Darwin Plus:
Overseas Territories Environment and Climate Fund

Final Report

Important note *To be completed with reference to the Reporting Guidance Notes for Project Leaders:*

it is expected that this report will be a maximum of 20 pages in length, excluding annexes

Darwin Project Information

Project Ref Number	DPLUS009
Project Title	Antarctic and Sub-Antarctic Marine Protected Areas: using penguin tracking data to identify candidate areas
Territory(ies)	GSGSSI, BAT
Contract Holder Institution	British Antarctic Survey
Partner Institutions	BirdLife International and Scientific Committee for Antarctic Research
Grant Value	£142,176
Start/end date of project	1 July 2013 to 31 March 2015
Project Leader	Philip Trathan
Project website	www.seabirdtracking.org
Report author and date	Philip Trathan, Sara Ann Bruss and Ben Lascelles, 26 June 2015

1 Project Overview

The focus of Project DPLUS009 was the southwest Atlantic, principally the Antarctic Peninsula and Scotia Sea (Figure 1). The project centred on the British Antarctic Territory (BAT) and the South Georgia and South Sandwich Islands (SGSSI), but has future potential benefits for the Falkland Islands and Tristan da Cunha. Though the scope was the southwest Atlantic, the majority of the project work was almost entirely UK based, with most of the work carried out in Cambridge, either at the British Antarctic Survey (BAS), or at BirdLife International (BLI). Two major workshops involved extensive international participation: an initial planning workshop was held at the 8th International Penguin Conference (IPC8) in Bristol in September 2013, and a final strategic workshop in Cambridge at BAS in May 2015.

Despite the UK's pioneering and leadership role within the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), in establishing the first MPA in the Antarctic Treaty area (plus the SGSSI MPA), CCAMLR's development of a representative network of MPAs has stalled (largely due to the politics relating to the Ross Sea and East Antarctica). To enable progress in the key area of West Antarctica, the UK has advocated a fully consultative marine spatial planning approach for marine managed areas (including for candidate MPAs) in the Scotia and Weddell Seas. Arguably the most critical data for delineating key habitats in coastal and inshore areas will be information on the favoured foraging locations of marine predators, such as penguins. The penguin data urgently needed compiling and analysing in a customised database (interoperable with BirdLife's Global Procellariiform Tracking Database (internationally recognised for its role in bycatch management by RFMOs (tuna commissions) and as the main global data input for pelagic marine species to the CBD's candidate MPA process). Development of a penguin tracking database should then allow analogous analyses to provide a suite of candidate sites whose protection and management will be fundamental and high priority for regional MPAs within BAT (and CCAMLR). The same process would provide input for revising coastal/inshore protection for penguins within the SGSSI MPA; with future application to the UKOTs of the Falkland Islands and Tristan/Gough.

The central work of Project DPLUS009 was therefore the creation of a regional database of penguin tracking data and analysis/modelling that would allow: a) definition of candidate sites/areas for special protection within a region-wide input to the CCAMLR MPA process; b) underpinning of new marine spatial planning to generate MPAs for BAT; c) identification of key penguin coastal/inshore foraging areas within the SGSSI MPA; d) easy and rapid future delineation of candidate MPAs for the Falkland Islands and Tristan/Gough, including via

interoperability with a longstanding analogue database for pelagic seabirds; e) future addition of marine mammal data; f) Antarctic candidate input to the CBD global marine MPA (EBSA) process.

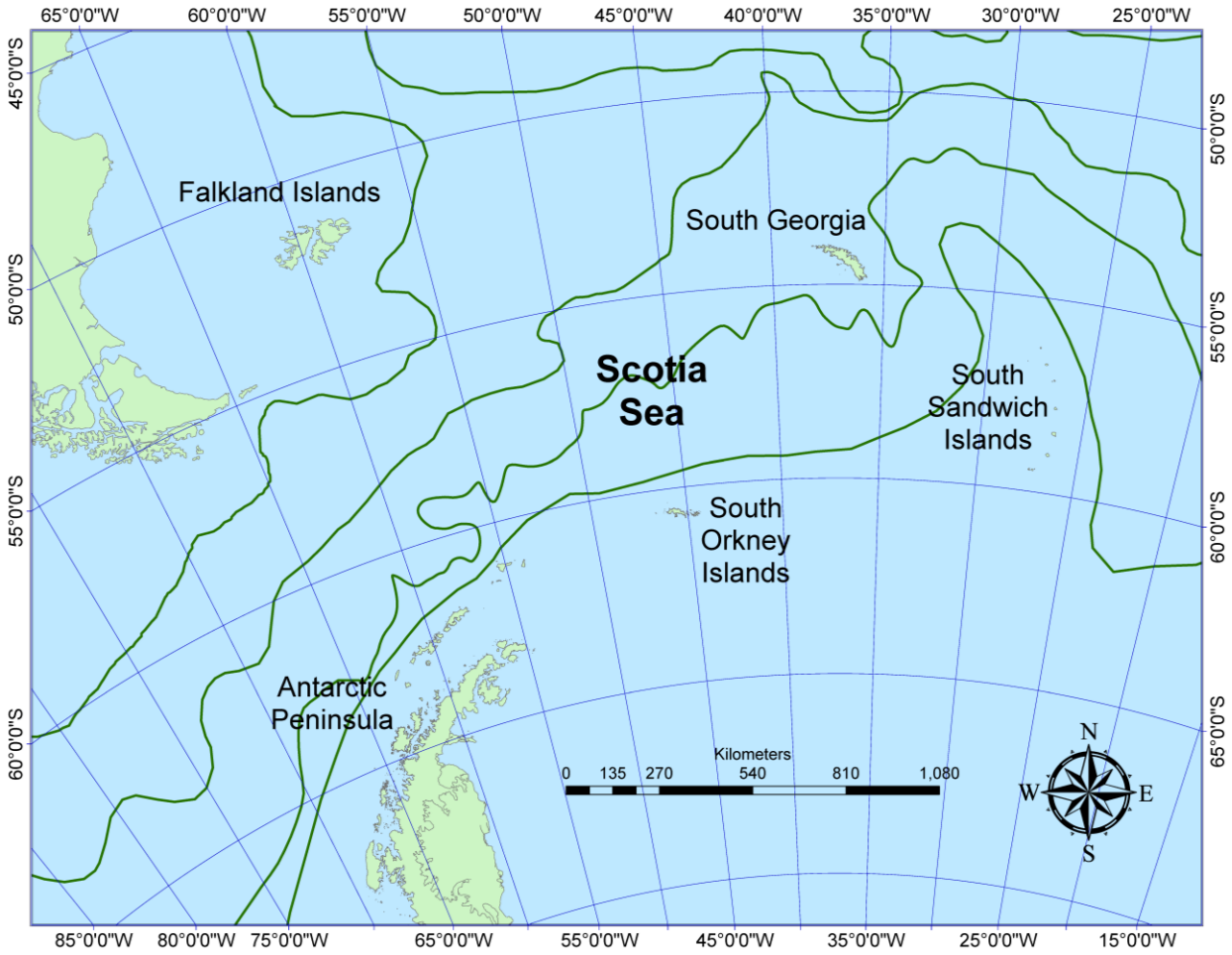

Figure 1. The Scotia Sea with the fronts (in green) of the eastward flowing Antarctic Circumpolar Current (ACC): south to north, Southern ACC Boundary, Southern ACC Front, Polar Front, Sub-Antarctic Front.

The principle threat to the southwest Atlantic marine ecosystem is potentially climate change. For example, surface water temperatures are increasing from the Peninsula to South Georgia, whilst seasonal sea ice is showing unprecedented decreases in the modern era. Further, the southwest Atlantic is also the focus of important fisheries, including the commercial fishery for Antarctic krill. The future potential expansion of the krill fishery, coupled with ongoing regional warming, is a critical combination of potential threats for the Antarctic marine ecosystem. CCAMLR has international responsibility for managing the krill fishery, but it has not yet delivered the robust ecosystem-based management framework that it aspires to achieve. Part of this management framework should include general protection for those species (such as penguins, other seabirds, seals, whales, fish and squid) that depend upon krill as a major source of nutrition, and specific and comprehensive protection for sites with important biodiversity or which are the site of key ecosystem processes.

Scientific evidence is widely used within CCAMLR to help formulate management decisions. Therefore, information about the locations and habitats used by foraging penguins should help CCAMLR identify areas of importance that could be protected.

Project DPLUS009 therefore set out to deliver a penguin relational tracking database, developed from the BLI Global Procellariiform Tracking Database (GPTD). It was envisaged that this platform would provide an ideal data archive and analysis framework for foraging and migration movements, as it allows telemetry data to be integrated from a variety of tracking devices.

Our plan was to populate the database with foraging information from the international penguin researcher community. This necessitated careful negotiation with data holders to facilitate data access; this is because when data are used, especially collectively, proper recognition must be given to data originators. BLI developed a template for data access and use which was used to engage with researchers, including within the CCAMLR community, through SCAR, and through the International Penguin Conference (the PL was on the steering committee for IPC8) to ensure data were assembled, collated and standardised.

We also planned to refine and develop a number of computer analysis routines to identify which areas of the ocean are selected by tracked penguins, so that by applying further statistical analyses the routines would report whether the areas were representative of all birds in the originating population and are therefore important. As tracking data

are only available from some colonies we aimed to relate known foraging distributions to environmental correlates so we can estimate the location of foraging areas for colonies where no tracking data exist.

Project members (Phil Trathan, Ben Lascelles and Maria Dias) were invited to participate in a recent marine spatial planning workshop focussed on the Falkland Islands and a gap analysis workshop also for the Falklands. Project members were able to share their experiences while information from Project DPLUS009 was seen as useful and informative for the work for this UKOT.

2 Project Achievements

2.1 Outcome

Tracking data are logistically and financially expensive to collect, and are seldom accessible to researchers other than those in the data originators group. Despite this, many researchers wish their data to be more freely available. Therefore, developing a database system was an important step for making data available whilst maintaining ownership rights for data originators. Rigorous scientific analysis is critical for identifying important habitats; however, links between the original data and any derived analytical product must be maintained and is essential for end user buy-in. The penguin tracking database will therefore engage both scientists and policymakers so that penguin habitats may be protected.

The principle outcome envisaged from Project DPLUS009 was a tracking database that would facilitate the combination of different tracking datasets, allowing analyses of combined data to support MPA designation within the Scotia Sea, as well as supporting a robust CCAMLR management framework for Antarctic krill. The database has been developed and is now operational at www.seabirdtracking.org. Completion of the database and user interface means that improved conservation-oriented analyses can now be undertaken. For example, the project has enhanced collaborative projects between holders of penguin tracking data, which will help increase scientific and conservation outputs. Argentinean, Norwegian, UK and USA dataholders are now planning collaborative analyses and have developed a joint project proposal that will, if funded, help deliver policy oriented scientific analyses for CCAMLR.

Another important part of Project DPLUS009 (in addition to providing the penguin tracking database) was to redevelop and update the GPTD database and web interface. This redevelopment was successfully completed under the project. This was important because the GPTD is a major strategic resource for seabird conservation, and integration of the penguin data with that already held for other species will facilitate even more effective regional and global analyses. So, in addition to developing new tools for penguins, the project has helped sustain an existing globally important conservation tool.

As well as providing a long term home for data and inputs to CCAMLR processes, the database and website have been designed to allow data to be requested for other purposes. Since the penguin tracking data have been made available, the broader scientific and conservation community have made a number of data requests for data access (72 penguin datasets requested since September 2014); these requests include both conservation and scientific requests. This provides further evidence of the utility of Project DPLUS009.

Collating historical data increases the value of those data, allowing them to be re-used for previously un-envisaged projects. Tracking data are particularly expensive, so the database at www.seabirdtracking.org creates enormous value for money. The combined value of the tracking data held in www.seabirdtracking.org is potentially greater than £1 million (even more if opportunity cost, logistic cost and data validation are included).

The project is by definition, embedded within international convention themes and should inevitably lead to progress in the areas of delivery of CCAMLR and CBD, but also CMS, given the international jurisdiction of the species ranges and stakeholder organisations.

2.2 Outputs

Three principal outputs were envisaged for Project DPLUS009.

Output 1	Collate all existing penguin tracking data into a centralised database.
1.1	Initiate workshop at the 8th International Penguin Conference in Bristol, October 2013 to discuss data sharing. Develop meta-data list of all penguin tracking data collected to date.
1.2	Develop a PostGreSQL relational database capable of integrating available penguin tracking data, this will be enabled with analytical tools to standardise formats and make data comparable.
1.3	Collaborate with penguin researchers and data originators to collate tracking datasets into the database system. Work with them to ensure data ownership is protected.

In our original proposal we indicated that we would compile 1500 tracks from 6 penguin species within the database by the end of the project. We have in fact surpassed this and the database now holds 2085 tracks including for 9 different species and collected from 47 different colonies (corresponding to more than 1.2 million locations).

The initial workshop at IPC8 revealed strong support from the penguin research community. A meta-data list of all existing penguin tracking data was developed during the course of the project, and in the project region we have compiled all available data bar one (which is not yet been published as part of an ongoing PhD, but has been promised once completed). This success further highlights the benefit of the BLI terms of use for encouraging contribution of data to the centralised database and ensuring data ownership is protected.

The data currently collated comprise:

Common Name	**Scientific Name**	**N tracks**
African penguin	*Spheniscus demersus*	20
Humboldt Penguin	*Spheniscus humboldti*	23
Magellanic Penguin	*Spheniscus magellanicus*	130
Adélie Penguin	*Pygoscelis adeliae*	169
Chinstrap Penguin	*Pygoscelis antarctica*	548
Gentoo Penguin	*Pygoscelis papua*	374
King Penguin	*Aptenodytes patagonicus*	200
Macaroni Penguin	*Eudyptes chrysolophus*	303
Southern Rockhopper Penguin	*Eudyptes chrysocome*	318
	Grand Total	**2085**

The PostGresSQL relational database developed by the project is now operational (http://seabirdtracking.org/mapper/?node=Sphenisciformes). This was implemented under a subcontract to the Marine Geospatial Ecology Lab, Duke University, North Carolina (https://mgel.env.duke.edu/). In addition some remaining funds were used to further develop the look and feel of the site, enhancing the user experience, via a subcontract with Builtbyclick (www.builtbyclick.com/). Templates of these new pages are included within Annex B, with the pages due to go live very soon. To further enhance the user experience an ESRI story map was developed (www.seabirdtracking.org/?q=Sphenisciformes) to act as an introduction to the penguin node of the website, explaining and presenting data on penguin threats, tracked distributions and project background.

Output 2	Analyse all available tracking data to define candidate foraging sites and moulting areas for special protection.
2.1	Data will be amalgamated into groups representing each unique combination of species, population and breeding stage and the BirdLife computer routines for the GPTD will be reviewed and applied to each individually.
2.2	Develop habitat modelling analyses to predict habitat preferences in order to better understand the drivers of each species distribution (i.e. whether it is located in relation to static ecosystem features or dynamic oceanographic features). Determine whether boundaries of candidate sites are locally and regionally representative.
2.3	Consult through the project steering committee made up of species and regional experts to understand any gaps in the process.

The data submission process now includes standardised categorisation of all tracking data points against species, population and breeding stages. This has allowed much greater automation of data searching and exploration via the mapping tool and will allow the future analysis of data via automated computer routines.

In Cambridge, during May 2015, an international workshop was held at BAS to pursue the objectives of Output 2. This workshop, "*Scotia Sea Pygoscelid Penguin Tracking and Habitat Analysis Workshop*" was jointly convened by BAS, BLI and US AMLR and funded by WWF (UK). The co-funding for the workshop allowed 17 participants to meet, with 10 coming from abroad (Argentina, Australia, Japan, Norway, and USA). All CCAMLR Member states that hold penguin tracking data were represented at the meeting. The workshop report is attached as Annex A.

At this workshop the BLI routines developed for the analysis of Procellariform tracking data were discussed and a number of recommendations made as to how these could be successfully adapted and applied to penguins. These will be tested and explored further over the coming months, after the current project is completed. The workshop agreed that there were a number of outputs, including via habitat modelling approaches, that would be of scientific value and which could also provide information about penguin foraging habitats for CCAMLR. In particular:

a) Producing a complete map of foraging areas for all colonies, across the Scotia Sea

- Develop statistical analyses of combined GPS tracking data and dive data to explore how penguins utilize the available water column in relation to the distance from the colony at different times of year.
- Develop statistical analyses to explore relationships between diving behaviour and horizontal spatial scale.
- Update the appropriate parameters in the BLI analysis routines so that they better reflect the characteristics of penguin foraging behaviour.
- Develop analytical approaches to extrapolate foraging information to locations where no tracking data exist in CCAMLR Subarea 48.1 and Subarea 48.2.

- Convene a second penguin tracking and habitat analysis workshop at the 9th International Penguin Conference during September 2016 in Cape Town, South Africa.

b) Assessing overlap with potential threats

- Develop analyses relating to the proximity of krill fishing locations to penguin colony locations in Subareas 48.1 and 48.2. Initial analyses were presented at the workshop and it was noted that the cumulative numbers of krill-eating penguin colonies that are close to the footprint of operation of the krill fisheries has increased since 2000. A paper will be presented on this issue to CCAMLR WG-EMM in July 2014 by the UK.

c) Recommendations for marine spatial planning

- Spatial utilization analyses and habitat use and habitat preference models could help inform CCAMLR Domain 1 MPA planning. Such analyses could also help inform the development of new CCAMLR krill management approaches. A paper will be presented on this issue to CCAMLR WG-EMM in July 2014 by the UK.

The project has been guided throughout by a global steering committee consisting of Charles-André Bost (Europe), Louise Emmerson (Australia); Akinori Takahashi (Asia); Azwianewi Makhado (Africa), Jefferson Hinke (North America), Pablo Garcia-Borboroglu (South America), Thomas Mattern (New Zealand) and Colin Southwell (CCAMLR). They have provided invaluable help and advice in obtaining penguin tracking data, ensuring the website and database is fit for purpose, and advising on suitable analytical approaches.

Output 3	Underpin new Marine Spatial Planning processes in CCAMLR and CEP.
3.1	Engage with BAT and SGSSI to identify UK policy requirements.
3.2	Develop scientific papers for delivery to CCAMLR and CEP via the appropriate UK delegation.
3.3	Engage internationally within CCAMLR/CEP to explain the conservation imperatives within the UK delegation papers and to advocate appropriate conservation measures.

Increased political difficulties within CCAMLR have emerged since our initial project proposal which have led to less progress with the development of marine protected area proposals. We knew that discussions were tough in 2012, but they became very much more polarised in 2013 and 2014. In fact, CCAMLR convened a special meeting of the Commission in 2013 to discuss the situation with respect to proposed MPAs in the Ross Sea and East Antarctica. No resolution as yet been achieved with regard to these two proposals.

In Chile this year a special CCAMLR Symposium (Heads of Delegation) was convened to review how well CCAMLR was working. At this meeting MPAs featured very strongly, but little resolution was achieved about how to use MPAs to help fulfil CCAMLR's mandate.

Part of this difficulty within CCAMLR stems from different views amongst Members about whether CCAMLR is more than just a regional fishery management organisation.

In order to maintain forward momentum with the development of MPAs, strong, evidence based proposals will be critical. The PL, as part of the UK Delegation to CCAMLR, has therefore continued to push to integrate the outputs of Project DPLUS009 as a critical component for MPA planning with the planning region for the Antarctic Peninsula and the South Orkney Islands (CCAMLR Planning Domain 1).

In Buenos Aires, Argentina, during May 2015, an international workshop to further marine spatial planning objectives for CCAMLR Subarea 48.1 and Subarea 48.2 (CCAMLR Planning Domain 1) was hosted by members of the Argentine delegation to CCAMLR. At the workshop penguin (plus seal and whale) tracking data were used to develop inputs for the marine spatial planning process. All of the penguin tracking data available at the workshop were collated in the BLI database (www.seabirdtracking.org). A paper will be presented to CCAMLR WG-EMM in July 2014 on the progress made at the workshop by Argentina.

At present, planning for CCAMLR Subarea 48.1 and Subarea 48.2 is at the early stages. This is because: the number of datasets is very extensive and issues related to the operation of the regional krill fishery have not yet been addressed in the planning process. Resolving any potential conflict between fishing and conservation are highly likely to require extensive consultation and deliberation. The BLI tracking database is likely to be highly influential in these discussions. Completion of the database was therefore both necessary and timely.

2.4 Sustainability and Legacy

BirdLife have successfully managed the GPTD since its inception in 2002. Throughout this period the system has been supported through BirdLife core funds, and where necessary, through additional money from external agencies and foundations. The penguin tracking database will receive similar maintenance considerations, and BirdLife have already agreed to make the commitment that they will maintain the penguin system in an analogous manner into the future.

During the initial database development period, all efforts were made to future-proof the system and ensure minimal maintenance and as little day-to-day management as maybe required. Computer software routines for data standardisation were developed so that data are processed automatically by the database.

The analytical methods and computer routines will be published as part of the project's submission to CCAMLR and also in the peer-reviewed scientific literature. The routines themselves will also be made available as open-source code so localised systems can be established if desired, with the offer to make them available to other UKOTs as appropriate. This will allow updates to be readily undertaken by responsible bodies as new data become available, and for the impacts of conservation measures to be monitored as new tracking data describing penguin foraging effort and location are collected

Project staff will continue in their respective positions at BAS and BLI, but are already seeking opportunities to fund continuing collaborative projects based around the penguin tracking database.

3 Project Stakeholders

Marine Spatial Planning (MSP) is a process that allows users of the ocean to work together to make informed and coordinated decisions about how to use marine resources. The intended result of MSP is a more sustainable approach to ocean use – ensuring that marine resources and ecosystem goods and services are utilised, but within clear environmental limits to ensure ecosystems remain healthy and biodiversity is conserved. Our stakeholders are therefore diverse and include SCAR and individual scientists, Antarctic tourist operators, Non-Governmental Organisations and conservation lobby groups, regional Governments including UKOTs, and CCAMLR and fishing companies.

Developing the tools to engage with and service the needs of this array of stakeholders is crucial if CCAMLR, as the multi-lateral organisation responsible for managing and protecting the Antarctic, is to agree the designation of appropriate conservation measures. Within Project DPLUS009, we have focussed on building a consensus amongst the data providers so that we can build on a solid platform for future evidence-based policy outcomes. We have involved scientists from the outset, running a large workshop (with over 60 attendees) at IPC8 and a smaller focused workshop (with 17 attendees) in Cambridge. We established a project steering committee to represent the needs of penguin researchers in different regions and have had data contributions from 22 scientists and research institutes. We have also initiated dialogue within CCAMLR, particularly within the Working Group on Ecosystem Monitoring and Management, which has primary responsibility for the developing marine spatial planning (MPAs) and management of the krill fishery. We tabled paper WG-EMM-13/18 during 2013 and paper WG-EMM-14/03 during 2014. We will table two further papers during 2015. Engagement within CCAMLR is increasing and is leading to further international collaborative work (see 2.1 above) which will benefit CCAMLR's MSP process.

4 Lessons learned

As with all projects, lessons can be learned. Potentially the important lessons we learned are as follows:

a. Developing trust amongst the members of a community takes time. Previous attempts to harness the efforts of scientific communities have sometimes faltered because project managers have attempted to move faster than the slower participants were willing to move. This can create difficulties, especially with vocal minorities. We therefore deliberately trod slowly and carefully to ensure the penguin research community moved with us. Building trust takes time, while destroying trust takes just a few seconds.
b. Developing large software packages also takes time. Developing the www.seabirdtracking.org web interface was a large project. This occupied much of the time for us. However, ensuring that such a globally important conservation tool was correctly delivered was critical and lays the much needed foundation for a wide variety of future work utilising penguin tracking data.
c. We probably underestimated the political difficulties within CCAMLR with respect to MSP. We knew that discussions were tough in 2012, but they became very much more polarised in 2013 and 2014. In fact, CCAMLR convened a special meeting of the Commission in 2013 to discuss the situation with respect to proposed MPAs in the Ross Sea and East Antarctica. No resolution as yet been achieved with regard to these two proposals.

The project management structure worked well, with BLI providing database technical expertise, SCAR providing engagement opportunities and BAS leading consultation with CCAMLR stakeholders.

4.1 Monitoring and evaluation

There were no changes necessary to the design of the project.

As the project interacted with the scientific community, there was continual review and constructive criticism of the project development and database structure design. The papers submitted to WG-EMM also received constructive criticism and evaluation.

The mid-term Project DPLUS009 reports were reviewed on behalf of Darwin Plus. The findings of the review were helpful

The Project DPLUS009 budget and financial transactions were externally audited; the financial audit reported favourably of the project, with no criticisms or major failures highlighted.

4.2 Actions taken in response to annual report reviews

Following a request in the annual report review last year, we have already provided Darwin with details of the subcontract with Duke University; this is appended again here as Annex C.

5 Darwin Identity

The Darwin identify was recognised and hopefully enhanced with the logo prominently shown on material presented at IPC8. The logo is also prominently displayed on the http://seabirdtracking.org/Sphenisciformes website, while Darwin is recognised in the report of the Cambridge workshop in May 2015 (Annex A).

The Antarctic scientific community is very broad as many different nations are Party to the Antarctic Treaty System. Within some Parties, Darwin may have some profile, but not in all and probably not by those that undertake science in the Antarctic. Darwin is also probably not well-recognised in the CCAMLR community. Project DPLUS009 therefore allowed the logo to be displayed to many individuals not previously familiar with Darwin.

6 Finance and administration

6.1 Project expenditure

Project spend (indicative) since last annual report	2014/2015 & 2015/2016 Grant (£)	2014/2015 & 2015/2016 Total actual Darwin Costs (£)	Combined Variance %	Comments (please explain significant variances)
Staff costs				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others				
TOTAL				

Staff employed (Name and position)	Cost + Overheads (£)
Philip Trathan – Head of Conservation Biology BAS	
Ben Lascelles – Marine Important Bird Area Co-ordinator	
TOTAL	

Consultancy – description of breakdown of costs	Other items – cost (£)
TOTAL	

Capital items – description	Capital items – cost (£)
TOTAL	

Other items – description	Other items – cost (£)
TOTAL	

6.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
BAS 2013/14 – contained in original project proposal	
BAS 2014/15 – contained in original project proposal	
BAS 2015/16 – contained in original project proposal	
WWF (UK) 2015/2016 – leveraged during the project	
TOTAL	

Source of funding for additional work after project lifetime	Total (£)
Global Penguin Society	
Project proposal submitted to CCAMLR CEMP Fund	
TOTAL	

6.3 Value for Money

The project has allowed the collation of penguin tracking data that can now be used for conservation, as well as for integrated scientific purposes. Overall, the value of these data is probably in excess of £1 million. Collating this data for the funds supplied by Darwin, together with associated funds in kind, is extremely good value. If the associated logistic and personnel costs associated with the original data collection are included, then the value for money is even greater.

The GPTD is a recognised tool used by the conservation community across the world and in various international legal fora (CBD, CMS and in Regional Fisheries Management Organisations). Renewing the underlying database structure and the user interface for www.seabirdtracking.org therefore prolongs the useful life of a key conservation tool. This is added value for money provided by the project.

Annex 1 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1	Number of (i) students from the UKOTs; and (ii) other students to receive training (including PhD, masters and other training and receiving a qualification or certificate)	0
2	Number of (i) people in UKOTs; and (ii) other people receiving other forms of long-term (>1yr) training not leading to formal qualification	0
3a	Number of (i) people in UKOTs; and (ii) other people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	0
3b	Number of training weeks (i) in UKOTs; (ii) outside UKOTs not leading to formal qualification	0
4	Number of types of training materials produced. Were these materials made available for use by UKOTs?	0
5	Number of UKOT citizens who have increased capacity to manage natural resources as a result of the project	0
Research Measures		
6	Number of species/habitat management plans/ strategies (or action plans) produced for/by Governments, public authorities or other implementing agencies in the UKOTs	0
7	Number of formal documents produced to assist work in UKOTs related to species identification, classification and recording.	4
8a	Number of papers published or accepted for publication in peer reviewed journals written by (i) UKOT authors; and (ii) other authors	
8b	Number of papers published or accepted for publication elsewhere written by (i) UKOT authors; and (ii) other authors	A number are planned or are in preparation (see Annex A)
9b	Number of computer-based databases enhanced (containing species/genetic information). Were these databases made available for use by UKOTs?	1
9a	Number of species reference collections established. Were these collections handed over to UKOTs?	0
9b	Number of species reference collections enhanced. Were these collections handed over to UKOTs?	0

Code	Description	Totals (plus additional detail as required)
Dissemination Measures		
14a	Number of conferences/seminars/workshops/stakeholder meetings organised to present/disseminate findings from UKOT's Darwin project work	2
14b	Number of conferences/seminars/ workshops/stakeholder meetings attended at which findings from the Darwin Plus project work will be presented/ disseminated	2 1 at 2nd World Seabird Conference in Cape Town October 2015; there is a session on global databases where seabirdtracking.org with be showcases and the new penguin node highlighted. plus 1 at 9th International Penguin Conference in Cape Town 2016; we plan to hold a session on the new penguin node for seabirdtracking.org.
Physical Measures		
20	Estimated value (£s) of physical assets handed over to UKOT(s)	0
21	Number of permanent educational/training/research facilities or organisation established in UKOTs	0
22	Number of permanent field plots established in UKOTs	0
23	Value of resources raised from other sources (e.g., in addition to Darwin funding) for project work	

Annex 2 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. contact address, website)
Paper to CCAMLR	M. Hindell (SCAR), B. Lascelles (BirdLife) and P. Trathan (UK) (2013). Developing a penguin tracking database to help determine their most important foraging areas. WG-EMM-13/18.	Australian	Scientific Committee for Antarctic Research	Male		Lead author
Paper to CCAMLR	P. Trathan (UK) B. Lascelles (BirdLife) and M. Hindell (SCAR) (2014). Update for CCAMLR WG-EMM on the BAS, BirdLife, SCAR penguin tracking database development and analysis project. WG-EMM-14/03.	UK	UK	Male		Lead author
Paper to CCAMLR	P. Trathan (UK), J.R.D. Silk (UK), S.L. Hill (UK), H.J. Lynch (USA) (2015). A critical issue for feedback management - how do we determine the level of functional overlap between krill fishing operations and penguin foraging activity.	UK	UK	Male		Lead author
Paper to CCAMLR	P. Trathan (UK) B.	UK	UK	Male		Lead author

	Lascelles (BirdLife) and J. Hinke (USA) (2015). Scotia Sea Pygoscelid Penguin Tracking and Habitat Analysis Workshop.					
[*]Workshop Report Annex A	Workshop participants (2015). Scotia Sea Pygoscelid Penguin Tracking and Habitat Analysis Workshop.	Workshop participants	International	Male		Lead author
[*]Web pages Annex B	BirdLife (2015). Story map of penguin populations.	International	International	Male		www.seabirdtracking.org

Annex 3 Darwin Contacts

Ref No	DPLUS009
Project Title	Antarctic and Sub-Antarctic Marine Protected Areas: using penguin tracking data to identify candidate areas
Project Leader Details	
Name	Philip Trathan
Role within Darwin Project	Principle Investigator
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Partner 1	
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Organisation	BirdLife International
Role within Darwin Project	Co-Investigator
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Partner 2 etc.	
Name	
Organisation	
Role within Darwin Project	
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