SEABIRD ECOLOGY ON DIEGO GARCIA:

June-July 2016 research trip report.

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Introduction: In the western Indian Ocean (WIO) the breeding seabird population is estimated at ~19 million individuals (30 species) currently distributed across 54 colonies, but their distribution and abundance has been declining since the 18th Century due to human activities. Pelagic Marine Protected Areas (PMPAs) have been proposed as one potential solution for the conservation of seabirds. In the WIO Marine Protected Areas (MPAs) cover less than 1% of the oceanic and coastal surface and except for the British Indian Ocean Territory (BIOT) PMPA (640,000km2) and the much smaller Glorieuses and Mayotte PMPA (110,000km2) no other measures protect the pelagic ecosystem in the region. BIOT supports 18 species of breeding seabirds, with 10 islands designated as important bird areas. In conjunction with the surrounding 'no take' MPA, the majority of which encompasses the pelagic ecosystem, it potentially provides an unrivalled opportunity for the conservation of seabird populations in the WIO and globally. However, to date information on how breeding and migratory seabirds utilise the MPA is extremely limited and provides no indication of how effective the MPA is in their conservation. It is envisaged that over the next three years field-based research will collect novel data and provide the first insight into how breeding seabirds utilise the BIOT MPA. As part of this the first fieldwork period was conducted in BIOT in June/July 2016 and the results from this are summarised in this report.

Participants: Dr. Malcolm Nicoll (MN) & Peter Carr (PC), from the Institute of Zoology, Zoological Society of London, UK.

Dates: 21st June - 13th July 2016.

Location: Diego Garcia; Barton Point and Cust Point.

Objectives: (i) Establish boat drills, field camp routines and emergency procedures associated with field-based research activities in BIOT that satisfy BIOTA requirements, and (ii) Establish field-based techniques and protocols in order to study the breeding biology and movement ecology of Red-footed Booby on Diego Garcia.

Results: As part of the Bertarelli Foundation funded BIOT science plan a two-person ornithological research team visited Diego Garcia to study Red-footed Booby (RFB) breeding and movement ecology (see Table 1 for locations and activities). Prior to the team's arrival BF BIOT personnel identified a suitable boat and engine from the science equipment available and serviced/tested both. The LC Section of BF BIOT also provided the team with a boat handling and safety training session, which enabled the team to move independently between field-study sites as required. The science team identified the cove at Barton Point (lagoon side) and the bay north of Cust Point (ocean side) as suitable field study sites, both holding numerous breeding pairs of RFBs. Two periods of fieldwork were conducted; one of 7 days and one of five days. During these periods the team were entirely self-sufficient and camped at Barton Point (see Figure 1). Following an extensive desk top risk assessment and discussions with the XO and ROPO 2 on Diego Garcia and, following the emergency response plan, the team contacted the Duty ROPO daily at 19:00 with a status update.

Figure 1. The field camp at Barton Point.

As part of the research the team caught and marked (with individually numbered alloy British Trust for Ornithology issued leg rings) 90 adult RFBs. Of these 46 were classed as breeding birds and caught on a nest (see Figure 2.), while the remainder were non-breeding birds. Thirty-nine of the breeding birds were fitted with tail-mounted GPS loggers (IGotU GT-120, Mobile Action Technology Inc.) (see Figure 3) to track their at-sea foraging movements. These tags were deployed for between three and 10 days before being recovered. Thirty-eight of the 39 tagged RFBs were recaptured and 35 tags were recovered. At recovery all tags were

viable. Preliminary examination of the downloaded data revealed that these tagged RFBs were typically conducting foraging trips of one to three days, covering 100-600km, to the North-East of Barton Point (see Figure 4). None of the tracked birds entered or crossed the Great Chagos Bank. These are the first tracking data from any seabird species from BIOT.

Figure 2. Red-footed Booby on a nest.

Figure 3. Tail-mounted GPS logger on Red-footed Booby.

Figure 4. Foraging tracks from three Red-footed Boobies with each track represented by a single line. For scale the straight-line distance from Diego Garcia to the NE corner of the longest foraging track is ~250 km.

Conclusion: Protocols (including communications and an emergency response plan) for small boat use and camping at Barton Point were established and Barton Point proved to be an ideal base for the study sites there and at Cust Point. During the course of the fieldwork on Diego Garcia it was proven that researchers can work independent of and with minimum impact upon BF BIOT and, that suitable field methodologies have been established which are effective for documenting the breeding behaviour and movement ecology of breeding RFBs. RFBs typically conducted foraging trips of between 1-3 days to the NE of Diego Garcia at this time of year during the SE monsoon.

BIOT is dominated by two monsoon seasons; the SE monsoon from May to September (strong SE trade winds) and the NW monsoon from October to April (light NW winds). In order to understand the year-round foraging patterns of breeding RFBs at Diego Garcia this research needs to be repeated during the NW monsoon, ideally in early December 2016. This proposed fieldwork in December 2016 would follow the same procedures undertaken in June/July 2016. Should this second period of fieldwork be approved by BIOTA, it is envisaged that now field routines have been established and bird-handling protocols tested, that volunteers from the Diego Garcia community will join and assist the research team.

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Table 1. Locations visited and activities conducted as part of the scientific research trip to Diego Garcia (BIOT) in June-July 2016.

DATE	PERSONNEL	LOCATION	EVENT
21/06/2016	MN/PC	Arrive Diego Garcia	AMC flight from Bahrain
22/06/2016	MN/BRIT REP/XO	HQ British Forces BIOT	Initial meetings with Brit Rep & XO
23/06/2016	MN/PC/LCs	Moody Brook & Diego Garcia lagoon	Science boat & engine prepared in advance by Royal Marines. Boat safety & handling training provided by Royal Marines
24/06/2016	MN/PC	Science store & ships stores	Equipment preparation & provisions
25/06/2016	MN/PC	Diego Garcia/Barton Point	Deployed to Barton Point: Camp established & field study sites identified.
26/06/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
27/06/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
28/06/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
29/06/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
30/06/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
01/07/2016	MN/PC	Barton Point/Diego Garcia	Field work at Barton/Cust Points de-camped & transfer back to Diego Garcia.
02/07/2016	MN/PC	Diego Garcia	Resupply
03/07/2016	MN/PC	Diego Garcia/Barton Point	Deployed to Barton Point.
04/07/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
05/07/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
06/07/2016	MN/PC	Barton Point	Field work at Barton/Cust Points
07/07/2016	MN/PC	Barton Point/Diego Garcia	Field work at Barton/Cust Points de-camped & transfer back to Diego Garcia.
08/07/2016	MN/PC	Diego Garcia: Moody Brook	Boat & engine cleaning, service & store. Science store tidy & organisation.
09/07/2016	MN/PC	Diego Garcia: Moody Brook	Seabird research project equipment inventory & storage.
10/07/2016	MN/PC	Diego Garcia	Data digitisation & storage.
11/07/2016	MN/BRIT REP/XO	Diego Garcia: BF BIOT HQ	Debriefing with Brit Rep & XO. Data digitisation & storage.
12/07/2016	MN/PC	Diego Garcia: Moody Brook	HazMat assessment of science store
13/07/2016	MN/PC	Diego Garcia	Departure on AMC flight to Bahrain.