researchers walk to find and retrieve the ducks. However, care will be taken to avoid any sensitive vegetation.

The environmental effects and proposed mitigating measures relating to Greene Peninsula are summarised in Table 1.

Table 2. Mitigation measures for monitoring activities on Greene Peninsula

Activity	Output and predicted Impact	Probability	Extent	Persistence	Intensity	Significance	Key mitigation measures
Capture of SG Pintails & speckled teal; attaching / removing transmitters / rings	Disturbance of ducks	Certain	Local	Short	High	Med	Capture after dark with torch and net to minimize disturbance
	Trampling of vegetation and potential damage to plants; loss of scientific value	Low	Local	Short-Med	Med	Low	Care to be taken when conducting ground-based monitoring to avoid vegetation damage
Note: the terms used in this assessment are described in Section 5 of the island-wide EIA for South Georgia rat eradication							

4.2 Potential positive impacts of the operation on Greene Peninsula

It is considered that, with rat eradication, the potential for recovery by of smaller seabird species, such as prions, South Georgian and common diving petrels and possibly blue petrels is high (Poncet, 2002). Antarctic prions are known to occur in the small rat-free area to the west of Greene Peninsula, between the Harker and Hamberg Glaciers and could therefore easily recolonise Greene Peninsula following rat eradication.

This initial phase will also provide valuable information for larger scale future work.

5 CONCLUSIONS

Greene Peninsula has been selected for Phase 1 of the rat eradication on South Georgia as it presents a relatively straight-forward site and is close to the operations base at Grytviken. The environmental impacts of the operation have been assessed in the island-wide EIA and site specific impacts have been assessed in this IEE. The main impacts are likely to be potential poisoning of non-target species and some disturbance of giant petrels due to helicopter overflights. These impacts will be minimised by following the mitigation measures outlined. They will also be monitored in order to inform future phases of the operation.

Impacts specific to this site would be disturbance of ducks due to monitoring activities and possible disturbance to king penguins on the transit route. Minor vegetation damage may also occur. These impacts can be minimised through good practise and they are likely to be very minor temporary

The environmental benefits of this operation will far outweigh the temporary negative environmental impacts and the eradication operation will enable many more birds to nest on Greene Peninsula and will allow the recovery of native vegetation.

6 REFERENCES

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7 ABBREVIATIONS AND ACRONYMS

Acronym	Meaning
EIA	Environmental Impact Assessment
GSGSSI	Government of South Georgia and the South Sandwich Islands
SGHT	South Georgia Heritage Trust
IEE	Initial Environmental Evaluation
IUCN	International Union for Conservation of Nature

8 APPENDICES

Appendix 1

List of Historic sites on Greene Peninsula

Type of site	Location	Lat / Long	Name of site
Shipwreck	Entrance to Moraine Fjord	54°18'S, 36º28'W	*Lyn* (2003)
Shipwreck	Entrance to Moraine Fjord	54°18'S, 36º28'W	*Moresko 1* (2003)
Whaling	Dartmouth Point	54°18'S, 36º27'W	Whaler's hut ruin (1950?)
Military /	Dartmouth Point	54°18'S, 36º27'W	Bunker on summit of

Defence			Dartmouth Point escarpment – possibly from 1982
Research sites and huts	Dartmouth Point	54°18'S, 36º27'W	A 2-berth hut for biological research, built 1976
Shipwreck	Cumberland East Bay	54°18'S, 36°25'W	*Fortuna* (1916)

Reference: Historic sites on South Georgia: Evaluation and Protection. Bob Headland, 2005 (unpublished)
With comments and contributions from Bob Burton, Sally Poncet, Ron Lewis Smith and Pat Lurcock.