

Darwin Initiative Main/Post/D+ Project Half Year Report (due 31st October 2017)

Project reference	DPLUS064
Project title	Characterising Bermuda's baitfish populations to improve management and fishery sustainability
Country(ies)/territory(ies)	Bermuda
Lead organisation	Bermuda Zoological Society
Partner(s)	Bermuda Government DENR,
Project leader	Joanna Pitt
Report date and number (e.g., HYR3)	HYR1
Project website/blog/social media etc.	

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 following outputs had activities scheduled during the first 6 months of the project:

1 Annual cycle of baitfish abundance

- 1.1 Test and install cameras at 4 locations – Testing took place and this method was found to be not sufficiently accurate. This activity has been replaced with twice weekly visual surveys, with data recorded directly. See 2a.
- 1.2 Install temperature loggers at same 4 locations – This has not yet been done. We are taking advantage of an existing temperature logger program at two of our monitored sites. Additional loggers will be placed in January for a full annual cycle at all four sites during 2018.
- 1.3 Test and place underwater cameras fortnightly for 3 hours – Testing took place and this method was found to be not sufficiently accurate. This activity has also been replaced by the twice weekly visual surveys with data recorded directly. See 2a.
- 1.4 /1.5 Analyse images for school size / density and species composition – Test images were analysed and the methods was found to be not sufficiently accurate. Data from twice weekly surveys of baitfish presence / absence and school characteristics are being recorded directly into a Google form instead. See 2a.

2 Age, growth and reproduction

- 2.1 Weekly sampling for life history parameters is ongoing.
- 2.2 – 2.5 Dissections and staging; Gonad sample prep; Fecundity analysis – Dissections and data collection are ongoing, with ovaries being preserved for later histological analysis. Contractor Corey Eddy completed his first visit and training sessions in July.
- 2.6 Otolith ageing – Otoliths are being extracted from samples on an ongoing basis.

3 Population genetics

- 3.1 Sampling – Sampling of 5 species of baitfish for genetic analysis is complete.
- 3.2 DNA extractions and amplification – extractions complete, DNA amplification (PCR) >66%

complete. Further genetic work is scheduled for the next quarter.

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.

Two significant issues have arisen in the start-up phase of this project. Some changes to project operations have had to be made because contractor Chris Flook, who was to be responsible for weekly sample collections, took up a new job just prior to the start of the project and is now unable to commit the time to participate. In addition, the use of in situ GoPro cameras for monitoring baitfish schools from above the surface did not prove as useful as anticipated, detecting only dense schools in good weather conditions. This then had implications for image analysis that was to be performed by Murdoch Marine Limited.

The combined solution to these issues has been to have Thad Murdoch of Murdoch Marine perform twice weekly surface and in-water visual surveys of baitfish presence, school size and species composition at three of our four monitored sites and the technician hired under the grant to perform these surveys at the fourth site and also take on the role of collector. TM has developed a standardised survey format for this and has made use of an online Google form. This new format has also allowed for a fifth site to be monitored regularly, and opportunistic observations and collections at other sites by SR Smith can now be included in our planned analysis.

The data generated by this new format will still fulfil the primary goal of determining the annual cycle in abundance and distribution of baitfish species. In situ cameras are still in place to monitor the sites for legal or illegal fishing activity, which can be readily assessed from the images without the need for complex image analysis.

The time lag in moving to the twice weekly surveys after three months of testing the cameras in different configurations means that acquiring data on the full annual cycle of baitfish abundance will not be complete until the end of June 2018, as opposed to the end of April. This will not affect the overall output of this component of the project. The information will still be available to DENR's marine management section in time for incorporation into the revised management plan. Further, the information gleaned from the camera trials and our personal observations (during that time and since) is that the period of peak baitfish abundance, which this component of the project aimed to identify, does not occur between April and June. Therefore this lag will not compromise the drone survey scheduled for the period of peak abundance in year 2.

In terms of budget impacts, changes to the activities undertaken by Murdoch Marine will be covered by the existing budget allocation for Murdoch Marine staff costs in year 1. However, it would be useful to be able to roll over GBP7000 from staff costs and GBP1400 of associated overhead into year 2 to account for the three month delay in starting up this revised data collection programme. A change request covering this is being submitted concurrently.

In addition, the funds budgeted for the sample collection contract (GBPXXX in year 1 and GBPXXX in year 2) will need to be reallocated. Given that the technician hired for this project (Bermudian Jirani Welch) has taken on the collecting role in addition to his regular duties, involving work outside of normal hours and on the weekends, the project management team has agreed that half of the collecting budget funds in year 1 and the full amount in year 2 should be paid to him for these additional services. This would not constitute a change in the agreed purpose of the funds, but only a change in the person who would receive them. However, if rolling over GBP8400 of funds budgeted for Murdoch Marine staff costs from year 1 to year 2 (as described above) is not possible, then some of the report preparation could be brought forward into year 1 and the year 2 collecting budget could be reallocated to help cover those costs. The balance of the work would have to be taken on by the staff whose salary is not paid by the grant.

This leaves GBP4600 from the collecting budget in year 1 unspent, and the change request being submitted concurrently is asking to reallocate these funds. We are asking to reallocate

GBP1250 to the purchase of a better microscope camera. The purchase of a new microscope, microscope camera and linked laptop computer were included in Partner Organisation Capital costs in year 1, however the cost of the items and associated shipping charges was underestimated. Further, we have collected enough specimens of two of the larger baitfish species (*Sardinella aurita* and *Harengula humeralis*) that they could be added to the genetic study, which was originally planned to focus on the three small baitfish species. A reallocation of GBP1000 from the collecting contract to the genetic component of the study would facilitate this.

In addition, the changes in the GBP:USD exchange rate between the submission of the proposal and the receipt of funds have left certain key budget items underfunded, particularly salaries for the technician and Gretchen Goodbody-Gringley as well as BIOS overhead. The change request is also seeking to reallocate the remainder of the collecting contract budget to address shortfalls in these areas.

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/No	no
Formal change request submitted:	Yes/No	submitted concurrently
Received confirmation of change acceptance	Yes/No	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: £8400 assuming reallocation approved

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 see details above and change request submitted.

It would be useful to be able to roll over GBP7000 from staff costs and GBP1400 of associated overhead into year 2 to account for the three month delay in starting up this revised data collection programme. If this is not possible, then some of the report preparation could be brought forward into year 1 and the year 2 collecting budget could be reallocated to help cover those costs. The balance of the work would have to be taken on by the staff whose salary is not paid by the grant.

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. Additionally, if you were funded under R23 and asked to provide further information by your first half year report, please attach your response as a separate document.