

Applicant: **McLeod, Alexander**  
Organisation: **Department of Environment & Coastal Resources (DECR)**  
Funding Sought: **[REDACTED]**  
Funding Awarded: **£0.00**

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# **DPLR3\1072**

## **Drone-based environmental monitoring in the Turks & Caicos Islands**

The Department of Environment & Coastal Resources aims to modernize its environmental monitoring techniques to answer new questions and respond to new threats tied to natural resource management. To meet this objective, this project will enable the capital purchase of a fixed-wing unmanned aerial vehicle specifically designed for high resolution surveying & mapping. In doing so, the DECR will build upon the work of previously funded projects leading towards biodiversity conservation, reduction of habitat degradation and promotion of coastal resilience.

## CONTACT DETAILS

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**Title** Mr  
**Name** Alexander  
**Surname** McLeod  
**Organisation** Department of Environment &  
Coastal Resources (DECR)  
**Website (Work)** [REDACTED]  
**Tel (Work)** [REDACTED]  
**Email (Work)** [REDACTED]  
**Address** [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

# DPLR3\1072

Drone-based environmental monitoring in the Turks & Caicos Islands

## Section 1 - Project Title & Contact Details

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### Q1. Project Title

Drone-based environmental monitoring in the Turks & Caicos Islands

### Q2. Please select whether you are applying as an organisation or as an individual (Guidance section 3 and Guidance Glossary)

Organisation

#### CONTACT DETAILS

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<b>Title</b>	Mr
<b>Name</b>	Alexander
<b>Surname</b>	McLeod
<b>Organisation</b>	Department of Environment & Coastal Resources (DECR)
<b>Website (Work)</b>	[REDACTED]
<b>Tel (Work)</b>	[REDACTED]
<b>Email (Work)</b>	[REDACTED]
<b>Address</b>	[REDACTED]

#### GMS ORGANISATION

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Type	Organisation
<b>Name</b>	Department of Environment & Coastal Resources (DECR)
<b>Phone (Fax)</b>	[REDACTED]
<b>Email (Work)</b>	[REDACTED]
<b>Website (Work)</b>	[REDACTED]
<b>Address</b>	[REDACTED]

## Section 2 - Overseas Territory(ies)

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### Q3. Overseas Territory (Guidance section 1.3):

Which UK Overseas Territory(ies) will your project be working in? Please note that in case of a non-permanent resident population you need to demonstrate a clear, meaningful, long-term link to the territory.

Turks and Caicos Islands (TCI)

\* if you have indicated a territory group with an asterisk, please give detail on which territories you are working on here:

*No Response*

In addition to the UKOT(s) you have indicated, will your project directly benefit any other UK OT(s) or country(ies)?

No

## Section 3 - Project Partners

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### Q4. Project partners (Guidance section 3.2)

In this section, please give details of all the partners involved (including the Lead Partner) and provide a summary of their roles.

Project Leader name (Guidance section 3.1):

Alexander R. McLeod

Lead Partner name (if applying as an organisation; Guidance section 3.1):

Department of Environment & Coastal Resources (DECR)

Lead Partner Website (if applicable):

<https://www.gov.tc/decr/>

Is the Lead Partner based in a UKOT where the project is working (Guidance section 3.1)?

Yes

List other partners involved and where are they based:

n/a

Summary of roles and responsibilities of each partner in the project:





Department of Environment & Coastal Resources (DECR), Turks and Caicos Islands Government is responsible for completion of project deliverables through: management of project finances; facilitating procurement of project equipment; seek consultancy to ensure methods are carried-out correctly; and implementation of modernized environmental monitoring techniques into long-term resource management strategies.

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I confirm that all listed partners are aware of this application and have indicated support: Checked

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**Attach a Cover Letter for your application (Guidance section 4.2).**

 [Cover Letter D+Local Wingtra 2024](#)  
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## Section 4 - Project Summary & Description

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### Q5. Project Summary (Guidance section 3.8)

**Please provide a brief summary of your project. This may be used in communication activities and/or published online, if your application is successful.**

The Department of Environment & Coastal Resources aims to modernize its environmental monitoring techniques to answer new questions and respond to new threats tied to natural resource management. To meet this objective, this project will enable the capital purchase of a fixed-wing unmanned aerial vehicle specifically designed for high resolution surveying & mapping. In doing so, the DECR will build upon the work of previously funded projects leading towards biodiversity conservation, reduction of habitat degradation and promotion of coastal resilience.

### Q6a. Description (Guidance section 2.1 and 6)

**Please provide a description of your project, including:**

- the overall objective
- the current situation and the problem the project is trying to address
- what success will look like and how you will measure it

**Please be as specific as possible when describing the project, using quantified data and evidence where available. You may wish to consider: what are the specific threats to the environment that the project will attempt to address, and what should we know about these threats? What does your successful project look like? And how will you demonstrate whether and how your project has been successful?**

The key objective of this project is to enable high-quality environmental data collection that can guide policymakers in natural resource management and provide evidence to more effectively direct conservation actions. To accomplish this goal, this project will purchase a fixed-wing unmanned aerial vehicle (UAV) specifically designed for high resolution surveying and mapping.

The marine and coastal environment of the Turks & Caicos Islands are under increasing pressure. Climate change has resulted in steadily increasing sea-temperatures, with the summer of 2023 erupting into the latest mass coral bleaching event (Redfearn, 2023) pushing many coral reefs to the limit of their environmental tolerances – TCI waters exceeding 20-degree-heating-weeks (NOAA, 2023) resulting in the prolonged and occasional mortal stress to many of our coral colonies. DECR recorded a maximum sea temperature of 32.26

degrees C (DECR, unpublished data). In addition to rising temperatures the globe is also experiencing rising of sea-levels, resulting in the increasing intensity of tidal pressures impacting coastlines (Leatherman et.al., 2000). Small island states like the TCI are at a disadvantage against these impacts and we have observed our local vulnerable coastal communities forced to invest in artificial coastal defenses and beach nourishment, or risk losing their homes.

Coastal development has exploded across the TCI, dramatically altering its coastlines over the past 25-years. But this economic growth comes with environmental risk. Land-based sources of pollution and sedimentation can reduce environmental quality. Rapidly growing water-sport industries to meet tourism demands threaten to push valuable habitats beyond their carrying capacities – in some cases their activities leave literal scars across the sea floor (CSSF, 2021). The growing foreign attraction to TCI draws in increasing international maritime traffic, from shipping to smaller pleasure craft, all of which threaten to transport a new invasive species and pathogens (DPlus147; Studivan, 2022). Marine disease outbreaks have spread throughout the region, reducing ecosystem biodiversity and quality (AGRRA, 2023a; AGRRA, 2023b). Invasive species like *Halophila stipulacea* (Winters, et.al., 2020) and *Unomia stolonifera* (ICRI, 2023) risk major habitat degradation.

Through the CSSF project 'Implementing Coral Reef Action Plans for the UK Overseas Territories Coral Reef Initiative' (2021) the TCI was able to begin developing its capacity for drone-based environmental monitoring. Through the use of quadcopter UAVs it has begun monitoring its shorelines for erosion and sargassum intrusion. Although we are collecting good quality data, we are restricted by scale and as such we have been recommended seek a fixed-wing UAV specifically designed for surveying & mapping. The Nature Conservancy (TNC) demonstrated to us the capacity such a survey quality drone can possess.

Through the procurement of such equipment, and the contacts DECR maintains, this project will enable the DECR to start several new initiatives:

1. Mapping of critically endangered *Acropora* corals on shallow reef crests to guide local restoration efforts (Wyatt, 2022; TNC pers. comm.);
2. Monitoring shallow sea-grass beds for the spread of invasive *H. stipulacea* and the introduction of invasive *U. stolonifera* (Ahmed et.al., 2017; TNC pers. comm.)
3. Monitoring mangrove & shallow sea-grass habitat health and for human impacts;
4. Monitoring larger scale coastal dynamics

The successful completion of this project will see:

1. The procurement of a survey & mapping quality fixed-wing unmanned aerial vehicle (UAV)
2. Design and initial implementation of an *Acropora palmata* mapping project on shallow reef crests
3. Design and initial implementation of a monitoring project for potential *Unomia stolonifera* introduction

## Q6b. Long-term sustainability (Guidance section 2.1 and 6)

**Please describe the long-term benefits of the project and the change it will bring about. How will the outcomes of the project be sustained after the funding is finished?**

This proposals aim of continued progress in modernizing environmental monitoring techniques within the DECR further develops upon work and capacity building established by previous project. The synergy of which creates an appetite to address new management questions along-side the understand of best-practices for monitoring developing threats. Procurement of a survey and mapping quality fixed-wing unmanned aerial vehicle provides the DECR opportunities to increase the standard and quality of its environmental monitoring. With GIS analysis becoming an increasingly utilized tool for environmental study, the possession of such a drone permits a modern approach to natural resource management. As the DECR is actively developing the standard of its environmental monitoring, this procurement will propel this momentum to a greater potential. Technical staff have already received training on drone-based monitoring and hardware and software procurement has already

taken place in support of these initiatives. Senior management within the DECR has expressed full support in the opportunities such techniques provide and therefore continued funding is expected to sustain such activities.

The limiting factor for such capacity building has been the granting of funding and if successful in this project, it is expected that the DECRs potential will be fulfilled.

**(Optional) Please upload any additional and supporting materials or files (such as maps of project sites, etc) below. Maximum of 5 sides of A4, and is combined as a single PDF:**

*No Response*

## Section 5 - Project Outcome(s)

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### Q7. Project Outcome(s) (Guidance section 1.2)

**Successful Darwin Plus Local projects must demonstrate measurable outcomes in at least one of the themes of Darwin Plus with a clear focus on biodiversity and the natural environment, either by the end of the project or soon after through a credible plan.**

**Please confirm that your project has a clear focus on biodiversity and the natural environment.**

Checked **Biodiversity: improving and conserving biodiversity, and slowing or reversing biodiversity loss and degradation;**

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Checked **Climate change: responding to, mitigating and adapting to climate change and its effects on the natural environment and local communities;**

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Checked **Environmental quality: improving the condition and protection of the natural environment**

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Checked **Capability and capacity building: enhancing the capacity within OTs, including through community engagement and awareness, to support the environment in the short- and long-term.**

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**Please justify your selection. Please use quantitative information where possible here.**

Biodiversity – procurement of a survey and mapping drone will directly support initiatives to reverse or mitigate against biodiversity loss and habitat degradation. Namely guiding coral restoration efforts, monitoring for invasive species and human impact to habitats.

Climate change – procurement will directly support initiatives for promoting coastal resilience through monitoring coastal dynamics and guiding coral restoration efforts.

Environmental quality –procurement will permit the monitoring of vegetative health in threatened or impacted habitats, providing evidence for management.

Capacity building – funding will primarily go towards the capital purchase of a high-resolution surveying and mapping designed fixed-wing unmanned aerial vehicle (UAV).

## Section 6 - Workplan





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## Q8. Workplan (Guidance section 2.2)

**Please provide anticipated dates for the start and end of your planned project here. Please use the Darwin Plus Local Project Workplan (available at: [Darwin Plus website](#)) to provide a list of the individual activities you have planned for this project, a brief description of what each activity entails, and the months in which the activities will be carried out. If the project involves only one activity (e.g. a purchase), please still provide project start and end dates (noting estimated times for procurement). Please note that your project must start after 1 April 2024 and be completed by 31 March 2025.**

Start date:	End date:	Duration (e.g. 3 months):
01 April 2024	31 March 2025	12 months

**Please upload the completed Darwin Plus Local Project Workplan with your proposed project activities here**

-  [R3-DPlus-Local-Workplan-Template-FINAL-Wingt](#)  
[ra-2024](#)
-  29/11/2023
-  18:50:29
-  pdf 158.56 KB


## Section 7 - Costs

## Q9. Costs (Guidance section 2.2 and please read the Finance Guidance)

**Please provide a breakdown of costs to be funded through Darwin Plus Local (in GBP).**

**Are you seeking any matched funding for this project?**

No

Budget line	Explanation	Cost in GBP
<b>Staff costs:</b>	n/a	£0.00
<b>Consultancy costs:</b>	Consultancy to kick-start Acropora coral mapping, review of Wingtra mission planning and training in machine learning applications.	
<b>Overhead costs:</b>	n/a	£0.00
<b>Travel &amp; subsistence costs:</b>	n/a	£0.00
<b>Operating costs:</b>	n/a	£0.00



<b>Capital equipment:</b>	WingtraOne GEN II with: <ul style="list-style-type: none"> <li>• Sony RX1 RII Payload Kit (42 MP RGB camera)</li> <li>• Micasense RedEdge-P Payload Kit (multispectral camera)</li> <li>• PPK activation license</li> <li>• Additional batteries</li> <li>• Accidental Damage Protection</li> <li>• Carrying Case</li> <li>• Shipping</li> </ul>	██████████
<b>Other Costs</b>	n/a	£0.00
<b>Total:</b>		██████████

**This section provides more information on the budget to help evaluators understand how you will use the funds you are requesting. You do not need to list all costs, but please list and detail costs of more than £1,000 per item below, under the appropriate budget line.**

**Details of staff costs over £1,000 (if relevant)**

n/a

**Details of overhead costs over £1,000 (if relevant):**

n/a

**Details of travel and subsistence costs over £1,000 (if relevant):**

n/a

**Details of operating costs over £1,000 (if relevant):**

n/a

**Details of capital equipment costs over £1,000 (if relevant):**

The project will be seeking the purchase of a WingtraOne GEN II drone, including a Sony RX1 RII Payload Kit (42 MP RGB camera), Micasense RedEdge-P Payload Kit (multispectral camera), additional batteries and accidental damage protection.

DECR was fortunate to participate in a local demonstration and basic training of environmental monitoring using drone technology. The DECR has been able to implement several of these lessons into their activities, however the training also demonstrated the strengths and versatility of the highly recommended WingtraOne GEN II drone. Such a tool would dramatically increase DECRs environmental monitoring capacity using learned GIS techniques.

**Details of consultancy costs over £1,000 (if relevant):**

With the procurement of a survey & mapping quality fixed-wing unmanned aerial vehicle, the DECR will receive consultancy from our partners to refresh DECRs knowledge of equipment use and methods behind the proposed monitoring programmes. Kick-starting Acropora coral mapping, review of Wingtra mission planning and training in ArcGIC Pro machine learning applications. This provides added security behind the capital purchase.

**Details of other costs over £1,000 (if relevant)**

n/a

**If your project budget was prepared in another currency and converted to GBP, please provide the exchange rate, its source, and the date it was accessed:**

<b>Other currency:</b>	<b>Exchange rate:</b>	<b>Source of this exchange rate:</b>	<b>Date exchange rate accessed:</b>
USD	1 USD = 0.793 GBP	XE.com	27 November 2023

**Darwin Plus Local has been created to build capacity and contribute to local economies in-territory.**

What % of the total will be spent in the OTs? 90

**If less than 80% of the total project spend is to be spent within the OT(s), please explain why.**

Only 10% of the project budget is expected to be utilized outside of the OT and this is to seek consultancy for technical equipment use. The remaining 90% is earmarked for equipment procurement. DECR will make every effort to utilize local vendors for procuring equipment. However, due to the unavoidable need to import project equipment, and commitments to ensure the most cost-effective delivery of project tasks and value for money, the DECR may be required to seek procurement through vendors outside the OT.

## **Section 8 - Local and National Priorities**

### **Q10. Local and national priorities**

**Please explain how this project aligns with local and national priorities? You may wish to consider the project in the context of national environmental laws, objectives, strategies, territory specific agreements, action plans or policies.**


Protection of the environment is a fundamental right to the people of the Turks & Caicos Islands (TCI Constitution, 2011) and we must seek to promote conservation and biodiversity. It is the TCI Environment Charter (2001) which encourages us to seek technologies that can benefit the environment and in doing so we plan to utilize modern approaches to achieve national priorities all tied to conserving or restoring local biodiversity & habitats (Environment Charter, 2001; Climate Change Charter, 2022). This project will support TCI by increasing our resilience to climate change impacts through guiding more effective restoration efforts and monitoring its impact to our coastlines. Through this project we will seek to uphold guiding principals of our Environment Charter in the control or eradicate invasive species and in motoring our critical habitats for degradation thus ensuring wise use of our natural resources is sustained for present and future generations.


**Will the project take place on Government owned land or water or involve biocontrol, invasive alien species control or eradication?**


Yes

**Please attach evidence that you have Government support for this project i.e. a Letter of Support. Applications which indicate that they do not take place on Government land or water, but which propose work that appears to the reviewers would be difficult/impossible to carry out without working on government land or waters may be ineligible if no Letter of Support is provided.**

 [DECR Letter of Support D+Local Drone 2024-2](#)

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## Section 9 - Project Risks

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### Q11. Project Risks

Please demonstrate your consideration of any risks involved in this project and how you intend to manage them. Please note the importance of health and safety and environmental risk assessment in the design of your project. If there is any possibility that your project may have negative impacts on the environment or human health, it is important that you provide a comprehensive analysis of potential environmental and human health risks, and the prevention measures you will take to ensure the work does not cause harm.

Depending on your project, you may wish to consider:

- Biosecurity risks – particularly for projects involving external equipment.
- Safeguarding risks – particularly for projects involving vulnerable groups such as children, older people or people with disabilities.

Risk	Mitigation
Delays to manufacturing and supply of WingtraOne GEN II and desired cameras and/or batteries	If the preferred drone is deemed to be unavailable for the project scope, an alternative fix-wing UAV will be identified and procured
Major changes to USD:GBP exchange rate	A margin for error has been factored into the budget planning for fluctuations in the exchange rate. If significant fluctuations occur, budgets will be adjusted and a suitable alternative mapping UAV will be identified and procured. Every effort will be made to ensure value for money.
<i>No Response</i>	<i>No Response</i>

Do you require more fields?

No

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## Section 10 - Terms & Conditions

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### Q12. Terms and conditions (Guidance section 3.10)

By applying for Darwin Plus Local you are adhering in full to the grant Terms and Conditions in full (available at: [Darwin Plus website](#) and as referenced in the Guidance at section 3.10). For information, the Terms and Conditions include requirements for all applicants to (amongst other requirements as per the full Terms and Conditions):

- Uphold a zero tolerance for inaction approach to tackling sexual exploitation, abuse, and harassment.

- Where appropriate, make all reasonable and adequate efforts to address gender inequality and other power imbalances.
- Notify all cases of fraud and theft (whether proven or suspected) relating to the project to the Grant Administrator as soon as they identified.

**Please indicate you have read, and understood, and will adhere to the Terms and Conditions.**

Checked

**Supporting documents list (please have these ready to attach with application)**

- Cover Letter of no more than two A4 pages. (Guidance section: 4.2 has information on what this cover letter should include).
- If the project takes place on public land or water or is addressing invasive alien species, a Letter of support from OT Government.
- Project Workplan in the template provided for Darwin Plus Local (available at: [Darwin Plus website](#)).
- Map and additional information (optional) maximum five additional pages.

**If your application is successful**

If your project application is successful, the Fund Administrator (NIRAS) will ask you to provide some financial evidence for due diligence checks before you receive your project grant. (Please see section 3.3 of the Darwin Plus Local Finance Guidance). Please be ready to provide this evidence promptly.

- **Financial evidence for organisations:** Year-end financial statements, the latest management accounts or audited accounts (if you have these).
- **Financial evidence for individuals:** Proof of identity such as a passport, ID card or driving licence and solvency (such as bank statements) and a police check.

## Section 11 - Certification

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### Certification

**I certify that, to the best of my knowledge and belief, the statements made in this application are true and the information provided is correct.**

Checked

**I have the authority to submit an application on behalf of my organisation.**

Checked

**Name:** Alexander R. McLeod

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**Position in the organisation: (if applicable)** Reef Specialist

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**Signature (please upload e-signature)**  [Graphic1](#)  
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**Date:** 29 November 2023

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## Section 12 - Submission Checklist

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### Checklist for submission

	Check
I have read the Guidance documents, including the “Darwin Plus Local Guidance” and the “Darwin Plus Local Finance Guidance”.	Checked
If my proposed project takes place on public lands or water or is addressing alien invasive species, I have uploaded a Letter of Support from Government.	Checked
I have uploaded a cover letter that details the information requested in the guidance (Guidance section 4.2 has information on what this cover letter should include).	Checked
I have read, and can meet, the current Terms and Conditions for this fund.	Checked
I have provided actual start and end dates for my project that fit this Round.	Checked
I have provided my summary budget based on UK government financial years i.e. 1 April – 31 March and in GBP in the application form.	Checked
I have uploaded my project workplan using the specific template provided.	Checked
I have uploaded all supplementary documents if I have any.	Checked
(If copying and pasting into Flexi-Grant) I have checked that all my responses have been successfully copied into the online application form.	Checked
The application has been signed by a suitably authorised individual (clear electronic or scanned signatures are acceptable).	Checked
I have checked the Darwin Plus website immediately prior to submission to ensure there are no late updates.	Checked
I have read and understood the Privacy Notice on the Darwin Plus website.	Checked

### We would like to keep in touch!

Please check this box if you would be happy for the lead applicant (Flexi-Grant Account Holder) and project leader (if different) to be added to our mailing list. Through our mailing list we share updates on upcoming and current application rounds under Darwin Plus. We also provide occasional updates on other UK Government activities related to biodiversity conservation and share project news. You are free to unsubscribe at any time.

Checked

### Data protection and use of personal data

Information supplied in the application form, including personal data, will be used by Defra as set out in the **Privacy Notice**, available from the [Forms and Guidance Portal](#).

This **Privacy Notice must be provided to all individuals** whose personal data is supplied in the application form. Some information may be used when publicising Darwin Plus including project details (usually title, lead partner, project leader, location, and total grant value).

Project Title: Drone-based environmental monitoring in the Turks & Caicos Islands (DPLR3\1072)

### Darwin Plus Local

Provide a **Workplan** that shows the key milestones in project activities. Complete the following table as appropriate to describe the intended workplan for your project. Round 3 is for a **maximum of 12 months** with activities starting from 1 April 2024. All activities must be completed by 31 March 2025.

Please add/remove columns to reflect the length of your project. For each activity (add/remove rows as appropriate) indicate the number of months it will last, and shade only the months in which an activity will be carried out. The workplan can span multiple pages if necessary.

Activity #	Description (max 25 words)	No. of months	UK Financial Year 2024/25											
			Calendar Year 2024									Calendar Year 2025		
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Seek procurement estimates from vendors	1												
2	Finalize procurement and delivery of equipment	6												
3	Design of <i>Acropora palmata</i> mapping project on shallow reef crests	4												
4	Design monitoring project for potential <i>Unomia stolonifera</i> introduction	4												
5	Begin implementation of monitoring programmes	4												
6	Finalize project expenditure & budget record-keeping	2												
7	Project reporting	2												