

SEABIRD ECOLOGY ON DIEGO GARCIA

June / July 2018 research expedition report



Figure 1. A pair of Red-footed Booby, both colour dyed for nest-monitoring purposes and the female (front bird), showing the GPS tag on the undertail for researching where this bird is feeding and foraging when out at sea in the Marine Protected Area. Photo H. Wood.

Peter Carr & Hannah Wood

Institute of Zoology

Zoological Society of London

Regent's Park

London NW1 4RY.

Email: peter.carr@ioz.ac.uk



Introduction:

The Zoological Society of London (ZSL) and Exeter University, supported by the Bertarelli Foundation, visited Diego Garcia (DG) in the British Indian Ocean Territory (BIOT), during June and July 2018, to continue research to assess the importance of the Marine Protected Area (MPA) for seabirds. Using Red-footed Booby (RFB) as the indicator species, the research consisted of three objectives that built on fieldwork conducted on DG in 2016 and January 2018. The three objectives were:

Objective 1: To document the year-round biology and foraging ecology of breeding RFBs at Barton Point Nature Reserve.

Objective 2: To document the distribution of non-breeding RFBs from the colony on DG.

Objective 3: To establish the status and distribution of breeding RFB on DG.

Methodology

Objective 1: Three fieldwork sessions have been completed, in June/July 2016 (SE monsoon season), December 2016 (NW monsoon season) and January 2018 (NW monsoon season) using the same methodology as for the latest session in June/July 2018 (SE monsoon). This involved the monitoring of nesting birds and the successful deployment and recovery of tail-mounted GPS loggers (15g, IGotU GT-120, Mobile Action Technology Inc) and leg-mounted geolocators (3.0g, Intigeo C330, Migrate Technology) on 40 breeding RFBs to document at-sea foraging locations and behaviour whilst incubating eggs or rearing small chicks. Tags were deployed for between 3 and 10 days and no apparent adverse effects were observed on either breeding success or welfare.

This research in to RFBs on DG is central to Peter Carr's BIOT MPA focussed PhD thesis, and is a part of the wider seabird research programme of the Bertarelli Programme for Marine Science. As a PhD thesis it has been important that the research is repeated not only during both monsoon seasons but also over separate years, to develop a year-round understanding of the 'typical' breeding biology and foraging ecology of RFBs.

Objective 2: While Objective 1 will provide essential data on where RFBs forage whilst breeding at the Barton Point colony we currently have no idea where RFB go during their non-breeding season. We do not know if they remain in the vicinity of DG, undertake 'migration' to other parts of BIOT, or even elsewhere in the Indian Ocean. Hence, we have no indication of the role the MPA plays in supporting non-breeding seabirds. To explore this we deployed long-term, leg-mounted (on salbex rings) geolocator tracking devices (3.0g, Intigeo C330, Migrate Technology) on RFBs to document their non-breeding season distribution. This was undertaken for the first time at scale as part of the January 2018 expedition. In June 2018 we tagged 51 further RFBs during the SE monsoon and tags will be recovered after at least one year during 2019 and 2020. As RFB return to the same nesting site each year we are confident that the majority of tags can be recovered.

Objective 3: Since the 1970s the breeding numbers and distribution of RFBs have been increasing on DG. Evidence to support this has come from DG-wide surveys conducted in 2005 & 2007. As part of an archipelago-wide assessment of the status and distribution of breeding seabirds in BIOT it has been essential that a survey of RFB be conducted on DG in 2018. As RFB breed year-round with two peak periods (usually December/January and

June/July) two surveys are required. A first count of the colony on DG was undertaken in January 2018, the second count was conducted in June/July 2018. The survey followed established methodologies and involved a component of ‘citizen science’ providing an opportunity for engagement and involvement with volunteers from DG. The survey counts Apparently Occupied Nests (AONs) along the shoreline from the Plantation Gate ocean-side to Turtle Cove lagoon-side to estimate the total number of breeding pairs (AON = one pair [two adult birds] per nest).

Participants: Peter Carr (PC), Institute of Zoology, Zoological Society of London, UK / Penryn Campus, Exeter University and, Hannah Wood (HW), Institute of Zoology, Zoological Society of London.

Dates: 05 June – 03 July 2018. The team did not depart the Territory on this date, a second research project commenced on 03 July that due to its precedence, warranted its’ own report.

Results: The fieldwork was a resounding success in all areas. Specifically:

Objective 1 (GPS and short-term GLS deployment and recovery) & Objective 2 (Long-term GLS deployment and recovery).

This, the fourth and final PhD fieldwork session at the study site of Barton Point was very successful. As per previous trips, the success was due to the fieldwork team having a thorough knowledge of the study system and site, there being an abundance of readily accessible breeding birds and, finally, outstanding logistical support from British Forces BIOT.

Table 1. Tagging activities June / July 2018.

Total birds caught	New birds ringed	Birds fitted with GPS	Birds fitted with short-term GLS	Short-term GPS recovered	Short-term GLS recovered	Long-term GLS recovered (June 18/all fieldwork)	Long-term GLS deployed (June 18/all fieldwork)
72	62	40	40	30	31	2/5	51/106

After four fieldwork sessions at Barton Point a total of 306 RFBs have been ringed with British Trust for Ornithology (BTO) rings. This number of uniquely marked birds in such a concentrated area has established an excellent baseline for future seabird ecology research. Of these ringed birds, 106 have been fitted with long-term GLS (Objective 2), including 51 in June 2018. 30 out of 40 GPS devices were recovered and over 100 individual tracks have been documented from these recovered GPS devices. In total there are now >350 tracks from the two years research to be analysed; testimony to the quality of the fieldwork and all it entails (e.g. preparation, logistical support, subject matter expertise).



Figure 2. A suite of tracks of foraging RFBs from the breeding colony on DG. (Copyright of Google Earth is acknowledged).

Objective 3: To establish the status and distribution of breeding RFB on DG.

The January 2018 RFB colony census revealed 5084 breeding pairs on mainland DG and the three islets in the mouth of the lagoon. It was believed at the time that this number was near-unprecedented and represented the peak breeding period. The June/July 2018 census revealed a further 4885 **NEW** nests. This gives a minimum number of breeding pairs in a calendar year of 9969. On a regional scale this makes DG the second largest RFB breeding colony in the entire Indian Ocean after Cosmoledo Island, Seychelles.

Secondary Objectives. Opportunistic Records.

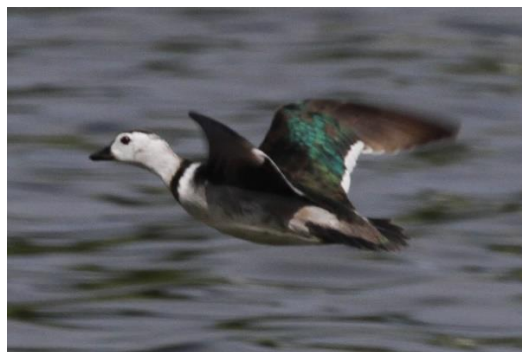


Figure 2. A male Cotton Pygmy-goose, a newly recorded species for BIOT. Photo P. Carr.

Opportunistic records of all taxon were gathered throughout the research activities. This resulted in a new species of bird for the Territory being discovered and photographed, a male Cotton Pygmy-goose *Nettapus coromandelianus*. This bird was undoubtedly an overshooting migrant that had spent the Northern hemisphere winter on DG and was last seen on 6 July 2018.

Conclusion: The June/July 2018 seabird research visit to DG was an outstanding success. Over the four fieldwork sessions an extensive data set for one PhD has been accumulated and this data set holds sufficient material for one or possibly two more academic research projects under the larger Seabird Ecology programme. It cannot be stressed enough that without full support from HQ BF BIOT on DG, especially the use of military craft to ferry equipment and personnel to the study site at Barton Point, this research would have been much harder to undertake and the outputs would have been poorer as a result.

Acknowledgements: This research is funded by the Bertarelli Foundation as part of the Bertarelli Programme in Marine Science. The research would not have been possible without the full support of the BIOTA and, on Diego Garcia, particularly the Executive Officer at the time of the visit. Several of the BF BIOT personnel extended assistance well beyond what was asked; particular gratitude is extended for the administrative help and all-round support individuals provided.