

Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

Important note *To be completed with reference to the Reporting Guidance Notes for Project Leaders:
it is expected that this report will be about 10 pages in length, excluding annexes*

Submission Deadline: 30 April

Darwin Plus Project Information

Project Ref Number	DPLUS040
Project Title	Securing the future of St Helena's endemic invertebrates
Territory	St Helena, Ascension and Tristan da Cunha
Contract Holder Institution	St Helena National Trust
Partner Institutions	St Helena Government, Natural History Museum (London), Buglife, Royal Museum for Central Africa (Tervuren, Belgium)
Grant Value	£179,332
Start/end date of project	Aug 2015-Jul 2017
Reporting period (e.g., Apr 2015-Mar 2016) and number (e.g., AR 1,2)	Apr 2015-Mar 2016
Project Leader Name	David Pryce
Project website/Twitter/Blog etc	
Report author(s) and date	

1. Project Overview

The project aims to conduct a baseline survey of invertebrates across the island of St Helena and also accurately record the current state of several areas of natural regeneration and conservation work undertaken on the island.

It is hoped that the invertebrate survey will lead to a better understanding of how successful conservation work for endemic plants on the island has been for the associated endemic fauna. It is also hoped to show that areas of non-native vegetation also harbour a significant endemic fauna and potentially will lead to the development of a framework for assessing habitats for planning purposes.

Accurately recording the distribution of endemic plants in areas of natural regeneration and in conservation plantings will enable an assessment of how these areas have changed in the future, how successful the planting has been and whether this has led to further spread of these species on site.

2. Project Progress

2.1 Progress in carrying out project activities

The start of the project was unfortunately delayed by four months as the Project Manager was extended for six months in his previous Darwin project.

In August and September, the Project Manager made an extremely successful visit to the collections at the Natural History Museum in London. The purchase of additional high quality macro photography equipment by the Project Manager (as matched funding) facilitated this

work. A total of just over 12000 focus stack and specimen label photographs were taken during the eight week visit. 1807 images of 482 species have been generated from this material, creating a virtual museum collection that is helping to with specimen identification on island. Additional species are being added to this resource as they are being encountered during the survey.

The Natural History Museum also donated unit trays to house individual species within the invertebrate collection that is being assembled on island. This is making the curation of the collection much simpler and is saving a considerable amount of time as the collection is being expanded. To date a total of 566 specimens representing 123 species have been added to the pinned reference collection; these two figures are now increasing on an almost daily basis. The specimens can be broken down as follows:

Order	No. species	No. specimens
Thysanura (Silverfish)	1	1
Neuroptera (Lacewings)	3	2
Odonata (Dragonflies)	1	1
Mantodea (Praying mantises)	1	1
Hemiptera (True bugs)	23	97
Coleoptera (Beetles)	28	91
Lepidoptera (Butterflies and moths)	6	7
Diptera (Flies)	33	182
Hymenoptera (Bees, wasps and ants)	27	184

Storage for specimens that can only be held in alcohol has been shipped to the island and it is planned to start adding material to this soon.

As a result of communications difficulties the planned visit to the Royal Museum for Central Africa at Tervuren in Belgium never took place. Consequently, a change request was approved to delay this visit to July 2016, reduce it in length and combine it with attendance of the Island Biology 2016 conference in the Azores.

Following scanning of the most important reference work for the island's invertebrate fauna, the 'Faune terrestre de l'île de Sainte-Hélène', during the previous invertebrate project, all sections of this four volume, 1865-page document have now been digitised using optical character recognition software. Three-quarters of these have been made available through the South Atlantic Environmental Research Institute (SAERI) and the remainder will be added to this website soon. This digital resource is now helping with the creation of keys to certain invertebrate groups and test versions of these are starting to being made available through the National Trust website.

2.2 Project support to environmental and/or climate outcomes in the UKOT's

The Red Listing of invertebrates has recommenced following the previous invertebrate project. Ninety-four Red Listings are in progress with three working sets (35 spiders and 23 species of fungus weevil) nearing submission for publication. When this process has been completed, this will allow the precise quantification of how threatened the invertebrate fauna is on the island and will probably lead to the unlocking of significant extra funds for conservation work in the future.

2.3 Progress towards project outputs

Output 1:	Conservation management will be improved in terms of the Island's endemic invertebrates.		
	Baseline	Change recorded by	Source of evidence

		2016	
1a) The invertebrate survey will be completed and all identifiable specimens identified to species level or morphotype.		<p>The main invertebrate survey will commence in the next quarter.</p> <p>The National Trust has conducted an invertebrate survey for Connect, the island's utility provider; this was undertaken at several sites that have been proposed as potential new reservoir sites. This has allowed testing of the proposed methodology for the main survey and has resulted in the decision to reduce the amount of time the sample bottle will be attached to the trap as the number of invertebrates collected was sometimes extremely high. Several important endemic species were found during the survey,</p>	<p>N/A</p> <p>It is hoped that the results of these surveys will be made public in due course. The species records generated will be added to the island's invertebrate record file and will help in mapping endemic species during the Red Listing process.</p>
1b) An assessment of the health of key areas of endemic plants for their associated invertebrates will have been made.		Will commence during the progress of Output 1a.	N/A
1c) An assessment of the success of conservation work in terms of the associated endemic invertebrates will have been made.		Will commence during the progress of Output 1a.	N/A
Output 2:	A complete invertebrate identification toolkit will have been assembled.		
2a) A near-complete set of keys will have been compiled and tested.	A few test keys were available following the completion of Darwin Project 19-029.	Testing and refining existing keys, along with the development of new keys has begun in earnest. This is being helped considerably by the	<p>Test keys available for download on National Trust website.</p> <p>Digital versions of the 'Faune terrestre</p>

		availability of high quality macro-photography equipment that will allow the keys to be illustrated in the near future.	de l'île de Sainte-Hélène' available through SAERI.
2b) The Museum reference collection will be considerably expanded with reference specimens from the survey. Over 50% of species known from the island should be represented in the collection.	Approximately a hundred specimens had been added to the collection during the previous project.	566 specimens representing 123 species have been added to the collection.	Photographs can be supplied on request. During the next quarter museum database software is being purchased, this will allow accurate reporting on the names and numbers of species / specimens that have been added to the collection.
Output 3:	The three main areas of restoration work undertaken will have been mapped at high resolution.		
3) Restoration work at the Millennium Forest, High Peak and Blue Point will be accurately mapped with the locations of at least 10,000 plants recorded.		Quotations for the purchase of the surveying equipment have been obtained and these will be bought and shipped to the island in the next quarter. Surveying will then begin in earnest.	
Output 4:	Areas of natural regeneration will have been recorded at high resolution.		
4) Areas of natural regeneration will have been recorded at high resolution.		Can only commence once the surveying equipment has reached the island as per (3) above.	
Output 5:	Increased knowledge of the ecology and distribution of the Prosperous Bay Plain Mole Spider.		
5) Increased knowledge of the ecology and distribution of the Prosperous Bay Plain Mole Spider.		Can only really commence once the surveying equipment has reached the island as per (3) above. Conducting an invertebrate survey for Basil Read following changes in design for	The report from this survey has been submitted and is currently submitted as an addendum to

		construction of the island's new airport found an extension to an area of previously known Mole spider activity.	the planning application; once this process has been completed it is hoped that the report will be published.
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It should be noted that there has been some slippage in the timetable, however, it should still be possible to deliver all of the outcomes within budget subject to a change request being granted, see 'Lessons learnt' below.

2.4 Progress towards the project outcome

Outcome 1:	Improvements in conservation of the island's terrestrial invertebrates will result from an increased knowledge of their distribution and seasonal abundance; we will have a better understanding as to how well current conservation work is helping their associated species.		
	Baseline	Change by 2016	Source of evidence
Indicator 1.1 Increased knowledge of species distributions on the island.	There is little understanding of the true distribution of the island's terrestrial invertebrates due to the historical focus on areas of remaining endemic vegetation.	There is an increasing awareness that areas of non-native vegetation hold significant populations of some endemic species that have managed to adapt to these new conditions. Mapping issues with regards to GIS systems have been resolved and it is now possible to accurately map the distribution of species on the island.	Survey work undertaken for Connect outlined above; it is hoped that this data will be made available in due course. Outline maps of species distributions submitted to the IUCN with completed Red Listing assessments. The latest version of the list of records for the island's invertebrates is included as evidence.
Indicator 1.2 Increased knowledge on how well conservation work for the flora has worked for its associated fauna.	There is little understanding of how well conservation work undertaken to date for the island's flora has worked for its associated invertebrate fauna.	This will only start to become apparent once the invertebrate survey has commenced.	
Indicator 1.3			

Increased knowledge in the seasonal distribution of invertebrates.	Using the current species records file it is possible to construct a phenology diagram for one species (the hoverfly <i>Syritta stigmatica</i>) that has been sampled across all seasons; this suggests that there may be two generations a year in some species.	This will only become fully apparent once the invertebrate survey has been completed.	
Outcome 2:	Identification of most invertebrates will be enabled on-island for the first time without resort to specialist taxonomists abroad.		
Indicator 2.1 A significant invertebrate reference collection will have been created on-island.	Only a very basic collection with approximately 100 specimens in it was available.	This has now been expanded significantly and continues to grow.	Data on how many specimens of each species that has been added to the collection has also been added to the invertebrate species list for the island in order to track progress and assess the completeness of the collection. The latest version of this file is included as evidence.
Indicator 2.2 Keys and digital resources to assist with the identification of most invertebrates on the island will have been created.	Only a few keys to species were available and most species photographs available were of relatively low quality.	Significant progress has been made in improving the digital resources available for the identification of invertebrates on the island (see numbers above).	The number of high-resolution digital images created.
Indicator 2.3 At least one year of training will have been given on-island to allow the continuation of this work once the project has been completed.	Only the Project Manager has the skills and experience to complete this training.	A Project Officer has been appointed to receive this training. While the Officer is St Helenian, she is, however, currently completing her degree in the UK and will not be able to join the project until early September 2016. It is hoped that a Darwin change request, to be	

		<p>submitted in the near future, will allow a short extension of the project (at no extra cost) to allow this training to be given.</p> <p>A St Helenian Education and Project Officer has been appointed at the same grade as the Project Officer. She will also receive the training being given so there is duplicate knowledge, helping to ensure that the Project has a firm legacy.</p>	
Outcome 3:	Precise maps of restoration work and an accurate record of the current state of sites where natural regeneration is occurring will be created against which future changes can be measured.		
Indicator 3.1 Five areas of natural regeneration have been mapped with centimetre-accurate GPS equipment.	No data available.	The equipment to complete this survey is currently in the process of being purchased.	
Indicator 3.2 Three areas of restored habitat have been mapped with centimetre-accurate GPS equipment.	No data available.	The equipment to complete this survey is currently in the process of being purchased.	
Outcome 4:	Increased capacity at SHNT to record conservation work and conduct future monitoring.		
Indicator 4.1 Seven members of staff at the National Trust have been trained in the use of centimetre-accurate GPS equipment.	No members of staff currently trained in the use of this equipment.	The equipment to complete this survey is currently in the process of being purchased.	
Indicator 4.2 Three members of staff at the National Trust and two at the Museum of St Helena have been trained in the use of Adlib Museum database software.	Only the Project Manager has used this software before.	The software is currently in the process of being purchased.	

It is expected that the project will have achieved all of its objectives by the end of funding. It will, however, probably be necessary to extend the time-frame of the project by four months, within

the constraints of the funding, in order to achieve this. This has resulted from the slow start of the project with respect to the funding being sent to St Helena and the consequent delay in the purchase of equipment, also taking into account the time it takes to ship this material to the island.

Should the extension be granted the National Trust have agreed to cover the Project Manager's salary for the extra four months.

2.5 Monitoring of risks

Risk 1: Endemic invertebrate species may be negatively impacted by the survey.

The work undertaken for Connect outlined above has allowed a refinement of the sampling strategy. While some sites are relatively poor in terms of the numbers of invertebrates present, others have substantial communities present, sometimes with significant endemic species. It is proposed to initially assess individual sites with a short preliminary collection before determining how long the collecting bottle will remain attached. Most sites will then be sampled for a three-day period only, rather than the proposed seven; some poorer sites will be monitored for the full seven days. This should also lower the risk of being swamped by too many invertebrates to handle in the sample identification phase.

Risk 2: Intentional damage to monitoring sites by external parties.

Malaise traps usually have a black body with a white roof; to minimise visibility in the landscape all-black traps are being purchased. It is also planned to place the traps in locations where they are not immediately obvious from roads and paths. Prior to commencement of the survey press releases explaining what the traps are and why the traps are being used will be released. Some initial trapping has already been undertaken in consultation with the Environmental Management Division of St Helena Government to ensure that there is buy-in to their use by conservationists on the island.

Risk 3: Change of personnel.

While attractive salaries have been offered from an island perspective, this is always a risk that must be considered on St Helena. The Education Officer with the previous Darwin 'Bugs on the Brink' project was successfully recruited to the Education and Project Officer position in this project. She has shown a commitment to work in this field and should, barring any unforeseen circumstances, be a valuable asset to this project. The successful candidate for the Project Officer role turned down an offer of employment offering a higher salary to take this position for the different training that it offered; it is hoped, therefore, that this show of commitment will continue. The process of recruiting the Surveyor post is about to commence; it is hoped that there is a sufficient pool of talent on the island following the completion of construction at the airport that a suitable candidate can be found.

3. Project Stakeholders/Partners

The visit to the Natural History Museum in London at the start of the project was particularly successful. Key members of staff in the Coleoptera, Hemiptera, Hymenoptera, Diptera and Lepidoptera sections were keen to learn about the project and how it could help them.

One key reciprocal activity that helped both the Museum and the Project was that, in return for the Project Manager being able to photograph specimens, the Museum would get high quality barcoded images of their specimens that will eventually be placed on the Museum website. This will help promote the endemic fauna of the island and its importance. A total of 407 specimens were barcoded during this period.

Between the proposal of the project and commencement of the work itself the Museum had raised their bench fees significantly; this reciprocal arrangement meant that the Project Manager was able to negotiate for the photographic work to be done at the old rate.

While communication with the Royal Museum for Central Africa at Tervuren in Belgium was problematic at the start of the project, it has been re-established following the change request after the Project Manager's return to St Helena. It is now planned to combine a much shorter

visit to this collection with attendance of the Island Biology 2016 conference. Representatives from Buglife and the IUCN will be attending the conference and it is hoped to engage with these key partners then.

On island we have been working with St Helena Government (SHG) to ensure that there will be no problems implementing the project. The National Trust is set to receive a permit to undertake this type of work once this system has been put in place; this is a requirement following the enactment of the Environmental Protection Ordinance earlier this year. Some preliminary survey work has been undertaken in conjunction with SHG to try to ensure that the survey does not harm the species themselves.

SHG have also allowed the project access to their copy of Leica Geo Office software which will save approximately £3500 from the purchase of the GPS equipment and thus allow better equipment to be bought. The project has offered to share data with SHG in return.

We have also been in consultation with the DPLUS051 project 'Water security and sustainable cloud forest restoration on St Helena' and hope to include their key study sites with this project for mutual benefit.

4. Monitoring and evaluation

Financially, all expenditure is being logged in the National Trust's SAGE software system to ensure that the Project meets all financial requirements.

All survey work undertaken has been documented both in hard-copy and electronically to minimise the risk of data loss; this will be maintained through the main invertebrate survey.

All training undertaken or given by the project is being logged.

Species that have been imaged with high-quality macro-photography equipment or that have been added to the invertebrate collection are being logged in the St Helena invertebrate species file compiled during the previous invertebrate project. This file, along with the St Helena species records file continue to be updated and improved on a daily basis. All new information on the invertebrates of the island is added to the 'St_Helena_invertebrates' digital archive which has now reached 20.7 GB in size. Copies of this file are being passed on to partners as and when opportunities arise during the project.

It is planned to set up a steering group prior to the commencement of the main survey to make sure that partners are happy with the progress of the survey and to ensure that any concerns are addressed.

5. Lessons learnt

The main lesson learnt is that the project finances should have been addressed from day one. The fact that this did not happen was a result of the project starting in the UK prior to moving to St Helena where it was to be based for the remainder of the time. In retrospect, a few weeks should have been put by at the very beginning to allow the setting up of the project on island by electronic communication, rather than plunging into the project and worrying about the finances later.

A common theme that seems to be shared by all projects on St Helena is that extra time needs to be built into the project from day one to allow for equipment purchase, transport, hiring staff, and sorting out the myriad other little wrinkles that seem to beset projects here as a result of our isolation. This is unlikely to alter much after the opening of the Airport as nearly all equipment will continue to arrive by sea, and the shipping will actually be slightly less frequent, and probably more expensive, than it is at the moment.

To get around this we hope to put in a change request soon that will build some extra time into the project, within the existing budget, that will allow it to be delivered successfully.

The digital imaging was the most successful and useful outcome so far; this has built up a considerable digital resource in the form of a virtual reference collection that can be consulted to help in the identification of specimens. The work at the Natural History Museum also raised

the importance of the work we are doing on the island and how the Museum can really help to conserve the endemic species.

6. Actions taken in response to previous reviews (if applicable)

N/A.

7. Other comments on progress not covered elsewhere

See section 8, third paragraph, below.

8. Sustainability

This project follows on from the 'Bugs on the Brink' project (19-029) and hopes to build on the legacy from that project. The Project Manager has built up a good reputation as the 'BugMan' on the island and most people know who he is and what he does.

With the opening of an international airport on the horizon there is clear concern that increased tourism and the reduced transit time involved with a direct air link could impact our endemic fauna in a negative way.

It is still planned to train-up the person in the Project Officer position to carry on the work once the project has been completed. This person will then be the go-to expert on-island to answer invertebrate queries, or work out how to get them answered, as well as being able to conduct invertebrate surveys as and when required. The Project Officer was born on St Helena and is currently completing her degree in the UK before a planned return to the island.

The project still plans to leave the sustained legacy of an invertebrate collection, microscopes to look at the specimens and as near-complete set of resources as possible to aide invertebrate identification. Some potential savings envisaged at this point have been potentially earmarked for the purchase of a set of binocular zoom microscopes for the secondary school on island. This equipment will enable study of invertebrate specimens at the school for the first time as well as being available for other cross-curricular uses, e.g. in marine biology classes. This will be the subject of a forthcoming change request.

One further planned output from the project, not initially included, is the potential development of a standardised invertebrate sampling procedure to inform planning decisions. As the invertebrate fauna is relatively poor (compared to the UK fauna), it is possible that a standardised methodology with a simple scoring system and seasonal adjustment could be developed from the main invertebrate survey. An idea as to whether this could be possible should emerge relatively early in the survey once there is enough data to start analysing the relative importance of sites.

9. Darwin Identity

Early on in the project a seminar was given by the Project Manager at the Natural History Museum in London. The half hour talk 'St Helena: an island biodiversity hotspot' was attended by 22 staff and was well received. This really raised the profile of the project, the island and the critical issues its endemic fauna is currently facing among the academic community at the Museum.

A half-hour radio interview about the project and the issues faced by invertebrates on the island was given on Saint FM on 03/03/2016.

The use of the Darwin branded vehicle, purchased by project 19-029, by this project has allowed a continuity between the two and it is hoped to build on the good reputation that this project built up. Work in conjunction with biosecurity and other island partners has really raised the profile of invertebrates on the island.

The Education Officer from project 19-029 was successfully recruited to the Project and Education Officer post with this project. Linkages built up with the Community Forest Project

(20-005) have been maintained and work continues with the island's three primary and one secondary school to 'St. Helenianise' the environmental curriculum and raise the profile and importance of the island's endemic species here.

It is planned to build on, and enhance, the National Trust web pages created by the previous 'Bugs on the Brink' project. Sections of the new invertebrate guide are now being uploaded as they are being completed, as are test keys to the various invertebrate groups. It is hoped that once this project has been completed the invertebrate guide will be updated with of the information we have learnt and it will then be published as a second edition in hard copy, possibly with the financial assistance of the St Helena Nature Conservation Group. The first sections of the guide can be found at:

www.nationaltrust.org.sh/shnt-conservation-programmes/natural-heritage/bugs-on-the-brink-our-invertebrates/invertebrate-guide/

It is also planned to expand the range of digital resources created by this and the previous project by placing further data on the SAERI website.

10. Project Expenditure

Table 1 Project expenditure during the reporting period (1 April 2015 – 31 March 2016)

Project spend (indicative) in this financial year	2015/16 D+ Grant (£)	2015/16 Total actual D+ Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs			-70.69	See comments below.
Consultancy costs	0	0	0	
Overhead Costs			-37.5	
Travel and subsistence			-4.00	
Operating Costs			-56.44	
Capital items		0	-100.00	
Other			-49.65	
TOTAL			-75.34	

As discussed in lessons learnt, the slow start to the project, coupled with the UK start meant that the finances weren't set up until the return to St Helena. On April 1st the third quarterly payment has still not been made to the St Helena national Trust (this arrived on 20th April); now that this has been received the finances are rapidly approaching the position they should have been in. Travel and subsistence (variance 4%) field is the only one where all spend has been completed; hopefully this should give an indication that the finances for the other costs will also be in line.