



## Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

To be completed with reference to the "Project Reporting Information Note"  
(<https://dplus.darwininitiative.org.uk/resources/information-notes/>).

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

**Submission Deadline: 30<sup>th</sup> April 2022**

### Darwin Plus Project Information

Project reference	DPLUS103
Project title	Saint Helena Climate Change and Drought Warning Network
Territory(ies)	St Helena
Lead partner	St Helena Government (Environment Natural Resources and Planning Directorate)
Project partner(s)	Connect Saint Helena, Saint Helena Research Institute, Arctium, Centre for Ecology & Hydrology, UK Met Office
Darwin Plus grant value	£298,335
Start/end dates of project	April 2020 – March 2023
Reporting period (e.g. Apr 2021-Mar 2022) and number (e.g. Annual Report 1, 2)	April 2021 – March 2022. Annual Report 2.
Project Leader name	Darren Duncan
Project website/blog/social media	Under construction – will be located on SHG website at: <a href="https://www.sainthelena.gov.sh/portfolios/environment-natural-resources-planning/darwin-initiative/">https://www.sainthelena.gov.sh/portfolios/environment-natural-resources-planning/darwin-initiative/</a>
Report author(s) and date	Darren Duncan, Murray Henry, Ben Sansom

### 1. Project summary

The provision of water on St Helena is intimately linked to the distribution of habitats and in particular the cloud forest area above 650m. Previous work (DPLUS051, CEH 1990's work) has demonstrated that native habitats function more effectively as hydrological units than introduced systems. These native habitats are the last refuges of St Helena's rich endemic flora and fauna but they are threatened by multiple drivers of extinction, e.g. invasive species habitat loss, genetic erosion and climate change.

Previous water resource studies have been limited in scope and duration with significant knowledge gaps concerning the island's geology, aquifers, springs and streams. The measurement of annual stream discharge across the island has never been achieved and an island water balance has only been attempted on two occasions using limited data sets (Mathieson, 1988 and Halcrow, 1969). Groundwater recharge was last estimated in 1982.

A robust data set is needed to assess the islands current water resources and provide new information linking the islands geology, hydrogeology and hydrology.

A more comprehensive long-term climate dataset is also needed across the island to assess the variability in climate.

A more accurate and comprehensive climate data set coupled with a detailed island water balance will be used to support water infrastructure planning, habitat management (to effectively manage habitat for near extinct species such as the St Helena false gumwood), agricultural development, demand forecasting, drought planning, climate change resilience mitigation and water efficiency/water demand reduction measures.

Maps showing the project locations for groundwater and stream flow monitoring and the 6 automatic weather stations are provided separately (Output 4, Activity 4.1). Automatic weather stations have been located across the island to ensure that climate measurements are representative of the island and its micro-climates. Surface water and groundwater monitoring locations have been established within the island's principal surface water and groundwater catchments. Recharge to aquifers and streams is provided by rain and mist in the cloud forest located in the centre of the island (Peaks National Park).

## **2. Project stakeholders/partners**

### **2.1 Project Steering Group**

The Project Steering Group (PSG) has met quarterly through the year and comprises key island and international stakeholders (Saint Helena Government, Connect Saint Helena, UK Met Office, Centre for Ecology and Hydrology and Saint Helena Research Institute). PSG meeting agendas and meeting minutes are provided as separate documents to this main report as evidence of project progress and decision making.

Key stakeholders comprise:

- Drought Resilience Forum.
- Agricultural sector.
- Forestry sector.
- Fisheries.
- Safety and Home Affairs Portfolio – Saint Helena Government (SHG)
- Local weather forecasting service.
- Tourism.
- Conservation groups (Saint Helena National Trust, Saint Helena Nature Conservation Group).
- South Atlantic Environmental Research Institute and other research groups and Universities UK Met Office.

### **2.2 Earth Systems Data Public Consultation. Output 1, Activity 1.3**

The key external stakeholder activity for Year 1 was completed during Year 2. Due to Covid-19 restrictions, the earth systems data reporting consultation was completed on island using electronic questionnaires rather than through in-person events. In total, 12 responses were received with responses summarised in a report which is provided separately. There were fewer responses than hoped, however the team will continue to work with the wider stakeholder community during Year 3 to ensure that all stakeholders have been consulted on draft reporting templates based on the outcomes of the survey completed in Year 2.

### **2.3 St Helena Cloud Forest Project Series of Public Talks**

The international project team from DPLUS103 were on island between 4<sup>th</sup> January and 16<sup>th</sup> February 2022 completing a variety of fieldwork activities with local project partners. This field work was being undertaken in parallel with local and international colleagues working on the St Helena Cloud Forest Project (Section 9).

As part of the combined project teams island activities, a series of 3 public talks were arranged to present the two research projects and how they work together to provide a more

comprehensive cloud forest project for the island with longer lasting outcomes. The 3 talks were held on 24<sup>th</sup> January, 7<sup>th</sup> February and 14<sup>th</sup> February. The DPLUS103 project team gave the first public talk which was livestreamed on YouTube for islanders to watch. The presentation was then broadcast daily on the island television channel between 25<sup>th</sup> January and 6<sup>th</sup> February 2022.

## St Helena Cloud Forest Project Public Presentations

The St Helena Cloud Forest Project is an exciting, highly collaborative project working to up-scale cloud forest restoration activities for biodiversity, water security and socio-economic benefits on the Island.

Are you interested in learning more about the work being undertaken for the St Helena Cloud Forest Project? We're thrilled to announce a series of talks in collaboration with our international partners who are on-island in January and February.

Please save the dates below and join us for some interesting evening talks:

### Monday 24 January

An update on the Darwin Plus funded St Helena Climate Change and Drought Warning Network (DPLUS103) led by international partners Ben Sansom, Michel Groenstaal & Steve Palmer, supported by local partners from the Met Office and Connect St Helena

### Monday 7 February

An introduction to planned work to secure the St Helena False Gumwood and associated species led by international partners Dr Alan Gray and Dr Quentin Cronk, supported by local partners from EMD.

### Monday 14 February

Setting up a world class micropropagation unit for endemic fern production at the EMD endemic nursery led by international partners from Royal Botanic Gardens, Kew and supported by local partners from EMD.

**Venue:** St Helena Community College      **Time:** 18.30

Further details to follow soon



The presentation was attended by 20 members of the public and project stakeholders. It was available to view on TV by the island's population (4,500). We understand that a large number of islanders watched the presentation, as the project team were asked about the project when stopped in the street by members of the general public after the broadcast. There were technical difficulties with the sound quality and some of the footage was of a reduced quality

despite being taken by the islands broadcaster.

### **3. Project progress**

#### **3.1 Progress in carrying out project Activities**

##### **3.1.1 Desk study to collate archive data (YR1). Output 1, Activity 1.1**

This task was not completed in Year 1 and was reported in earlier progress reports. The digitisation activity was completed in February 2022 and a large data set comprising 48 digitised reports was handed over to the project team who were on island at the time.

During February 2022 members of the international project team also explored two other sources of archive water resource reports, off the back of interviews conducted with retired members of the Public Works department. The first location was a former documents store at Scott's Mill, which was found to be a derelict building with extensive flood damage and infested by rats. The team found several flood damaged boxes of consultancy reports which indicated there were geological/geotechnical investigations, however all the documents were beyond repair and extremely unhygienic. The team concluded that this important archive could not be recovered and was a great loss to the island.



The second archive was identified in the courtyard of SHG's main office known as "The Castle" in Jamestown.

A review of documents indicated that they were mainly old customer water bills, Public Works water invoices and meter readings. There were a handful of documents in a filing cabinet which included a draft Public Works Sustainable Water

Management Plan from 2008 and an Overseas Development Agency National Development Plan from 1989 which both reference water supply on the island and a need to improve water security.

##### **3.1.2 Collection of climate and water resource data. Output 1, Activity 1.2. Output 2, Activity 2.2**

Data continued to be collected by the project Water Resource Monitoring Technician (WRMT) in Year 2. The international project team were finally able to complete geology fieldwork reconnaissance surveys over 11 days in January 2022. The international water resource specialists were able to extend their fieldwork programme until 16<sup>th</sup> February 2022.

All mist and rain loggers have been installed in the study area and overall are operating well. There have been some short gaps in data sets where staff have been learning how to use the equipment remotely, however discussion with the international project team has enabled a solution to be implemented to restart the loggers. A report outlining the combined DPLUS103 and Cloud Forest Restoration Project climate and water resource monitoring and fieldwork activities is provided separately. A full report on the outcomes of the water resource fieldwork completed in 2022 is provided in a separate document, which was written for the FCDO funded Cloud Forest Restoration Project as match funding evidence.

All manual stream flow locations were agreed in January 2022. Vandalism resulted in a barometric data logger at Harpers being damaged. Replacement equipment was ordered; however 3 months data was lost from this sensor. A press release was circulated across the island explaining what had happened and why the equipment is needed. Connect Saint Helena have now increased security at monitoring locations to ensure the likelihood of a reoccurrence is reduced. A copy of the press release is provided separately.

Automatic Weather Stations (AWS) have been built and overall are operating well. There have been some problems with the MiFi Routers, which are used to transmit the data collected by the AWS to the relevant online data portals. These MiFi Routers are solar powered, but the batteries which are used to store the power are low capacity and therefore deplete after a few days of insufficient sun to top up their charge. To try and combat this issue we ordered 2 improved solar panel systems for the MiFi Routers to allow for charging on overcast days, these were installed on the AWS stations that are in areas with limited sunshine hours. In addition, a full set of high capacity batteries were ordered for all the MiFi Routers to increase uptime during limited sunshine hours. We did have another issue with one of the MiFi Routers, whereby the main charging board had a fault which required the board to be replaced. After consulting with the supplier, they were able to provide a replacement board free of charge.

See Section 9 for a report on additional monitoring and survey equipment.

### **3.1.3 Geology and Geophysics Fieldwork. Output 2, Activity 2.1**

All geophysics work has been moved to Year 3 due to Covid-19 international travel restrictions. However, the fieldwork reconnaissance completed in January 2022 identified the following locations which may be selected for geophysics surveys in October 2022:

1. Lemon Valley – (deep) subsurface groundwater outflow into the ocean.
2. Iron Pot wellfield – located in a tributary of Lemon Valley (identify the relationship between deeper groundwater and superficial groundwater flow).
3. Frenches Gut wellfield – located in a tributary of Lemon Valley (identify the relationship between deeper groundwater and superficial groundwater flow).
4. Fishers Valley – located within the candidate RAMSAR wetland adjacent to the Connect water supply borehole (identify the relationship between the relative saline superficial groundwater and the deeper groundwater).
5. Wells Gut – located along the path leading to the Connect Saint Helena spring source catchpits (identify the relationship between deeper groundwater and superficial groundwater flow).
6. Grapevine Gut – along the side of the above ground reservoir (identify the relationship between deeper groundwater and superficial groundwater flow).

### **3.1.4 Island water balance and climate data interpretation. Output 2, Activity 2.3**

This activity will be completed in Year 3. Climate data is now being stored and processed in the UK Met Office weather station at Bottom Woods. All data from the AWS are being uploaded to the weatherlink website and the UK Met Office Weather Observations Website (WOW). There have also been some successful tests of the Climsoft Weather Database, which will serve as the central hub for the islands weather data by the end of the project. This database will reside at the Bottom Woods Met Office and be managed by its staff who will be able to quality control the data and provide support to external clients requesting weather data. Preliminary testing has also allowed the AWS data to be imported into the database automatically as an additional data output for the AWS.

At present the public can view the AWS data through the WOW service, which can be accessed via the link: <https://wow.metoffice.gov.uk/>

You can choose to pan to St Helena Island via the map on the homepage or you can search for station based on its Site ID:

<b>Site ID</b>	<b>Location</b>
STHL-AWS01	Flagstaff
STHL-AWS02	The Peaks
STHL-AWS03	Boxwood Hill
STHL-AWS04	Jamestown, Sisters Walk
STHL-AWS05	Horse Pasture
STHL-AWS06	South West Point
STHL-AWS07	High Peak

Meta data and data sets can be viewed when you click on a weather station on the map. We aim to publicise the homepage now that the WOW system is set up for St Helena. Stream, spring and groundwater level data is stored and viewed on spreadsheets, as the data is manually downloaded by the WRMT and other project partners on island.

### **3.1.5 Technical Capacity. Output 4, Activity 4.2**

Fieldwork in 2022 also included field training with the WRMT, which covered borehole monitoring, water sampling, principals of geophysics surveys, stream flow gauging and water chemistry testing. During fieldwork training in January 2022, the WRMT informed the project team that they were resigning from their position for personal reasons and would leave at the end of February 2022. This was a significant blow to the project team, as the field training had consolidated knowledge gained during earlier remote training events and it was felt that the Year 3 fieldwork would be of a higher standard.

Connect Saint Helena should be commended for their swift action and recruited a new WRMT in time for a 1 week handover with the outgoing WRMT. The new WRMT has received on the job training by members of the Connect Saint Helena survey team (who have collected field data for DPLUS103) and remote training provided by Arctium. An international training programme is being planned for the new WRMT now that travel restrictions have eased on the mainland. It is planned that this training will take place in late September 2022. The international project team intend to be back on St Helena in October 2022 and will provide more in-person training for the WRMT.

### **3.1.6 Protocols for climate data reporting, interpretation and data distribution. Output 5**

See Section 2.2 for a summary of the stakeholder consultation activity method. Outputs from the activity will be used to develop climate data reporting standards, report templates and agree data distribution methods. This activity will be completed in Year 3.

### **3.1.7 Project Report. Output 3 and Output 5**

Outputs from the project will be used to develop and climate change and drought warning plan which will be incorporated into the island Water Resource Management Plan (WRMP). The project team have identified the WRMP programme and will be contributing data and text during Year 2 and Year 3. Data collection has started (see evidence associated with Section 3.1.1 and Section 3.2.1).

## **3.2 Progress towards project Outputs**

### **Output 1**

Covid-19 delays and international project team travel restrictions have delayed the programme of this Output.

None of the archive climate and water resource data had been formally digitised at the start of the project. Mitigation activities to collate historic data sets are described in Section 3.1. This

task is now 100% complete. The delays will not impact the overall project programme. The change has been that a complete digital archive of data sets collected over the past 150 years is available for stakeholders and the research community to use. It has preserved many climate and water resource data sets that would have been lost had the archive hard copy reports been accidentally lost or destroyed.

There is limited baseline water resource data for the island (see Section 1). New baseline data for some water resource catchments started early, as equipment installed for DPLUS051 had continued to be maintained and downloaded by Connect Saint Helena. Collection of data from new monitoring locations has been impacted by Covid-19 as data collection started later than planned, however the latest log frame reflects the new data collection targets which the project team believe will still be achieved. Monitoring locations were reviewed by the international project team in January and February 2022 and included additional groundwater monitoring locations. The addition of new soil sampling locations, infiltration test monitoring locations and canopy drip monitoring locations funded by the St Helena Cloud Forest Project will enhance the interpretation of DPLUS103 data sets in Year 3 (Section 9). This data will enable the calculation of more accurate water balances, as variations in soil depth and soil type will influence the infiltration rate of rain and mist into the soils and underlying aquifers.

The resignation of the WRMT in February 2022 was a setback, however the new WRMT is settling in well and a great addition to the project team. Capacity building as re-started and the overall impacts of this change on the data collection programme are considered to be limited.



Source: St Helena Cloud Forest Project promotional video stills

Climate data collection started in March 2021. The new AWS start data collection in July 2021. Historically a limited data set has been collected across the island (temp and rainfall). The project will significantly improve the suite of climate measurements made at 7 locations across the island to aid weather forecasting and the assessment of climate change. An additional AWS has been funded by the St Helena Cloud Forest Project which has been added into the DPLUS103 monitoring network as of February 2022. An additional 22 hobo rain gauge data loggers funded by the St Helena Cloud Forest Project have also been purchased in Year 2 and will be installed in early Year 3 to replace manual rain gauges.



Source: STHL-AWS01 - Flagstaff



Source: STHL-AWS02 – The Peaks



Source: STHL-AWS06 - SW Point

Output indicators are still relevant and are measured through development of the digital historic climate and water resource archive and collection of new climate and water resource data.

## Output 2

This output started in Year 2. There has never been a geophysics survey of the geology of St Helena. A geology survey of the island was reported in a PhD thesis in 1968, completed via outcrop mapping in the field. A geology field mapping exercise has never been completed on St Helena to understand the islands water resources within key water resource catchments. Previous conceptual models have used limited data sets and geological information to assess the islands water resources and determine the mechanism for spring flow.

The completion of geology surveys and geophysics surveys were contingent on Covid-19 international travel restrictions lifting in Year 2. As the restrictions were maintained, the team had a limited time on St Helena in January 2022 to complete geology and geophysics fieldwork. It was agreed that the fieldwork outputs should be to determine the quality of existing geological mapping data and to identify geophysics locations for fieldwork planned for Year 3. A change request was submitted to Darwin Plus which was approved and moved the geophysics surveys to Year 3. A summary of this fieldwork was provided in the FCDO match funding fieldwork report (Section 3.1.2). The measurable indicators are still considered to be suitable for the Output.

## Output 3

A climate change and drought warning plan has never been completed for St Helena. A Climate Change Action Plan was published in 2020 by SHG and identified several actions that DPLUS103 outputs can support. Discussions have started with Connect Saint Helena regarding the project programme for the island WRMP (Section 3.1.5). At the time of writing, Connect Saint Helena has just completed the final draft of a contract for the WRMP. Saint Helena Government will go to formal tender during Year 3 of DPLUS103 allowing the DPLUS103 project team to complete data interpretation and reporting needed to contribute to the WRMP. The exact format of the output will be shaped by the requirements of the WRMP when project partners are able to share the tender document. This work will be completed in Year 3.

The measurable indicators are still considered to be suitable for the Output, except for Means of Verification 3.3 which is unlikely to happen in Year 3.

## Output 4

An island-wide climate and water resource monitoring network using data loggers with manual measurements has never been implemented. The network of 7 weather stations, 4 pairs of mist and rain loggers, 22 manual stream flow monitoring locations, 10 V-notch weirs, and 7 groundwater monitoring locations have been identified (See maps supplied separately – Section 1). Monitoring has started in all water resource catchments.

The project WRMT post was re-advertised and recruited in February 2022. Remote training started in March 2022 and comprised 3 sessions covering water resource management, monitoring techniques and an introduction to hydrology and hydrogeology. An international exposure visit for the WRMT has been delayed until Year 3 due to Covid-19 international travel restrictions. The visit to the UK is being planned based on the availability of in-person training events.



During the fieldwork completed in January and February 2022, 3 members of the Connect team and 1 member of the Environment Management Division (EMD) from SHG received surface water and groundwater monitoring training. In addition, over 15 project stakeholders who attended joint Cloud Forest and



DPLUS103 training events were trained by the DPLUS103 team to use mini-disk infiltrometers to collect soil infiltration data across the study area. The project will enable the long term continuous monitoring of climate and water resources across the island. It has been agreed with SHG that the WRMT post will transfer to the Environmental Management Division of the Environment Natural Resource and Planning Portfolio on a permanent basis at the end of the project. The measurable indicators are still considered to be suitable for the Output.

## Output 5

St Helena has received weather forecasts via the Public Weather Service (PWS) since 2011 based on data collected at the Bottom Woods weather station. Output 5 will enable island weather forecasts to include data collected across the island at a further 7 locations to provide a more detailed forecast representative of the islands microclimates.

Section 3.1.2 has reported on climate data collection activities. Section 3.1.4 has reported on progress related to Year 1 activities associated with this Output. The delay collecting climate data from the AWS will not impact on the project Output to upload data to the Weather observation website or development of detailed weather forecasts. These activities to support the delivery of Output 5 will continue in Year 3.

The measurable indicators are still considered to be suitable for the Output.

### 3.3 Progress towards the project Outcome

All activities continued in Year 2 will support the delivery of the project Outcome: to develop and operate a climate and water resource data collection network on St Helena with data management and reporting protocols. Baseline condition and progress concerning the project Outcome has been reported in Section 3.1 and Section 3.2.

The measurable indicators are still considered to be suitable for the Output. Evidence to measure progress will continue to be gathered during Year 3.

### 3.4 Monitoring of assumptions

The risks and assumptions identified in the revised October 2021 log frame still hold true (see Annex 2). The majority of project risks that have been realised have been linked to the Covid-19 global pandemic. A total of 35 important assumptions were identified for the project Outcome, Outputs and Outputs. The following risks and assumptions have impacted on the project in Year 2 and were included in the log frame.

Project	Important Assumption	Comment
Outcome	Covid-19 response by national governments will shape the project programme in Year 1 and Year 2. Significant elements of the project may need to be postponed, re-designed or removed from the programme.	The project programme and budget has been revised three times during Year 1 to reflect changes in the international response to Covid-19. All geology and geophysics activities have been moved into Year 2 and Year 3. International training has been moved from Year 1 to Year 3. All field work by international project staff has been moved into Year 2 and Year 3. The islands government has retained the 10 day quarantine period into Year 3 which had not been anticipated. This will impact on the length of time the team have available for fieldwork in Year 3.
	Land access agreements/ approvals for installation of permanent weather stations are supported and agreed.	The requirement of planning approval for the siting of portable climate monitoring equipment was not anticipated. It delayed installation of the AWS until early in Year 2.

Project	Important Assumption	Comment
		The delay has not impact on the length of data record needed to support climate reporting.
	Geophysics rental equipment can be air freighted to and from the island.	<p>Some geophysics equipment was shipped to St Helena for use in the January/February 2022 field surveys. Unfortunately the shipping company left 6 containers of supplies and equipment in Durban by mistake, including a container with the DPLUS103 equipment.</p> <p>The equipment eventually arrived on island 5 days after the field survey team left St Helena in mid February 2022. It is now on island, ready for use in October 2022.</p> <p>The project team have now decided to purchase geophysics cables, electrodes and pins rather than hire equipment. The equipment will be purchased in May 2022 and shipped directly to St Helena in time for the October fieldwork. Airfreight has been discounted as new fortnightly flights from Johannesburg have smaller airfreight allowances. Vertical Electrical Sounding geophysics equipment has been purchased in parallel through the Cloud Forest Project to provide 1D vertical soundings, which will complement the ERT system being used in October 2022.</p>
<b>Output 1. Climate and Water Resource Data Sets</b>		
Measurable Indicator 1.1	Reports and data sets are available to assess a baseline and collate historic data.	The desk study needed to be redesigned so that additional island support could be accessed to digitise the archive historic data set. See Section 3.1.1.
Measurable Indicator 1.2	Gaps in data are identified to support interpretation of new data and location of new monitoring equipment.	<p>Monitoring location selection was amended during the Year 2 fieldwork in January/February 2022. New monitoring locations were identified to increase surface water and groundwater data collection. A new borehole camera survey is being designed with Connect Saint Helena and in partnership with the St Helena Cloud Forest Project to gain more geological information from the deep and shallow boreholes.</p> <p>Changes in monitoring locations in Year 2 will not impact the project Outcome. Data being collection in Wells Gut and Fishers Valley will continue for the remainder of the project as they are historic data points from DPLUS051 and other island water resource projects.</p>
<b>Output 2. Geology and Hydrogeology Conceptual Model</b>		
Measurable Indicator 2.1	Equipment is procured and shipped to Saint Helena in time to meet the project programme.	This assumption is still valid. See geophysics equipment outcome comment above.
Measurable Indicator 2.2	A minimum of 20 months data is collected during the project for interpretation.	This assumption is still valid. The original log frame identified a minimum of 24 months data, however on review the reduced length
Measurable Indicator 2.3		

Project	Important Assumption	Comment
		<p>of data collection will still enable data to be interpreted to meet the Outcome.</p> <p>New borehole and stream monitoring locations identified in the January/February 2022 field survey will have 12 months data but are additional locations.</p>
<b>Output 4. Long term change in the local climate and water resource data collection and interpretation capacity.</b>		
Measurable Indicator 4.2	Technical capacity. Minimum of 4 people trained to deliver range of activities: collect, manage, interpret, archive and report data by end of project (YR1-YR3).	<p>The WRMT training has had to be repeated at the end of Year 2 due to the original WRMT resigning from their post. The newly recruited WRMT is currently being trained by local project partners on island and the wider international project team.</p> <p>The key impact is that local knowledge gained in Year 1 and 2 has been lost and training has had to re-start. On a positive note, the Connect Saint Helena team supporting the WRMT have had additional training and have been providing on the job training for the new WRMT using skills gained over the past 2 years.</p>

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

The project is linked into several other St Helena long-term outcomes for the natural environment. As discussed in Section 3.2 Output 3, the data collected from this report will contribute to the delivery of the St Helena Climate Change Action Plan (2020). The project will also support the delivery of The Peaks National Park Conservation Management Plan 2019-2024 and management objective 3b (Water Security and Climate Change Resilience Objectives).

The project will also contribute to the drafting of a new 30-year Water Resource Management Plan for the island. The Water Resource Management Plan is mandated in Section 9 of the Water Resource Strategy 2020-2050 published by SHG in November 2020. DPLUS103 project outputs will contribute to the WRMP assessment of the islands water resources and climate change impacts. DPLUS051 was used as a reference document in the Water Resource Strategy. Copies of these national plans and strategies are provided separately as evidence.

#### 5. Monitoring and evaluation

Darren Duncan (SHG) is the project lead and is supported by Ben Sansom (Arctium) and Murray Henry (Bottom Woods Met Office) who both share project management duties. A project organogram provided separately as evidence shows the structure of the PSG and the structure of the climate and water resource technical teams.

The project is monitored and evaluated by the PSG, who meet on a quarterly basis. Meeting agenda and minutes have been provided separately as evidence. The PSG report and challenge project progress and agree key project decisions related to project management, budget, programme etc. A standing agenda is structured to review the outputs and activities as provided in the log frame. Actions from each meeting are attributed to a member of the PSG and progress is reviewed at the next meeting.

Information is circulated via email and cloud based data storage services (OneDrive, SharePoint). Meetings are held using Microsoft Teams, Zoom or Skype. In most cases Microsoft Teams is used and PSG meetings are recorded to assist with writing meeting minutes.

Due to Covid-19, the use of Microsoft Teams has enabled all PSG members to access a reasonable quality of audio and/or video depending upon their nation's broadband infrastructure. Microsoft Teams is also used to smaller meetings between team members and delivering training courses.

Improvements at the moment relate to adequate broadband connections between the PSG. The data connection between the mainland and St Helena will markedly improve in the second half of Year 3 as a new undersea cable will be installed to deliver fibre broadband to St Helena for the first time. It is hoped that in the last months of Year 3, sharing data and delivering video call training events will become easier.

## **6. Lessons learnt**

The provision of training remotely has been challenging due to the limited broadband connection between St Helena and the mainland. This method of delivering training has only been needed due to Covid-19 international travel restrictions, as team members from the UK were going to deliver the training locally during Year 1 and complete water features surveys with the WRMT as part of a package of training. Instead, training has been limited, and the quality of data collected potentially compromised until the WRMT can receive more than one training in the field. For the moment, training videos and documents have been sent to the WRMT to supplement regular contact on Microsoft Teams to trouble shoot issues and to deliver formal training modules (see Section 3.1.2).

Field training during Year 2 has improved as the international project team were able to provide 4 weeks of on the job training, ranging from fieldwork data collection to formal office based learning. This training was very helpful for the wider project team and project partners, however the principal recipient of the training, the WRMT, resigned from their post during this period of in person field training (Section 3.1.2). As a consequence, the wider project team have had to start training a new WRMT from first principles, as none of the wider project team were able to take on the full-time role due to their other duties.

Another improvement on Year 1 is that the WRMT now has access to a dedicated project internet connection which has allowed for more frequent communications with the international project team. A weekly Teams meeting was started in Year 2 between the WRMT and Arctium so that project problems can be discussed and solutions identified. These meetings were also used to reinforce classroom training and field training.

Some training has been provided by the local project team which is progress from Year 1, however the main barriers to training remain e.g. international travel restrictions and Covid-19 quarantine requirements on island and limited internet access.

A training visit to the UK is still being planned for Year 3 in the hope that the new WRMT can meet members of the UK project team and receive more formal training. This is limited by the availability of face-to-face training being available in the UK, as many UK organisations are still limiting training courses to online events.

## **7. Actions taken in response to previous reviews (if applicable)**

Actions to respond in Year 2 comprised:

1. Provide mitigation strategies for training.
2. Report activities referring to the number in the log frame to enable easy tracking by the reviewer.
3. Include the Darwin logo and branding across all project outputs and showcase visibility of the project throughout documentation.

Training mitigation comprised the installation of a dedicated broadband connection at the desk of the WRMT based with Connect Saint Helena. This has enabled weekly meetings with the international project team who have been able to provide more regular advice and remote training. Two other members of the Connect Survey team also attended remote meetings as they provided cover when the WRMT was on annual leave during Year 2. The survey team had

previous experience downloading data from field equipment installed during DPLUS051, so were able to pick up the project tasks quickly and provide additional support to the new WRMT when they started work at the end of February 2022.

The most valuable training sessions were provided in January and February 2022 when the international project team were on island for the first time. We recognise this is not mitigation, but it significantly improved the situation from Year 1.

Reporting activity progress using log frame numbering has been implemented.

The use of the Darwin logo has improved, although it has not always been present on communications (see example press release from September 2021). The Darwin logo has been used in all presentations and documents associated with the Cloud Forest Project which has been running in parallel (Section 9). The Cloud Forest Project soil sampling presentation and DPLUS103 presentation have been provided as evidence.

The PSG are working to improve this during Year 3 with the support of project partners.

## **8. Other comments on progress not covered elsewhere**

The design of the project has been significantly enhanced through funding received from the UK Foreign Commonwealth and Development Office for a 3 year Cloud Forest Project on St Helena (Section 9).

## **9. Sustainability and legacy**

The project will enable the long term continuous monitoring of climate and water resources across the island. It has been agreed with SHG that the WRMT post will transfer to the Environmental Management Division of the Environment Natural Resource and Planning Portfolio on a permanent basis at the end of the project.

The project will deliver revised weather forecasts which will be a permanent change as the data collection and interpretation will continue way beyond the end of the project. The data will be used by local residents, local industry, conservation stakeholders, national climate change decision making, and drafting a 30 year water resource management plan for the island.

The DPLUS103 project forms part of the islands wider research efforts to restore the cloud forest. This work is being completed within the umbrella of the Peaks Management Plan (provided separately as evidence).

A number of the DPLUS103 project team have been working with the RSPB and island stakeholders to secure funding for a much larger cloud forest project which enables the delivery of additional climate and water resource activities. The team were successful and an additional £900,000 of funding was secured from the UK Foreign Commonwealth and Development Office (FCDO) for the 2021-2022 financial year <https://www.rspb.org.uk/about-the-rspb/about-us/media-centre/press-releases/new-page/>. DPLUS103 has been essential as it underpins the water and climate research activities being managed under the FCDO funded Cloud Forest project and demonstrates match funding. The following activities are being funded by the FCDO project, which compliment DPLUS103 and will enhance the Year 3 activities for DPLUS103:

- Purchase of a borehole camera survey system. This will enable DPLUS103 to access more geological information to support the hydrogeology conceptual model. The cameral system will be used by Connect under guidance from the DPLUS103 project team to collect data from key shallow and deep boreholes.
- The project has funded 22 replacement rain gauge data loggers used by ANRD and an additional Automatic Weather Station to compliment the DPLUS103 monitoring network (Section 3.1.2). This equipment is being operated by the DPLUS103 project team.

- The project has funded additional LevelScout and BaroScout data loggers so that more boreholes can be monitored. This equipment has been installed and is operated by the DPLUS103 project team.
- The Cloud Forest Project includes soil sampling across the cloud forest to evaluate soil type, depth of soil and soil chemistry. Fieldwork completed in 2021/2022 also included infiltration test to assess the speed which rainfall/mist percolates into the soil. This data will significantly enhance the DPLUS103 water balance calculations and the wider hydrogeology conceptual model.
- A canopy drip experiment has been started to measure the amount of rain/mist that drips onto the cloud forest floor. This data will be used to further refine the DPLUS103 water balance.
- The project will also fund all DPLUS103 monitoring and data collection activities for an additional year (once DPLUS103 has formally finished) providing funding is confirmed by the FCDO. This will enable the team to further mitigate the slow project start due to Covid-19 impacts (several field survey trips from the international project team were cancelled) and enable a more training and exposure activities for local project partners and team members – funding for international conferences, UK based training etc.

The team have been securing funding for a second year for the wider cloud forest restoration project (2022/2023). The RSPB are leading the contract negotiations with FCDO for approximately £800,000 of funding. The restoration project is planned to last 3 years and the DPLUS103 project team have every expectation that funding will be secured to continue the DPLUS103 project activities after the project has formerly finished in March 2023.

This funding will enable all DPLUS103 water and climate monitoring and reporting activities to be consolidate within Connect Saint Helena and SHG's "business as usual activities". All capacity building will have been completed to allow island stakeholders to continue project activities without the need for significant support from international experts.

International project promotion has come under the umbrella of the wider Cloud Forest Project which has provided access to professional video production teams and journalists. The URL below provides a link to a new video discussing water security and climate change resilience associated with the cloud forest projects. The DPLUS103 project team are in the film and provided the script for the film (water security and climate change resilience section) which references the collaborative approach between DPLUS103 and the Cloud Forest Project.

<https://youtu.be/TNfY0Wsxnm4>

Little has been done to promote the project amongst the Territories and it is hoped this will improve in Year 3. Local stakeholder events promoting the project on St Helena and international project exposure opportunities have been discussed in Section 2.

## **10. Darwin identity**

The Darwin initiative and logo have been promoted on St Helena during local stakeholder events (Section 2). Media coverage of these events and SHG communications also ensure that the initiative is recognised.

See comments made in Section 7.

## **11. Impact of COVID-19 on project delivery**

The key issue we have encountered in Year 2 (and going into Year 3) is related to continued restrictions on international travel between the UK and Saint Helena. The SHG Incident Executive Group have continued to advise a 10 day quarantine on island. Coupled with 1 direct flight from the UK to St Helena every 3 weeks, this limited some international team members to 11 days in the field out of an available 21 days. At the time of writing, flights have increased to a single flight every fortnight from Johannesburg, however this means that international field teams need to spend 28 days away from the UK in order to do 2 weeks of fieldwork. The

current quarantine rules mean that staff would only have 2 days of fieldwork before returning to the UK if they could only be away for 2 weeks. SHG review the quarantine requirements on a regular basis. It is hoped that quarantine time on arrival is further reduced in time for the October 2022 fieldwork being planned by the international project team.

Our response has been to work with LTSI and Defra to re-base the project budget and programme several times during the year to reflect changes in Year 2 and Year 3. The log frame has been updated to reflect feedback from the grant award committee and the latest version is provided in Annex 2.

The residual impacts have been to further delay geophysics field surveys to Year 3, however the delay will not impact the reporting outputs of the project.

The project team have been using available budget underspend to cover increased staff time on island and increased accommodation/subsistence costs due to the reduced number of flights to the island and quarantine time.

The revised flight schedule for Year 3 can be viewed using the following weblink:

<https://www.sainthelena.gov.sh/coronavirus-covid-19/travel-tourism/>

During the year we changed the following key aspects of the project:

- UK based training for the Water Resource Monitoring Technician post is postponed and moved into Year 3; and
- All geophysics surveys have been moved into Year 3 as international travel restrictions remain in place. This will not impact on the overall project outcome.

The changes have been reflected in the current logframe provided in Annex 2. The project is still on target to collect 20 months' worth of data from a large proportion of the field equipment. Delaying all geophysics surveys to Year 3 will still enable the project to deliver these aspects of the project without impacting on other activities in Year 3.

## 12. Safeguarding

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

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

## 13. Project expenditure

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

To be completed when financial information has been received from Saint Helena Government Finance Team.

**Table 1: Project expenditure during the reporting period (1 April 2021 – 31 March 2022)**

Project spend (indicative) in this financial year	2021/22 D+ Grant (£)	2021/22 Total actual D+ Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				
Consultancy costs				

Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others (Please specify)				
<b>TOTAL</b>				

Highlight any agreed changes to the budget and **fully** explain any variation in expenditure where this is +/- 10% of the budget. Have these changes been discussed with and approved by Darwin?