

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: 30th April 2018

Darwin Plus Project Information

Project reference	DPLUS040
Project title	Securing the future for St Helena's endemic invertebrates
Territory(ies)	St Helena
Contract holder institution	St Helena National Trust
Partner institutions	St Helena Government The Natural History Museum, London Museum für Naturkunde und Vorgeschichte, Dessau, Germany Buglife
Grant value	£179,332
Start/end date of project	1 st August 2015 to 30 th June 2018
Reporting period (e.g., Apr 2017-Mar 2018) and number (e.g., AR 1,2)	April 2017- March 2018 AR3
Project leader name	Amy-Jayne Dutton
Project website/blog/Twitter	http://www.trust.org.sh/invertebrates/ http://www.maiisg.com/resources/projects/ver.php?id=100 https://www.facebook.com/Buglifes/?ref=bookmarks
Report author(s) and date	Amy-Jayne Dutton 20 April 2018

1. Project overview

St Helena is a small volcanic island in the South Atlantic Ocean. While its isolation has meant that it has no native land mammals and only one endemic land bird, it has high invertebrate diversity, with around 470 terrestrial invertebrate species endemic to this small island. The invertebrates have been impacted on by loss of native vegetation, and are still under threat from invasive species, habitat loss and fragmentation, and infrastructure development.

Previous invertebrate survey work has been mainly concentrated during the 'summer' (Dec-May) which has resulted in disjointed data. This project aims to improve invertebrate knowledge by conducting a year-long baseline survey of invertebrates across the island. This work, in conjunction with habitat and weather data, will improve understanding of the impacts of conservation work and seasonal changes as well as abundance and distribution of species. More concentrated work will be undertaken on specific groups and species which are currently poorly understood, particularly the Prosperous Bay Plain Mole Spider.

A comprehensive resource collection will be developed, with stacked images of specimens, species information and a high-quality specimen collection, along with general identification

tools. This will be passed on to the St Helena Museum, providing a lasting legacy, by facilitating future identification and research to be undertaken on-island after the life of the project.

Figure 1. Location of St Helena



2. Project stakeholders/partners

The project has been fortunate to have the generous support of several highly respected organisations which are world leaders in invertebrate science on St Helena. All project partners are directly engaged with the project and are involved in specific areas of project delivery such as survey work and scientific development, as well as general project management through steering groups and reporting.

St Helena Government (SHG) has been closely involved with this project since its inception and is the main partner. The majority of survey sites are located on land which is administered by SHG's Environmental Management Division (EMD). EMD is responsible for issuing research permits, and so has direct influence on what work can/cannot be undertaken with permits for two visiting researchers being issued this year (Annex 3.1 Research permit). SHG have an interest in the invertebrates on the island, particularly in areas where they undertake conservation work, and information is shared freely between SHG and the Trust to improve the knowledge of each. SHG accompanied the experts in the field, and experts provided guidance on the presence of, and management for, specific/rare species in key endemic areas such as the Peaks and remnant Gumwood (*Commidendrum*) sites.

In October 2017 a steering group was formally created (response to AR2R), bringing together the parties already involved with the project to facilitate open dialogue and better project management. In addition to project staff at the National Trust, members include individuals from SHG, Buglife, Natural History Museum, London (NHM), Museum für Naturkunde und Vorgeschichte, Germany (NMVD), IUCN SSC Mid-Atlantic Islands Invertebrates Specialist Group (MAISG), and independent invertebrate specialists Roger Key and Amy-Jayne Dutton (before Amy accepted the role of Project Manager in January 2018). This has allowed a greater level of discussion on project work and implementation, with specialist advice then integrated into the running of the project. (Annex 3.2 Steering group minutes).

The involvement of expert entomologists, particularly from project partners NHM and NMVD has been invaluable, and has allowed for direct steering of fieldwork for the project to gain the greatest benefits. A second visit to St Helena by both partners in 2018 resulted in additional specialist surveys of beetles and moths (Response to AR2R, Section 3).

Howard Mendel from the NHM conducted a second visit to St Helena in February 2018, where he spent 3 weeks leading the project's beetle survey. Howard targeted niche areas and found rare beetles, including species not seen since 1876 (e.g. *Homoeodera nodulipennis*). Although not all specimens from the survey have yet been formally identified, Howard believes he has eight species which are new to science. (Annex 3.3 Photo a,b Howard and team in field).

Timm Karisch from NMVD returned for four weeks of fieldwork at the end of March 2018. He is leading the moth and butterfly surveys for the project. During this trip he has targeted *Opogona* moths, with caterpillars reared during his visit to establish relationships between moths and their plant hosts. His work on St Helena is ongoing at the time of this report (Annex 3.3 Photo c Timm and team in field).

This project has also worked with staff undertaking other Darwin projects on St Helena (DPLUS051, DPLUS052, DPLUS029) where work overlaps, such as surveying, habitat mapping and climate data collection. This has allowed more efficient data collection, and avoided repetition and duplication of information. Staff from DPUS052, as well as other Trust staff, have been directly involved with establishing habitat surveying and monitoring techniques to ensure longevity and consistency of monitoring efforts (Annex 3.3 Photo d, during habitat walkover at Blue point).

Roger Key has been instrumental in moving the fieldguide towards completion, collating information, being the central point of contact for the database, and providing invaluable advice on the invertebrates of St Helena and their conservation needs. Vicky Wilkins from MAISG has also supported the production of the fieldguide from its inception. MAISG have also provided technical advice, hosted information on the project and staff members on their website and promoted the project in their online newsletter (Annex 3.4 MAISG newsletter). Buglife have provided technical advice for the project and continues to support invertebrate work on St Helena. Amy-Jayne Dutton also provided advice and beneficial insight from her time on St Helena.

3. Project Progress

In response to reviewer comments in AR2R, the original Logframe was amended with a change request submitted to Darwin in January 2018 after prioritising budget issues and other project needs. However, a response was received in mid-March that further adjustments were required making it unlikely further changes could be approved before the submission date for AR3. Therefore project progress is reported against the original Logframe, with comments as appropriate where revisions are likely, but we would like to highlight that the SMARTening of the outcome and outputs is pending and a further amended Logframe has been resubmitted to Darwin as part of Change Request 6 (9th April 2018).

3.1 Progress in carrying out project Activities

Output 1. Conservation management will be improved in terms of the island's endemic invertebrates.

1.1 Visit the Royal Museum for Central Africa in Tervuren, Belgium to photograph specimens

This action was cancelled in Change Request number 3 and detailed in AR2. No further action to report.

1.2 Visit the Natural History Museum in London to photograph specimens

This action was completed in 2015 and reported on in AR2. No further action to report.

1.3 Conduct a year-long invertebrate survey

The year-long invertebrate survey began in January 2017. Twenty-four traps were erected and the collecting bottles were attached for seven days at a time on a four-weekly cycle as described in AR2. Three traps were closed due to strong winds which made it impossible to keep the traps up. The survey ended in October 2017, with 10 months and 11 samplings completed. In some cases large volumes of specimens were collected and it was unlikely that all specimens could be processed if the survey continued for the full 12 months. The decision to cease the survey was agreed by members of the steering group (Annex 3.5 Minutes of meeting with Roger Key). While this is slightly short of the year planned, this is the most thorough survey effort undertaken on the island to date and there is a substantial amount of data that will be available from this survey, including throughout the seasons.

1.4 Identify specimens

Staff members are highly competent at identification of nearly all of the larger invertebrates and many of the smaller specimens. Identification skills are constantly improving, and the tools and resources to allow species to be identified are being enhanced as needed. Sheena Issac joined the team in June 2017 as Project Officer and quickly became a competent member of the team.

However, sorting and identification is time consuming and after consultation with the steering group, it was agreed that funds from the original Project Manager salary would be redirected to recruit an additional staff member to aid the timely completion of the identification of samples. This change request was agreed in November 2017 and Natasha Stevens joined the team in January 2018 (Annex 3.6a change request, 3.6b job advert). She has experience of invertebrate identification from her previous Biosecurity work, is a valuable asset to the team and will play a strong role in aiding the completion of identification work. Specimen identification was approximately 75% completed at the end of March 2018 (Annex 3.7a sample tracking spreadsheet, 3.7b survey results sheet). It is estimated that sample sorting will be complete in early May 2018, allowing time for analysis and reporting of results.

There are already some interesting findings to note from the malaise trapping. Some species noted as rare at the beginning of the project are present numerous sample sites, e.g. *Ceratopogonidae* *indet.* has been found in all but one malaise trap site, often in very high numbers. Some species show high numbers in just one or two sample periods (particularly April 2017) which would be difficult to detect with shorter sampling timeframes.

The results from the malaise traps will be augmented with information from project partners Howard Mendel and Timm Karisch through their specialist surveys as described in Section 2. Identification of specimens collected during these surveys is in progress. They have also provided training to the project team, volunteers and other interested parties in identification and are in regular contact during the identification process.

Due to the diversity of species found on this small island, it is unsurprising that some specimens are awaiting specialist identification. This provides an opportunity to engage with other specialists, highlight the diversity and value of the species found on St Helena, and this will continue beyond the project. During this year we have been contacted regarding hymenoptera and diptera collected as part of this project. Where the research is compatible with island priorities these links will be greatly appreciated and encouraged.

1.5 Produce reports

A paper has been produced based on data from the previous “Bugs on the Brink” Darwin funded project (Laying the foundation for invertebrate conservation on St Helena 19-029) and incorporating information generated by this project. This has been submitted by Dr Alan Gray and includes a number of current project staff and partners as Co-authors. The paper was presented as part of the international St Helena Conference 2018 Diverse Island Environments which was held on the island in January 2018 (Annex 3.3e Photo of conference paper being presented, Annex 3.8 St Helena Conference Programme).

Further reports will be produced by the end of the project once the data has been analysed.

1.6 Re-assess any Red Listed species where new data may affect the listing

Data being collected from this project is likely to impact Red Listings, as discussed in AR2. However, it would be premature to alter listings before the data has been fully assessed, to ensure most up-to-date information is used. Species to be reassessed will be prioritised on the strength of changes in knowledge of distribution and/or abundance which will become clear during the analysis stage.

While the project no longer has staff members who are Red List trained, this is not viewed as a problem as the Red List re-assessments will be undertaken during the final stage of the project, when staff have completed sample sorting. Training is completed online, and the new Project Manager aims to complete this training over the next month to coincide with data analysis. Other staff are due to undergo training on completion of sample sorting.

1.7 Make data available

Data will be made available at the end of the project, primarily through the St Helena National Trust and MAIISG websites. A meeting is organised for April with the British Records Centre to look at the possibility of establishing an online database in order to make data available, useful and more easily updated. The SAERI website (<http://www.south-atlantic-research.org/metadata-catalogue>) also provides the opportunity to include all data produced, including sensitive data where additional permissions can be sought before the data is disseminated. No further action to report.

As noted in AR2R, further Actions detailing the Research Questions to be addressed by this project will be better defined as part of the pending Logframe changes. Following analysis of the survey results these will be addressed in the final reports produced for this project.

New Activities to be added as part of the pending Logframe Change Request

- Determine the impact of invasive predatory species on native invertebrate species and habitats
- Determine the effect of seasonality on invertebrates
- Determine the effect of conservation efforts for habitats on invertebrates
- Determine invertebrate diversity and abundance differences between natural, restored and non-native habitats
- Assess shifts in distribution of invertebrates attributable to global warming

Output 2. A complete invertebrate identification toolkit will have been assembled

2.1 Take data from Outputs 1.1, 1.2 and the Outputs from the ‘Laying the foundations’ projects to create resource set

In the pending Logframe changes this will be broke down into two activities 1) improving the invertebrate identification resource kit and 2) continue invertebrate education programmes to school children and update the education pack.

As previously reported in AR2, the “St_Helena_Invertebrates” digital resource set contains stacked images from Activity 1.2 and is being continuously added to and developed. This continues to be an essential resource in the identification of invertebrates during this project and will be a huge asset to anyone wishing to study the invertebrates of St Helena in the future.

Steering group member Roger Key has been heavily involved in the organisation of the species records and species list and reclassification of Liza Fowler’s photos to species to enable better usage and inclusion in the digital resource set.

Further improvements to the digital resource set have included adding photographs of species newly found, photographing key identification features under the microscope and creating a simple chart highlighting species most commonly found to aid speedy identification (Annex 3.9 Picture key identification guide).

Invertebrate education has continued through the inclusion of activities in ‘Forest Schools’ sessions held regularly during school term time (Annex 3.10 Invertebrate education sessions). Invertebrate project staff have been involved with 69 school group sessions, to three primary schools, reaching 512 children.

Other invertebrate education and outreach has been undertaken, with careers fair in October reaching 230 children and 151 adults (Annex 3.3f letter from careers fair) and an event at the public library which reached 39 children and 11 adults. The PM also visited Harford Primary School as part of World Book Day to talk about the importance of reading and her role.

The project team provided training for SHG staff working on the Landscape Ecology Mitigation Programme, this session was jointly run by SHNT and SHG as a team building and educational exercise and 26 people were involved.

The educational resource pack has been developed and improved and 10 packs have been produced for distribution around the local schools and teaching staff. These have been ordered from the UK and will be delivered shortly. An engagement session is planned with a number of teachers from the schools across the island, where teachers will be taught to use the education pack to demonstrate its utility and encourage its use.

2.2 Create accurate, tested invertebrate keys.

Keys have been produced as reported in AR2. Progress on these will be driven by the steering group, who collectively have the knowledge and skills base to develop, test or revise these keys as needed. The key to the Fungus Weevils of St Helena is being worked on by Howard Mendel in conjunction with his work on newly collected specimens from his most recent visit.

Picture keys have also been developed by project staff for quick reference, and are extremely useful for the easily identifiable species. This allows quick identification of a large number of easily recognisable taxa. Advice from experts is sought on which groups/species to be more cautious with and if there is doubt experts are consulted or specimens await specialist assessment.

2.3 Improve the field guide with new information and photographs.

As reported in AR2, work on the field guide is being conducted by steering group member Roger Key, supported by Vicky Wilkins from MAISG and is continuing well. All but two of the key sections of the guide are complete, an increase of 28 sections from the previous annual report. The invertebrate team provide on the ground information and photographs as needed. (Annex 3.11a Progress with guide, 3.11b Psocoptera and Thysanoptera section of guide). Project and Education Officer Liza Fowler has contributed over 300 photos which will be utilised within the guide and is one of the three authors. It will follow the same style as the Flowering Plants and Ferns of St Helena guide (Pisces Publications) produced by Phil Lambdon and will be published in hard copy by the St Helena Nature Conservation Group.

2.4 Improve the Museum of St Helena reference collection.

There are currently 1407 dry and 1087 wet specimens in the collection, with a total of 372 and 68 species respectively. This represents 31% of recorded, described species on St Helena. Once sample sorting is completed additional species not yet represented in the collection will be added from the malaise trap samples. The majority of the preparation and pinning of additional material will occur after the primary sample sorting has been undertaken. (Annex 3.12 Species list including Collection data, 3.3g Dry collection, 3.3h Wet collection, 3.3i Identification of specimens)

The Museum of St Helena computers are set up with Adlib software, a natural history cataloguing system, and specimens are already entered on the software. Also the lab space has been built in preparation for receiving the collection following the conclusion of the project, as a space for local and visiting scientists to use.

2.5 Make the contents of the reference collection available online.

The museum has the Adlib database software, as explained in AR2, but as the contents of the collection are changing as specimens are added the system will be updated once the collection has been passed over to the museum. Once the collection is stored at the museum access for updating this system will be more straightforward and the collection can then be made available online. The project is investigating options for making the entire invertebrate database and digital resource set available on-line, this would include information on the reference collection. No further progress to report.

Output 3. The three main areas of restoration work undertaken will have been mapped at high resolution

3.1 Map the Millennium Forest

As stated in AR2, the high resolution mapping has been altered to a more practical monitoring programme to build on methods utilised by previous projects (Darwin Initiative Project 20-005 "Creating Community Forests to Enhance Biodiversity and Provide Educational Activities" (CFP)).

Work has been undertaken with other Trust staff involved in the site and SHG staff working on DPLUS052 to establish the most effective monitoring techniques for the variable terrain and areas. As Millennium Forest is an easy site to access, most vegetation and habitat mapping trials have been undertaken here. Project staff have spent several field days assessing the vegetation and the most effective monitoring and mapping techniques. A trial survey using non-fixed photopoints at MF was done to develop methodology. It showed that fixed points are needed to reliably relocate photo positions (Annex 3.3j GPS location, 3.3k habitat photo).

Habitat classifications will be used in line with those used by DPLUS052, with 10m² plots surveyed in greater detail to provide more in-depth vegetation analysis (Annex 3.13 Monitoring methodology). Twelve plots have been defined which will provide ongoing information.

A Dell Latitude Rugged Tablet has finally arrived on St Helena after delays in ordering and shipping. It is capable of taking geo-referenced photographs which will allow for fixed point photography. Fixed point photographs will allow for assessing changes over time in vegetation.

Drone trials were also undertaken to assess the practicalities of using this technology to gain high quality aerial photographs. Although this would be a useful method, the implementation of 'no fly' zones due to the proximity of the airport, particularly to Millennium Forest, has severely restricted the utility of this method because two thirds of St Helena are deemed no-fly zones (Annex 3.3I Drone map)

3.2. Map High Peak

As with Activity 3.1, habitat classifications will be used in line with those used by DPLUS052 and established monitoring plots under CFP will be surveyed in greater detail to provide more in-depth vegetation analysis. Habitat monitoring at this location is ongoing and use of the GPS enabled tablet will allow for more accurate fixed point photography to be undertaken.

3.3 Map Blue Point

As with Activity 3.1, habitat classifications will be used in line with those used by DPLUS052. As will 3.2, selected established monitoring plots under CFP will be surveyed in greater detail to provide more in-depth vegetation analysis to provide continued, consistent monitoring.

These have been visited with Trust staff responsible for this area and current restoration plots mapped. As it is a large site, it is not feasible or practical to survey the entire area, and so as with Activity 3.2 original survey plots will be utilised for fixed point photography. Monitoring of these original plots where vegetation has been established will provide continuity and continued assessment of restoration success.

3.4 Make data available

Data will be made available at the end of the project. No further action to report.

Output 4. Areas of natural regeneration will have been recorded at high resolution

4.1 Map Flagstaff Scrubwoods

As with Output 3 and as stated in AR2, Output 4 activities have also been changed to focus more on effective monitoring of sites, rather than centimetre accuracy of specific plants.

Natural regeneration areas are difficult to access. The areas have been surveyed as part of DPLUS052 and general habitat data is available from this project. A key fixed photopoint will be established that is easy to access and relocate now that the Dell Tablet is available.

4.2 Map Pipe Path Scrubwoods

As with Activity 4.1 this site has been surveyed as part of DPLUS052. This area is small and a visit was made to the site in March 2018 to record the vegetation in more detail with staff from DPLUS052 (Annex 3.14 survey sheet, 3.3m Photo of Pipe Path scrubwoods). Key fixed photopoints will be established that are easy to access and relocate now that the Dell Tablet is available.

4.3 Map Signal House Scrubwoods

This project was designed before the airport was finished. The scrubwoods are in an isolated area on the seaward side of the airport and can only be accessed through the airport itself, which has high security requirements. This site is not practical to gain access to regularly and so will no longer be included in regular monitoring and maintenance.

4.4 Map Peak Dale Gumwoods

This area has been mapped as part of work undertaken by the St Helena Nature Conservation Group. This project will assist in updating their map, and establishing points for fixed point photography utilising the Dell Tablet now that it has arrived, rather than redoing work already done.

4.5 Map Blue Point Scrubwoods

This is also the site of restoration plots as stated for Activity 3.3. The area has been surveyed as part of DPLUS052 and general habitat data is available from this project. The Trust is working with SHG to fencing a large area of natural and restored endemic vegetation which will provide greater protection for the established endemic vegetation and restoration attempts. A walk over of the site has been undertaken (Annex 3.3d) and the vegetation at the malaise trap sites has been mapped. Key fixed photopoints will be established that are easy to access and relocate.

4.6 **Make data available**

Data will be made available at the end of the project. No further action to report.

Output 5. There will be increased knowledge of the ecology and distribution of the Prosperous Bay Plain Mole Spider

5.1 **Repeatedly map the molehills to see spatiotemporal movement**

A daytime walk-over was undertaken in February to establish an easily accessible area of molehills to revisit during a night survey to assess activity at night. This night survey did not reveal obvious mole spider activity. This was possibly due to the full moon, dry conditions of late summer, disturbance or other influencing factors (Annex 3.3n Mole Spider Observations).

Surveys around known mole spider areas in February and March 2018 did not reveal high numbers of mole hills. Some of the evidence was difficult to determine whether it was directly attributable to mole spiders as it was less well defined but may have been old mole hill remains. This lack of fresh material may have been due to the current hot, dry weather and there may be an increase in findings following wetter weather. An additional area close to the airport fence was also surveyed as part of potential airport works, few potential molehills being found (Annex 3.3m Mole spider survey).

Also, as part of DPLUS052 soil samples in areas of Prosperous Bay Plain in November 2017. Results from analysis of these will help to inform on potential mole spider habitat preferences. Due to oddities in the results more samples are due to be taken in April 2018 (Annex 3.15 Prosperous Bay Plain Soil survey map).

5.2 **Assess mole spider population size**

Assessment of the mole spider population will be undertaken after a full habitat walk-over. This will be undertaken in May 2018 in conjunction with EMD staff.

5.3 **Make data available**

Data will be made available at the end of the project. No further action to report.

3.2 Progress towards project Outputs

Output 1.

Conservation management will be improved in terms of the Island's endemic invertebrates

Before the project little wide ranging survey data on terrestrial invertebrates was available on St Helena. The last comprehensive survey was by Belgian researchers in 1966/67. Already from this project we have accrued a wealth of valuable invertebrate data that will be available beyond the life of the project.

Good progress has been made in the identification of specimens and the project is on track to identify the majority of the specimens from all samples with expertise on-island. Analysis of this will provide more information on the diversity, distribution and identity of terrestrial invertebrate species on St Helena. This data is complemented and augmented by data collected by Coleoptera expert Howard Mendel and Lepidoptera expert Timm Karisch. Confirmation of invertebrate plant associations, as well as better distribution patterns, will improve understanding of invertebrate needs for future work. This data will be looked at in conjunction with habitat data collected to better inform conservation management taking into account invertebrate associations and requirements.

Output 2.

A complete invertebrate identification toolkit will have been assembled.

Before the beginning of the project, information on terrestrial invertebrates was available from scattered sources and locations. This project has allowed the collation of information to a central point, providing a single 'go to' location which improves efficiency and ease of access to information. This includes a central reference collection which will be donated to the St Helena Museum following the end of the project. This provides a long-term resource legacy to encourage further invertebrate research and conservation.

As stated in Section 3.1, Activity 2.1, the project has amassed a substantial amount of resources for the identification of terrestrial invertebrates on St Helena. This has helped the local project team to become highly competent in identifying a huge range of the invertebrates found on St Helena, improving long-term capacity on the island for invertebrate work. This knowledge is highly valuable, providing a good base to aid visiting experts to efficiently identify areas to focus future research and providing a first line of enquiry for members of the public – the team is well established enough that enquiries are frequently directed to the Trust as the most knowledgeable organisation on St Helena for invertebrates, no doubt supported by the numerous education events undertaken as described in Section 3.1 Activity 2.2.

Output 3.

The three main areas of restoration work undertaken will have been mapped at high resolution.

There have been minimal maps available on areas of restoration work prior to this project. The Peak Dale Gumwoods have a map produced by SNCG, and a basic map exists for Millennium Forest. Since the project application, our SHG project partner is now also mapping habitats it is logical to work together, improving their knowledge with our site expertise. This provides mutual benefits and avoids replication of work and effort. DPLUS052 aims to produce new, in-depth maps of the island, and will be a fantastic resource for future work. Collaboration also ensures that the same mapping classifications are used to allow the data to be useable across projects as needed.

This output has been altered to reflect the reduced need for independent mapping and instead focuses on the need for monitoring of the restoration locations. This is reflected in the pending Logframe changes, and will allow the formation of SMART indicators. By working with other current projects, results will provide continued information on vegetation changes and management techniques to better inform future work and assessment of impacts of changes in vegetation and methods employed.

Output 4.

Areas of natural regeneration will have been recorded at high resolution.

As with Output 3 there has been minimal mapping of the areas of natural regeneration of endemic vegetation. In light of the work being undertaken by DPLUS052 this Output has also been altered to reflect the need for monitoring of the restoration locations. This is reflected in the pending Logframe changes, and will allow the formation of SMART indicators. This monitoring is based on techniques undertaken by previous project (CFP 20-005), providing continuity and information over an extended period of time. Results will provide continued information on vegetation changes and implications for invertebrate conservation.

Output 5.

There will be increased knowledge of the ecology and distribution of the Prosperous Bay Mole Spider.

There is little currently known about the ecology of the Mole Spider. There have been regular surveys by Basil Read, the company contracted to manage the new airport, to assess the distribution of the molehills and information has been collated into a species data review which will be updated at the end of the project into a report.

It is known to be still present and active in areas across Prosperous Bay Plain. There has been a daytime walk over and targeted night search to assess the suitability of other survey

techniques for this species. Although previously an individual spider has been seen out during daylight, it is speculated that this was at a wetter time of year. As discussed earlier, there are a variety of factors potentially affecting observations, although at this stage, any findings, including no-observations, increase knowledge of the species.

We have learnt more about the habitat preferences even through absence and old evidence, and for the first time soil sampling has been undertaken in the Prosperous Bay Plain area to help to inform on habitat preferences of this species. These results will help to inform future management plans for this species and potential impacts of activity within on the Plain.

Originally, it was stated that there would be 52 days of surveying undertaken of this species. This has not been possible, and would potentially cause unnecessary disturbance including compaction and erosion of this friable surface and is no longer viewed as an appropriate indicator for this project.

3.3 Progress towards the project Outcome

Project Outcomes:

- 1) An assessment of the success of conservation work for endemic terrestrial invertebrates and a baseline survey in natural and restored habitats against which future changes can be measured**
- 2) A high-resolution record of conservation work undertaken and endemic species regeneration so that spatial changes can be monitored accurately in the future.**

The Outcome, Outputs and Activities have been honed to provide more SMART activities, which is in progress (as stated at the start of Section 3) and there will be communication between project staff and Darwin to ensure the changes are appropriate and sufficient.

The baseline survey has been completed across a number of habitat types and data provided by this will greatly contribute to current knowledge and act as a measure for future changes, therefore the project has progressed greatly towards achieving the Outcome. Altering the Outcome to reflect the increase in invertebrate identification skills and improving species knowledge will improve the project and Actions for achieving this are already well underway.

This work will feed into long-term management plans for both restoration and natural areas, where invertebrate associations and requirements will be taken into account and management techniques altered to improve conservation efforts for this important aspect of the St Helena biota.

3.4 Monitoring of assumptions

The assumptions in how the project will meet its objectives have not changed. Some have been realised during the year.

Endemic invertebrate species may be negatively impacted by the survey.

The collection rate of the malaise traps was assessed at the beginning of the trapping sessions, with a three day collection being increased to seven days after it was determined that only a small number of specimens were collected as discussed in AR1. Specimen collection varied throughout the year, as expected in line with seasonal variation. However, there were instances of large catch rates which contributed to the decision to close the traps slightly early (discussed in Section 3.1, Activity 1.3).

The locations of the traps were chosen to minimise unintentional harm to surrounding vegetation, including some locations where access was already established for another project (DPLUS051). We believe this was effective in preventing additional vegetation damage.

Intentional damage to monitoring sites by external parties.

The traps were closed in October 2017 without serious vandalism to the monitoring sites. There was only one incident of damage that was likely attributable to vandalism where a trap was bent which required replacement.

Change of personnel

The project has again experienced changes in personnel this year, some of which was reported in HAR2. Mike Jervois joined the project in May 2017 as Project Manager (PM)/Surveyor and Sheena Isacc began in June 2017 as the new Assistant Project Officer. David Pryce left the project in August 2017 for personal reasons which was a huge loss to the project in terms of entomological expertise. However, the remaining staff had by then become familiar with a lot of the material, particularly Liza Fowler who has been a continuous presence during the changes in this project and has a wealth of experience from this and the previous “Bugs on the Brink” project as stated previously. With the resources that have been collated during the project and support from the newly formed Steering Group, as well as experience from the previous disruptions, the project has continued to progress. As discussed in section 3.1 Action 1.4, the savings from the PM role was put towards an additional staff member, Natasha Stevens, to help drive sample sorting forward. In December 2018 Mike Jervois was offered the role of Head of Conservation within the Trust, which could have potentially further disrupted the running of the project. However, Amy-Jayne Dutton joined the project, who was a member of the project steering committee, has experience working with invertebrates and successfully completed a previous Darwin Plus project for the Trust (Conservation of the Spiky Yellow Woodlouse and Restoration of Black Cabbage Tree Woodland, DPLUS025) which ended in March 2017. The reappointment of a member of staff who had worked on St Helena for the Trust before, who was present during the start the malaise trap survey and a member of the steering group, along with Mike continuing to support the project in his new role, has avoided further disruption and demonstrates ‘lessons learnt’ by the Trust in maintaining balance within the project.

3.5 Project support to environmental and/or climate outcomes in the UKOTs

This project helps to establish the value of terrestrial invertebrates on St Helena, not only for the island but in a global context. The huge number of species endemic to this island is a global resource, and consideration of the needs of these species should be incorporated into long-term strategic planning for the island. This project is working towards improving knowledge the species present on St Helena to provide the best information for informing strategic planning.

This project maintains links to MAISG, with their co-chair Vicky Wilkins on the steering group, which also helps to link the project to the rest of the UKOTs in the region (<http://www.maisg.com/>).

The invertebrate work on St Helena supported by Darwin, particularly this project, has provided the evidence to establish a better framework for evaluating invertebrate conservation on other UKOTs, as presented at the conference commented on in Section 3.1, Activity 1.5, which also involved people from other UKOTs.

Through visits this year Howard Mendel has specimens of at least eight species which need describing, and Timm Karisch estimates he has found five species new to science which demonstrates the continuing progress in understanding the fauna of St Helena.

This work directly contributes to:

- Articles 7 (Identification and Monitoring), 8 (*In situ* conservation), 12 (Research and training), 13 (Public education and awareness) and 17 (Exchange of information) of the Convention on Biological Diversity
- Objective 15 of the St Helena National Environmental Management Plan “Safeguard St Helena’s environment ... through effective environmental management including through improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity.”
- St Helena Invertebrate Conservation Strategy 2016-2021
- National Goal 3 of the St Helena Sustainable Development Plan “Effective management of the Environment”
- Principle 2 of SHG’s Land Development Control Plan “Conserve and manage the natural... heritage of the island
- SHG Environment Charter “Ensure the protection and restoration of key habitats (and) species”
- St Helena National Trust Strategic Plan

This project is making substantial strides forward in improving capacity on St Helena. We now have a team of invertebrate specialists who will be able to lead on further invertebrate work to ensure that all elements of the natural environment are taken into account with conservation works. The assembly of a complete invertebrate identification toolkit is of huge benefit to the island, as terrestrial invertebrates are such a key area of biodiversity for the island.

4. Monitoring and evaluation

The Activities and Outputs of the project directly improve the knowledge and understanding needed to achieve the Outcome of the project. Day-to-day monitoring is undertaken by the PM, who identifies short term activities and needs which feeds in to achieving the activities of the project. This is also influenced and monitored by the stakeholders. The formation of a steering group has allowed for greater communication between project partners and stakeholders regarding the progress of the project, as well as a greater influence on pending actions. This has given all persons involved more opportunity to monitor and evaluate actions and ensure work undertaken is progressing towards achieving project goals. Different project partners bring different expertise to the project but each is valued equally and monitoring by all partners is encouraged and appreciated.

The indicators for this project are under review for the Logframe Change Request and this will ensure that they are both measurable and appropriate for final part of the project.

Within the project the use of the digital resource and the varying experience and expertise of the staff members, has allowed for internal confirmation of identification of species as progress is made. Staff are encouraged to check their own mistakes and to check others' work as they go, with members of the steering group and other specialists also available where verification of more difficult specimens is needed.

5. Lessons learnt

While the change in staff could be seen as further problems for this project, it actually provided an opportunity to assess the successes and needs of the project, with 'fresh eyes' to evaluate where the project was actually at, rather than where it should be. This allowed issues to be resolved and aims to be honed more to staff's abilities. The balance of the project was maintained by having a handover between staff. Subsequent changes within the project, including new staff were far less disruptive as there was clearer project direction, communication and support.

For future projects it is clear that the aims and activities need to be achievable and adaptable in changing circumstances and it would be prudent to ensure that the success or failure is less dependent on the highly specific skills of a single individual. Unforeseen circumstances are unavoidable but building resilience into the project plan aids successful completion. The value of the support of project partners is clear, with the steering group providing invaluable help, and we recognise that this has helped to push the project forward, along with the stability of a single core staff member, Liza Fowler.

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

The role of the project partners has been clarified (Section 2) and their input is invaluable in moving the project forward. Minutes of the steering group meeting have also been reported as evidence of closer collaboration and project guidance.

A revised Logframe was submitted in January 2018, but comments on this including further adjustments required were not received by project staff until mid-March 2018. This did not allow enough time for further adjustments and communication with Darwin and approval before the Annual Report deadline. The potential changes have been referred to in Section 3 (3.1, 3.2, 3.3) as necessary and further amendments to the Logframe have been submitted to Darwin on 9th April 2018. These will include inclusion of the research aims (impacts of non-native predators, seasonality, climate change) as activities as requested in AR2R. The Logframe changes will allow assessment of Project achievements to be far more straightforward for the Final Report. This has been a learning process, delayed slightly by further changes in staffing,

but has been a valuable exercise for staff and we appreciate Darwin's patience and support while we make the necessary changes.

7. Other comments on progress not covered elsewhere

The project has recovered from potential doom in the last year. It reached a managerial crisis in April 2017 when the financial records were in disarray, and hadn't been reconciled for two financial years. It was clear that the Trust was on the brink of losing the project and having the grant agreement terminated. Mike Jervois was brought in as PM who got the project finances and management back on track and regained confidence from Darwin. Mike also created a steering group which bolstered confidence in the project and employed additional staff. The actions of Mike, and more recently Amy, have stabilised the project and have ensured that internal checks will be in place to avoid a recurrence in any other project undertaken by the Trust.

8. Sustainability and legacy

This project is a high profile project of the St Helena National Trust, with regular interaction with the general public. Staff are often shown photos or brought invertebrate specimens for identification (e.g. Hairy Field Spider Feb 2018, beetle grub photo March 2018). Several newspaper announcements have been made throughout the year, particularly around the arrival of entomological experts (Annex 3.3p Newspaper announcement of Timm's arrival) Events held to publicise the work of the project include events at the local Library and Careers fair, which resulted in four individuals volunteering for work experience as stated in HAR2. Attendance at the St Helena Conference has also increased the profile of the project even more both nationally and internationally. There has also been more activity on the Facebook page with increased interest and interaction.

The exit strategy for the project remains good.

This project will provide a substantial legacy after it has concluded. The island will be far better equipped to move forward with invertebrate research in the future thanks to the resources and training from this project. We have three staff who are now highly knowledgeable on the invertebrates found on this island, there is a well-equipped lab space in the museum for local and international research on the invertebrates to be undertaken and this will be complemented by an in-depth digital resource set. The long-term survey undertaken by this project will provide specimens and information which will be useful far into the future as different groups are examined by experts, and there will be a far better understanding of the current status of many more invertebrates.

The St Helena National Trust is an organisation which recognises the value of invertebrates on the island and is dedicated to invertebrate conservation beyond the life of the project.

9. Darwin identity

The Darwin logo is well used and recognised on St Helena, with the Darwin identity promoted wherever possible. There are a number of Darwin funded projects on St Helena which provide regular reference and exposure to the Darwin Initiative and its logo, as well as the legacy of t-shirts, etc from previous projects. The vehicle in use by the project has the Darwin logo on the door and is highly visible as the project team visit different sites across the island.

The project reference and Darwin logo was used in the press release for the visit of Timm Karisch in March 2018, and the Darwin funded project was referred to in a profile of Liza Fowler, our Education and Project Officer by the International National Trust Organisation (INTO), which was also reported in the local Sentinel paper (Annex 3.3q, <https://intoorg.org/30421>).

10. Project Expenditure

Table 1: Project expenditure during the reporting period (1 April 2017 – 31 March 2018)

Project spend (indicative) in this financial year	2017/18 D+ Grant (£)	2017/18 Total actual D+ Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others (Please specify)				
Overseas Staff member relocation Faune Terrestre Buglife Admin Costs				
TOTAL				

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2017-2018 – if appropriate

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
<p>Impact</p> <p>St Helena has all the skills and resources to identify invertebrates and conservation efforts work in favour of endemic invertebrates.</p>		<p>There is a highly valuable set of resources for invertebrate identification which will be a long-term provision for St Helena. Understanding of the diversity, abundance and distribution of invertebrate diversity of St Helena is improving during the sorting of samples of invertebrates from across the island. Information from the island-wide survey, and visiting experts, will enable appropriate conservation management to be undertaken in the future which takes into account invertebrate needs.</p>	
<p>Outcome</p> <p>1) An assessment of the success of conservation work for endemic terrestrial invertebrates and a baseline survey in natural and restored habitats against which future changes can be measured</p> <p>2) A high-resolution record of conservation work undertaken and endemic species regeneration so that spatial changes can be monitored accurately in the future.</p>	<p>0.1 Conservation management will be improved in terms of the Island's endemic invertebrates.</p> <p>0.2 A complete invertebrate identification toolkit will have been assembled.</p> <p>0.3 The three main areas of restoration work undertaken will have been mapped at high resolution.</p> <p>0.4 Areas of natural regeneration will have been recorded at high resolution.</p> <p>0.5 There will be increased knowledge of the ecology and distribution of the Prosperous Bay Plain Mole Spider.</p>	<p>Indicators changed as part of Change Request 6. Confirmation pending.</p> <p>Resources for invertebrate identification are far better than those available before the project began. These have already been successfully used for identification of a variety of invertebrate species and specialist visits have improved knowledge of target groups, with extensive data now available from an 11 month survey. This dataset will improve knowledge of the presence of invertebrates in different habitat types and conditions, to provide assessment of the impact of conservation efforts.</p> <p>Habitat mapping protocols have been established and priority sites identified.</p>	<p>Finish sample sorting</p> <p>Analyse data and produce reports on findings, including recommendations for future conservation management considerations for invertebrates</p> <p>Finish mapping habitat areas to use in conjunction with analysis of invertebrate data</p> <p>Make database available online</p>

		Knowledge of mole spider ecology and distribution has been summarised and improved by further surveys.	
Output 1. Conservation management will be improved in terms of the Island's endemic invertebrates	<p><i>(a) The invertebrate survey will be completed and all identifiable specimens identified to species level or morphotype.</i></p> <p><i>(b) An assessment of the health of key areas of endemic plants for their associated invertebrates will have been made.</i></p> <p><i>(c) An assessment of the success of conservation work in terms of the associated endemic invertebrates will have been made.</i></p>	<p>Indicators have changed as part of Change Request 6.</p> <p>Invertebrate survey have been concluded and final samples are being sorted (Evidence provided in section 3.1 of report), in order to analyse data and produce reports on findings</p>	
Activity 1.1 Visit the Royal Museum for Central Africa in Tervuren, Belgium to photograph		<p>(Report completed or progress on activities that contribute toward achieving this output), and what will be carried out in the next period</p> <p>Cancelled as part of Change Request 3</p>	
Activity 1.2 Visit the Natural History Museum in London to photograph specimens		Completed	
Activity 1.3 Conduct a year-long invertebrate survey		Completed, closed after 11 sampling periods	
Activity 1.4 Identify specimens		75% complete at the end of March and on schedule to be completed in May	
Activity 1.5 Produce reports		To be carried out in next period	
Activity 1.6 Re-assess any Red Listed species where new data may affect the listing		To be carried out in next period	
Activity 1.7 Make data available		To be carried out in next period	
Output 2. A complete invertebrate	<p><i>(a) A near-complete set of keys will have been compiled and tested. [It should be noted that this will not be possible for some groups where there</i></p>	<p>Indicators have changed as part of Change Request 6.</p> <p>Keys have been produced and tested where specialists are available.</p>	

<p>identification toolkit will have been assembled.</p>	<p>is considerable taxonomic uncertainty or where the species require highly specialist knowledge, skills or techniques to identify them].</p> <p>(b) 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.</p>	<p>Reference collection will be added to with specimens from the malaise trap surveying. Currently 30% of species represented, but this will be improved following sample sorting.</p>
<p>Activity 2.1. Take data from Outputs 1.1, 1.2 and the Outputs from the 'Laying the foundations' projects to create resource set</p>		<p>Resource set created and being continuously added to.</p>
<p>Activity 2.2 Create accurate, tested invertebrate keys.</p>		<p>Keys produced, picture key produced and improved for staff usage.</p>
<p>Activity 2.3 Improve the field guide with new information and photographs.</p>		<p>28 new sections written and photographs added</p>
<p>Activity 2.4 Improve the Museum of St Helena reference collection.</p>		<p>30% of species present on St Helena represented, more will be added from survey specimens following specimen sorting</p>
<p>Activity 2.5 Make the contents of the reference collection available online.</p>		<p>To be carried out in next period</p>
<p>Output 3.</p> <p>The three main areas of restoration work undertaken will have been mapped at high resolution.</p>	<p><i>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.</i></p>	<p>Indicators have changed as part of Change Request 6.</p> <p>Mapping will be changed to monitoring and improving current maps where appropriate, working with DPLUS052 mapping project</p>
<p>Activity 3.1 Map the Millennium Forest</p>		<p>Methodology defined and monitoring to be undertaken</p>
<p>Activity 3.2. Map High Peak</p>		<p>Methodology defined and monitoring to be undertaken</p>
<p>Activity 3.3 Map Blue Point</p>		<p>Methodology defined and monitoring to be undertaken</p>

Activity 3.4	Make data available	To be carried out in next period
Output 4.	Areas of natural regeneration will have been recorded at high resolution.	<i>At least 26 days will have been spent accurately mapping at least five areas of accessible natural regeneration.</i>
		Indicators have changed as part of Change Request 6. Mapping will be changed to monitoring and improving current maps where appropriate, working with DPLUS052 mapping project
Activity 4.1	Map Flagstaff Scrubwoods	Methodology defined and monitoring to be undertaken
Activity 4.2	Map Pipe Path Scrubwoods	Methodology defined and monitoring to be undertaken
Activity 4.3	Map Signal House Scrubwoods	Cancelled as part of Change Request 6 due to access difficulties
Activity 4.4	Map Peak Dale Gumwoods	Methodology defined and monitoring to be undertaken
Activity 4.5	Map Blue Point Scrubwoods	Methodology defined and monitoring to be undertaken
Activity 4.6	Make data available	To be carried out in next period
Output 5.	There will be increased knowledge of the ecology and distribution of the Prosperous Bay Mole Spider.	<i>At least 52 days will be spent over the period of one year accurately surveying the Mole Spider.</i>
		Indicators have changed as part of Change Request 6. Monitoring has been undertaken and ecological knowledge summarised
Activity 5.1	Repeatedly map the molehills to see spatiotemporal movement	Surveys have been undertaken
Activity 5.2	Assess mole spider population size	Complete walk-over to be carried out in next period
Activity 5.3	Make data available	To be carried out in next period

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed) - if appropriate

N.B. 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.

Not completed as Logframe changes are pending

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: .			
Outcome:			
Output 1 <i>Add more outputs as necessary</i>	1.1 1.2 1.3. etc.	1.1 1.2 1.3. etc.	
Output 2	2.1 2.2	2.1 2.2	
Output 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 3 Onwards – supplementary material (optional but encouraged as evidence of project achievement)

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	