



Darwin Initiative/Darwin Plus Projects Half Year Report (due 31st October 2021)

Project reference	DPLUS089
Project title	Integrating genetic approaches into sub-Antarctic deep sea research and management
Country(ies)/territory(ies)	South Georgia and the South Sandwich Islands
Lead organisation	University of Essex
Partner(s)	Cefas
Project leader	Dr Michelle Taylor
Report date and number (e.g. HYR1)	HYR2
Project website/blog/social media	N/A

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

Activities commenced	Current state
1.1 Collection and cataloguing of deep-sea coral samples and transported to the UK.	Completed
1.2.1 Specimens identified to highest possible level by Dr Taylor.	Completed
1.2.2 Research technician hired half way through year 1 to undertake genetic laboratory work.	Completed
1.2.3 Specimens of target species have DNA extracted, quality controlled, UCE libraries prepared, DNA sequenced	Completed
1.2.4 Research assistant hired half way through year 2 to undertake bioinformatics analyses.	On-going
1.2.5 Connectivity of locations across SGSSI and wider sub-Antarctic analysed, and population structure investigated.	Not completed
1.3 Results written into a report for GSGSSI.	Not completed
1.4 Results written into a report for CCAMLR.	Not completed
2.1.1 Genetic data formatted for Genbank and species identification and metadata formatted for GBIF.	Not completed
2.1.2 Genetic data submitted to Genbank and species information to GBIF for quality control.	Not completed
2.2 Species records submitted to GBIF, WoRMS, OBIS and BODC.	Not completed
2.3 New species descriptions written for peer-review publication (e.g. <i>Zootaxa</i> , <i>Polar Biology</i>) and submitted to WoRMS.	On-going
3.1 Deep sea biodiversity analysis conducted and integrated into reports to GSGSSI and CCAMLR.	On-going

4.1 Genomic connectivity publication written for submission to peer-review journal such as <i>Molecular Ecology</i> , <i>BMC Evolutionary Biology</i> etc.	Not completed
4.2 Diversity / biogeography of deep sea biodiversity of the SGSSI region publication written for submission to peer review journals such as <i>Deep Sea Research I</i> , <i>Polar Biology</i> , <i>Marine Ecology Progress Series</i> .	Not completed
4.3 Donation of samples to NHM and disseminate results to the wider audience.	On-going

Summary:

All library preparations are completed. Libraries have been sent to sequencing in service in the US. Sequencing results are expected in Oct 2021 (allowing the completion of output 1.2.3 and commencement of 1.2.4, 1.2.5, and ultimately the remainder of 1, 2, and 3 activities). Server space (1.2TB+) is organised. In terms of activities this progress means we can finally hire a bioinformatician. Due to the already documented covid issues and subsequent need to spend extra finance on completing sequencing work the hire is i) only going to be for a 9month period (opposed to a year; as explained in the last report), and, ii) be commencing later than expected. We are advertising the position in Sept 2021 and will ask for an Nov-Dec start (1.2.4); this would hopefully mean all expenditure on the grant will be complete within the current grant time period (end date: 31st Sept 2022).

At least one new species has been found and description has commenced. Three new Antarctic species have just been published (Aug 2021) so we are cross referencing this before continuing.

Dr Taylor will be attending the 16th International Deep-Sea Biology Symposium in late Sept.

2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months (for COVID-19 specific delays/problems, please use 2b). Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

Covid-19 has meant major delays and likely constrains the delivery of originally planned outputs; see below.

2b. Please outline any specific issues which your project has encountered as a result of COVID-19. Where you have adapted your project activities in response to the pandemic, please briefly outline how you have done so here. Explain what residual impact there may be on your project and whether the changes will affect the budget and timetable of project activities.

Due to constraints related to Covid-19, progressing in laboratory work, data analysis and associated reporting has faced many months of delays. However, stakeholders have been kept informed on the mitigation measures in place and progress of this project via informal meetings.

Due to our laboratory competing for Covid-19 PCR and PPE supplies, we have seen considerable delays in laboratory work in the last 6 months. This has resulted in an about 4-6 week delay in our planned work schedules. This resulted in a delay in advertising for the job role for a bioinformatician. At the moment, there is no subsequent change required to the budget or timetable, but this is dependent on the success of the imminent job advertisement.

Specific issues and delays have been reported to Darwin in previous iterations. An extension of 6-months has been granted to mitigate the impact of Covid-19 and ensure the successful delivery of agreed outputs.

2c. 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 (and received)
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 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. Please DO NOT send these in the same email as your report.

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

We have read and considered the review of our year 2 report. As has been discussed from the very beginning with LTS staff, the laboratory research within this grant does not easily fit into the Darwin progress framework (making the SMART). However, the next year of research results, engagement with various stakeholders etc should be easier to report upon.

Outputs resulting from this project will complement the range of physical and visual benthic sampling initiatives between scientists, government and industry that are either underway or planned within the SGSSI maritime zone and link closely with the UK Government's 'Blue Belt' initiative to enhance marine protection around the UKOTs.

Workstream 2 (*Benthic camera and in situ data collection*) contains two aspects of identification of benthic organisms around SGSSI. Partial outputs of this Darwin project, which resulted from the data collected during the (Blue Belt Programme) Discovery Expedition 99, are already published and were made available to the Government of SGSSI. At least one additional peer-review manuscripts will result from this workstream.

At present, we continue collecting by-catch of benthic sessile organisms on longlines deployed around SGSSI and from other scientific surveys in the region. Specimens were (are) catalogued, preserved, and sent to the UK, in collaboration with the British Antarctic Survey. Specimens collected in 2019 were already identified and genetic material collected by the UoE project team. In due course, specimens collected in 2020 have now arrived in the UK and the project team is making arrangements for collection at BAS to proceed with the adequate cataloguing, identification and tissue collection for subsequent genetic analysis. Constraints related to Covid-19 meant that sample collection and laboratory work is progressing at a slower pace, but we expect to have all the information and samples in due course.

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but should also be raised with LTS International through a Change Request. **Please DO NOT send these in the same email.**

Please send your **completed report by email** to Darwin-Projects@ltsi.co.uk. The report should be between 2-3 pages maximum. **Please state your project reference number in the header of your email message e.g. Subject: 25-001 Darwin Half Year Report**