

## Darwin Plus: Final Report

### Darwin Plus Project Information

|                                   |  |
|-----------------------------------|--|
| Project reference                 | DPLUS129   |
| Project title                     | Understanding Ramsar wetland dynamics for marine conservation and environmental resilience   |
| Territory(ies)                    | Turks and Caicos Islands   |
| Lead Partner                      | Environment Systems Ltd  |
| Project partner(s)                | Department of Environment and Coastal Resources (TCI); Marine Conservation Society (UK); University of Exeter (UK); Joint Nature Conservation Committee (UK); Wavehill (UK); SWA Environmental (TCI) |
| Darwin Plus Grant value           | £251,807.00  |
| Start/end date of project         | 01-07-21 — 30-03-24  |
| Project Leader name               | Katie Medcalf  |
| Project website/Twitter/blog etc. | <a href="https://www.envsys.co.uk/ramsar-wetlands/">https://www.envsys.co.uk/ramsar-wetlands/</a>  |
| Report author(s) and date         | Pike, S., May C., Manco B., Sanghera, A. June 2024   |

### 1 Project Summary

The wetlands spanning the Turks and Caicos Islands, which include the Ramsar site on North and Middle Caicos along with the wetlands of East Caicos, are home to a range of biodiversity of global significance. Comprising varied habitats such as mangroves, swamps, saline lagoons, coral reefs, and seagrass beds, these ecosystems play a crucial role in safeguarding the islands against the impacts of hurricanes and tsunamis, by absorbing wave energy and reinforcing the coastline. Moreover, they function as carbon sinks and vital breeding grounds for essential fisheries like conch and lobster. Nevertheless, these irreplaceable wetlands face threats from climate change and escalating development pressures.

Since the site was designated 30 years ago changing climate has altered the site dynamics, leading to issues e.g. coral bleaching and excessive erosion. This is likely to be exacerbated in the future as sea levels rise. Since a study in 2005 to produce a static habitat map, no work has been done on describing the dynamics of the wetland sites or change to indicator species such as the sea turtle. There is no indication of how these dynamics will be affected by climate change and no evidence that the current protected area is sufficient to maintain biodiversity, fisheries, carbon, and coastal

protection. Those areas that are not protected under the Ramsar convention are under threat by development and will also be in scope.

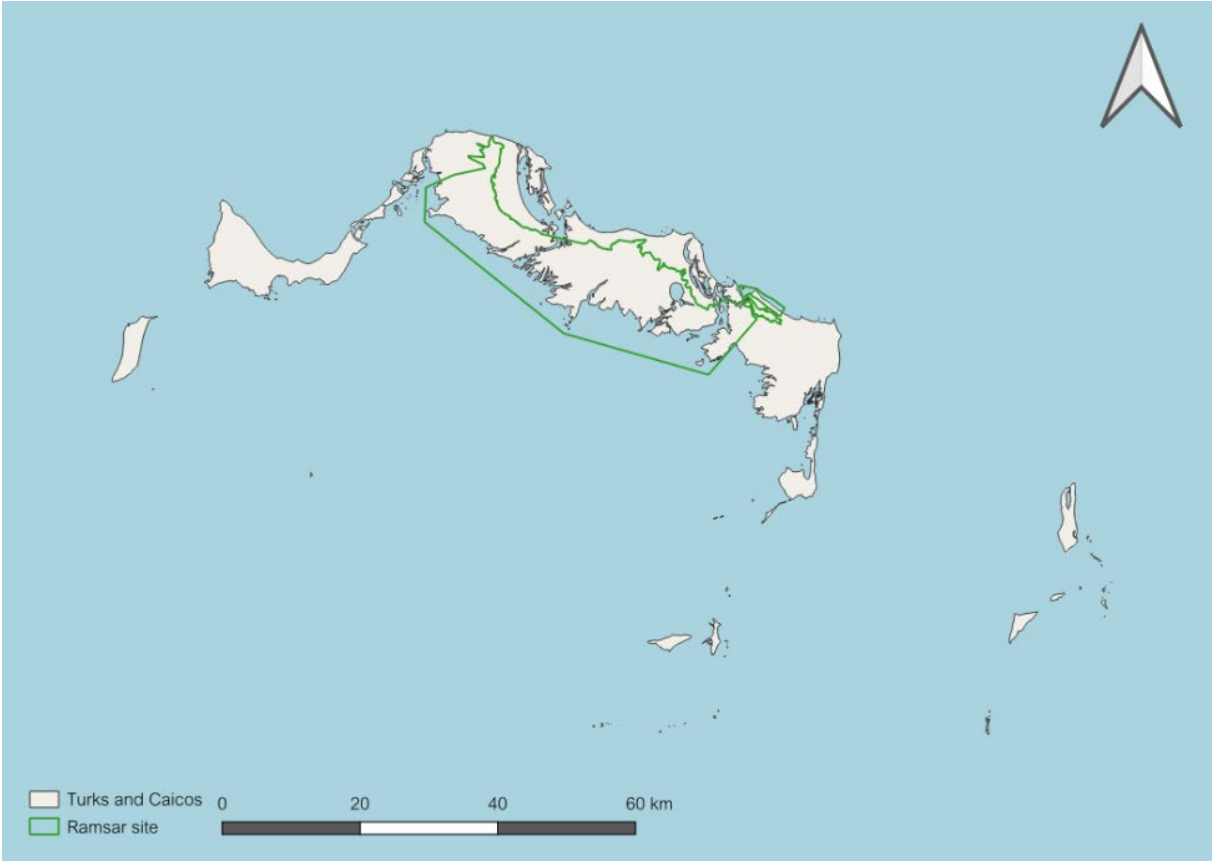


Figure 1 Turks and Caicos Islands, with the boundary of the Ramsar site (green)

This project provides new evidence on what contributes to the dynamic resilience of the Turks and Caicos Islands’ wetlands, and how they support biodiversity, coastal protection, carbon storage and water security. It evaluates how future climate change could impact the wetlands, and provides evidence to aid the review and expansion of their protection under the Ramsar Convention. The project has developed a satellite-based monitoring framework, specifically curated for the key issues impacting these wetlands. Lastly, the technical and scientific capacity of the Department of Environment & Coastal Resources (DECR) has been improved in order to better sustain the wetland management in the long term.

## 2 Project Partnerships

Environment Systems Ltd (ESL) leads this project in collaboration with the Department of Environment & Coastal Resources (DECR) in the Turks and Caicos Islands. Other partners include the on-island consultancy SWA Environmental, Marine Conservation Society (MCS), the University of Exeter (UoE), Joint Nature Conservation Committee (JNCC), and Wavehill.

The project lead has been working closely with primary project partners from the DECR (North Caicos), as well as involvement with the other partners. The engagement with DECR (North Caicos) was strong throughout the project duration, through monthly,

then fortnightly virtual meetings, and considerably shaped the outcomes and eventual focus of the project. We have further involved the stakeholders into decision-making and planning events, so that the final project outputs can have the maximum impact on the islands.

In Year 1, there was an unexpected departmental split in DECR (North Caicos) which increased the workload and decreased staff availability for the project. At the start of Year 2, the DECR (North Caicos) lead had significantly reduced their role in the project, and the then newly recruited Wetland Ecologist became the main point of contact. Also in Year 2, there were considerable staff changes in JNCC, leaving the project with one remaining JNCC stakeholder. In Year 3, the initial stakeholders for UoE and MCS also stepped away from the project, but replacements were found to allow the project to continue.

The DECR (North Caicos) project team have actively engaged with several island communities through school visits and international events, and with government/non-government agencies through workshops (Evidence 22), GIS surgeries (Evidence 21), and scientific research (Evidence 2). Furthermore, the Wetland Ecologist employed by this project has also fostered collaborative work with three other Darwin Plus projects (DPLUS114, DPLUS181, and DPLUS164), as well as non-government scientific projects such as with Rum-Powered Research and Project Lemon Aid (Evidence 2).

### **3 Project Achievements**

#### **I. Outputs**

**Output 1: Documentation, maps and methods: a) evidence of the ecological, climate mitigation and socially important functions of the wetland b) measures of good ecological condition established by the project c) reporting agreed that take into account the changing climate.**

1.1: Detailed models show the current functions of the Ramsar Site

Fully achieved. The data provides a comprehensive overview of ecosystem services such as biodiversity, carbon storage, and water storage, and examine storm surge vulnerability and the overall multi-benefits (e.g., Evidence 3). As well as the functions, ecological network models offer insights into the site's habitat connectivity, specifically for coral, mangrove, pine yard/oak bottom forest, and wetlands. Stakeholder engagement remained central throughout the process to mitigate challenges in data acquisition, particularly with obtaining lidar data. Peer-reviewed by the external scientific community (Evidence 22), the data can inform decision-making and guiding future conservation efforts and sustainable management strategies for the Ramsar Site.

Furthermore, two turtle surveys were conducted (Evidence 6) which, in conjunction with satellite tracking data, facilitated the modelling of habitat use of sub-adult and adult female green turtles (*Chelonia mydas*) within and around the Ramsar site and East Caicos (Evidence 7). This study highlighted the critical importance of the North, Middle,

and East Caicos islands as a significant sanctuary for sub-adult green turtle population, both nationally and regionally. Moreover, the nearshore waters of East Caicos emerged as likely important foraging grounds for green turtles across various life stages.

1.2: Detailed models show the potential functions of the Ramsar Site, by Sep 2023

Fully achieved. Ecosystem service opportunity models detail the potential functions of the Ramsar Site (Evidence 4). These datasets identify areas suitable for wetland, coral, mangrove, and pine yard/oak bottom forest ecosystems, and offer insights for land management options to increase biodiversity, water storage, carbon storage, and reduce risks from storm surges. DECR (North Caicos) was involved throughout the process, providing local knowledge and ensuring their perspectives were considered. The methodology and outputs underwent a peer review by DECR (North Caicos) and the wider scientific community (Evidence 22). These datasets are valuable for decision-making and guiding future conservation efforts and sustainable management strategies for the Ramsar Site, aligning with the project's goals of promoting ecological resilience and climate mitigation.

1.3: Detailed models show the impact that future climate may have on the functions of the Ramsar Site

Fully achieved. These datasets were created for the period 2060-2080 under the SSP3 scenario, using WorldClim data to evaluate both baseline and development scenarios, for biodiversity, carbon storage, water storage, storm surge vulnerability, and multi-benefits (Evidence 5). The outputs were developed using TCI-specific data and DECR (North Caicos) local knowledge. DECR (North Caicos) were involved throughout the process. The data underwent a peer review by DECR (North Caicos), ensuring their accuracy and reliability (Evidence 22).

1.4: Data-driven evidence supports the expansion of the Ramsar Site, by Dec 2023

Fully achieved. The review of the National Parks Ordinance is still ongoing, but the outcomes of this project significantly strengthen the DECR support for expanding the North, Middle, and East Caicos Nature Reserve and the adjacent Ramsar site. This project collaborates with the DPLUS181 East Caicos Wilderness Area project, further bolstering those initiatives. The results will also aid the forthcoming review of the National Parks Ordinance, slated for 2025, by enhancing management capabilities for the Turks and Caicos Islands' largest protected area and others.

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In March 2024, the Permanent Secretary for the Ministry of Tourism, Environment, Fisheries, Marine Affairs, Culture and Heritage, Agriculture at the Turks and Caicos Islands Government requested a cabinet paper to brief ministers on the proposal to extend East Caicos' Ramsar site. The project steering group drafted responses (Evidence 18), and meetings were arranged with the Permanent Secretary and the Minister.

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## **Output 2: A monitoring system enables users to access and view the latest in-situ and remotely sensed data.**

2.1: Ground collection data plan created, tested and routinely collected, by Mar 2023  
Fully achieved. The Wetland Ecologist developed a comprehensive fieldwork plan for the Ramsar site (Evidence 8). This plan includes an annual cross-disciplinary metric for collecting data on insects, birds, habitats, substrate, hydrology, and weather. Data collection followed predefined routes and areas based on current access points and included control areas outside the Ramsar site for comparison (Evidence 9). Fieldwork was regularly conducted within sections of the Ramsar site, using accessible trails in North Caicos. DECR (North Caicos) staff manually cut these trails to create access, recording waypoints along them to denote changes in the predominant ambient habitat type (Evidence 10). The ground collection data plan was devised, tested, and validated by DECR (North Caicos), ensuring its reliability and effectiveness.

2.2: The design, creation, validation and routine collection of Earth observation-based wetland condition indicators is complete by Jun 2023

Fully achieved. Five key wetland conditions were prioritised for monitoring, including short-term drastic changes (land clearance and fire damage), and medium-to-long-term indicators (drought stress, suspended solids, and coastal change) (Evidence 11). Earth observation data from Sentinel-2 and Landsat satellites were continually collected and processed for use in the indicators. Validation the short-term indicators were based on bush fire and land clearance events, observed by DECR (North Caicos). Validating medium and long-term indicators directly proved challenging, so peer-reviewed Earth observation-based indicators were utilised instead. Throughout the process, DECR (North Caicos) were actively engaged. A loss of a departmental vehicle meant that field surveys were limited, however the completion of the Earth observation-based wetland condition indicators marks a significant achievement in monitoring and managing the TCI Ramsar site.

2.3: The design, development, testing, and operation of the monitoring system is live by Dec 2023

Partially achieved. The DECR (North Caicos) proposed integrating the monitoring data into the existing TCI Data Portal, established through the Darwin Plus Project for Developing Marine Spatial Planning tools for Turks and Caicos. This consolidation aimed to provide government staff and the local community access to all spatial data through a single platform that was already known, and being used, within the community. While the integration plan aimed to improve accessibility and streamline data management, the absence of a single key government staff position throughout the project, posed significant obstacles outside of the projects control. Without a TCI Government Data Manager, there was no access to the Data Portal. The project attempted to circumnavigate the issue through various means, including contacting the company that build the portal. A temporary post allows the project baseline data to be uploaded, but this was filled too late to incorporate any automatic monitoring systems.

DECR (North Caicos) will maintain data for inclusion into the TCI Data Portal, in anticipation for when a full-time Data Manager is employed.

2.4: By the project end, funding is secured to ensure the continuation of the monitoring system

Partially achieved. The monitoring system depends on having an up-to-date and working Data Portal with an active Data Manager for TCI, so that data is received regularly, and reflects the current habitat conditions. This was not possible, as discussed in Output 2.3. The most secure funding for monitoring into the future is through internal government restricted funds, which can be carried over from year-to-year. It was confirmed late into the project that this funding was not secured. Other funding routes were actively pursued (Evidence 12).

**Output 3: Participants in the project develop the knowledge and skills necessary to effectively use the project tools required.**

3.1: At least 10 organisations actively engage with the project and are aware of its value, by Sep 2023.

Fully achieved. Since April 2022, nearly 40 organisations have been actively engaged with the project, showcasing a broad awareness of its value and objectives (Evidence 11). These organisations represent diverse sectors; 15 governmental bodies, 10 non-governmental entities, 2 from the private sector, and 12 from academic institutions. The level of engagement is multifaceted, ranging from collaborative efforts such as knowledge exchange, peer reviews, and collaborative projects, to educational initiatives such as school visits and fieldwork training. Communication strategies were comprehensive, utilising workshops, fieldwork training sessions, online GIS surgeries, posters, seminars, field trips, and on-island publications (Evidence 12). Additionally, participation in conferences and public events has helped disseminate project information and foster dialogue with stakeholders. Feedback received through workshops has been overwhelmingly positive, underscoring the value perceived by participating organizations, and serves as a testament to the project's effectiveness in engagement (Evidence 23). Challenges such as low attendance of the structured workshops and participation in drop-in GIS surgeries were noted. The DECR (North Caicos) team heavily engaged the local community through school presentations and several science projects (Evidence 11). Notably, collaboration between six different science projects, including DPLUS114, DPLUS181, and DPLUS164, further enriched the understanding and collaboration among participants (Evidence 11).

3.2: At least 75% of actively engaged participants understand the impacts that climate change may have on the Ramsar Site, and the mitigations that can be put into place, by Dec 2023

Fully achieved. Out of the ~40 actively engaged participants, a significant proportion demonstrated a commendable understanding of the potential impacts of climate change on the Ramsar Site, as well as available mitigation strategies (Evidence 23). Anonymous feedback from these initiatives was overwhelmingly positive, with 85% of

Workshop 3 participants scoring 4 or higher out of 5 for improved understanding of (1) climate change, (2) the Ramsar Site, and (3) potential mitigations.

3.3: Capacity within DECR (North Caicos) is increased to the extent that key personnel can create, interpret, visualise, and use GIS data for modelling and monitoring the Ramsar Site, by Mar 2024

Fully achieved. Significant improvement was made in enhancing the GIS capabilities of key personnel within DECR (North Caicos), especially for the wetland and terrestrial ecologists. The capacity-building involved monthly GIS surgeries with opportunities for self-learning. Initially, the wetland ecologist had no prior experience with GIS, and the terrestrial ecologist had some but unused/tested experience. By the project end, both ecologists successfully developed the skills to design and implement TCI-specific ecological models (Evidence 14). Key personnel from other departments participated in a structured GIS course, followed by GIS surgeries that provided ongoing support and guidance. Feedback indicated that the personalised, tailored nature of the training was particularly effective. Trainees appreciated the ability to shape the agenda and focus on the area's most relevant to their roles, which contributed to a more meaningful and applicable learning experience (Evidence 15).

3.4: By the end of the project, DECR independently use the monitoring system to plan fieldwork activities in the Ramsar Site

Partially achieved. As discussed for Output 2.3, the monitoring system could not be put into place due to the vacancy of a key TCI government role for the duration of the project. The satellite-based monitoring products were designed, tested, and developed into automated products, and are ready to be operationalised into a system at a future date (Evidence 11). These outputs were demonstrated during Workshop 3, to ensure all relevant staff could interpret the findings, and incorporate the data into their day-to-day work (Evidence 25).

## II. Outcome

**TCI Government creates and maintains scientifically robust evidence to support, and potentially extend the Ramsar Site, through understanding and monitoring of key wetland natural functions to support future TCI resilience.**

0.1 Sufficient evidence is produced to support the proposed Ramsar Site extension, by Dec 2023

Fully achieved. Comprehensive evidence has been produced to support the proposed extension of the Ramsar Site (Evidence 3, Evidence 4, Evidence 5, Evidence 6, Evidence 7). This evidence encompasses various ecosystem services, including biodiversity, carbon storage, water storage, and storm surge vulnerability in and around the current Ramsar Site. Additionally, opportunities to enhance these services and mitigate associated risks were identified. The evidence was peer-reviewed by both local and broader scientific communities (Evidence 22). The research has also focused on the ecological envelopes of five habitats identified as high conservation priorities. Turtle nesting beaches and satellite tracking data were analysed to identify important

habitats and beaches used by turtles. Future climate projections were utilised to demonstrate the resilience of the Ramsar Site, illustrating the potential impacts of development. All scenarios indicated a decline in ecosystem services if poor land management or development decisions are made. Key types of data and research compiled include ecosystem services assessments, ecological network analysis, ecological envelope studies, turtle tracking data, and ground surveys. These efforts have been a result of collaborative work involving all stakeholders.

The evidence was reviewed by DECR (North Caicos) and underwent peer review through an online symposium involving local and global scientists (Evidence 22). This thorough review process has validated the findings and strengthened the case for the Ramsar Site extension. Efforts to communicate and advocate for the extension included workshops, presentations (Evidence 22), <confidential> and ongoing work on a cabinet paper to brief ministers (Evidence 15) </confidential>. These activities ensure that decision-makers are well-informed and supportive of the proposed extension.

0.2 An environmental monitoring system is set-up and fully functioning for long-term operation. It feeds in-situ and remotely sensed data to key agencies (e.g., DECR), by the end of the project

Partially achieved. The project aimed to establish a fully functioning environmental monitoring system for long-term operation, integrating in-situ and remotely sensed data to support key agencies such as DECR. While significant achievement was made in developing, testing, and validating the monitoring products (Evidence 11), the system could not be fully implemented due to a critical TCI Government vacancy throughout the project's duration. Efforts to work around this issue were unsuccessful.

DECR (North Caicos) identified, created and/or maintained key access trails and waypoints throughout the duration of the project, while other access routes were traversed to provide opportunities for subsequent data gathering in areas which are seldom chartered (Evidence 9). DECR (North Caicos) also developed a comprehensive and user-friendly digital survey template (Evidence 8), which can be used to influence/advise future short-term and long-term research inquiries and expeditions, and can provide reference for concept notes and standard operating procedures (SOP).

0.3 Increased awareness, understanding, and skill capacity within key agencies (e.g., DECR), which will allow for data to be created, interpreted, and used for monitoring purposes by the end of the project

Fully achieved. Nearly 40 organisations, including governmental bodies, non-governmental entities, private sector participants, and academic institutions, were engaged through the project (Evidence 11). The DECR (North Caicos) team also engaged the local community through school presentations and visits, and collaborating with multiple science projects. The structured activities were highly praised by participants. Anonymous feedback from the final workshop scored 4 or higher out of 5 for improved understanding of climate change, the Ramsar Site, and potential mitigations (Evidence 23).



Capacity-building activities included monthly GIS surgeries, and two on-island workshops (Evidence 21, Evidence 22). These activities were instrumental in equipping participants with the necessary skills to utilise environmental data effectively. Specific skills developed within DECR (North Caicos) include data capture and handling, GIS-based environmental modelling, and cartography (Evidence 13). The DECR (North Caicos) team demonstrated their enhanced skills by producing detailed case studies using GIS, showcasing their ability to apply these skills independently (Evidence 14).

### III. Monitoring of assumptions

| Risk/Assumption   | Notes   |
|---|---|
| Decision makers / stakeholders are on board and there are no other major barriers to action                     | <p>Due to staff resourcing and workload, the DECR (North Caicos) lead significantly reduced their role and availability for the project.</p> <p>The Wetland and Terrestrial Ecologists worked together to take on the DECR (North Caicos) lead's role, but were routinely taken away from the project due to the scale of the DECR (North Caicos) workload.</p> |
| Covid-19 mitigating strategies remain robust and operating  | The project manager made sure that they tested every morning when on-island to mitigate for any unintentional transmission. At the end of the final workshop, the project manager contracted Covid and safely quarantined on-island.  |
| No major natural disasters  | Hurricane Fiona made landfall on North Caicos on 19-20 September 2022. This resulted in significant impacts on fieldwork for several months. The lack of reliable internet meant communication with the DECR (North Caicos) team was very unstable, at a time when planning for the first workshop was at its peak.   |
| On-island activities can take place, or remotely if required  | Not activated   |
| The financial, human and IT resource available is sufficient to deliver the project                             | <p>There were significant difficulties in transferring payments to DECR. Similarly, it was difficult for DECR (North Caicos) to finance fieldwork and conference expenditures.</p> <p>As such, a CRF transferred all funds originally allocated for DECR, to the project lead. These funds were spent within TCI only.</p>                                      |
| The reasons for designation of the Ramsar Site do not deteriorate - there may be less reason to expand the site | Not activated   |

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| if the justifications and objectives of designation were being lost or not deliverable         |  |
| Key input data is available, and suitable for use.   | From the project start until March 2023, the project had been attempting to acquire benthic, bathymetric, and topographic data. Lidar bathymetry data was eventually sourced, as was benthic habitat data. Lidar topography data was not available, and an alternative was sourced.  |
| Climate prediction data is accurate/precise enough for the modelling to be locally applicable. | Not activated  |
| Non-referenced information / expert opinion is accurate  | Not activated  |
| The data/models produced are fit-for-purpose   | Not activated  |
| Ramsar Site conditions allow for data collection   | Hurricane Fiona made landfall on North Caicos on 19-20 September 2022. This resulted in significant impacts on fieldwork for several months  |
| DECR staff are able to collect field data when required  | Hurricane Fiona also affected the physical ability of DECR (North Caicos) staff to collect data. On January 14, 2023, the DECR (North Caicos) truck on-island had been involved in an accident, rendering it unusable. The loss of the vehicle significantly affected the progress and extent of the surveys since then. An application for a new vehicle had been sent in the days following the incident. In response to this, fieldwork had to be limited to North Caicos, and by utilising other scientific fieldwork trips. |
| Sentinel satellites remain operational for their expected lifetime.                            | Sentinel-1B was retired following a power supply issue on December 23, 2021, leaving Sentinel-1A the only satellite of the constellation currently operating. The majority of the project utilised Sentinel-2 satellites, so there was minimum disruption.   |
| Key staff are available to participate in workshops/training.                                  | Not activated  |
| A wetland ecologist can be employed in a timely manner   | The process of recruiting the wetland ecologist was initiated shortly after the award was finalised. The   |

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|   | application deadline had to be extended to the end of Jan 2022 as only one candidate initially applied. The new ecologist only started work in May 2022. This significantly delayed work on the project, and an extension for the project to finish 31st March 2024 was granted under CRN 02.  |
| Current levels of knowledge/skill/understanding can be baselined for M&E purposes.  | Not activated  |
| Staff retention and progression allows them to implement and share knowledge/skills | Not activated  |
| TCI Gov infrastructure allows for a web-based data portal/dashboard to be build     | <p>During the project design phase, a post for a dedicated Data Manager was in progress by TCI Government and was expected to be filled by the project start. Unfortunately, this post was not filled throughout the lifetime of the project.</p> <p>Efforts were made to contact the original creators of the data portal, but their access was severely limited and were unable to help.</p> <p>Repeated efforts were also made to engage senior staff at DECR to gain access or information, however there was no improvement on the situation.</p> |

#### 4 Contribution to Darwin Plus Programme Objectives

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

This project focused on the important multiple values of, and potential changes to, the Ramsar site, including considering the impact of climate change issues affecting TCI. It focused on the following priorities:

- Conservation, restoration, and wise use of wetlands.
- Conservation and effective management of coral reef, wetland forest species, wetlands, and mangrove forest ecosystems.
- Raising awareness of these wetlands' role in biodiversity, carbon storage, coastal protection, and ecological networks

The project directly contributed to the Ramsar Convention by providing robust scientific evidence for the management of the TCI site and establishing the evidence base for potentially extending the Ramsar site into East Caicos. It helped address commitments made by the UK Government in various Ramsar Resolutions, including:

- XI.14 Climate change and wetlands: implications for the Ramsar Convention on Wetland,
- XIII.16 Sustainable urbanisation, climate change and wetlands
- XIII.24 The enhanced conservation of coastal marine turtle habitats and the designation of key areas as Ramsar Sites.

It helped TCI further meet commitments set out in the three pillars of the Convention:

- work towards the wise use of all their wetlands;
- designate suitable wetlands for the list of Wetlands of International Importance (the “Ramsar List”) and ensure their effective management;
- cooperate internationally on transboundary wetlands, shared wetland systems, and shared species.

The project helped TCI further the objectives of its Environment Strategy and contributed to meeting the Convention’s mission “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world”.

This project helped the Turks and Caicos Islands Government meet Guiding Principles and Commitments of the 2001 TCI Environment Charter including:

- Using natural resources wisely,
- Contributing towards the protection and improvement of the global environment;
- Safeguarding and restoring native species, habitats, and landscape features, and
- Studying and celebrating the environmental heritage as a treasure to share with our children.

The project made excellent progress in supporting the project partners in identifying the key ecosystem services, functions, and threats that face the wetlands, as well as designing and developing model rulesets to spatially map them. These were identified as key for the current timeframe, as well as the future in relation to the impacts of climate change. The project continued to process satellite imagery across the region and described the dynamics of the wetlands. Key species that represent the wetlands were identified, with an extensive desk study to understand their specific environmental requirements that make a good quality habitat. Efforts were underway to ensure that all the above information would be made available, for free and under an open license, for dissemination with the existing TCI data portal. This ensured that all the spatial data created under this Darwin project was managed and obtainable with other complementary data, and could be used by anyone. Capacity for the awareness and understanding of the importance of wetlands, the impacts that climate change would have, and the interpretation of data increased. This was across the island, across all ages, and across all sectors.

## II. Gender equality and social inclusion

There was an unbiased approach to target audiences with regards to gender, age, academia, social, or cultural affiliations. The audiences targeted included all age schools, educators, governmental technical staff, and passers-by (Evidence 11). Invitations to workshops and GIS surgeries were sent to associated organisations and directly to personnel who made their interest known.

The project outreach activities, led by the DECR (North Caicos), engaged over 400 individuals (Evidence 11) through school visits, collaborative work (i.e., contributions to the scientific exploration), supportive work (i.e., contributed to the operations of the DECR (North Caicos) team), workshops and GIS surgeries. Of these, 190 were males and 318 females (Evidence 11).

378 local primary, secondary, college, and further education students were engaged through 13 school visits across North Caicos, South Caicos and Grand Turk, as well as 54 adult teachers/chaperones. Of these, 141 were male and 283 were female.

Outside of education visits, a wide variety of scientists and NGOs and government employees were engaged for a mixture of GIS training, workshops and collaborative work. Outside of the DECR (North Caicos) project team, 16 were local to TCI and 5 were from the Caribbean region.

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| Please quantify the proportion of women on the Project Board <sup>1</sup>  | 25% |
| Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women <sup>2</sup> | 33% |

## 5 Monitoring and evaluation

The M&E system outlined the key evaluation questions and the approach to monitoring that helped design evaluations and data collection activities. This allowed us to identify the information we needed to collect, how we could collect it, and who would collect it.

There were 3 phases to the M&E plan:

- Evaluation design / Theory of Change
- Mid-term evaluation report
- Final evaluation report & legacy workshop (Evidence 14)

The data collection methods included:

- Analysis of project management and monitoring data
- Surveys of stakeholders and project participants

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<sup>1</sup> A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

<sup>2</sup> Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

- In-depth stakeholder and participant interviews
- Analysis of open access / published data

The Theory of Change Workshop, led by Wavehill and focused on ESL and DECR (North Caicos), was conducted in September 2022, in order to set out the things that need to happen to achieve the intended final outcome of the project. The workshop imagined starting the project from scratch, to identify:

- What is the final goal of the project and its ultimate impact?
- What will be the interim outcomes of the project?
- What needs to happen before the final goal/ultimate impact of the project can be achieved?
- How will we know that we're making progress towards the final goal?
- What assumptions are being made, and what's the basis for those assumptions?
- What are the key barriers that will need to be overcome if the project is going to be a success?
- What are the key enablers?
- What has to be in place if the project is going to work, and are they in place?

Following this, a week-long on-island project planning meeting between ESL and DECR (North Caicos) took place in November 2022, to redefine the specific requirements of the project, taking into account the difficulties experienced since the project start, and the ongoing resourcing issues within DECR. This led to a CRF and an overhaul of the project logframe, in collaboration with the project partners in Q4 2023, to bring it in line with the outputs from the theory of change, and the project planning meeting.

The mid-term evaluation report was completed in July 2023. This concentrated on project processes with an emphasis on the learning points and where to focus moving forward, rather than searching for evidence of outputs and outcomes at that relatively early stage. It was informed by project monitoring data, progress reports and interviews with the ESL programme manager and DECR (North Caicos) wetlands officer.

The final evaluation report outlines the findings and lessons learnt from interviews with Environment Systems and DECR (North Caicos). Interviews were performed with the key stakeholders, including the Wetland Ecologist, Assistant Director of Research & Development, and Terrestrial Ecologist from DECR (North Caicos), as well as the Director and Remote Sensing GIS Consultant from Environment Systems. The final evaluation findings were focused on:

- competing priorities and resourcing constraints
- infrastructure and equipment
- workloads and capacity
- unintended and unanticipated consequences
- experiences and feedback on training
- project legacy
- key learnings

## 6 Actions taken in response to Annual Report reviews

“This is an important and very worthwhile project that has faced many challenges to its work programme. One of these relates to a significant delay to modelling activities, due to difficulties encountered in acquiring three key datasets which it believed would be obtainable. It now has lidar data and bathymetry data, but the topography data is reported to be unprocessed and not therefore usable at this stage. It is not clear what the implications of this might be over the coming year.”

The lidar data was used as the basis of the bathymetric data. There were attempts to process the topographic lidar, including from JNCC and academic institutes, but the data was too large for their systems. The project lead was previously involved in a project that utilised a licensed topographic dataset from Airbus, though this was at a lower resolution. Licenses for the dataset were obtained, and the modelling could continue once all the different elevation datasets were composited together.

“The loss of the DECR truck has clearly caused considerable problems for the survey team, adding increased strain to their operational capacity. As it is unclear when a replacement vehicle might be acquired, does project need to revise its survey schedule and objectives?”

As a response to the loss of the vehicle, the survey work was predominantly limited to North Caicos, and some areas of Middle Caicos. Fortunately, the DECR (North Caicos) Wetland Ecologist employed by this project also proved essential for several other projects working in East Caicos, including DPLUS114, DPLUS181, and DPLUS164. By fostering a strong sense of collaboration between all these projects, we were able to utilise all the resources in a beneficial manner that provided transport into East Caicos for the Wetland Ecologist, whilst helping out the other projects.

## 7 Lessons learnt

The project demonstrated great success across various aspects, particularly its modelling, outreach, and collaboration efforts. Integrating drone technology after a DECR project in December 2022 proved advantageous to gain insight into the vast and remote areas of East Caicos, as well as facilitating navigation during survey work. In outreach, utilising social media platforms, local magazines, and film festivals effectively shared project content. Collaborations with other Darwin Plus projects, as well as local and international organisations, especially for East Caicos expeditions, expanded the project's reach.

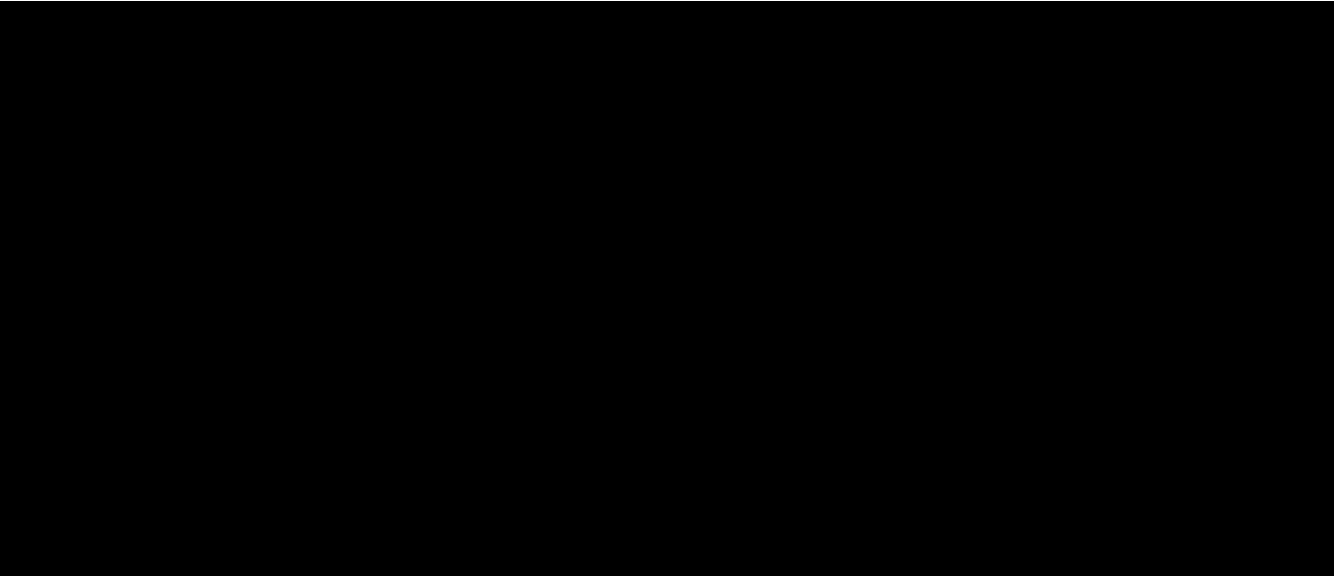
However, there were significant challenges. There was considerable delay to the project due to the time it took to find and employ the Wetland Ecologist, despite starting the process as soon as the Darwin award was announced. It was noted that, at that time, there was a [critical shortage of ecologists](#). In future projects, it is essential to plan in an extended lead time for employing new positions that are key to the project. Time must also be allowed to account for any issues relating to visas. Additionally, TCI Government (TCIG) salaries, relative to cost of living, were deemed unreasonably low

in a consultation carried out by TCIG during the project. As the salary funds were set prior to DECR knowledge of the consultation or its results, the Wetland Ecologist salary was not altered. In future, the salary level for attracting in expertise must be considered, including whether the TCIG scales are appropriate.

Fieldwork was restricted by the lack of accessible trails, where initial expeditions spent time creating trails due to the lack of existing paths. The remote and inaccessible nature of the Ramsar Site added to the challenge, with its boundary located 1—8 km away from the nearest accessible roadway. Furthermore, following the removal of the DECR (North Caicos) vehicle, securing reliable transport to survey sites became extremely difficult. As such, time spent on the ground had to be used wisely and efficiently. It is recommended that digital reference materials are used for speeding up the recording of species identification, as well as acquiring advanced tools for trail clearing. Where possible, it would be beneficial to integrate Unmanned Aerial Vehicles into projects to supplement physical surveillance and allow more GIS-capable products.

This project was also constrained by the delay in acquiring key datasets that were expected to be available before the project began, the diversion of confirmed funds that were made available for the monitoring system before the project started, and the four-year Data Manager vacancy in the TCI Government who was essential for integrating the monitoring data into the existing TCI Data Portal. For future work, it is recommended to design projects with the resources that are known to be readily available at hand. To facilitate this, it is essential to involve senior executive staff members across key TCI Government departments as project partners, in order to drive the project team activities forward and with greater buy-in for DECR central team.

## 8 Risk Management





The various landscapes within and around the TCI Ramsar site are difficult to navigate, and exposes field team members to unfavourable weather conditions. The effects of local weather patterns are most felt in the remote shrublands, as there is almost no shelter for extended periods of the day. This includes high temperatures exceeding 40°C (with the largest value of 55°C), sporadic and severe rain/lightning storms and localised flood conditions. There were times when field teammates reported sensations of nausea, disorientation, heat exhaustion, sun burn, and other skin irritations. The adaptation to mitigate these environmental conditions was to, where possible, coordinate field expeditions around projected weather patterns, prioritising the health and safety of the fieldwork team over the objectives of the project.

As there are no well-maintained pre-existing pathways and routes into sections of the Ramsar Site, declared waypoints for references/resurvey, or consistent cellular/GPS signals, there were there were periods of misdirection and confusion along the pathways that were created for this project. Since all gear (food, water, and research equipment) had to be hand-carried, there was a high risk of fatigue. The adaptations included scheduling, where applicable, bushwacking/trail creation expeditions separate from field research expeditions. For expeditions which only allowed for one visit, the decision was made to carry only essential gear for operations/data collection based on modified survey methods. Whilst along trails, frequent rests were taken to recuperate and reassess routes.

On 14 January 2023, the DECR (North Caicos) unit's vehicle was damaged beyond repair in an accident; the passengers survived the incident and we cleared after medical examination. Unfortunately, due to circumstances outside of DECR's control, a replacement vehicle was not available for the rest of the project. The adaptation for this circumstance was to coordinate foot trails that were within the proximity of the base of operations. Where possible/offered, the field team would collaborate and accompany other researchers and Darwin Plus projects to venture into other locations by alternate means of acquired transportation.

## **9 Sustainability and Legacy**

The project was publicly promoted through social media, workshops, conferences, community engagement, local publications, as well as through the TCI International Film Festival in 2023.

The intended sustainable benefits post-project is still valid given the project is now finished. Due to changes in other DECR (North Caicos) efforts, the benefits of this project have exceeded expectations in terms of efficacy. The National Parks Ordinance review has not yet been completed, and so the outputs of this project significantly bolster the DECR (North Caicos) position to support the expansion of the North, Middle and East Caicos Nature Reserve and contiguous Ramsar site. Collaboration with the DPLUS181 East Caicos Wilderness Area project will further support that project's efforts. Furthermore, the project outputs will give support for the next review of the

National Parks Ordinance (scheduled for 2025) in terms of management capacity for TCI's largest Protected Area and others.

Now the Darwin Plus funding has ceased, the project Wetland Ecologist has secured another position in a TCI Government department that allies and collaborates strongly with DECR. The other staff members associated with the project will continue in their positions and utilise the project outputs to move toward more effective management of the Ramsar Site. The resources from the project will remain with the DECR North Caicos Field Office in the continued applied conservation and management of the Ramsar Site and other Protected Areas and biodiversity of TCI.

## **10 Darwin Plus Identity**

The Darwin Plus and the UK Aid logos were incorporated into digital and physical media, that was disseminated in person and via online platforms/forums. The robust interests that the Darwin initiative has in support of environmental, socio-economical, and governmental projects within the UK and UK Overseas Territories were mentioned within all presentations.

PowerPoint presentations were created and utilised to engage a variety of audience types, within academic institutions, corporate, local workshops and symposiums, and public fairs (Evidence 15). Presentations were conducted at local academic institutions (primary, secondary, and tertiary), virtual symposiums, local and international conferences, and at local community gatherings; across the islands of North Caicos, Middle Caicos, Providenciales, Grand Turk, and South Caicos.

Two documentary videos/cinematics were used in conjunction with physical and virtual presentations (Evidence 15). These videos incorporated the overview of the DPLUS129 Project, biota of the Ramsar Site, and local concerns, along with the embedded logos of the funders and project partners in the acknowledgement sections. These videos were also integrated into an assortment of videos which are publicly showcased in the lobby/ waiting room of the DECR Providenciales office.

The social media platform "Instagram" was used to promote and disseminate media relating to the direct and indirect activities of the DPLUS129 Project (Evidence 20), where two photo collages (containing between 1-10 photos each) and one video compilation were uploaded every week, aligned with a respective theme. These themes included partnerships with other Darwin Plus projects. Since September 2023, 883 individual accounts were reached, including personal, corporate, governmental, NGO, and activist accounts within and outside of the country (especially with Overseas Territories).

Physical displays such as flyers and poster boards were also designed and shared to advertise the DPLUS129 Project (Evidence 16). One hundred and twenty (120) flyers were distributed during school visits, academic field trips, and workshops. These were targeting students and teachers (within primary, secondary, and tertiary institutions), local Government and local non-government staff, and visiting/collaborating

researchers or institutions. Three (3) posters were printed and put on display during scholastic science/youth fairs, produce markets, and workshops.

This project contributed to several print media/articles and public forums. Two articles were submitted and published in the local magazine, *Times of the Islands*, in both their Winter 2022/2023 edition (article’s title ‘Using Technology to Preserve Nature’) and the Spring 2024 edition (article’s title ‘Conservation and Resilience’) (Evidence 19). Another article, entitled ‘Conservation and Resilience of Turks and Caicos Islands Wetlands’, was submitted and published in the *InPractice* magazine/newsletter from the Chartered Institute of Ecology and Environmental Management (CIEEM), in their March 2024 edition of “*Water and Ecology*”, Issue 123 (Evidence 18).

The Darwin Plus funding was recognised as a larger programme that allowed for several distinct projects to be coordinated, often during the same period in one country. The subsidiary funding opportunities such as Darwin Local were also mentioned. The departments of the Turks and Caicos Islands government are often the main applicants and recipients of Darwin Plus/Local funding in the Turks and Caicos; chiefly observed within/involving the DECR, Department of Fisheries and Marine Resources Management (DFMRM), and the Turks and Caicos National Trust (TCNT). Members of the local ministries of the government (especially the ministries of Tourism, Education, and Finance) are kept abreast of applications and acceptance of Darwin Plus grants. Darwin Plus projects are fairly known by the members of the public with which these departments engage with (i.e., fishers, academic institutions, and environmental organisations.) However, the broader local industries/ infrastructure such as fishing co-ops, community groups, and the public not aligned with environmental conservation, does not distinguish between a Darwin Project and the routine visits from domestic and international research groups; if at all understands that these projects even exist.

## 11 Safeguarding

|  |                                 |
|--|---------------------------------|
| Has your Safeguarding Policy been updated in the past 12 months?   | No                              |
| Have any concerns been investigated in the past 12 months  | No                              |
| Does your project have a Safeguarding focal point?   | Mr Graeme [REDACTED]            |
| Has the focal point attended any formal training in the last 12 months?  | No                              |
| What proportion (and number) of project staff have received formal training on Safeguarding?   | Past: 0% [0]<br>Planned: 0% [0] |
| Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses. | No                              |

## 12 Finance and administration

### I. Project expenditure

| Project spend (indicative) since last Annual Report | 2023/24 Grant (£) | 2023/24 Total actual Darwin Plus Costs (£) | Variance% | Comments |
|---|-------------------|--|-----------|----------|
| Staff costs   |                   |  |           |          |
| Consultancy costs                                   |                   |  |           |          |
| Overhead Costs                                      |                   |  |           |          |
| Travel and subsistence                              |                   |  |           |          |
| Operating Costs                                     |                   |  |           |          |
| Capital items                                       |                   |  |           |          |
| Others  |                   |  |           |          |
| <b>TOTAL</b>  | <b>57,807.00</b>  | <b>57,807.00</b>                           |           |          |

| Staff employed (Name and position)                               | Cost (£)      |
|--|---------------|
| Dr Katie Medcalf ( Environment Director - Project Lead)          |               |
| Samuel Pike (senior Remote Sensing Consultant - Project Manager) |               |
| Dr Gemma Bell (Senior Environmental Consultant)                  |               |
| Anthony Scarth (Remote Sensing Consultant)                       |               |
| Stevan Howe (Environmental Consultant)                           |               |
| James Rugg (GIS Consultant)                                      |               |
| Suzana Baretto (Software Developer)                              |               |
| Christopher May (Terrestrial Ecologist DECR)                     |               |
| Peter Richardson (Marine Conservation Society)                   |               |
| Stephen Grady (JNCC)   |               |
| <b>TOTAL</b>   | <b>38,535</b> |

| Consultancy – description and breakdown of costs | Other items – Cost (£) |
|--|------------------------|
| Wavehill   | 4,000                  |
| <b>TOTAL</b>                                     | <b>4,000</b>           |

| Capital items – description | Capital items – Cost (£) |
|-----------------------------|--------------------------|
| N/A                         | 0.00                     |
| <b>TOTAL</b>                | <b>0.00</b>              |

| Other items – description | Other items – Cost (£) |
|---------------------------|------------------------|
| N/A                       | 0.00                   |
| <b>TOTAL</b>              | <b>0.00</b>            |

### II. Additional funds or in-kind contributions secured

| Source of funding for project lifetime | Total (£) |
|--|-----------|
| Environment Systems                    |           |

|                             |  |               |
|-----------------------------|--|---------------|
| DECR                        |  |               |
| JNCC                        |  |               |
| Marine Conservation Society |  |               |
| <b>TOTAL</b>                |  | <b>20,762</b> |

| <b>Source of funding for additional work after project lifetime</b> | <b>Total (£)</b> |
|---|------------------|
| N/A   | 0.00             |
| <b>TOTAL</b>  | <b>0.00</b>      |

### **III. Value for Money**

Off-island, this project modelled 5 key ecosystem services within the Ramsar site and surrounding area, as well as the opportunities to enhance each of these services. These data were projected into the future using global climate predictions. In addition, ecological networks were modelled to identify the resilience of 4 key habitat types, as well as their opportunities to make them bigger, better and more joined up. Furthermore, the ecological envelopes of 6 key wetland habitats, representing the homes of 5 key wetland species were modelled for 2020 and 2080. Lastly, two turtle surveys were conducted in East Caicos for analysis with satellite telemetry data, which concluded with evidence of how East Caicos provides significant spatial protection to the sub-adult green turtle population in TCI.

On-island, the project cleared and established 13 trails into the Ramsar site, devised a new operating procedure for collecting and monitoring ground data, and routinely surveyed areas of the wetlands that are very remote and difficult to access. This was in addition to an extensive awareness campaign to the local community and the considerable capacity building to both the DECR project team and the wider TCI Government and NGOs. This was achieved whilst supporting numerous other scientific studies that took place in and around North, Middle, and East Caicos, including other Darwin Plus projects.

There are financial challenges when operating on-island in TCI. For example, when organising workshops, most local businesses are reluctant to provide quotes for their service (e.g., catering), or add on costs unexpectedly. This does make it extremely difficult to budget accordingly, and the final invoices can be far higher than expected. Overall, the project has sourced and yielded a large body of high-quality data that will feed into the conservation management of the existing Ramsar site, as well support the evidence of its expansion into East Caicos.

### **13 OPTIONAL: Outstanding achievements of your project**

*I agree for the Biodiversity Challenge Funds Secretariat to publish the content of this section.*

The DPLUS129 DECR project team demonstrated a noteworthy skill that caught the attention of the Hon. Josephine Connolly, Minister of Tourism, Environment, Fisheries and Marine Affairs, Culture and Heritage, Agriculture and Religious Affairs. Anticipating a workshop in November 2022, Mr. Christopher May, the project's Wetland Officer, created a video highlighting the rich biodiversity of the Ramsar Site. Titled "DECR DPLUS129- The North Middle and East Caicos Nature Reserve 2022," the video impressed the Minister, who recognised its potential for broader applications. The Minister's enthusiasm led to the video's presentation at the Turks and Caicos International Film Festival on November 11, 2022. The event attracted local and international film industry professionals, residents, and schools. Being selected as the festival's final showreel was a significant honour for the DPLUS129 project team, underscoring the importance of their conservation work, and the role the Ramsar site plays in the island culture.

After its successful festival debut, the DPLUS129 project team utilised the video for school visits, where it proved to be an effective educational tool in showcasing the Ramsar Site's biodiversity and promoting conservation awareness. The video's success at the festival and its ongoing use in educational contexts highlighted the effectiveness of multimedia in disseminating conservation messages. The DPLUS129 project team's video not only earned recognition from the Minister but also served as a valuable educational resource, enhancing public understanding of the importance of preserving the natural environment and maintaining the island's natural beauty.

**Image, Video or Graphic Information:**

| File Type<br>(Image /<br>Video /<br>Graphic) | File Name or File Location | Caption, country<br>and credit  | Online<br>accounts<br>to be<br>tagged<br>(leave<br>blank if<br>none) | Consent of<br>subjects<br>received<br>(delete as<br>necessary) |
|--|----------------------------|---|--|--|
| Video  | DPLUS129_WP3_video.mp4     | This cinematic-style video was created to highlight the rich biodiversity and textured environments within the TCI North, Middle and East Caicos Ramsar site. | Video  | Yes / No   |

**Annex 1 Project’s full current logframe as presented in the application form (unless changes have been agreed)**

| Project Summary  | Measurable Indicators   | Means of Verification  | Important Assumptions  |
|--|---|--|--|
| <p>Impact:<br/>                     TCI wetlands and their internationally significant biodiversity are maintained into the long-term despite a changing climate, due to the enhanced understanding, monitoring and knowledge of what contributes to their resilience.</p> |   |  |  |
| <p>Outcome:<br/>                     TCI Government creates and maintains scientifically robust evidence to support, and potentially extend the Ramsar Site, through understanding and monitoring of key wetland natural functions to support future TCI resilience.</p>   | <p>0.1: Sufficient evidence is produced to support the proposed Ramsar Site extension, by Dec 2023</p>  | <p>0.1: Technical and policy report that outline the methods, results and recommendations</p>  | <ul style="list-style-type: none"> <li>• Decision makers / stakeholders are on board and there are no other major barriers to action</li> <li>• Covid-19 mitigating strategies remain robust and operating</li> <li>• No major natural disasters</li> <li>• On-island activities can take place, or remotely if required</li> <li>• The financial, human and IT resource available is sufficient to deliver the project</li> <li>• The reasons for designation of the Ramsar Site do not deteriorate - there may be less reason to expand the site if the justifications and objectives of designation were being lost or not deliverable</li> </ul> |
|  | <p>0.2: An environmental monitoring system is set-up and fully functioning for long-term operation. It feeds in-situ and remotely sensed data to key agencies (e.g., DECR), by the end of the project</p>             | <p>0.2: Sign off and subsequent press release</p>  |  |
|  | <p>0.3: Increased awareness, understanding, and skill capacity within key agencies (e.g., DECR), which will allow for data to be created, interpreted, and used for monitoring purposes by the end of the project</p> | <p>0.3: Interviews with senior officials of key stakeholder organisations, short surveys disseminated via key organisations to their own stakeholders and a series of case studies as feedback to support learning around how to improve awareness of climate resilience issues and activities</p> |  |

|  |  |   |   |
|--|--|---|---|
|  |  | on the island to strengthen climate resilience.   |   |
| <p>Output 1:<br/>Documentation, maps and methods:<br/>a) evidence of the ecological, climate mitigation and socially important functions of the wetland<br/><br/>b) measures of good ecological condition established by the project<br/><br/>c) reporting agreed that take into account the changing climate.</p> | 1.1: Detailed models show the current functions of the Ramsar Site, by Sep 2023                                    | 1.1: Data and maps of wetland dynamics, stock ecosystem services, current risks/vulnerabilities, and habitat quality                                  | <ul style="list-style-type: none"> <li>• Key input data is available, and suitable for use.</li> <li>• Climate prediction data is accurate/precise enough for the modelling to be locally applicable.</li> <li>• Non-referenced information / expert opinion is accurate</li> <li>• The data/models produced are fit-for-purpose</li> </ul> |
|  | 1.2: Detailed models show the potential functions of the Ramsar Site, by Sep 2023                                  | 1.2: Data and maps of the opportunities to enhance the ecosystem services, and mitigate the risks/vulnerabilities, of the Ramsar Site                 |   |
|  | 1.3: Detailed models show the impact that future climate may have on the functions of the Ramsar Site, by Sep 2023 | 1.3: Data and maps of the ecosystem services, risks/vulnerabilities, and habitat quality, under different climate scenarios                           |   |
|  | 1.4: Data-driven evidence supports the expansion of the Ramsar Site, by Dec 2023                                   | 1.4: Documents, data and maps produced showing the extent the Ramsar Site needs protecting, in order to maintain its current function into the future |   |
| <p>Output 2:<br/>A monitoring system enables users to access and view the latest in-situ and remotely sensed data.</p>   | 2.1: Ground collection data plan created, tested and routinely collected, by Mar 2023                              | 2.1: Sign-off on ground collection plan, fieldwork reports  | <ul style="list-style-type: none"> <li>• Ramsar Site conditions allow for data collection</li> <li>• DECR staff are able to collect field data when required</li> </ul>   |
|  | 2.2: The design, creation, validation and routine collection of Earth observation-based                            | 2.2: Sign-off on condition indicators, data and maps of wetland condition   |   |



|  |  |   |   |
|--|--|---|---|
|  | wetland condition indicators is complete by Jun 2023   |   | <ul style="list-style-type: none"> <li>• Sentinel satellites remain operational for their expected lifetime.</li> </ul>   |
|  | 2.3: The design, development, testing, and operation of the monitoring system is live by Dec 2023  | 2.3: Stakeholder feedback, sign-off, press release  |   |
|  | 2.4: By the project end, funding is secured to ensure the continuation of the monitoring system  | 2.4: Signed-off departmental plans/funding applications   |   |
| <p>Output 3:<br/>Participants in the project develop the knowledge and skills necessary to effectively use the project tools required.</p> | 3.1: At least 10 organisations actively engage with the project and are aware of its value, by Sep 2023.   | 3.1: Communication plan, publicity material, event attendance lists, attendee feedback surveys, stakeholder interviews, press releases<br><br>Press release and recording of workshop 2 webinar | <ul style="list-style-type: none"> <li>• Key staff are available to participate in workshops/training.</li> <li>• A wetland ecologist can be employed in a timely manner</li> <li>• Current levels of knowledge/skill/understanding can be baselined for M&amp;E purposes.</li> <li>• Staff retention and progression allows them to implement and share knowledge/skills</li> <li>• TCI Gov infrastructure allows for a web-based data portal/dashboard to be build</li> </ul> |
|  | 3.2: At least 75% of actively engaged participants understand the impacts that climate change may have on the Ramsar Site, and the mitigations that can be put into place, by Dec 2023 | 3.2: Event materials, attendee feedback surveys, stakeholder interviews   |   |
|  | 3.3: Capacity within DECR is increased to the extent that key personnel can create, interpret, visualise, and use GIS data for   | 3.3: Case study reports of the models created by DECR for Output 1  |   |

|  |  |  |  |
|--|--|--|--|
|  | modelling and monitoring the Ramsar Site, by Mar 2024  |  |  |
|  | 3.4: By the end of the project, DECR independently use the monitoring system to plan fieldwork activities in the Ramsar Site | 3.4: Evaluation report / field officer log books |  |

**Activities** (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

1.0 Mapping and modelling

**1.1 Historic change:** Data collation and modelling to show the longer-term changes for the wetlands since Darwin Project 8146.

**1.2 Current wetland dynamics:** Data collation to provide the current data on the wetland dynamics and to develop useful indicators that can be automated to describe good ecological condition.

**1.3 Ecosystem Services (Stock / Opportunities):** Modelling to describe key ecosystem services/vulnerabilities, and the opportunities to enhance/mitigate them, respectively.

**1.4 Ecological Envelopes:** Modelling to describe the spatial quality/extent of wetland habitats, for key wetland species.

**1.5 Species modelling:** Modelling to describe the spatial quality/extent of habitats used by turtles, from the [Turks and Caicos Islands Turtle Project](#).

**1.6 Modelling climate change:** Modelling to describe the climate change impacts on the ecosystem services, ecological envelopes, and species.

2.0 Monitoring

**2.1 Establish a monitoring plan:** Design a monitoring plan based on frequency and importance of, seasonal, annual and long-term change. Design the indicators of significance and consider aspects such as their frequency of assessment and ease of collection.

**2.2a Design monitoring system:** document the full specifications, software and ease of communication with other on-Island systems, data capture systems, ongoing management and maintenance systems.

**2.2b Build the monitoring system:** build the monitoring system and trial its use for both remote sensing and field data, with the involvement of new wetland officers and other key staff.

**2.3 Testing the monitoring system:** the monitoring system is populated with data and its usability confirmed. This is validated by relevant project partners.

**2.4 Future funding:** Cases written for future funding, including sourcing funding types and writing the application, to take the most important aspect of natural capital opportunities modelling forward at the end of this project to retain the Wetland Officer.

### 3.0 Capacity building

**3.1 Communication plan:** Establish an outreach calendar, identifying the key stakeholders, the key messages and the communication tools.

**3.2 Recruitment:** Recruitment a Wetland Officer for North Middle and East Caicos, and ensure access to GIS-capable IT.

**3.3 Project launch:** online/on-island event with key stakeholders.

**3.4a Workshop 1:** Educating stakeholders about wetland function, modelling and remote sensing, and monitoring.

**3.4b Workshop 2:** Defining the monitoring options and agreeing methods/systems to be put into place.

**3.4c Workshop 3:** Ramsar Site evidence and project show and tell. Monitoring system goes live.

**3.5a DECR GIS training:** case studies and training for modelling ecosystem services, ecological envelopes, and climate scenarios.

**3.5b Wider GIS training:** setting up and running monthly GIS surgeries for TCI Government departments.

**3.6 On-island training:** in-field work methods and turtle survey and update on history of original Ramsar Site designation.

**3.7 Monitoring system:** Training to key stakeholders, on how to use and interpret the monitoring data.

## **Annex 2 Report of progress and achievements against final project logframe for the life of the project (if your project has a logframe)**

| <b>Project summary</b>   | <b>Measurable Indicators</b> | <b>Progress and Achievements for the life of the project</b>   |
|--|------------------------------|--|
| Impact<br>TCI wetlands and their internationally significant biodiversity are maintained into the long-term despite a changing climate, due to the enhanced understanding, monitoring and knowledge of what contributes to their resilience. |                              | The outputs of this project will significantly bolster the DECR (North Caicos) position to support the expansion of the North, Middle and East Caicos Nature Reserve and contiguous Ramsar site.<br>The project outputs will support the next review of the National Parks Ordinance (scheduled for 2025) in terms of management capacity for TCI's largest Protected Area and others. |

| Project summary  | Measurable Indicators  | Progress and Achievements for the life of the project  |
|--|--|--|
| <p>Outcome</p> <p>TCI Government creates and maintains scientifically robust evidence to support, and potentially extend the Ramsar Site, through understanding and monitoring of key wetland natural functions to support future TCI resilience.</p>      | <p>0.1: Sufficient evidence is produced to support the proposed Ramsar Site extension, by Dec 2023</p> <p>0.2: An environmental monitoring system is set-up and fully functioning for long-term operation. It feeds in-situ and remotely sensed data to key agencies (e.g., DECR), by the end of the project</p> <p>0.3: Increased awareness, understanding, and skill capacity within key agencies (e.g., DECR), which will allow for data to be created, interpreted, and used for monitoring purposes by the end of the project</p> | <p>Comprehensive evidence supports the proposed Ramsar Site extension, focusing on ecosystem services like biodiversity, carbon storage, water storage, and storm surge vulnerability (Evidence 3, Evidence 4, Evidence 5, Evidence 6, Evidence 7). Data of high-priority habitats and turtle use, along with climate projections, underscores the site's importance and function, and advocate for the site's expansion.</p> <p>&lt;confidential&gt;</p> <p>A Government Cabinet paper is currently being drafted (Evidence 15).</p> <p>&lt;/confidential&gt;</p> <p>Despite developing a robust environmental monitoring system (Evidence 11), full implementation was hampered by the absence of a Data Manager. The project increased awareness and skills within DECR and other organisations, enhancing data capture, and GIS modelling through training and workshops (Evidence 13, Evidence 23).</p> |
| <p><b>Output 1</b></p> <p>Documentation, maps and methods:</p> <p>a) evidence of the ecological, climate mitigation and socially important functions of the wetland; b) measures of good ecological condition established by the project; c) reporting</p> | <p>1.2: Detailed models show the potential functions of the Ramsar Site, by Sep 2023</p> <p>1.3: Detailed models show the impact that future climate may have on the functions of the Ramsar Site, by Sep 2023</p>   | <p>Detailed data of the Ramsar Site, showcasing ecosystem services like biodiversity, carbon storage, and storm surge vulnerability, have been completed (Evidence 3, Evidence 4, Evidence 5). These data, peer-reviewed and based on robust data collection, guide future conservation efforts. Turtle surveys and satellite tracking identified key habitats for green turtles (Evidence 6, Evidence 7). Despite challenges in data acquisition, the data provide insights for land management. Future climate scenario data were run for 2060-2080, under 'normal' and 'developed' scenarios (Evidence 5).</p>  |

| Project summary  | Measurable Indicators   | Progress and Achievements for the life of the project  |
|--|---|--|
| agreed that take into account the changing climate.  | 1.4: Data-driven evidence supports the expansion of the Ramsar Site, by Dec 2023  | <confidential><br>The project also supports the proposed expansion of the North, Middle, and East Caicos Nature Reserve and the adjacent Ramsar site through a draft Cabinet Paper (Evidence 15).<br></confidential>   |
| 1.1 Historic change: Data collation and modelling to show the longer-term changes for the wetlands since Darwin Project 8146.  |   | Complete   |
| 1.2 Current wetland dynamics: Data collation to provide the current data on the wetland dynamics and to develop useful indicators that can be automated to describe good ecological condition. |   | Complete   |
| 1.3 Ecosystem Services (Stock / Opportunities): Modelling to describe key ecosystem services/vulnerabilities, and the opportunities to enhance/mitigate them, respectively.                    |   | Complete   |
| 1.4 Ecological Envelopes: Modelling to describe the spatial quality/extent of wetland habitats, for key wetland species.   |   | Complete   |
| 1.5 Species modelling: Modelling to describe the spatial quality/extent of habitats used by turtles, from the Turks and Caicos Islands Turtle Project.   |   | Complete   |
| 1.6 Modelling climate change: Modelling to describe the climate change impacts on the ecosystem services, ecological envelopes, and species.   |   | Complete   |
| <b>Output 2</b><br>A monitoring system enables users to access and view the latest in-situ and remotely sensed data.   | 2.1: Ground collection data plan created, tested and routinely collected, by Mar 2023<br>2.2: The design, creation, validation and routine collection | The Wetland Ecologist created a ground survey plan for the Ramsar site to collect data on insects, birds, habitats, substrate, hydrology, and weather (Evidence 8). Data collection followed predefined routes, including control areas outside the site. DECR staff created trails in |

| Project summary   | Measurable Indicators  | Progress and Achievements for the life of the project  |
|---|--|--|
|   | <p>of Earth observation-based wetland condition indicators is complete by Jun 2023</p> <p>2.3: The design, development, testing, and operation of the monitoring system is live by Dec 2023</p> <p>2.4: By the project end, funding is secured to ensure the continuation of the monitoring system</p> | <p>North Caicos and recorded detailed data despite challenges like extreme weather and vehicle shortages (Evidence 9).</p> <p>Earth observation data from Sentinel-2 and Landsat satellites monitored five key wetland conditions (Evidence 11). Validation efforts faced limitations due to vehicle loss, but Earth observation-based indicators were successfully completed.</p> <p>DECR aimed to integrate monitoring data into the TCI Data Portal, but the absence of a data manager hindered this integration.</p> |
| 2.1 Establish a monitoring plan: Design a monitoring plan based on frequency and importance of, seasonal, annual and long-term change. Design the indicators of significance and consider aspects such as their frequency of assessment and ease of collection. |  | Complete   |
| 2.2a Design monitoring system: document the full specifications, software and ease of communication with other on-Island systems, data capture systems, ongoing management and maintenance systems.   |  | Complete   |
| 2.2b Build the monitoring system: build the monitoring system and trial its use for both remote sensing and field data, with the involvement of new wetland officers and other key staff.   |  | Complete   |
| 2.3 Testing the monitoring system: the monitoring system is populated with data and its usability confirmed. This is validated by relevant project partners.  |  | The monitoring system could not be deployed as there was no Data Manager on staff within the TCI Government.   |
| 2.4 Future funding: Cases written for future funding, including sourcing funding types and writing the application, to take the most  |  | It was confirmed late into the project that funding was not secured. Further funding routes were actively pursued (Evidence 12). Whilst no funding has been secured, this project marks the beginning of an  |

| Project summary  | Measurable Indicators  | Progress and Achievements for the life of the project  |
|--|--|--|
| important aspect of natural capital opportunities modelling forward at the end of this project to retain the Wetland Officer.                    |  | active, continuous monitoring system, which is ready to be put into place at a later date.   |
| <p><b>Output 3</b><br/>Participants in the project develop the knowledge and skills necessary to effectively use the project tools required.</p> | <p>3.1: At least 10 organisations actively engage with the project and are aware of its value, by Sep 2023.<br/>3.2: At least 75% of actively engaged participants understand the impacts that climate change may have on the Ramsar Site, and the mitigations that can be put into place, by Dec 2023<br/>3.3: Capacity within DECR is increased to the extent that key personnel can create, interpret, visualise, and use GIS data for modelling and monitoring the Ramsar Site, by Mar 2024<br/>3.4: By the end of the project, DECR independently use the monitoring system to plan fieldwork activities in the Ramsar Site</p> | <p>Since April 2022, nearly 40 organizations have engaged with the project, representing government, NGOs, private sector, and academia (Evidence 11). These groups participated in knowledge exchanges, collaborative projects, school visits, and fieldwork training, with overwhelmingly positive feedback from workshops (Evidence 23). Diverse communication strategies, including workshops, GIS surgeries, and public events, fostered strong stakeholder engagement. Despite challenges such as low workshop attendance due to competing priorities, the DECR (North Caicos) effectively engaged the community. Enhanced GIS skills among DECR staff were a key outcome, with two environmental modelling case studies produced (Evidence 13). Sustained efforts and senior-level support are crucial for maximizing the project's long-term success and impact.</p> |
| 3.1 Communication plan: Establish an outreach calendar, identifying the key stakeholders, the key messages and the communication tools.          |  | Complete   |
| 3.2 Recruitment: Recruitment a Wetland Officer for North Middle and East Caicos, and ensure access to GIS-capable IT.                            |  | Complete   |

| <b>Project summary</b>   | <b>Measurable Indicators</b> | <b>Progress and Achievements for the life of the project</b>  |
|--|------------------------------|---|
| 3.3 Project launch: online/on-island event with key stakeholders.  |                              | Complete  |
| 3.4a Workshop 1: Educating stakeholders about wetland function, modelling and remote sensing, and monitoring.                    |                              | Complete  |
| 3.4b Workshop 2: Defining the monitoring options and agreeing methods/systems to be put into place.                              |                              | Amended to a virtual symposium, with peer review of model methods and outputs   |
| 3.4c Workshop 3: Ramsar Site evidence and project show and tell. Monitoring system goes live.                                    |                              | Workshop 3 complete. Monitoring system could not go live, but the data/methods that would have gone on to it were shown and examined                      |
| 3.5a DECR GIS training: case studies and training for modelling ecosystem services, ecological envelopes, and climate scenarios. |                              | Complete  |
| 3.5b Wider GIS training: setting up and running monthly GIS surgeries for TCI Government departments.                            |                              | Complete  |
| 3.6 On-island training: in-field work methods and turtle survey and update on history of original Ramsar Site designation.       |                              | Complete  |
| 3.7 Monitoring system: Training to key stakeholders, on how to use and interpret the monitoring data.                            |                              | The monitoring system could not go live. However, DECR and TCI Government staff were trained in the data that would have gone on to it during Workshop 3. |



### Annex 3 Standard Indicators

| <b>DPLUS Indicator number</b> | <b>Name of indicator using original wording</b>   | <b>Name of Indicator after adjusting wording to align with DPLUS Standard Indicators</b>  | <b>Units</b> | <b>Disaggregation</b> | <b>Project Total</b> |
|-------------------------------|---|---|--------------|-----------------------|----------------------|
| DPLUSA01                      | Number of people from key national and local stakeholders completing structured and relevant training.  | Number of people from key national and local stakeholders engaged in structured and relevant training.  | People       | Gender balance        | 36M:33F              |
| DPLUSA02                      | Number of secondments or placements completed by individuals of key local and national stakeholders   | Number of secondments or placements completed by individuals of key local and national stakeholders   | People       | Employed              | 1                    |
| DPLUSA03                      | Number of local/national organisations with improved capability and capacity as a result of project.  | Number of local/national organisations with improved capability and capacity as a result of project.  | Number       | Organisations         | 14                   |
| DPLUSA04                      | Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.                  | Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.                  | People       | Organisations         | 2                    |
| DPLUS-A07                     | Number of government institutions/departments with enhanced awareness and understanding of biodiversity and associated local community issues | Number of government institutions/departments with enhanced awareness and understanding of biodiversity and associated local community issues | Number       | Departments           | 9                    |
| DPLUS -B05                    | Number of people with increased participation in local communities / local management organisations (i.e.,                                    | Number of people with increased participation in local communities / local management organisations (i.e.,                                    | People       |                       | 2                    |

| <b>DPLUS Indicator number</b> | <b>Name of indicator using original wording</b>   | <b>Name of Indicator after adjusting wording to align with DPLUS Standard Indicators</b>            | <b>Units</b> | <b>Disaggregation</b> | <b>Project Total</b> |
|-------------------------------|---|---|--------------|-----------------------|----------------------|
|                               | participation in Governance/citizen engagement).  | participation in Governance/citizen engagement).  |              |                       |                      |
| DPLUS-B11                     | Area identified as important for biodiversity   | Area identified as important for biodiversity   | Area         | Hectares              | 15,621               |
| DPLUS -C01                    | Number of best practice guides and knowledge products published and endorsed  | Number of best practice guides and knowledge products published and endorsed                        | Number       | Products              | 1                    |
| DPLUS -C05                    | Number of projects contributing data, insights, and case studies to national Multilateral Environmental Agreements (MEAs) related reporting processes and calls for evidence. | Number of contributing data, insights, and case studies reporting processes and calls for evidence. | Number       | Datasets              | 40                   |
| DPLUS-C10                     | Number of case studies published  | Number of case studies published  | Number       | Case studies          | 2                    |
| DPLUS-C12                     | Social Media presence   | Social Media presence   | Number       | Followers             | 121                  |
| DPLUS-C13                     | Number of webinar attendees.  | Number of webinar attendees   | Number       | Gender balance        | 7M:12F               |
| DPLUS-C14                     | Number of decision-makers attending briefing events   | Number of decision-makers attending briefing events   | Number       | Government            | 6                    |
| DPLUS-C15                     | Number of Media related activities  | Number of Media related activities  | Number       | Press events          | 2                    |

In addition to reporting any information on publications under relevant standard indicators, in Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Mark with an asterisk (\*) all publications and other material that you have included with this report.

Table 2 Publications

| <b>Title</b>   | <b>Type<br/>(e.g. journals,<br/>manual, CDs)</b> | <b>Detail<br/>(authors, year)</b>                                      | <b>Gender<br/>of Lead<br/>Author</b> | <b>Nationality<br/>of Lead<br/>Author</b> | <b>Publishers<br/>(name,<br/>city)</b> | <b>Available from<br/>(e.g. weblink or publisher if not available<br/>online)</b>   |
|--|--|--|--------------------------------------|---|--|---|
| Conservation and Resilience of Turks and Caicos Islands Wetlands | Article  | May, C., Pike, S., Medcalf, K., Manco, B. and Prosper, D.              | Male                                 | Jamaican                                  | CIEEM, Romsey (UK)                     | CIEEM   |
| Building on the Past   | Article  | Manco, B.  | Male                                 | American                                  | Times of the Islands, TCI              | <a href="https://www.timespub.tc/2022/12/building-on-the-past/">https://www.timespub.tc/2022/12/building-on-the-past/</a>               |
| Using Technology to Preserve Nature                              | Article  | May, C.  | Male                                 | Jamaican                                  | Times of the Islands, TCI              | Times of the Islands, TCI   |
| Conservation and Resilience                                      | Article  | May, C., Pike, S., Medcalf, K., Manco, B., Prosper, D., and Blaise, J. | Male                                 | Jamaican                                  | Times of the Islands, TCI              | <a href="https://www.timespub.tc/2024/03/conservation-and-resilience/">https://www.timespub.tc/2024/03/conservation-and-resilience/</a> |

Checklist for submission

|   | Check |
|---|-------|
| <b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> putting the project number in the Subject line.  |       |
| <b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> about the best way to deliver the report, putting the project number in the Subject line.                                       |       |
| If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 10)?  |       |
| <b>Have you included means of verification?</b> You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.   |       |
| <b>Do you have hard copies of material you need to submit with the report?</b> 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. |       |
| If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 13)?  |       |
| Have you involved your partners in preparation of the report and named the main contributors  |       |
| Have you completed the Project Expenditure table fully?   |       |
| Do not include claim forms or other communications with this report.  |       |