



## Darwin Initiative: Half Year Report

(due 31 October 2014)

<b>Project Ref No</b>	DPLUS 010
<b>Project Title</b>	Coral nursery project in Little Cayman: enhancing resilience and natural capacity of coral reefs in the UKOTs
<b>Country(ies)</b>	Cayman Islands
<b>Lead Organisation</b>	Central Caribbean Marine Institute
<b>Collaborator(s)</b>	Cayman Islands Department of Environment
<b>Project Leader</b>	<i>Carrie Manfrino</i>
<b>Report date and number (eg HYR3)</b>	<i>HYR2</i>
<b>Project website</b>	<a href="http://reefresearch.org/research/staghorn-coral-nursery/">http://reefresearch.org/research/staghorn-coral-nursery/</a>

### 1. Outline progress over the last 6 months (April – Sept) against the agreed baseline timetable for the project (if your project has started less than 6 months ago, please report on the period since start up to end September).

Output 1.1 (Q2 & Q3) Maintain and upgrade nursery structures and assess the nursery year-round, providing biweekly in-situ monitoring of nursery colonies by our conservation coordinator

In April 2014, an additional fragmentation event occurred, bringing the total number of colonies in the nursery to 250 (originating from 5 wild parent colonies). To increase the nursery's capacity for these new colonies, four additional line nurseries were installed. In August 2014, we upgraded the existing pilot nursery by adding two new PVC tree nurseries, each with the capacity to hold 100 fragments of staghorn coral. These tree nurseries will receive new staghorn colonies resulting from fragmentation of the existing nursery population, tentatively planned for late 2014/early 2015. The total number of structures now totals three PVC tree nurseries and 10 line nurseries. As stated in previous reports, biweekly visits were replaced by monthly visits due to the consistently healthy growth of nursery colonies. During each visit, CCMI's Conservation Scientist checks all colonies for signs of disease, predation, or algal overgrowth, and performs routine cleaning and maintenance of the nursery structures.

Output 1.3 (Q2 & Q3) Quarterly monitoring and reporting of nursery and wild parent colonies to ensure recovery and 6 month reporting as per DEFRA requirements

Nursery colonies have been monitored regularly as dictated by output 1.1, and any progress or changes are promptly reported to project partners from CIDOE and the University of Miami. Parent colonies were monitored quarterly for a year beginning immediately after the collection of nursery fragments (September 2012), in order to assess the condition of fragmentation lesions. All parent colonies recovered fully after 4–6 weeks and continued growing normally. Fragmentation lesions were overgrown by new tissue, and in most cases, new branches started growing on the lesion sites. These observations were communicated to all project partners. In September 2013, quarterly monitoring of wild parents ceased as agreed at the initiation of the project. If any additional collections occur over the course of the project, new parent colonies will be monitored quarterly for a period of one year.

A half-year report was submitted to DEFRA in September 2013 and an annual report was submitted to DEFRA in April 2014; reporting will continue at 6 month intervals per DEFRA requirements. CCMI quarterly nursery project reports for partners will also continue as per the grant reporting framework.

### Output 2.3 (Q2) Facilitate training, based on DOE requirements

In April 2014, CCMI facilitated training by bringing project partners from the University of Miami (UM) to the Cayman Islands to meet with DOE and CCMI to provide new training on genetic sampling techniques for *Acropora cervicornis*. Training focused on sampling protocols and associated measurements such as GPS location, colony condition, and colony size. Training in techniques for field preservation of samples to safeguard genetic material for later processing was also provided. These techniques were then used to execute a related collaborative project which resulted in sampling 100 wild colonies of *Acropora cervicornis* on Grand Cayman, Little Cayman, and Cayman Brac to determine the total genetic diversity of the remaining wild population across the Cayman Islands (as described in CCMI's project annual report). These efforts resulted in additional collaboration and teamwork between CCMI, DOE, and UM, strengthening project partnerships.

### Output 2.4 (Q3) Disseminate results - training notes made available through CCMI's website and project reports

Workshop reports, which include notes on techniques used during workshops, have been provided for public access on CCMI's nursery project webpage. An additional published resource on *Acropora* nursery techniques and best practices has also been linked through the project webpage to increase knowledge of nursery techniques among interested parties.

### Output 3.2 (Q2) Select small number of outplants to be used to test climate change (ocean acidification) variations in habitats relevant to this species (*Acropora cervicornis*)

Sixty-two nursery-reared colonies were selected for outplanting in June 2014 and a protocol for testing climate change variations in habitats relevant to *Acropora cervicornis* was designed. Permitting, equipment sourcing, and field scheduling were completed in preparation for an outplanting event. In addition, 40 small fragments (i.e. <10 cm total linear extension) were collected from the nursery in June 2014 and used in an ex-situ laboratory experiment to determine the effect of *Dictyota* algae and pCO<sub>2</sub> conditions predicted for the year 2100 on coral linear extension and calcification. Preliminary results after two months indicated that high abundance of *Dictyota* reduced calcification, but not linear extension, in *A. cervicornis*. Increased pCO<sub>2</sub> did not affect linear extension or calcification in *A. cervicornis* during the course of the experiment. A scientific manuscript detailing these results is currently in progress.

### Output 3.3 (Q3) Refine outplanting techniques and strategy, then complete on larger scale, including climate change mitigation and adaptation recommendations

The results of the 2013 outplanting event were used to refine outplanting techniques and develop a new strategy for outplanting. For example, the ICON Reef site used in 2013 experienced a high amount of sedimentation, which likely led to increased mortality. For that reason, new sites with higher relief were selected at the ICON Reef and Coral City locations. In June 2014, 62 colonies of *Acropora cervicornis* were outplanted to these new sites at the ICON Reef and Coral City locations. Outplants are currently being monitored for growth and mortality.

Acoustic Doppler Current Profiler (ADCP) and SeaFET instruments were deployed for two weeks at each outplanting site. These instruments will allow us to understand site-specific differences in water flow and pH, which can contribute to site-specific climate stress. Once we have analyzed this oceanographic data, we can compare it to site-specific colony survivorship and growth. This will allow us to better understand climate-based differences between the two outplanting sites and determine whether these differences impacted outplanting success. These results will be used to design climate change mitigation and adaptation recommendations for *Acropora cervicornis* and will be published for use by the scientific community and restoration practitioners throughout the region.

**2a. Give details of any notable problems or unexpected developments that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.**

None have occurred over the last 6 months.

**2b. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?**

Discussed with LTS: Not applicable

Formal change request submitted: Not applicable

Received confirmation of change acceptance Not applicable

**3a. Do you currently expect to have any significant (eg more than £5,000) underspend in your budget for this year?**

Yes  No  Estimated underspend: £

**3b. If yes, then you need to consider your project budget needs carefully as it is unlikely that any requests to carry forward funds will be approved this year.** Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project and would like to talk to someone about the options available this year, please indicate below when you think you might be in a position to do this and what the reasons might be:

N/A

**4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?**

There are no issues we wish to raise relating to any of the above.

**If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.**

**Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but **should also** be raised with LTS International through a Change Request.**

Please send your **completed report by email** to Eilidh Young at [Darwin-Projects@ltsi.co.uk](mailto:Darwin-Projects@ltsi.co.uk) . The report should be between 2-3 pages maximum. **Please state your project reference number in the header of your email message eg Subject: 20-035 Darwin Half Year Report**