Darwin Initiative/D+ Project
Half Year Report
(due 31ˢᵗOctober 2019)

Project reference	Dplus070
Project title	Oceanographic influences on the Saint Helena pelagic ecosystem
Country(ies)/territory(ies)	Saint Helena Island, South Atlantic Ocean
Lead organisation	Saint Helena Government (SHG)
Partner(s)	British Antarctic Survey (BAS)
	South Atlantic Environmental Research Institute (SAERI)
Project leader	Rhys Hobbs
Report date and number (e.g. HYR3)	HYR3
Project website/blog/social mediaetc.	Website: http://www.sainthelena.gov.sh/dplus070-oceanographic-influences-on-the-st-helena-pelagic-ecosystem/
	Facebook: https://www.facebook.com/sthelenaconservation/
	Project hashtag: #StHelenaPelagicProject

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1. Outline progress over the last 6 months (April – Sept) against the agreed baseline timetable for the project (if your project has started less than 6 months ago, please report on the period since start up to end September).

Output 1: Capacity building

Training has met reporting requirements as outlined in the Annual Report and the focus of capacity building has shifted to retaining and passing on skills as well as expanding on gained knowledge.

A survey for oceanographic principles was designed to assess staff member's confidence about key concepts. Staff were asked to answer questions such as 'I feel confident in archiving data collected during fieldwork' and 'I understand the relevance of oceanographic data that we collect during Dplus070' on a scale from 1 to 5 (with 1 being strongly disagree and 5 being strongly agree). This was given to all staff members in April 2019 to assess knowledge and confidence-gaps in order to target capacity building for the final year of the project. The survey will be given to staff again in December and can be used to assess progress. It can also be used for new staff members entering the section.

Local staff have begun to train new staff members in the skills they have learnt over the course of the project and the project officer is no longer required to upskill new staff.

Output 2: Oceanography

The CTD sampling program has been completed with all stations sampled each month in the last 6 month period. Additional ad-hoc CTD casts were taken in collaboration with other projects when boats had space and time for the additional equipment. All CTD data has been transferred to BAS and processed to produce de-spiked, binned data which is being used for further analyses.

All oceanographic data has been sourced. Oceanographic data has been provided for the analysis of zooplankton data (see output 3) including surface temperature and salinity, at depth temperature and salinity, mixed layer depth, seasonal thermocline depth and average

temperature and salinity across hydrologically important depth ranges. Chlorophyll-a estimates (a proxy for primary productivity) were provided from satellite data. A key challenge which was overcome in the last 6 months was to produce viable chlorophyll-a data for time series stations due to extensive and persistent cloud cover (which prevents the satellites gathering data).

Analyses of remotely sensed data to provide information on the annual cycle, seasonal and inter-annual variability in sea surface temperature and primary productivity (chlorophyll a) at local and regional scales for St Helena and nearby seamounts (Bonaparte and Cardno) has continued. Satellite-derived surface current and wind data is being used as supporting data, and the structure of a manuscript for submission to a journal for peer review has been worked on. The manuscript will form the base for the report for SHG which is planned to be delivered at the end of the project.

Output 3: Zooplankton

Activities 3.1, 3.2 and 3.3 have been completed. The zooplankton sampling programme has been completed and all stations were sampled over the last 6 month period. All 114 zooplankton samples collected over the course of the project have been enumerated. In addition to the zooplankton guide used to identify the zooplankton in hauls, a 'quick look' zooplankton guide has been designed using non-specialist language to give an overview of all common zooplankton groups found in St Helena over the course of the project. Currently photos are being collated to complete the guide before it is published on the SHG website.

Zooplankton data is being analysed in relation to oceanographic parameters (see Output 2) and a manuscript is being prepared for submission to a peer review journal. Analysis suggests that there are no significant differences between stations within individual months; this information has been used to help design the long term monitoring programme (see Output 5).

Output 4: Bait fish

The bait fish sampling programme has been completed with fish sampled for length, weight, sex and stage and 50 stomachs retained each month (Activity 4.1). A viable dataset has been produced although the quota for 200 fish sampled per month was not always met. The sampling effort has been undertaken consistently but during certain months bait has been scarce. The seasonal cycle of bait fish in Saint Helena is currently unknown and therefore fish may not always be present or feeding (a behaviour needed to catch them) at all times of the year. Stomach content analysis has been completed (activity 4.2). Analysis has started using the data collected for Activity 4.3 and 4.4.

Dplus070 has made a strong partnership with international stakeholder Cefas (Centre for Environment, Fisheries and Aquaculture Science) and have combined data gathered under this project and the UK funded Blue Belt programme in order to meet outcomes for both in a more comprehensive way than either would be able to achieve alone.

A Fisheries Management Plan (FMP) for bait is underway and data collected by Dplus070 is providing information on bait fish ecology. Key parameters estimated using this data include size at maturity, length-frequency and other length-based indicators.

Meetings have been scheduled to finalise the structure of the bait FMP with a decision on whether a combined or separate bait ecology section will be included in the full FMP or as a separate report (activity 4.3 and 4.4 for Dplus070).

Output 5: Long term monitoring programme

Using knowledge gained from Outputs 2 (oceanography) and Output 3 (zooplankton) a long term monitoring programme has been devised. The basic proposal is to regularly monitor one fixed location in waters that are representative of those influenced by the island. The purpose of this station will be to monitor change over time and has been chosen as the most representative station of those sampled during the Dplus070 programme.

SHG funds (outside of Dplus070) have been secured to trial the long term monitoring programme in December 2019, while the project is still running. Funding requests have also been submitted as part of a three year financial budget plan for SHG Marine Section which is awaiting approval in order to allow sampling to continue long term on a bimonthly basis.

In addition to monitoring sea temperature over time using oceanographic equipment a citizen science project has been devised to further engagement of local scuba divers in climate change and environmental monitoring. This will involve getting them to participate in a monitoring programme using their dive computers which convert pressure sensor readings into a temperature measurement. A launch event is being planned to give divers the information and tools needed to submit their computer data.

Output 6: Seabirds

Activity 6.1 has been completed as outlined in previous reports. A list of dominant prey species identified from brown noddy regurgitates has been compiled and submitted to SHG for publication online (output 6.2). Environmental variables such as wind velocity, currents, sea surface temperature and chlorophyll-a have been downloaded from Environmental Data Automates Track Annotation System (Env-DATA) on Movebank relevant to the storm petrel and brown noddy GPS tracking data. Statistical analysis of both environmental and spatial data has commenced with help from Dplus070 stakeholder RSPB (Royal Society for the Protection of Birds) and project partner BAS (6.3).

The brown noddy geolocation (GLS) analysis has begun using probGLS software (a probabilistic algorithm for processing geolocation data). An initial comparison of the estimated latitudes compared to immersion data recorded by the logger (which indicated that the brown noddies most frequently spend their nights at the breeding colony) have suggested that the latitude estimation is poor using the current software. Another piece of processing software (GeoLight) is now being investigated for processing these data.

Drafting of the final report in the style of a scientific journal has commenced and is due to be completed on time (6.4).

Output 7: Data management

Activity 7.1 was completed as outlined in previous reports. Activity 7.2 will be completed at the end of the project. SAERI have made contact with BODC (British Oceanographic Data Centre) in regard to submitting CTD data to the relevant database and raw files are being prepared now that the data sets are complete (Activity 7.3).

Draft metadata forms were completed while sampling was on going and reviewed by SAERI for feedback. A request has been sent to all working on the project to complete metadata forms in a timely manner before the end of the project. All project partners are aware of the aim to produce a Web-GIS project to increase access to project information and have factored producing these materials into their timelines.

Output 8: Summary reports and dissemination of information

Activity 8.1 cannot be completed until the end of the project. Activity 8.2 has been worked on throughout the project; in the last 6 months project information has been spread internationally through submitting material to be included in the 2019 Birdlife Fair as well as slides at the Blue Belt Symposium, UK.

On-island, three work experience students were hosted in July and August who were included in Dplus070 fieldwork to further their understanding of the project. Project concepts were included in the annual island event Marine Awareness Week with information being printed in booklets given to all primary school children in addition to games designed to further their knowledge of open ocean ecosystems.

Dissemination of project results is planned for the end of the project.

2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

A scientifically notable problem was the extensive cloud cover which limited the satellite regions for the waters around St Helena Island. This, combined with the resolution of the data, was a particular challenge due to the small size of the island, meaning that only a few grid squares were available to provide data. If a grid square was obscured by cloud there was no available data for certain monitoring stations. This was resolved by taking an average of several grid squares closest to the station and although this has limitations, it has greatly improved the data coverage.

An unexpected development was the loss of a key staff member from the Island. Annalea Beard stepped down as project lead and resigned from SHG, which also removed her from the role of seabird expert on the project, a key skill for output 6. This was overcome by bringing Annalea back on to the project through a consultancy contract and transferring the project lead role to the SHG Marine Conservation Officer, Rhys Hobbs (via the change request process).

A key lesson learned throughout the project, and highlighted in the last 6 months, is that transient staffing is disruptive to progress. However, this has been well managed through passionate staff, excellent project partner relationships and stakeholder engagement.

2b. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?

Discussed with LTS:	Yes
Formal change request submitted:	Yes
Received confirmation of change acceptance	Yes

3a. Do you currently expect to have any significant (e.g., more than £5,000) underspend in your budget for this year?

Yes ☐   **No**   **X**   Estimated underspend: £

3b. If yes, then you need to consider your project budget needs carefully. Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project, please submit a rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget so please ensure you have enough time to make appropriate changes if necessary.

4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?

No, Darwin has been excellent at communicating and working with us whenever we have had any issues.