



Department
for Environment
Food & Rural Affairs



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Commonwealth
Office



Department
for International
Development



Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

Important note *To be completed with reference to the Reporting Guidance Notes for Project Leaders:
it is expected that this report will be about 10 pages in length, excluding annexes*

Submission Deadline: 30 April

Darwin Plus Project Information

Project Ref Number	DPLUS036
Project Title	Sustainable management of threatened keystone predators to enhance reef resilience
Territory(ies)	Cayman Islands
Contract Holder Institution	Marine Conservation International
Partner Institutions	Cayman Islands Dept. of Environment, Guy Harvey Ocean Foundation, Nova SE University, Bangor University
Grant Value	Darwin Plus £173,439; Total Grant £288,640
Start/end date of project	01/04/2015 – 31/03/2017
Reporting period (e.g., Apr 2015-Mar 2016) and number (e.g., AR 1,2)	Apr 2015-Mar 2016 AR 1
Project Leader	Dr. Mauvis Gore
Project website	www.marineconservationinternational.org ; http://www.doe.ky/
Report author and date	Dr. Mauvis Gore, 29/04/2016

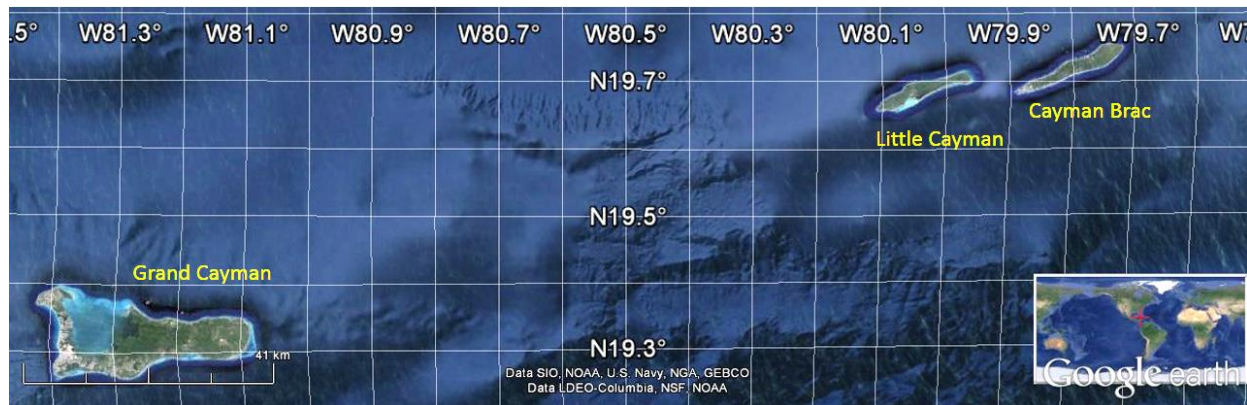
1. Project Overview

The project focuses on key biological parameters for five threatened and keystone species of shark, grouper and snapper, and introduces measures to recover their abundance, so ensuring related fisheries are sustainable. Recovery of these populations also enhances the capacity of Cayman coral reefs, vital to tourism, to withstand climate change.

Thanks to existing Marine Protected Areas (MPAs), coral reefs in Cayman have fared better than those in other Caribbean areas. Nevertheless due to climate and other impacts the abundance of living corals in Cayman is but a third of that originally present. Similarly, while globally the abundance on reefs of top predators, especially sharks, has collapsed, our recent OTEP project showed that in Cayman various sharks, grouper and snapper are still present but with relative abundances markedly lower than expected. The protection of these apex predators is now considered critical since they play a keystone role in maintaining the balance of trophic cascades, thus enhancing reef resilience. Our acoustic tagging studies revealed that top predators such as Caribbean reef sharks range over areas considerably larger than any one MPA, strengthening the argument for an extension of existing MPAs. The present project will determine abundance of keystone predators, quantify reproductive parameters, produce and implement Species Action

Plans, and implement sustainable management of on-going fisheries. This effort will address the Cayman government's commitment to "Ensure the protection and restoration of key habitats and species".

The project is located in the Cayman Islands in the Caribbean Sea, focusing on Grand Cayman and Little Cayman, shown in the map below.



Map showing the position of the three Cayman Islands in relation to each other (main map) and the American continents (red in inset).

2. Project Progress

2.1 Progress in carrying out project activities

Project activities for Year 1 are highlighted in the section below.

Output 1 Knowledge of population size of 5 marine apex predators

1.1 Deployment of 80 high definition Baited Remote Underwater Video Stations (BRUVS)

120 BRUVS have been deployed on both Grand and Little Cayman Islands in Q1 and Q3 as planned. The data have been entered into a database, cleaned and preliminary analyses begun.

1.2 Diver-based Distance Sampling of representative reef areas (minimum of 14 stations)

43 Distance Sampling surveys have been undertaken on both Grand and Little Cayman Islands in Q1 and Q3 as planned. In addition, 43 band transects were undertaken as a comparison with the Distance Sampling surveys for the target fish species. The data have been entered into a database, cleaned and preliminary analyses begun.

1.3 Conventional tagging with a target of 20 Caribbean reef shark, 20 grouper and 20 snapper.

During 11 scientific longline sets for shark species, 4 Caribbean reef shark (*Carcharhinus perezi*) were caught and have had conventional tags attached.

The NGO REEF has unexpectedly begun to tag tiger grouper (*Mycteroperca tigris*) in the Cayman Islands and our partners at the DoE requested that we concentrate on mutton snapper (*Lutjanus analis*) instead.

We have completed 24 fishing trips with 122.5 total fisher-hours and caught 30 grey (*L. griseus*, also known as lagoon) and 15 mutton snapper; 8 mutton and 3 grey snapper have had conventional tags applied.

1.4 Application of mark-recapture models to determine population size

We have begun to analyse current with historic photographs of Caribbean reef sharks around Grand Cayman and 8 have been re-sighted to date over 1-5 years. We are also collecting images of other shark species and groupers for photo-identification in relation to mark-recapture analysis.

Output 2 Knowledge of individual movement patterns of 5 apex marine predators

2.1 Tagging with acoustic tags of 20 reef shark, 20 grouper & 20 snapper

Through 11 scientific longline sets and 24 fishing trips, we have tagged 4 Caribbean reef sharks, 4 mutton and 6 grey snapper to date with acoustic tags.

2.2 Recapture of conventionally tagged fish during scientific long-lining & trapping

None have been recaptured to date.

2.3 Re-sightings of individuals during distance sampling surveys and by participating recreational divers.

There have been sightings of two Caribbean reef shark that our team tagged in previous years.

Output 3 Knowledge of reproductive biology in Cayman

3.1 Collect samples of gonads to determine breeding seasons

We have collected and stored gonads of 2 grey and 16 mutton snapper and as expected for the time of year, none of the gonads sampled were ripe.

3.2 Investigate use of potential spawning aggregation sites (SPAGS) by tiger grouper and grey snapper

We have interviewed and discussed SPAGS with our 45 fisher contacts and potential sites for spawning have been identified for further investigation. We are fishing to tag as many suitable snappers as is possible to prepare for the spawning migration season during the summer.

3.3 Survey potential grouper and snapper nursery areas (through visual surveys & netting) and fishing to assess abundance of juveniles

Surveys of potential nursery areas have begun through snorkel surveys. The method used was fishing rather than netting as our partners at the DoE felt would now be more effective. 23 roving snorkel surveys for target snapper species have also been added as a further method of data collection, and conducted.

Output 4 Knowledge of population exchange with adjacent areas

4.1 Collect fin and tissue samples during tagging work and from participating artisanal & recreational fishers

15 fin clips (14 mutton and 29 grey snapper) and fish scales (15 mutton and 29 grey snapper) were collected during tagging sessions and from fishers, along with stomach samples from 16 grey and 1 mutton snapper analysed for analysis of food in diet and 14 otoliths (ear bones for aging analyses) extracted. The samples are labelled and preserved in either molecular biological grade ethanol for DNA analysis, freezing for further analysis or in 5% formalin for histological analysis, as appropriate.

*4.3 Tag with SPOT satellite tags at least 15 oceanic whitetip (*C. longimanus*) and 5 tiger (*Galeocerdo cuvier*) sharks.*

Our partners at the GHOF have satellite tagged 4 oceanic whitetip shark and 4 tiger shark to date during five fishing expeditions.

Output 5 Functional interactions of marine apex predators with other

5.1 Collect gut samples of focal species mainly through artisanal trophic groups and recreational fishers

Of the 17 stomach samples, 8 were either empty (3) or had only bait (5). The remaining 8 grey and 1 mutton snapper had largely crab with some squid and mantis shrimp ingested.

5.2 Co-analyse (with Bangor Darwin Project staff) data for abundances of top predators and of lower trophic groups

Discussions have begun with our partners at Bangor University and will continue in the coming year. Comparison of databases is expected to take place then.

Output 6 Establish & Operate Fishers Liaison Groups

6.1 Establish formal liaison group with artisanal & recreational fishers AND

6.2 Hold meetings & workshops to exchange knowledge and discuss common interests

We have begun to establish small groups through contacts and meetings to table issues and the interests of the fishers and to explain the nature and work of the project. 22 of our fisher contacts have shown a particular interest in being involved in discussions towards management of fish stocks

6.3 Prepare and distribute illustrated booklet on marine predators for use by fishers

When we began to contact and meet with fishers, we understood that a variety of beliefs and interests existed. We then produced leaflets to inform the fishers of the project's aim and to garner their support and participation. The style and content of the booklet is under discussion with the fishers and with designers to produce a booklet to be distributed.

Output 7 Develop and Publish Species Action Plans (SAPs) for 5 marine apex predators (with reference to related species)

7.1 Discuss fisheries management options with DoE and Fishers Liaison Groups and other stakeholders.

We have begun to discuss what the DoE, the National Conservation Council and fishers regard as the future of sustainable fishing, to integrate these opinions and to offer scenarios for further discussion.

7.2 Prepare draft SAPs for 5 apex predators

This has been discussed with our partners at the DoE and agreed that they will be produced in Q2 and Q3 of the coming year, when we have had more detailed discussion with our partners and fishers and have an appropriate intern available to assist with drafting the SAPs.

7.3 Distribute draft SAPs for public consultation, publicising via media and collected responses via hard copy and web-based questionnaire

Please see Section 7.2

Please see Annex 1 for revised work plan for Output 7.1, 7.2, 7.3 and 7.4.

7.4 Revise & finalise SAPs and submit to government.

Please see Section 7.2

Output 8 Enhanced conservation and fisheries management of marine apex predators

8.2 DoE patrol vessels increase interaction with fishers vessels to check awareness and compliance

The DoE has appointed 2 new Conservation Officers to patrol, ahead of the project's schedule, and have new powers of arrest for violations.

8.3 Wider public awareness programme: distribution leaflets and posters and release of information via media

We have designed, distributed and printed over 2000 leaflets for divers & snorkelers and the same number for fishers and anglers. Additionally, we have printed and distributed 6000 postcards linked to a Twitter account and a Facebook page for the public to become involved (see Section 3 for details).

We have also had 4 press releases, 10 television and 4 radio spots, and 8 news items to support our public awareness-Citizen Science programme, all with the Darwin logo presented. These activities are ahead of schedule.

Some of the Citizen Science programme includes:

#SpotThatCayFish,

SharKY Fest <https://www.facebook.com/events/1778194145737858/>

SharKY Poster Competition <https://www.facebook.com/events/957339037694584/>

8.4 Continued monitoring (BRUVs, underwater distance sampling & catch data) to assess on-going trends

Please see Section Output 1 for details.

2.2 Project support to environmental and/or climate outcomes in the UKOT's

The project supports sustained and increased numbers and populations of top marine predators to maintain healthy coral reef. As is evident from the project description, the direction of the project is focused on promoting recovery and sustainable management of threatened and overexploited species, in tandem with MPA expansion proposed by the DoE.

2.3 Progress towards project outputs

The project's outputs include providing support for the recovery of 5 threatened and keystone species of shark, grouper and snapper and ensuring related fisheries are sustainable. This will enhance the capacity of Cayman coral reefs to withstand climate change. The outputs have been detailed in Section 2.1 of Outputs for Year 1.

2.4 Progress towards the project outcome

The project outcomes are to determine the extent of decline for each target species and whether the MPA system will be sufficient to protect them or if additional measures would be required. The information from these outcomes will be incorporated into Species Action Plans. Fisher liaison groups will provide a mechanism for involving these critical stakeholders in sampling work and co-opting them in the implementation of improved fisheries management / conservation measures, resulting in both sustainable fisheries and greater reef resilience to climate change.

Legislation to enable the protection and management of endangered and exploited species (i.e. sharks and groupers) has been passed and consultative meetings with the public and special interest groups concerning more detailed regulations are in progress. It is intended that these will lead to implementation of protective measures before the end of the project.

The Cayman DoE is demonstrating full ownership of the project.

2.5 Monitoring of risks

No risk related to boats, vehicles and accommodation occurred and there have been sufficient capable interns to assist with the fieldwork in Year 1.

The weather, however, has been much less favourable for field work, possibly related to climate instability. Fewer sharks and snappers have been caught than anticipated from our earlier work and therefore fewer numbers to analyse to date. These two factors may be a concern if the trend continues.

One of co-sponsors (Caybrew) has reduced funding to the project, but this should not adversely affect Year 2 of the project.

3. Project Stakeholders

Stakeholder involvement in the project includes:

Fishers: we have recruited 45 fishers to the network and of these, 22 are particularly keen to participate in discussion on sustainable management of fisheries. To date, three workable suggestions have been tabled to tackle this target, as well as collaboration on fishing for snapper.

The fishers have shown a mixed response to the inclusion of protection of sharks in the new Cayman National Conservation Law and in their attitude to new MPAs proposed by our partners, the DoE. Some of this attitude is reflected in our conversations concerning our current aims. We are working with the fishers to change this negative attitude including planning for an event designed to tackle this in June 2016.

DoE: we are in the DoE office daily and have office space there where we interact with our partners, work together on field surveys, consult on the surveys and Citizen Science programme and on each aspect of project.

Divers – Snorkelers: we are in working with the Cayman Islands Tourism Association (CITA) and closely with the 27 dive companies in relation to attitudes to sharks, monitoring shark, grouper and snapper behaviour and movement.

The Citizen Science programme has been designed to reach out to both the focal groups including fishers, anglers, divers and snorkelers, and to the general public and schools through social media (SpotThatCayFish in Facebook - Sharks and Cetaceans: the Cayman Islands and Twitter - #SpotThatCayFish), leaflets and contributing dive log programme.

Of particular success has been:

The new Cayman Islands National Conservation Law includes the protection of sharks has been passed. This has been a huge achievement by the DoE with support from the outcomes achieved over the past 6 years by the Marine Conservation International team, largely through Darwin Initiative, OTEP and now Darwin Plus funding.

4. Monitoring and evaluation

Discussions are in hand with the Director of the DoE Gina Ebanks-Petrie, the Deputy Director of the DoE Timothy Austin, the Cayman National Conservation Council (absorbing the former Marine Conservation Board), Prof. Rupert Ormond, Prof. John Turner and external adviser Prof. Callum Roberts.

5. Lessons learnt

We have had excellent support from the DoE and we would do very little different if we were to begin again, particularly as we have had considerable experience both of similar projects and working with DoE in Cayman.

We would recommend others embarking on a similar project to be sure to liaise with the appropriate local department(s) during development of proposal, identify local product champion(s), and ensure desk space in the partner organisation.

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

Not applicable

7. Other comments on progress not covered elsewhere

8. Sustainability

We intend to maintain contact with DoE into the future to advise on implementation.

9. Darwin Identity

The Darwin logo has been displayed on every presentation, documentation and printed material, and mentioned in presentations to the media, related to the project. The Darwin Initiative support is recognised as a distinct project with partners noted alongside. Many are aware of the Darwin Initiative from previous projects by the lead investigator and several other Darwin Initiative projects both current and previous in the Cayman Islands.

Project Expenditure

Table 1 Project expenditure during the reporting period (1 April 2015 – 31 March 2016)

Project spend (indicative) in this financial year	2015/16 Grant (£)	2015/16 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs			0	
Consultancy costs	0	0	0	
Overhead Costs			0	
Travel and subsistence			5.07	
Operating Costs			0.68	
Capital items			3.09	
Others (Consumables)			-3.62	
TOTAL			-0.03	

10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

I agree for the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

A major achievement that occurred at the beginning of the project and was based on work leading up to the current project was the Cayman Islands National Conservation Law, which not only protects coral reefs but specifically legislates for the protection of sharks.

We have implemented a Citizen Science programme to involve the public and our stakeholders in particular – fishers, anglers, divers and snorkelers. The programme encompasses both leafleting and direct contact with organisations and companies. We have initiated a campaign with an eye-catching postcard which relates to a dedicated Twitter account and Facebook page inviting participation in providing data and is used as a platform for disseminating information to participants.

Please contact Dr. Mauvis Gore if you would like any project photographs. The report is being sent from the field so no hard copies of material have been included. The team would be very happy to send these materials at a later date if the reviewing panel would like to have them.