

SATELLITE TRACKING AND FORAGING ECOLOGY OF SOCOTRA CORMORANTS (*PHALACROCORAX NIGROGULARIS*) BREEDING ON SINIYA ISLAND, UMM AL QUWAIN, UAE

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Keywords: Socotra Cormorant, *Phalacrocorax nigrogularis*, satellite transmitters, GPS loggers, Temperature Depth Recorders, diving, foraging

INTRODUCTION

The Socotra Cormorant (*Phalacrocorax nigrogularis*) is an iconic seabird endemic to the Arabian Gulf and the adjoining Gulf of Oman waters (Jennings 2010, BirdLife International 2012). The bulk of the global breeding population (110,000 pairs) occurs in the Arabian Gulf and many of the historic breeding colonies have either undergone substantial declines or become extinct making the species Vulnerable (BirdLife International 2012). Little is known about the foraging ecology or movement patterns of the species although individuals are known to move widely within the Arabian Gulf (Jennings 2010, Muzaffar et al. 2012, Muzaffar et al. in press). A study on the Socotra Cormorant was started on Siniya Island in 2011 to better understand the breeding biology, diet, foraging behaviour and conservation challenges faced by the species.

METHODS

As part of this ongoing study, GPS loggers were deployed (in collaboration with Tim Cook and Peter Ryan, Percy Fitzpatrick Institute, University of Cape Town, South Africa) on 11 adult Socotra Cormorants in 2012 and 9 cormorants in 2013. These loggers record precise GPS coordinates at very short intervals (every five seconds) and collect vast quantities of data over short time periods (usually 2-3 days) after which the individual needs to be re-captured to download the data. With each of these cormorants, Temperature Depth Recorders were also included to better understand diving patterns. Platform Terminal Transmitters (satellite transmitters) were also placed on nine adult Socotra Cormorants in November 2013 (Fig. 1) to better understand foraging ecology during the breeding season and post-breeding dispersal. Satellite transmitters have been deployed on other cormorant species with limited success (King et al. 2000), especially since cormorants have a tendency to remove the Teflon ribbon used to harness the device. In spite of this apparent risk, deployment proceeded due to the dearth of information on post breeding dispersal.

RESULTS AND DISCUSSION

GPS loggers and TDRs generated rich data on the behaviour and ecology of the individuals. Socotra Cormorants were seen foraging considerable distances away from Siniya Island. The birds that were monitored foraged in one of three areas: (i) adjacent to the Siniya Island; (ii) adjacent to the Palm Deira area in Dubai and near Ajman; and (iii) adjacent to Al Jazirah-Al Hamra area in Ras Al Khaimah. The distances travelled by individual Socotra Cormorants ranged from 10-70 km. The Deira region appears to be important as foraging areas. Foraging away from Siniya Island could indicate local, short-term shortage (or movement) of fish shoals forcing birds to fly to the regions that are more distant (Palm Deira is about 50 km from Siniya). This is not unusual in seabirds and variation in movement indicates the movement of abundant fish shoals. Careful analysis of fishing activity, fish species in the fishery and timing of fishing must be studied in more detail to better understand the interactions between foraging of Socotra Cormorants and fisheries. Further analysis will be undertaken in the upcoming months.

Diving activity using temperature depth recorders (TDRs) showed maximum recorded depth was 25m although most dives were between 7-12m and lasted approximately 1 minute. Dive profiles were either 'V' or 'U' shaped. U-shaped dives indicated that birds were searching for fish at epibenthic regions for some time before successfully capturing prey. V-shaped dives were slightly shallower compared to the U-Shaped dives, which generally indicate pursuit of shoals of fish.

Satellite transmitters largely corroborated the information from the GPS loggers, with records of movements along the shoreline that were as much as 78 km from Siniya island during the breeding season (Fig. 2). At the end of the season, however, birds began to disperse from the colony. Two birds moved west towards Sadiyaat Island and were last recorded foraging and roosting in the region. One bird moved northwards from Siniya and was last noted crossing the Strait of Hormuz into the Mussandam area of Oman. All the birds remained close to the shoreline presumably taking advantage of coastal fish stocks. Although the data from satellite transmitters have been over a one-month period, it has generated new information on this threatened species. Collectively, the



Fig.1. Socotra Cormorant with satellite transmitter immediately after release (R. Gubiani).

data on diving and spatial distribution of Socotra Cormorants highlight the depth at which Socotra Cormorants feed and the foraging and roosting areas occurring along the UAE's shoreline. Thus, protection of the species will have to incorporate areas beyond their breeding colonies that include foraging grounds as well as roosting sites in the post-breeding period.



Fig.2. Movement patterns of within a 10 day period in December showing foraging movements during breeding (northeast and southwest of Siniya Island) followed by gradual movement away from Siniya Island as it began roosting west of Jebel Ali.

ACKNOWLEDGMENTS

Funding for this work has been provided by the Ministry of Environment and Water and the UAE University/National Research Foundation's research grant. I thank Rob Gubiani and Sonya Benjamin for their assistance in the field during 2012 and 2013.

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