Darwin Plus:
Overseas Territories Environment and Climate Fund
Annual Report

To be completed with reference to the "Writing a Darwin/IWT Report" Information Note: (https://dplus.darwininitiative.org.uk/resources/reporting-forms-change-request-forms-and-terms-and-conditions/). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Submission Deadline: 30th April 2021

Darwin Plus Project Information

Project reference	DPLUS092
Project title	Seabird sentinels: mapping potential bycatch risk using bird-borne radar
Territory(ies)	Falkland Islands (FI); South Georgia and The South Sandwich Islands (SGSSI)
Lead organisation	British Antarctic Survey (BAS)
Partner institutions	BirdLife International
Grant value	£269,420.00
Start/end dates of project	1 July 2019 to 31 December 2021
Reporting period (e.g. Apr 2020-Mar 2021) and number (e.g. Annual Report 1, 2)	Apr 2020-Mar 2021 Annual Report 2 (AR 2)
Project Leader name	Richard Phillips
Project website/blog/social media	See section 13
Report author(s) and date	Richard Phillips, Ana Carneiro, Lizzie Pearmain 29 April, 2021

1. Project summary

The project will link habitat preference, activity patterns and detections from novel bird-borne radar-GPS devices, and immersion loggers to quantify interactions of tracked wandering albatrosses with legal and unreported fishing vessels in the South Atlantic. Areas and periods of highest susceptibility to bycatch will be mapped for birds of different age and sex. We will engage with stakeholders to use project results for this iconic species to better target bycatch observer programmes, monitor compliance with bycatch mitigation and highlight impacts of bycatch on seabirds.

2. Project stakeholders/partners

The project is led by the British Antarctic Survey (BAS) in close collaboration with project partner BirdLife International (BL). The roles of both BAS and BL are clearly defined, and both organisations work together in project planning, monitoring and evaluation, and decision making. Regular contact (weekly or at least fortnightly) has been maintained between project team members since the beginning of the project.

The project has benefited from BL partners, particularly the NGOs that run fisheries observer programmes in South America. The RSPB (the BirdLife Partner in the UK), will continue to play an important role in awareness raising and engagement with Regional Fisheries Management Organisations (RFMOs). The NGOs in South America are also involved, and the project will use this network for dissemination of the results of the project.

It has also benefited from the role of the project leader as co-convenor of the Populations and Conservation Status Working Group of the Agreement on the Conservation of Albatrosses and Petrels (ACAP), and his participation in the Seabird Bycatch working group. As a member of the UK delegation to ACAP, he represents the interests of UK government bodies with devolved responsibilities for conservation of marine fauna in UK OTs and surrounding waters.

3. Project progress

3.1 Progress in carrying out project Activities

Output 1 Understand fine-scale attendance patterns of wandering albatrosses of different age, sex and breeding status to legal and illegal fishing vessels.

All activities within this output were completed. A manuscript describing data processing and results was submitted to Movement Ecology, and is now under review (Annex 3).

Activity 1.1 *Organise fieldwork logistics.*

Progress to date: Completed.

Activity 1.2 *Collect and compile fisheries and tracking data (i.e. radar, 3-D acceleration, GPS location, and immersion data).*

Progress to date: Completed.

The BAS field assistants collected data for adult wandering albatrosses during brood-guard (March-April 2020) and post-guard chick-rearing (July-August 2020). Retrospective review forms were completed and sent to the animal welfare and ethics body, and South Georgia Govt., which issued the permit. To maximise data collection, a second season of deployments was carried out in January-April 2021, involving tracking of adults during incubation, deferring (sabbatical) breeders, and juveniles. All applications for this work, i.e., for animal welfare and ethical review, EIA and the govt. permit were approved. Protocols with instructions on device deployments and configuration were finalised, and sent to the field assistants at Bird Island (Annex 4).

We made substantial progress in our collaboration with Global Fishing Watch (GFW) with regards to accessing satellite Automatic Identification System (AIS) data from vessels. GFW provided detailed position data for all individual vessels operating close to all locations of tracked birds (whether or not there was a radar detection). The GFW data include: unique vessel identifier, date, time, latitude, longitude, type of vessel, nationality (flag state), and a field indicating if the AIS position was classified as fishing using a neural network analysis.

Activity 1.3 *Data analysis to determine the distance at which wandering albatrosses respond to vessels (i.e. change direction, flight height etc. based on acceleration data), and proportion of time spent behind each vessel.*

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Activity 1.4 *Assess whether a signature is detectable in GPS, acceleration and immersion data that indicates scavenging behind vessels vs feeding on natural prey. If so, quantify time spent following vessels from other GPS and immersion datasets (from the current and previous seasons).*

Progress to date: Completed.

This analysis focused on data collected from breeding adults only. Of the 85 individuals tracked, devices on 46 birds (54%) detected vessel radar during at least one trip, of which 33 were associated with one or more fishing vessels (based on the GFW dataset). We used hidden Markov and random forest (RF) models to investigate whether a signature in patterns of movement and behaviour of the tracked birds could be associated with either natural foraging or interactions with vessels.

Radar detections were associated with all behavioural states, with no clear pattern indicative of foraging behind vessels (Figure 1). The random forest models had collectively very low predictive accuracy, and were unable to distinguish bouts in which a fishing vessel was, or was not nearby. Thus, we were unable to accurately predict from the movement metrics whether

foraging bouts occur in the vicinity of a fishing vessel or naturally. The inclusion of immersion data in our hidden Markov models allowed two area-restricted-search states to be identified, both involving slow speeds and high turning rates, and in one state with landings indicative of prey capture attempts; this would not otherwise be detectable with location data only (Table 1). Our results suggest that scavenging behaviours behind fishing vessels of wandering albatrosses mirror natural foraging. These results underline the value of using devices (radar detectors or cameras) that detect vessel proximity for a better understanding of seabird-fishery interactions, rather than just overlap at large spatial scales.

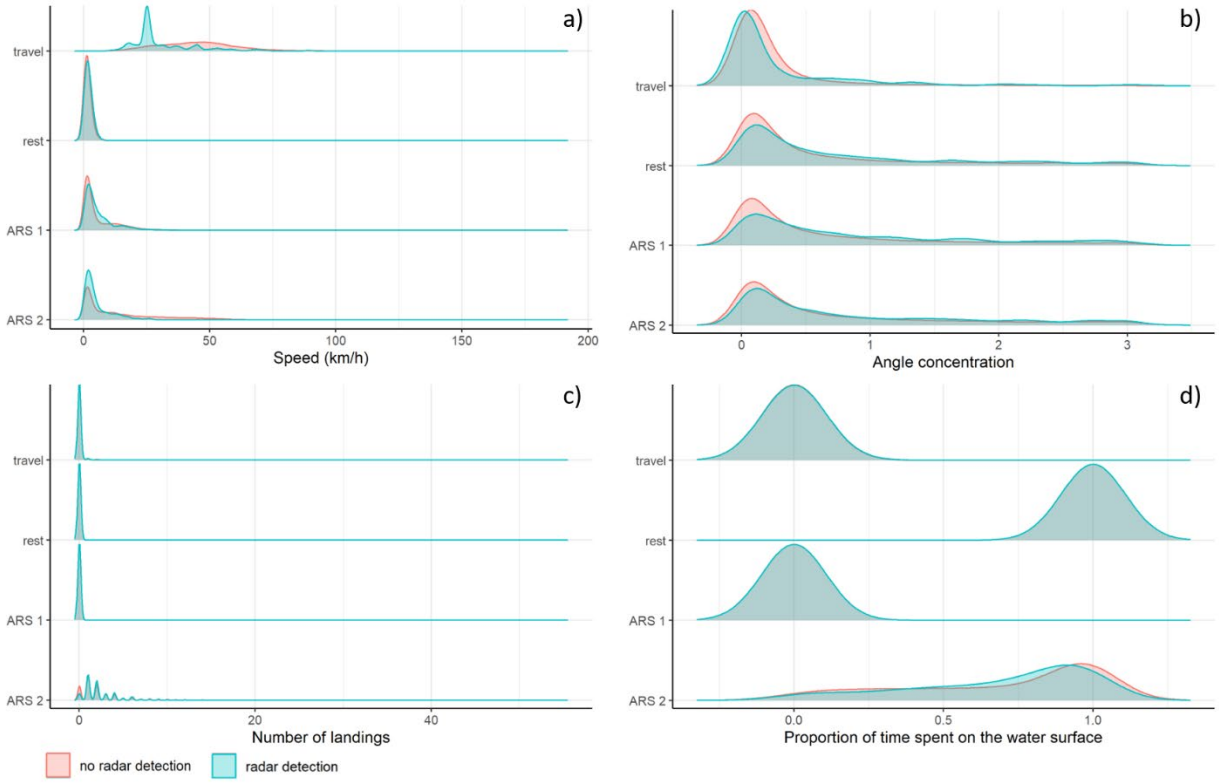

Figure 1. State-dependent density histograms of a) observed speed, b) angle concentration, c) number of landings and d) proportion of time spent on the water surface of wandering albatrosses tracked from South Georgia for each behaviour state. Different colours indicate the proportion of locations within each state that were associated (green) or not (pink) with radar detections.

Table 1 Parameter estimates of the state-dependent probability distributions from the 4-state hidden Markov model (HMM) of tracked wandering albatrosses from South Georgia based on GPS and immersion (activity) data. The table also includes the proportion of time spent, percentage of radar detections and mean ± SD duration and travel speeds (derived from step lengths) of bouts of each state. Turning angle is the concentration parameter (higher values indicate less variable values and less convoluted tracks). Prob wet indicates the probabilities from low to high that time was spent on the sea surface. ARS refers to area-restricted search type behaviour.

Behavioural state	Bout duration (hrs)	Speed (km/h)	Angle concentration	N landings	Prob wet (low)	Prob wet (medium)	Prob wet (high)	% locations	% radar
Travel	3.31 ± 3.05	44.68 ± 15.5	0.92	0.02	1.00	0.00	0.00	40	0.42
Rest	3.41 ± 3.01	1.59 ± 1.08	0.80	0.00	0.00	0.00	1.00	23	2.40
ARS 1	4.48 ± 5.91	5.63 ± 6.10	0.77	0.00	1.00	0.00	0.00	23	2.28
ARS 2	1.55 ± 1.22	13.80 ± 16.19	0.72	2.62	0.12	0.36	0.52	14	6.93

Output 2 Model habitat preferences of wandering albatrosses of different age, sex and breeding status.

Activity 2.1 *Extract oceanographic data at appropriate spatial and temporal scales*

Progress to date: We have identified the most biologically relevant oceanographic variables for wandering albatrosses. Codes to extract variables from raster images at appropriate spatial and temporal scales have been written.

Activity 2.2 *Build and evaluate habitat models.*

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Activity 2.3 *Generate predictive maps of distribution of wandering albatrosses of different age, sex and breeding status.*

Progress to date: All codes to build habitat models (including models and model validation) and to generate predictive maps of distribution of wandering albatrosses are being developed in R. We made progress developing these codes and have tested the scripts using a small subset of the data. The second season of deployments finished in late March 2021, and the last transmission was received in the last few days. Habitat models can be time-consuming to run; hence, we will wait until all the tracking data from this season have been cleaned before proceeding. Meanwhile, we have been working on Output 3, which we plan to finish one month earlier than our original timetable in order to reallocate the extra month to the work on Output 2.

Output 3. Identification of the areas, periods and fleets from which bycatch risk is greatest for wandering albatrosses of different age, sex and breeding status.

Activity 3.1 *Calculate temporal and spatial overlap between predicted distributions of wandering albatrosses and fishing effort. Identify areas and times of greatest interaction (and therefore bycatch risk).*

Progress to date: We have made substantial progress and anticipate completion of this activity one month in advance of the original timetable.

We have pre-processed (speed filtering, interpolation, resampling, splitting trips, etc.) all but the most recent dataset, and now have cleaned data for sabbaticals, immatures and juveniles, as well as for a second set of incubation deployments from this season to increase sample size.

Radar events were identified as an association with a vessel. All series of radar detections associated with GPS locations without gaps of more than two hours were grouped into a unique radar event. All vessel locations (from GFW data) within 5 km and 5 minutes of each interpolated location for the tracked albatrosses were extracted. Vessel events were created based on the same criteria as radar events, but unique to individual birds and vessels.

Vessel events and tracking data (including radar events) were combined at multiple levels to quantify overlap and interaction with vessels for different breeding stages. Age and sex differences have not yet been explored. The tracked birds comprised an even spread of sexes and ages (9 – 44 years).

Results indicate that there are some vessel interactions for all status groups (incubation, brood-guard, post-guard, sabbatical, immature and juveniles) (Figure 2), but on a higher proportion of trips for birds tracked during incubation (Annex 5). Tracked birds interacted with fishing vessels more than any other vessel class, suggesting the targeting of discards, baited hooks or galley food-waste when scavenging behind vessels (Figure 3). Interactions mostly occurred with vessels from China, Argentina and Korea (Figure 3).

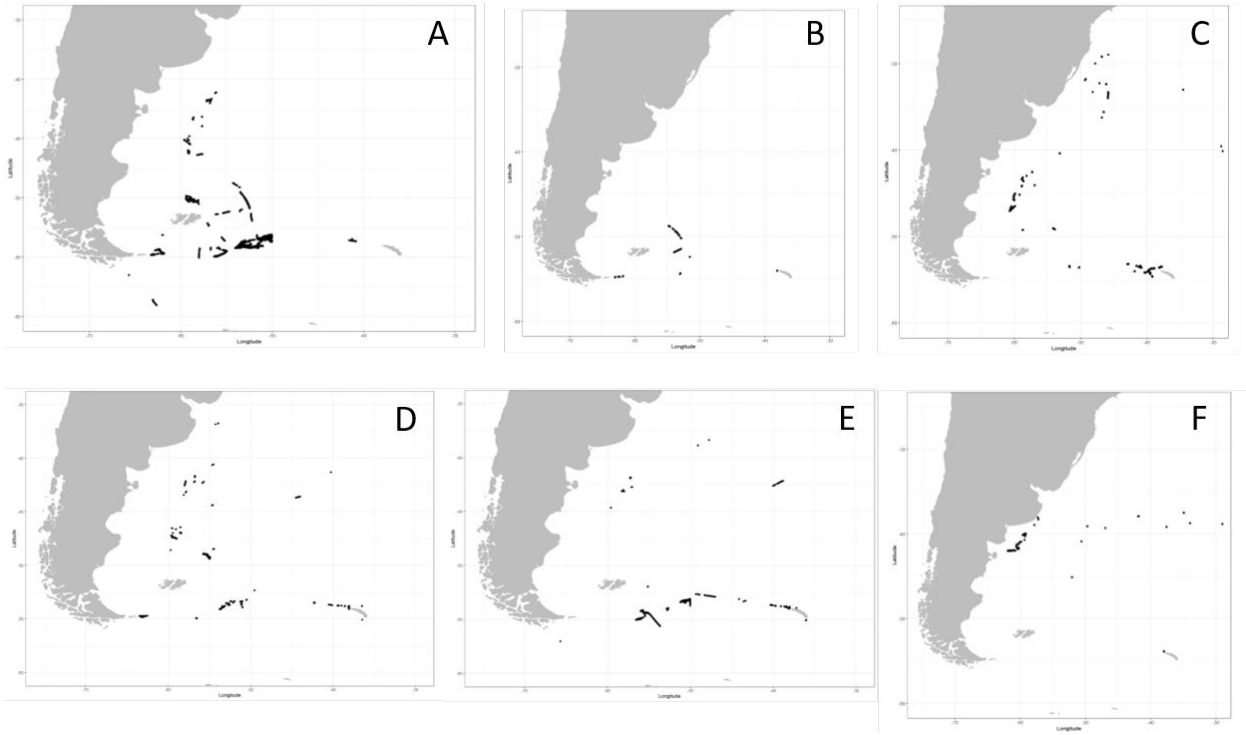

Figure 2. Vessels in close proximity of tracked wandering albatrosses from South Georgia during: A) incubation, B) brood-guard, C) post-guard chick-rearing, D) sabbatical, E) immature, and F) juvenile.

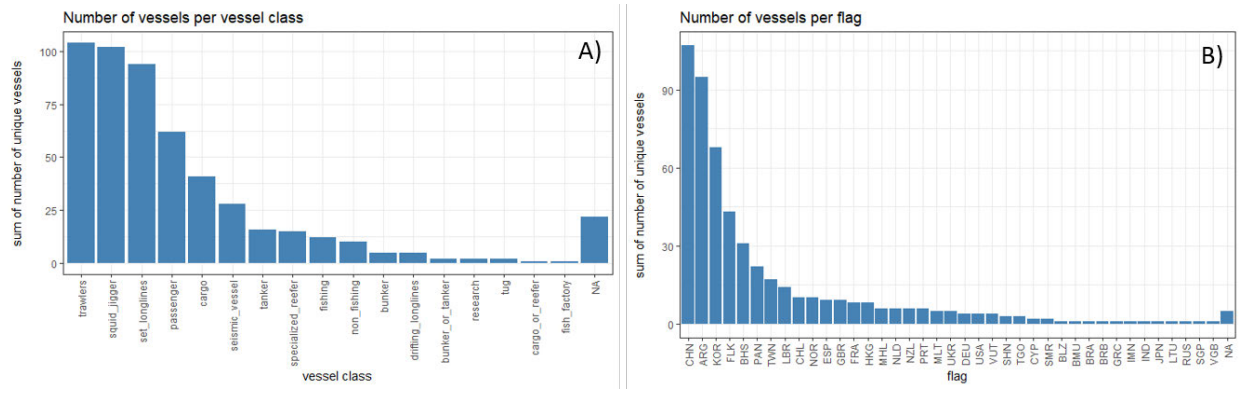

Figure 3. Summary of vessels that interacted with tracked wandering albatrosses from South Georgia per A) vessel class, and B) flag state.

Output 4. Dissemination and application.

Progress to date: A series of communication channels were set up to publicise the project (see examples in section 13).

3.2 Progress towards project Outputs

1. Understand fine-scale attendance patterns of wandering albatrosses of different age, sex and breeding status to legal and illegal fishing vessels.

All activities under this output were completed according to the timetable. The results were written up as a manuscript submitted to *Movement Ecology*.

We investigated whether it was possible to detect a characteristic signature from movement data that would indicate interaction of wandering albatrosses from South Georgia with fishing vessels, rather than natural foraging. We deployed recently-developed devices that record the GPS position of birds at sea and regularly scan the surroundings to detect radar transmissions from vessels. We matched these data to the position of fishing vessels, and used a combination of hidden Markov and random forest models. Our results suggest that scavenging

behaviours behind fishing vessels of wandering albatrosses mirror natural foraging, and underline the value of using devices (radar detectors or cameras) that detect vessel proximity for a better understanding of seabird-fishery interactions, rather than just overlap at large spatial scales.

2. Model habitat preferences of wandering albatrosses of different age, sex and breeding status.

We have identified the most relevant variables to model habitat preferences for wandering albatrosses, and started work on a subset of data to develop codes for building models and generating predictions. Habitat models, however, can take a considerable amount of time to run, and since our last dataset has only just been received (and is not yet cleaned), we switched our efforts towards Output 3. We plan to finish Output 3 one month in advance of the original timetable in order to return and complete Output 2 (see log frame).

3. Identification of the areas, periods and fleets from which bycatch risk is greatest for wandering albatrosses of different age, sex and breeding status.

We have made considerable progress towards this outcome. Preliminary results indicate that wandering albatrosses overlap with fishing vessels during all breeding and life-history stages. The most important fleets in terms of attendance for wandering albatrosses were from China, Korea and Argentina, with some limited unregulated activity (i.e. with no associated AIS data) on the Patagonian Shelf. Our results have the potential to influence the action plans of both GSGSSI and FIG through an improved understanding of seabird-fisheries interactions and the associated threat of bycatch. Additionally, the results provide evidence of undeclared vessels (i.e. with no AIS signal) in fishing areas in the southwest Atlantic.

4. Dissemination and application

We have created various channels for the dissemination of the project results and to engage with stakeholders. We worked alongside RSPB and the wider BirdLife team to ensure that updates from the project were shared via the relevant social media channels (see section 13).

3.3 Progress towards the project Outcome

0.1 Areas, periods and fleets of highest susceptibility of wandering albatross to bycatch recognised by fisheries regulatory bodies and incorporated into their management decisions.

Prior to this project, there was a knowledge gap regarding the proportion of birds from different life-history stages and sex that interact with vessels in the South Atlantic. Limited vessel-based monitoring indicate that two areas of particularly high risk for wandering albatrosses are the Patagonian Shelf and subtropical convergence. Impacts of IUU fishing there and elsewhere are also unknown. We have completed all data collection and are now working on the analysis that will help secure this outcome. Wandering albatrosses interact with fishing vessels during all life-history stages, and preliminary results suggest that most of the interactions were with Chinese, Argentinean and Korean vessels. Wandering albatrosses spent longer following fishing vessels than vessels from any other class, suggesting the targeting of discards, baited hooks or galley food waste when scavenging behind vessels. Interactions without an associated AIS record occurred less often than expected, and mostly around the Patagonian Shelf. Analysis are still ongoing. The information provided by GPS-radar devices in combination with GFW data was critical to improving our understanding of these interactions.

0.2 Better advocacy strategies and allocation of resources to target bycatch mitigation and compliance-monitoring.

The identification of areas, periods and fleets of highest susceptibility of wandering albatross to bycatch will inform conservation advocacy and efforts. An improved understanding of bycatch risk, including from IUU vessels, will help focus allocation of the limited resources available to

improve mitigation and compliance-monitoring. Stakeholders will be invited to a meeting in the last year of the project to ensure that we provide results from our project in a usable form and that the associated management advice can be tailored to their requirements.

3.4 Monitoring of assumptions

The assumptions identified at the proposal stage were:

1. **Tracked birds will have contact with vessels**- our first results showed that wandering albatrosses tracked from Bird Island, South Georgia interact with vessels, and that time spent near fishing and other vessels differs according to life-history and breeding stage.

2. **VMS or AIS data will be available for the tracking period**- we have established a productive working relationship with Global Fishing Watch, who provided us with detailed satellite-AIS data. We were unable to obtain access to VMS data. However, the tracked birds have spent most of their time in the High Seas where few VMS data are available and satellite-AIS coverage is much better.

3. **Stakeholders will engage with the project**–we maintained regular contact with stakeholders via email or social media to ensure they are engaged with the project. The PI is closely involved with ACAP and attended the last ACAP meeting where he discussed the project with stakeholders.

4. Project support to environmental and/or climate outcomes in the UKOTs

This project contributes towards the understanding of vessel interactions and bycatch risk of wandering albatrosses from South Georgia. It will provide detailed information to fisheries regulatory bodies (including UK OT governments), NGOs (including BL Partners), observer programmes and MEAs (ACAP and CCAMLR) that highlight the ongoing risk to this and other seabird species, and can be used to advocate for more effective fisheries management. Bycatch in fisheries is the major driver of population declines in albatrosses and other seabirds, so understanding where, when and from which fleets and vessel types the birds are at risk is crucial for effective management.

Albatrosses are the primary species of conservation concern in terms of the biodiversity of South Georgia. Work outlined in the Albatross Conservation Action Plans of GSGSSI aims to arrest these declines by 2020. Fisheries are the mainstay of the economies of the OTs. The OT governments have exemplary records in the last 1-2 decades of managing their own fisheries, providing the foundation for the Blue Belt programme. That initiative is intended to provide long-term protection for the marine environment, but will not safeguard seabird populations from the OTs when they forage in the EEZs of Brazil, Uruguay, Argentina and Chile, and in the High Seas (under ICCAT jurisdiction). All the South Atlantic OTs consider conservation of threatened albatrosses and other seabirds to be top priorities in their environmental strategies, including the National Plans of Action for seabirds in fisheries.

Our project addresses Blue Belt ambitions as well as the goals in these documents, including multiple priorities in the GSGSSI Action Plan for the wandering albatross. Indeed, the UK has a specific commitment under ACAP Advisory Committee to report on progress with this Action Plan as this population is one of just 10 considered a global Priority Population for conservation and management. The PI is on the UK delegation to ACAP, and represents the interests of UK government bodies with devolved responsibilities for conservation of marine fauna in UK OTs. These Priority Populations were identified because of their high rates of decline, global importance and because the main driver was bycatch in fisheries, which can only be addressed by international cooperation. Our project will also help the OTs meet the Convention on Biological Diversity's Aichi Targets.

The highest priority within these plans is to reduce bycatch of albatrosses in fisheries outside South Georgia waters. This year we have made progress towards our outputs (see Section 3.1 and 3.2 for details) which will when complete make a positive contribution towards the goals in the documents listed above.

5. OPTIONAL: Consideration of gender equality issues

Issues related to gender equality are not strictly relevant for this project as South Georgia does not have a resident human population. It is however worth noting that the project is co-led by a woman, and the two of the three core-team members are female.

6. Monitoring and evaluation

There have been no changes to the M&E plan over the reporting period. Monitoring and evaluation is conducted by the Project Leader who assesses progress against the logframe. This underpins all aspects of the work plan, provides measurable outcomes, and sets realistic targets for completion. The project team have meetings by Zoom every 1-2 weeks which is sufficient for monitoring and evaluation. Emails are exchanged with other stakeholders as and when relevant issues arise, or we have progress to communicate. Monitoring of the finances of the project is carried out using BAS's internal financial systems.

7. Lessons learnt

What went well?

One of the particular strengths of our project, which was noted in the mid-term review, is the close collaboration between the BAS and BirdLife teams, particularly among the project staff. Hence, although this is the first formal collaboration with these three core-team members in a project of this type, it has benefited a great deal from the trust and good working relationships developed in previous interactions between the organisations.

Having clear scientific goals in the logframe has provided an effective framework towards completion of our objectives, particularly for tracking progress. Indicators relating to the scientific outputs can be more clearly defined and usually verified more readily than other indicators in the logframe, particularly those relating to activities such as completion of data collection, specific analyses and submission of scientific papers to academic journals. This clear pathway has worked well in enabling us to stay on track.

Most of the foraging areas of the tracked birds were in the High Seas rather than within EEZs, and we developed a very productive collaboration with Global Fishing Watch to obtain AIS data from vessels in the High Seas. Hence although we were initially expecting to use VMS data, these were not actually required for our analyses, and the same would apply to other seabirds species with distributions predominantly in international waters.

What didn't work well?

Working with new technology, in our case with the GPS-radar devices, always carries potential risks and challenges. A new batch of satellite-linked devices were sent by the manufacturer at no cost as a replacement for devices which failed in the 2019/20 season, and were deployed on juveniles in Dec. 2020. Despite assurances from the manufacturer that the earlier problems had been overcome, and our testing of two randomly-chosen devices prior to deployment, which were successful, most of the devices again started to fail from within a few weeks post-deployment, and some possibly as soon as the chicks left the island (although a proportion of chicks may have died from natural causes in that period). We therefore obtained data on average for only 1-2 months rather than the expected 6-9 months. However, the majority of data for the project were collected in the previous season so the more limited data from juveniles has minimal impact on the project outcomes.

Recommendations:

We learned that it is difficult to generate a focus with which to engage stakeholders before the scientific results are ready. We would recommend that similar projects should be longer and plan for a dedicated policy phase (with reduced % staff time) after the research phase, to account for the longer timescales over which scientific evidence can be used to develop and refine policy. Building this learning into the current project, we plan to continue the stakeholder engagement beyond the project end date, by submitting the results to working groups of

fisheries bodies, particularly as many meetings have been postponed or changed to a virtual format. Unfortunately, the latter typically means a much more limited agenda and time for discussion, and hence more focus on core business which in most cases is not seabird bycatch. As such, we expect that our results and policy recommendations would be given more consideration at in-person meetings once they resume.

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

More evidence of activities have been submitted in the annexes of this report. The project team meets regularly to discuss the analysis, results, scientific papers, engagement etc., so while it is not appropriate to include minutes of these meetings, evidence for progress towards the scientific goals is provided in the form of the methods and results presented in this report, and drafts of papers (see Annex 3).

Impacts of the COVID-19 pandemic are discussed in more detail in section 14.

The PI and lead analyst have engaged with colleagues in New Zealand that are also using radar-GPS devices to assess seabird-vessel overlap and interactions. We provided advice on various aspects of data analysis, including filtering techniques.

Our engagement with Global Fishing Watch for this project facilitated the development of proposals for a much wider collaboration between BirdLife and GFW, for which a funding application has been submitted. This will be on overlap of seabirds and fishing vessels (using satellite AIS) at a global scale. Thus, the legacy of our Darwin Plus project will be an improved understanding of impacts of bycatch not just on wandering albatrosses from South Georgia, but numerous other seabird species and populations, worldwide.

Following the project Mid-Term Review, we have improved the indicators and means of verification in the project logframe to make them SMARTer (see annexes 1 and 2), allowing better assessment of progress.

9. Other comments on progress not covered elsewhere

During analyses contributing to outputs 1 and 3, we made substantial progress in refining the methodology for assessing fine-scale overlap between individual seabirds and fishing vessels. This included developing methods for including immersion (activity) data in behavioural state analysis and for identifying interaction bouts.

In February 2021, Global Fishing Watch released a new version of their vessel dataset with an improved algorithm for detecting fishing vessels. To take advantage of this refinement, we repeated the analyses for outputs 1 and 3 using the new improved dataset.

We streamlined the order in which our analyses are being conducted, and switch focus onto completing analyses for output 3 before output 2, so that we will have a paper ready by the last submission date (early July) for consideration at working groups of the ACAP Advisory Committee at the meeting in September 2021.

10. Sustainability and legacy

Although reversal of the population declines of wandering albatrosses at South Georgia is not expected within the lifetime of this project, the project contributes to the longer term work of both BAS and the BirdLife International Marine Programme in reducing albatross bycatch.

This project has the clear support of the governments of the Falkland Islands, and South Georgia and the South Sandwich Islands. It has already, and will continue to improve knowledge of fisheries overlap and bycatch risk of wandering albatrosses. It directly addresses the conservation action plan of GSGSSI for the South Georgia wandering albatross, which is also given consideration by the ACAP Advisory Committee, as this population is one of just 10 considered to be a Priority Population for conservation and management. As indicated above, the results of output 3 will be submitted to the ACAP Advisory Committee meeting in Sept. 2021.

We are likely to switch our project workshop from in-person to virtual because of COVID-19. One positive outcome of this is that we are now considering how videos about the project can be used for dissemination of the project results, particularly to ensure a sustained presence and wider reach online.

11. Darwin identity

Webpages and web articles about the project on the BAS, BirdLife and RSPB websites have received hundreds of views in this reporting period, and each clearly acknowledges the Darwin Initiative as the project funder. Links:

- https://www.bas.ac.uk/project/bycatch-risk-of-wandering-albatrosses-using-radar-detection
- https://www.birdlife.org/worldwide/news/seabird-sentinels-will-help-mitigate-bycatch
- https://www.birdlife.org/worldwide/news/tracking-ocean-wanderers
- https://community.rspb.org.uk/getinvolved/b/albatross-stories/posts/ana-carneiro---real-time-albatross-conservation-part-1
- https://community.rspb.org.uk/getinvolved/b/albatross-stories/posts/ana-carneiro---real-time-albatross-conservation-part-2

The 2020/21 season deployment of satellite-linked GPS-radar devices on juvenile and sabbatical wandering albatrosses was publicised widely on twitter, with all tweets tagging the @Darwin_Defra twitter account to acknowledge the Darwin Initiative as project funder. BirdLife and BAS also posted on Facebook and LinkedIn, and a news article was published on the ACAP website. Examples:

- https://twitter.com/BAS_News/status/1352587254280187910
- https://twitter.com/BAS_News/status/1354791253381148675
- https://twitter.com/AlbyTaskForce/status/1353622142601068545
- https://www.acap.aq/latest-news/3932-using-bird-borne-radar-to-understand-interactions-between-wandering-albatrosses-and-fishing-vessels

The project was mentioned in a podcast by the University of Cambridge Centre for Science and Policy (CSaP): “Science & Policy for Deep Oceans, Space, and Antarctica: Conservation”. Links:

- https://twitter.com/CSciPol/status/1381634943831400452
- https://www.youtube.com/watch?v=viu0IiJqScM

The project contributed an article for the Darwin Newsletter in June 2020.

12. Impact of COVID-19 on project delivery

Fisheries meetings have gone virtual with much reduced agendas and time for discussion, reducing the chances of engagement with project stakeholders and fisheries managers, particularly as seabird bycatch is often not the priority at these meetings.

All conferences at which we planned to present results in late 2020 (World Seabird Conference and the International Biologging Society Conference) were postponed to October 2021.

The project workshop is likely to be changed from in-person to online due to difficulties in meeting in person during the COVID-19 pandemic. We may produce videos about the project results for online dissemination, and host a virtual Q&A for stakeholders. While this will not have the same level of impact as an in-person workshop, the videos and materials produced will be publicly available online, accessible to a wider audience and for much longer than the workshop.

We contributed tracking data to a global collaborative project to investigate the impacts of COVID-19 related lockdowns on animal movements.

Health and safety of staff: both BAS and BirdLife have risk assessments in place regarding working from home during the COVID-19 pandemic.

13. Safeguarding

Please tick this box if any safeguarding violations have occurred during this financial year. ☒

If you have ticked the box, please ensure these are reported to ODA.safeguarding@defra.gov.uk as indicated in the T&Cs.

14. Project expenditure

Please expand and complete Table 1. If all receipts have not yet been received, please provide indicative figures and clearly mark them as Draft. The Actual claim form will be taken as the final accounting for funds.

Table 1: Project expenditure during the reporting period (1 April 2020 – 31 March 2021)

Project spend (indicative) in this financial year	**2020/21 D+ Grant (£)**	**2020/21 Total actual D+ Costs (£)**	**Variance %**	**Comments (please explain significant variances)**
Staff costs	[redacted]			
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others (Please specify)				
TOTAL				

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2020-2021 – if applicable

Project summary	Measurable Indicators	Progress and Achievements April 2020 - March 2021	Actions required/planned for next period
Impact Population declines of wandering albatrosses from South Georgia will slow or reverse, and species conservation status will improve due to more effective management.		Albatrosses are the principal declining group of species for the Territories involved in the project. GSGSSI have specific albatross species action plans that this project is attempting to address.	[redacted]
Outcome Improve understanding of susceptibility of wandering albatrosses to bycatch, including by legal and illegal vessels, and map the areas and periods of highest risk to better target bycatch mitigation and fisheries observer programmes.	0.1 Areas, periods and fleets of highest susceptibility of wandering albatross to bycatch are communicated to, and discussed by, fisheries regulatory bodies, and NGOs by end of project. 0.2 Reports and papers are submitted to relevant fisheries bodies, multilateral environmental agreements (ACAP) and NGOs in order to improve advocacy strategies and allocation of resources to target bycatch mitigation and compliance-monitoring.	0.1-0.2 Currently unable to measure against the indicators as the analysis and reports have not yet been completed.	Continuation of analyses and preparation of manuscripts and reports.
Output 1. Understand fine-scale attendance patterns of wandering albatrosses of different age, sex and breeding status to legal and illegal fishing vessels.	**1.1** Assess behavioural signature of wandering albatrosses foraging behind fishing vessels and distance at which they respond to vessels.	Activities have been completed. Paper has been approved by co-authors and submitted to *Movement Ecology* to undergo peer review process. Evidence provided in section 3.1.1 & 3.2.1 of report and submitted manuscript in Annex 3.	
Activity 1.1 1.1 Organise fieldwork logistics.		Completed in December 2019.	None.
Activity 1.2 1.2 Collect and compile fisheries and tracking data (i.e. radar, 3-D acceleration, GPS location, and immersion data).		Tracking data collection for the remaining life-history stages was completed in April 2021, and all relevant AIS data were obtained from Global Fishing Watch.	None.

Activity 1.3 1.3 Data analysis to determine the distance at which wandering albatrosses respond to vessels (i.e. change direction, flight height etc. based on acceleration data), and proportion of time spent behind each vessel. Activity 1.4 1.4 Assess whether a signature is detectable in GPS, acceleration and immersion data that indicates scavenging behind vessels vs feeding on natural prey. If so, quantify time spent following vessels from other GPS and immersion datasets (from the current and previous seasons).		Analyses completed and written up into a paper, which was submitted to the journal in April 2021.	Paper to undergo peer review before publication.
Output 2. **2**. Model habitat preferences of wandering albatrosses of different age, sex and breeding status.	**2.1** Relationship between species and oceanographic variables established by June 2021. **2.2** Predictive maps of wandering albatross distribution and high-density hotspots produced by June 2021.	2.1-2.2 Currently unable to measure against the indicators as the analysis have not yet been completed.	
Activity 2.1. 2.1 Extract oceanographic data at appropriate spatial and temporal scales.		Relevant oceanographic variables have been identified (see section 3.1.2 of this report).	Download relevant oceanographic data.
Activity 2.2. 2.2 Build and evaluate habitat models. Activity 2.3. 2.3 Generate predictive maps of distribution of wandering albatrosses of different age, sex and breeding status.		Activities currently in progress.	Continuation of analyses.
Output 3. **3.** Identification of the areas, periods and fleets from which bycatch risk is greatest for wandering albatrosses of different age, sex and breeding status.	**3.1** Maps of the overlap of wandering albatross distribution with fine-scale data on fishing effort (reported effort by 1 deg. square, VMS or AIS data) are produced. **3.2** Proportion of time spent behind legal and IUU vessels is calculated; risk of birds of different life-history stages from each fleet and in different time	Considerable progress has been made towards this outcome. Evidence of results is provided in sections 3.1.3 and 3.2.3 of this report. Information paper is being prepared for submission to the ACAP Seabird Bycatch Working Group meeting in September 2021. Scientific paper is being prepared.	

	periods is quantified by May 2021.		
Activity 3.1 3.1 Calculate temporal and spatial overlap between predicted distributions of wandering albatrosses and fishing effort. Identify areas and times of greatest interaction (and therefore bycatch risk).		Completed data preparation and identification of bird-vessel interactions. Preliminary results on vessel types and fleets are in section 3.1.3 of this report.	Continue analyses to map overlap of birds and vessels and identify priority areas and time periods of greatest bycatch risk; write up results into a paper.
Output 4. Dissemination and application	**4.1** Results and recommendations shared with stakeholders via project-specific workshop and direct communication, to inform their conservation advocacy and efforts. **4.2** Data deposited in global databases by end of project. **4.3** Reports/papers to working groups of fisheries bodies by end of project or after project depending on the timing of relevant meetings. **4.4** Submission of two papers for publication by end of project. **4.5** Share results via websites and conferences.	4.1-4.5 Currently unable to measure against the indicators as the results of the project have not yet been completed. We have created various communication channels for the dissemination of the project and to engage with stakeholders. Evidence of online communications are provided in section 13 of this report.	Continue disseminating results of the project and engaging with stakeholders.
Activity 4.1 4.1a Share results and recommendations with stakeholders. 4.1b Organise workshop in South America with main stakeholders		4.1a The Project Leader has engaged with stakeholders during the ACAP meeting last year to discuss about the project. 4.1b This activity has not yet commenced.	Continue engagement with stakeholders and organise the workshop in South America.
Activity 4.2 4.2 Deposit tracking data into BirdLife online Tracking Database.		This activity has not yet commenced	Deposit data into BirdLife online Tracking Database when analyses are completed.
Activity 4.3 4.3 Prepare reports for working groups		Information paper is being prepared for ACAP Seabird Bycatch Working Group meeting in September 2021.	Prepare reports prior to the workshop to be discussed with stakeholders.
Activity 4.4		Manuscript with results of Output 1 has been submitted to the journal, and	Finish results and manuscript for Output 2 and 3.

4.4 Prepare manuscripts for publication in peer-reviewed journals.	manuscript for Outputs 2 and 3 is being prepared.	
Activity 4.5 4.5a Attend national and international conference to present results. 4.5b Make results available via websites for public dissemination.	4.5a Planned conferences in 2020 were all postponed due to the COVID-19 pandemic. 4.5b Various communication channels for the dissemination of the project and to engage with stakeholders were updated during this reporting year.	Prepare material to disseminate results, and attend national and international conferences.

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed) - if applicable

N.B. if your application's logframe is presented in a different format in your application, please transpose into the below template. Please feel free to contact Darwin-Projects@ltsi.co.uk if you have any questions regarding this.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: Population declines of wandering albatrosses from South Georgia will slow or reverse, and species conservation status will improve due to more effective management.			
Outcome: Improve understanding of susceptibility of wandering albatrosses to bycatch, including by legal and illegal vessels, and map the areas and periods of highest risk to better target bycatch mitigation and fisheries observer programmes.	**0.1** Areas, periods and fleets of highest susceptibility of wandering albatross to bycatch are communicated to, and discussed by, fisheries regulatory bodies, and NGOs by end of project. **0.2** Reports and papers are submitted to relevant fisheries bodies, multilateral environmental agreements (ACAP) and NGOs in order to improve advocacy strategies and allocation of resources to target bycatch mitigation and compliance-monitoring.	**0.1** Results of the project will be communicated to stakeholders via email, teleconferences and, if appropriate, in person. Key stakeholders will be invited for a workshop at the end of the project. **0.2** Papers and a workshop report with agreed recommendations for improved bycatch management including targeting of resources to monitor bycatch rates and compliance with recommended mitigation will be widely shared. **0.3** Scientific papers are approved by expert co-authors and go through peer-review to be published.	Tracked birds will have contact with vessels. In a preliminary study (Indian Ocean) using similar devices, 79.5% of loggers attached to birds detected vessels. VMS or AIS data will be available for the tracking period. This project combines multiple sources of access to vessel locations. Stakeholders will engage with the project. Discussions throughout the project will be made to ensure engagement of stakeholders and viability of the actions.
Outputs: **1**. Understand fine-scale attendance patterns of wandering albatrosses of different age, sex and breeding status to legal and illegal fishing vessels.	**1.1** Assess behavioural signature of wandering albatrosses foraging behind fishing vessels and distance at which they respond to vessels.	**1.1** Results of behavioural models are produced and discussed; draft manuscript is approved by co-authors and submitted to a scientific journal by April 2021; paper undergoes verification by peer review.	Tracked birds will have contact with vessels. In a preliminary study (Indian Ocean) using similar devices, 79.5% of loggers attached to birds detected vessels.
2. Model habitat preferences of wandering albatrosses of different age, sex and breeding status.	**2.1** Relationship between species and oceanographic variables established by June 2021. **2.2** Predictive maps of wandering albatross distribution and high-density hotspots produced by June 2021.	**2.1** Models will be validated by performance metrics using withheld data. **2.2** Maps are produced, and presented in publications / reports. Results are written up into a manuscript which is approved by co-authors and undergoes peer-review process.	Seabird data will correlate with environmental data and models will have good predictive capacity. There is ample evidence that seabirds select habitats based on oceanographic cues. Additionally, large sample sizes, correct choice of oceanographic variables and the use of appropriate methods will

			minimize the chances of poor model performance.
3. Identification of the areas, periods and fleets from which bycatch risk is greatest for wandering albatrosses of different age, sex and breeding status.	**3.1** Maps of the overlap of wandering albatross distribution with fine-scale data on fishing effort (reported effort by 1 deg. square, VMS or AIS data) are produced. **3.2** Proportion of time spent behind legal and IUU vessels is calculated; risk of birds of different life-history stages from each fleet and in different time periods is quantified by May 2021.	**3.1** Maps are produced and included in reports and publications. **3.2** Results are written up into a draft manuscript; draft manuscript is approved by co-authors and submitted to a scientific journal by June 2021; paper undergoes verification by peer review. **3.3** Information paper is submitted and discussed at the next ACAP Seabird Bycatch Working Group (SBWG).	Fine-scale fisheries data will remain available and vessels will be detected by loggers (see above).
4. Dissemination and application	**4.1** Results and recommendations shared with stakeholders via project-specific workshop and direct communication, to inform their conservation advocacy and efforts. **4.2** Data deposited in global databases by end of project. **4.3** Reports/papers to working groups of fisheries bodies by end of project or after project depending on the timing of relevant meetings. **4.4** Submission of two papers for publication by end of project. **4.5** Share results via websites and conferences.	**4.1** Results and recommendations available for OT governments, other countries, and local and international NGOs. Workshop with the main stakeholders (attendance list). **4.2** Datasets available online via the Seabird Tracking Database. **4.3** Working papers are submitted to and discussed at meetings of fisheries bodies and multilateral environmental agreements (ACAP) (minutes and attendance lists of meetings). **4.4** Manuscripts submitted by end of project and accepted for publication. **4.5** Monitor number of visitors to the website and interest in the project at conferences.	Manuscripts will be accepted for publication. Working group papers will be discussed as relevant for particular agenda items. The novelty and relevance of the study for the conservation of wandering albatrosses will make it a priority in conservation or policy journals, and for consideration by fisheries management bodies.
Activities (each activity is numbered according to the Output to which it will contribute, e.g. 1.1, 1.2 and 1.3 are contributing to Output 1) 1.1 Organise fieldwork logistics. 1.2 Collect and compile fisheries and tracking data (i.e. radar, 3-D acceleration, GPS location, and immersion data). 1.3 Data analysis to determine the distance at which wandering albatrosses respond to vessels (i.e. change direction, flight height etc. based on acceleration data), and proportion			

of time spent behind each vessel.

1.4 Assess whether a signature is detectable in GPS, acceleration and immersion data that indicates scavenging behind vessels vs feeding on natural prey. If so, quantify time spent following vessels from other GPS and immersion datasets (from the current and previous seasons).

2.1 Extract oceanographic data at appropriate spatial and temporal scales.

2.2 Build and evaluate habitat models.

2.3 Generate predictive maps of distribution of wandering albatrosses of different age, sex and breeding status.

3.1 Calculate temporal and spatial overlap between predicted distributions of wandering albatrosses and fishing effort. Identify areas and times of greatest interaction (and therefore bycatch risk).

4.1a Share results and recommendations with stakeholders.

4.1b Organise workshop in South America with main stakeholders

4.2 Deposit tracking data into BirdLife online Tracking Database.

4.3 Prepare reports for working groups

4.4 Prepare manuscripts for publication in peer-reviewed journals.

4.5a Attend national and international conference to present results.

4.5b Make results available via websites for public dissemination.

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
Do you have hard copies of material you need to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	
Have you involved your partners in preparation of the report and named the main contributors	
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	