



Darwin Plus: Overseas Territories Environment and Climate Fund Final Report

Darwin Project Information

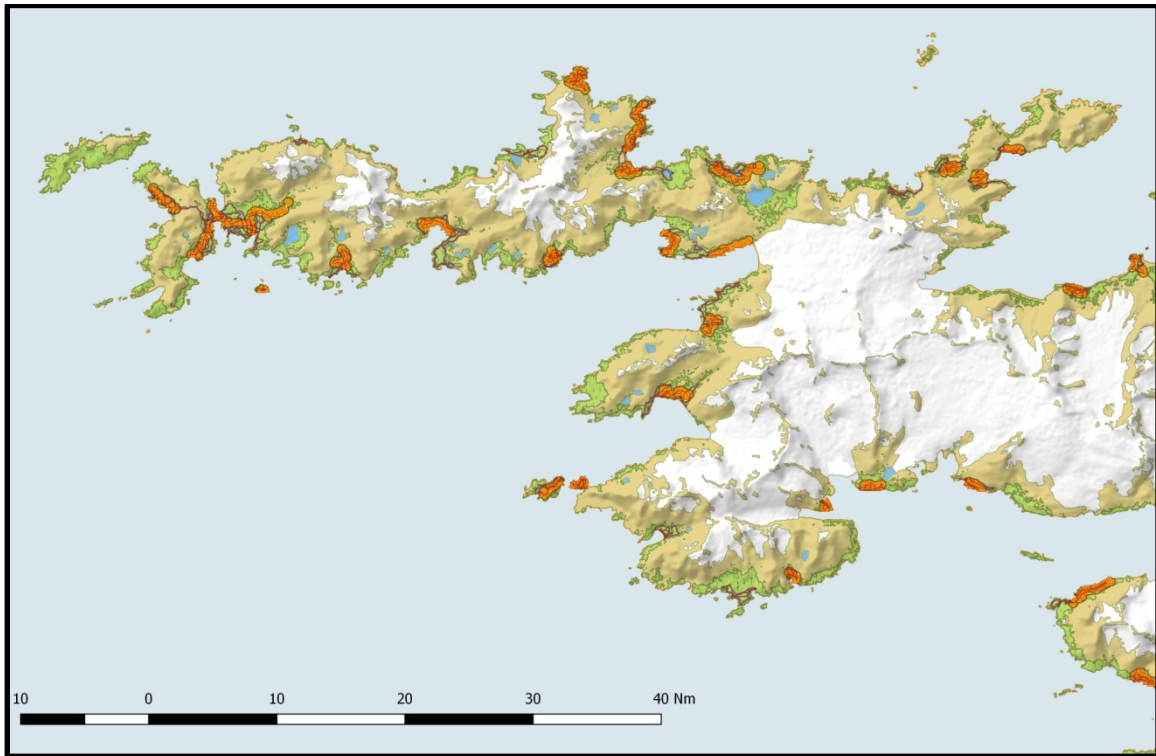
Project reference	DPLUS048
Project title	South Georgia Habitat Restoration Project: Post-Baiting Phase
Territory(ies)	South Georgia and the South Sandwich Islands
Contract holder Institution	South Georgia Heritage Trust (SGHT)
Partner institutions	n/a
Grant value	Total £87,000 (year 1 £45,000, year 2 £42,000)
Start/end date of project	April 2016/ March 2018
Project leader name	Richard Hall
Project website/Twitter/blog etc.	www.sght.org www.facebook.com/pages/South-Georgia-Heritage-Trust/107047869335869 https://twitter.com/SGHTcharitysite
Report author(s) and date	Stephanie Strutt, Richard Hall, 28th May 2018

1 Project Overview

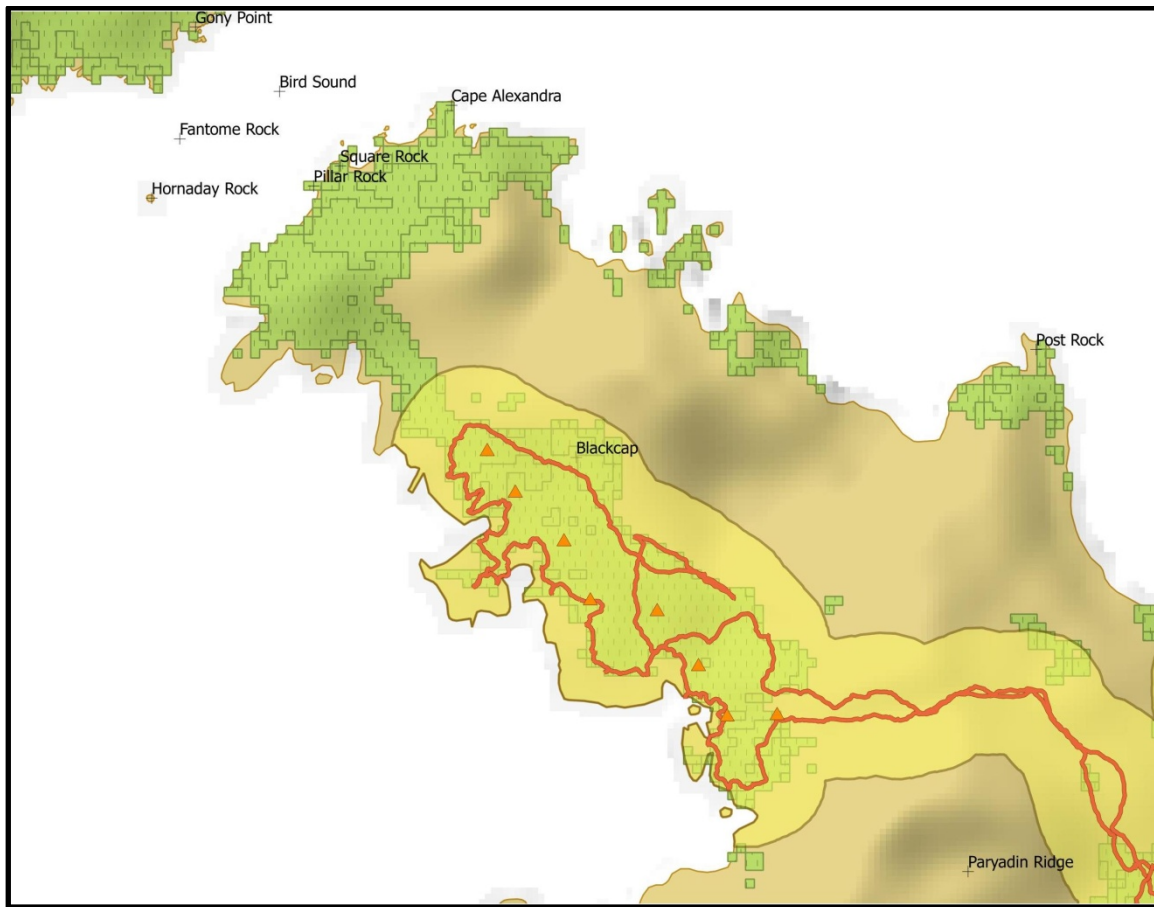
Globally, invasive alien species (IAS) are second only to habitat loss in reducing biodiversity. This impact is especially pronounced on islands, and many UKOTs have consequently lost endemic fauna. South Georgia was invaded by rats and mice soon after discovery in 1775, and they subsequently spread, destroying native wildlife and leaving many bird species confined to small offshore islands. Over three seasons ending in 2015, rodent eradication was attempted on South Georgia. Indications were that the effort had been successful, but a comprehensive survey was needed before South Georgia could be declared rodent-free and treated as such. This project, covering the post-baiting phase of the eradication effort, was centred around the preparation and delivery of that survey work which took place from October 2017 to April 2018.

N.B. The original proposal comprised two elements, the survey and an international conference. The conference, entitled "Island Invasives 2017: Scaling up to Meet the Challenge", took place in July 2017 and was the third in a series of international conferences focused on invasive alien species on islands, their impact and management, the first such meeting for seven years and the first to be held in the northern hemisphere. The Darwin Committee decided not to support the conference with this Darwin Plus grant and consequently we were advised by LTS that there is no requirement to report against the components of the proposal relating to the conference. However, for general interest, progress with the conference is briefly mentioned in the relevant sections below.

- *Figure 3. Western end of South Georgia, showing a closer view in orange the actual coverage of survey work during Phase 4.*



- **Figure 4. Western most tip of South Georgia showing survey coverage at a single survey area (Cape Alexandra) with dog transects shown in red line and passive devices as orange triangles.**



2 Project Stakeholders/Partners

(a) The Government of South Georgia and the South Sandwich Islands (GSGSSI) has been closely involved in the planning and logistical support of previous phases of SGHT's Habitat Restoration Project on South Georgia. SGHT liaised with GSGSSI over the scope and design of the survey, providing them with an EIA and Operational Plan for review and discussing the detail of sites to be visited. SGHT also worked closely with the Government on permitting issues, and to agree details of the movements of the field team and dogs. GSGSSI provided its Fishery Patrol Vessel, the MV *Pharos* to deploy monitoring devices in November/December 2017 and January 2018. Government also provided free shipping for much of the monitoring project supplies from the Falklands to South Georgia and accommodation for the survey team on South Georgia at the administrative centre at King Edward Point. Throughout the project SGHT was in regular discussion with GSGSSI to encourage increased biosecurity measures to ensure the legacy of the project going forward.

(b) South Georgia's tour operators and tourists have also been closely involved throughout the earlier phases of the Habitat Restoration project. SGHT consulted with the operators at their annual meetings (International Association of Antarctic Tour Operators), liaised with them about potential impacts on their operations and directly addressed the majority of the clients at South Georgia in recent years. Visiting cruise ship passengers have responded enthusiastically to the SGHT team's onboard presentations and to the already evident signs of wildlife recovery by continuing to donate towards the ongoing work of the Habitat Restoration Project. During the monitoring season the rodent detection dogs and handlers engaged in advocacy with cruise ship passengers during their shore visits to Grytviken and onboard tourist vessels.

(c) British Antarctic Survey (BAS) board members serve on the Steering Committee for the Habitat Restoration Project. SGHT and BAS worked closely over the accommodation of the team

and dogs on the island during the survey work. BAS runs South Georgia's logistical base at King Edward Point, which served as the monitoring expedition's accommodation base. Although for the majority of the time that the field teams spent on South Georgia they were camping or aboard vessels, the RRS *Ernest Shackleton* and RRS *James Clarke Ross* supported the survey teams with logistical capacity during resupply visits to King Edward Point. BAS transported SGHT staff and cargo from South Georgia to both the Falklands and UK and enabled the input and extraction of SGHT teams on survey areas around Cumberland Bay and on the Barff and Busen Peninsulas through the support of Rigid Hulled Inflatable Boats (RHIBs) and Harbour Launches from KEP, crewed by BAS staff.

3 Project Achievements

3.1 Outputs

Progress towards Output 1 ("Evidence gathered to confirm whether earlier baiting phases have succeeded in eradicating rodents from South Georgia").

The **baseline condition** at the start of the project was "*Success of the rodent eradication campaign is unknown. Consequently SG cannot be declared rodent free and managed as such*". There was, however, strong anecdotal evidence that the eradication project had been at least partly successful as there were reports of high numbers of pipits and pintail ducks along with evidence of breeding and fledging success in previously rat infested areas.

Change recorded by end of project.

In May 2018, following the monitoring project and assessment of data recorded, SGHT announced South Georgia to be free of rodents. Throughout the monitoring work no evidence of extant rodents was found and every indication pointed to the complete success of the eradication work.

Evidence for this change.

In our application SGHT identified several indicators of success, including at least 48 person-weeks in the field and a minimum of 1000 rodent detection devices set out and revisited. The monitoring project has far surpassed those targets. By the end of the survey our team had spent over 130 person-weeks conducting active field work, deploying 4686 detection devices and going on to retrieve and check 4375 of these devices. These devices mainly comprised chew sticks, wax tags and chew boards (generally set out in combination) but were also bolstered by tracking tunnels and camera traps.

The efficacy of these devices is well tested. Prior to Phase 3 of the baiting work several devices were installed at South Georgia to test their attractiveness to rodents. The picture below shows the clear damage done by rodents over just a two-week deployment. Both the chew board (left) and wax tag (right) were heavily gnawed by rodents.



These passive devices were set at 112 areas around South Georgia, at 1542 individual monitoring stations. This gave complete coverage of all baited areas of the island through a range of habitats which targeted the most likely locations to harbour extant rodent populations, including penguin colonies, seal breeding beaches and seabird nesting sites. The extent of the monitoring put in place was well beyond minimum requirements and provided extremely high confidence in the efficacy of the devices and the findings of the Phase 4 project.

In addition to the passive monitoring devices, three active monitoring devices were also employed. These were three specially trained rodent detection dogs accompanied by their two handlers, who were both New Zealanders and extremely experienced in rodent detection work. During their 92 day deployment period the handlers walked a combined distance of 1608km with the three dogs surveying a combined total of 2420km of transects on the island (see Figure 4 for an example of such a transect). The dogs excelled at detecting historical rodent sign and were focussed on the task in hand. They were able to do a wider surveillance of certain areas and provided an extra level of confidence that no rodents had been missed because they had not been attracted to the passive devices for some reason.

With this diverse and effective monitoring arsenal at our disposal and with the coverage achieved during the monitoring work, SGHT can be highly confident that any rodent population existing on the island would have been discovered. No evidence of extant rodents was detected, either by dogs or passive devices.

Progress towards Output 2. “International conference held in Dundee to disseminate lessons from eradications on South Georgia and elsewhere to wider community of conservation professionals”. Output 2 related to the Island Invasives conference which SGHT delivered in July 2017 in partnership with the University of Dundee. The committee decided against funding this component of our application, but a brief update is included here for interest.

Baseline: Seven years had passed since the last IUCN international Island Invasives conference was held in Auckland in 2010. No conference in the series had ever been hosted in the Northern Hemisphere.

Change recorded by end of project: The conference attracted a variety of delegates including practitioners, academics, suppliers and members of the public. Judging by the feedback from the participants, the conference was a success and such an event was felt to be

long overdue. It included 19 different sessions, 96 talks and several workshops as well as a public lecture and various social events. There was lively Twitter coverage of the conference as it progressed. Many connections were forged and much experience was shared.

HRH The Princess Royal gave a well-informed and well-delivered opening speech. An engaging and enjoyable public lecture was given that evening by former Habitat Restoration Project Director Professor Tony Martin to a large audience. Lord Gardiner (Parliamentary Under Secretary of State for Rural Affairs and Biosecurity) talked for 15 minutes about the UK Government's commitment to supporting biosecurity conservation in the UK Overseas Territories. Lord Gardiner is very engaged on the subject of biosecurity and as a result of this event offered to facilitate discussions between Defra officials and the new South Georgia Commissioner on the issue of biosecurity on South Georgia.

Delegates from Mexico, Canada and the US have been inspired to host the next Island Invasives conference in 4-5 years' time.

Indicators/evidence

The conference was attended by 275 delegates from 44 different countries.

As well as local press coverage, the conference received publicity from BBC Scotland, STV, BBC Wildlife Magazine, the BBC World Service and Good Morning Scotland.

A survey was sent out to the delegates following the conference, many of whom commented that the conference was an excellent opportunity to network and to find out about advances in the field.

3.2 Outcome

As detailed in full in section 3.1, the outcome of the Phase 4 monitoring project was that no rodents were detected on South Georgia. Given the range of monitoring and detection techniques used and the extensive coverage of the monitoring work, SGHT is as confident as it is possible to be that South Georgia is now rodent free, and issued a joint declaration of success with GSGSSI on 8 May 2018. We can therefore state that the eradication effort conducted in Phases 1-3 fully met its aim of removing rodents from the island.

Monitoring of several bird species ('Key Species') most adversely affected by rodent presence was also undertaken by the team during the survey. Many of these hardest hit species such as the South Georgia Pipit and Pintail were sighted extensively around South Georgia, where previously they had been absent. This is yet another indicator of the success of the eradication work.

3.3 Long-term strategic outcome(s)

The work of Phase 4 built upon previous monitoring projects conducted around the world but importantly it significantly developed existing techniques in order to survey much larger areas than had been attempted before. It was successful in surveying South Georgia in a single season rather than over the course of several years, thus making considerable cost savings.

With the monitoring work completed and the eradication hailed a success, confidence within the eradication community has been bolstered, which SGHT hopes will lead on to further and larger eradication projects in the future. Team members who have acquired skills and knowledge during the South Georgia Habitat Restoration work will go on to advise and lead such projects.

4 Sustainability and Legacy

With the announcement of a rodent-free South Georgia there is now an ever stronger emphasis on biosecurity for the island, to prevent the re-introduction of rodents and to progress with the task of removing and controlling other invasive organisms on the island, specifically several plant species. GSGSSI has increased the biosecurity measures in place on South Georgia, as set out in its updated biosecurity handbook (available on its website at <http://www.gov.gs/docsarchive/environment/#tab-3>),

While biosecurity is the responsibility of the territory Government, SGHT is committed to supporting the implementation of best practice biosecurity measures on South Georgia. From February to April 2018 GSGSSI trialled the use of rodent detection dogs in the Falkland Islands to search vessels allowed alongside the jetty at South Georgia, an initiative which SGHT has supported financially. SGHT has offered to fundraise for the long-term use of dogs in the Falkland Islands for this purpose and for the new biosecurity facility that GSGSSI plans to install at King Edward Point in 2019-20. The Non-Native Species Secretariat has recently undertaken an audit of biosecurity on South Georgia, the results of which have been shared with SGHT. SGHT hopes to support GSGSSI in addressing any improvements suggested by the audit.

The permanent removal of rodents from the island will allow the fragile ecosystem to recover and many bird species to expand their territories and reclaim their ancestral homeland. The expected increase in bird population will transform South Georgia, returning it to a state not seen since the discovery of the island by early explorers. This increase in bird population will reduce the risk of extinctions to several species.

The experienced staff from this project will, and already are, moving on to other eradication projects around the world, taking the experience of their time with Team Rat on South Georgia with them.

The Island Invasives 2017 conference, co-hosted by SGHT, provided another opportunity to share the knowledge gained through the South Georgia rodent eradication work with practitioners around the world, and it is hoped to inspire others, including non-profit and non-Governmental organisations, to take on future challenges.

The ground-breaking nature of the SGHT rodent eradication project has given rise to worldwide interest in the project outcome and much attention will be paid to its success, particularly in terms of the scale and logistics of the area tackled, but also to the eradication of mice from a larger area than ever previously attempted.

5 Lessons learned

Monitoring of post eradication recovery is an important part of any eradication project. Ideally a pre-eradication survey of the island would have been conducted to provide a baseline for known key indicator species which could be used as a measure of recovery. This would have required a significant commitment to an eradication project at a very early stage, when both time and funds were limited, but would have been a valuable investment in proving the effectiveness and value of eradication work.

Biosecurity measures are being improved on South Georgia but best practice biosecurity should have been in place prior to eradication work. This would have given time for techniques to be fine-tuned to prevent the risk of re-invasion during or immediately following the eradication period. A likely compounding factor in the late implementation of best practice biosecurity was that it was the responsibility of two separate organisations to undertake the eradication work and to implement biosecurity. Although time and funds are limited at the early stages of a project, it is of paramount importance to put in place best practice biosecurity measures prior to eradication or risk project failure through early re-invasion.

The importance of having an experienced and skilled team in any eradication and monitoring work cannot be overstated. Eradication projects build on the success (and failure) of those that have gone before. Having a field team composed of people who have worked on similar projects is invaluable. This was a driving force in recruitment for Phases 1-4 and saw SGHT bring in many experienced staff from organisations that had taken part in similar projects, including from the New Zealand Department of Conservation, Tasmania Parks and Wildlife Service and USA based non-profit organisation Island Conservation.

Knowledge sharing is a key part of eradication projects, through conferences, staff sharing and inter-organisation communication. Every project is different with its own variables and challenges but it is through the sharing of lessons learned that each subsequent project can be made to succeed.

Building flexibility into your plans is vital especially when you are operating in a remote and extreme environment – contingency planning should include extra equipment and team members.

The project's Steering Committee continued to play a crucial role in project oversight and the involvement of key stakeholders in major decisions, with GSGSSI providing very considerable support for Phase 4.

5.1 Monitoring and evaluation

Throughout, the Project Director reported to the SGHT Steering Committee (SC) overseeing the project, which met as required. On financial and contractual matters, the Project Director worked with the SGHT Chief Executive who reported to the SGHT Board.

There were no major changes to the project design during the monitoring season but there were several adjustments to timings. Most notably it had been planned that ground team surveys of the Barff and Busen Peninsulas would run concurrently, but as some areas took less time to survey than expected, the Busen was finished before work on the Barff began. As a result there was a temporary surplus of staff. This surplus was absorbed by expanding the survey to cover more areas within the Phase 1 baited area. This added to the quality of the survey work and increased the robustness of its findings. Feedback and communications were maintained throughout these adjustments to the project.

Advice on the sub-sampling approach to surveying the island was sought from experts within the eradication community and their feedback helped to advise on the approaches taken during our survey season. Devices were recovered from 1,538 of the 1,542 sites deployed, a 99.74% success rate. Each discrete baiting zone was surveyed, and the number of areas reached (112) far exceeded the planning target of 100.

Evaluation of Phase 4 will take place once the end of season reporting and data is published. SGHT used best practice and expert advice throughout the planning process so that findings and data from the monitoring season would stand up to critical analysis.

5.2 Actions taken in response to annual report reviews

Consideration was given as to what immediate action could be taken if rodents were discovered during the course of the survey. To engage in any kind of baiting activity would have required too much time, resulting in a failure to complete a full and proper survey of the island which could have identified any other pockets of surviving rodents. SGHT's priority was therefore to ensure that the island was surveyed to the greatest extent possible in the time available. Any rodents or rodent sign found would be recorded and, if time was available, additional surveys conducted to ascertain the extent of the population in order to advise future remedial action.

The pre-defined list of target areas for monitoring included a selection of areas which would have to be surveyed as an absolute minimum in order to have any confidence in the findings of the monitoring work. Of the approximately 120 areas listed for survey, at least one site on each geographically isolated zone of South Georgia had to be surveyed. This would indicate if there had been any significant failure in the baiting operation. To have good confidence in the findings it was estimated that at least 60% of target areas must be surveyed and that they should be spread evenly around the island, leaving no significant area of habitat that had not been checked. A combination of passive detection devices and dogs would be used to give a high level of confidence in the findings. All of the above output indicators were met and some surpassed during the monitoring phase.

6 Darwin Identity

The project received a great deal of publicity amongst international conservation professionals at the Island Invasives conference held in Dundee in July 2017, as described earlier.

Wider publicity has been achieved following a press conference following the conclusion of the project on 8 May at the Wellcome Institute in London. Annex 6 shows the extent of the media coverage that was secured and Annex 7 references the press pack that was circulated.

The Darwin Initiative logo was prominently displayed on the team's jackets and on the dogs' jackets for the duration of the fieldwork. Please see photographs in Annex 8.

The Darwin Initiative funding has been publicised on SGHT's web site <http://www.sght.org/latest-news-page/page/2/> and is acknowledged in talks and interviews.

Although there are no permanent residents on South Georgia the island's Government is very aware of the Darwin Initiative, both as a partner in this and other projects and as Lead Institution for a Darwin Plus award relating to the management of invasive plants.

7 Finance and administration

7.1 Project expenditure

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total actual Darwin Costs (£)	Variance %		Comments (please explain significant variances)
Staff costs					
Consultancy costs					
Overhead Costs					
Travel and subsistence					
Operating Costs					
Capital items					
Others					
TOTAL					

Staff employed (Name and position)	Cost (£)
Patrick Lurcock, Deputy Project Director	
TOTAL	

Consultancy – description of breakdown of costs	Other items – cost (£)

n/a	
TOTAL	

Capital items – description	Capital items – cost (£)
n/a	
TOTAL	

Other items – description	Other items – cost (£)
n/a	
TOTAL	

7.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
Schroder Foundation	
Ernest Kleinwort Charitable Trust	
Lyda Hill Foundation (via our US affiliate Friends of South Georgia Island)	
Mithun Family Foundation (via our US affiliate FOSGI)	
Ludwick Family Foundation (via our US affiliate FOSGI)	
Wallace Research Foundation (via our US affiliate FOSGI)	
TOTAL	

We also received 'in kind' support from:

- GSGSSI in the form of *FPV Pharos SG* and accommodation at King Edward Point.
- BAS provided small boat support and shipping of equipment back to UK as well as providing a significant proportion of the food for our team during survey operations.
- We received field clothing for the survey team in kind from Ship to Shore Traveler.
- Iridium kindly loaned several handsets and provided all of our calling credit gratis for the duration of the survey.
- Cruise ship companies provided passage for some of our staff and items of equipment.

Source of funding for additional work after project lifetime	Total (£)
Cruise ship passenger donations towards a rodent dog detection trial in the Falkland Islands	
TOTAL	

7.3 Value for Money

One of the previous largest eradication project undertaken before South Georgia had been Macquarie Island by the Tasmania Parks and Wildlife Service. Despite the South Georgia eradication area being around eight times the size of Macquarie, the monitoring work on Macquarie lasted for over three years in comparison to the six month survey on South Georgia. The approach for monitoring was whole island survey. This approach of covering every hectare of ground was simply not feasible on South Georgia; monitoring work on this scale would have taken many years and cost millions of pounds. Through prior research into rodent behaviour and habitats on the island and extent of population it was possible to reduce the monitoring area. By targeting and prioritising monitoring sites SGHT was able to accomplish monitoring of all baited areas in a single season, resulting in a significantly lower cost for the operation.

The project made significant savings through in-kind contributions from GSGSSI who provided asbestos training prior to the fieldwork, free transportation for the dogs, handlers and some team members; and logistical and staffing support during the actual survey work, where the Government fisheries patrol vessel MV *Pharos* was the main form of transport used to deploy the inert detection devices. Thies Matzen and Kicki Erikson volunteered their time and their yacht *Wanderer III* to help with device deployment and retrieval from areas that were hard to reach for the larger vessels involved in the survey. BAS also provided boating support free of charge.

Annex 1

Project's original (or most recently approved) logframe (if your project has a logframe), including indicators, means of verification and assumptions. N.B. Insert your full logframe. If your logframe has changed since your application and was approved by a Change Request the newest approved version should be inserted here, otherwise insert the logframe from your application. If your application's logframe is presented in a different format in your application, please transpose into the below template. Please feel free to contact Darwin-Projects@ltsi.co.uk if you have any questions regarding this.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact:			
Outcome:			
Outputs:	1.1	1.1	
1. Add more outputs as necessary	1.2	1.2	
	1.3 etc.	1.3	
2.	2.1	2.1	
	2.2	2.2	
3.	3.1	3.1	
Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)			

Annex 2 Report of progress and achievements against final project logframe for the life of the project (if your project has a logframe)

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Impact:		
Outcome		
Output 1.		
Activity 1.1		
Activity 1.2.		
Output 2.		
Activity 2.1.		
Activity 2.2. Etc.		
Output 3. Etc.		

Annex 3 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1	Number of (i) students from the UKOTs; and (ii) other students to receive training (including PhD, masters and other training and receiving a qualification or certificate)	
2	Number of (i) people in UKOTs; and (ii) other people receiving other forms of long-term (>1yr) training not leading to formal qualification	
3a	Number of (i) people in UKOTs; and (ii) other people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	(ii) 7
3b	Number of training weeks (i) in UKOTs; (ii) outside UKOTs not leading to formal qualification	(ii) 1
4	Number of types of training materials produced. Were these materials made available for use by UKOTs?	
5	Number of UKOT citizens who have increased capacity to manage natural resources as a result of the project	1
Research Measures		
9	Number of species/habitat management plans/ strategies (or action plans) produced for/by Governments, public authorities or other implementing agencies in the UKOTs	
10	Number of formal documents produced to assist work in UKOTs related to species identification, classification and recording.	
11a	Number of papers published or accepted for publication in peer reviewed journals written by (i) UKOT authors; and (ii) other authors	
11b	Number of papers published or accepted for publication elsewhere written by (i) UKOT authors; and (ii) other authors	

Code	Description	Totals (plus additional detail as required)
12b	Number of computer-based databases enhanced (containing species/genetic information). Were these databases made available for use by UKOTs?	
13a	Number of species reference collections established. Were these collections handed over to UKOTs?	
13b	Number of species reference collections enhanced. Were these collections handed over to UKOTs?	
Dissemination Measures		
14a	Number of conferences/seminars/workshops/stakeholder meetings organised to present/disseminate findings from UKOT's Darwin project work	
14b	Number of conferences/seminars/ workshops/stakeholder meetings attended at which findings from the Darwin Plus project work will be presented/ disseminated	
Physical Measures		
20	Estimated value (£s) of physical assets handed over to UKOT(s)	
21	Number of permanent educational/training/research facilities or organisation established in UKOTs	
22	Number of permanent field plots established in UKOTs	
23	Value of resources raised from other sources (e.g., in addition to Darwin funding) for project work	

Annex 4 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. weblink, contact address, annex etc)

Annex 5 Darwin Contacts

Ref No	DPLUS048
Project Title	South Georgia Habitat Restoration Project: Post-Baiting Phase
Project Leader Details	
Name	Richard Hall
Role within Darwin Project	Project Director
Address	
Phone	
Fax/Skype	
Email	
Partner 1	
Name	n/a
Organisation	
Role within Darwin Project	
Address	
Fax/Skype	
Email	
Partner 2 etc.	
Name	n/a
Organisation	
Role within Darwin Project	
Address	
Fax/Skype	
Email	