

Darwin Initiative/D+ Project Half Year Report (due 31st October 2019)

Project reference	DPLUS100:
Project title	Sustainable solutions for Sargassum inundations in Turks & Caicos
Country(ies)/territory(ies)	Turks & Caicos
Lead organisation	University of Greenwich
Partner(s)	The Turks and Caicos Island Government (TCIG) Department of Environment and Coastal Resources; The School for Field Studies, Centre for Marine Resource Studies, South Caicos; The Chartered Institute of Ecology and Environmental Management (CIEEM) UK Overseas Territories Special Interest Group (OTSIG).
Project leader	Dr Debbie Bartlett, University of Greenwich
Report date and number	HYR1
Project website/blog/social media etc.	N/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).

The agreed logframe required the following actions in the first 6 months of the project.

	Achieved	Partially	Unknown
a) Identify beaches for monitoring	X		
b) Set up baseline for monitoring	X		
c) Establish a baseline for the impact on tourism	X		
d) Set up a local 'Sargassum Task Force'			X
e) Establish links with educational establishments		X	
f) Contact local naturalists		X	
g) Develop a sample collection protocol	X		

Detailed information is provided below.

- a) **Identify beaches for monitoring:** The aim of monitoring is to gain data on the amount, frequency and location of Sargassum landings as this will be essential if any commercial use is to be found for this material. Prior to leaving TCI, we had discussed monitoring of beaches by DECR officers on the three islands, Grand Turk, South Caicos and Providenciales, during their everyday activities. While the SFS have carried out regular monitoring in Shark Bay and some resorts are recording the amount they are removing and submitting this information to us, it is unclear how much other monitoring has been done. Involving the wider public was central to this bid, both to raise awareness of Sargassum

and to engage them in 'citizen science'. All focus group attendees and questionnaire respondents (see c below) were invited to send in photographs of Sargassum, with location and date, via WhatsApp. Records were added to a GIS map created by one of the MSc projects; reciprocal record sharing has been set up with Sargassum Watch and via the EpiCollect App.

- b) **Set up baseline for monitoring:** while on South Caicos, we worked with SFS staff to explore options for regular monitoring to assess the quantity landing. Shark Bay was selected, and we cleared a 10m stretch of shoreline for 10m back from the tideline of Sargassum. The is was repeated after a week, and the material weighed in sacks. Local schools were invited to join in but, despite enthusiasm from staff and pupils, this did not happen as the headteacher, required to sign off the Health and Safety Risk Assessment was off island and so unavailable.
- c) **Establish a baseline for the impact on tourism:** we had anticipated that DECR would have a list of stakeholder's contacts, but when it became clear this was not the case a basic questionnaire was devised and agreed by both DECR and SFS. The students worked impressively hard locating and interviewing a wide variety of tourism operators, and the total of 100 responses in the limited time we were on TCI is impressive. A report analysing the data collected has been produced, distributed to all respondents, and revealed interesting results – not least that many of those reporting that they were actively removing Sargassum from the beaches consider their businesses to be unaffected.
- d) **Set up a local 'Sargassum Task Force':** the responsibility for administering this rests with DECR.; It was envisaged that the 100 questionnaire respondents would form the core.
- e) **Establish links with educational establishments:** while on South Caicos we stayed at the school for Field Studies and so had active involvement with the students on the marine science programme. The Greenwich students gave presentations on the research they were undertaking for their MSc projects, and some of the SFS have subsequently been actively involved in the monitoring of landings at Shark Bay. The partnership with SFS has been beneficial as they have well-established links to local schools resulting in invitations to give presentations and demonstrate how to sort samples of Sargassum to identify the three morphotypes. DECR have an education outreach officer who has been provided with the ID sheets to enable sorting of Sargassum into the three morphotypes. It is not clear how or if these have been used in schools on Providenciales.
- f) **Contact local naturalists:** the rationale for this action is to find out if the Sargassum is having either positive or negative impacts on wildlife as this would need to be established and taken into account if there was to be commercial exploitation of this biomass resource. Some contacts were made prior to leaving the UK, and we attended a meeting of the Overseas Territories Conservation Forum in London on 31/5/19. However, the student working on this aspect received an email from a member of DECR staff requesting that we should not contact anyone without prior approval. Our hopes were pinned on the officer responsible for North and Middle Caicos as he is well known as a keen botanist and birder. Unfortunately, our visit coincided with his extended period of annual leave. While there are clearly many local people with extensive interest in and knowledge of local wildlife there doesn't seem to be any organisation – such as the Wildlife Trusts in the UK – that represents them, and they seem to be operating largely on their own. Discussions with locals revealed that the floating rafts of seaweed may be affecting the seagrass meadows and this, in turn, is likely to have long term impacts on the conch which breed there. Conversely, these floating masses are reported to be fertile breeding grounds for many species, and this is increasing numbers of predators such as shark, tuna and marlin, to the benefit of the sports fishing industry. There are concerns regarding sea turtles as these are endangered and nest on sandy beaches. While there were some anecdotal reports of nesting on beaches, this seemed to be an area requiring urgent research as heavy inundations of seaweed would be likely to impede nesting and the journey of hatchlings into the sea. Direct observations were made of flocks of birds feeding on fresh and dried Sargassum on the beach as well as on floating rafts out at sea.
- g) **Develop a sample collection protocol:** when the bid was written, we had nor realised the significance of the different types of Sargassum. It was only after carrying out a literature review that we realised that, as the three morphotypes could not be assumed to have the same chemical composition, we would need to try to establish the relative proportions of each type. (In fact, the initial analysis has shown considerable differences in composition and methane potential between the individual species and the mixed samples, so this is an essential area for more research). The first step was to produce an identification guide and then to sort random, weighed, samples separating any biological or non-biological contamination at the same time. This took a lot of time and, although

we were pleased that initial results revealed little plastic contamination, a lot more needs to be done to establish a profile for the landings on the different islands. Experimentation revealed that taking samples from the water minimised contamination with sand, and these were then sorted into the three types. The issue of requiring a phytosanitary certificate and export license was complex and time-consuming, not least because the pre-requisite research permit had not been signed off. Samples of each of the three morphotypes, as well as one unsorted mixed sample, were prepared and placed in mesh bags immersed in seawater inside a cool box. While we wanted to bring the freshest possible samples back to the labs the inspection and certification procedures took time, so the seawater was changed regularly, and sealed bags of ice added to minimise degradation

In addition, the following actions have been achieved ahead of schedule

- Two MSc research projects have been completed
- Created easily reproducible ID sheets to enable the different morphotypes of Sargassum affecting the islands to be identified
- Collected samples and brought them back to the UK
- Carried out analyses of moisture and ash content, calorific value, protein, lipid and fibre content, amino acid profile, fatty acid profile, XRD analysis of ash, CHN analysis and metal and arsenic contents. Further chemical and methane potential analyses are on-going, and we expect full results to be available in the next six months.
- Submitted a flier summarising the research aspects of this project to Sarg-Expo
- Submitted an article to the 'Times of the Island' inviting citizen science involvement
- Uploaded the report, ID guide and student project posters to the International Sargassum Network website <https://www.internationalsargassumnetwork.com/file-share/ba60a886-2138-47b5-b554-a843443ae0f3>

In-kind contributions:

In line with the offer made in the application document, the School for Field Studies on South Caicos have provided the following summary of time/effort and resources dedicated to this Sargassum project since June. Note that it does include our experiment that we started in Fall 2018 with this project in mind. As part of this project, SFS has donated:

- Room and vehicle use - \$ (not including fuel or travel to Provo for kick-off meeting)
- 3% of Hertler, 4% of Elmer, 2% Intern and 3% of Waterfront Assistant time. \$ (a bit underestimated); 112 student hours have been involved in this project.

2a. Give details of any notable problems or unexpected developments/lessons learnt 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.

- There was a fundamental lack in our understanding of the geography, particularly the distance between the islands and the cost and frequency of transport between them when we wrote the initial bid. It was only later it became clear that, despite the excellent free accommodation offered us by the School for Field, in order to have meetings with Government officials we needed to book and pay for additional accommodation.
- In the original bid, it was anticipated that one MSc student would assist with the research in each year of the project. As it became clear early in 2019 that the MSc in Environmental Conservation would not be recruiting in September 2019 (due to a combination of factors such as accreditation and the need to update to accommodate apprentices) two students completed their MSc research papers while contributing to this project.
- The issue of the three types of Sargassum has been mentioned above. While we were able to bring back a number of samples, initial costing for the laboratory work had not taken this into account, and additional funding is needed to complete the full spectrum of analyses required (some additional funding has been raised and contributed to this).

In response to the above points, the additional cash match funding to date has been £

- Timing of our visit, just before schools closed for a break has not helped with actively involving them in monitoring beaches. Despite interest from the High School teacher working with the SFS staff to take on a beach monitoring project involving the science club. It is hoped this will happen during the autumn.

<ul style="list-style-type: none"> Monitoring at Shark Bay has been affected by the heavy rains as this has made the roads impassable (this has also affected monitoring on Highland House beach). There are a number of DECR officers named in the bid and, although we met some during our visit, it is not always easy to get regular updates on their contribution to the project. In retrospect it would have been beneficial to have an MOU completed prior to the visit however it was felt important to meet the partners face to face to establish the details of project implementation prior to formalising arrangements. While the actions and responsibilities were agreed at the closeout meeting at the end of the visit the standard MOU issued by the University of Greenwich contracts team has yet to be completed by DECR. This is required before any monies can be transferred. 	
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:	Yes
Formal change request submitted:	No
Received confirmation of change acceptance	N/A
3a. Do you currently expect to have any significant (e.g., more than £5,000) underspend in your budget for this year?	
Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Estimated underspend: £	
3b. If yes, then you need to consider your project budget needs carefully. 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, please submit a rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget so please ensure you have enough time to make appropriate changes if necessary.	
4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?	
Not at this point.	

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. Additionally, if you were funded under R25 and asked to provide further information by your first half year report, please attach your response as a separate 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 DO NOT send these in the same email.**

Please send your **completed report by email** to 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 e.g. Subject: 25-035 Darwin Half Year Report**