The purpose of this report is to describe the activities conducted during the last quarter as part of the Darwin Plus-funded Marine Spatial Planning (MSP) project, the state of activities against the expected outputs in the work plan and an update on the project budget with spent and expected expenses. The quarterly steering committee reports are produced for the steering committee to monitor and assess progresses. Edited versions of the reports are posted on the project webpage.

This report is ahead of schedule due to the upcoming workshop early April where all members of the steering committee will be and following UK trip and report writing. The steering committee meeting is therefore conducted early, which also gives the steering committee the opportunity to give some feedbacks on the workshop agenda.

1. **Summary of activities in the second quarter (2015:Q4, Jan-Mar 2016)**

   - Organisation for workshop #3 (5-7 April 2016) well under way
   - Outcome from ExCo submission received
   - Budget Select Committee paper submitted
   - Prototype webGIS completed and online soon
   - Recruited a contractor to digitise kelp beds
   - Completed marine megafauna spatial analyses
   - Completed whale sighting study
   - Completed coastal value study
   - Thank you letters sent by the post to all participants interviewed as part of the cultural value and whale studies
   - Updated the MSP webpage

2. **Progress against work plan**

   The work plan for the life of the project is shown in the table below with the detailed expected outputs. The years are Darwin finance years (that are from April to March each year, not calendar years). The outputs relevant to the period 2015 Q4 (Jan-Mar 2016) are highlighted in yellow.
All activities progressed successfully. The Darwin administrator has approved a request to combine annual and final report. There will be no annual report due in April but instead only the final project report due end of July (Output 9). The FIG paper has already been submitted (see previous report, ExCo paper), but a second paper will be submitted as an information paper with further details on MSP implementation mechanisms recommended from workshop, for approval.

Extra activities related to MSP took place during this quarter:

- Participation in a one-day Strategic Ecological Assessment (SEA) workshop on 22/01/16
- Field assistance retrieving GLS tags on sooty shearwater for tracking studies (4 days) and satellite tags from penguins (1 day, GAP project).
- Organise an MSP public talk on the megafauna analyses (given by Dr Maria Dias 2/2/16)
- Participation in a one-day SAERI Future workshop to help develop mechanisms for the future of SAERI and its science
- Assistance to the EU Best III officer with definition of marine KBAs
3. **Budget update**

The Darwin budget to report against is (with Darwin expenses categories):

The expenses and revenues for 2015:Q4 are as follow:

![Budget update table]

---

*Note: The table above provides a breakdown of expenses and revenues for specific periods, showing detailed categories such as staff costs, consultancy costs, travel & subsistence, operating costs, capital equipment, and other costs. The table is designed to help in understanding the financial status and budget allocation of the Darwin project.*
Note that some of these expenses are estimated as they will be incurred from the date of this report to 31 March. The non-committed funds from this quarter will be spent in the next quarter for the final workshop expenses.

The final grant income from Darwin Plus will be £14,243 for the quarter 2016:Q1 (April-June 2016).

Expenses planned in the next quarter are:

4. **ExCo paper submission outcomes**

   The Executive Council examined the MSP paper submitted in December at the 16 Dec. 2015 meeting. The governmental press release contained the following paragraph about MSP:

   “Marine Spatial Planning (MSP) was the subject of the next paper. Members agree that a MSP should be considered for the Islands as it would benefit many sectors and enhance the international reputation of the Falklands with regard to care of the marine environment. However, members did not go so far as to agree implementation of a MSP framework at this stage and want to consider the cost of preparing a plan and the FIG resources that may be required to support the preparation at BSC.”

   The minutes of the ExCo meeting were summarised as follow:

   “Executive Council:
   • acknowledged the importance of implementing an MSP process for the long-term sustainable and safe management of the coastal and marine environments of the Falkland Islands and that such a process is grounded in objective and sound science;
• agreed to support and the creation of an MSP Plan, according to the framework and
details provided in this paper and with the addition of a finer scale delivery and financial
plan;
• referred the request for funding to the 2016/17 Budget Select Committee; and
• agreed to make this paper and all appendices public.”

5. Budget Select Committee paper

Following the submission of the MSP ExCo paper and the support given for MSP by ExCo,
a paper was prepared to describe the delivery and financial plan for the next phase of
MSP in finer details. The attached paper (see first Appendix) was submitted to the FIG
Financial Department for the Budget Select Committee on 3/2/16. The Finance Officer
later required that the paper be split into two: the delivery and financial plan separated
(the contents are similar).

6. MSP webGIS prototype

The link to the MSP webGIS will be available in the next few days. Unfortunately due to
difficulties with infrastructure and support, the idea of having an intranet type webGIS
(i.e. free for users based in the Falkland Islands) is currently not possible. Dr iLaria
Marengo of the IMS-GIS Centre will keep working on the possibility to develop this
intranet web-GIS idea.

7. New MSP webpage

The MSP webpage on the SAERI website was revamped and updated. The link to the
webGIS will be added as soon as it becomes available in the relevant section. With the
help of the SAERI webmaster, Maria Taylor, a menu was installed within the page to help
readers navigate through the different sections.

8. Marine megafauna key area analyses

A total of 36 species were modelled using a combination of tracking and at-sea sighting
data. Density use maps per quarter were produced by Maria Dias using a modified R
script from the IBA methodology. The proposed methodology was submitted to all
collaborators on the study, with generally positive feedbacks and some suggestions for
improvement taken in.

Below is the example of the final maps for black-browed albatross for each quarter,
showing density of use by the birds (bottom left from at-sea sighting data, all others from
satellite tracking and extrapolation to other colonies).
All the quarterly maps are now being brought together to produce two maps: one key ecological areas (using data quality as weights) and one key conservation area (using scores based on the established KBA methodology) for marine megafauna. A scientific publication will be produced.

9. Cultural values sub-project

This sub-project is now completed. Denise Herrera interviewed 47 people throughout the Falkland Islands and digitised the maps of their given coastal cultural values. The maps were finalised and the layers added in the MSP metadata catalogue and database, on the webGIS, and in the IMS-GIS Data Centre. Denise has also sent results to all participants in the mail as part of the public outreach campaign for MSP. A scientific publication is under progress.

10. Whale sightings sub-project

This sub-project is now completed. The final results are available. A summary report of activities and results was prepared and submitted to the Environmental Committee in February (see second Appendix). A scientific publication has been finalised and is under review. Veronica is now working on a follow-up study until end of June 2016, funded by the Environmental Studies Budget with matched funding from SAERI: Species distribution models to identify most suitable habitats for whales.

All datasets and information acquired during the project were entered in the metadata catalogue of the IMS-GIS Data Centre, and authorised copies of datasets or information
were added to its database. The final map of density was also added in the MSP metadata catalogue and database, and on the webGIS. Veronica has also sent results to all participants in the mail as part of the public outreach campaign for MSP.

11. **Kelp bed mapping**

The kelp bed mapping is now ongoing with a recent PhD student from the University of Otago (New Zealand), Junichi Sugishita, undertaking the mapping under a research contract. The latest delivery date for the final layer is end of May 2016 but it is likely that it will be available end of April 2016.

12. **Work plan for the next quarter**

- Workshop #3 5-7 April 2016
- Workshop report writing, with submission for feedbacks to steering committee and participant before being publicly published
- Participation in the Ascension Island MSP workshop (London, 18 April 2016)
- Visit at Cambridge’s BirdLife office to work with Maria Dias, finalising maps and starting writing the publication, and other collaborators and MSP experts (19-24 April 2016)
- Public outreach campaign: public talks (28 April) and a series of 3 articles in the PN
- Write up of the marine megafauna scientific paper
1. Purpose

1.1. The paper 235/15 was submitted to the Executive Council on 16th December 2015 meeting to update and describe the Marine Spatial Planning (MSP) framework for implementation and production of the first Falkland Islands Marine Spatial Plan. The following memorandum was received:

“• acknowledged the importance of implementing an MSP process for the long-term sustainable and safe management of the coastal and marine environments of the Falkland Islands and that such a process is grounded in objective and sound science;

• agreed to support and the creation of an MSP Plan, according to the framework and details provided in this paper and with the addition of a finer scale delivery and financial plan;

• referred the request for funding to the 2016/17 Budget Select Committee”

1.2. This report presents a finer scale delivery and financial plan to produce the first Falkland Islands Marine Spatial Plan (the Plan) and implement MSP as a long-term process to manage marine activities and their development.

As the Darwin Plus project will not be complete until July 2016, the delivery plan will be further refined over the next few months in consultation with FIG and other stakeholders through the steering committee and presentations at FIG committees. The budget, however, is considered to be realistic.
2. **Background (refer to the ExCo paper 235/15 for full details)**

2.1. A Marine Spatial Plan is a strategic coordinated plan for regulating, managing and protecting the marine environment that addresses the multiple, cumulative and potentially conflicting uses of the sea, current and future, typically with a 20-25 year vision. Marine Spatial Planning is the science and evidence-grounded process needed to produce and maintain an efficient Plan in the long-term. The process involves understanding and mapping wildlife and human activities, spatial analyses of risks and opportunities, and stakeholder engagement. The process is stakeholder-driven. MSP implementation will demonstrate governmental commitment to establish strong environmental stewardship and holistic marine management.

2.2. Darwin Plus (a UK Government grant scheme for environmental scientific research in the UK Overseas Territories) funded a grant endorsed by the Falkland Islands Government called ‘Marine Spatial Planning for the Falkland Islands’ for 2 years (July 2014-2016). The grant was awarded to SAERI with the aim to provide the initial sets of tools and recommendations for implementation of an MSP framework in the Falklands.¹

FIG now has the opportunity to use the momentum gained to facilitate the development of MSP and ensure a coordinated approach to sustainable management of the marine activities in the Falklands.

2.3. The Darwin Plus funding allowed SAERI to create the foundation for MSP in the Falkland Islands, which included stakeholder and public engagement and awareness efforts, creation of an initial set of scientific datasets and of a framework for MSP in the Islands, along with some relevant and coordinated MSP research activities.

3. **Delivery plan**

3.1. The three phases of MSP implementation

The development of MSP in the Falkland Islands can be described as a 3-phase process as shown in the Figure below.

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¹ More details on the project can be found on the webpage: [http://south-atlantic-research.org/research/current-research/marine-spatial-planning](http://south-atlantic-research.org/research/current-research/marine-spatial-planning).
Phase 1 (Foundation)

This phase was funded by a Darwin Plus grant of £152,000 awarded to SAERI for 2 years and will be completed in July 2016. Together with FIG, local stakeholders and international experts, SAERI produced an MSP framework to plan the move into phase 2 (Development).

Phase 2 (Development)

During the Development Phase (expected to be August 2016 to July 2018), the first Falkland Islands Marine Spatial Plan will be produced and mechanisms will be put in place for implementation of MSP within FIG. Once the first Plan is published and processes for MSP in place within FIG, an ongoing Operation Phase will then follow. The Development phase is described in detail in the next section because it is for this phase that the funding is required to support a further 2 years.

Phase 3 (Operation)

The Operation Phase will be ongoing once MSP is incorporated in FIG policies and the first Plan produced. FIG will take the lead on MSP coordination while SAERI will provide the science inputs (in the form of research projects, geospatial analyses, etc) needed for the process and updates to the Plan. The MSP Forum will keep the overall lead on the direction of MSP. This Phase will allow evaluation and monitoring of the outputs from the Plan and updates to the Plan and further policies from acquisition of new scientific data and analyses, changes in the use of the marine environment and potential climate change impacts. Enforcement of the policies in the Plan and voluntary or legislated MSP measures will also be part of the Operation Phase.
3.2. Details for Phase 2: The Development Phase

The outputs from Phase 1 (the framework, initial sets of tools and stakeholder engagement) will be implemented within FIG in order to produce the first Falkland Islands Marine Spatial Plan.

SAERI will administer this phase to ensure a smooth transition from the Darwin Plus project, but the MSP Forum will drive the process of identifying the current and future management priorities for MSP and endorsing the material and policies for the Plan.

Phase 2 will start in August 2016. The main output from this phase will be the first Falkland Islands Marine Spatial Plan. The content of the Plan will be detailed by the MSP Forum as they will drive the vision and targets for MSP and suggest which policies should be included.

The Plan itself will contain sections with:
- descriptions and maps of the Falkland Islands’ marine environment and activities,
- vision, objectives, and targets,
- areas identified as most valuable for economic, environmental and cultural aspects,
- zones for management and for emergency situations and,
- details of management policies for different zones, including opportunities for co-benefits and future activities.

Each section will contain a best-practice section as well as a detailed policy section that will describe the mechanisms for legislation of aspects that the MSP Forum will identify as priorities. The Plan will be reviewed by an experienced external consultant from the UK.

During Phase 2, it is anticipated that SAERI will keep the role of coordinating and developing the MSP process via the position of MSP managing scientist. However, it will be the role of the MSP Forum to lead the process and make decisions on its direction by formulating the content of the Plan.

The more detailed activities and outputs for the Implementation Phase will consist of the following:

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2 The MSP Forum will be made of representatives from all marine and coastal stakeholder groups of the Falkland Islands, including FIG.
### Main activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Timeline</th>
<th>Party responsible during Phase 2 (Development)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSP Forum quarterly meetings, and reporting</td>
<td>Every 3 months from August 2016</td>
<td>SAERI</td>
</tr>
<tr>
<td>Public communication (local in Penguin News, TV, presentations, and international in blog, conferences etc)</td>
<td>Regularly</td>
<td>SAERI and MSP Forum</td>
</tr>
<tr>
<td>Establishment of policies for priority management</td>
<td>As needed from September 2016</td>
<td>FIG Policy Programme Manager with SAERI inputs</td>
</tr>
<tr>
<td>Coordination of communication between MSP Forum and FIG</td>
<td>From October 2016 (or as soon as the Deputy Marine Officer is in place)</td>
<td>FIG MSP liaison officer</td>
</tr>
<tr>
<td>Reports to the Executive Council, and the Fisheries and Environmental Committees</td>
<td>Once or twice a year</td>
<td>SAERI</td>
</tr>
<tr>
<td>Maintenance and update the MSP GIS database and its layers, and website</td>
<td>Regular</td>
<td>SAERI</td>
</tr>
<tr>
<td>Development and promotion of an FIG MSP officer role</td>
<td>Continuous</td>
<td>MSP Forum and FIG MSP liaison officer</td>
</tr>
<tr>
<td>Development of research program, application for external funding and research for MSP</td>
<td>Continuous</td>
<td>SAERI</td>
</tr>
<tr>
<td>Organise peer-review of the MS Plan</td>
<td>May-June 2018</td>
<td>SAERI</td>
</tr>
</tbody>
</table>

### Main outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>Expected date</th>
<th>Party responsible during implementation phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms of Reference for MSP Forum</td>
<td>September 2016</td>
<td>SAERI and MSP Forum</td>
</tr>
<tr>
<td>MSP website and webGIS</td>
<td>Design in October 2016, regular updates thereafter</td>
<td>SAERI</td>
</tr>
<tr>
<td>Quarterly reports of the MSP Forum posted on website</td>
<td>Every 3 months from September 2016</td>
<td>SAERI with MSP Forum inputs</td>
</tr>
<tr>
<td>Document describing mechanisms for legislation of the MS Plan</td>
<td>August 2017</td>
<td>External consultant</td>
</tr>
<tr>
<td>Draft legislation for MS Plan</td>
<td>August 2018</td>
<td>FIG Policy Programme Manager</td>
</tr>
<tr>
<td>First Falkland Islands Marine Spatial Plan published</td>
<td>August 2018</td>
<td>SAERI directed by MSP Forum</td>
</tr>
<tr>
<td>Peer-review report of the MS Plan</td>
<td>July 2018</td>
<td>External consultant</td>
</tr>
</tbody>
</table>
Appendix

- Value creation during Phase 2 and Phase 3

It is the intention that an MSP science team (MSP lead scientist, scientific officer and PhD students) will incrementally be created within SAERI and be externally funded on grants and consultancy work (including to FIG to provide the scientific data and analyses, and maintaining the MSP GIS database) by August 2018 and provide added financial value to the Falkland Islands during phases 2 and 3. This is aligned with the FIG vision for SAERI to provide best scientific information for management and coordinate scientific activities in the long-term to obtain best value of all data available for the Falkland Islands.

There will also be a high potential for the MSP Science team to provide advice and expertise to the other South Atlantic UKOTs. MSP is a growing science-led management process all around the world and could become one of SAERI’s pillars with the Falkland Islands and FIG being a leader in this developing field.

4. Fine-scale financial plan

The subvention required by SAERI to undertake Phase 2 (Development) of MSP is £61,000 for 2016/17 and £45,500 for 2017/18. The Phase 2 proposed budget is detailed in table below.

The Implementation Phase will also require FIG resources in the form of time from established positions. An indicative estimate of cost for existing FIG positions’ time is £7,000 each year. The main position that will be involved in the Implementation Phase is the Marine Officer or Deputy Marine Officer (to be advised upon recruitment). It is estimated that one of these positions will spend on average 2 days per month (or approximately 12 hrs) as the FIG MSP liaison officer. John Barton, Director of Fisheries, and Chris Locke, Marine Officer, support the addition of this task to the Marine Officer or the Deputy Marine Officer (existing position expected to be staffed before end 2016). The FIG Policy Programme Manager should also be involved in the MSP Development Phase by providing guidance for policies within the Plan and liaising with the Law & Regulation Department to work on legislation of the MS Plan. Other FIG staff (from Fisheries, EPD, Minerals etc) will be involved in the process as representatives at the MSP Forum (2-3 hours per quarter of meeting time with 2-3 hrs of reading) and small focussed meetings.
## Appendix

<table>
<thead>
<tr>
<th>Expense type</th>
<th>Detailed expense</th>
<th>2016/17</th>
<th>2017/18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MSP managing scientist</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salary (Grade C)</td>
<td></td>
<td>35,000</td>
<td>36,000</td>
</tr>
<tr>
<td>Salary on-cost (MST, RPC)</td>
<td></td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Flights (start, end and mid-contract)</td>
<td></td>
<td>2,500</td>
<td>1,600</td>
</tr>
<tr>
<td>Workshop/training attendance (one week UK)</td>
<td></td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>Computer and accessories</td>
<td></td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Misc. office equipment</td>
<td></td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td><strong>FIG Policy Programme Manager</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training attendance (one week UK)</td>
<td></td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td><strong>Consultant (legislation mechanisms and external review)</strong></td>
<td>Fees and T&amp;S</td>
<td>8,000</td>
<td>4,000</td>
</tr>
<tr>
<td><strong>MSP Forum</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servicing</td>
<td></td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>MSP website</strong></td>
<td>webGIS and Plan</td>
<td>200</td>
<td>500</td>
</tr>
<tr>
<td><strong>TOTAL REQUESTED</strong></td>
<td></td>
<td>61,000</td>
<td>45,500</td>
</tr>
<tr>
<td><strong>FIG MSP liaison officer</strong></td>
<td>1 to 2 days/month on average of the Marine Officer or Deputy Marine officer (tba)</td>
<td>3,500</td>
<td>3,500</td>
</tr>
<tr>
<td><strong>FIG Policy Programme manager</strong></td>
<td>1 to 2 days/month on average</td>
<td>3,500</td>
<td>3,500</td>
</tr>
<tr>
<td><strong>INDICATIVE COSTS TO EXISTING FIG ROLES</strong></td>
<td></td>
<td>7,000</td>
<td>7,000</td>
</tr>
</tbody>
</table>
SUMMARY RESEARCH REPORT

To the Falkland Islands Government Environmental Committee,

*Environmental Studies Budget*

**Marine Spatial Planning for the Falkland Islands**

Filling an important ecological gap for efficient planning:

*Investigating whale recovery and mapping whale distribution around the Falkland Islands using best available knowledge*

Amélie A. Augé & Veronica F. Frans

*South Atlantic Environmental Research Institute*

15 February 2016
1. Summary

A 6-month research project on historical whale sighting distribution around the Falkland Islands using existing data and local knowledge was conducted to inform Marine Spatial Planning (MSP) and provide the first study into the potential recovery of the whale populations using Falkland Islands’ waters.

Veronica Frans was recruited as the research assistant for the project and worked at SAERI from August 2015 to February 2016. She collated a wide range of whale sighting data from commercial whaling era (until the 1980s) and post-whaling era (from the 1990s). She also interviewed 58 long-term Falklands’ residents and mapped their sightings, which formed the core of the results for the analysis of the recovery because of the spatio-temporal disparity and paucity in empirical data for whale sightings, preventing the comparison from decades to decades for investigation of the recovery pattern. The analyses were conducted in QGIS (open-access GIS software).

This study provides the first evidence that the whale populations using Falkland Islands’ waters have been recovering since the end of the commercial whaling era. With this in mind, a map of sighting distribution was produced to inform MSP and future research, so that this recovery is not impeded by development of maritime activities.

2. Methods and preliminary results

Existing baleen whale sighting data within the Falklands’ EEZ were gathered from a wide range of sources, including public and private databases, citizen science, local government records, and grey and published literature. These data were separated into three categories: whaling, survey and opportunistic data. Table 1 describes all sources of data.

All datasets obtained were homogenised and collated. The following attributes were extracted for each sighting: (1) species name; (2) date; (3) minimum and maximum number of individuals seen; (4) observation platform; (5) location. Despite the variety of existing data (the empirical data), these data are all spatio-temporally limited, covering different areas over non-overlapping periods or seasons. Therefore, long-term changes of presence and abundance are difficult to assess with these types of data. Historical and contemporary sighting information was thus collected through local knowledge to supplement these data.

Historical knowledge was produced using structured interviews with Falkland Islands residents. Ninety-four households, located in settlements throughout East and West Falkland and the surrounding islands, were contacted by phone to solicit participation. These households covered 34 out of 46 mainland settlements and 8 out of 12 total outer island settlements.
### Table 1. List of the types of whale sighting data and their years of coverage. A count of inshore (territorial sea, 12nm from shore) and offshore (rest of the EEZ) observations is provided for each source.

<table>
<thead>
<tr>
<th>Category</th>
<th>Source</th>
<th>Years</th>
<th>Number of sightings</th>
<th>Offshore</th>
<th>Inshore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whaling Databases</td>
<td>IWC Individual and Summary Catch</td>
<td>1905-</td>
<td>2497</td>
<td>241</td>
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<td>Survey</td>
<td>IWC IDCR/SOWER Database (DESS)</td>
<td>1978-</td>
<td>7</td>
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<tr>
<td></td>
<td>JSV Database</td>
<td>1965-</td>
<td>19</td>
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<td></td>
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<tr>
<td>Government Records</td>
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<td>2003-</td>
<td>16</td>
<td>1</td>
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</tr>
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<td>Grey (Unpublished) Literature</td>
<td>Munro 2013</td>
<td>2012</td>
<td>30</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td>Falkland Conservation (Thomsen 2014)</td>
<td>2014</td>
<td>0</td>
<td>57</td>
<td></td>
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<tr>
<td></td>
<td>White et al. 2002</td>
<td>1998-</td>
<td>132</td>
<td>29</td>
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<tr>
<td>Opportunistic Citizen Science Records</td>
<td>Falklands Conservation</td>
<td>1999-</td>
<td>5</td>
<td>83</td>
<td></td>
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<tr>
<td></td>
<td>Falkland Islands Government Air Service</td>
<td>1994-</td>
<td>15</td>
<td>20</td>
<td></td>
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<tr>
<td></td>
<td>Falkland Islands Museum and National Trust</td>
<td>1991-</td>
<td>1</td>
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<tr>
<td>Databases</td>
<td>OBIS-SeaMap (Halpin et al. 2009; Maughan)</td>
<td>1997-</td>
<td>3</td>
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<td>Government Records</td>
<td>Falkland Islands Fishery Observer Reports</td>
<td>2001-</td>
<td>43</td>
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<td>Munro 2013</td>
<td>2012</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Falkland Conservation (Thomsen 2014)</td>
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<td>Published Literature</td>
<td>Iñíguez et al. 2010</td>
<td>2005-</td>
<td>1</td>
<td>2</td>
<td></td>
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<tr>
<td>Local Interviews</td>
<td></td>
<td>1940-</td>
<td>0</td>
<td>631</td>
<td></td>
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</tbody>
</table>

Participants were prompted to draw on an A1-sized laminated map the locations where they sighted whales over different decades, from the earliest they could remember to 2015. The interview map displayed the Falkland Islands and the boundary of the inshore study area, with a 1km$^2$ grid throughout the area as a reference for scale and later use for digitising the maps. Using a dry-erase marker, participants drew polygons over the grid to indicate areas of sightings, and were encouraged to give as many details about each sighting as they could remember. For each polygon, the following attributes were recorded whenever possible: (1) the species seen; (2) the approximate year(s); (3) the approximate month(s); (4) the minimum and maximum number of whales seen; (5) the observation platform; (6) an estimate of how often they visited that location during the decade; and (7) the frequency of sightings they had in relation to those visits. Figure 1 illustrates the interviewing process using the A1 map. The local knowledge observations were mapped by digitising the photos of the maps over the 1km$^2$ grid by selecting cells that intersected with the polygons drawn by the participants.
Figure 1. Veronica Frans interviewing Ben Bernsten from Elephant Beach as part of the historical whale sighting project

The empirical and local knowledge datasets were homogenised. An observation was defined as a specific capture, survey or opportunistic sighting, or a polygon drawn by a participant for a specific decade.

A total of 3,842 observations were compiled, of which 27.8% were located inshore (within 24km from shore). The 631 local knowledge observations were obtained from 58 participants. Only 3 participants (5.2%) were under age 30, with 31.3% of participants aged 30 to 50, 29.3% aged 50 to 64, and 24.2% older than 65.

Sei and fin whales were the most sighted whales throughout the study period, from the whaling era to now. Both species showed a significant increase in number of sightings from 1940 to 2015, with no or very few sightings during the last decades of the whaling era (1970s and 1980s) and a steep rise in number of sightings since the 2000s (Figure 2). A spread in the spatial distribution of observations was also observed between the whaling and post-whaling era (Figure 3). Other species have also shown signs of increased number of sightings (minke whales, humpback whales and southern right whales) but appeared to have never been sighted in as large numbers as sei and fin whales around the Falkland Islands, based on the commercial whaling catch data (Table 2). Blue whale numbers do not appear to have recovered from commercial whaling around the Falkland Islands.

Finally, using all sightings (of adequate reliability) gathered as part of the project, a map of sighting distribution was produced and highlights whale sighting hotspots in the coastal waters of the Falkland Islands (Figure 4). The lack of adequate data in the offshore area prevented from producing a map for offshore sighting hotspot distribution. The follow-up study will use environmental factors to predict the most suitable marine areas for whales and identify key areas for baleen whales throughout the Falklands’ waters.
Figure 2: Number of whale sightings (observations) from all data sources from 1940 to 2015. Note that 2010 decade only includes 5 years (2010-2015) compared to 10 for other decades.

Figure 3: Increase in density of fin (top) and sei (bottom) whale sightings in the territorial sea of the Falkland Islands. Max. Val.: The maximum value of density of sighting per km² (shown in red).
Table 2: Species composition of all whale sighting data during and post whaling era

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Figure 4. Hotspots of whale sightings from 1990 to 2015 (top) and corresponding spread of effort based on frequency of visits (bottom).
Appendix

3. Other project outputs

- Data and metadata available for management, future research and the public

All data and information gathered during the length of the project have been recorded and documented in Excel and Zotero databases that are available for public use. All the publicly-available data gathered as part of this project were submitted to the Falkland Islands IMS-GIS Data Centre and all metadata describing all information collated as part of the project were entered in the metadata catalogue. This includes the contact details of organisations for data that were obtained under a one-off license for this project. All results and maps from the interviews with local residents were also saved in the IMS-GIS Centre in the format of a Zotero database (open-access reference manager software, freely available to anyone for download and use) with photos or scans of the maps and entry forms. The GIS results of the analyses (the data used to build the result maps) were also added in the IMS-GIS Data Centre and available to inform further research and MSP.

- Public outreach

An article about the study was written for the Penguin News and published on 23 October 2015 (see Appendix B).

Veronica has spent over 15 days in camp over September and October 2015 meeting with people for interviews. This has allowed for public outreach by providing printed information sheets (Appendix C) to households of participants and discussions raising awareness about whales and Marine Spatial Planning within the community. All participants in the study will also soon be mailed a letter to thank them for their inputs in the study, accompanied by a summary of the results.

A radio interview for FIRS was given and broadcasted about the project and the whales of the Falkland Islands in November 2015.

- Scientific publication

A scientific publication presenting the results of the project is in preparation and will be submitted to the international scientific journal, *Endangered Species Research*.

*Frans V.F. and Augé A.A. (in prep.) Return of the whales in the Falkland Islands’ waters.*

This publication will be circulated to the Environmental Committee and all interested parties when it has been published. The results (maps and graphs) presented in this report are preliminary and should not be circulated to a wider audience than the
Environmental Committee or used for decision making until they are finalised and the paper is published.

4. Follow up study

The ESB has kindly supported a follow-up study to this initial whale project. Veronica Frans is now undertaking this follow-up project using the data described in this report and Species Distribution Models to predict the most suitable areas for whales within Falklands’ waters. This will provide further information to manage the recovery of the whale population in the context of MSP. This follow-up project will be completed in July 2016. Public outreach will again be maximised (including via a Penguin News article and a public presentation).

Acknowledgments

We would like to thank everyone who was interviewed or provided data towards this project. The FIG Environmental Studies Budget and the Darwin Initiative (Darwin Plus project ‘Marine Spatial Planning for the Falkland Islands’) funded the study.
Appendix B: Penguin News article about the MSP whale study, published on 23 October 2015

Marine Spatial Planning
Mapping historical whale sightings

By Veronica Frans, Research Assistant at South Atlantic Environmental Research Institute (SAERI) leading the study on ‘Mapping historical whale sightings’ as part of the Darwin Plus-funded project ‘Marine Spatial Planning for the Falkland Islands’ and supervised by Dr. Amélie Augé (SAERI).

When was the last time you saw whale? Have they always been around, or did they suddenly just reappear?

The story behind the whales in the Falklands is currently incomplete. Commercial whaling activities in the early 1900s nearly decimated whales throughout the world, including here. Annual captures of as many as 483 whales at New Island Station were recorded then. These were solely the large baleen whales - mainly sei and fin whales. Since then, according to anecdotal hearsay while talking with people, in particular with FIGAS pilots, these whales may well have been doing a comeback to the beautiful Falklands' shores, and in great numbers. So could there be a success story here, of a possible recovering whale population?

What has been noticed or not, something is happening with the baleen whales here in the Falklands. The problem is, no one has actually studied them until now. It means that we have very little data to determine what is happening. They're here now, but the questions are: Are they returning? Are their numbers increasing? Is there a seasonal pattern for their presence? Are these hotspots where they can be found? All of these questions need answers.

If the whale population is increasing, they may interact with ships and potentially collide with them. This is a serious issue faced in other countries with high whale density. Therefore, understanding the pattern of recovery of the whales in the Falklands and mapping their current distribution is needed for the Marine Spatial Planning (MSP) project. This project was described in the last couple of Penguin News and aims to provide scientific tools to FIG to co-ordinately manage the marine environment, in order to identify areas of potential risks and plan

Map illustrating a sample of the data from three people interviewed on whale sightings from the 1990s-2015 for the future, we need to identify areas used by whales, and whether their numbers are increasing.

But do we really not have the data to answer these questions? Well, although there is not much actual data, you (yes, you) may be able to help fill in the data gap.

This is called citizen science where scientists recognize that local inhabitants, as a group, have a huge amount of knowledge about the environment in which they live - especially historical knowledge. This can be harvested to fill gaps for scientific studies. As part of the MSP project, a study currently underway addresses these questions on whales and is using this concept of citizen science to accomplish it. Information is being gathered by interviewing people, and the goal is to determine where and when they could and can be found, in the past and now. MSP is addressing the gaps in knowledge that exist, and it is hoped that maps can be produced to inform FIG for management, and also the tourism industry for development purposes.

Getting historical information on whales therefore largely depends on eyewitness accounts. In September, I went on field trips to Camp (on the East and West Falklands and some of the outer islands), visiting people and interviewing them. I asked for their first-hand knowledge on whales, having them indicate on a map when and where they have seen whales over their lifetime. Whether

or someone can provide one sighting or 30, or whether they know which species they saw or not, any input is helpful to the study because it is working to build strength in numbers.

Preliminary results from 38 interviews thus far indicate that whales have been seen as early as November and as late as August in more recent years. The majority of sightings have been in January and February, according to 68 per cent and 87 per cent of these interviewees. Some of the earliest whale sightings were in the 1940s and 50s, but only 8 per cent of interviewees have attested to those rare. The majority of people have first seen whales in the 1990s and 2000s, and are still seeing them up until now.

More information is needed to obtain robust results, which will happen through more interviews, analysis of data recorded from FIGAS pilots, Falklands Conservation and other sources, and looking into commercial whaling archives.

In terms of interviews, I will continue to contact people over the next few weeks. As a newcomer to the Islands, the study has given me the privilege of seeing many amazing places and meeting so many welcoming and friendly people. I would like to thank those who have already participated in this study and also welcomed me into their homes.

If you have any questions, my email is VFrans@avm institute.ac.uk. For more information on the overall MSP project, you can check SAERI’s website.

The Environmental Planning Department financially supports the study via their Environmental Studies budget.

Building a map of whale sightings with Ben Berntsen at Elephant Beach Farm.

Typical sighting of baleen whales two blows of humpback whales
Appendix

Appendix C: Information sheet distributed to households that participated in the study (this information sheet was combined for 2 MSP projects).

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**Marine Spatial Planning for the Falkland Islands**

FIG has identified the need to implement marine spatial planning (MSP). In particular with oil exploration. MSP is a process to produce a strategic spatial plan to help manage marine activities sustainably and ensure that economic, environmental, and also cultural values are included in the decision process. SAERI is leading an MSP project aimed at producing the tools (e.g. maps) that FIG will need to develop MSP. A number of gaps were identified during MSP workshops, including the following two sub-projects where your inputs will be highly valuable to map some important values. For more information on MSP check the webpage [http://south-atlantic-research.org/research/current-research/marine-spatial-planning](http://south-atlantic-research.org/research/current-research/marine-spatial-planning), or contact Dr Amélie Augé (MSP project manager) at [AAuge@env.institute.ac.fk](mailto:AAuge@env.institute.ac.fk).

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**Whale Sightings and Recovery**

In the 19th and 20th centuries, commercial whaling had, for the most part, removed large baleen whales from the Falkland Islands’ waters. Several people said that they have begun to see more and more whales, indicating a positive sign that the whale population is recovering. With the Falklands serving as a home to many lifeforms dependent on its waters, it is possible that this place can become a globally important site for whales. In order to assess this importance and confirm that a recovery is indeed occurring, SAERI, under the MSP project, is working to gather as much information as possible on baleen whales of the Falkland Islands.

**Project Aims:**

Currently, there is no consolidated knowledge on where baleen whales have been found in the Falklands. By interviewing locals, gathering citizen scientist reports, looking through publications and going into historical archives, we are hoping to get enough information that could allow us to:

1. Create historical and current maps of whale sightings;
2. Determine whale sighting “hotspots”;
3. Estimate the trends in whale diversity and numbers over time.

**Further Information:**

Veronica Frans, MSc.
MSP Research Assistant
VFrans@env.institute.ac.fk

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**Coastal Cultural Values**

The tangible and economically beneficial products from our marine environments, such as oil and fish, are often seen as most valuable. The cultural benefits gained from the coastal and marine environments, however, are often overlooked. Cultural values are abstract and span anything from family memories to one’s favourite beach, which are hard to put a price-tag on. Often ignored by policy makers, these cultural values can nonetheless be incorporated if they are uncovered. This study aims to map where cultural values are found along the coast. Having such maps will allow managers to ensure that cultural values are included in MSP and other management processes.

**Project Aims:**

Currently there is no knowledge on what types of coastal cultural values the people of the Falkland Islands hold and where they are situated. In that regard, interviews are being planned throughout the islands to define and map these.

This study will allow SAERI, in the context of the MSP project, to:

1. Create maps showing current coastal values;
2. Define the intensity of these values.

**Further Information:**

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