Darwin Plus:
Overseas Territories Environment and Climate Fund
Annual Report

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

Submission Deadline: 30th April 2021

Darwin Plus Project Information

Project reference	DPLUS113
Project title	CRACAB: Climate Resilience and Conservation of Ascension's Biodiversity
Territory(ies)	Ascension Island
Lead organisation	Ascension Island Government Conservation & Fisheries Directorate (AIGCFD)
Partner institutions	University of Exeter French Institute for Agricultural Research (INRA)
Grant value	£261,894
Start/end dates of project	1st September 2020 – 31st March 2023
Reporting period (e.g. Apr 2020-Mar 2021) and number (e.g. Annual Report 1, 2)	Sept 2020 – Mar 2021 (Annual Report 1)
Project Leader name	Dr Diane Baum
Project website/blog/social media	www.ascension-climate.org
Report author(s) and date	Sam Weber, James McGurk & Diane Baum (April 2021)

1. Project summary

The Earth's climate is changing at an unprecedented rate, threatening biodiversity and human well-being alike. Small oceanic islands are predicted to be highly vulnerable to climate change because of their size, isolation and relatively simple ecosystems. However, those same attributes also make small islands ideal microcosms in which to understand and manage its effects.

On Ascension Island, climate change is regarded as one of the principal threats to biodiversity, cutting across marine and terrestrial ecosystems. All but one of the 16 Species and Habitat Actions Plans prepared for the Island's Biodiversity Action Plan recognise climate change as a substantial threat; it is listed the Marine Protected Area (MPA) Management Plan as one of the few impacts that will continue to affect Ascension's marine environment following the designation of a large-scale MPA in September 2019; and it is identified as posing a significant risk of extinction in the island's Endemic Plant Restoration Plan. Yet, the likely impacts are rarely quantified.

Climate change is not an existential threat but a real and current problem facing Ascension's biodiversity, and managers need to treat it with the same impact assessment approach as other pressures. This project will enable such a paradigm shift by providing outputs that allow quantitative measures of risk and impact that can be incorporated into Ascension's strategies and management plans, as well as exploring adaptation strategies to mitigate the most serious threats. This locally-specific information is

vital to capture the attention of policy makers and galvanise action both on-island and globally. The adaptations trialled during the project will provide direct benefit to the species and ecosystems concerned and also benefit the AIGCFD staff and volunteers involved as they are able to take positive action to address climate change.

2.   Project stakeholders/partners

The project is led by the Ascension Island Government Conservation & Fisheries Directorate (AIGCFD) and was developed in response to priorities identified in conservation plans and strategies contributed to by numerous subject specialists over the past decade. The Project partnership builds on a long-term collaboration between AIGCFD and the University of Exeter (UoE) and this relationship has continued to be productive over Y1 of the project. In addition to leading research outputs on marine turtles, the UoE is providing project management support (including drafting of reports, change requests etc. and the creation of Project website) and the Project Manager at UoE and Project Leader in AIG meet at least monthly. The project has also developed a new collaboration with the French Institute for Agricultural Research (INRA) to support research on drought impacts affecting endemic plants. Unfortunately, the COVID-19 pandemic has prevented planned visits by INRA to Ascension Island during Y1. Nevertheless contact has been maintained with INRA to update them on wider developments on the project and plan how a visit to Ascension would fit in with revised work schedules in Y2. The Project's climate forecasting objectives are being delivered through consultancy contracts awarded to the University of East Anglia's Climate Research Unit and Plymouth Marine Laboratory (see Annex 1). The Project Leader and Project Manager are in regular contact with both teams to discuss methodology and monitor progress, and have developed effective partnerships that are likely to be sustained beyond the lifespan of this project. The CRU team have already provided preliminary results and content for the project website, while the PML contract formally begins in Q1 of Y2 with further updates expected shortly.

3.   Project progress

3.1   Progress in carrying out project Activities

Progress is summarised below for all activities that were scheduled for Y1 according the agreed implementation timetable, as well as activities planned for subsequent years for which there is early progress to report.

Output 1.

1.1 *Creation of climate model for Ascension capable of predicting temperature and rainfall changes with measured degree of certainty*

During Y1, consultants at the University of East Anglia have compiled the first comprehensive timeseries of temperature and precipitation collected on Ascension Island, covering at least the last 100 years (see Project website). Temperature series extend back to 1815, and are almost continuous from 1920-2020 while rainfall data are available from 1899-2020. These historical timeseries will be used for measuring climate change over the past century and validating the predictions of regional climate models, as well as forming the baseline from which future climate change is projected.

1.3 *Creation of oceanographic model for Ascension EEZ produced predicting future changes in current and upwelling systems.*

Following a competitive tender process, a team from Plymouth Marine Laboratory (PML) have been appointed to lead the development and validation of predictive oceanographic models for the Ascension Island Marine Protected Area (see Annex 1A & 1B). Work will begin in Q1 of Y2 (April 2021) and will generate long-term projections (2020–2100) for a range of biophysical variables (including temperature, acidification, oxygenation, primary production and currents/upwelling) using the state-of-the-art CMIP6 model ensemble and emission scenarios developed by the International Panel for Climate Change (IPCC).

Output 2.

2.1 *Production of response curves relating temperature to green turtle sex ratios, and soil moisture content to stress levels in an endemic plant species (Euphorbia origanoides) from experimental data*

All available data on green turtle hatching success and offspring sex ratios from artificial incubation experiments and natural nests have been compiled and will form the basis for generating temperature response curves in Y2 of the project. Soil moisture probes have been purchased and monitoring sites and protocols established to look at the relationship between soil moisture and plant health of *Euphorbia origanoides* (Annex 2). Due to the COVID-19 pandemic, researchers from INRA have been prevented from visiting Ascension to measure drought stress levels in *E. origanoides.* This work is now planned for Y2 and will still report in time to guide restoration efforts within the scope of the project.

2.2 *Production of digital terrain maps of turtle nesting beaches*

Digital elevation models (## resolution) have been developed for all of the Island's main nesting beaches using photogrammetric methods applied to existing drone imagery (see Project Website).

2.3 *Production of maps predicting future availability of turtle nesting habitat produced from swell height data collected adjacent to turtle nesting beaches combined with output 2.2*

DEMs created in 2.2 have been overlaid with all available data on the spatial distribution of green turtle nesting from the Ascension Island Marine Turtle Monitoring Programme. Flooding simulations have then been applied that allow losses of beach habitat and nests to be estimated under different sea level rise scenarios (see Project Website). These analyses are preliminary and still need to incorporate the effects of swell height and storms on flooding frequency, but are ahead of where we had planned to be at this stage.

2.4 *Analysis of correlation between seabird productivity and ocean state variables completed and used to assess feasibility of using seabirds as indicators of ocean health.*

Estimates of annual and seasonal variability in fledging success have been generated for the endemic Ascension frigatebird based on all available data from the seabird monitoring programme and correlated with some potential environmental predictors (see Project website). Although these analyses are preliminary, they suggest that inter-annual variation in the strength of upwelling-induced, seasonal peaks in primary productivity to the north of Ascension may have some influence on frigatebird fledging success through its influence on prey availability. The strength of upwelling along the so-called Atlantic 'cold tongue' is known to be sensitive to variation in ocean and atmospheric circulation (and hence climate change) so this relationship warrants further investigation. As part of Activity 1.3, marine ecosystem modellers at PML will make more quantitative predictions of how regional oceanographic processes like the cold tongue will be affected by climate change.

Output 3.

3.1 *Trials of turtle nest shading, endemic plant shading and fog-catching irrigation systems carried out*

Trials of turtle nest shading have been postponed until Q4 of Y2 (approved by Darwin Initiative) due to travel disruption caused by the COVID pandemic. Materials for shading *E. origanoides* have arrived on the island, trial sites have been identified and shade structures will be built in Y2Q1. Fog catcher plans have been produced and materials are in transit to the island. Sites for fog irrigation have been identified. Baseline mapping of the distribution of endemic plants has been undertaken at the irrigation sites.

3.2 *Digital terrain models of beaches presented to policy makers and planners to illustrate options for landward migration of beaches.*

Activity not scheduled until Y3, although production of terrain models is well advanced (see Activity 2.2-2.3)

3.3 *Sites on Ascension that have suitable climate conditions for Euphorbia origanoides identified. Transplant nursery grown stock to these areas and monitor success.*

Seed have been sown in the nursery to provide plants for translocation as scheduled in Y2Q4. A longlist of candidate relocation sites has been identified and this will be further refined following the results of the soil moisture studies described in output 2.1.

Output 4.

4.1 *Creation of project website setting out scope of project and updated with project outputs*

This Activity has been completed (www.ascension-climate.org).

4.2 *Public meetings held on Ascension to initially outline the objectives of the project and later to showcase results of the project and illustrate climate scenarios for the island*

A planned public meeting introducing the project has been postponed because partners were not able to travel to Ascension as planned. The Plant Consultant will arrive on Ascension in Y2Q1 and a public meeting will be scheduled soon after. An article has been written for the Ascension press to inform people about the project (Annex 3).

3.2   Progress towards project Outputs

Output 1. *Ascension-specific predictions of future climate and ocean conditions produced and published.*

Work towards this output is progressing in accordance with the timeframe and we anticipate that it will be delivered in full. A comprehensive climatic baseline has been established for Ascension Island, incorporating more than 100 years of temperature and rainfall data. These timeseries will be used to model recent climate change on Ascension and will form the baseline against which future projected change is measured (Output 1.1). The timeseries and an explanation of the methodology used are available on the project website, with plans to publish the datasets in a scientific paper over the coming months. Development of predictive oceanographic models (Output 1.3) is not due to commence until Y2; however, following a competitive tender process, a team from Plymouth Marine Laboratory have been appointed to deliver this work package, with final outputs expected in Q4 of Y2 (see Annex 1). Work towards achieving Output 1.2 will commence in Y2.

Output 2. *Quantitative relationships between key habitats/species and climate variables established to allow greater detail on predicted impact of climate change on biodiversity.*

Although the majority of deliverables for Output 2 are not due to be completed until Y3, significant progress has already been made in several areas. Digital elevation models (DEMs) have now been created for all of Ascension's turtle nesting beaches, overlaid with green turtle nesting locations, and run through flooding simulations to assess habitat loss under different projections of sea level rise (**Output 2.2**). Drone imagery used to create DEMs was available prior to the project, but had not been processed and analysed. The UoE team have also assembled all available data on marine turtle hatching success and offspring sex ratios which will form the basis for generating temperature-response curves and climate change projections in Y2 of the project. These data were previously held by several researchers and required compilation. Progress in relating seabird productivity to climate anomalies (Output ##) is slightly delayed, in part due to the impacts of the COVID-19 pandemic (see Section ##). Nevertheless, a number of important steps have been completed. All existing monitoring data for the endemic Ascension frigatebird have been analysed to quantify interannual and seasonal variability in fledging success, and oceanographic data corresponding to the same time period has been obtained. Preliminary analyses have revealed a potential correlation between fledging success and the strength and timing of upwelling-

induced, seasonal peaks in primary production to the north of Ascension, although this requires further verification.

Output 3. *Evidence-based adaptation actions trialled and those demonstrated to be successful are implemented through core AIGCFD workplans*

Trials of climate adaptation measures are either planned for subsequent years of the project or have been postponed due to international travel caused by the COVID pandemic. Nevertheless, early preparations for this output have begun: designs have been produced and equipment has been purchased to construct the *E. origanoides* restoration sites (Annex 2) and fog catchers and seeds have been sown to produce a nursery stock of *E. origanoides* on schedule for the restoration activities.

Output 4. *Results of project and knowledge gained are widely shared to galvanise action on Ascension and encourage similar projects on other OTs and small islands*

The majority of research outputs are still in their early stages and are too premature to be widely shared. This is consistent with the implementation timetable, with the majority of publicity activities planned for the second half of Y2 and Y3. However, a public-facing project website has been created (**Output 4.1**) and has already been used to post preliminary findings from several workstreams. In addition to providing background on the aims and scope of the project, the website features a "News and Updates" blog that can be accessed by the project team for uploading outputs and tracking progress. An article has been published in the Ascension press (Annex 3) and social media posts produced to introduce the project and outline its aims.

3.3 Progress towards the project Outcome

Progress towards the intended outcome of informing and empowering Ascension's response to climate change is on track at this early stage in the project and we remain confident that it can be achieved by the end of the funding period. We have made good progress in generating the first, long-term, Ascension-specific climate projections for the marine and terrestrial environments (Annex 1; Project Website), which is an essential step in preparing evidence-based impact assessments. Satisfactory progress has also been made with predicting impacts of climate change for a range of Biodiversity Action Plan priority species, including green turtles, the Ascension frigatebird and *E. origanoides* (see Project website). Quantifiable measures of the threat posed by climate change were lacking previously and are necessary to guide responses and galvanise action. Indicators proposed for monitoring progress against the intended Outcome are based on inclusion of final projections and management recommendations in relevant strategies, action plans and policy presentations, which makes it hard to directly measure progress at this stage. Nevertheless, the Output level indicators are adequate for monitoring the progress of individual workstreams that will ultimately contribute to this Outcome.

3.4 Monitoring of assumptions

Assumption 1: There is sufficient existing and available data to input into models

Comments: Consultants involved in developing predictive climate models (Output 1.1) and oceanographic models (Output 1.3) are confident that sufficient data exist for these outputs to be delivered in full (see Annex 1). It is less clear currently whether sufficient meteorological data exist for robustly mapping climatic zones on the island (Output 1.2) as the majority of records originate from a just a few locations. This will become apparent as further analysis and modelling is carried out and approaches will be adjusted as necessary.

Assumption 2: Observed relationships between climate variables and biological indicators are sufficiently robust to allow meaningful predictions

Comments: It is too early to assess whether this assumption has held. Preliminary analyses have confirmed significant interannual variability in seabird productivity, but relationships with oceanographic predictors are yet to be thoroughly investigated (see Project website). The small number of years in which sufficient frigatebird nests have been monitored to reliably estimate fledging success may limit the power of statistical tests, although this will be augmented by two additional years of data

collected during the project. Longer-term productivity data are available for other species but these have yet to be analysed.

Assumption 3. At least some potential adaptation actions are shown to be effective and deliverable within available resources

Comments: Trials of adaptation actions are either scheduled for later years of have been delayed due to COVID-19 so we cannot currently test whether this assumption has held. There have been no changes in circumstances locally that have altered this assumption, although there is now the additional assumption that more normal travel access to Ascension Island is restored in Y2/Y3 allowing planned fieldwork to proceed.

Assumption 4. Outputs from the models and adaptation trials are sufficiently robust to warrant public interest

Comments: Most public engagement and outreach activities are planned for subsequent years of the project so it is currently too early to test this assumption.

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

The project is currently at too early a stage to demonstrate clear, positive outcomes for biodiversity on Ascension Island. Nevertheless, meaningful progress has been made towards the intended impact of "demonstrating leadership in tackling climate change by treating it as a current, quantifiable pressure". As a result of work that is currently underway, Ascension will be perhaps the first UKOT to have access to detailed, locally-specific climate projections spanning both the marine and terrestrial environments. Topographic mapping of sea turtle nesting beaches is already demonstrating in a very visual way how sea level rise may reduce the extent of nesting habitat for Ascension's iconic green turtles, and we are beginning to understand how climate variability influences the breeding success of the Island's endemic frigatebird. Work is underway to quantify the soil moisture conditions required by endemic plant species and to create and trial passive irrigation systems that will ensure these conditions can be maintained under future climate scenarios. All of these outputs represent important steps towards embedding climate change as a real, quantifiable threat to Ascension's biodiversity and mobilising action through updates to the Island's Biodiversity Action Plan and Marine Protected Area management plan. The core outputs of the Project also contribute directly towards commitments under the United Nations Framework Convention on Climate Change, including 4.1e ("Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management…") and 4.1f ("Take climate change considerations into account in … social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally").

5. OPTIONAL: Consideration of gender equality issues

Climate change will affect everyone living on Ascension and so the problem is shared by all genders. The current make-up of the AIGCFD is 77% female, including the Project Leader, meaning women are taking a prominent role in finding solutions. This is an important step on an island where two thirds of the population and a high proportion of senior managers are male.

6. Monitoring and evaluation

The M&E plan remains unchanged, involving at least quarterly meetings between project partners to monitor progress, identify milestones that have been missed (or are likely to be missed) and adapt accordingly. The effectiveness of this approach was tested during Y1 in responding to major disruption caused by the COVID-19 and has resulted in a revised implementation timetable and budget that will allow the project to deliver all planned outputs and activities. M&E during Y1 has focussed on monitoring progress against individual Outputs as the contribution of each of these to achieving the overall Outcome is explicit in the project design. In accordance with the Project logframe, progress has been monitored by sharing preliminary results of individual activities between partners and, where appropriate, uploading

these to the Project website. As finalised results and recommendations are incorporated into policy documents and peer-reviewed articles in Y2 and Y3 of the project these will become the primary source of verification that the project is achieving its intended impact.

7. Lessons learnt

There are no specific lessons that have been learned over the first seven months of the project, which have progressed largely as planned, although we note that the competitive tendering process for recruiting to deliver technical outputs has worked well. We were fortunate to receive several expressions of interest and were able to select applicants with expertise most relevant to delivering the specific goals of the Project. This model could be applied in future projects, rather than attempting to formalise all partners at the application stage.

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

N/A

9. Other comments on progress not covered elsewhere

N/A

10. Sustainability and legacy

The Project's intended exit strategy of enabling sustained and well-informed action on climate change remains valid. Sustainability will be achieved through locally-specific climate projections, impact assessments and response plans enshrined in relevant biodiversity strategies and policies, combined with a clearer communication of the threat and available adaptation measures to local decision-makers and the wider community. Preliminary results of the work are already being promoted through the project website and the range of publicity and communication activities will increase as these outputs are finalised and published. Public events to discuss the recently-designated Ascension Marine Protected Area have highlighted the threat climate change poses to the island's biodiversity and there is already a high level of interest in the developing outputs of this project from the community and decision makers.

11. Darwin identity

The Darwin Initiative has been the principal external funder of conservation work on Ascension Island over the past decade and its identity and brand are already well known in the Territory. In the current project, the Darwin Initiative logo and acknowledgement of Darwin funding features prominently on the new project website (www.ascension-climate.org) and in information materials distributed to parties interested in tendering for climate modelling contracts (Annex 1). Acknowledgement of Darwin funding also appears at the head of a local newspaper article introducing the project (Annex 3).

12. Impact of COVID-19 on project delivery

Like many projects, disruption to international travel has had significant impacts on planned fieldwork and consultancy visits during the first seven months of the project. Uncertainty as to when more normal access to Ascension Island will resume has also presented challenges for replanning project activities. The range of potential impacts were identified as part of the scheduled M&E process and have been addressed through a change request approved by the Darwin Initiative on 22nd February 2021. This has involved delaying a number of activities to subsequent years and reorganising the project budget accordingly, which will ensure that all planned outputs can be delivered in full while ensuring the safety of project team and local population on Ascension Island. The impacts of national lockdowns and school closures on the working arrangements of UK-based staff have also had inevitable consequences on the progress of some desk-based exercises. While all activities planned for Y1 have begun, we are behind where we had planned to be at this stage for a small number of activities (e.g. Activity 2.4; see Section

3.1). Nevertheless, because the project is still in its early stages, we are confident that any ground lost to COVID can be made up over the remainder of the project.

13.   Safeguarding

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

There have been no safeguarding issues during Y1 of the project. The institutional safeguarding procedures and policies of AIG and project partners, as described in the original project application, remain unchanged.

14.   Project expenditure

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

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

TOTAL	█████████████████

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

Project summary	Measurable Indicators	Progress and Achievements April 2020 - March 2021	Actions required/planned for next period
Impact A small island demonstrates leadership in tackling climate change by treating it as a current pressure and proactively introducing adaptation measures to protect the most vulnerable species and habitats.		Even at this early stage in the project, significant progress has been made towards producing locally-specific climate projections spanning both the marine and terrestrial environments and assessing potential impacts for Ascension's marine turtles, seabirds and endemic flora. All of these outputs are necessary to embed climate change as a real, quantifiable threat to Ascension's biodiversity and galvanise action locally.	
Outcome Ascension-specific predictions of future climate and ocean conditions produced and published	0.1 By Q4 of Year 3 Ascension's Biodiversity Action Plan and protected area management plans will include the specific local threats of climate change, new monitoring protocols and proposed adaptation actions. 0.2 By Q2 of Year 2 Adaptation actions (including irrigation and shading) are initiated to reduce climate change impacts on priority species and habitats 0.3 By Q4 of Year 3 Results of project presented to the Ascension Island Council and Administrator to inform future policy on areas such as coastal land use.	The project is currently at the evidence gathering and planning stage so it is too early to report progress against Outcome level indicators. However, progress against Output level indicators is largely on track and we are confident that the project will achieve its intended outcome.	0.1 & 0.3 Finalise research outputs that will inform future management objectives and policy recommendations 0.2 Initiate trials of adaptation actions
Output 1. Ascension-specific predictions of future climate and ocean conditions produced and published	1.1 By Q1 of Year 2 climate model for Ascension created capable of predicting temperature and rainfall changes with measured degree of certainty (Using methods developed by	1.1. All available temperature and rainfall data for Ascension Island have been compiled to establish climatic baselines, model recent climate change and bias-correct predictions from regional and global models (see Project Website). Projections will be carried out relative to this baseline in Y2 of the project.	

Project summary	Measurable Indicators	Progress and Achievements April 2020 - March 2021	Actions required/planned for next period
	UEA in the Falklands through the EU Best funded TEFRA project) 1.2 By Q2 Year 2 Map of climatic zones on Ascension produced based on altitude, aspect and distance from sea 1.3 By Q2 of Year 2 oceanographic model for Ascension EEZ produced predicting future changes in current and upwelling systems	1.2 Work not due to commence until Y2 1.3 A team from Plymouth Marine Laboratory has been appointed to develop and validate the oceanographic model. Terms of reference for the work have been drawn up (Annex 1A) and methodology and an implementation plan has been proposed by the successful tenderer (Annex 1B). Work will commence in Y2Q1 and is expected to be completed by Y2Q4.	
Activity 1.1 Creation of climate model for Ascension capable of predicting temperature and rainfall changes with measured degree of certainty.		Temperature and precipitation baselines for model validation and climate change projections have been established.	Produce long-term temperature and rainfall projections (present – 2100) based on CMIP6 model ensemble, bias-corrected using baseline observational data.
Activity 1.2 Production of map showing climatic zones on Ascension based on altitude, aspect and distance from sea.		Not yet started	Evaluate spatial and temporal coverage of climate data to assess feasibility of zonal mapping and most appropriate methodology.
Activity 1.3 Creation of oceanographic model for Ascension EEZ produced predicting future changes in current and upwelling systems.		Consultants appointed to develop and validate oceanographic model and Terms of Reference and methodology agreed (Annexes 1A & 1B).	Produce long-term oceanographic projections according to methodology set out in Annex 1B
Output 2. Quantitative relationships between key habitats/species and climate variables established to allow greater detail on predicted impact of climate change on biodiversity.	2.1 By Q2 of Year 3 Response curves relating temperature to green turtle sex ratios, and soil moisture content to stress levels in an endemic plant species (*Euphorbia origanoides*) produced from experimental data 2.2 By Q1 of Year 3 Digital terrain maps of turtle nesting beach produced 2.3 By Q2 of Year 3 Maps predicting future availability of turtle nesting habitat produced from swell height data	2.1 Work scheduled for Y2; however, preparation has begun including compiling available green turtle monitoring data and ordering soil moisture probes for experiments on drought stress (see Section 3.1). 2.2 & 2.3 Digital elevation models have now been produced for all nesting beaches and are currently being incorporated into visualisations and sea level rise models (see Project Website).	

Project summary	Measurable Indicators	Progress and Achievements April 2020 - March 2021	Actions required/planned for next period
	collected adjacent to turtle nesting beaches combined with output 2.		
	2.4 By Q1 Year 2 Analysis of correlation between seabird productivity and ocean state variables completed and used to assess feasibility of using seabirds as indicators of ocean health.	2.4 Preliminary analyses have been carried out correlating seabird breeding success with variation in marine productivity around Ascension Island linked to equatorial upwelling systems (see Project website).	
Activity 2.1 Production of response curves relating temperature to green turtle sex ratios, and soil moisture content to stress levels in an endemic plant species (*Euphorbia origanoides*) from experimental data.		Turtle datasets collated and equipment ordered for drought stress experiments.	Analyse green turtle sex ratio and hatching success data to generate thermal response curves. Initiate experiments on drought stress and soil moisture.
Activity 2.2 Production of digital terrain maps of turtle nesting beaches		Largely completed (see Project website)	Finalise visualisations and 3D flythroughs for all beaches as per website example.
Activity 2.3 Production of maps predicting future availability of turtle nesting habitat produced from swell height data collected adjacent to turtle nesting beaches combined with output 2.2		Distribution of turtle nesting overlaid on DEMs from activity 2.2 and initial flooding simulations have been run for a subset of beaches (see Project website)	Run simulations for all nesting beaches to assess overall habitat loss under different sea level rise scenarios.
Activity 2.4 Analysis of correlation between seabird productivity and ocean state variables completed and used to assess feasibility of using seabirds as indicators of ocean health.		Preliminary analysis carried out correlating breeding performance of one species to most likely source of environmental variation (see Project website).	Extend analyses to other seabird species, including data for current nesting season, and explore a wider range of oceanographic correlates.
Output 3. Evidence-based adaptation actions trialled and those demonstrated to be successful are implemented through core AIGCFD workplans	3.1 By Q2 Year 3 Trials of turtle nest shading, endemic plant shading and fog-catching irrigation systems carried out 3.2 By Q3 Year 3 Digital terrain models of beaches presented to policy makers	3.1 Trials not due to commence until Y2/Y3 but materials have been ordered and plans for construction of passive irrigation systems have been drawn up (see Section 3.1 and Annex 2). 3.2 Production of terrain models is well advanced (see Project website) and we are on track to achieve this output ahead of schedule.	

Project summary	Measurable Indicators	Progress and Achievements April 2020 - March 2021	Actions required/planned for next period
	and planners to illustrate options for landward migration of beaches. 3.3 By Q2 Year 3 Identify sites on Ascension that have suitable climate conditions for *Euphorbia origanoides*. Transplant nursery grown stock to these areas and monitor success 3.4 By Q4 Year 3 Climate change adaptation measures shown to be successful are incorporated into AIGCFD management plans and implemented as part of core workplans.	3.3 & 3.4 Work is not due to commence on these outputs until Y2/Y3; however necessary preparations are underway, including building up of nursery stock for translocation trials and ordering equipment.	
Activity 3.1 Trials of turtle nest shading, endemic plant shading and fog-catching irrigation systems carried out.		Trials of adaptation measures scheduled for Y2/Y3. Equipment has been ordered and is either on-island or in transit.	Carry out nest shading trials in Q4Y2.
Activity 3.2 Digital terrain models of beaches presented to policy makers and planners to illustrate options for landward migration of beaches.		Not scheduled until Y3, although production of terrain models is well advanced (see website)	Finalise terrain models and assess potential for landward beach migration.
Activity 3.3 Sites on Ascension that have suitable climate conditions for *Euphorbia origanoides* identified. Transplant nursery grown stock to these areas and monitor success		Seeds have been shown in nursery to generate *ex situ* stock for *E. origanoides* translocation experiments.	Refine longlist of candidate relocation sites based on findings of soil moisture studies (Activity 2.1)
Activity 3.4 Climate change adaptation measures shown to be successful incorporated into AIGCFD management plans and implemented as part of core workplans.		Trials of adaptation measures scheduled for Y2/Y3.	Await findings of field trials before making management recommendations.
Output 4. Results of project and knowledge gained are widely shared to galvanise action on Ascension and encourage similar projects on other OTs and small islands	4.1 By Q4 Year 1 Create project website setting out scope of project and updated with project outputs 4.2 By Q4 Year 1 and Q4 Year 3 Hold public meetings on Ascension to initially outline the objectives of the	4.1 Project website has been completed and updated with project outputs from Y1.	

Project summary	Measurable Indicators	Progress and Achievements April 2020 - March 2021	Actions required/planned for next period
	project and later to showcase results of the project and illustrate climate scenarios for the island 4.3 By Q3 Year 3 Create animated films of future scenarios as visual tools for stakeholder engagement 4.4 By Q4 Year 3 Attend international conference to showcase how Ascension is addressing major threat to its biodiversity	4.2 The initial public meeting has been postponed to Y2 as project partners were unable to travel due to COVID pandemic. However, an article introducing the project has been published in local media (Annex 3). 4.3 Work not scheduled until Y2/Y3. However, some initial animations of the impacts of sea level rise on green turtle nesting habitat have been created (see Project Website) 4.4 Final project outputs will be presented in Y3Q2 at the 5th International Marine Protected Areas Congress to be held in June 2022 in Vancouver, Canada	
Activity 4.1. Creation of project website setting out scope of project and updated with project outputs		Website completed as planned (www.ascension-climate.org)	Continue to update website with project outputs via dynamic content pages.
Activity 4.2. Public meetings held on Ascension to initially outline the objectives of the project and later to showcase results of the project and illustrate climate scenarios for the island		Initial meeting postponed due to COVID pandemic.	Hold public meeting when project partners are on-island to discuss climate change impacts and share preliminary findings.
Activity 4.3. Creation of animated films of future scenarios as visual tools for stakeholder engagement		Preliminary animations of turtle nesting beach morphology and impacts of sea level rise have been produced (see website).	Refine nesting beach animations; produce animations of projected terrestrial and marine climate change based on results of Output 1.
Activity 4.4. Presentation of results at international conference to showcase how Ascension is addressing major threat to its biodiversity		Not due to take place until Y3.	Continue finalising research outputs that will form basis of presentation

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

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: A small island demonstrates leadership in tackling climate change by treating it as a current pressure and proactively introducing adaptation measures to protect the most vulnerable species and habitats.			
Outcome: Ascension's response to climate change is transformed through detailed, evidence-based predictions of impact that are used to galvanise action, prepare an adaptation response and focus monitoring effort.	0.1 By Q4 of Year 3 Ascension's Biodiversity Action Plan and protected area management plans will include the specific local threats of climate change, new monitoring protocols and proposed adaptation actions. 0.2 By Q2 of Year 2 Adaptation actions (including irrigation and shading) are initiated to reduce climate change impacts on priority species and habitats 0.3 By Q4 of Year 3 Results of project presented to the Ascension Island Council and Administrator to inform future policy on areas such as coastal land use.	0.1 Text of Biodiversity Strategy and protected areas management plans 0.2 Results of adaptation action trials 0.3 Minutes of Council meetings	It is possible to produce climate and oceanographic projections and receptor-response curves with sufficient levels of certainty to generate meaningful scenarios At least some potential adaptation actions are shown to be effective and deliverable within available resources
Outputs: **1.** Ascension-specific predictions of future climate and ocean conditions produced and published	1.1 By Q1 of Year 2 climate model for Ascension created capable of predicting temperature and rainfall changes with measured degree of certainty (Using methods developed by UEA in the Falklands through the EU Best funded TEFRA project) 1.2 By Q2 Year 2 Map of climatic zones on Ascension produced based on altitude, aspect and distance from sea 1.3 By Q2 of Year 2 Oceanographic model for Ascension EEZ produced predicting future changes in current and upwelling systems	1.1 Climate model outputs made available on project website 1.2 Climate zone map made available on website 1.3 Oceanographic model outputs made available on project website	There is sufficient existing and available data to input into models

2. Quantitative relationships between key habitats/species and climate variables established to allow greater detail on predicted impact of climate change on biodiversity.	2.1 By Q2 of Year 3 Response curves relating temperature to green turtle sex ratios, and soil moisture content to stress levels in an endemic plant species (*Euphorbia origanoides*) produced from experimental data 2.2 By Q1 of Year 3 Digital terrain maps of turtle nesting beach produced 2.3 By Q2 of Year 3 Maps predicting future availability of turtle nesting habitat produced from swell height data collected adjacent to turtle nesting beaches combined with output 2. 2.4 By Q1 Year 2 Analysis of correlation between seabird productivity and ocean state variables completed and used to assess feasibility of using seabirds as indicators of ocean health.	2.1 Response curves published in peer-reviewed articles 2.2 Terrain models available on the project website 2.3 Maps of future turtle nesting habitat available on project website and published in peer-reviewed articles 2.4 Seabird productivity data and potential as indicators of ocean health published as a peer-reviewed article	Observed relationships between climate variables and biological indicators are sufficiently robust to allow meaningful predictions
3. Evidence-based adaptation actions trialled and those demonstrated to be successful are implemented through core AIGCFD workplans	3.1 By Q2 Year 3 Trials of turtle nest shading, endemic plant shading and fog-catching irrigation systems carried out 3.2 By Q3 Year 3 Digital terrain models of beaches presented to policy makers and planners to illustrate options for landward migration of beaches. 3.3 By Q2 Year 3 Identify sites on Ascension that have suitable climate conditions for *Euphorbia origanoides*. Transplant nursery grown stock to these areas and monitor success 3.4 By Q4 Year 3 Climate change adaptation measures shown to be successful are incorporated into AIGCFD management plans and implemented as part of core workplans.	3.1 Results of adaptation trials published in reports 3.2 Terrain models published on website and peer-reviewed article. Minutes of Council meetings. 3.3 Report and photographs of translocation programme 3.4 Reports and photographs of adaptation measures installed available on project website. Biodiversity Action Plan, MPA Management Plan and Endemic Species Restoration Plan available on AIGCFD website	At least some potential adaptation actions are shown to be effective and deliverable within available resources

4. Results of project and knowledge gained are widely shared to galvanise action on Ascension and encourage similar projects on other OTs and small islands	4.1 By Q4 Year 1 Create project website setting out scope of project and updated with project outputs 4.2 By Q4 Year 1 and Q4 Year 3 Hold public meetings on Ascension to initially outline the objectives of the project and later to showcase results of the project and illustrate climate scenarios for the island 4.3 By Q3 Year 3 Create animated films of future scenarios as visual tools for stakeholder engagement 4.4 By Q4 Year 3 Attend international conference to showcase how Ascension is addressing major threat to its biodiversity	4.1 Website available online 4.2 Photographs of public meetings and presentations distributed via project website 4.3 Films distributed online and at meetings and conferences 4.4 Conference proceedings and presentations available online	Outputs from the models and adaptation trials are sufficiently robust to warrant public interest

Activities.

Output 1.

1.1 Creation of climate model for Ascension capable of predicting temperature and rainfall changes with measured degree of certainty

1.2 Production of map showing climatic zones on Ascension based on altitude, aspect and distance from sea

1.3 Creation of oceanographic model for Ascension EEZ produced predicting future changes in current and upwelling systems

Output 2.

2.1 Production of response curves relating temperature to green turtle sex ratios, and soil moisture content to stress levels in an endemic plant species (*Euphorbia origanoides*) from experimental data

2.2 Production of digital terrain maps of turtle nesting beach

2.3 Production of maps predicting future availability of turtle nesting habitat produced from swell height data collected adjacent to turtle nesting beaches combined with output 2.2

2.4 Analysis of correlation between seabird productivity and ocean state variables completed and used to assess feasibility of using seabirds as indicators of ocean health.

Output 3.

3.1 Trials of turtle nest shading, endemic plant shading and fog-catching irrigation systems carried out

3.2 Digital terrain models of beaches presented to policy makers and planners to illustrate options for landward migration of beaches.

3.3 Sites on Ascension that have suitable climate conditions for *Euphorbia origanoides* identified. Transplant nursery grown stock to these areas and monitor success

3.4 Climate change adaptation measures shown to be successful incorporated into AIGCFD management plans and implemented as part of core workplans.

Output 4.

4.1 Creation of project website setting out scope of project and updated with project outputs

4.2 Public meetings held on Ascension to initially outline the objectives of the project and later to showcase results of the project and illustrate climate scenarios for the island

4.3 Creation of animated films of future scenarios as visual tools for stakeholder engagement

4.4 Presentation of results at international conference to showcase how Ascension is addressing major threat to its biodiversity

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.	
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.	