

## 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: 30<sup>th</sup> April 2019**

### Darwin Plus Project Information

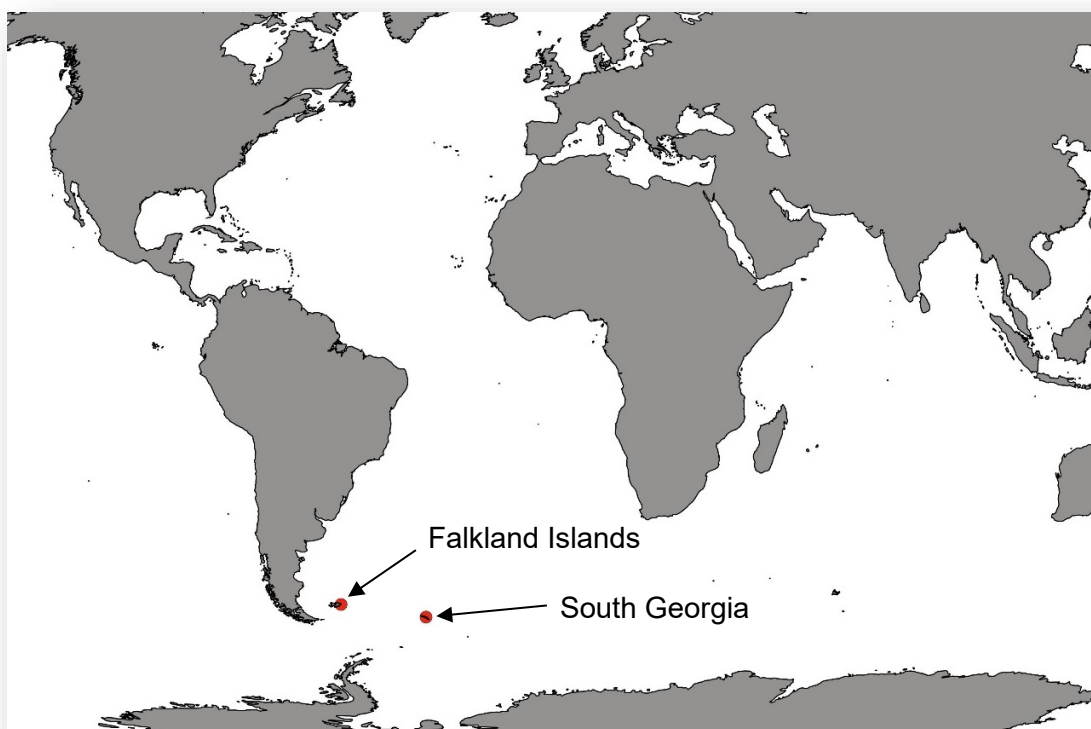
Project reference	DPLUS065
Project title	Mapping Falklands and South Georgia coastal margins for spatial planning
Territory(ies)	Falkland Islands, South Georgia
Contract holder institution	SAERI
Partner institutions	Oregon State University, Joint Nature Conservation Committee, Shallow Marine Surveys Group Ltd, Falkland Islands Government, Government of South Georgia & the South Sandwich Islands.
Grant value	£278,696
Start/end date of project	April 2017 – March 2020
Reporting period (e.g., Apr 2018-Mar 2019) and number (e.g., AR 1,2)	AR2 1 <sup>st</sup> April 2018 - 31 <sup>st</sup> March 2019
Project leader name	Dr Paul Brickle
Project website/blog/Twitter	<a href="http://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/">http://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/</a>  #SouthAtlanticCoastalMapping @SAERI_FI (Twitter) @S4ERI (Facebook)
Report author(s) and date	Neil Golding & Bran Black

## 1. Project overview

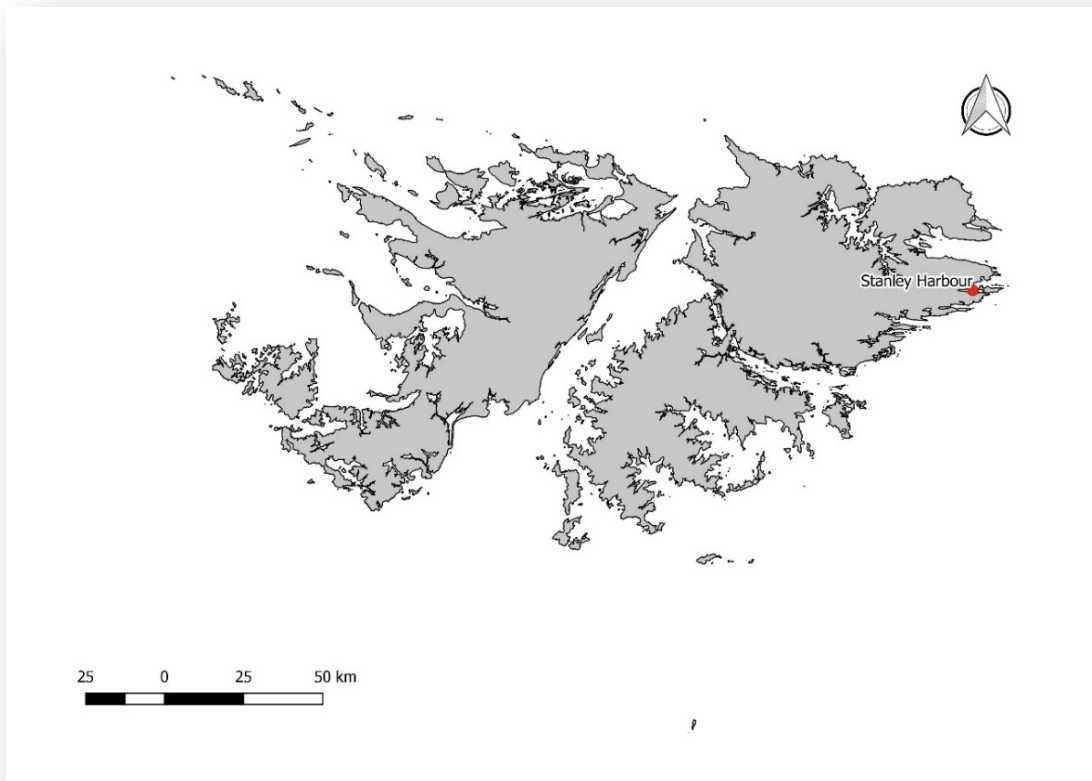
The coastal and inshore marine ecosystems and resources of the Falkland Islands and South Georgia (**Figure 1.1**) play an important role in these two United Kingdom Overseas Territories (UKOTs). From their historical role as a safe harbour, source of food, and forage for livestock, to their present importance for fishing and wildlife-based tourism revenues, the diverse range of ecosystem services provided by the coast and the sea defines these islands. Knowledge of these coastal environments is essential for their effective conservation and management, and yet they have been subject to little regional study. In summary, comprehensive island wide broad scale and fine scale coastal habitat maps, which would form an important baseline (from which to measure future change for example), are lacking. This project aims to fill this critical gap in coastal knowledge.

This project seeks to use freely available Earth Observation (EO) data (primarily in the form of Sentinel-2 medium resolution satellite imagery) along with other relevant data layers to develop broad-scale (Stage 1) coastal habitat (land cover) models/maps, using machine-learning techniques on the Google Earth Engine platform. Where there are significant uncertainties in habitat classifications, or where stakeholders deem it a priority (from a spatial and/or temporal perspective), fine-scale (Stage 2) coastal habitat models/maps will be developed. These will be based on very high-resolution satellite imagery (e.g. World View 2-4) or very high resolution aerial imagery gathered using drone technology. The resultant ‘satellite-derived’ coastal habitat maps, a ‘first’ for both the Falkland Islands and South Georgia, will form an effective baseline against which to monitor change, providing a sound basis for planning, decision making and future monitoring.

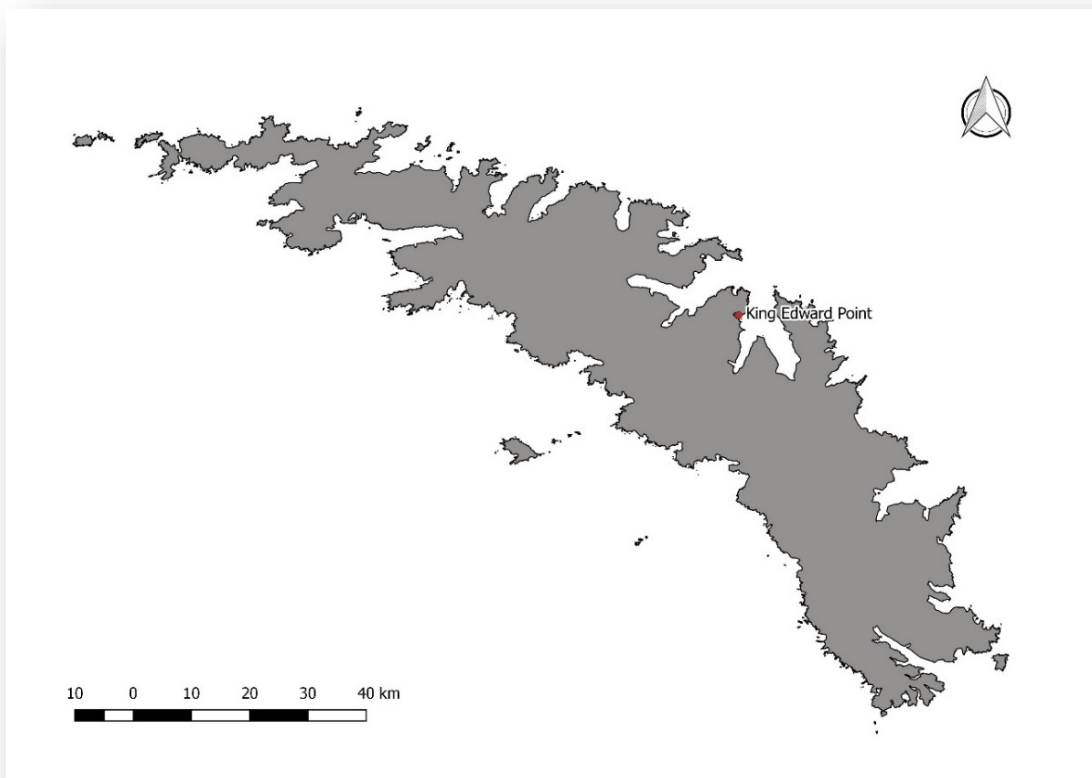
A key part of the project, over and above the coastal habitat modelling/mapping, is the establishment of methods and systems for the Islands to allow these maps to be updated in the years to come. This latter part (the projects legacy) will be critical to ensure that future monitoring of the Falklands (**Figure 1.2**) and South Georgia (**Figure 1.3**) coastal habitats can continue after this project has ended.



**Figure 1.1:** Location of the Falkland Islands and South Georgia in the South Atlantic. Map projection World Robinson



**Figure 1.2:** Falkland Islands, South Atlantic. The location of Stanley is indicated with a red dot. Map projection WGS84 UTM 21S



**Figure 1.3:** South Georgia, South Atlantic. The location of King Edward Point research station is indicated with a red dot. Map projection WGS84 South Georgia Lambert

## 2. Project stakeholders/partners

The project partners (**SAERI, Oregon State University (OSU), Falkland Islands Government (FIG), Government of South Georgia & the South Sandwich Islands (GSGSSI), Shallow Marine Surveys Group (SMSG) and Joint Nature Conservation Committee (JNCC)**) form the Project Management Group (PMG). The PMG meets quarterly to monitor and steer the project, ensuring it aligns with the project proposal document, and to ensure it delivers its outputs on time, and on budget. In this reporting year, there have been four PMG meetings. The PMG Terms of Reference and Approved Minutes are available from the Coastal Habitat Mapping project webpage, under the Document Download Area (<https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>). Note that due to the month-long South Georgia Coastal Habitat Mapping expedition in February/March 2019, the FY18/19 Q4 PMG meeting was pushed back until 5<sup>th</sup> April 2019. However, this has now been held and the minutes from the meeting are in the process of being finalised; they will be made available on the project website in due course.

The 2018/19 reporting year has been an exceptional year for the project from a stakeholder engagement perspective, and this has resulted in a significant amount of stakeholder support, as well as opportunities to discuss and implement unique collaborations (for example, the minefield mapping collaboration with SafeLane Global and the UK Foreign & Commonwealth Office). This year, **Falkland Islands Government (FIG)** and the **Government of South Georgia & the South Sandwich Islands (GSGSSI)**, both primary stakeholders who will utilise the project outputs as well as project partners, have remained heavily involved in the project. The project has received financial support through the FIG Environmental Studies Budget. GSGSSI supported the project through the planning process for the 2019 South Georgia field expedition, including facilitating with the permitting process to enable drones to be used on South Georgia to collect very high-resolution aerial imagery in non-visitor sites and waiving visitor landing fees for the project participants during the expedition.

Biannual Project Stakeholder Group (PSG) meetings have been held; minutes and presentations are available on the project website<sup>1</sup>. One of these meetings took the form of a workshop. Two workshops were held, one for each Territory (Falkland Islands & South Georgia), and these formed a valuable mechanism by which Stakeholders could direct progress with the fine-scale mapping element of the project, through highlighting their priorities at the workshop. These workshops are discussed in more detail in Section 3.1.

Further details of notable engagement with stakeholders is provided below, with evidence where relevant.

### **Falklands Conservation (FC)**

FC is a key project stakeholder, who provided a letter of support during the project proposal stage. There are clear synergies between Falkland Conservation's priorities and those of the project. **Katherine (Frin) Ross**, who runs the Habitat Restoration project at FC, has a seat on the PSG, and participated in the stakeholder prioritisation workshop. The project has actively engaged the Falklands Watch Group. The Watch Group is a youth group based in Stanley, run by the Falklands Conservation Community Outreach Officer. The Watch Group undertook a coastal habitat mapping exercise organised by the DPLUS065 Project Manager (PM) on Sat 24<sup>th</sup> November 2018 (**Figure 2.1**), and a second follow up exercise with Nicole Durfee (Shackleton Scholar) and the PM on Sat 1<sup>st</sup> December 2018.

The project was also involved in collecting a baseline aerial imagery dataset for the Port Howard Nature Area (PHNA) in West Falkland. This is a new area which has been fenced off from livestock and will be subject to habitat restoration as part of the FC project. The PM flew a drone mapping mission over the PHNA at an elevation of 50m (**Figure 2.2**) which resulted in the

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<sup>1</sup> <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>

production of a 3D model and a high resolution orthomosaic of the PHNA. This latter dataset has been shared with FC, and will provide an essential baseline for FC to detect future change in vegetation cover. The data will also be fed into the fine-scale habitat mapping workflow to develop a fine-scale habitat model for the area.



**Figure 2.1:** The DPLUS065 team getting the Falklands Conservation Watch Group involved in some habitat mapping ground validation.

### **British Antarctic Survey (BAS)**

BAS are a relevant stakeholder, particularly with respect to the South Georgia element. **Adrian Fox, Head of Mapping and Geographic Information Centre** has a seat on the PSG, and has contributed to various PSG meetings as well as the South Georgia fine-scale mapping prioritisation workshop on 9<sup>th</sup> August 2018. Adrian Fox has a wealth of knowledge, particularly around aerial imagery, and was able to contribute to discussions around the Falklands 1956 aerial imagery geo-referencing in particular. The PM also liaised with Adrian to facilitate the input of the South Georgia broad-scale habitat map into the SG GIS system.

The PM has also liaised with **Susie Grant** from BAS, who leads the DPLUS069 project ([Building data resources for managing the SGSSI Marine Protected Area](#)), which led to the PM giving a presentation about the DPLUS065 Coastal Habitat Mapping project at a DPLUS069 workshop in Cambridge, UK in December 2018 (**Figure 2.3**). The workshop was titled *Developing a Research and Monitoring Plan for the South Georgia and South Sandwich Islands Marine Protected Area* (**Figure 2.3**).





**Figure 2.2:** Baseline mapping at the Port Howard Nature Area with project stakeholder, Falklands Conservation.



**Figure 2.3:** Presenting an update on the DPLUS065 project at the DPLUS069 workshop: *Developing a Research and Monitoring Plan for the South Georgia and South Sandwich Islands Marine Protected Area*

### **International Association of Antarctica Tour Operators (IAATO)**

The project has engaged with **IAATO**, specifically its **Executive Director, Damon Stanwell-Smith**. Damon participated in the South Georgia Stakeholder Prioritisation Workshop held on 9<sup>th</sup> August 2018. All commercial tourist vessels, which visit South Georgia, are required to be members of IAATO to ensure the highest standards of visitor management and compliance are followed, and transparency in decision making is essential to the relationship between GSGSSI and IAATO. As a key stakeholder in South Georgia’s natural environment and involved in South Georgia’s rapidly expanding cruise tourism industry, receiving IAATOs input into the prioritisation process was of critical importance to the project. Additionally, GSGSSI does not permit tourists to fly drones at South Georgia, therefore engagement with IAATO vessels during fieldwork was essential to explain why this project was allowed to use drones under strict permitting conditions when other visitors to the islands are not able to do so.

## **UN Environment World Conservation Monitoring Centre (WCMC)**

The PM has continued to liaise with **Edward Lewis** from the WCMC this reporting year. WCMC were contract by project partner GSGSSI to develop a suite of Terrestrial Protected Areas for South Georgia. The data needs of the WCMC in light of this work are closely aligned to that data being generated through the DPLUS065 project. For this reason, WCMC were invited to participate in the South Georgia fine-scale stakeholder prioritisation workshop in August 2018, where Edward Lewis made a valuable contribution to proceedings. Once again, developing these relationships with stakeholders really highlights the impact that the DPLUS065 project outputs will have upon completion.

## **UK Foreign & Commonwealth Office (FCO) and SafeLane Global**

It became apparent during the Falklands fine-scale mapping stakeholder prioritisation workshop held in August 2018 that there was significant interest among stakeholders in the habitat recovery of the minefields from the 1982 conflict following the demining process. These minefields had lain almost untouched for 35 years. The Darwin + Coastal Habitat Mapping project provided an opportunity to map these areas prior to the demining process, allowing the project to capture a baseline of what these pristine habitats looked like, so that future change could be monitored. The PM realised that there was an opportunity to work with the Falklands Demining Programme (SafeLane Global and the UK FCO) to create a better product with wider utility through collaborating with these stakeholders. As part of this collaboration, prior to a drone-mapping mission being flown, SafeLane Global deployed markers (known as Ground Control Points) actually within the minefields and then took their positions and heights using specialist survey equipment. The PM could then use this information during the processing of the drone imagery to create highly accurate digital terrain models of the minefields. The digital terrain models (DTMs) have proved to be a useful addition to the work already undertaken by SafeLane as part of the demining process. This high resolution drone imagery will also be fed into the fine-scale habitat modelling process in order to develop fine-scale habitat maps for the coastal margins of the Falkland Islands (see **Annex 9**). **John Hare, Technical Director at SafeLane Global** stated that “this supplementary piece of work provides really good corroborative, and in some cases additional, data and a bench mark for the remediation of the minefield sites”. The collaboration has also involved **Ross Chaloner** from the **Falkland Islands Government Public Works Department (PWD)** who provided survey and technical support.

## **Falkland Island landowners/farm managers**

Farmers Week, a weeklong series of events and meetings held in Stanley each year in July, was an ideal opportunity to update the Falklands landowners on progress with the Coastal Habitat Mapping project. Many landowners and farmers from East and West Falkland come into Stanley for this week. There was an opportunity for the PM to make a formal presentation during this week (**Figure 2.4**) about the project. In addition, a Farmers Week Expo is also held the weekend preceding Farmers Week. This event attracts a wide-ranging audience, both young and old, and allowed the PM to explain a bit about the project in a more relaxed atmosphere, chat to landowners about how the project could benefit them, and demonstrate some of the equipment being used by the project (**Figure 2.5**). The drone simulator proved to be very popular.



**Figure 2.4:** Presentation by DPLUS0665 Project Manager, Neil Golding, at Farmers Week.



**Figure 2.5:** Getting people excited about the DPLUS065 Coastal Habitat Mapping project at the Farmers Week Expo.



A specific priority emerging from the Falklands Stakeholder prioritisation workshop was a better understanding about the distribution of invasive non-native species such as calafate. The PM has been working with the FIG Department of Agriculture (**Adam Dawes & James Bryant**) and the farm owners at Port Sussex farm to collect very high-resolution aerial imagery from drone mapping missions. Through using a drone equipped with a multispectral camera as well as a standard RGB camera, it may be possible to identify reflectance characteristics of vegetation (such as calafate) to enable it to be more accurately modelled (**Figure 2.6**). During this fieldwork, the PM was joined by the Shackleton Scholar, **Nicole Durfee** from Oregon State University (also a project partner). Nicole has considerable experience using multispectral cameras on drones, and was able to share the wealth of experience she has gained undertaking her research on rangeland habitats on the western US.



**Figure 2.6:** Completing drone mapping missions with a multispectral camera, focussing on calafate at Port Sussex farm.

During this reporting year, the PM has had the opportunity to meet and discuss the DPLUS065 project with a range of Falklands landowners. **Lewis Clifton**, owner of Weddell Island, participated in the Falklands fine-scale mapping stakeholder prioritisation workshop alongside other landowners such as **Mike & Phyl Rendell**, owners of Bleaker Island.

### **Wildlife Conservation Society (WCS)**

WCS<sup>2</sup> own some of the Jason Islands to the far west of the Falklands, and are the location of globally important populations of seabirds such as the Black-Browed Albatross. The PM has continued to liaise with **Graham Harris** the WCS representative for the Falklands this reporting year, particularly around working with WCS to undertake fieldwork on Steeple and Grand Jason. While in the end, logistics meant that it was not possible for the PM to join Graham when WCS visited the Jason's to undertake fieldwork, WCS have agreed to share drone imagery from Steeple Jason, and these orthomosaics will form an important dataset for the fine-scale habitat mapping of this priority area.

### **Springcreek Conservation**

Springcreek Conservation<sup>3</sup> are already working with DPLUS065 project stakeholders such as Falklands Conservation and Elephant Beach Farm. The PM had the opportunity to work with

<sup>2</sup> <https://www.wcs.org/>

<sup>3</sup> <http://www.springcreekconservation.com/>

**Gifford Hickey**, one of the co-founders of Springcreek during the South Georgia Coastal Habitat Mapping expedition in February/March 2019. Gifford assisted the PM to collect ground validation information on South Georgia to train the broad-scale and fine-scale habitat models being developed by the project. In addition, Gifford was the designated visual observer during the various drone mapping missions flown on South Georgia during the expedition.

### **South Georgia Association (SGA) and Cambridge University: Cambridge Archaeological Unit (CAU)**

The SGA have been an important stakeholder this reporting year from a South Georgia perspective. As plans for the South Georgia expedition developed, the PM met with **Robert Burton** (SGA) and **Marcus Brittain** (CAU) in Cambridge on Monday 10<sup>th</sup> December 2018 to finalise the expedition planning. Further details of the South Georgia expedition are included in **Section 3.1**.

### **South Georgia Heritage Trust**

A collaboration with SGHT this reporting year added significant value to the project. The SGHT led expedition to South Georgia, for the purposes of archaeology, provided an opportunity for crucial data to be gathered for the DPLUS065 project. Through a relatively small contribution, the PM was able to join the expedition and support the archaeological project through the collection of aerial drone imagery, while at the same time collect both ground validation information and high resolution aerial imagery in areas identified through the South Georgia stakeholder prioritisation workshop. This information is of great value to the project partners, such as GSGSSI, and will allow highly accurate fine-scale habitat models to be developed for specific areas of stakeholder interest on South Georgia (see **Annex 13** for a letter of thanks from SGHT). The PM has been instrumental in ensuring that a significant amount of outreach and awareness was generated through social media from during and after this expedition. A summary of the projects top tweets can be seen in **Table 8.1** in **Section 8**.

### **Iridium Communications**

The PM made initial contact with Iridium Communications regarding provided satellite data support for the South Georgia expedition, in order for online drone mission planning to be undertaken whilst in extremely remote locations. From this, the PM was able to develop a strong relationship with Iridium Communications, and generate strong support for the project. This support (in the form of 4GB of satellite data, valued at over \$4,800 / £3,600) proved invaluable for ensuring that the highest quality drone imagery data could be collected at the various locations around South Georgia. In addition, Iridium provided three handsets (with complimentary calls) and three trackers for the expedition to use whilst on South Georgia.

### **Engagement with the wider public in the Falkland Islands**

This reporting year, there has been the opportunity for the project to engage effectively with the wider public in the Falklands in a number of ways:

- **Shackleton Scholar programme of events** – The PM was successful in his application to the Shackleton Scholarship Fund application to get a drone expert down to the Falklands. The intention was to work with the community to promote how drones, when used safely, can really benefit science, education and more. The resulting series of events run by Nicole Durfee and the PM jointly was well received and well attended by the wider public. Further information can be found in **Annex 11**.
- **Falkland Girl Guides** – The PM wrote a letter of support to the **Falkland Islands Government** in support of their Environmental Studies Budget application to visit Bleaker Island to undertake some conservation orientated activities. As part of this visit, the Girl Guides collected ground validation data from Bleaker Island for inclusion in the Falklands broad-scale habitat model/map.

- **Infant & Junior School (IJS), Stanley** – The PM visited IJS in July 2018 as part of their Science Week and with his colleague, made an informative presentation on marine forests (kelp forests) which are a vitally important marine habitat around the Falklands coastline, and one of the habitats being mapped as part of DPLUS065. As part of this session, the PM was able to provide some background to the Darwin + Coastal Habitat Mapping project (see **Figure 2.7**)
- **Chamber of Commerce public talk** – The PM gave a public talk about the DPLUS065 project at the Chamber of Commerce on 27<sup>th</sup> November 2018, and there was very good attendance, despite it being a warm, sunny evening, which usually leads to reduced participation in such events. (**Figure 2.8**)



**Figure 2.7:** Getting involved with Science Week at Stanley Infant & Junior School.



**Figure 2.8:** Public Talk - presenting an update on the DPLUS065 Coastal Habitat Mapping project at the Chamber of Commerce.

## Links with other Darwin projects (and other work)

The PM has fostered links with a number of other Darwin Initiative funded projects (and other relevant projects), both within and outside the Falkland Islands and South Georgia in order to share ideas, experience and data. These include:

- **DPLUS071 - Fine scaling the design of Falkland Islands Marine Management Areas.** There are a number of areas of spatial/geographic overlap with this project and DPLUS065, and the PM has been exploring efficiencies with the DPLUS071 PM regarding data collection and delivering maximum value for money. This has included sharing data for areas of overlap. In addition, the DPLUS071 project team participated in the sidescan processing workshop run during a visit by **Chris Goldfinger** from Oregon State University.
- **DPLUS069 - Building data resources for managing the SGSSI Marine Protected Area.** The PM has liaised with the DPLUS069 project regarding data sources of relevance to the Coastal Habitat Mapping project. This resulted in the PM being invited by **Susie Grant** to give a presentation about the DPLUS065 Coastal Habitat Mapping project at a DPLUS069 workshop in Cambridge, UK in December 2018 (**Figure 2.3**). The workshop was titled “*Developing a Research and Monitoring Plan for the South Georgia and South Sandwich Islands Marine Protected Area*”.
- **DPLUS083 - Soil map and online database as climate change mitigation tools.** While out on fieldwork in the Falklands, the Soils project team have also been collecting ground validation information at their sampling points using the DPLUS065 field recording pro-forma. This will be valuable information to feed into the wider habitat modelling work being undertaken. There are also clear synergies between the Soils project (focussing on below ground) and the Coastal Mapping (focussing on vegetation cover above ground). We have been discussing ways that the final outputs could be linked into the future.
- **DPLUS068 - Building foundations to monitor and conserve Falklands marine forest habitats.** The PM has been discussing options with the DPLUS068 project team to better understand how drone imagery being collected by the Coastal Mapping project may be utilised by DPLUS068, and where synergies lie.
- **DPLUS080 - Securing South Georgia's native habitats following invasive species control.** Ahead of the 2019 South Georgia field expedition, the PM contacted **Rosemary Newton** and **Colin Clubbe** at the Royal Botanic Gardens, Kew. During a skype conference, they discussed both projects, terrestrial habitat classifications in use in South Georgia and how and where drone technologies may benefit invasive species mapping. They identified synergies that could be explored in future. Data collected during the 2019 SG expedition will be of immense value to DPLUS080.
- **Global *Macrocystis* model - Alejandra Mora Soto (PhD student) – University of Oxford.** The PM has been in contact with Alejandra from University of Oxford following her enquiry about the project. Alejandra is developing a global *Macrocystis* (giant kelp) model. SAERI have shared data (kelp layer from Falklands) generated through the DPLUS065 project and are exploring ways that other information being collected (such as drone imagery) can assist Alejandra with her research, as well as exploring future collaboration ideas.

In summary, this reporting year has been extremely busy from a stakeholder engagement perspective, with plenty of interest being generated. This clearly demonstrates the relevance and impact that the DPLUS065 Coastal Habitat Mapping project is having across the Territories and beyond.

Evidence that some of the above meetings took place is in the form of written correspondence (emails etc). In order to keep this report of a manageable size, these can be provided on request.



### 3. Project Progress

It was noted in the last Annual Report (AR1) that due to delays in recruiting a Project Manager (PM), the project was running up to 3 months behind schedule. However, following key changes to the timings of deliverables across Work Packages and a change in spend across financial years (this was approved through the change request process - approved by Defra on 9<sup>th</sup> March 2018), the PMG can report that the project is now on track delivering on time and on budget.

#### 3.1 Progress in carrying out project Activities

##### **Output 1: Project Management structure and communications tools established**

**Summary: ALL activities planned for this reporting year have been completed.**

The Memorandum of Understanding (MoU) was signed by all project partners during Q1 of FY 18/19 (**Activity 1.2**). A copy of the MoU is available on the project website ([https://www.south-atlantic-research.org/wp-content/uploads/2019/04/MoU\\_DPLUS065\\_CoastalMapping\\_Final.pdf](https://www.south-atlantic-research.org/wp-content/uploads/2019/04/MoU_DPLUS065_CoastalMapping_Final.pdf)). In addition, a copy of the signatories to the MoU is included in **Annex 3** of this report.

Quarterly Project Management Group (PMG) meetings have been held in June 2018, September 2018 and December 2018 (**Activity 1.3**). Approved minutes can be found on the project website (<https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>). Note that due to the month-long South Georgia Coastal Habitat Mapping expedition in February/March 2019, the FY18/19 Q4 PMG meeting was delayed until 5<sup>th</sup> April 2019. However, this has now been held and the minutes from the meeting are in the process of being finalised; they will be made available on the project website in due course.

Bi-annual Project Stakeholder Group (PSG) meetings were run in April 2018, August 2018 and February 2019 (**Activity 1.4**). Approved minutes from these meetings and presentations made are available on the project website (<https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>). Note that the August PSG meeting doubled as a fine-scale habitat mapping stakeholder prioritisation workshop. Two workshops were held on the 8<sup>th</sup> August 2018 and 9<sup>th</sup> August 2018 for the [Falklands](#) and [South Georgia](#) respectively. These workshops were extremely successful, providing a clear steer for which areas the project should focus its fine-scale modelling/mapping efforts on. Presentations and reports from these workshops are available on the project website.

Regular updates have been made to the DPLUS065 Coastal Habitat Mapping project webpage, hosted by SAERI. <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/> (**Activity 1.5**). Of particular interest on the project website is the 'Latest News' section, which highlights key achievements/outputs that have been generated through the project, as well as details of project outreach. You can see the 'Latest News' section here: <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/>

During the day to day running of the project, various project management tools are used to ensure that project outputs are achieved and assessed against measurable indicators, and delivered on budget (**Activity 1.6**). These include the use of **TRELLO**, an online (cloud-based) project management tool to ensure all members of the PMG have secure access to relevant documents, irrespective of their location. In addition, other mechanisms such as an **Issues Log** keeps track of various issues that may arise during the project, and which may impact delivery. The latest version of the **Issues Log** is available in **Annex 6**.

##### **Output 2: Work Package 1: Digitised 50 year old aerial imagery (FI only) - COMPLETE**

**Summary: ALL planned activities for this year have been completed.**



In AR1, we highlighted the fact that due to the considerable number of aerial images requiring geo-referencing in this Work Package (approx. 3,688 images), and assuming it takes 5 minutes to manually geo-reference an image, it would take 8.5 weeks (assuming a 36 hour working week) to complete this task, without completing any other project work. This was not feasible, so a revised plan was required in order to deliver this output.

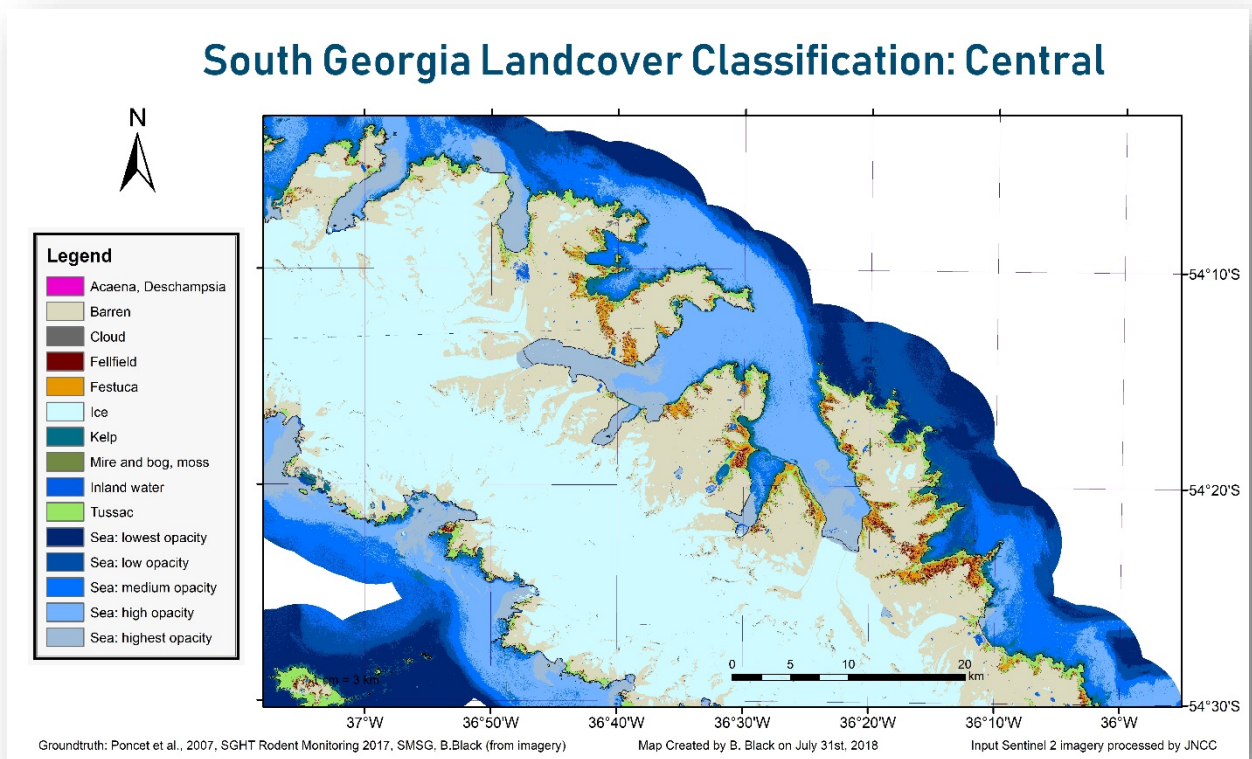
Through collaborative working between SAERI, it's IMS-GIS data centre and Oregon State University, we have been able to deliver a digital map of 1956 aerial imagery for the Falkland Islands. The digital map can be seen on the DPLUS065 Coastal Habitat Mapping webGIS [https://data.saeri.org/saeri\\_webgis/lizmap/www/index.php/view/map/?repository=04f&project=fi\\_coastal\\_hab\\_map\\_wu\\_rem](https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&project=fi_coastal_hab_map_wu_rem) (*ensure the 1956 Aerial Imagery box is checked*) (**Activity 2.2, 2.3 & 2.4**). On the webGIS, you can see the extent of every 1956 black and white aerial image. An example can be seen in **Annex 7**. This output was achieved by using innovative techniques developed by the SAERI IMS data centre, who wrote a script to automate the image geo-referencing process; the script will be run for each aerial image (loaded on the WebGIS) when requested by an end user.

This Work Package can now be considered complete.

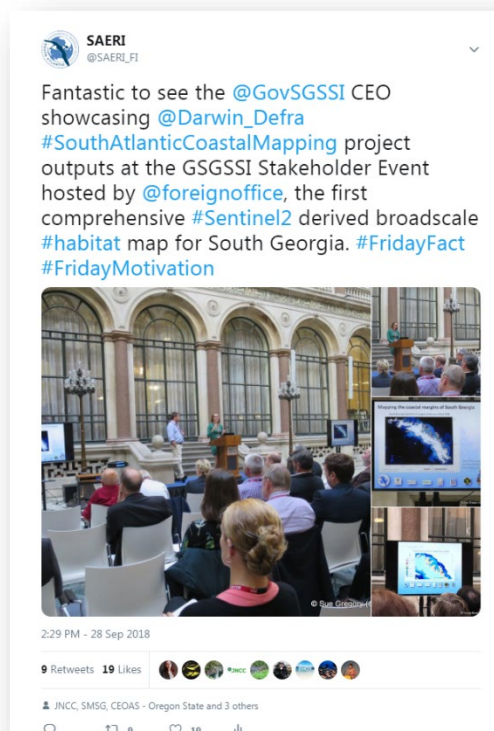
### ***Output 3: Work Package 2 - Object based image analysis and habitat modelling of the coastal margin (FI and SG) - COMPLETE***

***Summary: ALL planned activities for this year have been completed.***

The work undertaken for Work Package 2 in this reporting period primarily involved Oregon State University (OSU) and SAERI. Following on from the successful testing of the broad-scale habitat mapping using a cloud-based system (Google Earth Engine) for South Georgia (reported in AR1), the classification was further developed, through the testing of other variables and data layers, before agreeing on a final suite of classification inputs (**Activity 3.3**). Further evidence of the broad-scale (Stage 1) habitat classification development process is detailed in **Annex 8**. A final broad-scale habitat map (with terrestrial and shallow coastal water components) was delivered to the project partner - Government of South Georgia & the South Sandwich (GSGSSI) - at the end of July 2018 (**Activity 3.4**) (**see Figure 3.1.1**). Further example maps can be seen in **Annex 8**. These broad-scale mapping outputs were well-received by GSGSSI, and were subsequently presented by them at the annual South Georgia Government's Stakeholder Event, hosted by the Foreign & Commonwealth Office in London (**Figure 3.1.2**). The South Georgia broad-scale habitat maps are also now available online to the wider public via the South Georgia Geographical Information System website (<https://www.sggis.gov.gs/>) (**Activity 3.5**) (**Figure 3.1.3**).



**Figure 3.1.1** – The broad-scale (Stage 1) habitat model/map showing the central area of South Georgia. Further maps can be seen in **Annex 8**.



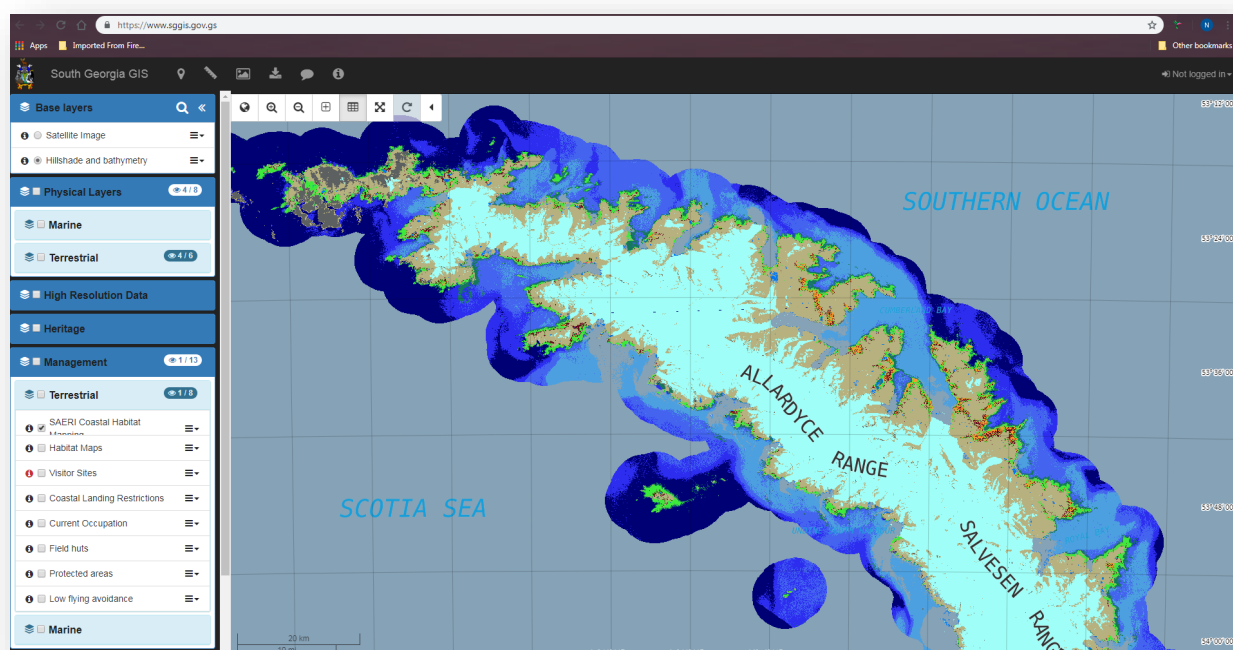
**Figure 3.1.2** – showcasing of the new South Georgia broad-scale habitat model/map at the Foreign & Commonwealth Office hosted South Georgia Stakeholder workshop.

A final broad-scale (Stage 1) habitat model/map was also delivered to the Falkland Islands Government in October 2018 (**Activity 3.4**). This final output was then made available to the wider public on a bespoke DPLUS065 Coastal Habitat Mapping project webGIS hosted by the SAERI IMS-GIS data centre (**Activity 3.5**)(**Figure 3.1.4**).

([https://data.saeri.org/saeri\\_webgis/lizmap/www/index.php/view/map/?repository=04f&project=fi\\_coastal\\_hab\\_map\\_wu\\_rem](https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&project=fi_coastal_hab_map_wu_rem)).

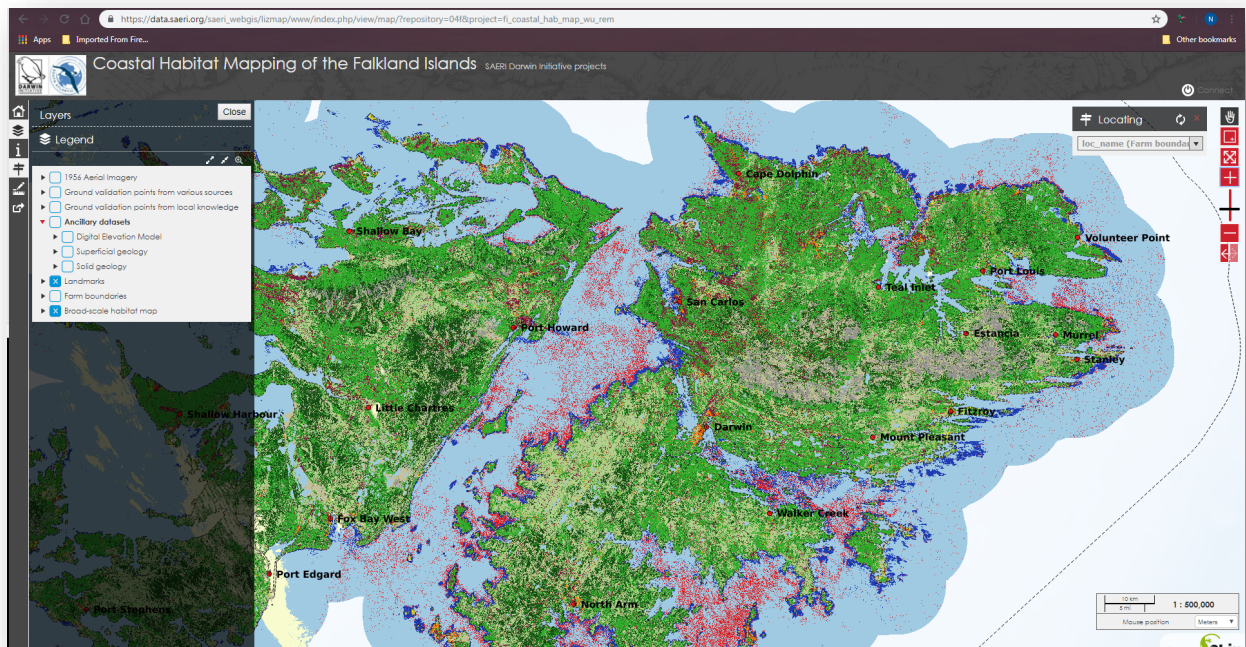
It is important to highlight here that the project was able to deliver ‘added value’ with the Falklands broad-scale habitat map. Rather than just focussing on the coastal margin, in light of the available data, it seemed feasible and appropriate to create a broad-scale habitat map for the entire Falkland Islands. This was for two reasons; firstly, extensive ground validation data was available from previous projects (including the JNCC’s CSSF-funded Natural Capital Assessment project), which could be utilised. Secondly, it was more efficient for JNCC to process the Sentinel satellite imagery for the entire extent of the Falklands, rather than just the coastal margin.

Following the production of these outputs for the Falklands and South Georgia, this Work Package is now considered complete.



**Figure 3.1.3** – The broad-scale (Stage 1) South Georgia habitat maps on the South Georgia web online mapping system.





**Figure 3.1.4** – The broad-scale (Stage 1) Falkland Islands habitat maps on the DPLUS065 Coastal Habitat Mapping project webGIS.

**Output 4: Work Package 3 - Identification, prioritisation and fulfilment of information data needs for the systematic conservation and planning of the coastal margin for the FI and for SG**

**Summary: ALL planned activities for this year have been completed.**

The work undertaken for Work Package 3 this year primarily involved Oregon State University (OSU), Falkland Islands Government, Government of South Georgia & the South Sandwich Islands, Joint Nature Conservation Committee (JNCC) and SAERI. Following completion of the broad-scale (Stage 1) habitat models/maps, it was important to understand where there was stakeholder demand for fine-scale habitat models, through dedicated stakeholder prioritisation workshops (**Activity 4.1 & 4.2**). In addition, these fine-scale models will also address areas of uncertainty in the broad-scale habitat maps. As stated in the previous annual report (AR1), it was agreed that different approaches should be employed for the Falklands and South Georgia stakeholder workshops. A traditional one-day workshop with ‘stakeholders round the table’ was held for Falkland Islands stakeholders on 8<sup>th</sup> August 2018 (**Activity 4.3**). However, with South Georgia stakeholders being widely distributed across many different countries, a different model was needed; material was circulated beforehand and a dedicated Skype conference at GSGSSI offices was held for views to be fed back on 9<sup>th</sup> August 2018 (**Activity 4.3**). The workshops were extremely successful, and stakeholders provided a clear mandate on their priorities. Reports from the [Falkland Islands](#) and [South Georgia](#) stakeholder prioritisation workshops are available on the project website (**Activity 4.5**), and detail workshop attendees etc.

Following a successful bid by project partner Oregon State University to the Digital Globe Foundation, high-resolution WorldView satellite imagery was made available to the project in April 2018 (**Activity 4.5**). **This initiative has added significant value to this project, as the purchase of this imagery (c. £) was out of scope for the original project. With the full range of very high-resolution imagery now available through the Digital Globe grant for the Falkland Islands and South Georgia, it is envisaged that the project outputs will be even more robust.** Evidence of the Digital Globe Foundation data can be seen on the various outputs produced by the project, including the stakeholder prioritisation reports and project outreach material (**Figure 3.1.5**).



**Figure 3.1.5:** An example dataset provided by the Digital Globe Foundation following a successful grant application.

In light of this successful Digital Globe Foundation grant, Darwin funding originally allocated to the “*acquisition of remote sensing data and associated costs*” was put to other uses to enhance the project further and provide excellent added value. These included the acquisition of aerial/subtidal remote sensing data and the training and certification in drone-flying for the PM. This was submitted to Darwin as a change request on 11<sup>th</sup> May 2018 and approved by Darwin on 21<sup>st</sup> May 2018.

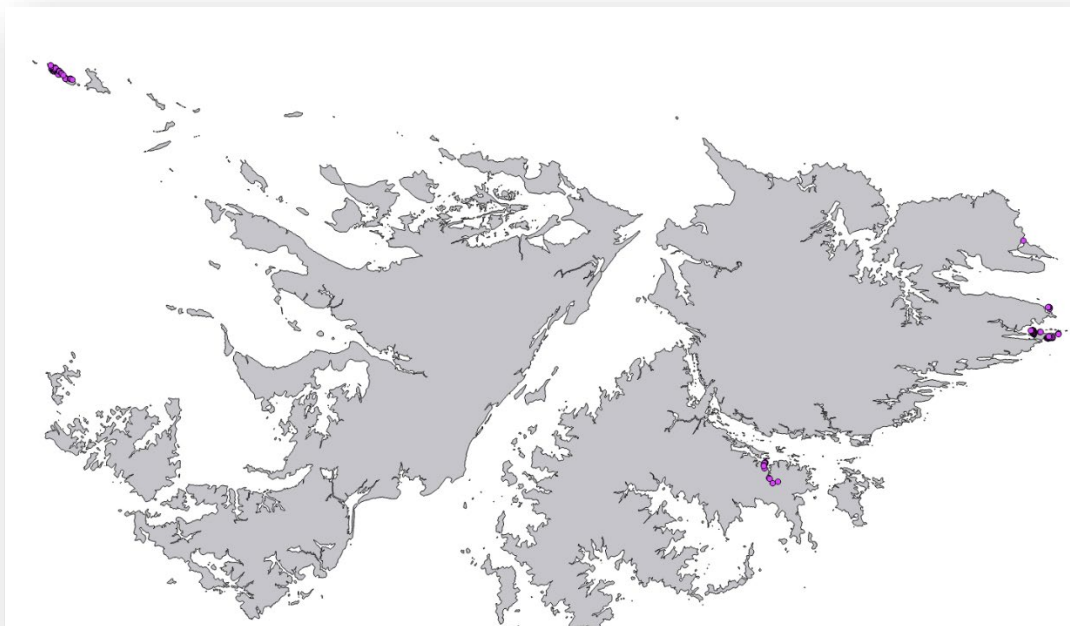
Throughout this reporting period, a significant amount of aerial drone imagery data has been collected from within the Falkland Islands. This was from priority locations selected by stakeholders during the Falklands stakeholder prioritisation workshop (**Activity 4.5**). During this time, the project has worked collaboratively with other local stakeholders and organisations, such as Falklands Conservation (**Figure 2.2**) and the Falklands Demining Programme (SafeLane Global and UK Foreign & Commonwealth Office) (**Figure 3.1.6 & Annex 9**). This very high-resolution drone imagery has been processed to create three-dimensional models, digital elevation models and orthomosaics (**Activity 4.6 & 4.7**) (as shown in **Annex 9**), the latter will be fed into the fine-scale habitat modelling workflow. Other areas that have been a priority include the mapping and modelling the invasive plant calafate, where the project has been working with the Falkland Islands Government Department of Agriculture.



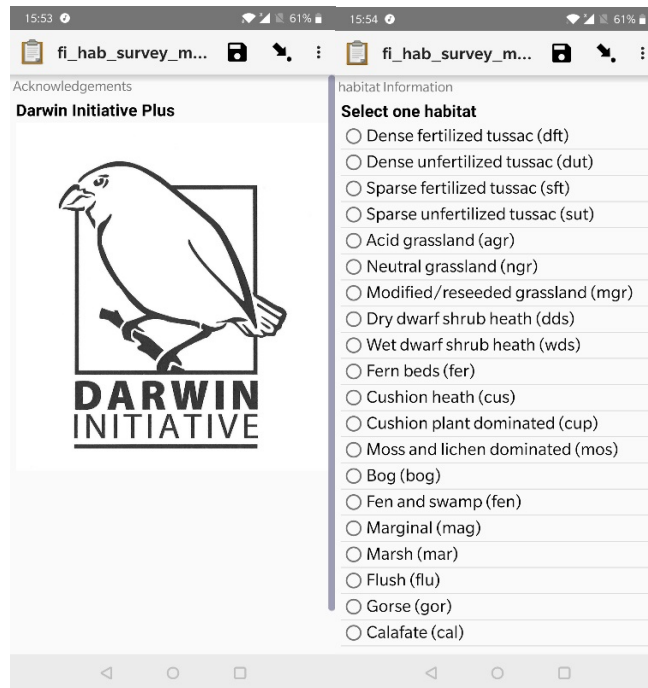


**Figure 3.1.6:** Collaborating with SafeLane Global and the UK Foreign & Commonwealth Office: Falklands Demining Programme

A significant amount of ground validation data has been collected for the Falklands this reporting year (see **Figure 3.1.7**). This is in addition to those ground validation points that have been created through the use of WorldView and other satellite imagery available on platforms such as Google Earth. To aid the collection of high quality and robust ground validation data, SAERI has developed a bespoke field recording form as an Android smartphone app, based on Open Data Kit (ODK) app available for Android smartphones (**Figure 3.1.8**). This has significantly improved the efficiency and accuracy of the ground validation phase of the project (**Activity 4.8**).

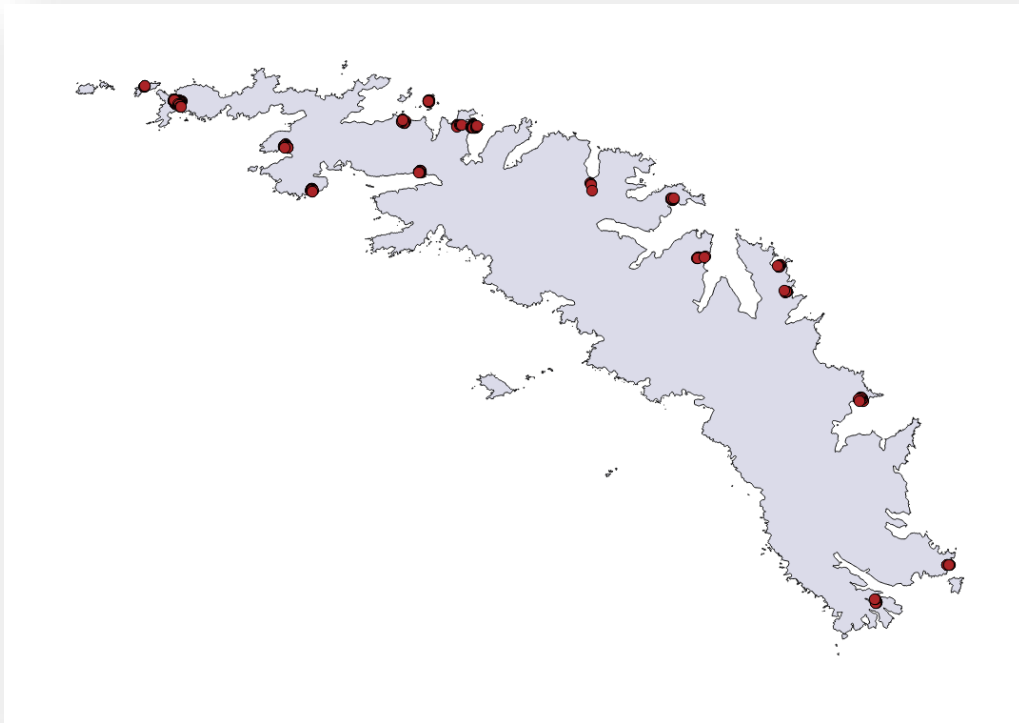


**Figure 3.1.7:** Ground validation points on the Falkland Islands collected using the SAERI developed ODK smartphone field recording app.



**Figure 3.1.8:** The SAERI ODK field recording app

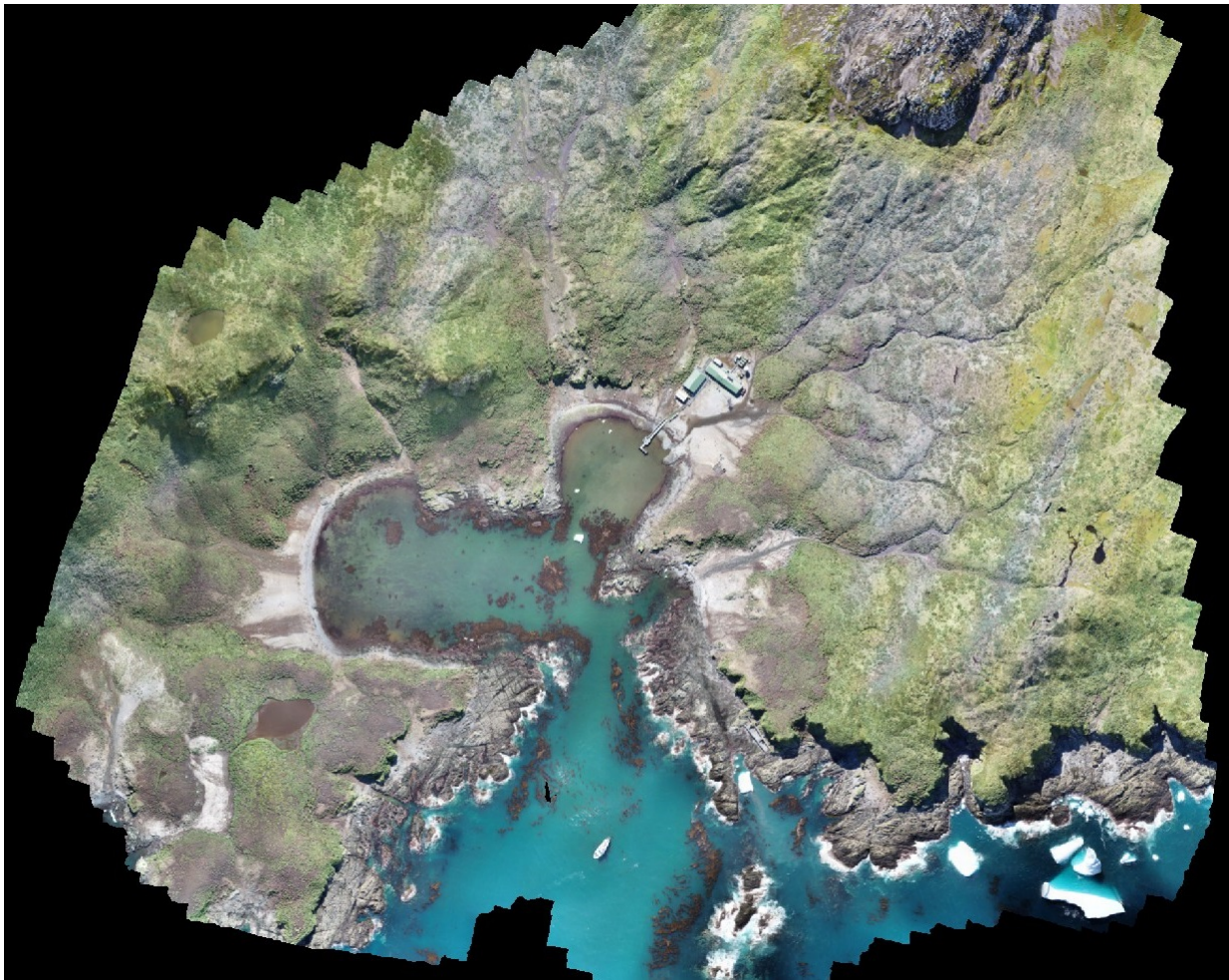
SAERI collaborated with the South Georgia Heritage Trust and Cambridge University Archaeological Unit and others on an expedition to South Georgia, which departed Stanley on 23<sup>rd</sup> February 2019. While the primary reason for the month long expedition was the South Georgia Archaeological Project, the SAERI Coastal Mapping PM joined the expedition in order to collect ground validation information and very high resolution aerial imagery from drone surveys of South Georgia (**Activity 4.5, 4.6, 4.7 & 4.8**). The Coastal Habitat Mapping element of this expedition collected 241 sample points across South Georgia (**Figure 3.1.9**) – these will be used to verify the ground cover/habitats at each of these locations, and will supplement information used to train and validate the computer models being used to create coastal habitat maps for South Georgia. A South Georgia variant of the smartphone recording app was used to collect the ground validation data during the South Georgia expedition. In addition, high-resolution drone mapping surveys were carried out in 8 locations, including Bird Island, Elsehul, Koppen Point, Jason Harbour, Start Point (Salisbury Plain), Fortuna Bay, Albatross Cove (Cooper Bay) and Gold Harbour (An example of the drone imagery collected is shown in **Figure 3.1.10 & 3.1.11**).



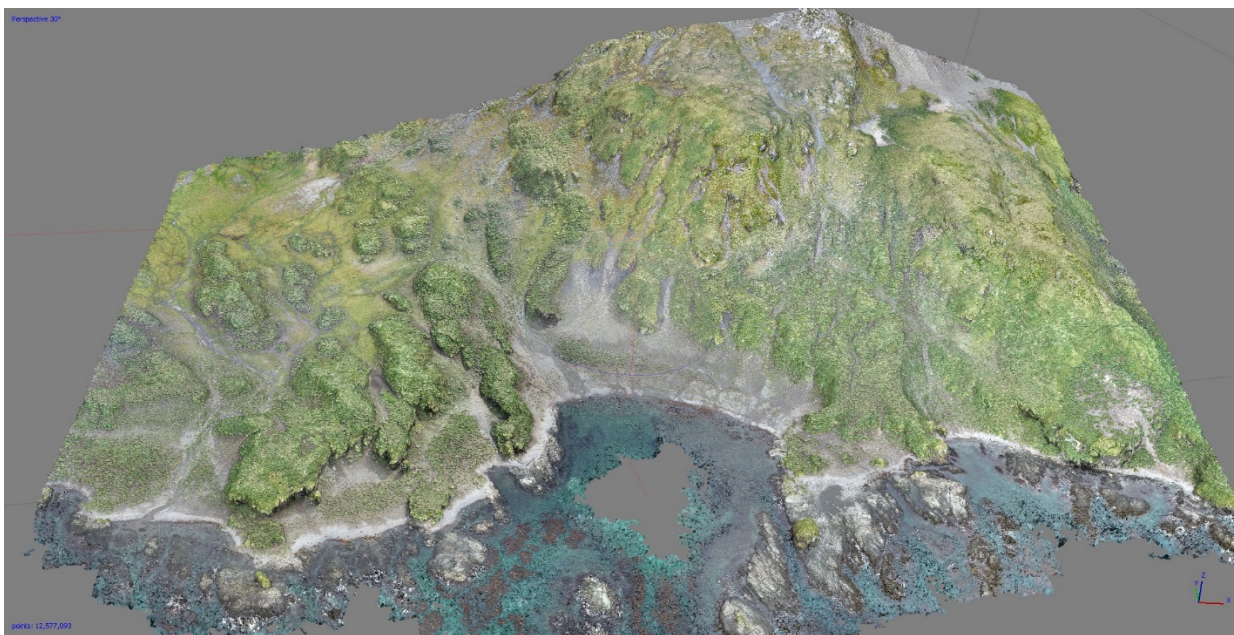
**Figure 3.1.9:** 241 ground validation points collected on the 2019 South Georgia expedition.

The expedition was a success. Sponsorship from Iridium Communications (in the form of satellite data as well as use of satellite handsets) was secured by the PM to allow the project to maintain a high level of social media outreach. This sponsorship from Iridium was essential for the drone mission planning, which utilised novel technology in the form of a drone mapping application, which altered the height of the drone in real time during the mapping mission with the terrain to ensure a near constant elevation above ground level, despite the mountainous terrain of South Georgia.





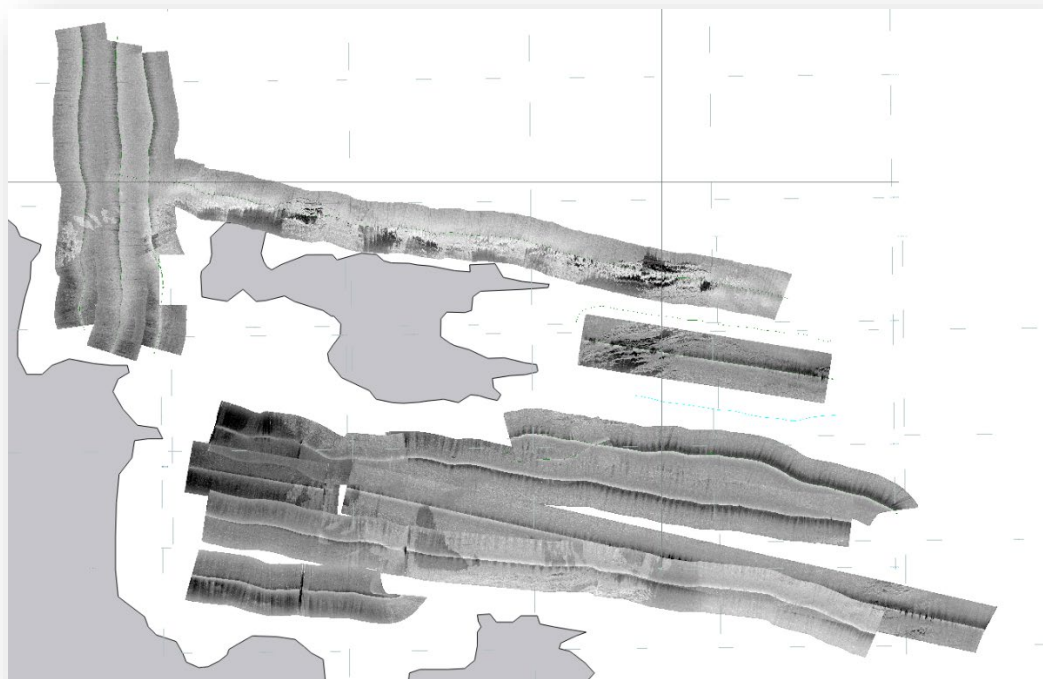
**Figure 3.1.10:** Bird Island mapping on the 2019 South Georgia expedition



**Figure 3.1.11:** Albatross Cove, Cooper Bay, 3D view, from the 2019 South Georgia expedition



With respect to the subtidal mapping element, building on progress reported in AR1, several dedicated subtidal survey expeditions were completed this reporting year; a collaboration between SAERI, Shallow Marine Surveys Group (SMSG) and Oregon State University (OSU). These included side-scan sonar surveys of areas around Port William, Kidney Island (**Figure 3.1.12**) & Cochon Island and drop-camera ground validation surveys (**Activity 4.5, 4.6 & 4.7**). Dr Chris Goldfinger from OSU visited the Falklands to take part in some of these subtidal surveys, sharing his extensive knowledge of collecting side-scan imagery. In addition to the collection of survey data, Dr Chris Goldfinger ran a side-scan processing workshop for SAERI (cross-Darwin project working with DPLUS065 and DPLUS071 staff) and SMSG staff (**Figure 3.1.13**). The data collected through these sublittoral surveys will be invaluable for the sub-tidal aspects of the habitat models being developed through the project.



**Figure 3.1.12:** Side-scan survey of Kidney Island



**Figure 3.1.13:** Side-scan training



## 3.2 Progress towards project Outputs

There has been excellent progress towards achieving the project outputs. Despite earlier delays highlighted in AR1 getting a project manager in post, appropriate re-planning ensured the project got back on track. **Rigorous project controls have ensured the project remains on track and on budget to deliver its Outputs.**

**Output 1** involves establishing the project management structure and communication tools. Overall progress of this Output is excellent. The baseline reported in AR1, and at the start of the second reporting year was that all work (and associated **Indicators 1.1, 1.3, 1.4 & 1.5**) was complete with the exception of a final, signed MoU (**Indicator 1.2**). This year, all relevant work has been completed as planned, including signing the MoU off by project partners (measured by **Indicator 1.2, 1.3, 1.4 & 1.5**). The indicators in use for Output 1 remain appropriate, and are measured according to the M & E plan. All (non-confidential) indicator means of verification (**1.2, 1.3, 1.4 & 1.5**) are available on the project website<sup>4</sup>.

**Output 2** deals with the geo-referencing of 1956 aerial imagery for the Falklands – the baseline at the start of this reporting year was that a workflow had been devised to take this work forward in Year 2 but no further work has been undertaken. At the end of this reporting year, the project has delivered a digital map of 1956 aerial imagery for the Falkland Islands, thereby achieving **Indicator 2.2**. This output was achieved by using innovative techniques developed by the SAERI IMS data centre, who wrote a script to automate the image geo-referencing process; the script will be run for each aerial image (loaded on the WebGIS) when requested by an end user. Evidence of completion of this output can be seen on the Coastal Habitat Mapping webGIS (**Annex 7** & [https://data.saeri.org/saeri\\_webgis/lizmap/www/index.php/view/map/?repository=04f&project=fj\\_coastal\\_hab\\_map\\_wu\\_rem](https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&project=fj_coastal_hab_map_wu_rem) - ensure the 1956 Aerial Imagery box is checked). The indicators remain appropriate, and are measured according to the M & E plan. This output can be considered complete.

**Output 3** considers the development of broad-scale (Stage 1) coastal habitat maps for the Falklands and South Georgia. The baseline from the end of reporting year one (AR1) was that the first iteration broad-scale habitat map for South Georgia had been delivered. This year, a revised broad-scale ‘satellite-derived’ habitat map was delivered for South Georgia (**Figure 3.1.3**). A broad-scale ‘satellite-derived’ habitat map was also delivered for the Falkland Islands (**Figure 3.1.4**). It is important to note the added value delivered through the project; a Falklands-wide habitat map was delivered, not just a habitat map of the Falklands coastal margin. **Indicator 3.1, 3.2 & 3.3** has been achieved this year. Evidence of these outputs can be seen in **Figure 3.1.3 & 3.1.4**, and the detail is reported in **Annex 8**. The indicators in use for Output 3 remain appropriate, and are measured according to the M & E plan. This output can now be considered complete.

**Output 4** deals with the identification, prioritisation and fulfilment of information data needs for the systematic conservation and planning of the coastal margin for the Falkland Islands and for South Georgia. The baseline from the end of the last reporting year was largely around the collection of ground validation. Excellent progress has been made this reporting year delivering this Output, and is on track to deliver by the end of the project. **Indicator 4.1** has been achieved: a set of successful stakeholder workshops were held (workshop reports available on the project website evidence this<sup>5</sup>). **Indicator 4.2** has been achieved; ground validation information has been collected from both Territories (evidenced in **Section 3.1 & Figure 3.1.7, 3.1.8 & 3.1.9**). **Indicator 4.3** has been partially achieved this year – as far as could be expected. This is outlined in Annex 8. The indicators in use for Output 4 remain appropriate, and are measured according to the M & E plan.

<sup>4</sup> <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>

<sup>5</sup> <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>

**Output 5** involves the prioritisation of ongoing planning, protection and monitoring of the coastal margin. This output focusses on knowledge sharing and training; no work was planned under this Output in Year 2 although a draft schedule has been agreed for the training workshop (**Indicator 5.3**). The indicators proposed for Output 5 remain appropriate, and will be measured according to the M & E plan.

**Output 6** deals with the integration of project outputs with existing and emerging initiatives. The baseline from the end of the last reporting year was largely around the commencement of a data initiatives review. This review (**Indicator 6.1**) was completed this reporting year. The remaining indicators relate to the final reporting year. The indicators in use for Output 6 remain appropriate, and are measured according to the M & E plan.

**Output 7** considers the monitoring and evaluation of the project. The baseline at the end of the first reporting year was the achievement of **Indicator 7.1**. Progress for this Output this reporting year has been good, with **Indicator 7.2** being achieved, as evidenced through the PMG meeting minutes available from the project website<sup>1</sup>. The indicators in use for Output 7 remain appropriate, and are measured according to the M & E plan.

### 3.3 Progress towards the project Outcome

This year, the project has made excellent progress to achieve the project Outcome “mapping generated from this cost-effective and innovative remote-sensing will underpin and enhance spatial and conservation planning in the remote Falkland Islands and South Georgia and allow for efficient, effective monitoring”. Considering the baseline with neither Territory having an island-wide coastal habitat map, excellent progress has been made, with a broad scale ‘satellite-derived’ habitat map being completed for both South Georgia and the Falkland Islands (see Section 3.1 – Output 3). Work is now progressing to deliver fine-scale habitat models/maps in line with stakeholder priorities by the end of the project. Following recommendations from the reviewer of AR1, the two indicators for the project Outcome have been revised (see **Annex 1**). Both indicators (**Indicator 0.1 & 0.2**) are deemed adequate for measuring project success. It is envisaged that the project will achieve its Outcome by the end of March 2020.

### 3.4 Monitoring of assumptions

Overall, the stated risks and assumptions identified at the start of the project (**Annex 2**) are still relevant.

An important assumption identified, and still relevant, under the broader project Outcome was that SAERI continues to “retain relevant skilled staff”. This has been essential for the delivery of the project mapping outputs via a bespoke project webGIS delivery system, as well as progressing **Output 2** as outlined below.

When considering the risks/assumptions for **Output 2**, we identified in AR1 that the planned workflow would need some consideration in order to deliver this Output, in light of the significant resource required. Having access to skilled staff within the SAERI IMS-GIS data centre ensured that a solution could be “coded” programmatically, thereby automating the geo-referencing process and expediting the process significantly. **Output 2** has now been delivered.

Regarding **Output 3**, the maps produced for South Georgia & the Falkland Islands demonstrate that this Output is achievable, and that the methodology proposed is feasible.

The assumptions for **Output 4** are relevant, for example, landowner permission has been required for access to survey locations (this has generally been forthcoming). From a satellite imagery perspective, cloud cover is an important factor to consider as the project progressed the fine-scale modelling/mapping. In addition, collection of very high-resolution drone imagery is extremely weather dependent – and this has been factored in when considering the number of areas and the number of available days when drone aerial imagery could be collected to feed into the fine-scale modelling/mapping.

The assumptions for **Output 5 & 6** are still considered to be realistic.

These assumptions have been incorporated into a project risk register and are being monitored as part of the monitoring and evaluation process.

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

Both Territories have plans and policies in place where the implementation will be enhanced by the increased coastal knowledge provided by this project

In the Falklands, the Islands Plan (2018 – 2022) contains a number of targets where the Outputs of this project could significantly advance knowledge and provide baseline conditions from which to detect future change and trends. They include:

- The implementation of the 2030 Biodiversity Framework to preserve our natural environment;
- Implement control of invasive species, biosecurity and eradication plans;
- Encourage natural habitat restoration and preservation;

This year, the project has worked towards delivering the Outputs tailored to stakeholder priorities (following the successful stakeholder prioritisation workshops). For example, specifically, the project has focussed efforts on looking at habitat restoration following the Falklands Demining Programme (see **Annex 9**), through collection of a baseline very high-resolution drone imagery dataset. The project has also focussed on the collection of data from around Port Sussex farm, an area where Falkland Islands Government is tackling the spread of a non-native invasive plant called calafate. This data will facilitate Falkland Islands Government to be able to monitor and track the spread of this invasive plant (**Figure 3.5.1**).



**Figure 3.5.1:** 3D dense point cloud (from processed drone imagery) from a calafate mapping mission at Port Sussex, East Falkland.

For South Georgia, the 2016-2020 Biodiversity Action Plan (BAP) published by GSGSSI, a key project partner for that Territory, includes a target to “*Enhance knowledge of the biodiversity and habitats of GSGSSI [...], including the establishment of scientific baselines from which to monitor environmental change*”. There are clear links between this BAP target and the mapped scientific baselines this project has been delivering. For example, the South Georgia Coastal Habitat Mapping expedition successfully completed by the project this year has collected important aerial baseline datasets and ground validation data for a variety of visitor landing sites – these datasets will provide GSGSSI with a useful tool to help better inform their management. In addition, the detailed imagery and consequent mapping will also provide a valuable baseline into how habitats and the island’s vegetation are changing and developing in the wake of the successful eradication of rodents and reindeer from South Georgia (**Annex 10**).

## 4. Monitoring and evaluation

A **Monitoring and Evaluation plan (Activity 7.1)** is available on the project website<sup>6</sup>, and has been an instrumental tool to allow the **Project Management Group (PMG)** to effectively govern the project (the latter was established in **Activity 1.3**); all project partners (SAERI, GSGSSI, FIG, OSU, JNCC and SMSG) sit on the PMG and actively participate. There is also a separate **Memorandum of Understanding (MoU) (Activity 1.2)**, signed by all partners, which underpins the partnership. The Project Manager (PM) has responsibilities to present a quarterly report on progress against deliverables, M&E and quarterly financial reports to the PMG (**Activity 7.2**). The PM also has responsibilities to maintain an **Issues Log** and project **Risk Register** which are also presented to the PMG at quarterly intervals (evidenced in the finalised minutes of each quarterly PMG meeting on the project website<sup>7</sup>). The PMG is tasked with ensuring that the project delivers its outputs on time and on budget. The PMG also has a responsibility to review and monitor the quality of the outputs.

**Trello**<sup>8</sup>, an online (cloud-based) project management tool is being utilised to ensure all members of the PMG have secure access to relevant documents, irrespective of their location.

Through a **Project Stakeholder Group (PSG) (Activity 1.4)**, there is the ability to check the relevance of planned products with a suite of potential end users. This is formalised through the biannual stakeholder meetings (evidenced by minutes and presentations from biannual PSG meetings on the the project website). Through a dedicated workshop for each Territory, the project was able to elicit priorities from the stakeholder network to determine priorities for fine-scale habitat mapping across both Territories (**Activity 4.1, 4.2, 4.3 & 4.4**).

## 5. Lessons learnt

The project has found that allocating sufficient time to project promotion and outreach within the community has paid dividends, and is worthy of note. This has really elevated the knowledge of the project, and the Darwin Initiative, within the Territories. Outreach has taken place through social media (Facebook & Twitter posts) as well as local radio station interviews, public presentations at the Chamber of Commerce, running special sessions at the local infant and junior school as well as attendance at local events such as the Rural Business Association show. Promotion of the project through the successful award of a Shackleton Scholarship Fund focussing on drone technologies with the Falklands allowed the Project Manager (PM) to share knowledge and experience of the technology being used by DPLUS065 to undertake the fine-scale mapping (**Annex 11**). The power of social media in small island territories which often use social media platform such as Facebook as a key method of communication should not be underestimated.

The project has built many new partnerships, which have meaningfully enhanced the opportunities and support for the project. In addition, the value of stakeholder engagement cannot be underestimated, opening up opportunities in terms of other complimentary activities and projects taking place. For example, collaborating with SGHT on the South Georgia Archaeological expedition, and building a partnership with Iridium Communications. This shows the importance of working with other organisations to find out about these types of projects and then how integration and cooperation can benefit both parties.

The project has benefitted from both the lead organisation (SAERI) and the PM being based in-territory, this is of value as it results in strong local partnerships with stakeholders, as well as helping to understand the local issues “on the ground” and ensure that any outputs are tailored to local stakeholder needs as a far as possible.

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<sup>6</sup> [https://www.south-atlantic-research.org/wp-content/uploads/2019/04/DPLUS065\\_ME\\_Plan\\_Final\\_Updated.pdf](https://www.south-atlantic-research.org/wp-content/uploads/2019/04/DPLUS065_ME_Plan_Final_Updated.pdf)

<sup>7</sup> <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/>

<sup>8</sup> <https://trello.com/b/ISipUNL0/dplus065-coastal-mapping-project-management>



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

The reviewer made a number of comments when reviewing the DPLUS065 AR1. Reviewer comments and responses are provided below:

1. **Reviewer comment:** *The website link for the M&E was not active and so it could not be reviewed*

**Response:** *the web link to the DPLUS Coastal Habitat Mapping project webpage has now been repaired - <https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/>*

2. **Reviewer comment:** *Please provide suitable evidence upfront on future reports*

**Response:** *suitable evidence is available either via a working website link or within this report.*

3. **Reviewer comment:** *Consider splitting the Outcome indicator into multiple SMART indicators to better measure progress. If not split, the indicator should be amended to be more clearly measurable and SMART.*

**Response:** *the Outcome Indicator has both been split, to make it easier to measure progress, as well as being made SMARTer. The revised Outcome Indicator is shown in Annex 2 (highlighted yellow)*

## 7. Other comments on progress not covered elsewhere

The project has a clearly defined and developed exit strategy, ensuring that consideration is given to what happens after the project ends; in-project training being considered a key part of this. The training of local stakeholders and personnel, scheduled for the third (final) year, will ensure that the local community has the skills to take forward habitat modelling and mapping in the Falklands and South Georgia after the project has completed, through using the tools developed by the Coastal Habitat Mapping project.

Towards the end of the year, the project experienced some problems from a subtidal fieldwork perspective with both weather windows and mechanical failure of vessel assets being used by the project. Both are unpredictable, and it was possible to mitigate this through sourcing alternative vessels which may be used. This highlights the importance of considering contingencies during the project planning phase. When planning projects such as this in remote locations, the malfunctioning of key assets/survey platforms could have a profound effect on project delivery.

When working in remote locations with extreme weather conditions, it is important to consider the risks of weather disrupting field work (i.e. drone flying) and building in enough time and flexibility to get out in the field and deliver results when conditions are appropriate.

The project commissioned a study looking to develop a Satellite-Derived Bathymetry layer for the shallow coastal waters of the Falkland Islands. This layer will be a useful input into the subtidal habitat modelling work. However, it would also be an extremely useful dataset in its own right for the Falklands community. There were difficulties with the approach, and these are reporting on in **Annex 14**. The work was undertaken by Environment Systems Ltd.

## 8. Sustainability and legacy

During this reporting year, the profile of the project has increased significantly. An increase in the frequency of posts on social media by the PM have resulted in a demonstrable increase in post sharing and retweeting, including from the Darwin Initiative, Iridium Communications and wider project partners. Consistent use of the project #SouthAtlanticCoastalMapping has helped elevate project visibility and identity. A summary of the top tweets with impressions and total engagements are provided in **Table 8.1**.

Regular project management group meetings, and the project stakeholder group meetings remain as important platforms for engagement, promotion and awareness of the work with key stakeholders on the islands.

Dedicated blog posts by visiting researchers such as Bran Black from Oregon State University have helped raise the profile of the project outside the two territories of the Falklands and South Georgia<sup>9</sup>.

There have been numerous examples of project (and Darwin Initiative) promotion throughout this reporting year, including press releases, radio interviews, television interviews and newspaper articles. These are listed (and evidenced) in **Section 9** below.

The *aide memoire* (a single side A4 PDF) prepared last year for all project related communications (included with AR1 – Annex 7) has worked exceptionally well, ensuring that all project partners are mentioned in the correct way. The success of this single sided PDF was demonstrated when South Georgia Heritage Trust requested a similar document for the 2019 South Georgia field expedition. For this trip, it was important that expedition sponsors such as Iridium Communications and National Geographic received recognition in all social media outreach (**see Annex 12**)

The exit strategy is still valid, with this forthcoming final year being very important; during Year 3, a training workshop will be held (draft schedule is shown in **Annex 4**). This workshop will enable the outputs from the project to be revised in later years even after the project has finished, using tools developed by the project.

Data generated through the project will be made available for future initiatives, through the IMS-GIS Database. In addition, data from South Georgia has been made available by the British Antarctic Survey through the South Georgia GIS.

With the Project Manager (PM) based in the Falkland Islands, working for SAERI – a Falklands-based research institution, there is a strong local connectivity for the full duration of the project.

Engaging the local community, through visiting schools and planning activities for the Watch Group has been a great way to get people enthusing about the project, which can only help with the future sustainability and legacy of coastal habitat mapping.

**Table 8.1:** A summary of the DPLUS065 project top tweets, with impressions and total engagements.

Date	Tweet	Impressions	Total Engagements
24 <sup>th</sup> July 2018	Look who's hiding in the tussac at Cape Dolphin! 😊 Stands of tussac form an important coastal habitat for the southern <a href="#">#sealion</a> around the <a href="#">#Falklands</a> - one that we're modelling and mapping as part of the <a href="#">@Darwin Defra</a> <a href="#">#SouthAtlanticCoastalMapping</a> project <a href="#">#TussacTuesday</a> <a href="https://pic.twitter.com/1VYS17z1dJ">pic.twitter.com/1VYS17z1dJ</a>	8,279	118
15 <sup>th</sup> August 2018	An important part of <a href="#">#Falklands</a> history, viewed from space! Pan-sharpened WorldView image of Stanley courtesy of <a href="#">@DigitalGlobeFDN</a> . The <a href="#">@Darwin Defra</a> <a href="#">#SouthAtlanticCoastalMapping</a> project is using this data to help map <a href="#">#Falklands</a> coastal habitats <a href="#">#FalklandsDay</a> <a href="#">#WednesdayWisdom</a> <a href="https://pic.twitter.com/SEDG5XXwS2">pic.twitter.com/SEDG5XXwS2</a>	5,997	181
6 <sup>th</sup> November 2018	Last week, the <a href="#">#SouthAtlanticCoastalMapping</a> project went to sea, joined by <a href="#">@goldfinger300</a> from	5,139	79

<sup>9</sup> <https://www.south-atlantic-research.org/bran-blacks-basic-rules-for-geo-referencing-drone-imagery/>

Date	Tweet	Impressions	Total Engagements
	<a href="#">@OSUCEOAS</a> . Chris specialises in seabed mapping, with sidescan sonar the tool of choice. Even our local charismatic megafauna couldn't resist the towfish! <a href="#">#Dolphins</a> <a href="#">#TuesdayMotivation</a> <a href="https://pic.twitter.com/ijwCQVJ51o">pic.twitter.com/ijwCQVJ51o</a>		
8 <sup>th</sup> February 2019	15 days until <a href="#">@SG Archaeology</a> expedition departs for SG on Hans Hansson ( <a href="#">@Quixote Exped</a> ), and some more drone imagery courtesy of <a href="#">@GovSGSSI</a> & Geometria from around Grytviken. The <a href="#">@Darwin Defra</a> <a href="#">#SouthAtlanticCoastalMapping</a> project will be collecting more like this <a href="#">#FridayFeeling</a> <a href="https://pic.twitter.com/DUrnHuazpj">pic.twitter.com/DUrnHuazpj</a>	8,338	172
7 <sup>th</sup> March 2019	An <a href="#">#albatross</a> view of Bird Island - the <a href="#">#CoastalMappingTeam</a> had stunning weather & completed a 100 ha high resolution aerial imagery of the island. Thank you <a href="#">@IridiumComm</a> <a href="#">@mailasail</a> <a href="#">#IridiumNEXT</a> for their support, allowing us to plan our drone missions in the most remote places! <a href="https://pic.twitter.com/hlPHwxOmem">pic.twitter.com/hlPHwxOmem</a>	4,376	134

## 9. Darwin identity

Over the last reporting year, significant effort has been made to publicise the project, and the Darwin Initiative funding for the project. The project has followed Clause 21 of the Darwin Terms and Conditions<sup>10</sup>, and has used the Darwin logo where possible.

**Table 9.1** below lists the outreach activity, which was undertaken to raise the profile of both the project and the Darwin Initiative.

**Table 9.1:** Outreach activity for the DPLUS065 Coastal Habitat Mapping project

Date	Details	Link to evidence
20 <sup>th</sup> April 2018	Interview on Falkland Islands Radio introducing the Coastal Habitat Mapping project given by the project manager Neil Golding	<a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/</a>
4 <sup>th</sup> Sept 2018	This poster, presented at the 2018 UK National Earth Observation Conference, won first prize. It features the DPLUS065 broad scale habitat mapping work completed for South Georgia as one of the case studies	<a href="https://www.south-atlantic-research.org/wp-content/uploads/2018/10/The-Living-Maps-Method-Poster-V2.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2018/10/The-Living-Maps-Method-Poster-V2.pdf</a>
1 <sup>st</sup> August 2018	Bran Black, a grad student from Oregon State University recently visited the Falklands and joined project manager Neil Golding to finish island-wide maps based on satellite imagery for both the Falklands and South Georgia, as well as to help create the more detailed maps of localized areas of interest. Bran wrote a blog sharing her experience on the islands and working with SAERI	<a href="https://www.south-atlantic-research.org/brn-blacks-basic-rules-for-geo-referencing-drone-imagery/">https://www.south-atlantic-research.org/brn-blacks-basic-rules-for-geo-referencing-drone-imagery/</a>
21 <sup>st</sup> Nov 2018	The article 'Drones as a tool for our future – drone expert to visit the Falkland Islands' was circulated on the SAERI network on 21st November 2018	<a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/</a>
24 <sup>th</sup> Nov 2018	The visit of the Shackleton Scholar "drone expert" to the Falkland Islands that will be running junction with DPLUS065 Coastal Mapping project was broadcast on the local radio station.	<a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-latest-news/</a>

<sup>10</sup> Schedule of Terms and conditions for Darwin Plus awards 2017-2018.

24 <sup>th</sup> Nov 2018	Shackleton Drone week video produced by FITV	<a href="https://www.youtube.com/watch?v=d5JAJhEOJCo&amp;feature=youtu.be">https://www.youtube.com/watch?v=d5JAJhEOJCo&amp;feature=youtu.be</a>
15 <sup>th</sup> Feb 2019	The article 'Using drones to create fine scale models of minefields' was published on the Penguin News on 15th February 2019	<a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/02/20190215-11.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/02/20190215-11.pdf</a>
20 <sup>th</sup> Feb 2019	The presentation 'Mapping the coastal margins of the Falklands & South Georgia' given to the Environment Committee was held on the 20th February 2019	<a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/04/2019_02_20_CoastalHabitatMapping_EnvCommittee_Presentation.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/04/2019_02_20_CoastalHabitatMapping_EnvCommittee_Presentation.pdf</a>
29 <sup>th</sup> March 2019	The article 'South Georgia Archaeological Expedition 2019: collection of news from the field' published by South Georgia Heritage Trust, includes the contribution to the expedition made by the DPLUS065 Coastal Habitat Mapping project.	<a href="http://www.sght.org/news/south-georgia-archaeological-expedition-2019-collection-of-news-from-the-field/">http://www.sght.org/news/south-georgia-archaeological-expedition-2019-collection-of-news-from-the-field/</a>
5 <sup>th</sup> April 2019	Project manager, Neil Golding, and the DPLUS065 Coastal Habitat Mapping project provided aerial mapping support to the South Georgia Archaeological Project expedition in February/March 2019. This is described on the article 'Tracing the birth of a global economy' published on the Penguin News on the 5th April 2019.	<a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/04/pncentre.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/04/pncentre.pdf</a>
5 <sup>th</sup> April 2019	The article 'Using drones to map South Georgia's coastal habitats' was published on the Penguin News on the 5th April 2019	<a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/04/pn11.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/04/pn11.pdf</a>

Samples of the social media outreach produced by the project have been used throughout this report. Both Facebook and Twitter posts tagged the Darwin Initiative. SAERI has 1655 followers.

## 10. Project Expenditure

This reporting year, in light of a successful Digital Globe Foundation grant, Darwin funding originally allocated to the “*acquisition of remote sensing data and associated costs*” was put to other uses to enhance the project further and provide excellent added value. These included the acquisition of aerial/subtidal remote sensing data and the training and certification in drone-flying for the Project Manager (PM). This was submitted to Darwin as a change request on 11<sup>th</sup> May 2018 and approved by Darwin on 21<sup>st</sup> May 2018.

Project expenditure for this reporting year can be seen below in **Table 10.1**.

**Table 10.1: Project expenditure during the reporting period (1 April 2018 – 31 March 2019)**

Project spend (indicative) in this financial year	2018/19 D+ Grant (£)	2018/19 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)				
<b>TOTAL</b>				



## Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2018-2019 – if appropriate

**Note that the green highlighted section under Measurable Indicators was revised following feedback from the AR1 reviewer.**

**Also note that Measurable Indicators completed and reported in AR1 (April 2017 – March 2018) have not been included in this report of progress below.**

Project summary	Measurable Indicators	Progress and Achievements April 2018 - March 2019	Actions required/planned for next period
<p><b>Impact</b></p> <p>Environmental evidence-base for decision-making on the FI and SG is significantly enhanced by the provision of baseline data in a thematic area that is a current gap i.e. coastal margin.</p>		<p><i>With the production of broad-scale (Stage 1) habitat models/maps for both the Falklands and South Georgia now complete, these have effectively plugged this data/knowledge gap for both territories. This has then allowed stakeholders to prioritise the location of fine-scale modelling/mapping (Stage 2). Fieldwork has been undertaken in both territories to support Stage 2.</i></p>	
<p><b>Outcome</b></p> <p>The mapping generated from this cost-effective and innovative remote-sensing will underpin and enhance spatial and conservation planning in the remote FI and SG and allow for efficient, effective monitoring.</p>	<p><b>0.1</b> The coastal habitats of the Falkland Islands are broadly classified and visualized via digital outputs (e.g. maps, GIS layers) at a spatial and temporal scale sufficient for spatial planning and decision making, by the end of March 2020.</p> <p><b>0.2</b> The coastal habitats of South Georgia are broadly classified and visualized via digital outputs (e.g. maps, GIS layers) at a spatial and temporal scale sufficient for spatial planning and decision making, by the end of March 2020.</p>	<p><i>In this second year, excellent progress was made achieving this projects outcome. In addition, opportunities to add value to this project were sought and have delivered significant gains. Following successful delivery of broad-scale habitat models/maps for the Falklands (Figure 3.1.4) and South Georgia (Figure 3.1.3), these have been rolled out to the wider public through bespoke and existing spatial data delivery mechanisms. Work has now commenced developing and delivering fine-scale maps for the Falklands and South Georgia at a resolution and location driven by stakeholder demand.</i></p>	<ul style="list-style-type: none"> <li>• <i>Further collection of ground validation information for fine-scale habitat modelling.</i></li> <li>• <i>Completion of fine-scale (Stage 2) coastal habitat models/maps for the Falklands and South Georgia.</i></li> <li>• <i>Monitoring manual for the long-term monitoring of the coastal margin of the Falklands and South Georgia (final project report).</i></li> <li>• <i>Training workshop for knowledge transfer</i></li> <li>• <i>End of project synthesis workshop</i></li> </ul>

Project summary	Measurable Indicators	Progress and Achievements April 2018 - March 2019	Actions required/planned for next period
<p><b>Output 1.</b> Project Management structure, and communications tools established</p>	<p>1.2 An MoU agreed and signed by all partners by end Quarter 4 FY 17/18.</p> <p>1.3 A Project Management Group (PMG) meeting held every 3 months starting October 2017.</p> <p>1.4 A Project Stakeholders group (PSG) meeting held every 6 months starting Quarter 4 FY 17/18.</p> <p>1.5 At least 1 project webpage created by end Quarter 4 FY 17/18, and at least 1 update to the page made every month.</p> <p>1.6 Final project report produced by March 2020</p>	<p>1.2 <i>The MoU was approved and signed by project partners in Q1 of FY 18/19. The text of the MoU is available on the project website <a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/04/MoU_DPLUS065_CoastalMapping_Final.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/04/MoU_DPLUS065_CoastalMapping_Final.pdf</a>. A copy of the signatories to this MoU is shown in Annex 3 of this report. Indicator is appropriate.</i></p> <p>1.3 <i>On track – quarterly PMG meetings held &amp; approved minutes available here: <a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/</a>. Indicator is appropriate. Due to the February/March 2019 month-long South Georgia fieldwork expedition, the FY 18/19 Q4 PMG meeting was delayed until 5<sup>th</sup> April 2019. However, this has now been held and the minutes are in the process of being finalised.</i></p> <p>1.4 <i>On track – Bi-annual stakeholder meetings have been held, and approved minutes and presentations available here: <a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/</a>. The August 2018 stakeholder meeting was also a very successful Stakeholder prioritisation workshop. Two workshops were held, one for the Falklands and one for South Georgia. Reports are available at the same web link above. Indicator is appropriate.</i></p> <p>1.5 <i>On track – Project website is running well, and has been updated regularly <a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/</a>. Note the ‘Latest News’ section which is regularly updated. Indicator is appropriate.</i></p> <p>1.6 <i>N/A in this reporting period. This will be completed next year (Year 3). Indicator is appropriate.</i></p>	
Activity 1.2: Draft and sign Project Partners MoU		Completed	
Activity 1.3: Quarterly PMG meetings		Completed	Further PMG meetings planned for next period
Activity 1.4: 6 monthly PSG meetings		Completed	Further PSG meetings planned for next period

Project summary	Measurable Indicators	Progress and Achievements April 2018 - March 2019	Actions required/planned for next period
Activity 1.5: Monthly Webpage updates		<i>Completed</i>	<i>Further website updates planned for next period</i>
Activity 1.6: Complete various project management activities		<i>Completed</i>	<i>These will be completed as required next period</i>
Activity 1.7: Final project report and publicity		<i>Not planned for this reporting period</i>	<i>Planned for completion next reporting period.</i>
<b>Output 2.</b> Work Package 1 (WP1): Digitised 50 year old aerial imagery (FI only)	2.2 Complete geo-referencing of 1954 aerial imagery to create a digital map by end Quarter 2 FY 18/19	2.2 <i>This was completed in this reporting period. Using innovative techniques, the SAERI IMS data centre developed a script to automate the image geo-referencing process. A digital map of the Falklands 1956 aerial imagery is now available on the DPLUS065 Coastal Habitat Mapping webGIS: <a href="https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&amp;project=fi_coastal_hab_map_wu_rem">https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&amp;project=fi_coastal_hab_map_wu_rem</a> (Please tick the 1956 Aerial Imagery box)</i>	
Activity 2.2: Complete the geo-referencing of 1956 aerial imagery along the coastal margin		<i>Completed</i>	
Activity 2.3: Produce a digital map of the 1956 aerial imagery showing the coastal margin		<i>Completed</i>	
Activity 2.4: Upload the 1950's coastal margin (aerial imagery) map onto the MSP GIS portal and a copy of the associated metadata onto the South Atlantic metadata catalogue		<i>Completed</i>	
<b>Output 3.</b> Work package 2 (WP2): Object based image analysis and habitat modelling of the coastal margin (FI and SG)	3.1 Stage I habitat modelling and classification complete for the Falklands by September 2018.  3.3 Stage I habitat modelling and classification (subtidal) complete for South Georgia, and integration with terrestrial and intertidal habitat maps by end July 2018	3.1 <i>This was completed this reporting period; the resulting broad-scale habitat map for the Falklands can be seen in Figure 3.1.4 as well as being available on the webGIS. Value was added to this output through creation of a Falklands wide habitat model, not just focussed on the coastal margin. (<a href="https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&amp;project=fi_coastal_hab_map_wu_rem">https://data.saeri.org/saeri_webgis/lizmap/www/index.php/view/map/?repository=04f&amp;project=fi_coastal_hab_map_wu_rem</a>). (Please tick the Broad-scale habitat map box). Indicator is appropriate</i>  3.3 <i>This was completed this reporting period; the resulting broad-scale habitat map for South Georgia can be seen in Figure 3.1.3 as well as being available on the South Georgia GIS: <a href="https://www.sggis.gov.gs/">https://www.sggis.gov.gs/</a> (On the left hand side,</i>	

Project summary	Measurable Indicators	Progress and Achievements April 2018 - March 2019	Actions required/planned for next period
		<i>please expand 'Management', 'Terrestrial' and then tick the SAERI Coastal Habitat Mapping box). Indicator is appropriate</i>	
Activity 3.3: Undertake Analysis of the satellite imagery and habitat modelling		<i>Completed</i>	
Activity 3.4: Produce a Coastal Margin habitat map for South Georgia and the Falklands		<i>Completed</i>	
Activity 3.5: Upload the Coastal Margin habitat map onto the MSP GIS portal (for the Falklands) and supply SG map to GSGSSI (for upload to GSGSSI web portal); upload a copy of the associated metadata onto the South Atlantic metadata catalogue.		<i>Completed</i>	
<p><b>Output 4.</b> Work Package 3 (WP3): Identification, prioritisation and fulfilment of information data needs for the systematic conservation and planning of the coastal margin for the FI and for SG.</p>	<p>4.1 At least 1 FI (Q3 FY 18/19) and 1 SG (Q3 FY 18/19) stakeholder workshop held to identify and prioritise data needs for the coastal margin</p> <p>4.2 Ground truthing of satellite imagery analysis on SG (Quarter 3 FY 17/18 &amp; Quarter 4 FY 18/19) and the FI (Quarter 1 – Quarter 4 FY 18/19)</p> <p>4.3 Stage II geospatial data products reflecting prioritized information needs utilizing high res imagery to reduce uncertainty in habitat models/classifications and address spatial and temporal data priority needs expressed by stakeholders – for both the FI and SG by Quarter 1 FY 19/20</p>	<p>4.1 <i>Two successful fine-scale mapping stakeholder prioritisation workshops were held on the 8<sup>th</sup> &amp; 9<sup>th</sup> August 2018 for the Falkland Islands and South Georgia respectively. Workshop presentations and reports can be found here: <a href="https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/">https://www.south-atlantic-research.org/research/terrestrial-science/coastal-mapping-project/coastal-mapping-project-download-area/</a>. Indicator is appropriate</i></p> <p>4.2 <i>Successful ground validation campaigns were completed on South Georgia in Q4 FY 18/19 (see Penguin News article: <a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/04/pn11.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/04/pn11.pdf</a>, Section 3.1 and Figure 3.1.9) and the Falklands right through FY 18/19. See Section 3.1 &amp; Figure 3.1.17 . Indicator is appropriate</i></p> <p>4.3: <i>Good progress has been made developing the fine-scale habitat modelling/mapping framework, which will address stakeholder priorities, by Oregon State University, the partner leading on this work package. Progress to date is reported in Section 3.1 and Annex 8. This work is scheduled for completion in Year 3. Indicator is appropriate</i></p>	
Activity 4.1: Confirm Stakeholder workshop (to identify and prioritise spatial and temporal data priority needs expressed by Stakeholders) date, venue, and participants for the Falklands and South Georgia		<i>Completed</i>	



<b>Project summary</b>	<b>Measurable Indicators</b>	<b>Progress and Achievements April 2018 - March 2019</b>	<b>Actions required/planned for next period</b>
Activity 4.2: Confirm Stakeholder workshop programme, speakers and facilitators through consultations via the PMG and PSG for the Falklands and South Georgia		<i>Completed</i>	
Activity 4.3: Host the Stakeholder workshop for the Falklands and South Georgia		<i>Completed</i>	
Activity 4.4: Produce the Stakeholder workshop report for the Falklands and South Georgia and upload onto the project webpage		<i>Completed</i>	
Activity 4.5: Acquire very high resolution satellite imagery (e.g. WorldView) and/or undertake drone missions to acquire high resolution imagery for priority areas requiring fine-scale mapping in South Georgia and the Falklands		<i>Completed for South Georgia. The bulk of drone surveys have now been completed for the Falkland Islands.</i>	<i>Anticipated that further drone surveys will be completed within the Falkland Islands in the next reporting period.</i>
Activity 4.6: Pre-process the imagery to prepare for analysis		<i>Completed for imagery collected in this reporting period.</i>	<i>Further image processing will be anticipated for drone surveys undertaken in the next reporting period.</i>
Activity 4.7: Undertake analysis of the imagery.		<i>Analysis of imagery commenced in this reporting period.</i>	<i>This analysis will continue into the next reporting period, when it will be completed.</i>
Activity 4.8: Undertake ground-validation of analysed data on the Falklands and South Georgia		<i>The collection of ground validation information has been completed for South Georgia, following the successful completion of the 2019 South Georgia Coastal Habitat Mapping expedition.  The collection of ground validation has been largely completed for the Falkland Islands, but will continue into the next reporting period</i>	<i>Collection of Falklands ground validation information will continue into the next reporting period.</i>
Activity 4.9: Produce detailed (Stage II) Coastal Margin habitat maps for priority areas for South Georgia and for the Falklands		<i>Work has commenced on the fine-scale (Stage 2) habitat models/maps, led by Oregon State University.</i>	<i>To be completed in next reporting period.</i>
Activity 4.10: Upload the detailed (Stage II) Coastal Margin habitat map onto the MSP GIS portal (for the Falklands) and supply to GSGSSI for upload onto the			<i>To be completed in next reporting period.</i>

Project summary	Measurable Indicators	Progress and Achievements April 2018 - March 2019	Actions required/planned for next period
GSGSSI web portal. Upload a copy of the associated metadata onto the South Atlantic metadata catalogue.			
<b>Output 5.</b> Work Package 4 (WP4): Prioritisation of ongoing planning, protection and monitoring of the coastal margin	<p>5.1 A monitoring manual produced for long-term monitoring of coastal margin for the Falklands by end Quarter 3 FY 19/20</p> <p>5.2 A monitoring manual produced for long-term monitoring of coastal margin for South Georgia by end Quarter 3 FY 19/20</p> <p>5.3 At least 1 face-to-face training workshop in implementing monitoring undertaken by end Quarter 2 FY 19/20</p>	<p><i>5.1 For completion in Year 3 - Indicator is appropriate</i></p> <p><i>5.2 For completion in Year 3 - Indicator is appropriate</i></p> <p><i>5.3 For completion in Year 3 - Indicator is appropriate</i></p>	
Activity 5.1: Draft a long-term coastal mapping/monitoring manual for the Falklands and South Georgia and upload onto the project webpage			<i>For completion in final reporting period</i>
Activity 5.2: Confirm date, venue, and participants for the Falklands and South Georgia coastal mapping/monitoring training workshop		<i>Training workshop schedule was discussed in the Q4 PMG meeting, with the date of 9<sup>th</sup> – 11<sup>th</sup> July reserved for workshop. A draft training workshop schedule is shown in Annex 4.</i>	<i>For completion in final reporting period</i>
Activity 5.3: Undertake coastal mapping/monitoring training workshop			<i>For completion in final reporting period</i>
Activity 5.4: Record videos of training sessions and upload online onto the project webpage			<i>For completion in final reporting period</i>
<b>Output 6.</b> Work Package 5 (WP 5) All outputs integrated with existing and emerging initiatives	<p>6.1 New geospatial products maximally informed and integrated with existing FI and SG geo-spatial data initiatives</p> <p>6.2 End of project synthesis workshop for FI and SG held by end Quarter 3 FY 19/20 to discuss and consider how</p>	<i>6.1 Review of stakeholder and data initiatives within the Falklands and South Georgia was completed this year. The short report from which can be seen in Annex 5, and has been uploaded onto the project website for wider dissemination<sup>11</sup>.</i>	

<sup>11</sup> [https://www.south-atlantic-research.org/wp-content/uploads/2019/04/19\\_03\\_A\\_review\\_of\\_existing\\_data\\_management\\_initiatives\\_in\\_Falklands\\_SouthGeorgia\\_FINAL.pdf](https://www.south-atlantic-research.org/wp-content/uploads/2019/04/19_03_A_review_of_existing_data_management_initiatives_in_Falklands_SouthGeorgia_FINAL.pdf)

Project summary	Measurable Indicators	Progress and Achievements April 2018 - March 2019	Actions required/planned for next period
	findings will contribute to systematic conservation planning	6.2 For completion in Year 3 – Planned for October/November 2019. Indicator is appropriate	
Activity 6.1: Review all of the existing (relevant) stakeholder groups and data creation and management initiatives and protocols.		Completed	
Activity 6.2: Produce a report on the review demonstrating how this initiative links to and builds on the existing and emerging work, and publish on the project webpage.		Completed	
Activity 6.3: Prepare for and host 'end of project' synthesis workshop to decide how outputs will be fed into planning			For completion in final reporting period
<b>Output 7.</b> Monitoring & evaluation	7.2 6-monthly updates on implementation of M&E Plan provided to PMG	7.2 Regular updates on implementation of the M&E plan have been given to PMG. Trello online project management tool continued to be used to share PMG documentation. Review of the M&E plan has been a standing agenda item on the quarterly PMG meetings. M&E plan can be seen here: <a href="https://www.south-atlantic-research.org/wp-content/uploads/2019/04/DPLUS065_ME_Plan_Final_Updated.pdf">https://www.south-atlantic-research.org/wp-content/uploads/2019/04/DPLUS065_ME_Plan_Final_Updated.pdf</a> . Indicator is appropriate	
Activity 7.2: Prepare and present 6 monthly M and E updates		Completed	Further updates planned for next reporting period
Activity 7.3: Upload M and E plan and updates onto webpages		Completed	Any further changes will be reflected in the version available on the project website

## 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](mailto:Darwin-Projects@ltsi.co.uk) if you have any questions regarding this.*

**Note that the green highlighted section under Measurable Indicators, revised following feedback from the AR1 reviewer.**

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<b>Impact:</b> Environmental evidence-base for decision-making on the FI and SG is significantly enhanced by the provision of baseline data in a thematic area that is a current gap i.e. coastal margin.			
<b>Outcome:</b> The mapping generated from this cost-effective and innovative remote-sensing will underpin and enhance spatial and conservation planning in the remote FI and SG and allow for efficient, effective monitoring.	0.1 The coastal habitats of the Falkland Islands are broadly classified and visualized via digital outputs (e.g. maps, GIS layers) at a spatial and temporal scale sufficient for spatial planning and decision making, by the end of March 2020.  0.2 The coastal habitats of South Georgia are broadly classified and visualized via digital outputs (e.g. maps, GIS layers) at a spatial and temporal scale sufficient for spatial planning and decision making, by the end of March 2020.	0.1 FI MSP Web GIS portal 0.2 SG webGIS portal 0.3 SAERI project webpages.	SAERI’s IMS-GIS Centre continues to retain relevant skilled staff
<b>Outputs:</b> 1. Project Management structure, and communications tools established	1.1 Project Manager recruited by end Quarter 3 FY 17/18. 1.2 An MoU agreed and signed by all partners by end Quarter 4 FY 17/18. 1.3 A Project Management Group (PMG) meeting held every 3 months starting October 2017. 1.4 A Project Stakeholders group (PSG) meeting held every 6 months starting Quarter 4 FY 17/18.	1.1 Project Manager employment contract signed 1.2 MOU signed by all parties 1.3 PMG meeting notes available online 1.4 PSG meeting notes available online.	PM with the relevant skills can be recruited.



	<p>1.5 At least 1 project webpage created by end Quarter 4 FY 17/18, and at least 1 update to the page made every month.</p> <p>1.6 Final project report produced by March 2020.</p>	1.5 Project webpage available for viewing online	
2. Work Package 1 WP1: Digitised 50 year old aerial imagery (FI only)	<p>2.1 1 Commence geo-referencing of 1954 aerial imagery by Quarter 4 FY 17/18.</p> <p>2.2 Complete geo-referencing of 1954 aerial imagery to create a digital map by end Quarter 2 FY 18/19</p>	2.1 1954 FI aerial imagery digital map available via MSP GIS portal	Aerial imagery is of sufficient quality to be able to be digitised. Preliminary checks suggest this is the case.
3. Work package 2 (WP2): Object based image analysis and habitat modelling of the coastal margin (FI and SG)	<p>3.1 Stage I habitat modelling and classification complete for the Falklands by September 2018.</p> <p>3.2 Stage I habitat modelling and classification (terrestrial and intertidal) complete for South Georgia by end March 2018.</p> <p>3.3 Stage I habitat modelling and classification (subtidal) complete for South Georgia, and integration with terrestrial and intertidal habitat maps (3.2) by end July 2018</p>	<p>3.1 FI coastal margin (Stage I) habitat map available online via MSP GIS portal</p> <p>3.2 SG coastal margin (Stage I) habitat map available online via South Georgia GIS portal</p>	<p>Satellite imagery at useful resolution and without cloud cover is obtainable.</p> <p>Preliminary checks suggest several options and suitable imagery will be available.</p> <p>Satellite imagery and derived products are open access.</p> <p>Preliminary enquiries and expert opinion suggest this is feasible.</p>
4. Work Package 3 (WP3): Identification, prioritisation and fulfilment of information data needs for the systematic conservation and planning of the coastal margin for the FI and for SG	<p>4.1 At least 1 FI (Q3 FY 18/19) and 1 SG (Q3 FY 18/19) stakeholder workshop held to identify and prioritise data needs for the coastal margin</p> <p>4.2 Ground truthing of satellite imagery analysis on SG (Quarter 3 FY 17/18 &amp; Quarter 4 FY 18/19) and the FI (Quarter 1 – Quarter 4 FY 18/19)</p>	<p>4.1 FI and SG stakeholder workshop report on the project page website</p> <p>4.2 FI coastal margin fine scale (Stage II) maps available online via FI MSP GIS portal.</p>	<p>Satellite imagery at useful resolution and without cloud cover is obtainable.</p> <p>Preliminary checks suggest several options and suitable imagery will be available.</p> <p>Permissions to access study areas approved by landowners (where required).</p>

	4.3 Stage II geospatial data products reflecting prioritized information needs utilizing high res imagery to reduce uncertainty in habitat models/classifications and address spatial and temporal data priority needs expressed by stakeholders – for both the FI and SG by Quarter 1 FY 19/20	4.3 SG coastal margin fine scale (Stage II) maps available online via SG GIS portal	
5. Work Package 4 (WP4): Prioritisation of ongoing planning, protection and monitoring of the coastal margin	5.1 A monitoring manual produced for long-term monitoring of coastal margin for the Falklands by end Quarter 3 FY 19/20  5.2 A monitoring manual produced for long-term monitoring of coastal margin for South Georgia by end Quarter 3 FY 19/20  5.3 At least 1 face-to-face training workshop in implementing monitoring undertaken by end Quarter 2 FY 19/20	5.1 FI monitoring manual available on the project page website  5.2 SG monitoring manual available on the project page website.  5.3 Training workshop report available on project page website  5.4 Televised training available online on project page website.	There are in-territory staff who are well-positioned to undertake the training.  Discussions to identify where the future long-term monitoring role would sit for both islands are underway.
6. Work Package 5 (WP 5) All outputs integrated with existing and emerging initiatives	6.1 New geospatial products maximally informed and integrated with existing FI and SG geo-spatial data initiatives  6.2 End of project synthesis workshop for FI and SG held by end Synthesis workshop held by end Quarter 3 FY 19/20 to decide how findings will contribute to systematic conservation planning	6.1 Report on integration with other initiatives on the FI published on the project webpage.  6.2 Report on integration with other initiatives on the SG published on the project webpage.	Owners and co-ordinators of existing initiatives are willing to collaborate and explore these opportunities as well.  The support of the project partnership brings on board key leaders in these areas.
7. Monitoring and evaluation	7.1 Detailed Monitoring and evaluation plan produced by end Quarter 4 FY 17/18  7.2 6-monthly updates on implementation of M&E Plan provided to PMG	7.1 Detailed M&E Plan available on project webpage  7.2 M&E updates available on project webpage	PM has skills to deliver M&E plan  This will be built into the Job description of the PM and

**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 Advertise, interview and recruit PM
  - 1.2 Draft and sign Project Partners MoU
  - 1.3 Quarterly PMG meetings
  - 1.4 6 monthly PSG meetings
  - 1.5 Monthly Webpage updates
  - 1.6 Complete various project management activities
  - 1.7 Final project report and publicity
- 
- 2.1 Explore development of a workflow to aid the geo-referencing 1954 aerial imagery
  - 2.2 Complete the geo-referencing of 1954 aerial imagery along the coastal margin
  - 2.3 Produce a digital map of the 1954 aerial imagery showing the coastal margin
  - 2.4 Upload the 1950's coastal margin (aerial imagery) map onto the MSP GIS portal and a copy of the associated metadata onto the South Atlantic metadata catalogue
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- 3.1 Source the Satellite imagery for the Falklands and South Georgia
  - 3.2 Pre-processing of satellite imagery to prepare for analysis
  - 3.3 Undertake Analysis of the satellite imagery and habitat modelling
  - 3.4 Produce a Coastal Margin habitat map for South Georgia and the Falklands
  - 3.5 Upload the Coastal Margin habitat map onto the MSP GIS portal (for the Falklands) and supply SG map to GSGSSI (for upload to GSGSSI web portal); upload a copy of the associated metadata onto the South Atlantic metadata catalogue.
- 
- 4.1 Confirm Stakeholder workshop (to identify and prioritise spatial and temporal data priority needs expressed by Stakeholders) date, venue, and participants for the Falklands and South Georgia
  - 4.2 Confirm Stakeholder workshop programme, speakers and facilitators through consultations via the PMG and PSG for the Falklands and South Georgia
  - 4.3 Host the Stakeholder workshop for the Falklands and South Georgia
  - 4.4 Produce the Stakeholder workshop report for the Falklands and South Georgia and upload onto the project webpage
  - 4.5 Acquire very high resolution satellite imagery (e.g. WorldView) and/or undertake drone missions to acquire high resolution imagery for priority areas requiring fine-scale mapping in South Georgia and the Falklands
  - 4.6 Pre-process the imagery to prepare for analysis
  - 4.7 Undertake analysis of the imagery.
  - 4.8 Undertake ground-validation of analysed data on the Falklands and South Georgia
  - 4.9 Produce detailed (Stage II) Coastal Margin habitat maps for priority areas for South Georgia and for the Falklands
  - 4.10 Upload the detailed (Stage II) Coastal Margin habitat map onto the MSP GIS portal (for the Falklands) and supply to GSGSSI for upload onto the GSGSSI web portal. Upload a copy of the associated metadata onto the South Atlantic metadata catalogue.

- 5.1 Draft a long-term coastal mapping/monitoring manual for the Falklands and South Georgia and upload onto the project webpage
- 5.2 Confirm date, venue, and participants for the Falklands and South Georgia coastal mapping/monitoring training workshop
- 5.3 Undertake coastal mapping/monitoring training workshop
- 5.4 Record videos of training sessions and upload online onto the project webpage
  
- 6.1 Review all of the existing (relevant) stakeholder groups and data creation and management initiatives and protocols.
- 6.2 Produce a report on the review demonstrating how this initiative links to and builds on the existing and emerging work, and publish on the project webpage.
- 6.3 Prepare for and host 'end of project' synthesis workshop to decide how outputs will be fed into planning
  
- 7.1 Prepare monitoring and evaluation (M and E) plan
- 7.2 Prepare and present 6 monthly M and E updates
- 7.3 Upload M and E plan and updates onto webpages



## Annex 3: DPLUS065 MoU

### Checklist for submission

	Check
<b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> putting the project number in the Subject line.	-
<b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> about the best way to deliver the report, putting the project number in the Subject line.	Yes
<b>Have you included means of verification?</b> You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	Yes
<b>Do you have hard copies of material you want to submit with the report?</b> 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?	Yes
Do not include claim forms or other communications with this report.	