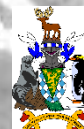




## DPLUS065 Coastal Habitat Mapping

# Report of the Workshop on Fine-scale Mapping Stakeholder Prioritisation for South Georgia



### Version Control Table

| Version | Date     | Author | Comments  |
|---------|----------|--------|---|
| 0.1     | 13/08/18 | NG     | First draft   |
| 0.2     | 03/12/18 | NG     | Draft circulated to Project Stakeholder Group               |
| 0.3     | 16/12/18 | NG     | Final version: updated with comments from Stakeholder Group |

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**Cover image:** *Satellite imagery courtesy of Digital Globe Foundation. Panchromatic image of Grytviken, South Georgia.*

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## 1. Background

The coastal margin around South Georgia provides an essential habitat for globally important populations of birds and marine mammals. The Coastal Habitat Mapping project, grant aided by the Darwin Initiative through UK Government funding, seeks to map these coastal habitats using medium resolution satellite imagery alongside other spatial data and local expert knowledge in order to develop the first broad scale coastal margin (terrestrial, intertidal and subtidal) habitat maps for South Georgia.

Where there is significant uncertainty in these broad scale maps, or in response to specific priorities from stakeholders, fine scale habitat maps utilising very high-resolution satellite imagery (via the Digital Globe Foundation grant) or bespoke imagery captured using aerial drones will also be developed. Together, these broad and fine scale habitat maps will create an essential baseline for South Georgia, providing a sound basis for use in future planning, decision-making and monitoring.

This three-year project brings together experts from [SAERI](#), [Oregon State University](#), [Shallow Marine Surveys Group](#), the UK [Joint Nature Conservation Committee](#), [Falkland Islands Government](#) and the [Government of South Georgia & the South Sandwich Islands](#), representing the leading edge in remote sensing, ecological knowledge and field expertise. The project is due to conclude in March 2020.

## 2. Workshop aims

The project had a clear mandate to elicit the views of stakeholders as to their priorities for the fine scale mapping phase of the project. The stakeholder prioritisation workshop provided a mechanism to do this, posing two key questions to stakeholders.

- What aspects of the coastal environment are important to you/your business, and that you'd like incorporated into the fine scale mapping outputs?
- In light of those aspects highlighted above, where do you feel that fine scale mapping should be prioritised (specifically, what spatial locations)?

## 3. Opening of the workshop

The workshop, held at the Government of South Georgia & the South Sandwich Islands (GSGSSI) office, was opened on 9<sup>th</sup> August 2018 by Neil Golding, the Coastal Habitat Mapping project manager. There were representatives from British Antarctic Survey (BAS), International Association of Antarctic Tour Operators (IAATO), South Georgia Heritage Trust (SGHT), Island Landcare and UN Environment World Conservation Monitoring Centre (WCMC). Also present were project partners GSGSSI, Shallow Marine Surveys Group (SMSG), Oregon State University (OSU) and the South Atlantic Environmental Research Institute (SAERI). Appendix 5 lists the workshop attendees. Following a brief welcome, introductions and approval of the agenda (Appendix 4), Neil Golding presented an update on the Coastal Habitat Mapping project. A copy of the presentation can be found in Appendix 6 of this report. The presentation included the final South Georgia broad scale habitat maps (circulated to workshop participants on 28<sup>th</sup> July) that have been developed using Sentinel-1 and Sentinel-2 satellite data (at 10 metre resolution) and other relevant spatial layers. The presentation also stressed that in the next fine scale mapping phase, there were no preconceptions as to what may be mapped where, but that the project was striving to produce the best coastal habitat maps that would deliver stakeholders needs.

Following this update on project progress, Bran Black introduced the different imagery datasets in use within the project, and reviewed the different features (ponds, rock outcrops, areas of different vegetation) that can be resolved using the different imagery datasets. It will be important to consider the resolution of these imagery datasets when requesting specific features/habitats to be mapped in this next phase of the project.

Following the presentation, there was a short question/answer/discussion session. These are summarised in Table 1 below.

**Table 1:** Questions/comments raised by workshop participants, along with responses provided by the project team (Neil Golding, Bran Black, and Michael Harte)

| Question/comment   | Response from project team  |
|--|---|
| IAATO made the observation that some of the key challenges from previous projects has been ensuring that the outputs are designed so they can be used widely (without specialist software/skills) and updated, even after the project has finished, in order to detect change, to inform management decisions. | The project is aware of this issue. We are using standardised approaches and algorithms and have a clear legacy component, a thread which runs throughout the systems being developed. Also of key importance to the project is the use of cloud-based systems. This will allow us to “future-proof” the process, ensuring repeatability in future years. Training workshops have also been built into the project into 2019 to get relevant people familiar with using these tools. Getting the right people to these workshops will be crucial. |
| SMSG asked whether glaciers were a feature class within the broad scale maps.  | Yes, ice is mapped as a habitat class on the broad scale maps. Potentially, glacial retreat could be focussed on from a fine scale mapping perspective.   |
| SMSG highlighted potential future work, which might look at glacial retreat, affecting kelp distribution and density through changes in water opacity.   | Water opacity was a very striking feature of the Sentinel-2 image (February 2018) used for the broad scale maps. There could be options around using Sentinel-2 image to examine seasonal change of water opacity (linked to glacial melt).   |
| SMSG queried whether the GeoMetria laser scan data could be utilised and integrated into the models, along with the LIDAR dataset  | A request has been made to GSGSSI regarding whether data collected by Geometria can be shared for the purposes of this project. <b>ACTION: Steve Brown to discuss with Neil Golding.</b>  |

#### 4. Workshop Exercise One: What aspects of the coastal environment are important to you/your business, and that you'd like incorporated into the fine scale mapping outputs?

The first exercise was aimed at identifying which particular aspects of the coastal environment were important to stakeholders, and which they valued. Participants were asked to consider the different resolutions of imagery available, such as the WorldView (2m resolution) and drone (2cm) imagery. Discussions (see Figure 1) around this first group exercise are summarised in Table 2 below.

**Table 2:** Summary of points raised regarding aspects of the coastal environment of interest to stakeholders with respect to fine scale coastal habitat mapping.

| Primary aspects of the coastal environment for consideration   | Detailed discussion points raised in relation to those primary aspects   |
|--|--|
| <p>Potential human impacts - the overlap between visitor/researcher use and historic sites/locations important for wildlife.</p> | <p>SGHT highlighted the fact that areas most accessible to humans (whether visitors or researchers) may also overlap with important historic sites and macro-wildlife zones.</p> <p>IAATO were particularly interested in looking at sites with larger numbers of visitors, to try to detect change (e.g. Grytviken, Shackleton Hike, Gold Harbour, St Andrews).</p> <p>High resolution data to understand human impacts over narrow corridors, such as the hikes, could be extremely valuable. Sally Poncet highlighted that it may be better to focus effort on existing visitor “trampling” impacts (e.g. Shackleton walk, Maiviken track and Brown Mountain flats).</p> <p>Proposal to look at Post Visit Report (PVR) numbers as a way to consider which visitor sites should be prioritised for mapping versus those visitor sites which are in need of updated information for Site Management Plans. <b>ACTION: GSGSSI to provide visitor numbers/site for inclusion into the stakeholder workshop report.</b></p> <p>Horizon scanning - potential to include sites which are not currently open to visitors, but which may be opened in future.</p> <p><b>ACTION – What criteria are used by GSGSSI for approving locations as Visitor Sites?</b></p> |

| <b>Primary aspects of the coastal environment for consideration</b> | <b>Detailed discussion points raised in relation to those primary aspects</b>  |
|---|--|
| Climate change  | <p>Could potentially look at assessing temporal changes in snow cover (better suited to using Sentinel-2 imagery). For example, snow drifting may account (at the fine scale) for Wandering Albatross mortality.</p> <p>Use of South Georgia as a “climate barometer”. Examining sediment plumes from glaciers. These impact on water clarity, and may have an impact on kelp forests – thus monitoring of kelp forest extent may provide a useful proxy for sediment load, and thus climate change impacts. Nutrient loads from glacier run off could also be considered – and are one of the reasons for the productive waters around South Georgia (for commercially fished species as well as the wealth of marine biodiversity). Could be used as a ‘snapshot’ using current satellite imagery as well as establishing a future monitoring programme. Note that on the occasions when pack ice comes up from the south (Sally was aware of two events when this happened), it can drastically alter the seabed, including rocks/kelp etc.</p> |
| Non-native invasives  | <p>Particular attention should be drawn to areas where the greatest number of vectors are present, for example visitor sites with the largest number of visitors and areas such as KEP/Grytviken, which is the main arrival/embarkation point.</p> <p>Sorrel control at Grytviken was flagged as a potential use for fine scale habitat mapping. For example, could high resolution imagery aid in monitoring progress of the weed control programme.</p>  |
| Terrestrial protected areas   | <p>Providing data (terrestrial habitat maps) at sufficient resolution at specific locations to assist with the management decision-making process.</p>   |
| Accessibility   | <p>Not so relevant when using WorldView imagery (although this still requires ground validation information) but accessibility for researchers for undertaking drone surveys needs some consideration.</p>   |



| Primary aspects of the coastal environment for consideration | Detailed discussion points raised in relation to those primary aspects   |
|--|--|
| Monitoring changes since eradication events (Reindeer/rats)  | <p>Burrowing petrels – GSGSSI is undertaking long-term monitoring of burrowing petrels and vegetation change following the eradication – drone imagery of these locations over time would be very valuable (6 sites). Proposal from the ACAP perspective to focus some effort on these more cryptic species, where traditionally, accurate counts have been quite challenging. Also, potential of examining seabird rafting areas.</p> <p>Reindeer exclusion areas that date from the 1970s (three sites) – examining vegetation change within and outside these areas using drone imagery.</p> <p>Vegetation changes (e.g. Blue grass within Olson Valley returning now that the reindeer have gone) since eradications, building on the work done by BAS (report submitted by BAS to GSGSSI – Adrian Fox suggested)</p>  |
| Monitoring of bird colonies and marine mammal aggregations   | <p>Weddell seal colonies at Doubtful Bay/Drygalski Fjord/Larsen Harbour have received limited study. Burton (2015) reports on observations made of pup numbers. Stony Brook University have been gathering photos of adults for individual recognition – drone imagery of these colonies could be extremely valuable. While Feb/March would not be a good time to record pup numbers, BAS have stated that any additional information on adult seal numbers would be extremely beneficial (Ian Staniland <i>per comm</i>).</p> <p>Use of remote sensing imagery (either WorldView or potentially drone) to facilitate population counts of Wandering Albatross and other ACAP species in areas such as Annenkov &amp; Albatross Island (producing counts would be outside the scope of the Coastal Mapping project). Noting that within the South Georgia ACAP Implementation Plan, there was a proposal to increase the number of monitoring sites for ACAP species.</p> <p>Consideration of collection of imagery to undertake monitoring of elephant seal beaches, to better understand populations and how stable they are (for example Salisbury Plain).</p> <p>Outputs in the form of vectors (polygons) for penguin colonies rather than the points in current use.</p> |

| Primary aspects of the coastal environment for consideration | Detailed discussion points raised in relation to those primary aspects   |
|--|--|
| General habitat mapping and suitability modelling            | <p>Development of habitat suitability models for a variety of species, as well as creating a suite of baseline habitat maps. For example, consideration of tussac colour (fertilised tussac)/slope angle when considering burrowing petrel habitat. Potential Bayesian modelling approaches.</p> <p>Trying to map changes in vegetation following increase in fur seal numbers (following cessation of sealing) and their impact on habitat used by ACAP species (e.g. Prion Island)</p> |
| Anthropogenic impacts from KEP wharf construction            | With work planned to commence soon on the King Edward Point wharf project, and with areas identified where aggregate extraction is likely to occur, collection of high resolution imagery for these areas should be considered a priority, to provide a baseline ahead of any work.  |



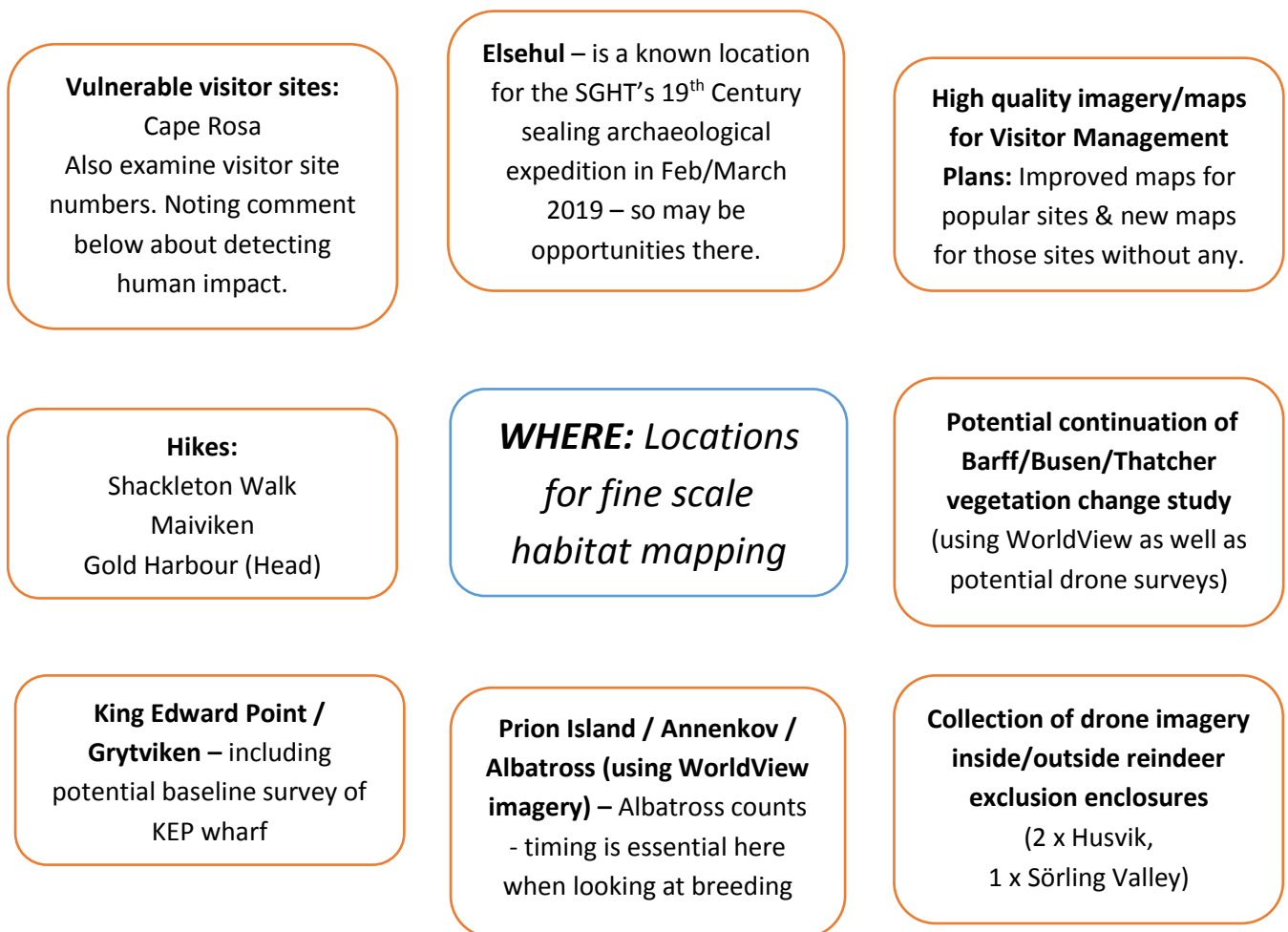
**Figure 1:** Workshop participants undertaking a group exercise during the stakeholder prioritisation workshop.

Workshop participants stressed that repeatability of the methods for habitat mapping was key. This has already been addressed for the broad scale mapping, through the established cloud-based workflow (Google Earth Engine). Consideration will also be given to repeatability when developing the fine scale mapping workflow (likely to be locally based rather than cloud-based).

Adrian Fox updated the workshop participants on work undertaken by the British Antarctic Survey (three areas - Busen Region, Thatcher Peninsula and Barff Peninsula) where WorldView-2 imagery along with ground validation information from Sally Poncet (Scott & Poncet, 2003) was used to examine changes to Normalised Difference Vegetation Index (NDVI) from before the reindeer eradication and two and three years (February 2016) afterwards. The general conclusion was that the method was promising, but that there was probably insufficient time elapsed to allow the separation of trends from inter-annual vegetation variation. There would be value in trying to include these three areas when considering actual locations for fine scale mapping (detailed in the next section of the report). Sally reiterated that there have been significant changes since 2016 to the vegetation in these three areas, so agreed that continuing this work would be extremely valuable. Michael Harte highlighted that while NDVI is great for regional scale changes, fine scale community complex changes would not be picked up, so fine scale mapping, potentially using drones, could be a useful supplementary piece of work at specific areas. This work could also be linked with the reindeer exclusion areas for comparison (for example Olson Valley). There are also potential links with sorrel control work being undertaken at Grytviken.

## 5. Workshop Exercise Two: In light of the aspects/values considered in Exercise One, where do you feel that fine scale mapping should be prioritised?

The second group exercise was aimed at identifying where (spatial locations) fine scale mapping should be prioritised across South Georgia, noting that this second exercise was focussed on those aspects/values determined as being important from the first exercise. A summary is provided below in Figure 2.



**Figure 2:** A summary of discussions surrounding where fine scale mapping should be prioritised in South Georgia.

With respect to visitor sites, it is important to note that the majority of these sites are primarily beaches/gravel. Therefore, consideration needs to be given as to whether it will be feasible to detect human impact (anthropogenic) versus impacts caused by wildlife (fur seals/penguins etc), and the value in mapping these areas. This priority could be linked to those visitor sites where improved aerial imagery/maps are required for visitor management plans.

## 6. Visitor Sites

All participants acknowledged during the workshop exercises that Government approved visitor sites should be viewed as a specific priority. Therefore, these were discussed in more detail, with a summary captured within this section of the report.

Figure 3 below shows the distribution of these approved visitor sites around South Georgia. Vessels visiting South Georgia are only allowed to visit these approved site without additional permissions, and there are varying restrictions on vessel size at different sites. Meanwhile, Appendix I & II provides a summary of the most popular sites for each season based on total number of passengers completing boat landings and the number of participants for each of the South Georgia hiking routes/trails respectively.



**Figure 3:** Government approved visitor sites (and codes) for South Georgia.

GSGSSI have prepared Site Visitor Management Plans (SVMPs) for the most popular approved visitor landing sites and a number of overland walks. These detail open access areas, closed areas and routes for overland walks. Visitor management information is detailed as well as additional information such as hazards and areas which are particularly sensitive to disturbance. In workshop exercise two, GSGSSI highlighted that revised maps would be beneficial to update some SVMPs.

The following sites have Visitor Management Plans:

- Cape Rosa
- Cooper Bay (Macaronis)
- Fortuna Bay (Anchorage Bay)
- Fortuna Bay (Whistle Cove – King Penguins)
- Godthul to Sandebugten Walk
- Godthul
- Gold Harbour
- Maiviken Walk
- Ocean Harbour Walk
- Prion Island
- Rookery Point Walk
- Salisbury Plain
- Shackleton Walk
- St Andrews Bay
- Stromness to Leith Walk

Of the above SVMs, it was noted that those for Cape Rosa, Godthul and Prion Island did not contain overview maps, which were considered useful for stakeholders and government alike. With respect to these sites, Cape Rosa currently has restricted access (with two vessel allowed to visit per day). Godthul may become an increasingly popular destination if tourist numbers continue to increase as expected. Finally, while Prion Island has a boardwalk installed, so additional mapping is not required in terms of visitor management, mapping could prove useful in terms of assessing occurrences of invasive species in proximity to the boardwalk, and provide a useful baseline for future monitoring.

All other SVMs contained map extracts from Scott & Poncet (2003)<sup>1</sup>. Therefore, the collection of aerial imagery from these three former sites could be considered a higher priority.

It was also noted that SVMs for the following extended walks could benefit from development (and integration) of fine scale habitat maps from WorldView imagery: Godthul to Sandebugten Walk, Maiviken Walk, Ocean Harbour Walk, Rookery Point Walk, Shackleton Walk & Stromness to Leith Walk.

Of all the approved visitor sites, King Edward Point (KEP) and Grytviken were highlighted as a particular priority, with respect to their vulnerability to invasive species, as these are the main hubs where visitors are channelled. Weeds such as sheep's sorrel was highlighted as being a particular issue around Grytviken, as discussed earlier in this report.

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<sup>1</sup> Scott, J.J & Poncet, S. 2003. South Georgia Environmental Mapping Report. Technical Report No. EBS03/1

KEP was discussed in the context of the wharf development work which is underway. Both GSGSSI and BAS were strongly in favour of the project spending some dedicated time at KEP completing a detailed aerial mapping survey using the coastal mapping drones. Ground Control Points could be deployed, and accurate heights/spatial positions obtained through using an RTK GPS unit. This would enable detailed 3D models (including digital elevation models) and ortho-mosaics of the KEP and surrounding area to be developed, which would act as an important environmental baseline ahead of wharf construction work.

## 7. Workshop summary & prioritisation for fine-scale mapping

Through the stakeholder workshop, participants provided a clear mandate for the Coastal Mapping project to progress fine scale coastal habitat mapping around South Georgia.

Two elements were considered. The first element were the aspects/values of the coastal environment considered a priority by stakeholders

*Across the three themes of terrestrial, intertidal and marine, the following aspects were drawn out and considered a priority for the Coastal Mapping project to focus on during the fine scale mapping phase:*

- *Aid the identification of human impacts (including invasives)*
- *Monitoring changes since eradication events*
- *Baseline & anthropogenic impacts from KEP wharf construction*
- *Monitoring of bird and marine mammal aggregations*

*Wider aspects considered were:*

- *Climate change*
- *Terrestrial protected areas*
- *General habitat suitability modelling*

The second element considered which locations around South Georgia's coastal margin should be prioritised for fine scale habitat mapping, considering both WorldView (2m) and Drone (2cm) imagery.

*Priority locations for fine scale coastal habitat mapping, based on WorldView (~2m resolution) imagery (in no particular order):*

- 6. Baseline habitat mapping for hikes, such as the Shackleton Walk, Gold Harbour (Head), Godthul to Sandebugten Walk, Maiviken Walk, Ocean Harbour Walk, Rookery Point Walk & Stromness to Leith Walk.*
- 7. Baseline habitat mapping of Grytviken, Jason Harbour, Stromness & Fortuna Bay, for integration into Site Visitor Management Plans.*
- 8. Potential continuation of Barff/Busen/Thatcher vegetation change studies - post eradication*
- 9. Prion Island / Annenkov / Albatross (using WorldView imagery) – Albatross counts - timing is essential here when looking at breeding bird numbers.*

*Priority locations for fine scale coastal habitat mapping, based on Drone (~2cm resolution) imagery (in no particular order):*

- 1. Collection of drone imagery inside/outside reindeer exclusion enclosures, potentially using RedEdge multispectral camera (2 x Husvik, 1 x Sörling Valley)*
- 2. Acquisition of high resolution aerial imagery from Elsehul*
- 3. Baseline survey of King Edward Point and wharf development area using RTK GPS and ground control points*
- 4. Baseline aerial mapping around Grytviken, focussing on invasive species such as sheep's sorrel*
- 5. Baseline aerial mapping around Cape Rosa, Godthul & Prion Island boardwalk system (and adjacent)*

The list of priorities above should be considered against potential locations which may be visited by the project on in collaboration with the SGHT archaeological expedition to South Georgia, scheduled for Feb/March 2019. These can be seen in Appendix 3.

The priorities listed above form an ambitious list, with the completion of all considered outside the scope of this project. Progress will depend on a number of factors including opportunities to gather field data down in South Georgia. The collaborative SGHT expedition is already scheduled for February/March 2019, but further opportunities to collect field data should also be explored, including allocating some dedicated time at KEP



and Grytviken, as well as possible visits to Sörling Valley and Sandebugten/Godthul using KEP boats, allowing these specific priorities to be delivered; this later point needs further discussion between project partners.

Synergies can be identified in the above lists, where collecting of data at one location could deliver multiple outputs (for example at KEP/Grtyviken)

## **8. Next steps**

The outputs from this workshop will allow a realistic work plan to be developed for the second phase of the project, delivering a series of stakeholder prioritised fine scale habitat models/maps for South Georgia.

Further discussions will be held between project partners regarding field data collection over the next few months.

Delivery of the fine scale habitat models are scheduled for the end of June 2019, after which a training workshop, hosted by SAERI, will facilitate the transfer of knowledge gained through the project, both from a broad scale and fine scale modelling perspective.

## **9. Acknowledgements**

The Coastal Habitat Mapping project would like to thank all the workshop participants for their input during the stakeholder prioritisation workshop, and GSGSSI for providing the workshop venue.

**Appendix I: Summary of the most popular sites for each season based on total number of passengers completing boat landings (number of visits to each site given in parenthesis). Those sites shaded green have Visitor Management Plans in place. Therefore, those sites shaded yellow could be considered as priority areas for fine scale mapping to be undertaken (supplied by GSGSSI).**

| <b>Visitor Site</b>         | <b>2016/17</b> | <b>2015/16</b> | <b>2014/15</b> |
|-----------------------------|----------------|----------------|----------------|
| Grytviken                   | 9,688 (65)     | 8,297 (68)     | 7,119 (65)     |
| St Andrews Bay              | 5,563 (40)     | 5,223 (56)     | 3,050 (30))    |
| Salisbury Plain             | 5,420 (42)     | 5,223 (56)     | 5,583 (47)     |
| Gold Harbour                | 5,031 (43)     | 4,535 (53)     | 4,950 (49)     |
| Stromness                   | 4,909 (45)     | 3,735 (42)     | 3,496 (41)     |
| Prion Island                | 2,737 (30)     | 2,886 (44)     | 2,596 (32)     |
| Fortuna Bay – Whistle Cove  | 2,502 (19)     | 2,307 (22)     | 1,046 (14)     |
| Fortuna Bay (Anchorage Bay) | 1,307 (11)     | 967 (8)        | 655 (5)        |
| Jason Harbour               | 856 (8)        | 583 (9)        | 1,168 (13)     |
| Godthul                     | 774 (10)       | 542 (10)       | 361 (7)        |
| Fortuna Bay                 | 574 (11)       | 626 (8)        | 1,276 (14)     |
| Cooper Bay – Macaroni's     | 233 (5)        | 514 (10)       | 639 (9)        |

**Appendix 2: Numbers of participants (2016/17 season) for each of the South Georgia hiking routes/trails (supplied by GSGSSI).**

| <b>Site</b>                          | <b>Number of visits in season 2016/17</b> | <b>Total number of visitors</b> |
|--------------------------------------|---|---------------------------------|
| <i>Fortuna Bay - Shackleton Hike</i> | 19  | 828                             |
| <i>Maiviken Hike<sup>23</sup></i>    | 16  | 775                             |
| <i>Salisbury Plain</i>               | 7   | 609                             |
| <i>Fortuna Bay (Whistle Cove)</i>    | 3   | 359                             |
| <i>Fortuna Bay</i>                   | 7   | 343                             |
| <i>Grytviken and KEP</i>             | 9   | 322                             |
| <i>Godthul - Ridge Hike</i>          | 2   | 142                             |
| <i>St Andrews Bay</i>                | 3   | 126                             |
| <i>Rosita Harbour</i>                | 3   | 199                             |
| <i>Gold Harbour – Head Hike</i>      | 2   | 106                             |
| <i>Gold Harbour</i>                  | 3   | 102                             |
| <i>Rookery Bay</i>                   | 2   | 75                              |
| <i>Cobblers Bay - Macaronis</i>      | 2   | 53                              |
| <i>Cobblers Cove Rookery Hike</i>    | 1   | 48                              |
| <i>Leith / Husvik Hike</i>           | 2   | 42                              |
| <i>Elsehul Inner bay</i>             | 1   | 39                              |
| <i>Ocean Harbour</i>                 | 1   | 27                              |
| <i>Possession Bay</i>                | 1   | 27                              |
| <i>Right Whale Bay</i>               | 1   | 18                              |
| <i>King Haakon - Peggoty Bluff</i>   | 1   | 16                              |
| <i>Ocean Harbour Hike</i>            | 2   | 9                               |
| <b>Total</b>                         | <b>88</b>                                 | <b>4265</b>                     |

<sup>2</sup> Note that this figure includes visitors who may have only completed a section of the Maiviken Hike (for example an extended walk to the hut rather than just a beach landing).

<sup>3</sup> These figures do not include use of the trail by various staff and researchers based at King Edward Point Research Station.

### Appendix 3: South Georgia Archaeological Project potential locations

The following locations are listed in the South Georgia Archaeological Project Operational Plan (V 10.0) as being areas where extra work may be focussed during the expedition planned for February/March 2019, if time permits:

- Elsehul (ELS02)
- Main Bay, Bird Island
- Nilse Hullet
- Diaz Cove
- Whistle Cove (FOR02) & other caves

Other sites around South Georgia are listed as being of interest to this expedition – work at these sites will depend on available time and weather constraints.

- Undine Harbour
- Coal Harbour
- Narval Bay
- Wilson Harbour
- Mouse Cove
- Trollhul
- Larsen Harbour (LAR01)
- Albatross Cove (COO02)
- Köppen Point (ROY01)
- Grytviken (GRY01)
- Carlita Bay
- Tønsberg Point
- Blue Whale Harbour
- Start Point (SAL01)
- Prince Olav Harbour/Cook Bay (POH01)
- Right Whale Bay (RIG01)

## Appendix 4: South Georgia Stakeholder Prioritisation Workshop Agenda

### Darwin Plus DPLUS065 – Coastal Habitat Mapping

### South Georgia Stakeholder Prioritisation Workshop

Thursday 9<sup>th</sup> August 2018, 10:00 - 12:00hrs: GSGSSI Conference Room

#### **Agenda:**

- Welcome and introductions
- Coastal Habitat Mapping in South Georgia – an update on the project, and what it can do for you.
- From broad to fine scale – the issue of scale & resolution – what it means for you
- *Group Exercise*
- Next steps and conclusions

## Appendix 5: Workshop attendees

| Name                 | Affiliation  | Contact email  |
|----------------------|--|--|
| Bran Black           | Oregon State University  | <a href="mailto:bblack@ceoas.oregonstate.edu">bblack@ceoas.oregonstate.edu</a> |
| Paul Brewin          | Shallow Marine Survey Group  | <a href="mailto:pbrewin@smmsg-falklands.org">pbrewin@smmsg-falklands.org</a>   |
| Paul Brickle         | South Atlantic Environmental Research Institute (SAERI)                    | <a href="mailto:pbrickle@env.institute.ac.fk">pbrickle@env.institute.ac.fk</a> |
| Steve Brown          | Government of South Georgia & the South Sandwich Islands                   | <a href="mailto:Steve.Brown@gov.gs">Steve.Brown@gov.gs</a>                     |
| Adrian Fox           | British Antarctic Survey   | <a href="mailto:ajfo@bas.ac.uk">ajfo@bas.ac.uk</a>                             |
| Neil Golding         | South Atlantic Environmental Research Institute (SAERI)                    | <a href="mailto:ngolding@env.institute.ac.fk">ngolding@env.institute.ac.fk</a> |
| Sue Gregory          | Government of South Georgia & the South Sandwich Islands                   | <a href="mailto:Sue.Gregory@gov.gs">Sue.Gregory@gov.gs</a>                     |
| Michael Harte        | Oregon State University  | <a href="mailto:mharte@coas.oregonstate.edu">mharte@coas.oregonstate.edu</a>   |
| Edward Lewis         | UN Environment - World Conservation Monitoring Centre                      | <a href="mailto:Edward.Lewis@unep-wcmc.org">Edward.Lewis@unep-wcmc.org</a>     |
| Sarah Lurcock        | South Georgia Heritage Trust   | <a href="mailto:sghtdirectorsg@sght.org">sghtdirectorsg@sght.org</a>           |
| Sally Poncet         | Island Landcare  | <a href="mailto:sallyponcet@horizon.co.fk">sallyponcet@horizon.co.fk</a>       |
| Damon Stanwell-Smith | International Association of Antarctica Tour Operators (IAATO)             | <a href="mailto:dstanwellsmith@iaato.org">dstanwellsmith@iaato.org</a>         |
| Megan Tierney        | Agreement on the Conservation of Albatross & Petrels (ACAP) representative | <a href="mailto:Megan.tierney@jncc.gov.uk">Megan.tierney@jncc.gov.uk</a>       |

## Appendix 6: “Setting the scene” introductory presentation

The introductory presentation given by Neil Golding and Bran Black at the Stakeholder Workshop can be downloaded from the Coastal Habitat Mapping project webpage here:

[https://www.south-atlantic-research.org/wp-content/uploads/2019/01/2018\\_08\\_09\\_SouthGeorgia\\_StakeholderPrioritisationWorkshop\\_Presentation.pdf](https://www.south-atlantic-research.org/wp-content/uploads/2019/01/2018_08_09_SouthGeorgia_StakeholderPrioritisationWorkshop_Presentation.pdf)