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	DPLUS052
Project title	Mapping St Helena's Biodiversity and Natural Environment
Territory(ies)	St. Helena, South Atlantic Ocean
Contract holder institution	Environment and Natural Resources Directorate, St Helena Government
Partner institutions	Environment Systems, Aberystwyth University, South Atlantic Environment Research Institute
Grant value	£212135
Start/end date of project	1st April 2016 – 30th June 2018
Reporting period (e.g., Apr 2017-Mar 2018) and number (e.g., AR 1,2)	April 2017 – March 2018 AR2 (004) F1 version
Project leader name	Derek Henry & Samantha Cherrett
Project website/blog/Twitter	None
Report author(s) and date	Samantha Cherrett 31/04/2018

1. Project overview

St Helena is one of the most remote islands in the world. It is situated in the South Atlantic Ocean 1200 miles from Southern Africa and 1800 miles from South America. The Island's first international airport opened to commercial flights in October 2017.

Mapping St Helena's Biodiversity and Natural Environment will produce a series of high-detail island-wide maps and datasets, showing a baseline of habitat types, soils and other associated environmental information. The purpose of this information is to support island conservation and future management activities by helping to understand biodiversity, species (particularly endemic) geographic distribution and dynamic, protect and restore native habitats, control invasive species, aid sustainable agriculture, land resource planning and water resource management.

These maps and dataset outputs will be derived from a combination of analysis of multi-spectral satellite imagery, ground-truthing field work and analysis of relevant historical and current datasets available. Additionally, training will be provided to local stakeholders in order for this data to be updated over time, via a 'living map'; subjects include an introduction to remote sensing and how environmental data is derived, field work methodology and data collection, mapping techniques. The data will be available for any organisation involved in decision making to do with land and species management.

2. Project stakeholders/partners

In year two of the project, involvement by Environment Systems and Aberystwyth has increased to the level that was expected prior to the year one 'slow start'. Both have been involved in decision making on imagery, methodologies and fieldwork/workshops. Note that a trip by both Environment Systems and Aberystwyth University is booked in for 7-14th April and therefore not covered in this reporting period, but may be referred to throughout the document.

Following their visit in February 2017, and the acquisition of satellite imagery from January 2017, Environment Systems have been working on developing the final segmentation and incorporating field data into the work. A 'final' habitat segmentation was sent to us in February 2018, which has had further development on island to improve its accuracy and detail. Additional maps will be produced in the final few months once the habitat data has been checked and finalised on St Helena. A few issues arose with the accuracy of the 2017 imagery in some areas and some additional rectification of imagery was done. Due to IT restrictions on downloading, they only arrived on island in April 2018. Planning continued throughout the second year, in preparation for the second visit in early April 2018 for the Ecosystem Services project aspects.

Aberystwyth University finally made it to St Helena for soil sampling and training, for three weeks in November 2017. During this time, over twelve field days, 72 samples were taken, with an additional 58 in the weeks immediately after the trip. Whilst on island, training, field support and information sessions were attended by 23 people and a presentation to the Environment and Natural Resources Committee was undertaken. The first sets of analysis of the samples was completed on Friday 30th March 2018, with some results available for the second visit in

early April 2018. Additional sampling was also planned for the April visit, based on these results.

Aberystwyth completed the Ascension sampling, training in April 2017 with analysis of the data taking place in year two. Completion of the main soil sampling campaign on Ascension including 84 locations (four full days of sampling were undertaken after a reconnoitre of the island on the day of arrival) covering the main habitat types on the island and some targeted sites of particular conservation interest; the main focus was on the Euphorbia sites including restoration plots, but with samples taken from several sites with M. purpurascens (both at the request of conservation staff). All samples have now been analysed for texture, % C and loss on ignition, moisture, electrical conductivity (EC) and pH, with some additional analysis for base cations was undertaken for high EC samples. Several roots in samples from under well-defined species are being investigated for root fungal endophytes. Several litter layer samples were also taken and may be used in decomposition studies. Jolene Sim (Conservation Team Leader on Ascension Island) noted that “this data will be very useful. Some of the soil samples John collected from around the dying endemic plants had a fungus in it, so we are currently using fungicide to treat this. John and his colleague Gareth Griffith have been excellent not only in providing results, but also giving advice on what fungicides to use and a variety of methods to trial.”

South Atlantic Environmental Research Institute (SAERI) has had less involvement in year two due to the project delays, and the latest re-budget reflected this. Work was postponed until data was available to produce the final maps in year three, however, SAERI did attend the field work on Ascension and provide guidance on metadata and proposed project outputs. A trip to St Helena is programmed for the end of May 2018.

The following stakeholders, departments and organisations have been involved in the project so far;

- ENRD GIS Department: Four members of the GIS team assisted with field data collection in November 2017. The GIS department has also provided datasets and information to aid field work planning and habitat segmentation.
- ENRD Agricultural and Natural Resourced Division: Five staff member from the ANRD department assisted with field data collection in November 2017 or attended training.
- ENRD Environmental Management Division (EMD): Six staff members from the EMD department assisted with field data collection in November 2017 or attended training.
- ENRD Landscape and Ecological Mitigation Programme: Three staff members from the LEMP assisted with field data collection in November 2017 or attended training. Additionally, one LEMP staff member has collaborated directly with this project over the use and incorporation of the habitat classification and data.
- St Helena National Trust (SHNT): Four staff members from the SHNT assisted with field data collection in November 2017 or attended training. Additionally, two members of SHNT have collaborated directly with this project over the use and incorporation of the habitat classification and data.
- Connect St Helena: Connect were unable to attend soil field work and training.
- Arctium (DPLUS051): assisted with field work and attended training in November 2017.
- The following Darwin Plus Projects (duplication of individuals identified above) have been involved in training, data collection and field-based activities: DPLUS029, DPLUS040, DPLUS051, DPLUS059.
- The following BEST 2.0 Projects (duplication of individuals identified above) have been involved in training, data collection and field-based activities: Restoration of Peak Dale’s St Helena Gumwood Forest
- Staff from Ascension Island Government and SAERI attended field work and training on Ascension Island in April 2017.

The main challenges of stakeholder involvement have been time; finding suitable times that multiple stakeholders can attend workshops and meetings. Unfortunately, some interested parties were unable to attend November training and field work due to annual leave and other prior commitments.

Despite this, interest in the project has increased as the project has progressed. Other projects and organisations have requested use of the habitat classification; field days have been undertaken with these individuals to demonstrate how the classification was determined and how the segment have been assessed using it. Subsequently, these individuals are aiming to use the classification and mapping data in their projects, once it's completed and available. It is also hoped that the data will be utilised by SAERI for their Natural Capital Assessment project.

Supporting evidence provided is listed in Annex 3.

3. Project Progress

Progress in year two has been better than year one, especially once the airport opened in October 2017. Unfortunately, there was still a knock on effect to the project timescales. The highlight of the year was finally completing the soil sampling for the project! To help mitigate delays, a two day visit to Environment Systems and Aberystwyth University was undertaken in June 2017, to discuss project progress and planning of future work.

There have been two change requests submitted during year two, both of which have been approved. The contents of the change requests reflect the changes required (financially and with regards to timescales) to adapt to difficulties with access to St Helena which were not anticipated (to this extent) at submission stage. The delays to the project resulted in a knock-on effect to the timescales of deliverables and subsequently, the project was extended by three months to allow for this.

Supporting evidence provided for sections below is listed in Annex 3.

3.1 Progress in carrying out project Activities

Activity 1.1 Sourcing of suitable satellite imagery: Purchase and orthorectification of Nov 2014, Dec 2014 and Jan 2017 imagery (with a resolution on 0.5m) has completed by Environment Systems and delivered to St Helena. Additional free imagery (Sentinel 2) training to be completed April 2018. The training for use of free imagery will be to allow St Helena to monitor change in the future. A procedure needs to be put in place to ensure that new imagery is checked for regularly, made available and incorporated into GIS systems, but this is reliant on IT and GIS staffing (discussed later).

Activity 1.2 Processing of imagery to produce preliminary maps: Environment Systems have now created a segmentation based upon the two 2014 images and 2017 imagery. Fieldwork (a total of 55 days) and supplementary datasets and office based work fed in to support the creation of the habitat map dataset. Soil maps will be delayed due to the delay in field work and will depend on the validation of the accuracy of the historical soil map, which, following field work in November 2017, seems unreliable in places.

Activity 1.3 Review of data held in IMS-GIS Data Centre: completed in year one. The useful data requires QA checking, cleaning and creation/finalising of metadata. Useful datasets (such as the historical infra-red imagery) will be incorporated into the final digital GIS systems.

Activity 2.1 Field surveys for vegetation and habitat mapping. Field surveys for soil sample collections and Activity 2.2 Field surveys habitats, vegetation and soils for remaining data outstanding: During Environment Systems visit in year one, 367 habitat points were collected and subsequent field work in year one by SHG assessed and classified over 450 segments. By the end of year two, 1701 segments had been assessed in the field or in the office (including 55 field days). For soil sampling, 72 soil samples were taken during Aberystwyth Universities visit in November 2017 and a further 58 samples in December 2017 and January 2018 (a total of 21 days). With the exception of some additional soils sampling in April 2018, the fieldwork for this project is considered completed in order to produce the maps.

Activity 3.1 Ground-truthing training and workshops for data collection occur and Activity 3.2 Remote sensing training and workshops occur: Habitat and vegetation workshops were

completed in year one. Soils workshops and training were completed in November 2017, during the three weeks Aberystwyth were on island. During this time, representatives from stakeholders participated in training or supported field work and learnt in the field. Information sheets and videos on these procedures are to be drawn up so that the sampling and classification can be repeated in the future. Additional workshops and refresher sessions can be covered in year three or on request from stakeholder organisations.

Activity 3.3 Monitoring systems developed and training session delivered; Planned for year three following completion of Outputs 1-2. Visit planned for April 2018. This was a little behind schedule, but completed as soon as practical.

Activity 4.1 Preliminary maps updated with survey data to produce final maps; Planned for year three following completion of Outputs 1-3. Final checked version on the habitat data due to be sent to Environment Systems by the end of April 2018.

Activity 4.2 Digital data combined into 'living map'; Planned for year three following completion of Outputs 1-3 and delivery of mapping data.

Activity 4.3 Development of subject specific tools for individual stakeholders; Planned for year three following completion of Outputs 1-3 and delivery of mapping data.

Supporting evidence provided is listed in Annex 3.

3.2 Progress towards project Outputs

Output 1: Satellite imagery sourced and processed resulting in preliminary habitat and soil maps, supported by existing collated geospatial data;

As indicated in section 3.1 all intended imagery to be purchased has been acquired and processed, within budget; we now have imagery from November 2014, December 2014 and January 2017. Project image processing completed in year one. Pleiades imagery captured in 2017 was reprocessed to better represent the topography of the island. All Pleiades imagery were pan-sharpened to 0.5 m.

From these images, a several draft and a preliminary final habitat dataset have been created by Environment Systems. The final draft is the fourth iteration received from Environment Systems (received in February 2018) and is currently being QA checked on St Helena. A review of existing habitat data highlighted that much of it was too detailed or not detailed enough to be incorporated into the map, but has been utilised where possible.

The production of the draft soil map is outstanding due to the late fieldwork and time to process results, as well as needing a final habitat dataset to produce. Existing and historical soil data has been reviewed and has been used mainly for targeting field work as methods used for collection were different, unspecified or targeted for specific end uses (such as agriculture). Any useable data is being incorporated if deemed appropriate by Aberystwyth University.

Between the three images, cloud cover is virtually eliminated and in those areas, an approximate segmentation was produced, to be manually edited, but ensuring that 100% of the island is covered.

The habitat classification was completed for field work (version 6) and was contributed to by several stakeholders, on-island organisations and individuals. It was based on a classification created by a previous project but developed to be more usable in relation to satellite imagery classification. A few amendments are being finalised (such as habitat titles and expected species within them) based on what was found during the field work. Local stakeholders have already shown interest in using this document as a starting point for future habitat surveys and one-on-one field sessions with them as to how it was used in the map creation has boosted confidence that the categories and data collection methods are suitable and accurate to future habitat survey work.

The indicators for this output are still relevant and this output is on course to be achieved.

Output 2: Habitat and soil maps ground-truthed and refined with field data and local expertise;

Habitat and soil fieldwork, both by visiting project team and later on-island project team has been completed. As mentioned in section 3.1, a total of 55 field days were completed for habitat ground-truthing and 21 days of soil sampling. A further set of soil sampling is planned for April 2018 to check and add to the existing results.

Following the on-island workshop and the training held on collecting data for remote sensing, we continuously provided Environment Systems with habitat survey information, derived from on-site field work and visual interpretation. Each delivery of new survey information allowed them to identify classified areas and habitats which did not correlated with the survey findings, and adjust the rule-base accordingly.

Since the delivery of the last 'final' habitat dataset in February 2018, the Darwin Project Assistant on St Helena has been checking and updating the segments, adding data and additional levels of detail where it was not possible to identify these via remote sensing, or the data was incorrect; The unmerged version of this file has 146998 segments which are being reviewed as best possible. It is likely that once the data becomes available, additional local expertise will feed in to improving it in the future.

The indicators for this output are still relevant and this output is on course to be achieved.

Output 3: Workshops held on remote sensing techniques, field techniques and monitoring systems creation;

Workshops for remote sensing and habitat related work were held in year one. Presentations and training on soil fieldwork and sampling techniques were held in November 2017, along with a presentation to the Environment and Natural Resources Committee, summarising the soil sampling being undertaken. During the planned April 2018 visit in year three, the remaining workshops are planned along with a presentation to the Councillors. Additional workshops and training are planned for SAERIs visit in May/June 2018 and refresher sessions and sessions for new staff on the above workshops can be held once the final data is completed and disseminated.

Feedback forms were issued but few returned. New forms will be sent after the April 2018 visit, hopefully with a better response rate. Training certificates will be issued upon completion of all training and workshops.

The indicators for this output are still relevant and this output is on course to be achieved.

Output 4. Development of final maps and specific management tools informed by the baseline data; the majority of work remaining for the project relates to Output 4.

During the April 2018 visit by Environment Systems and Aberystwyth, we aim to hold sessions to discuss the most useful tools and ecosystems services data to be created. As previously stated, the final habitat dataset needs completing before the soils and additional environmental maps can be created. This is due to be by the end of April.

Many of the datasets created and information gathered as part of the project requires the creation or finalising of metadata before integration with the regional management systems. SAERI will visiting for two weeks end May-early June 2018 to assist with the creation of the living map and development of and any other assistance with developing systems and procedures for future management and update of the data.

There is some uncertainty as to the post-project data management and data distribution, which is discussed in more detail in section 8.

The indicators for this output are still relevant.

This output is likely to be achieved but due to the delays to the project, the last three months of the project will be very busy completing this and relevant associated documentation. Additionally, the Darwin Project Assistant will become part-time, stretching resources for this period.

Supporting evidence provided is listed in Annex 3.

3.3 Progress towards the project Outcome

Project Outcome: Production of St Helena's most comprehensive environment maps showing the functioning of habitats and soils; creating an accessible digital system to utilise RS for now and future ecosystem services monitoring; develop transferable skills, produce factual maps, concise baseline data and adaptable tools that are used for decision making, informing policy and combined to solve existing and future problems faced locally.

Good progress has been made in year two, towards the project Outcome so far; imagery, habitat classification, fieldwork, workshops, training, dataset creation and historical data analysis that feed into the production of the maps are all completed or near completion (evidence provided throughout this report).

Perhaps not as we originally planned, we will have a system in place for accessing and updating the data, and should therefore achieve the project Outcome by end of funding.

We have made Darwin aware of all the major issues and delays as soon as they have occurred or we became aware of them we have therefore tried to adapt the project around this, and submitted change requests to reflect this.

The indicators for this output are still relevant.

3.4 Monitoring of assumptions

Imagery Assumptions (cost and suitability): No longer a primary concern to year three work. Freely available data for post-project monitoring and data updates will be discussed in April 2018.

Stakeholder organisations continue project involvement: No longer a primary concern to year three work. Over the past two years, involvement and interest for the project and its outputs has steadily increased. At this stage of the project, stakeholders are keen to see the final outputs and understand how they will be delivered and maintained at the end of the project.

Existing data comprehensive enough for field work not to be required: no longer a concern, data established as not detailed enough or too detailed.

Travel; No longer a primary concern to year three work, but a low-medium risk for planned but yet-to-be taken trips. The airport is now open (one flight a week) and travel to St Helena is possible by air and the costs known; wind shear and delays to flights due to weather is still possible. The project budget has been amended to reflect these changes. Visiting project partners have been asked to ensure adequate insurance is in place to cover costs from unexpected delays.

Outputs are not comprehensive enough:

As mentioned in last year's report, and following additional field work, the visits from Environment Systems and Aberystwyth have helped to assess what the likely quality of outputs from the project will be.

In terms of habitat data, we have established that the habitats on St Helena are very dynamic, don't follow the 'rules' expected and that the steep terrain will affect the level of detail we can achieve using remote sensing. Additionally we now have a better understanding of how similar some habitats may be and that manual amendments to data may be required. Emphasis on a process for end users to update the mapping data is being more seriously considered due to the number of segments and classifications on the latest habitat dataset, and the potential for errors.

In terms of soil data, stakeholders now have a greater understanding of what is being sampled and why, how the samples will feed in to produce the map and how accurate this may be.

Overall, the stakeholders on island understand that the outputs are not intending to be 100% perfect and detailed enough to solve all problems, but will act as a baseline and starting point for future work and provide evidence of conditions and environmental conditions, some of which may need to be investigated further.

This should remain as a medium risk.

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

At present, there has not been significant physical 'final' data output for the project to contribute to strategic long-term outcomes, these will be available and distributed in the last three months of the project, however the habitat classification (v6) is being used by external organisations and other departments in their environmental work already.

This year a third presentation to the Environment and Natural Resources Committee, to introduce the project and explain the outputs and how they may be able to support government work was undertaken during the Aberystwyth soil sampling visit. Further presentations to raise the profile of the project and its outputs are planned towards the end of the project and new departments have been identified who may be able to use the data to support their government work and aid island land resource planning.

As mentioned elsewhere, other current on-island projects are awaiting the final datasets for use in their work, including other Darwin Plus Projects who may mention this in their annual reports. To support these projects, we have also provided additional field days to compare methodologies, existing data and their requirements, to help target our outputs to be of the most use for everyone.

4. Monitoring and evaluation

This is covered in other sections.

The logframe outputs and activities are robust enough to mark the project progress against, and along with the list of project partner responsibilities included in their organisations MOUs, gives targets for completion for us to mark our developments against.

Communication both with the project team at regular and key points of the project have continued. Stakeholders on island have been informed of all fieldwork planned and consulted in areas of their expertise.

5. Lessons learnt

Our first year lesson of project flexibility continued into year two as we were still adapting to the continued uncertainty surrounding flights. This has resulted in continued flexibility with timescales, but I believe we have coped well, having completed several tasks we set out to finish in year two.

During the soil sampling field work, it became apparent that the logistics of finding land owners and acquiring written permission for sampling is not a quick and easy process. Because of this, the need for very detailed fieldwork plans (and their distribution to all interested/required stakeholders) was necessary, and our fieldwork went remarkably to plan and worked very efficiently. This has helped other researchers coming to St Helena for unrelated fieldwork as we were able to advise them on the best process. We have also learnt a lot about the rules and regulations relating to taking samples on aeroplanes.

Another lesson learnt is the need for adequate personnel on the project at key times. At the start of this project, it was envisaged that short term experts and field workers would be sufficient to complete the work. Fortunately, we managed to recruit a Darwin Project Assistant on a more permanent basis, and having a second person with long term project involvement and local knowledge was invaluable. It is recommended that future projects to budget for adequate or additional staff for the duration of the project.

We also learnt the importance of carrying backup equipment, as during field work, our main soil corer broke twice. The first occasions resulted in us frantically trying to find a welder, but the second time, the damage was not fixable and the main corer was rendered unusable. Fortunately we had a backup corer as we were in a quite a remote location at the time.

One major change to finances for the year was a change to the St Helena Government divided costs such as utilities and IT charges; this was not budgeted for when the project was written in 2015, but fortunately, a re-budget meant that these charges could be covered. Future Darwin Plus projects should be made aware of this.

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

The Annual Report Review did have some queries for the Project Leader – whilst listed as 'No response needed' we have responded in the previous half year report and the details are provided as evidence (Annex 3).

No further explanation above details in this half year report to comments 1 (Fusion of optical and radar data) and 2 (evidence to planning field work) are felt necessary at this stage, but we would be happy to provide if requested.

With regards to comments 3 (plan for sharing the data) and 4 (long term data management), this is still a major concern for the project and discussed in further detail in section 8.

Overall, ourselves and the project team were very happy with the previous review, considering the delays we had had to the project and slow progress made. It was encouraging that the reviewer felt positive about the project progress.

7. Other comments on progress not covered elsewhere

No other comments on progress, not covered elsewhere.

8. Sustainability and legacy

As discussed in this and previous reports, ongoing staff and departmental restructuring changes within SHG it is uncertain at this stage as to the most suitable exit strategy and best placed data manager. We have raised two options with management and the IT department for the best way of making digital data available in the future and have not really had adequate contribution towards a solution.

At time of writing this annual report, no GIS Manager has been recruited (we have been told this is now in progress) or alternative staff member/s identified for data maintenance. There has been no input yet from the IT department in relation to IT support for developing the systems envisaged at time of writing the project plan. It is hoped that a suitable solution will develop in the following weeks.

The preferred outcome is the development of the web-GIS system and PostgreSQL databases for data which will be maintained by GIS with input from stakeholders (as suggested in the half year report). There are two ways of doing this, one which could benefit the GIS department and potentially the whole government, the second being just developed for Environmental departments only on individual computers. This can only be done with the support of IT and continued commitment from the GIS department.

In the absence of long term data management commitment, the option at present is the development of standalone projects which will be installed on individual's computers. This is not ideal as it requires more time for updates and is a backwards step in terms of data management and distribution, but without long term support, is the only practical solution at present. We are reluctant to invest time in postgresql and WebGIS training if the knowledge is likely to be lost and the developed systems become unusable; standalone GIS projects will need less training as users on island are already familiar with the concept and use the software already. Knowledge is more likely to be retained.

It saddens us that we have not yet agreed a solution for the data distribution and management post-project, and hope that whatever solution is implemented ensures the data is still used to its maximum potential in the future.

On a more positive note, we have made steps in raising awareness of the data outputs and how they are derived, from this project, including senior government managers and councillors. We hope that by informing senior officials as to the availability of the data, and getting the data used in key decision making processes that it will require it to be a dataset that's maintained, because it has been used for strategic level decisions.

9. Darwin identity

Previous Darwin projects have raised awareness on this small island and so governmental staff, stakeholders, councillors and local population are familiar with its remit and its value to island work.

Unfortunately, this project doesn't currently have much that we can update the island with exciting news about its development as the work to date has been data collection, analysis and draft data. As data and final mapping datasets filter though in the past few months we will increase the awareness campaign and include updates in available newsletters.

In year two we wrote an article for a Darwin Newsletter and also two for the Directorate Newsletters. As previously mentioned, a short presentation was given to the Environment and Natural Resources Committee (ENRC).

Internal documentation and presentations carry the Darwin logo and logos of partner organisations. Few published materials and physical products have been produced but those that do recognised the Darwin Initiative.

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)				
TOTAL				

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

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
Impact To create robust data and systems to support the long term strategic planning, development and adaptation of St Helena's public, private and voluntary sectors for environmental and climate change management.		Development of habitat classification for long term use. Data collection and creation of draft datasets: satellite imagery, historical data, new datasets for the maps, field data. Ongoing development of training and support documentation for future and repeat work.	[redacted]
Outcome Production of St Helena's most comprehensive environment maps showing the functioning of habitats and soils; creating an accessible digital system to utilise RS for now and future ecosystem services monitoring; develop transferable skills, produce factual maps, concise baseline data and adaptable tools that are used for decision making, informing policy and combined to solve existing and future problems faced locally.	0.1 Imagery acquired for use and combined with existing harvested data. 0.2 Field methodologies, mapping methods and classifications designed, understood and implemented. On-going strategy developed. 0.3 Training completed for minimum of one training or workshop session for at least one participant per stakeholder organisation. Skills for surveying and analysis acquired. 0.4 Surveying completed for soils and habitat. Final summary reports for each created. 0.5 Final non-editable and paper maps produced. 0.6 Living maps and subject specific tools, maps and data layers created	0.1 No further imagery purchased. Metadata written but not yet submitted – to be done in bulk. Completion of 2017 satellite imagery rectification and recreated segmentation. 0.2 Methodologies for habitat classification were adapted during field work. Final classification subject to tweaks; this version is also now currently being used by SHG and other organisations. Strategy and methodology documentation still to be finalised. Habitat classification (v6) finalised and used for field work. 0.3 Training for remote sensing and habitat projects aspects completed in year one. Training participation attendance sheets for completed year two soil fieldwork and presentations provided.	No further work to be done with existing imagery or habitat segmentation. Additional environment and soil maps to be created following completion of habitat map editing on St Helena. Training on download and processing of new free Sentinel 2 imagery (April 2018) Remote sensing, habitat data, ecosystem services, soil data workshops and presentation in April 2018. Minor amendments to habitat classification (v7) due at end of project. Methodologies, final reports and other key relevant documentation to be finalised (ongoing until end of

		0.4 Surveys complete. Summary reports due year three. 0.5 In progress – year three 0.6 In progress – year three. Workshops early April 2018	project)
Output 1. Satellite imagery sourced and processed resulting in preliminary habitat and soil maps, supported by existing collated geospatial data	1.1 Acquisition of suitable satellite imagery, within budget 1.2 Processed imagery used to produce a preliminary habitat and soils map. 1.3 Collated soils, habitat and species data from assessment of existing data held on island. Assessed for usefulness to identify potential additional field work. 1.4 Classifications and field surveys designed for habitat map	1.1 Completed. Purchase and orthorectification completed. Additional free imagery training to be completed April 2018. 1.2 Final computer-based iteration of segmentation based on 2014 and 2017 imagery completed and refined following field work. Soils mapping ongoing due to travel delays. 1.3 Completed in year one. Formalising the records of useful data still to be completed and metadata created (if missing) and submitted to the IMS-GIS Data Centre with any new data. 1.4 Version 6 of the habitat classification completed and used for field work, with assistance from workshops in year one and consulting island experts in year two. A version 7, with minor amendments to descriptions and titles will be completed by the end of the project. This will be available to all stakeholders for use in future work. Relevant evidence in Sections 2, 3.1, 3.2 and Annex 3 Indicators are still valid.	
Activity 1.1 Sourcing of suitable satellite imagery		Completed.	
Activity 1.2 Processing of imagery to produce preliminary maps		Completed. Final draft of habitat map dataset provided by Environment Systems February 2018. Further review, QA and improvement to be completed by St Helena by end April 2018, to enable other environmental maps to be produced.	
Activity 1.3 Review of data held in IMS-GIS Data Centre. Visit to SHG archives and department offices to search for other historical non-digital data. Create digital versions of useful data.		Review completed. Digital data to be cleaned; metadata forms to be completed.	
Output 2. Habitat and soil maps ground-truthed and refined with field data and local expertise	2.1 Practical field work for vegetation and soils ground-truthing in areas of uncertainty involving project team where necessary. Supplementary soil analysis.	2.1 Habitat fieldwork completed year one. Soil fieldwork completed November 2017. Preliminary habitat map currently being refined. 2.2 Habitat fieldwork completed year one. Soil fieldwork completed December 2017. In-kinds time has been provided by local stakeholders for field work.	

	Preliminary map refined. 2.2 SHG and available field based staff in stakeholder organisations complete field work for ground truthing and collate all existing data required to fill data gaps.	Relevant evidence in Sections 2, 3.1, 3.2 and Annex 3 Indicators are still valid.
Activity 2.1 Field surveys for vegetation and habitat mapping. Field surveys for soil sample collections		Completed. No further habitat data collection planned. Additional soils samples planned for April 2018, by Aberystwyth University.
Activity 2.2 Field surveys habitats, vegetation and soils for remaining data outstanding.		Completed. No further habitat or soil data collection planned.
Output 3. Workshops held on remote sensing techniques, field techniques and monitoring systems creation	3.1 Attendance certificates issued. Feedback gathered for hosts. 3.2 Attendance certificates issued. Feedback gathered for hosts. 3.3 Monitoring systems in place for training. Attendance certificates issued. Feedback gathered for hosts. On island publicity.	3.1 Habitat workshops completed, soil workshops completed. Soil related training on Ascension for AIG and SAERI completed April 2017. Certificates to be issued together. 3.2 Completed. Certificates to be issued together. 3.3 Training on Monitoring Systems programmed for April 2018. Certificates to be issued together. Feedback requested from attendees. Publicity to occur with final outputs, however, presentations and promotion of activities in year two included two ENRD newsletters and a Darwin Plus Newsletter. Relevant evidence in Sections 2, 3.1, 3.2 and Annex 3 Indicators are still valid.
Activity 3.1 Ground truthing training and workshops for data collection occur		Completed. No further habitat or soil data collection planned. Training information sheets to be created for future data collection.
Activity 3.2 Remote sensing training and workshops occur		Completed. Refresher sessions planned for April 2018.
Activity 3.3 Creation of monitoring systems		Planned for year three (April 2018 onwards) following completion of Outputs 1-2
Output 4. Development of final maps and specific management tools informed by the baseline data	4.1 Creation of final maps and integration with regional data management system. Reporting by consultants. 4.2 Creation of 'living map'	Planned for year three (from April 2018) Indicators are still valid.

	comprising geospatial data 4.3 Tools for management of invasive species, water resources, agricultural management habitat conservation and restoration created	
Activity 4.1 Preliminary maps updated with survey data to produce final maps		Planned for year three following completion of Outputs 1-3.
Activity 4.2 Digital data combined into 'living map'		Planned for year three following completion of Outputs 1-3
Activity 4.3 Development of subject specific tools for individual stakeholders		Planned for year three following completion of Outputs 1-3

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

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.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: To create robust data and systems to support the long term strategic planning, development and adaptation of St Helena's public, private and voluntary sectors for environmental and climate change management.			
Outcome: Production of St Helena's most comprehensive environment maps showing the functioning of habitats and soils; creating an accessible digital system to utilise RS for now and future ecosystem services monitoring; develop transferable skills, produce factual maps, concise baseline data and adaptable tools that are used for decision making, informing policy and combined to solve existing and future problems faced locally.	0.1 Imagery acquired for use and combined with existing harvested data. 0.2 Field methodologies, mapping methods and classifications designed, understood and implemented. On-going strategy developed. 0.3 Training completed for minimum of a one training or workshop session for at least one participant per stakeholder organisation. Skills for surveying and analysis acquired. 0.4 Surveying completed for soils and habitat. Final summary reports for each created. 0.5 Final non-editable and paper maps produced. Digital layers produced. Reporting by consultants. 0.6 Living maps and subject specific tools, maps and data layers created. Specific for invasive species control, habitat management, land management and water resource management are utilised by	0.1 Recent imagery purchased, available for use, metadata submitted to IMS-GIS Data Centre. Methodologies circulated. 0.2 Documentation finalised, circulated and agreed by project partners. 0.3 Training manuals produced. Training verified by participation statistics 0.4 Metadata for reports and spatial data submitted to IMS-GIS Data Centre. 0.5 Metadata for final 'static' products submitted to IMS-GIS Data Centre. Reports circulated. 0.6 Stakeholder organisations successfully use these tools for decision making	Suitable imagery is available and licence restrictions do not hinder project aims. Stakeholder organisations continue project involvement.

	stakeholders.		
Outputs: **1**. Satellite imagery sourced and processed resulting in preliminary habitat and soil maps, supported by existing collated geospatial data	1.1 Acquisition of suitable satellite imagery, within budget 1.2 Processed imagery used to produce a preliminary habitat and soils map. 1.3 Collated soils, habitat and species data from assessment of existing data held on island. Assessed for usefulness to identify potential additional field work. 1.4 Classifications and field surveys designed for habitat map	1.1 Imagery provided to SHG 1.2 Preliminary maps provided to SHG and stakeholders by Environment Systems and Aberystwyth University 1.3 Suitable soils, habitat and species data provided to Aberystwyth University and Environment Systems by SHG, including habitat surveys, 2015 1m DEM, 1989 imagery, soil reports, vegetation reports, and other relevant data. 1.4 Classifications agreed by project team and stakeholders involved in long term use.	Suitable cloud-free satellite imagery can be purchased within budget. There is a low risk of the imagery being unsuitable or costly; options have already been investigated by Environment Systems and two WorldView 2 images identified. Additional free imagery has been sourced and only one of the WorldView 2 images could be used should costs escalate. Existing data identified at early stages is suitable and does not require additional field work for ground truthing and sampling. A contingency of local consultancy and field work has been included, should this happen. Medium risk of existing soils map is comprehensive enough and cannot be improved upon although it is expected that this will not be the case. Focus will shift to transferring the historical data to a format upon which it can be used for this project, check the spatial accuracy and develop soils services maps based on existing map after validation whilst substituting with additional soil samples and analysis to measure relevant parameters.
2. Habitat and soil maps ground truthed and refined with field data	2.1 Practical field work for vegetation and soils ground truthing in areas of	2.1 Days in the field catalogued and collected data incorporated into	A low risk that field based staff in partner organisations are fail to or

and local expertise	uncertainty involving project team where necessary. Supplementary soil analysis. Preliminary map refined. 2.2 SHG and available field based staff in stakeholder organisations complete field work for ground truthing and collate all existing data required to fill data gaps.	preliminary map. Data gaps identified for additional field work. Analysis of collected data. On island publicity. 2.2 Days in the field catalogued and collected data incorporated into maps. Samples sent to partner organisations if required	unable to assist at key times. A contingency for local consultancy and field work has been included, should this happen, however stakeholders have proven historical working relationships and have pledged in-kind time.
3. Workshops held on remote sensing techniques, field techniques and monitoring systems creation	3.1 SHG and available field based staff in stakeholder organisations attend workshops and training sessions on field techniques required for successful ground-truthing prior to start of surveying for data gaps. 3.2 Training session on remote sensing techniques 3.3 Monitoring systems developed and training session delivered	3.1 Attendance certificates issued. Feedback gathered for hosts. 3.2 Attendance certificates issued. Feedback gathered for hosts. 3.3 Monitoring systems in place for training. Attendance certificates issued. Feedback gathered for hosts. On island publicity.	Travel costs for off island trainers and trainees is a huge uncertainty at present and the most fluid aspect of the budget, due to the unknown cost of flights from Feb 2016 and potential accommodation and other on-island costs in 2017-2018 after air access. A contingency has been included to allow for increases in costs.
4. Development of final maps and specific management tools informed by the baseline data	4.1 Creation of final maps and integration with regional data management system. Reporting by consultants. 4.2 Creation of 'living map' comprising geospatial data 4.3 Tools for management of invasive species, water resources, agricultural management habitat conservation and restoration created	4.1 Metadata provided to IMS-GIS Data Centre. Reports circulated. 4.2 Creation of map incorporating historical and current data as a basis upon which to add additional data in the future 4.3 Creation of project environment and training with stakeholders involved in each specific aspect. On island publicity.	Low risk that the outputs are not comprehensive enough to fulfil the needs of the department. The key needs of the stakeholders has been discussed to try to identify the most useful information and the development of the living map will allow more data to be added in the future to fill any gaps that might exist

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)

1.1 Sourcing of suitable satellite imagery

1.2 Processing of imagery to produce preliminary maps

1.3 Review of data held in IMS-GIS Data Centre. Visit to SHG archives and department offices to search for other historical non-digital data. Create digital versions of useful data.

2.1 Field surveys for vegetation and habitat mapping. Field surveys for soil sample collections.

2.2 Field surveys habitats, vegetation and soils for remaining data outstanding.

3.1 Ground truthing training and workshops for data collection occur

3.2 Remote sensing training and workshops occur

3.3 Creation of monitoring systems

4.1 Preliminary maps updated with survey data to produce final maps

4.2 Digital data combined into 'living map'

4.3 Development of subject specific tools for individual stakeholders

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.	YES
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.	NO
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.	YES
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.	NO
Have you involved your partners in preparation of the report and named the main contributors	YES
Have you completed the Project Expenditure table fully?	NO
Do not include claim forms or other communications with this report.	