Darwin Plus:
Overseas Territories Environment and Climate Fund

Final 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)*

Darwin Project Information

Project reference	DPLUS116
Project title	Falklands wetlands and aquatic habitats: baselines for monitoring future change
Territory(ies)	Falkland Islands
Lead organisation	South Atlantic Environmental Research Institute (SAERI)
Partner institution (s)	Falkland Islands Government (FIG), UK Centre for Ecology and Hydrology (UKCEH), University College London (UCL), Independent consultants UCL Emeritus Professor Roger Flower, and David Stroud
Darwin Plus Grant value	£210,072
Start/end date of project	1st July 2020 to 30th June 2022
Project leader name	Dr Alastair Baylis and Tara Pelembe Project Manager – Dr Stefanie Carter
Project website/Twitter/blog etc.	Website: https://www.south-atlantic-research.org/research/terrestrial-science/falklands-wetlands-and-aquatic-habitats-baselines-for-monitoring-future-change/ Twitter: @SAERI_FI Facebook: https://www.facebook.com/S4ERI/ #FalklandWetlands
Report author(s) and date	Dr Stefanie Carter (Project Manager), David Stroud (Project Partner), proof-reading by the whole Project Management Group and SAERI Leadership Team 13 April 2022

1 Project Summary

The Falkland Islands (FI) (Figure 1) historically lacked herbivorous mammals. The introduction of grazing animals approximately 250 years ago has led to vegetation changes and soil erosion. The impact of these changes on wetlands and other aquatic habitats is not well understood; limited past research suggests that water quality has remained fairly natural and is largely influenced by sea salt deposition and humic acids from peat runoff. Some studies, however, have shown evidence of human impacts, such as elevated nutrient concentrations in some ponds.

Climate change also presents several threats to the FI wetlands. A predicted temperature rise could directly impact the aquatic biota and increase evapotranspiration rates, which without equivalent increases in rainfall could adversely affect freshwater availability and thereby leading

to the loss of some habitats and their associated species. Changes in the magnitude and/or temporal distribution of precipitation could similarly impact the hydrological regimes of wetlands. Increased storm frequency or severity is likely to change water quality (through increased deposition of sea salts) and may alter the hydro-morphology of drainage systems and wetlands. These impacts on aquatic biota can be identified and tracked into the future by regular monitoring of suitable indicators.

The project is hereafter referred to as Wetlands Project. 'Wetlands' as addressed in this project are defined in the project brief based on Ramsar definitions and have focussed on inland aquatic wetlands such as streams, rivers, ponds or lakes containing either freshwater of brackish water. It excluded coastal systems and other wetland types included in the Ramsar Convention's definition of the term 'wetland'.

Beyond initial funding from the Darwin Initiative, the project has had support from many other organisations and individuals, as acknowledged in Annex 6.1.

The Wetlands Project fulfilled the following objectives:

Identifying gaps in baseline data

All existing data and literature related to lakes, ponds, rivers and streams in the Falkland Islands were brought together, including outputs from previous Darwin Plus projects and data from published and unpublished research. All data were reviewed to identify gaps in knowledge. All open data were uploaded into the Falkland Islands data portal, reviewed and analysed to identify gaps in knowledge about the Islands' wetlands. All spatial data were compiled into a GIS database.

Filling the gaps in baseline data

Gaps in data related to wetlands were addressed by an intensive field assessment of 81 inland aquatic wetland within 11 representative regions distributed across the Falkland Islands. Within each site, representative examples of relevant waterbodies were visited and a range of biological, chemical and hydrological field data on the aquatic systems was collected.

Producing action plans and defining indicators

Recommendations for a terrestrial Wetlands Action Plan were made based on the knowledge gained during the project. Measurable indicators for ecosystem condition were defined and recommendations for long-term monitoring were made. Infrastructure for basic hydrological long-term monitoring was developed and deployed.

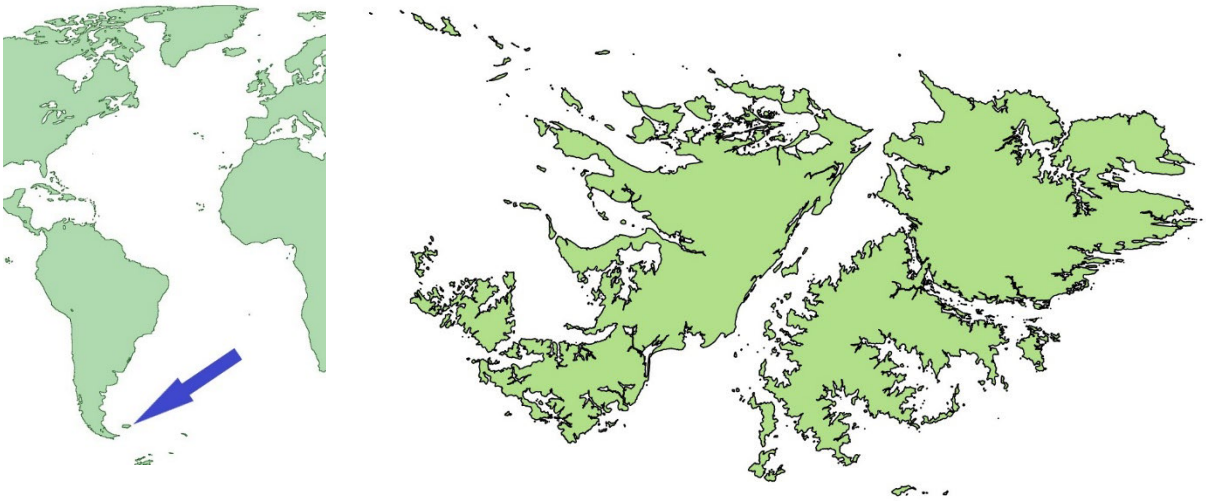

Figure 1: Location of the Falkland Islands (left) and outline of the Falkland Islands (right).

2 Project Stakeholders/Partners

2.1 Project Partners

The project partners formed the project management group (PMG) and met regularly to steer the project, decide on the methodologies applied and discuss any issues that arose. Eight PMG meetings were held throughout the project, the notes for which are available here. The PMG worked well together and the range of expertise complemented each other and strengthened the project.

The project partners were directly involved in supporting the project as follows.

- SAERI was the lead organisation. Project Manager (PM) Dr. Stefanie Carter ran the project administration (e.g. organising and chairing PMG meetings, purchasing equipment, managing the budget), undertook stakeholder engagement, planned and carried out the fieldwork with assistants. She was supported by SAERI's Executive Director Dr. Paul Brickle with overall scientific considerations, Deputy Director (Innovation) Tara Pelembe and Deputy Director (Science) Dr. Alastair Baylis with the overall project management, by SAERI's Deputy Director (Business & Programmes) Teresa Bowers with project finances, the IMS-GIS data managers Cat Gallagher and Jack Ingledew and by SAERI's office staff (Bree Forrer, Arlene Bowers and Amy Constantine) with general administration, outreach and logistics.
- Falkland Islands Government (FIG) was a key project partner and stakeholder and was represented by Environmental Officer and Policy Adviser Denise Blake and Head of Environment Dr. Rachel Cooper. The project's main outcomes – recommendations for long-term monitoring of indicators and a Wetlands Actions Plan – can only become a long-lasting project legacy if the government takes the recommendations forward. It was therefore important to have FIG as a project partner to feed into project progress and advise on policy issues.
- UK CEH was represented by Prof. Chris Evans. The partnership between UK CEH and SAERI has been growing stronger over several years; they worked particularly closely during the DPLUS083 Soil Mapping Project and signed a memorandum of understanding in May 2020 to strengthen their future research collaboration. UK CEH and SAERI are also joint hosts of a PhD student, who commenced a research project on carbon and greenhouse gas balances in the Falkland peatlands in October 2021. This will continue some of the work started during the DPLUS083 Soil Mapping Project. For this Wetlands Project, Chris Evans provided expertise in biogeochemical, hydrological and ecological processes within streams and lakes as well as guidance on equipment, fieldwork and laboratory work. He also visited the Islands in early 2022, contributing to fieldwork.
- UCL was represented by Prof. Julian Thompson and Emeritus Prof. Roger Flower both from the Department of Geography. Julian Thompson provided expertise on wetland hydrology including hydrological surveying and monitoring; Roger Flower brought general

and Falklands specific expertise in freshwater ecology to the project and contributed to the literature review and data mining.

- Independent Consultant David Stroud has experience of international conservation processes related to the Ramsar Convention, wetlands, their identification and inventory, and the processes of their protection (both legally and through management planning). He was involved in the project's literature review on international and national legislation as well briefing FIG on scope for future Ramsar Site designations.

2.2 Project Stakeholders

Stakeholders have been updated on the project and engaged with the project through various channels.

Landowners

In the first instance, an email was sent to all landowners providing a background to the project, stating its aims and objectives, and inviting landowners and land managers to support the project through fieldwork and set-up of long-term monitoring on their land (Annex 6.2). This invitation was first taken up by the landowners on Weddell Island and Bleaker Island; these islands were therefore visited during the first fieldwork season and data loggers for long-term monitoring were deployed (see fieldwork report and Figures 2 and 3). A third logger station was set up in the following winter in 2021 at Salvador Farm (Figure 4). During the second field seasons two further landowners indicated interest in the project work and joined the fieldwork on their land and learned about the chemistry and biota of their aquatic ecosystems (Figure 5).

Fieldwork also included several ponds within the Ministry of Defence's (MOD) Mount Pleasant Complex (MPC). This was supported by MPC's Environmental Protection Officer (Figure 6) and opened up engagement with the wider MOD community. A public engagement fieldwork event as well as a public talk followed on from this in April 2021. A social media summary can be found here. The MOD control a large area of land, which has had little grazing in the past 40 years. Their waterbodies (and peatlands) have therefore been exposed to less grazing pressure than surrounding areas, which may have proved beneficial. The Environmental Protection Officer appeared very encouraged by the MOD's custodianship and was very pleased to support environmental research. Even though the MOD generally have a high staff turnover, families with children tend to stay longer (1+ years); the public engagement fieldwork event enabled the participating families to see the waterbodies on their doorstep in a completely new light and provided a new experience for them.

In the beginning of July 2021, Farmer's Week presented the chance to engage with the general public as well as land owners and land managers. On the first day of Farmer's Week, the 'Expo' took place at which SAERI had a stall that included live freshwater invertebrates (which were released afterwards) and an ID challenge for children as well as background information on the project. A few days later, the PM gave a presentation on the project to members of the Rural Business Association. She also encouraged a discussion on 'ditching practices', presented examples of UK peatland restoration within the ditching context, and ran a questionnaire on 'ditching practices'. See Figure 7 for Farmer's Week highlights.

Government

FIG is a project partner on the project but at the same time also one of the key stakeholders on the Islands. In order to keep relevant government posts updated on the project, a paper was presented to FIG's Environment Committee (EC) meeting in March 2021, which included two members of the legislative assembly (MLAs) and representative officers across FIG. The paper generated interesting discussions on the changing availability of water on the land and possible ways to approach these challenges (EC meeting notes are available online, an excerpt from the meeting is presented in Figure 8). This was also reported by MLA Teslyn Barkman in her Penguin News column 'Inside Gilbert House'. The Wetlands Symposium was also of interest to MLA Teslyn Barkman, who joined the afternoon talks and requested all presentation afterwards (Symposium report available here).

Local Community outreach (local media)

The second half of the 2020/21 austral summer in the Falkland Islands has been particularly dry, which has caused general concerns about waterbodies drying out. In order to address some of these concerns and to ensure that the general public are aware of the Wetlands Project, the local Penguin News published an article on the project written by the PM whilst Falkland Islands Television (FITV) put together a short video about life in one local pond near Stanley and included an interview with the PM (YouTube hyperlinks do not work in word documents, please search for 'What lurks in the Falklands wetlands?'). The September / October edition of The Wool Press included an article on the Wetlands Project and a summary of the results of the above-mentioned ditching questionnaire.

Local Community outreach (schools)

SAERI were invited to take part in the Careers Day 2021 at the Falkland Islands Community School (FICS), which involved a two-hour session in which the students were able to try out different practicals and learned about the career paths of SAERI scientists. The PM organised a soil pH testing practical and explained how she obtained her current role as the Wetlands Project Manager (Annex 6.3). This was followed by Careers Day 2022, during which the PM organized a practical on freshwater chemistry and invertebrates. Students had to measure conductivity and pH, and identify invertebrates from three different local waterbodies (Annex 6.4). SAERI also hosted a year 10 work experience student in April 2021, who joined the PM for a day in the field and a day in the lab (Figure 9).

Local and international outreach (social media)

Regular posts on SAERI's social media provided updates on the project, particularly the fieldwork. SAERI currently have 2,138 followers on Facebook, and 2,919 followers on Twitter. Examples of Facebook posts and Tweets are given in Figures 10 and 11. The project also has its own website, and is regularly highlighted in the quarterly SAERI newsletter.

Peaty Pals

In collaboration with Falklands Conservation (FC) SAERI co-hosts the 'Peaty Pals', a local peatlands interest group. The group meets informally during the Falklands' lunch hour with the chance for overseas and camp participants to dial in virtually. One or two presentations on peatlands are given, which is followed by discussions. Three meetings have been held – July and October 2021 and February 2022. The PM gave a presentation on greenhouse gas flux measurements in the Falklands for the second meeting and visiting project partner Chris Evans presented on carbon credits in the third meeting (Figures 12 and 13).

Figure 2: Fieldwork on Bleaker Island: PM and landowner Phyl Rendell use the shelter of the Landrover to look at invertebrates caught in Big Pond (left and centre), the PM about to deploy the loggers in Big Pond (right).

Figure 3: Fieldwork on Bleaker Island: Landowner [redacted] and temporary field assistant [redacted] collecting invertebrates and water samples at New Year's Cove Stream (left), the buoy indicating the location of the loggers in Tern Hill Stream (right).

Figure 4: Owner of Salvador Farm [redacted] (left) and PM (right) after the installation of the final logger station at Long Pond, Salvador.

Figure 5: Left image: Owner of Leicester Creek farm [redacted] (left) and fieldwork volunteer [redacted] (right) at Bucket Peck Pond, Leicester Creek. Right image: Elephant Beach farm owner and Cape Dolphin land manager [redacted] (left) and fieldwork volunteer [redacted] (right) at Pens Pond, Cape Dolphin.

Figure 6: Fieldwork at MPA, from left: temporary field assistant Bree Forrer, PM, MOD Environmental Protection Officer at Mount Pleasant Complex [redacted] and his work experience student [redacted].

Figure 7: Farmer's Week Expo (left and centre), Farmer's Week presentation (right).

7. 7.1	**Update on SAERI DPlus Wetlands Project:** AB explained the project and future of the project, also that 1 field season had rolled into 2, due to COVID-19 restrictions.	
7.2	LR enquired if invitations were going out to landowners for long-term monitoring. AB replied that only certain sites were being used to establish a baseline. This was achieved by a targeted approach to landowners, rather than a general outreach.	
7.3	ME suggested a joint approach from SAERI and Department of Agriculture (DoA) to consider facilitating drainage (ditching) to create wetlands. DB suggested that FC could join in this as they also had a DPLUS project on Wetlands. NP suggested digging out ditches to rehydrate the land and to start collecting water from hill top ponds as natural springs are starting to dry out. TM commented that this should be linked up with Steffi Carter and it could be raised in the Agricultural Advisory Committee (AAC). There is no defined process to tackle climate change within the DoA. NP commented that animal welfare and improved hydration of land can both be achieved if done properly.	TM

Figure 8: Excerpt from the 15 March 2021 Environment Committee meeting relating to the Wetlands Project. The full meeting notes are available from the FIG website. Note: AB is Alastair Baylis (SAERI), LR is Leona Roberts (MLA), ME is Mike Evans (Community Representative), DB is Denise Blake (FIG Environment Department), NP is Nick Pitaluga (Rural Business Association), and TM is Tom McIntosh (FIG Department of Agriculture).

Figure 9: Facebook post summarising the work experience student's week with SAERI.

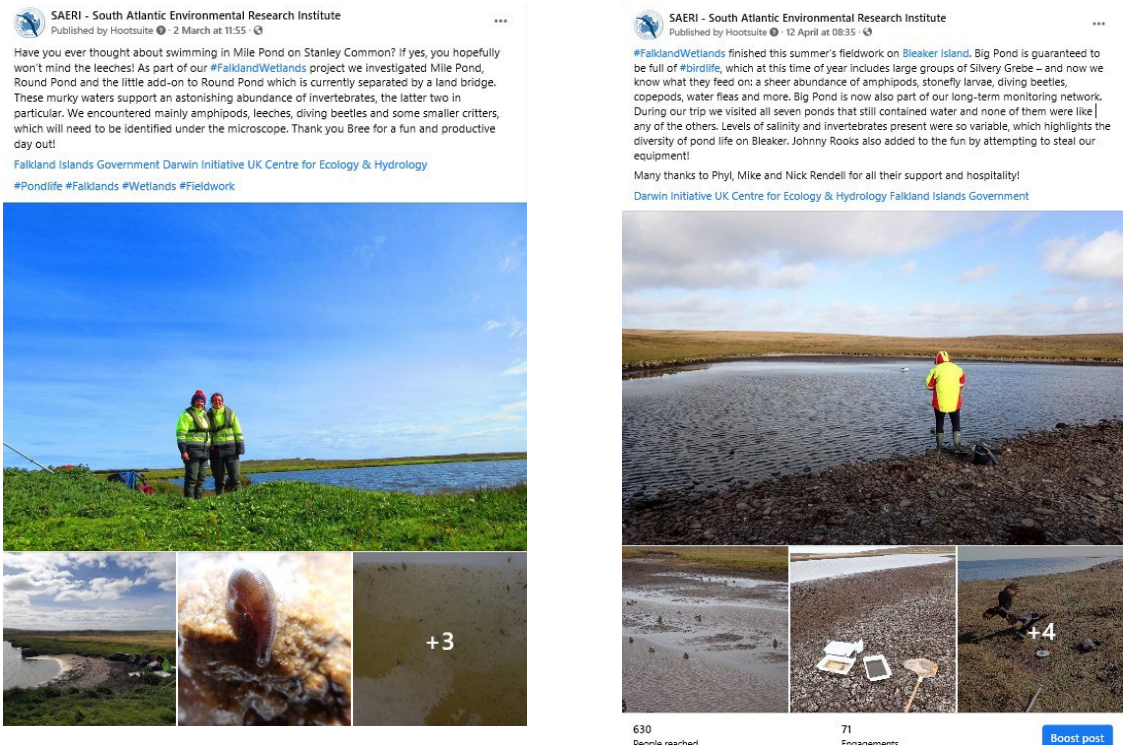

Figure 10: Examples of Facebook posts related to the Wetlands Project.

Figure 11: Examples of tweets related to the Wetlands Project.

Figure 12: Falklands Peatland Interest Group Meeting on 19 October 2021 with the PM presenting.

Figure 13: Falklands Peatland Interest Group Meeting on 3 February 2022 with Project partner Chris Evans presenting.

3 Project Achievements

Output 1: Project Management System

The purpose of Output 1 was to establish the project management structure to ensure a smooth administration of the project. This was established early on in the project and remained effective throughout the project. Quarterly PMG meetings were held; the meetings' notes are available on the project website (**Indicator 1.1**). The PM was recruited and started work on the project on 8 October 2020. The contract is available upon request. (**Indicator 1.2**). The Monitoring and Evaluation Plan was completed and is available on the project website (**Indicator 1.3**). An end of Year 1 project update was provided to the FIG Environment Committee on 15 March 2021. This is available on the project website, and is also discussed in Section 2.2 of this annual report. The Environment Committee minutes are available on the FIG website; the section of the meeting minutes discussing the Wetlands Project are shown in Figure 8 (**Indicator 1.4**).

Output 2: Existing baseline data mined and collated and data gaps identified and prioritised

Output 2 focussed on gathering and evaluating existing data and published literature on the wetlands and aquatic habitats as defined in the project brief. A literature review including a gap analysis was undertaken by the PM and one project partner; the review is available on the project website (**Indicator 2.1**). All existing and available data previously obtained by visiting researchers

have been collated and uploaded to the FI data portal. (**Indicator 2.2**). A WebGIS was created for the Wetlands Project to spatially display some of the existing data that can be displayed spatially as well as the project fieldwork data. The WebGIS with the data layers is available here (**Indicator 2.3**).

Output 3: Priority data gaps addressed through fieldwork

The focus of Output 3 was the completion of fieldwork to address the identified knowledge gaps. It was originally planned that project partners would travel to the Falklands for joint fieldwork during the 2020/21 austral summer. Due to Covid-19 travel restrictions this was not possible and fieldwork with project partners was postponed to the following summer. Nonetheless, the PM completed a fieldwork season during the first summer with local assistants. Travel circumstances during the 2021/22 austral summer were not much better for project partners, which meant that only one project partner was able to visit. In the beginning of the summer, the PM completed a second fieldwork programme with local assistants. She joined up with project partner Chris Evans in the second half of the summer to visit additional sites. A total of 81 waterbodies across 11 regions were surveyed over two fieldwork summers, exceeding the initial project plan for fieldwork. The full fieldwork reports are available on the project website for field season 1 and field season 2 (**Indicator 3.1 and Indicator 3.3**).

The gaps in spatial aspects of water quality in inland waters were addressed during the fieldwork. In-situ measurements were made at each waterbody for pH, conductivity, dissolved oxygen and salinity. More detailed data on water quality were obtained by collecting water samples and sending these to a laboratory in the UK for analyses. Data loggers were deployed at six sites to monitor water level, temperature and light levels; one site also received loggers to monitor pH and conductivity; the latter provides an indication of salinity. Details are provided in the fieldwork reports (links under Indicator 3.1) (**Indicator 3.2**).

A Wetlands Symposium was organised for the end of the fieldwork and was planned to coincide with World Wetlands Day on 2 February 2022. Three project partners joined online and visiting project partner Chris Evans joined in the Falklands. A full report on the Symposium including links to presentations, attendance list and discussion outputs is available on the project website (**Indicator 3.4**).

As explained for Indicator 3.1 and in Section 9 only one project partner – Chris Evans – was able to visit the Falklands for fieldwork. He carried out fieldwork on Stanley Common and on Sea Lion Island and was joined by the PM for fieldwork at Goose Green. Chris's visit is summarised in a social media post here (**Indicator 3.5**).

The field season database and the webGIS were updated after the completion of fieldwork. The fieldwork data in the webGIS can be accessed here (**Indicator 3.6**).

Output 4: Indicators established, capacity in indicator monitoring built and policy recommendations made

The aim of Output 4 was to ensure that some of the work started during the project and the future care of Falkland Islands wetlands can take place beyond the project with on-Islands capacity. The first output feeding into this is an Indicator Monitoring Report, which can be accessed on the project website. This report lists nine key indicators for the monitoring of inland aquatic wetlands, suggests budget-based monitoring scenarios and outlines monitoring protocols for each of the indicators (**Indicators 4.1 and 4.2**). A practical training session took place at the end of the project with 10 attendees (50% female; 4 FIG staff, 3 SAERI staff and 3 FC staff). It was felt that the training session would be more effective if FC were included rather than focussing on just SAERI and FIG. The full training report is available here. Additionally, three landowners were engaged with during the project to become involved in long-term monitoring as highlighted in Section 2.2 (**Indicator 4.3**).

The second output for project legacy were recommendations for an action plan, in which pressures and threats for the targeted wetland types are identified and actions to eliminate, reduce or mitigate these pressures and threats are proposed. The action plan is submitted alongside the final report (**Indicator 4.4**). Both the indicator report and the action plan will be presented to FIG at the next Environment Committee on 18 May 2022. It was not possible to finalise these for the previous Committee Meeting (25 February 2022) due to Wetlands

Symposium preparations and fieldwork commitments with Chris Evans (visiting from 27 January to 15 February 2022).

A final project talk took place on 31st March 2022, which was open to the general public and all stakeholders (Figure 14). The presentation is available here (**Indicator 4.5**).

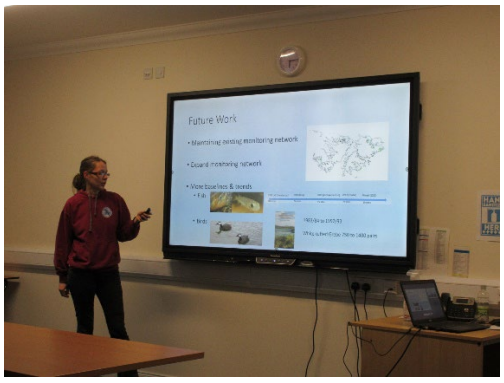

Figure 14: The PM presenting the final project talk on 31st March 2022.

Other achievements

Even though it was not integrated into the project log frame, the application of eDNA for invertebrate studies was suggested in the original project bid and was applied as a pilot study. Additional project funding was secured, which allowed the sampling and analyses of eDNA from five waterbodies. The fieldwork report is available here and a preliminary report on the results is available here.

Sampling and analyses of diatoms micro-algae was also a significant aspect of the project even though it was not specifically written into the project log frame. Project partner Roger Flower has processed some samples already and received the final samples for analyses upon Chris Evans' return to the UK in February 2022. Once these have been processed (estimated completion in May 2022) a final report will be published on the project website. The results currently available are published on the project webGIS.

Even though not directly related to aquatic wetlands, the project also supported the successful first field season for CEH's and SAERI's joint UK-based PhD student Katy Ross. Her project considers wider environmental change in the Falklands and looks at human and livestock impact on carbon stock and greenhouse gas fluxes. Through Wetlands travel funds project partner Chris Evans was able to accompany her on her first trip to the Falklands to select field sites and the PM and Katy Ross subsequently set up her study sites.

3.1 Outcome

The overall project outcome was for the wetlands of the Falkland Islands to be better understood through the establishment of indicators for long-term monitoring and triggering of rapid management interventions. This was achieved by developing at least three indicators for long-term monitoring (**Indicator 0.1**) and the production of a policy paper to the FIG's Environment Committee with recommendations on a Wetlands Action Plan (**Indicator 0.2**). The indicators were relevant and appropriate for achieving the outcome.

The first step in better understanding the Falklands wetlands was to review existing data. The baseline for the project was that some research on terrestrial wetlands in the Falklands had taken place in the past but all projects were carried out by different researchers sporadically over the course of 30 years. The data had not been collated in one place and it was therefore difficult to judge how much was actually known about the FI wetlands. A literature and data review was completed, and now provides a basis for the current state of knowledge.

This was followed by two intensive fieldwork campaigns during which 81 waterbodies across 11 regions were visited, exceeding the original goals. Additionally, six logger stations were deployed across the Falklands, all of which are currently monitoring three important indicators of hydrology and water quality, and one of which monitors an additional two indicators for water quality. The

details for this were provided in Section 3 for Output 3. The combined data from the fieldwork and the data logging stations have all fed into completing **Indicator 0.1**.

At the end of the project, two major reports were produced to ensure a long-lasting project legacy on the Islands. An indicator monitoring report aims at providing the knowledge and capacity to continue monitoring wetland hydrology and water quality beyond the project. The recommendations for an action plan (submitted with the final report) highlight pressures and threats for inland wetlands and propose actions to mitigate against these (**Indicator 0.2**).

The data and knowledge gained from the fieldwork and data logging stations, combined with the indicator monitoring report and recommendations for an action plan, have all ensured that Falklands inland wetlands are now better understood and can be managed better through long-term monitoring and appropriate management actions. This all means that the overall project aims and outcomes have been achieved.

3.2 Monitoring of assumptions

The PMG met regularly and discussed any issues that arose and jointly found solutions; this process worked very well and monitored the assumptions. Most assumptions were inconsequential and most outputs could be completed without any necessary adjustments.

Outcome

The indicator monitoring report suggests different levels of long-term monitoring depending on budget availability. The most basic scenario covers the continuation of the current monitoring set-up, which can be achieved with a very modest annual budget (**Assumption 0.1**). FIG were part of the PMG meetings that discussed the outline and content of the indicator monitoring report and action plan recommendations. Their requirements for practical inputs into this report were included, which will hopefully allow them to integrate the recommendations smoothly into their work streams. FIG's Environment Department have also created a new position, which will update their legislation and action plans over the next two years. The PM will remain in the Falkland Islands employed by SAERI for a further few months, which will allow her to work with the postholder to ensure that all wetlands related aspects are considered. Adopting action plans within FIG is a longer process beyond the timeline of the project, but within the project everything was achieved to ensure that **Assumption 0.2** will be met.

Output 1: Project Management System

The recruitment for the PM was completed as scheduled (**Assumption 1.1**) and the Environment Committee accepted the paper from the Wetlands Project (**Assumption 1.2**). Both assumptions were fulfilled and the indicators have been completed (see Section 3.3).

Output 2: Existing baseline data mined and collated and data gaps identified and prioritised

Published literature and unpublished data were available for the PM to carry out the literature and data review (**Assumption 2.1**). The assumption for Output 2 was therefore fulfilled and the relevant indicators have been completed (see Section 3.3).

Output 3: Priority data gaps addressed through fieldwork

Assumptions 3.2 to 3.3 were fulfilled, fieldwork could be carried out and all indicators for Output 3 were completed (see Section 3.3). Strong winds in February 2022 caused ferry cancellations, which meant that the PM and visiting project partner were not able to travel to West Falkland as initially planned but instead focussed their fieldwork on East Falkland (**Assumption 3.1**). Covid-19 related quarantine requirements upon arrival in the Falklands meant that only one project partner was able to travel to the Falklands. **Assumption 3.4** was therefore not fulfilled; however, this did not impact on project progress because the PM was able to complete the fieldwork with local assistants and was able to visit additional sites with Chris Evans. All relevant indicators have been completed (see Section 3.3).

Output 4: Indicators established, capacity in indicator monitoring built and policy recommendations made

Ten attendees were able to join the training workshop as planned, **Assumption 4.1** was therefore met. It is confirmed that the project outputs will be presented in the next Environment Committee meeting, **Assumption 4.2** was therefore met. All relevant indicators have been completed (see Section 3.3).

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

An initial review – part of the overall literature review – has been undertaken of the relevant international multi-lateral environmental agreements (MEAs) relevant to freshwater wetlands and their biodiversity in the Falkland Islands. These include the Conventions on:

- Biological Diversity (CBD);
- Wetlands of international importance especially as waterfowl habitat (Ramsar Convention);
- Conservation of Migratory Species of wild animal (CMS);
- The protection of world cultural and natural heritage (World Heritage Convention);
- International Trade in Endangered Species (CITES); and the
- Agreement on the Conservation of Albatrosses and Petrels (ACAP).

Other MEAs are relevant for other wetland types, coastal in particular.

Summaries have also been made of principle national legislation and policies affecting freshwater wetlands, including:

- The Nature Reserves Ordinance of 1964;
- The Wild Animals and Birds Protection Ordinance 1964;
- Conservation of Wildlife & Nature Ordinance 1999;
- Endangered Species Protection Ordinance 2015;
- National Plan of Action concerning seabird bycatch;
- Environment Charter 2001;
- The Falkland Islands Development Plan 2001-2016;
- The Falkland Islands Biodiversity Strategy 2008-18; and
- The Falkland Islands Environment Strategy 2021-2040.

A more detailed briefing on the obligations under the Ramsar Convention on wetlands has been prepared for the Falklands Islands Government (FIG) – available on the project website – noting that it has previously designated two wetlands of international importance and has identified 30 other wetlands of international importance that qualify under the Ramsar Convention's international criteria.

As well as summarising the main provisions of the Convention and implications for small island territories such as the Falklands, the briefing addresses the practical steps involved in moving towards further Ramsar Site designations – in particular:

- an introduction to the relevant UK and international organisations involved in the process;
- a guide to the key obligations following from a decision to designate a Ramer Site;

- a summary of the process and obligations with respect to submitting and then regularly updating Information Sheets describing Ramsar Sites;
- summary information on the 30 internationally important sites in the Falklands and the criteria related to the reasons why each qualify under the Ramsar Convention; and
- possible different strategic approaches to prioritisation of designation amongst qualifying wetlands.

A simple 'how-to-do-it' guidance on the process of Ramsar Site designation for the UK Overseas Territories does not appear to be available. The current **guidance prepared for FIG has significant potential to be further developed generically with potential use by all UKOT/CDs**. Frequent changes of government staff within UKOT/CDs and the infrequency with which these international designations are made, means that in any territory, organisational knowledge about such issues is soon lost.

There would be value in the UK government drafting and maintaining such guidance generally in support of encouraging effective implementation by the UKOT/CDs of their international conservation obligations.

Information Sheets for the two designated Ramsar Sites of Sea Lion Island and Bertha's Beach have been fully updated with local consultation and bringing together significant new information. Following sign-off by Falklands Islands and UK Governments in early 2022, these will be submitted to the Ramsar Secretariat in fulfilment of the obligation to update such sheets at least every six years. They provide a valuable source of contemporary information on the reasons why these areas are internationally important and the current pressures on, and threats to, their biodiversity.

5 OPTIONAL: Gender equality

In the SAERI office, the current staff cohort is 60% female and 40% male, and SAERI has an equal opportunities policy as part of its internal policy framework. The project leader and PM of the Wetlands Project are both female.

Most of the land in the Falkland Islands is privately owned and tends to be family managed, with both the men and women within the households making an active contribution to the maintenance and development of the farm. The initial email sent to landowners to participate in the project either through fieldwork on their land or through long-term monitoring (Section 2.2 stakeholders) was sent to all landowners irrespective of gender; therefore, everyone had an equal opportunity to participate in the project.

All project talks (Farmer's Week, Symposium, final project talk) were available to the general public irrespective of gender. The final project training session achieved the intended equal gender participation (Indicator 4.3).

The SAERI session for Careers Day at the senior school (see Section 2.2) included the PM as well as other mainly female scientists, which will have hopefully highlighted the possibility of a science career path for the female students, who participated in the sessions.

6 Sustainability and Legacy

Maintenance of the ecological character of wetlands, through the principle of wise use (i.e. sustainable use) is one of the core obligations that FIG has assumed by being a signatory to the Ramsar Convention. To that end, specific attention has been paid this year in understanding the

provisions of FIs conservation legislation and policies and how adequately this delivers the international obligations FIG has assumed.

Of particular note in this regard, although the details are yet to be finalised, is the current negotiation, planned to conclude in late 2022, under CBD of the Post-2020 Global Biodiversity Framework which will establish enhanced national ambitions to address the global biodiversity crisis. It is likely that one of the key targets within the Framework will relate to the need for enhanced protected area establishment and management, and this is something where the Falklands are well-placed to contribute.

The planned exit strategy is still valid. The project will provide FIG with the baselines, knowledge and training to implement a long-term strategy to monitor and so contribute to wetlands protection actions beyond the duration of the project. By producing recommendations for a Wetlands Action Plan the project will enable FIG to fulfil the Falkland Island Biodiversity Framework (2016-2030). During the project we have established long-term monitoring sites, and intend to support the collection of environmental data from wetlands using data loggers long after the project ends by applying for additional funding sources.

FIG is a key project partner and project stakeholder and the project ensured that FIG were involved in all aspects of the project (especially the indicator monitoring training session and the production of the indicator monitoring report and action plan recommendations) to enable FIG to be in a position to take up the recommendations at the end of the project.

Furthermore, engagement with different audiences (see Section 2.2) provided opportunities for local stakeholders to further understand the importance of the project, appreciate their local wetlands on different levels, and hopefully have an increased interest in protecting them by the end of the project.

The project PM will remain in the Falklands and employed by SAERI for an additional few months, which will allow her to continue with some of the project work to ensure a lasting project legacy. This will include the presentation of the final project outputs to FIG's Environment Committee in May 2022 and further data logger maintenance and data analysis. She will also continue to work with project partner Roger Flower to produce a final report on diatom results and with collaborator Swansea University to produce a final report on the invertebrate eDNA study.

7 Lessons learned

Having both SAERI as well as the PM based in the UKOT, where the project was carried out, added immense value and advantage to the project. The PM managing the Wetlands Projects was the same PM, who managed the DPLUS083 Soil Mapping Project; she was therefore able to use lessons learned from the Soil Mapping Project in respect to project management and fieldwork planning as well as links to landowners from her previous work. Having the PM based in the UKOT allowed outreach activities to take place, which otherwise could not have been implemented, such as work experience for local students, careers day in the local school and representation at local events such as GIS Day and Farmer's Week. These events strengthened the breath of outreach and awareness.

Whilst the project was based in the Falkland Islands and could therefore maximize its local outreach, it also benefited from the expertise of international project partners – a concept, which worked very well for the Soil Mapping Project as well as this current project. Future projects should always combine local knowledge and experience with expertise from the outside where necessary in order to maximize both local and international impact.

SAERI maintain the Falkland Islands data portal and all WebGIS projects and have the necessary expertise and infrastructure in place. This ensured project legacy and availability of data beyond the project and provided the PM with GIS and data support on a day-to-day basis. SAERI is also a member of the Falkland Islands Environment Committee and is therefore well-placed to present the project and relevant issues at committee meetings.

The project faced several Covid-19 related challenges but all were overcome without affecting project outputs and outcomes (see Section 9 for details). Any project that relies on acquiring

equipment and consumables will always need sufficient lead-in time to have these shipped to the respective UKOT before any practical work can start. Covid-19 has prolonged supply chains; therefore, additional lead-in time may be necessary. When projects are planned initially, there should always be a sufficient time allowance for acquisition of necessary items.

Projects with a heavy fieldwork element such as Wetlands Project, should always have a project assistant in place additionally to the PM so that fieldwork support is guaranteed. Project partners could not travel to the Falklands in the first austral summer and only one project partner could travel in the second austral summer. Fieldwork support for this project therefore had to be found elsewhere, which were SAERI staff and one volunteer. Whilst volunteer opportunities are a great way for project outreach, the availability of fieldwork volunteers is not guaranteed, especially for longer fieldwork periods. A project assistant would therefore provide much needed reliable project support.

Project planning primarily focusses on establishing a project log frame and timeline through the intended outcomes can be achieved. This, however, rarely allows for the scientific write-up and dissemination of the project. An additional three months of project time for the writing of peer-reviewed papers after the completion of all log frame items would be highly desirable to enhance project impact.

7.1 Monitoring and evaluation

A Monitoring and Evaluation (M&E) plan was developed for the project and is available on the project website; no changes were made to it during the project. The project was governed through an established PMG, which was formed by all project partners. The project partners worked well together and regularly met to discuss and steer the project. The project manager updated the PMG in these quarterly meetings on the deliverables in the log frame, the M&E, and budget. The PMG used Google Drive to share data. It was the PMG's responsibility to facilitate project delivery on time and within budget and to review the quality of the outputs. Involvement of landowners in fieldwork and data logging as well as discussion at Farmer's Week 2021 (see Section 2.2), ensured that the project also incorporated their interests and views. Completion of indicators and full project delivery highlights how this process worked very well.

7.2 Actions taken in response to annual report reviews

Five comments were received in the previous annual report review, four of which required a response.

Comment 1: The MOD engagement was highlighted in Section 2.2.

Comment 2: The project's exit strategy was discussed in the PMG meeting on 13 July 2021 (meeting notes here) and explained in the 2021 Half Annual Report.

Comment 3: The term 'wetlands' as defined under the Ramsar Convention includes a wide range of wetlands including marine, inland and human-made. When the DPLUS116 and DPLUS110 project proposals were submitted, there was concern expressed that these projects might overlap and duplicate some fieldwork. This was, however, never the case. The separation between the two projects under the Ramsar wetland types is that DPLUS110 covers category U (non-forested peatlands), and DPLUS116 covered freshwater and brackish inland wetlands (e.g. Ramsar types M, O, P, Q, etc.). This had always been the intention of the projects but perhaps it was not fully explained in the original project proposals. To ensure the focus of DPLUS116 remained clear throughout the project, a project brief was produced at the beginning of the project.

In the AR1 (2021) it was suggested that a holistic inventory of Falkland Islands Wetland may be desirable to address all wetlands as defined by Ramsar; however, such a large report lies outside both DPLUS110 and DPLUS116 because it would require the incorporation of marine wetlands (such as shallow marine waters, kelp beds, sandy and rocky shores), which are quite substantial in the Falklands.

The DPLUS110 and DPLUS116 PMs have regularly met and exchanged ideas. For example, they attended each other's talks at Farmer's Week. The DPLUS110 PM attended the DPLUS116 Symposium, training session and final project talk. The DPLUS116 PM joined DPLUS110 for fieldwork on Kidney Island. Alongside another Falklands Conservation colleague, both PMs have jointly initiated and co-hosted the 'Peaty Pals'.

Comment 4: Stakeholder engagements took place more often than every six months:

Dec 2020	Initial email inviting landowners to participate in fieldwork and data logging
Feb/Mar 2021	Fieldwork with landowners
March 2021	paper submitted to FIG's EC
July 2022	Farmer's Week Engagement
Nov/Dec 2021	Fieldwork with landowners
Jan/Feb 2022	PMG meetings with FIG discussing indicator monitoring and wetlands action plans
Mar 2022	Training session with FIG and FC

Comment 5 (No response required): The gender equality is highlighted in Section 5. It is difficult to look at male/female ratio of landowners contacted and engaged because every landowners' situation is different (e.g. son farming with parents, mother engaged in fieldwork but son maintained logger station, vs. single male landowner, vs. married landowner, whose wife is not involved in land management, vs. couple who discuss all matters together). The female participation is therefore more related to the family unit and the responsibilities within that. The local outreach at the school provides opportunities for all students to sign up for Careers Day sessions or work experience, irrespective of gender. Whether female students are encouraged particularly to pursue science opportunities to cover the gender gap in STEM (Science, Technology, Engineering and Mathematics) is for the school to decide. Hopefully, the overwhelming majority of female SAERI scientist at Careers Day will have inspired some of the female students to pursue science subjects and careers.

8 Darwin Identity

The Darwin Initiative funding was recognised in every communication and public engagement event. The logo was displayed in presentations and the Darwin Initiative was recognised in press articles and the funding through the UK government was explained in presentations and meetings with stakeholders.

The Wetlands Project was always presented as a distinct project with a clear identity attached to the Darwin Initiative as the funding donor. The Darwin Initiative funding programme was known to some people as there have been previous Darwin Projects on the Falklands; however, the project's outreach work has increased public awareness of the Darwin Initiative, e.g. the MOD community seemed less aware of the Darwin Initiative prior to engaging with the PM.

The Darwin logo was displayed in the following outreach:

- The Landrover 130 puma purchased by the Wetlands Project has the Darwin logo displayed on the hood (Figure 15).
- DPLUS083 Soil Maps presented by the Wetlands Project PM at the SAERI stall for Map Day 2020, an event organised for the general public (Annex 6.5).
- Careers Day presentation to year 7, 8 and 9 students at FICS (Annex 6.3)
- Project website
- Project presentations, e.g. MOD, Farmer's Week, Symposium.
- Outreach material, e.g. Invertebrate ID sheet, Farmer's Week Poster, Wetlands Symposium Programme

Figure 15: SAERI vehicle with the Darwin logo purchased by the Wetlands Project

The Darwin Initiative was mentioned in the following outreach:

- Several Facebook posts and tweets in which the Darwin Initiative was tagged (examples in Figures 10 and 11). The hashtag #FalklandWetlands can be searched on Facebook and Twitter for additional examples.
- FITV interview
- Penguin News article
- Email to all Landowners (Annex 6.2)
- SAERI newsletter, e.g here and here
- At the beginning of presentations when the background to the project and project partners was explained.

9 Impact of COVID-19 on project delivery

The project faced two Covid-19 related challenges:

1. **International travel**: Project partners were not able to visit the Falkland Islands as planned due to Covid-19 related travel restrictions mainly in the form of quarantine requirements upon arrival in the Falklands, which would have prolonged trips substantially. When project partners could not travel to the Falklands for the first austral summer, a change request was submitted to LTS to move travel funds to project year 2. However, even for the second austral summer only one project partner was able to travel, primarily due to continuing quarantine restrictions This was mitigated by completing the majority of the work with local assistants and generally enhanced the project because more fieldwork could be carried out over a longer time with the local PM and local assistants instead of during short project partner visits.

2. **Equipment delays**: Some equipment and consumables took longer to arrive in the Falklands because of Covid-19 related delays in the UK. This was mitigated by borrowing a probe (for measuring pH, conductivity and dissolved oxygen) from Falklands Conservation and temporarily amending the fieldwork protocol.

The Falkland Islands have not had community transmission of Covid-19 in Stanley. Therefore, the Falkland Islands has not faced the same level of national lockdowns as in the UK and other UKOTs, which has enabled fieldwork with local staff to be undertaken.

10 Finance and administration

10.1 Project expenditure

Project spend (indicative) since last annual report	2020/21 Grant (£)	2020/21 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs	[redacted]	[redacted]	[redacted]	n/a
Consultancy costs	[redacted]	[redacted]	[redacted]	n/a
Overhead Costs	[redacted]	[redacted]	[redacted]	n/a
Travel and subsistence	[redacted]	[redacted]	[redacted]	Please see below*
Operating Costs	[redacted]	[redacted]	[redacted]	n/a
Capital items	[redacted]	[redacted]	[redacted]	n/a
Others	[redacted]	[redacted]	[redacted]	Please see below*
TOTAL	[redacted]	[redacted]		

* Three out of four project partners could not travel to the Falkland Islands. These travel funds were reallocated to 'Others' to cover additional GIS work and vehicle costs from project year 1 as agreed with Eilidh Young.

Staff employed (Name and position)	Cost (£)
Project Manager – Stefanie Carter	[redacted]
Dep. Dir. Science – Alastair Baylis	[redacted]
Dep Dir. Business – Teresa Bowers	[redacted]
Data Manager – Jack Ingledew	[redacted]
Project Partner – Chris Evans	[redacted]
Project Partner – Julian Thompson	[redacted]
TOTAL	[redacted]

Consultancy – description and breakdown of costs	Other items – cost (£)
Consultancy Roger Flower – Analysis of diatom samples	[redacted]
Consultancy David Stroud – Review of Falklands Ramsar Wetlands & Contribution to Symposium	[redacted]
TOTAL	[redacted]

Capital items – description	Capital items – cost (£)
n/a	[redacted]
TOTAL	[redacted]

Other items – description	Other items – cost (£)
Monitoring & Evaluation	[redacted]
Data Storage	[redacted]
Shipping & Freight	[redacted]
Vehicle Cost Cover from project year 1	[redacted]
Fuel	[redacted]
Water sample analysis (UK)	[redacted]
ID Guides	[redacted]
Fieldwork Consumables	[redacted]
Labwork Consumables	[redacted]
Electrode replacements	[redacted]
Cool Bags & Ice Packs	[redacted]
Data Logger replacement battery kits	[redacted]
Stationary & Office consumables	[redacted]
Refunds to Defra for Year 1	[redacted]
TOTAL	[redacted]

10.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
Ernest Kleinwort Charitable Trust	[redacted]
John Cheek Trust	[redacted]
SAERI in-kind (planned)	[redacted]
SAERI in-kind (additional for fieldwork assistance)	[redacted]
FIG in-kind	[redacted]
CEH in-kind	[redacted]
Swansea University in-kind (no overheads charged for eDNA work)	[redacted]
TOTAL	[redacted]

Source of funding for additional work after project lifetime	Total (£)
Falkland Islands Government's Environmental Studies Budget	[redacted]
TOTAL	[redacted]

10.3 Value for Money

The project and the PM were based in the host territory, which meant that no international travel budget was required for the PM and most of the travel funds could be used for fieldwork travel. The project also greatly benefitted from in-kind time provided by project partners and SAERI staff as outlined in section 9.2. Volunteers and SAERI staff dedicating their time to assist with desk and field work allowed the project to survey more regions and waterbodies than initially planned and supported the eDNA element as well. The eDNA pilot study on invertebrate was only made possible by successfully securing additional funding, which added further value to the project.

The project also extended its impact by assisting PhD student Katy Ross with her first fieldwork season as outlined in Section 3.1 'Other Achievements'.

Through careful budgeting during the project, FIG's ESB contribution can be used to employ the PM beyond the official project end date to complete further work including logger maintenance and data analysis.

Overall, the project was excellent value for money because it not only completed its initial objectives but also carried out fieldwork beyond the original scope, supported a closely related PhD project and ensured that project work can be continued for a few additional months.

11 OPTIONAL: Outstanding achievements of your project during the (300-400 words maximum). This section may be used for publicity purposes

I agree for the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

The Darwin Plus 116 project 'Falklands wetlands and aquatic habitats: baselines for monitoring future change' has achieved a great level of local outreach throughout the project raising awareness on the ecological characteristics of the habitats, their threats and pressures as well as possible legislation to protect these. Largely as a result of the project, we now know that, while streams in the Falklands appear to be comparatively homogenous in terms of their chemistry and biota, the large population of standing waters in the Islands (mostly referred to as 'ponds', but including many lakes) show a remarkable degree of chemical and biological diversity. This diversity may be of sufficient importance (at a Falkland, UK and even international) scale to justify greater designation and protection, perhaps including the establishment of additional Ramsar sites.

However, it is clear that this diversity is under threat; the project took place during two very dry summers and local landowners noted that many ponds and lakes dried out that had not dried out in previous living memory. Several of the ponds surveyed had highly diverse aquatic plant and invertebrate communities, which were potentially completely lost to desiccation, supporting the view that the drought during the austral summer of 2021-22 has had severe and possibly unprecedented impacts. Although this has been widely attributed to climate change, it is also possible that increased inputs of windblown sediment to ponds as a result of soil erosion has contributed to them becoming shallower and therefore more drought-prone; a theory that requires further testing.

Through outreach, the project was able to address some of these concerns by highlighting the science that is involved in characterising and monitoring wetlands as well as detecting changes in their condition. The Wetlands Symposium was a particular success with 30 attendees from a

wide range of organisations and the general public. The project partners' expertise brought together several key aspects on wetlands including hydrological monitoring and international conventions. Fieldwork examples emphasised how changes in wetlands biota and water chemistry have taken place over the last 20 years.

Furthermore, engagement with landowners, land managers and the public revealed that little common knowledge existed on the biota of inland aquatic wetlands. Engagement opportunities either in the field directly or at events with live invertebrates targeted at both adults and children brought 'pond life' much closer to many people, which will hopefully aid their protection in the future.

Image 1

Caption: Examples of lakes and rivers surveyed by DPLUS116 in the Falkland Islands.

Photo credit: SAERI

Image 2

Caption: Examples of biota encountered by DPLUS116 in lakes and rivers of the Falkland Islands.

Photo credit: SAERI

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.	X
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.	
If you are submitting photos for publicity purposes, **do these meet the outlined requirements (see section 11)?**	X
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.	X
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	X
Have you completed the Project Expenditure table fully?	X
Do not include claim forms or other communications with this report.	