



**Darwin Initiative/Darwin Plus Projects  
Half Year Report  
(due 31<sup>st</sup> October 2021)**

<b>Project reference</b>	DPLUS090
<b>Project title</b>	Reducing the impacts of plastic on the BIOT natural environment
<b>Country(ies)/territory(ies)</b>	British Indian Ocean Territory (BIOT)
<b>Lead organisation</b>	Zoological Society of London
<b>Partner(s)</b>	Swansea University, BIOT Administration
<b>Project leader</b>	<i>Rachel Jones</i>
<b>Report date and number (e.g. HYR1)</b>	<i>HYR3</i>
<b>Project website/blog/social media</b>	<a href="https://twitter.com/Marine_Science">www.twitter.com/Marine_Science</a> <a href="http://www.marine.science">www.marine.science</a> <a href="https://www.facebook.com/HelloDGGoodbyeOceanPlastic">https://www.facebook.com/HelloDGGoodbyeOceanPlastic</a>

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

**Output 1: Characteristics of plastic waste pollution on BIOT marine turtle nesting beaches, and negative effects on nesting turtles and hatchlings, are understood with appropriate mitigation measures developed and implemented.**

*Note all dates reflect a requested change request (attached) which will affect final reporting dates if successful.*

- Surveys to record hawksbill and green turtle nesting attempts and those that were aborted/interrupted by (sub-) surface plastic waste continued every two weeks on the Index Beach on Diego Garcia between April-September 2021. There were no observations of plastic waste visibly affecting nesting activities.
- Temperature loggers recovered from the plastics treatment field trial were imported to UK in March and data from all 16 loggers were successfully downloaded in July 2021, including pre- and post- experiment temperatures. Temperature from all loggers was consistent. Analysis has been underway with preliminary findings demonstrating that environmental variables (air temperature, rainfall, tide height) had a large effect on sand temperature (in accordance with previous reports, see Esteban et al. 2016) and that the plastics treatment had a significant effect on temperature in some but not all plots. The experimental method, results and interpretation will be reported in a Swansea University MSc thesis by Alice Wheeler and will be included in the next project report. Alongside the field-based experiment above, a controlled experiment in the Constant Temperature and Humidity Chamber is being conducted to assess effects of surface macro- and microplastics. This experiment commenced in July 2021 (treatments mixed with 1x plastic in top 4cm sand) and is expected to conclude in early November 2021 after each treatment has been exposed to summer temperature and humidity, winter temperature and humidity conditions, and then repeated (with 4x plastics concentration 0-30cm sand). Data will be analysed and reported in the final project report. We hope to combine results from field trial and controlled-conditions trial in a scientific paper in Q1 Y4.
- Sand cores for microplastics analysis: 25 cores from 5 atolls sampled in 2019 have now been analysed in the Swansea University Benthos Laboratory to characterise sand particle size. Organic matter was extracted prior to flotation with potassium chloride of micro- and macro-plastics in order to estimate the amount of microplastics in each core section (every 4 cm to 60 cm depth). An interesting spatial pattern of microplastic concentration is emerging – with greater concentrations of microplastics in southern atolls. The plastic material is currently being assessed using FTIR and data analysis is underway to finalise and report the study in a Masters by Research thesis expected to be submitted Q1 Y4. We anticipate preparation of a scientific paper following viva of this MRes in Q3 Y4.
- Surface debris on beaches was recorded using the Marine Debris Tracker app along five 100 m transects on the Index beach (DG) and uploaded to the central database. Surveys were conducted every two weeks between February and September 2021 and recorded a total of 36,061 individual items during this time. Two of the five transects were in the reserved area for beach clean ups and dates of clean ups were recorded for preliminary analysis of rates of accumulation of debris.
- Data collected on surveys conducted in 2019 and forming part of an MSc project were published as a manuscript (Hoare, V., Atchison Balmond, N., Hays, G.C., Jones, R., Koldewey, H., Laloë, J-O., Levy, E., Llewellyn, F., Morrall, H. and Esteban, N. (accepted with revision) Plastics dominate beach debris in a remote archipelago; spatial variations in island debris accumulation inform targeted beach management. Ocean and Coastal Management.) describing surveys methods and the distribution of plastic waste across the archipelago.
- Rachel Jones contributed material from the project to the [plastics Ocean Matters podcast episode](#). Nicole Esteban also contributed to the [turtle Ocean Matters podcast episode](#) and via a webinar event on '[Plastic Pollution in the Indian Ocean](#)' which had 59 attendees joining live from 15 different countries.
- Installation of signage to indicate the value of beach cleans for turtle nesting on Index beach have been agreed and signs are being designed for two of the frequent entry points for beach clean ups. The draft signage is being prepared for approval by BIOT Administration.

**Output 2: The system of single-use plastics (SUP) on DG is understood, with a proposed strategy developed to reduce SUP in identified priority areas, with pilot completed to reduce SUP water bottles, increase refilling and enhance connection between personnel and the ocean**

- System analysis was completed including 'before' behaviour and attitudes survey. The SUP reduction campaign 'Hello DG Goodbye Ocean Plastic' was fully designed, and suite of material produced to support it.
- Campaign activity planned for June 2020 but was delayed several times due to COVID-19 – the team is now on DG and have begun these activities (Q3 Y3)
- 'After' behaviour survey planned for 6 months after campaign delivery (Q1 Y4)
- Delay will push final analysis and reporting of this activity back by six months to September '22 (Q2 Y4) - see change request and logframe.

**Output 3: Strategy for recycling DG-generated plastic waste and plastic waste collected during beach cleans developed and recommendations made to BIOT administration.**

- Draft waste report in preparation using case studies with the Thermal Compaction Group, Taylor Environmental Ltd, We are Pie, ByFusion Global Inc, and Precious Plastics, with final reporting due Q2 Y4.
- Interviews conducted with 3 other UKOTs so far to understand the issues and challenges they face with marine debris and plastic pollution, as well as what interventions they have or plan to implement
- Manuscript published on the connection between climate change and plastic pollution with co-authors from the team and acknowledging Darwin Plus funding support (Ford, H., Jones, N., Davies, A., Godley, B., Jambeck, J.R., Napper, I.E., Suckling, C., Williams, G., Woodall, L., and Koldewey, H.J. (2021) The fundamental links between climate change and marine plastic pollution. Science of the Total Environment. <https://doi.org/10.1016/j.scitotenv.2021.150392>)

**2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months (for COVID-19 specific delays/problems, please use 2b). Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.**

Nicole Esteban has been invited to present at COP26 on 10 November on the subject of Marine Plastics and Climate Change in a themed topic of Marine Turtles and Climate Change by the Government of Turkey. Some results from the project will be included in the presentation. Budget assigned for UK travel for project meetings will be used for train travel and hotel in Glasgow.

**2b. Please outline any specific issues which your project has encountered as a result of COVID-19. Where you have adapted your project activities in response to the pandemic, please briefly outline how you have done so here. Explain what residual impact there may be on your project and whether the changes will affect the budget and timetable of project activities.**

COVID-19 prevented travel to DG for most of 2020 and 21. Delivery of Year 2 activities on the ground were delayed from June 2020 to Oct 2021. Our plan is to establish the impacts of the campaign on behaviours and attitudes by a follow up survey 6 months after delivery (Q1 Y4) which will push final reporting on Output 2 back to Q2 Y4 and requires authorisation of a change request (also submitted).

Delays will affect the budget and timetable both detailed in the change request.

**2c. 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: Yes

Received confirmation of change acceptance No

**3a. Do you currently expect to have any significant (e.g. 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.** 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. Please DO NOT send these in the same email as your report.**

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

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 DO NOT send these in the same email.**

Please send your **completed report** by email to [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 e.g. Subject: 25-001 Darwin Half Year Report**