Darwin Fellowship - Final Report

Due within one month of the end date of the Fellowship (maximum 6 pages)

Darwin Fellowship reference	DPLUS0197
Name of Darwin Fellow	Selene Gough
Lead organisation	St Helena Research Institute (SHRI)
Fellow's organisation(s)	UK Centre of Ecology & Hydrology (UKCEH)
Fellow's role within their organisation	Data Manager
Start/end date of Fellowship	1 April 2023-30 March 2024
Location	Wallingford UK and St Helena
Darwin Fellowship grant value (£)	£13,275
Type of work (e.g. research, training, if other please specify)	Work experience and exposure
Main contact in UK organisation	Dr David [redacted]
Author(s) and date	Selene [redacted] & Rebecca [redacted]-[redacted] 09/05/2024)

1. Background

Prior to the Fellowship, Selene was the Data Manager for the EU funded BEST 2.0_ SA-2020-91 "Establishing a St Helena biological records system (SHBRS)" that ran from July 2021-January 2023 and comprising a centralised biological records database accessible through the iRecord St Helena website and associated iRecord St Helena App. In establishing the SHBRS we also needed to generate the new skills and capacity needed to set up and run it. We started from a baseline of no previous experience to establishing a centralised biological records system. With the support of our project partners and stakeholder group we successfully set up the island's first centralised database accessible through the iRecord St Helena website and associated App. Selene joined the St Helena Research Institute to take on the new role of Data Manager after completing of her A Levels at the island's secondary school. The Data Manager was the key post established under the project and Selene's progress and achievements over the 15 months she was employed was fundamental to the delivery of the project. Selene was responsible for communicating with stakeholders to understand user needs; liaising with the web and App developers to set up the system as agreed with the stakeholders; confirming species lists for recording; identifying and locating known plant and invertebrate species spatial data records in whatever form that they exist and working to an agreed prioritised list starting to bring them in the database; producing project documentation e.g., user guidelines; delivering training in the use of the website and App; and providing regular progress updates on the project to the stakeholder group and stakeholders. She developed her learning and skills through a combination of online training, technical support from our website developer and the UKCEH and practise. The Fellowship application was developed and submitted in the last quarter of the EU BEST 2.0+ project with the intent to further develop Selene's skills and experience so that she could apply new knowledge and learning to enable the Research Institute to maintain and develop the St Helena biological recording system (SHBRS).

The Fellowship was linked to DPL00027 “iRecord St Helena: wildlife recording for research, education and decision-making”; both projects started in April 2023. It’s objective to enable the Research Institute to develop and manage the biological records system to increase the number of reliable records available for analysis and interpretation to support conservation management decisions and strategic planning needs. Crucially it sought to secure the continued employment of Selene as Data Manager. Through the implementation of DPL00027 Selene has been responsible for leading on:

- System development: focusing on expanding the species list beyond the set-up project of invertebrates and plants; increasing the number of biological records through quality assurance and validating historic datasets; developing and field-testing new recording forms; working with our consultants to develop new software features and functionality to build the new forms within the iRecord St Helena system.
- Working with local wildlife experts in the field to capture local knowledge and train in the use of iRecord St Helena
- Carrying out professional development training through the fellowship and local QGIS training and on-line courses.
- Delivering training and outreach including 1-2-1 sessions in use of iRecord St Helena and submission of datasets (with a focus on biosecurity, INNS, including disease and biodiversity).
- Communications: project newsletter and promotional video.

The aim of the Fellowship was to build local capability to manage and develop the St Helena biological recording system (SHBRS). Having set up the SHBRS, we needed to secure organisational support for the adoption of the new technology; grow the professional user base by increasing understanding in how to use it; bring more records into the system so that data is available for analysis and show how the toolkit can be applied to support recording programme, education and research. In support of this goal Selene needed to develop her skills in biological recording, programming and systems management. A three-month bespoke work experience and exposure visit was designed with Selene and Dr David Roy, Head of Biological Records Centre, UKCEH. This was followed by practical application of learning back on St Helena that enabled Selene to support and deliver actions under DPL00027.

The five main objectives of the Fellowship were to give Selene the opportunity to:

1. learn key skills in biological recording, data analysis and interpretation, database management and programming.

2. Have hands on practical experience working with UKCEH staff, programmes and projects to learn how to work with data from biodiversity monitoring, undertake relevant analysis and produce summaries for others.

3. Learn SQL for extracting data from Indicia and R programming to manipulate, analyse and visualise data.

4. Get exposure to UKCEH invertebrate and plant monitoring programmes to interpret biological trends.

5. Put new skills into practise on St Helena, supported by continued interaction and online communications post visit.

The programme of work set out the activities to achieve the intended outputs:
Output 1. learn key skills in biological recording, data analysis and interpretation, database management and programming.
Output 2. learn SQL for extracting data from Indicia and R programming to manipulate, analyse and visualise data.
All the arrangements for the visit to take place were to be carried out in the first quarter of the project. Activities contributing to outputs 1 & 2 were conducted during a three-month work experience and exposure visit to UKCEH planned in the second and third quarters of project. In this period, it was planned that Selene would work with UKCEH Biological Records Centre staff to get hands on practical experience in data management and learn programming to be able to manipulate, visualise and interpret data.

Output 3. In the fourth quarter of the project put new skills into practise on St Helena, supported by continued interaction and online communications post visit.

Rebecca Cairns-Wicks, coordinator of the Research Institute is responsible for line managing Selene and providing supervisory support and guidance. Rebecca has responsibility for project oversight. Planning for the training and mentoring programme was carried out with David Roy and Selene. Whilst in the UK, Selene was supported remotely with weekly scheduled contact (and more often when needed) to check on how she is doing at work, sharing news and offering advice as needed and checking up on her general well-being. On St Helena, Rebecca provided mentorship and support to Selene to apply her new knowledge and experience to manage the SHBRS, raise the profile and grow biological recording and work to develop the system.

David Roy, Head of the Biological Records Centre hosted Selene's visit to the UK Centre for Ecology and Hydrology (UKCEH). Offering opportunities to work with highly experienced BRC staff in managing and analysing biodiversity data for research, conservation and policy evaluation. The training and mentoring programme was developed with Selene and the Research Institute and focused on technologies being used for the SHBRS. David Roy hosted regular meetings with Selene to ensure her well-being and to maximise the opportunities of her visit.

2. Achievements

During my time at the UKCEH, I was based within the Biodiversity Monitoring and Analysis Office, and primarily focused on learning the key skills in biological recording: data analysis and interpretation, database management and programming. After consideration and discussions with the data science team, including Robin Hutchinson, an entomologist specialising in Data and Research Support, it was agreed that R, would be the most beneficial to learn, recognising its potential to elevate my capabilities in data analysis, visualisation, and interpretation. Given the steep learning curve, and time it requires to learn a language, I found that it was most effective and efficient to focus on learning one programming language for the duration of my visit, rather than trying to learn R and SQL simultaneously. With the mentorship of Robin and some training materials provided by UKCEH, I was based in the perfect environment to learn the language. To put my new and developing skills into practise, I cleaned and visualised my first St Helena dataset, from the Environmental Management Division's (EMD) Seed Collecting Database. This is an important dataset originating in Microsoft Access, which contains over 1,500 records collected over 10 years of seed collections from wild populations of endemic plant species. It contains information on species population size, plant status and habitat conditions and is the only long-term record of terrestrial endemic plant populations. As a result of my training, in addition to extracting and cleaning data I can now validate the data, and map within R Studio. *Annex 1.1*; Annex 1.2 ; Annex 1.3

Since my visit, I have continued to use and develop my programming skills. Programming has not only been useful for processing data but has also equipped me with the tools to enhance the design of biodiversity surveys, ensuring the capture of high-quality, detailed data. Annex 2.1; Annex 2.2

Another key feature of my data science training is that it has enabled me to support this year's International Union for Conservation of Nature (IUCN) Red Listing of Invertebrates for St Helena, led by the Mid-South Atlantic Islands Invertebrate Specialist Group (MAIISG) and the St Helena National Trust (SHNT). I played a helpful role in processing the SHNTs Cloud Forest Invertebrate Survey and Malaise Trap Survey datasets, two significant sources of invertebrate data. As well as supplying historical data, which I had previously processed, containing records dating back to the year 1825. My knowledge in GIS also supported the entomologists who wanted to contribute data, by which I transformed GPS polygons, lines and points into coordinates, a format compatible with the Red Listing.

Improving accessibility to robust and reliable data is an example of the biological records database's value and how I would like to further develop its use to support conservation on the island. As I continue to upload datasets like those mentioned above, iRecord St Helena provides a streamlined and accessible solution to meet the demands of biodiversity data for future projects such as the Red Listing which further supports identifying threats, prioritising conservation management and assessment of impact of actions.

Additionally, I had insight into UKCEH's Pollinator Monitoring Scheme (POMS), which generates systematics on the abundance of bees, hoverflies, and other flower-visiting insects across the UK. Surveys are conducted by Flower-Insect timed counts, whereby you collect data on the total number of insects that visit a particular flower. The data provides a resource from which to measure trends in pollinator populations and inform where conservation efforts should be targeted. After conducting some flower-insect timed counts myself, I got to understand the methodology and data they collect. The SHNT has shown an interest in conducting pollinator surveys; therefore I was able to provide them with some information about the POMS. With added interest from the EMD team, there is potential to adapt the POMS and embed it within iRecord St Helena, as both systems are hosted on the same infrastructure. The exposure of the Pollinator Monitoring Scheme highlights the potential for further collaboration and knowledge sharing between UKCEH and St Helena.

In addition to technical skills, my time at UKCEH has supported invaluable professional relationships that continue to shape my journey back on St Helena. Robin's mentorship has been instrumental in navigating the complexities of database management and data science. Their experience in supporting the establishment of recording centres in the UK, have proven insightful as we continue to develop and expand the scope of iRecord St Helena, which shares parallels with smaller UK recording centres. For example, during the processing of biodiversity data for import into iRecord St Helena, I have encountered numerous synonym changes to taxa, which has highlighted the importance of detailed nomenclature tracking in data management. Drawing upon Robin's expertise, we collaboratively explored iRecord (UK's) synonym tracking database, gaining valuable insights into best practices and potential solutions to the challenges we experienced with St Helena biodiversity data. Building upon this foundation, I am currently developing a bespoke synonym tracking database tailored to the needs of iRecord St Helena. This database serves an important role, enabling me to systematically catalogue synonym changes and avoid the loss of historical taxonomic information. This solution, we hope will secure the integrity and accuracy of iRecord St Helena's biodiversity records. Annex 3.1

On a personal level, this fellowship has been a catalyst for developing my confidence and networking skills. Overcoming initial challenges, such as illness in the first week and adapting to a new country, as well as an institution that has hundreds of employees is a massive culture shock and one that was at times overwhelming. However, I learnt how to adapt to my new routines and was supported and encouraged to engage with my work colleagues, and this has reinforced the importance of resilience and adaptability.

I am now much more confident to open conversations and engage with professionals and have a newfound appreciation for the network of professional relationships I have fostered. A skill that has been key in boosting my confidence, it has helped me in my public speaking and initiation and contribution to professional conversations and debate.

Recently, I presented iRecord St Helena to senior management professionals in the fields of education and environment. I took the opportunity to highlight how iRecord St Helena can be utilised as a tool to support evidence-based decision making through the use of mapped outputs of biodiversity data. As well as an opportunity for biological recording and data analysis of St Helena's wildlife to be implemented into the curriculum. Annex 4.1

3. Outcome, lessons and impact

The Fellowship has not only enabled me to develop the technical skills to support the development of iRecord St Helena, but also professional skills, such as improved engagement and confidence when networking with others. Since returning to St Helena, I have supported wider projects such as the DPLUS157: Managing the pathogens affecting St Helena's biodiversity and food security. By creating a digital tree health form, field staff can streamline their surveying process by entering data through mobile phones whilst simultaneously collecting GPS reference data.

Additionally, I have digitised the SHG Environmental Management Division's (EMD) seed collecting recording form. After an initial trial with the EMD team, it's clear it provides an efficient and effective way to record data without the use of paper-based recording forms. Making the data easily accessible and available to map.

The skills I have learned have proven helpful in the implementation of activities under project DPL00027. Specifically, my experience in data science and programming has enabled me to process datasets efficiently and effectively. The development of this skill has been beneficial in extracting insights.

I have continued to dedicate time developing my programming skills, we are currently setting up a subscription for a programming course. Providing a structured learning path, to expand into advanced programming skills in data science. Enabling efficient processing of datasets and increased productivity in my work.

My participation in the development of project DPL00090: iRecord St Helena: A data-driven approach, empowering bird conservation, which secured funding for 2024-2025, ensures a further year's employment, providing continuity and stability in my role. Moreover, there is a commitment from the Coordinator of the Research Institute to work towards securing longer-term sustainable funding, ensuring greater security of my job role.

As mentioned above, I have actively contributed to the enhancement of digital recording forms for both the DPLUS157 project and the EMD team's seed collection database. Leveraging insights gained from exposure to various recording schemes hosted by UKCEH, we have refined the structure and quality of the data being recorded.

In addition to these efforts, my supportive role in the IUCN Red Listing of invertebrates, through the processing of datasets such as the National Trust's Cloud Forest Invertebrate Survey and Malaise Trap Survey datasets. I have contributed to the comprehensive assessment of invertebrate species on the island.

Building on these advancements, our next step is to embed these recording forms directly into iRecord St Helena. An initiative which aims to streamline the data collection process, providing a seamless and standardised approach for recording biodiversity data. By integrating the forms, we not only ensure a secure and centralised repository for survey data but also enable stakeholders, such as the EMD team and DPLUS157 stakeholders, to access and visualise data online.

A recent example, through the DPL00027, we have been updating species lists and processing datasets for import into iRecord St Helena. We have identified a number of synonym changes to taxonomy, particularly in reference to historical datasets. As an important aspect of biological recording, we have had to ensure we have an efficient and effective system for cataloguing taxonomic changes.

My UKCEH contact, Robin, has been helpful in providing insight into the structure and format of the iRecord (UK) species list database and how they maintain an organised system for synonym tracking. This meeting has enabled me to progress the development of iRecord St Helena's synonym tracking database, and ensure we are remaining as up to date as possible.

In addition to maintaining communication with UKCEH, I have established relationships with other UK biodiversity institutions, including the Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservation Committee (JNCC). These connections were made possible through meetings we had with organisations during my Fellowship, and they have proved helpful in advancing our work relating to iRecord St Helena and collaboration on various conservation initiatives.

For instance, discussions with RSPB led to the development of project DPL00090, which secured funding for continued biodiversity monitoring efforts in bird conservation. This project represents a significant milestone for iRecord St Helena as we continue to develop and integrate the system within organisations on the island, as well as collaborate with conservation organisations such as the RSPB.

Furthermore, meetings with JNCC have facilitated the establishment of a strong rapport with Eve Englefield, International Biodiversity Officer. Our discussions have highlighted the potential for the biological recording data collected by iRecord St Helena to contribute to indicators of species and habitat health, which are integral to JNCC's conservation efforts. To keep these valuable contacts, I plan to continue regular communication through various channels, including email correspondence such as monthly project newsletters and virtual meetings.

During my Fellowship, I was uncertain about pursuing higher education. My exposure at UKCEH and engaging with individuals from JNCC and RSPB provided me with the opportunity to seek advice and guidance on the pathways to a career in environmental data management.

As a result, this experience reaffirmed my passion to learn more about the environment and how technology can support environmental conservation and management. Therefore, I have decided to pursue an undergraduate degree with the Open University in Geography and Environmental Science. I started my first module part-time in October of 2023, it has equipped me to understand the dynamic shifts within the environment and the ways in which people, flora, and fauna adapt to their evolving environments. I've gained insights into the collective efforts to manage and safeguard against biodiversity loss and wildlife extinctions as well as advocating for conservation. The module is continuing to expand my knowledge everyday and in turn enabling me to expand the range of work I can do on the island.

Reflecting on the lessons learned, and experiences gained during my Fellowship, they have laid a solid foundation for continued professional growth, from which I hope to continue supporting the development of iRecord St Helena and support conservation on the island. The Fellowship has increased my capability and enhanced capacity within the St Helena Research Institute to support the environment in the short- and long-term.

The nature of UKOT’s are often smaller communities, which are much different from countries such as the UK. I would like to encourage the funding team to continue prioritising the safeguarding of young individuals who embark on fellowships to new countries, particularly those who are less “well-travelled”. Ensuring that they have support and access to people who could reach out during their fellowship is incredibly important. Ensuring the wellbeing of the individuals is a key part to the success of their fellowship experience. I am grateful for the support that I received in consideration of my safety and wellbeing. Practices such as weekly meetings with my line manager worked well. As well as having the contact details of SHGs UK representative in the case of an emergency, however what supported me most was the ability to travel weekends to spend time with my friends and family, ensuring I had access to a support system regularly.

4. Impact of COVID-19 on Fellowship

The visit to the UK took place between June and August 2023. COVID-19 had no impact on the Fellowship.