South Georgia Habitat Restoration Project, Phase 1

Monitoring Plan

South Georgia Heritage Trust

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Overview

Phase 1 of the South Georgia Habitat Restoration Project has been designed as a trial of the whole-island operation (SGHT 2010a). The objective is to carry out the work on an area of land that is large enough to provide a meaningful test, but small enough such that any mistakes or surprises cannot result in irrecoverable damage to the flora or fauna of the island.

There is almost no limit to the amount of monitoring work that would be desirable before, during and after this eradication project has been carried out. For cost reasons, however, priority must be given to work that directly contributes to increasing the probability of the project being successful in (a) killing every rodent in the treated areas, and (b) minimising non-target deaths to recoverable levels.

The probability of detecting any rodents that survive the Phase 1 baiting, and their progeny, increases with time. In principle, therefore, the longer the gap between baiting and the search for survivors, the better. No further baiting is anticipated until nearly 2 years after that of Phase 1, so the best use of resources would be to search for rodents in the summer of 2013. The existing routine checking and setting of rat traps around the buildings at King Edward point (KEP) and Grytviken should suffice until that time, although mouse traps will be added to the trap round (see below). Consequently, the monitoring to be carried out as part of Phase 1 will concentrate on gaining information on other important aspects of the Project. These are primarily:

1. Impact on non-target vertebrate fauna

2. Establishing how long the bait pellets remain a risk to both target and non-target fauna.

Impact on non-target vertebrate fauna

An evaluation of the risk of significant population-level damage to each of the native birds on South Georgia as a result of this operation is included in the Environmental Impact Assessment (SGHT 2010b). Most species are considered to be at low risk because they obtain their food exclusively offshore. However, a small number of the diurnal seabirds and terrestrial birds are more vulnerable to direct and/or indirect poisoning from the bait pellets, and it is very important that the scale of any mortality to these or any other birds is learned.

Detecting dead birds over a landscape like South Georgia's is challenging, and in reality only a small proportion of carcasses are likely to be found by visual means before they are scavenged or decompose, no matter how much effort is invested in locating them. A better method of estimating losses, though still subject to bias and error, is to compare the number of live birds of each species visible before and after the baiting operation.

Better still, but representing a substantial investment of time and finance, is to find a way of locating individual birds before and after the operation, in order to determine their state of health after they have been exposed to the bait pellets for known periods of time.

The monitoring effort for non-target vertebrate fauna (i.e. birds) will comprise a combination of the three techniques outlined above. The only endemic bird at significant population risk from the baiting is the South Georgia pintail *Anas g. georgica* (SGHT 2010b), and consequently this taxon will be the focus of particular monitoring and investigative effort.

Searching for live and dead birds

A visual search for birds both alive and dead will be carried out along the foreshore of King Edward Cove, along the Bore Valley stream to Myviken and at other locations dependent on the effort and transportation available, at least twice (with an interval of 7 days ideally) before the baiting commences. During these searches each bird seen will be marked on a map (or with a GPS unit) and a note made of whether they were alive or dead, and on the ground, on water or flying. Dead birds will be disposed of in such a way that they cannot be found again during subsequent searches.

At weekly intervals for 4 weeks after baiting a similar search will be made along the same routes, all birds similarly located on a map, and carcasses returned to KEP for possible subsequent toxicological analysis. A note will be made of the apparent state of health of all live birds.

During these surveys particular attention will be paid to species considered to be at possible risk (at the level of the individual) from the baiting, i.e. skuas *Catharacta*, giant petrels *Macronectes*, gulls *Larus*, sheathbills *Chionis* and ducks *Anas*.

Tracking South Georgia pintails

Fifteen miniature VHF radio transmitters will be available to attach to pintails and, if possible, speckled teal *Anas flavirostris*, though the numbers of teal are extremely low and the probability of encountering one is similarly small.

The transmitters will be deployed 7 - 14 days prior to the commencement of the baiting operation. The intention is to characterise the behaviour of the birds with the transmitters attached before baiting commences, and then to relocate the transmitters at, say, 10 days and 20 days after bait has been dropped on the area where the birds were last known to be. The transmitter should be findable, regardless of whether it is attached to a live bird, a carcass or just a cleaned leg bone in the crop of a scavenger. Finding the general location of the transmitters will be accomplished by helicopter from altitude, when detection range will be 1000m or more. Thereafter two or more people will search on the ground with a hand-held antenna and receiver until the transmitter is located.

The objective is to discover what proportion of the instrumented ducks survive the immediate aftermath of the baiting work. If any transmitters cannot be located, a search will be made further afield by helicopter as time and opportunity permits, using flights made for other purposes and perhaps dedicated flights, depending on the circumstances.

Ducks will be captured in a hand-net, some on Greene peninsula and some around the margins of King Edward Cove. This work will require two people operating after nightfall, when ducks can be dazzled and relatively easily captured. Transmitters will be attached to leg rings and designed according to the results of trials on captive birds in September 2010. Clearly, such transmitters must have no impact on bird survival. Accommodation on Greene peninsula will be in the existing field hut near Dartmouth Point. Transportation will be either by rib, helicopter or harbour launch.

Monitoring the longevity of uneaten bait pellets

A minimum of five bait pellet trial stations will be set up in a variety of habitats to determine how long the pellets remain (a) intact, and (b) in a decomposed form that would still allow a bird or rodent to consume their content.

These stations will be covered in wire mesh to prevent disturbance. They will be checked at weekly intervals for the first four weeks after deployment, at half-monthly intervals up to three months, and then if necessary at monthly intervals until they cease to be potent.

Impact on target rodents

The Phase 1 bait drop will occur in the austral autumn and early winter. At this time, and thereafter as winter progresses, it is likely that most rodents will descend from higher elevations into coastal areas where water and food are more easily available. It is here that effort to detect any animals that survive the baiting should be concentrated. Break-back traps have long been in continuous use at King Edward Point and Grytviken, and should continue to be set and monitored for the foreseeable future. Not only will they serve to detect any surviving rats, but they will also be a powerful means of detecting any possible future re-invasions from ships or yachts entering King Edward Cove.

Approximately two weeks after the Phase 1 bait drop, when (hopefully) all of the rats have disappeared, mouse traps will be set up in and around KEP and Grytviken and subsequently

monitored at the same time as the rat traps. The purpose of the mouse traps is to detect any mice that may have survived the baiting work, but may not be caught in rat traps.

Wax indicator blocks will be deployed widely in the KEP/Grytviken area and checked regularly to provide another means of detecting rodents.

No other efforts will be made to detect rats in the Phase 1 area until the few months prior to commencement of Phase 2 of the Project, and will be treated as part of Phase 2.

Monitoring the expected recovery of native birds

Most of the bird species that will respond to the absence of rats on mainland South Georgia are long-lived seabirds with high levels of natal fidelity and low reproductive rates. Consequently their recovery is likely to be measured on a scale of decades. However, the more terrestrial species have a shorter generation time, higher reproductive rate and lower natal fidelity, so a response should be measurable on a scale of years.

The South Georgia pipit, in particular, may be expected to explore a rat-free Phase 1 area at the first opportunity, and may even breed in the year following the bait drop. The extreme vulnerability of this species to rat predation, and its obvious presence as a breeding species, due largely to its display song, renders it an excellent indicator of the success of the Phase 1 operation.

Residents of KEP and Grytviken, and visiting tourists, will be asked to report observations of pipits singing or feeding young in the Phase 1 area in the summers of 2012 and 2013. Absence of this behaviour will not be proof of failure, but confirmed breeding on pipits on the Thatcher Peninsula will be a powerful and inspiring indication that the Phase 1 bait drop was indeed successful in clearing rats from the area.

References

SGHT 2010a. Operational Plan for the eradication of rodents from South Georgia: Phase 1. Version 3. South Georgia Heritage Trust. Available from the SGHT office & website.

SGHT 2010b. Environmental Impact Assessment for the eradication of introduced rodents from South Georgia. South Georgia Heritage Trust. Available from the SGHT office & website.