

Biodiversity Challenge Funds Projects Darwin Initiative, Illegal Wildlife Trade Challenge Fund, and Darwin Plus Half Year Report

Note: If there is any confidential information within the report that you do not wish to be shared on our website, please ensure you clearly highlight this.

Submission Deadline: 31st October 2023

Project reference	DPLUS109
Project title	Initiating monitoring support for the SGSSI-MPA Research and Monitoring Plan
Country(ies)/territory(ies)	South Georgia
Lead partner	British Antarctic Survey
Partner(s)	GSGSSI
Project leader	Philip Hollyman
Report date and number (e.g. HYR1)	HYR4
Project website/blog/social media	https://www.bas.ac.uk/project/fixe-wing-wildlife-surveys-at-south-georgia/

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).

Although we are not looking for specific reporting against your indicators, please use this opportunity to consider the appropriateness of your M&E systems (are your indicators still relevant, can you report against any Standard Indicators, do your assumptions still hold true?). The guidance can be found on the resources page of the relevant fund website.

Over the last 6 months, good progress has been made on several key outputs for the project. In summary, work has progressed on the analysis of all collected imagery from both field seasons, alongside the progression of peer reviewed outputs.

Progress against specific outputs:

2.2 – Photogrammetric processing has been undertaken on imagery collected during the 2022/23 season, resulting in 3D models for all sites.

2.3 & 2.4 – Orthophotos have been produced for 2022/23 season sites. Additionally, georeferenced outlines of king penguin colony extents have been determined.

3.1 – We are continuing to work closely with collaborators to employ automated counting methods to the processed imagery. This approach has thus far not been fruitful as the project contained no funds for progressing this work, relying on previously established collaborations. New collaborations have been established and imagery of king penguin colonies has been provided to trial automated counting techniques. We are currently awaiting the in initial results from this collaboration, assuming the results are positive, we will be able to utilise these automated counting scripts to count all of the remaining imagery.

Excellent progress has been made in developing alternative automated counting methods within the project team using the Digital Elevation Models (DEMs) created during the project,

which has already resulted in population counts for several sites and species (3.2). Manual female elephant seal counts have also been completed for all sites.

4.1 – A methodology paper is in preparation (to be submitted by the end of the project), focussed on the implementation of fixed wing drones for wildlife monitoring in the sub-Antarctic. Two further methodology focussed papers are ready for submission.

- I. One is focussed on counting methodologies for penguin imagery (see section 5.1).
- II. The other is focussed on thermal imagery of Antarctic fur seals that was collected opportunistically as an addition to the project. This methodology holds great promise for rapid surveying and counting of seals, even those obscured by tussock grass which are currently difficult for traditional RGB drone imagery. It is likely that a new funding proposal based on the thermal imagery will be developed over the next 6-months in lieu of recently observed trends on Bird Island.

4.2 – We have had extensive discussion with GSGSSI regarding the training of field assistants. The scientific assistants at King Edward Point station (employed by BAS) are unsuitable for this training, as they are employed on short contracts and the training is expensive. We initially agreed that the GSGSSI operations manager would receive training to fly the fixed wing platforms, however this was not possible with her workload. We discussed several other GSGSSI staff who may be suitable for this training, but were unable to identify anyone. There has been high turnover of Government officers, making them unsuitable (it is also not part of their role on the island) and other GSGSSI staff do not visit the island regularly enough to utilise the fixed wing platforms on a routine basis. The same applies for 4.3 and 4.4.

5.1 Two ecology focussed manuscripts are either in progress or awaiting submission.

- I. “A comparison of established and novel counting methods for king penguin colonies using fixed-wing drone and satellite imagery to establish long term monitoring”.

This paper presents the results of king penguin colony counts arising from this project, from a variety of methods. A novel semi automated counting approach was developed using the high-resolution DEMs created using the fixed-wing platform. These DEMs can be used to automatically count penguin colonies by selecting individual penguins using their height off the ground to identify them. This approach has the potential to revolutionize the way penguins and other ground nesting species worldwide are monitored, as it greatly speeds up counting. The various manual and automated counting approaches are then compared to satellite counts for several of the sites. A workflow for the different counting approaches is also presented.

The resulting population counts are then discussed in an ecological context and compared to the most recent colony estimates from Foley *et al.*, (2020) who used satellite imagery to calculate an island wide population estimate.

This paper will be submitted by the end of October, 2023.

- II. A second paper is in progress counting elephant seal colonies also using a range of methods (adjusted DEM counts, manual counts and satellite imagery). This paper will also encompass a historical aspect for this species by incorporating long-term monitoring data from King Edward Point station (from 1995 to present) and satellite imagery of St Andrews Bay between 2010 and present. This data will hopefully support future Darwin funded work to census South Georgia’s elephant seal population.

We are also in the process of writing a final report for GSGSSI, which will include summary outputs of all field work and subsequent analysis. All of the project outputs including DEMs, orthorectified imagery, colony extents and the novel counting workflows detailed above will also be given to GSGSSI. The report includes recommendations for future monitoring, including priority sites and suggested frequency of surveys. This will allow GSGSSI to establish long-term monitoring of the key higher predator species surveyed during this project, with the ultimate goal of supporting the management of the Marine Protected Area (MPA).

6.1 Key outputs of the project were presented in an invited talk at the GSGSSI MPA symposium in June 2023. This symposium was designed to showcase the science in support of the MPA as part of the 5-year review, highlighting the importance of this project to GSGSSI.

2. 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.

One ongoing issue detailed in the last annual report is surrounding 4.2 – 4.4 (training of a GSGSSI staff member). As detailed above and in the previous report, despite lengthy discussions, nobody has been identified to undertake the training. It should not have any long-term impact on the project as it has become apparent that the reason nobody suitable can be found, is that nobody from GSGSSI regularly undertakes scientific work on the island. It would be more prudent to continue to pursue future survey work at South Georgia using the fixed wing in collaboration between BAS (who have trained staff and regularly undertake fieldwork at South Georgia) and GSGSSI. BAS also has an extensive drone program and an Airborne survey unit, under which the insurance for use of the fixed wing platforms will fall.

The main unexpected outcome over the last 6-months has been the development of a novel DEM counting approach for drone imagery. This will greatly increase the speed of future imager analysis using this platform and is a major output of the project in its own right. It has many benefits over traditional automated methods and will be developed further after this project is over.

Additionally, by utilising the thermal platform we were able to identify problems with RGB imagery for fur seal counts. From collected data we have developed a semi automated workflow using both thermal and RGB imagery which will increase efficacy and accuracy of future counts.

3. Have any of these issues been discussed with NIRAS and if so, have changes been made to the original agreement?

Discussed with NIRAS: N/A

Formal Change Request submitted: N/A

Received confirmation of change acceptance N/A

Change request reference if known:

4a. Please confirm your actual spend in this financial year to date (i.e. from 1 April 2023 – 30 September 2023)

Actual spend: ██████████

4b. Do you currently expect to have any significant (e.g. more than £5,000) underspend in your budget for this financial year (ending 31 March 2024)?

Yes No Estimated underspend: £

4c. 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 re-budget Change Request as soon as possible. There is no guarantee that Defra will agree a re-budget 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.

NB: if you expect an underspend, do not claim anything more than you expect to spend this financial year.

5. Are there any other issues you wish to raise relating to the project or to BCF management, monitoring, or financial procedures?

No

If you are a new project and you received feedback comments that requested a response, or if your Annual Report Review asked you to provide a response with your next half year report, please attach your response to this document.

All new projects (excluding Darwin Plus Fellowships and IWT Challenge Fund Evidence projects) should submit their Risk Register with this report if they have not already done so.

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

Please send your **completed report by email** to BCF-Reports@niras.com. The report should be between 2-3 pages maximum. **Please state your project reference number, followed by the specific fund in the header of your email message e.g. Subject: 29-001 Darwin Initiative Half Year Report**