

Biodiversity Challenge Funds Projects Darwin Initiative, Illegal Wildlife Trade Challenge Fund, and Darwin Plus Half Year Report

Note: If there is any confidential information within the report that you do not wish to be shared on our website, please ensure you clearly highlight this.

Submission Deadline: 31st October 2023

Project reference	DPLUS167
Project title	Pathogens as a threat to seabirds in the Falkland Islands
Country(ies)/territory(ies)	Falkland Islands
Lead partner	School of Biodiversity, One Health and Veterinary Medicine (SBOHVM), University of Glasgow (UofG), UK
Partner(s)	South Atlantic Environmental Research Institute (SAERI), Falkland Islands Falklands Conservation (FC), Falkland Islands Centre for Functional and Evolutionary Ecology (CEFE), National Centre for Scientific Research (CNRS), France Marine and Environmental Sciences Centre (MARE), ISPA Instituto Universitário, Portugal
Project leader	Amandine Gamble
Report date and number (e.g. HYR1)	HYR2
Project website/blog/social media	facebook.com/FalklandsWildlifeHealth twitter.com/FIWildHealth

Outline progress over the last 6 months (April – Sept) against the agreed project implementation timetable (if your project has started less than 6 months ago, please report on the period since start up to end September).

Although we are not looking for specific reporting against your indicators, please use this opportunity to consider the appropriateness of your M&E systems (are your indicators still relevant, can you report against any Standard Indicators, do your assumptions still hold true?). The guidance can be found on the resources page of the relevant fund website.

This report covers the project activities from April to September 2023. The project timetable is available in [Appendix 1](#), the project outputs are presented in [Appendix 2](#), and contributors to the project are acknowledged in [Appendix 3](#).

1. Database on potential pathogen detection and quantification in the seabirds of the Falkland Islands (Output 1)

1.1. Synthesis of previous and preparation for future field campaigns (Activity 1.2)

We will collect field data and samples to map pathogen occurrence in seabirds across the Falkland Islands, completing pre-existing banked samples (from 2017/2018 and 2018/2019) and samples collected in Year 1 (2022/2023). Banked samples represent from 807 individuals from 6 seabird species from New Island (Falkland Islands). In Year 1 of the project, we collected samples from 1 459 individuals from 9 species from 3 main sites. In Year 2 of the

project, we plan to collect samples from the same 9 species, in addition to 5 new species – expected to play a specific role in the introduction, spread and/or maintenance of highly pathogenic avian influenza (HPAI) – from 9 main sites, including 8 new sites (Figure 1). For each individual, plasma samples and mucosal swabs were collected. All the samples are stored at CEFE, CNRS (France) and available for laboratory analyses. The past few months has been dedicated to fieldwork preparation.

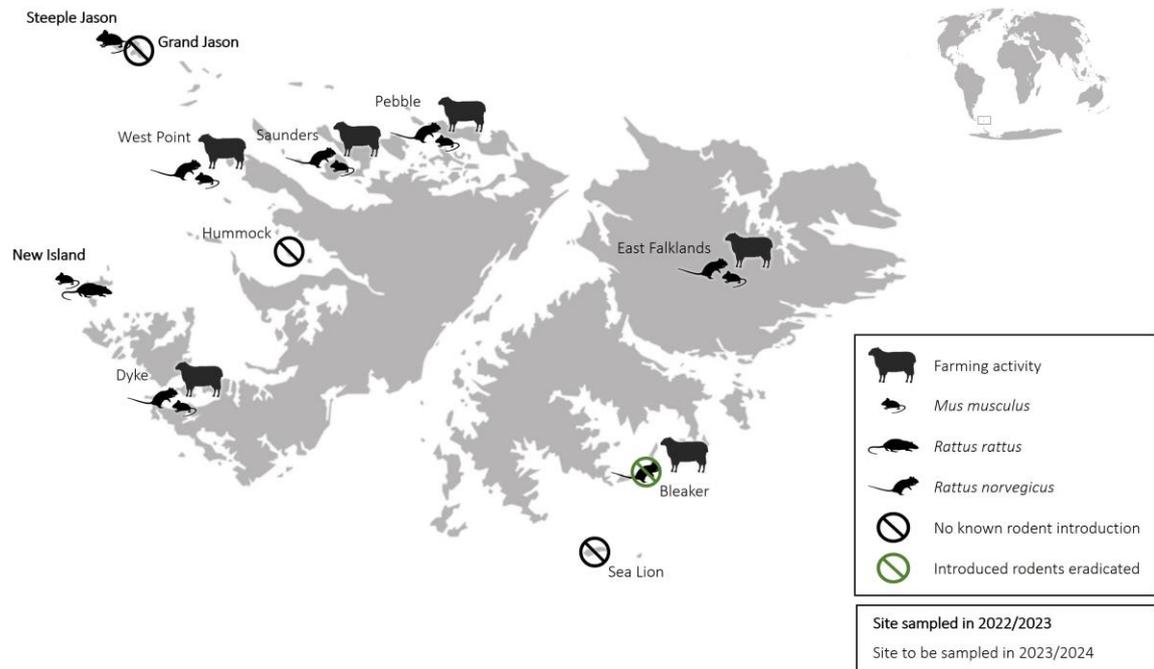


Figure 1. Epidemiological, ecological and anthropological data collection. This map shows sites where specific data collection campaigns occurred in 2022/2023, and will occur in 2023/2024. Those sites were chosen to capture the diversity of ecosystems within the Falkland Islands (sites with and without farming activities, introduced rodents, or tourism). It completes long-term ecological data collection across the Falkland Islands led by Falklands Conservation and SAERI.

Field campaign administration and logistics – Research permits (#R24.2022) were renewed by the Falkland Islands Government. The field team has been recruited (in collaboration with the CEFE partners). The needed visas and visitor permits have been granted. Accommodation and travel to field sites have been booked. **Scientific equipment** required for the field campaign is now on-site in the Falkland Islands.

Infectious disease outbreak preparedness – In light of the HPAI panzootic that spread in the Northern Hemisphere, then South America, and recently reached South Georgia, we are on **high alert regarding a potential introduction of HPAI in the Falkland Islands** (Dewar et al. 2023; Appendix 2). To best prepare for a potential outbreak, we regularly exchange with local and international stakeholders (see below), and our team has developed **modified research protocols** to ensure safe fieldwork (for both the staff and wildlife), while allowing us to collect critical data to understand how the pathogen spreads and its impact on wild populations. These protocols will be reviewed and published only after the detection of HPAI locally as per Falkland Islands Government guidelines.

This year field campaign started on the 5 October 2023. There has been no sign of HPAI so far.

1.2. Immunological analyses informing on past infections (Activity 1.3)

Plasma samples collected as part of Output 1 are screened for pathogen-specific antibodies, indicative of past infection.

Avian influenza viruses – Considering the global context, we made a priority of looking for evidence of exposure to avian influenza viruses. Previous exposure to low-pathogenic avian influenza (LPAI) could inform on risk of introduction (assuming that LPAI and HPAI use the same transmission pathways), as well as on potential protection from cross-immunity,

representing key data for local risk assessment. We found **limited evidence of past exposure of Falklands birds to avian influenza viruses**, with low prevalences in southern rockhopper penguins, low prevalence in southern rockhopper penguins, and lack of significant detection in other tested species (Gamble et al., in preparation). **Our result thus suggest that avian influenza viruses have rarely, in the recent past, been introduced to the Falklands, but that a potential introduction could have devastating effects in this relatively naïve community.** We will maintain avian influenza surveillance through Year 2 of the project, and work towards sustainable surveillance beyond the duration of the project.

Paramyxoviruses – Paramyxoviruses are commonly found in birds and have unclear effects on wild bird health. Paramyxoviruses with strong effects on wild bird health include Newcastle disease virus. We found **evidence of exposure of Falklands birds to paramyxoviruses.** Intensity of exposure **varies strongly across species**, with particularly high prevalences in imperial shags, which may act as reservoir of the virus. Future work will explore the ecological drivers of these variations (e.g., cohabitation with shags).

Flaviviruses – Flaviviruses are vector-borne viruses with unclear effects on wild bird health. Flaviviruses with strong effects on wild bird health include West Nile virus. We found **evidence of exposure of Falklands birds to flaviviruses**, concerning particularly colonial nesting species, likely through the highly prevalent seabird ticks present on the islands. Intensity of exposure **varies strongly spatially, potentially because of tick distribution.** Future work will explore the ecological drivers of these variations (e.g., favourable habitat for ticks). This work complements a focused study on the **negative effect of tick infestation on albatross chick survival** (Militão et al., submitted; [Appendix 2](#)).

1.3. Molecular analyses informing on current infections and genetic characterisation (Activity 1.4)

Mucosal swabs collected as part of Output 1 are screened for pathogen genetic material (indicative of current infectious status), and can be used for further genetic characterisation.

Development of a high-throughput screening approach for the simultaneous detection of multiple potential pathogens – Our team has developed a **new tool for the simultaneous screening of samples against several potential pathogens at the same time from small volumes of sample.** The development of this tools produced successful preliminary results (Bralet et al., in preparation). In this context, we have chosen to invest more time in the finalization of the development of this tool in the short term, instead of analyses samples for individual potential pathogens, postponing molecular analyses to later this year, but multiplying the outputs we will get from the same samples. This part of the project is led by the CEFE partner and benefits from matched funding from the Agence National pour la Recherche (Project ECOPATHs led by Thierry Boulinier) and the work of PhD Student Tristan Bralet (CEFE).

Development of a novel typing approach from non-purified bacterial samples – Our team has developed a **new protocol enabling bacterial typing** (i.e., identification below the species level) directly from swab samples, without having to culture the bacteria (simplifying field and lab work logistics, and improving staff safety). This protocol has been applied to *Pasteurella multocida*, the agent avian cholera, and demonstrated the cross-species transmission of *P. multocida* between highly affected albatrosses, scavenging skuas, and introduced rodents (Gamble et al. in preparation). This part of the project is led by the CEFE and UofG partners and benefits from matched funding from the Royal Society (Project 'Contribution of introduced species to multi-host epidemiological dynamics' led by Amandine Gamble) and the work of PhD Student Augustin Clessin (CEFE).

Development of a focused study on the molecular ecology of avian pox viruses – **Recurrent outbreaks of avian pox viruses** have been detected in the seabirds of the Falkland Islands over the last decades. Why do avian pox viruses keep on reemerging, and how they spread across sites and species remains unknown. We developed a focused study aiming at using phylogenetic tools to address those questions (Emerit et al. in preparation). **We acquired additional matched funding** for this focused study. This funding also allowed to purchase a field sequencer (Oxford Nanopore technology) to enable on-site genetic characterisation of the

pathogen if an outbreak were to occur. This part of the project is led by the UofG partner and benefits from matched funding from the Antarctic Science International Bursary (Project 'Ecology of pox viruses in a Subantarctic seabird community' led by Amandine Gamble) and the work of Master Student Julia Emeri (Cornell University) and PhD Student Augustin Clessin (CEFE).

2. Database on potential pathogen detection and quantification in the seabirds of the Falkland Islands (Output 3)

2.1. Synthesis of previous and preparation for future field campaigns (Activity 1.2)

Development of a complementary project on the role of bird movements in pathogen spread – We developed a new project aimed at collecting focused ecological data to better understand mechanisms of pathogen spread within the Falkland Islands. This study will **look at the movements of bird populations suspected to play a particular role in pathogen spread** (scavenging skuas and non-breeding albatrosses). This part of the project is led by the UofG partner and benefits from matched funding from Cornell University (Amandine Gamble's start-up fund) and the work of Research Intern Léo Streith (UofG). Implementation is scheduled for November 2023 to March 2024, and is conditional on the local HPAI situation.

3. Improved disease surveillance and response system via increased local engagement and capacity and revised protocols (Output 4)

3.1. HPAI preparedness

Besides getting our team ready for a potential HPAI outbreak in the Falkland Islands, we have worked on a series of publications and other outreach material to (1) increase awareness of the risks posed by HPAI and how to prevent its introduction to seabird colonies of the Southern Hemisphere, and (2) share knowledge, initiate collaborations and coordinate efforts across groups of experts:

- Together with other members of the Wildlife Health Monitoring Working Group of the Scientific Committee for Antarctic Research, we published **risk assessments and practical guidelines related to the potential risk of introduction of highly pathogenic HPAI in the (sub)antarctic region** (Dewar et al. 2023; [Appendix 2](#)).
- With local partners within the Falkland Islands, we are developing enhanced biosecurity guidelines. This notably includes **practical recommendations regarding equipment** for scientists working in proximity of seabird colonies and other visitors of the Falkland Islands. These recommendations are now communicated to all visitors of sites managed by Falklands Conservation.
- Project partners joined the **High Pathogenicity H5N1 Avian Influenza Intersessional Group of the Agreement for the Conservation of Albatrosses and Petrels (ACAP)**, which is notably leading risk assessment and development guidelines for the study of concerned species.

We are preparing to a potential HPAI outbreak with an evidence-based approach drawing upon our own experience in wildlife ecology and infectious disease ecology, as well as from lessons learned from HPAI outbreaks in the Northern Hemisphere. This includes:

- **Collaboration with avian ecologists to better understand the spread and impact of HPAI in summer 2022**, leading to several publications (Gremillet et al. 2023; Duriez et al. 2023; Gamble et al. 2023).
- **Contribution to field investigations in the Northern Hemisphere in summer 2023** (Amandine Gamble in the Shetland Islands, UK, in collaboration with NatureScot and Royal Society for the Protection of Birds; Thierry Boulinier in Brittany, France, in collaboration with Réserve Naturelle Nationale des Sept Iles).

3.2. Connecting the Falkland Islands community and the 'Seabirder' community with infectious disease surveillance and response

We have **maintained engagement thorough the year** with the local and international community through **social media**, using the following accounts for the *Falklands Wildlife Health Initiative*:

- Facebook, which is widely used by the Falkland Islands community:
[facebook.com/FalklandsWildlifeHealth](https://www.facebook.com/FalklandsWildlifeHealth)
- Twitter, which is widely used by the international seabird community:
twitter.com/FIWildHealth

We also **communicated locally** around the project via a public talk organized in Stanley, Falkland Islands (Chamber of Commerce, October 2023) and a radio interview (Falklands Radio, October 2023). We also organized several **individual meetings with stakeholders** from various institutions (landowners, environmental and veterinary department of the government, academic and conservation collaborators, etc.).

Local interest in our project is demonstrated by **landowners and managers' willingness to facility research on wildlife infectious diseases** on their lands (**Figure 1**). **International interest** is demonstrated by **invitations of project partners to join expert committees in international institutions and initiatives** (e.g., ACAP).

2. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

For future projects we will develop, we will:

- **Plan more time for collaboration agreements, fund transfers, and other administrative tasks related to multi-institution projects.** We planned 6 months, but it actually took about 12 months.
- **Transfer more funds to local institutions to facilitate expenses related to field activities led by visiting partners**, including both purchases from international suppliers to have equipment delivered directly delivered on site, and local expenses such as accommodation and transportation of international staff once on site. This has not had any impact on the project but made the task more challenging.

The **HPAI epidemic** that has been affecting seabird populations in the Northern Hemisphere was not expected at the time of the proposal redaction. As mentioned above, our team has responded through (1) preparation for a potential outbreak in the Falkland Islands, and (2) communication around HPAI. At the stage, there has been no sign of outbreak, and **we do not expect any significant impact on the budget or timetable.**

3. Have any of these issues been discussed with NIRAS and if so, have changes been made to the original agreement?

Discussed with NIRAS: Yes/No

Formal Change Request submitted: Yes/No

Received confirmation of change acceptance Yes/No

Change request reference if known: CR23-009 related to Year 1 unspent funds was accepted

4a. Please confirm your actual spend in this financial year to date (i.e. from 1 April 2023 – 30 September 2023)

Actual spend: £17,158

4b. Do you currently expect to have any significant (e.g. more than £5,000) underspend in your budget for this financial year (ending 31 March 2024)?

Yes No Estimated underspend:

4c. If yes, then you need to consider your project budget needs carefully. Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project, please submit a re-budget Change Request as soon as possible. There is no guarantee that Defra will agree a re-budget so please ensure you have enough time to make appropriate changes if necessary. Please DO NOT send these in the same email as your report.

NB: if you expect an underspend, do not claim anything more than you expect to spend this financial year.

5. Are there any other issues you wish to raise relating to the project or to BCF management, monitoring, or financial procedures?

Our project got selected for a financial audit, and the timeline to provide all the documents has been really hard to make. We had two weeks to submit, among other things, justifications for all expenses, which would in theory be feasible as all expenses and their justifications are recorded by the project partners, but this arrived in late September, at the beginning of the academic year, when the finance team is busy kicking off many projects, and the scientific team busy organizing the field campaign and/or already in the field with limited access to the internet. If possible, on your side, more time should be given to address the audit requests, to make this task less stressful for everyone.

If you are a new project and you received feedback comments that requested a response, or if your Annual Report Review asked you to provide a response with your next half year report, please attach your response to this document.

All new projects (excluding Darwin Plus Fellowships and IWT Challenge Fund Evidence projects) should submit their Risk Register with this report if they have not already done so.

Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but **should also be raised with NIRAS through a Change Request. **Please DO NOT send these in the same email.****

Please send your **completed report by email** to BCF-Reports@niras.com. The report should be between 2-3 pages maximum. **Please state your project reference number, followed by the specific fund in the header of your email message e.g. Subject: 29-001 Darwin Initiative Half Year Report**