Post breeding movements of Sandwich Terns in the Firth of Forth

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Many Sandwich Terns spend the post breeding period in the Firth of Forth. By reading the inscriptions of rings with the help of a telescope, information about the origin and movements of 45 birds was obtained in the period 2000–2004. Most of these birds were ringed at the Farne Islands or further north in Scotland, from Orkney to Fife. The remaining birds were ringed in Ireland, the Netherlands, Belgium and Denmark.

Introduction

The Sandwich Tern *Sterna sandvicensis* is a regular breeding bird along the coasts of Scotland. It is, of course, a migratory bird, and its wintering areas are generally found along the coasts of western Africa (Wernham *et al* 2002). The breeding period covers usually the months from May till July. It is well known that the terns, before they migrate south to their wintering quarters, spend time in the northern zones, presumably taking advantage of food supplies. This period, referred to as the post breeding period, may span several months, with the last birds leaving in October.

The Firth of Forth is one of these areas visited by many Sandwich Terns in the post breeding period, in numbers exceeding thousands at peak times (Thomson *et al* 2003). Large groups of terns can gather at communal roosts, but often small flocks of fledglings and adults can be seen fishing at sea. Family ties are strong and are maintained along the way to the wintering quarters, and it is very common to see adults feeding their young in this period. Presumably the Forth is particularly attractive to Sandwich Terns because of the combination of food supply and good roost sites, such as islands and lagoons. Sandwich Terns do not breed regularly anymore in the Forth, and numbers have fluctuated: 100–500 nests/pairs in 1988–94 (Murray *et al* 1998), 0–5 in 1995–98 (Murray *et al* 1998, Kelly 1999), 122 in 1999 (Kelly 2000) and ca 300 pairs in 2000 (Thomson 2003).

When I noticed that Sandwich Terns in the Forth used regular roosts during incoming tides, and that many of the terns were ringed, I saw an excellent opportunity to discover more about their origin and movements. Were these really local birds, on their way to the African coast, or were they coming from further afield? How long did they stay? Did they always use the same roost? By reading the inscription of the rings with the help of a telescope, one could find out such information in a relatively straightforward way.

Methods

I carried out observations over 5 seasons, from 2000 to 2004, usually in the period July to November, along the south coast of the Forth from Cramond to Musselburgh. Observations were made during incoming tides, usually one or 2 hours before the tide reached its highest point. The locations I regularly checked were: Cramond, at the the sewage outfall area, Musselburgh at the mouth of the River Esk and the large ash lagoon, and Joppa Rocks, where most of the data for this study was gathered.

During incoming tides, the Joppa Rocks were regularly used as a temporary roost by Sandwich Terns, often accompanied by waders. The brick wall that separates the sea from the main land made an excellent hide to get a good view of the birds without disturbing them. The roosting birds stayed here only a few hours, just until the rocks disappear under the water, and then moved to other roosts such as the Musselburgh ash lagoon. The rocks are close enough to read the inscriptions on metal rings with a telescope; I used a Swarovski AT80 HD with 20–60 zoom. The inscriptions were immediately jotted down in a notebook At home all the inscriptions were entered in a database with information about the age of the bird (juvenile or adult), the position of the ring (left/right, upside down or right side up, presence of colour rings). Rings whose the inscriptions could be read in full were reported to the BTO who forwarded ringing details.

The total number of observation days was 70. These were distributed over the 5 year period as follows: 2000: 17, 2001: 17, 2002: 9, 2003: 9, and 2004: 18. Most of the visits took place in September (31), then October (18) and August (14), followed by July (4) and November (3).

Results

Origin

I obtained resighting data from 45 different Sandwich Terns with metal rings (Table 1). From 32 of these, the inscriptions could be completely read and for these birds the ringing information was retrieved via the various national ringing centres. From 13 birds the inscription of the rings could only be partially read. The majority of the rings, 39 of 45, were BTO rings used by ringers in Britain or Ireland. In addition, there were 3 birds with rings from Belgium, 2 with rings from the Netherlands and one from Denmark.

Table 1. ***Completely and partially read rings on Sandwich Terns***

Origin	Complete	Partial	Total
Britain/Ireland	30	9	39
Belgium	1	2	3
Netherlands	0	2	2
Denmark	1	0	1

The 30 terns with the BTO rings were ringed in England (23), Scotland (6), and Ireland (1). The English ones were mostly ringed in Northumberland, about 100 km away at the Farne Islands (11) and Coquet Island, Amble (10), and in Cleveland (2). The Scottish terns were ringed in Orkney (2), Grampian (2), Highland (1), and Fife (1). The Irish bird was ringed at Lady's Island Lake in Wexford. Figure 1 shows a map with the ringing locations of all the Sandwich Terns resighted in Lothian.

There was a total of 51 resightings, because 6 birds were seen twice. Most of the resightings were in the month of September (33), followed by October (14), July (2), and August (2). The first and last sightings in a calendar year were respectively on 22 July 2001 and 27 October 2001.

The number of resightings distributed over the 5 years of study were: 2000 (21); 2001 (17); 2002 (4); 2003 (7); 2004 (2). In the first 2 years of the study Sandwich Terns seemed more numerous in the Forth than in the following years.

Site Fidelity

Only 6 birds were seen more than once, and no birds were seen more than twice. In all of these cases the period between the 2 resightings was very short. Four times the same tern was seen a day later at the same site, one time 6 days later (2 and 8 September), and one time 10 days later (4 and 14 October). Never has the same

Sandwich Tern been seen in different years. This suggests that the Sandwich Terns do not stay long at one location.

Distance

In what follows the distance between the ringing and resighting locations is measured along a straight line which may not be the actual path the bird took. The smallest distance was 58 km, covered by a Sandwich Tern ringed at Tentsmuir Point in Fife in 1987 and resighted in Joppa in 2001. The largest distance, 854 km, was covered by a Sandwich Tern ringed as a nestling in Denmark in 1992 and seen in Joppa in 2004. As adult Sandwich Terns need not breed near the colony where they themselves fledged it is more meaningful to look at distance information obtained by resightings of birds ringed as nestlings in the same year. Here the 3 largest distances were 309 km (South Ronaldsay, Orkney), 459 km (Lady's Island Lake, Ireland), and 660 km (Zeebrugge, Belgium).

Age

In Britain and Ireland, about 97% of ringed Sandwich Terns later recovered were ringed as nestlings (Wernham *et al* 2002). The data gathered from the Forth comprised 29 terns that were

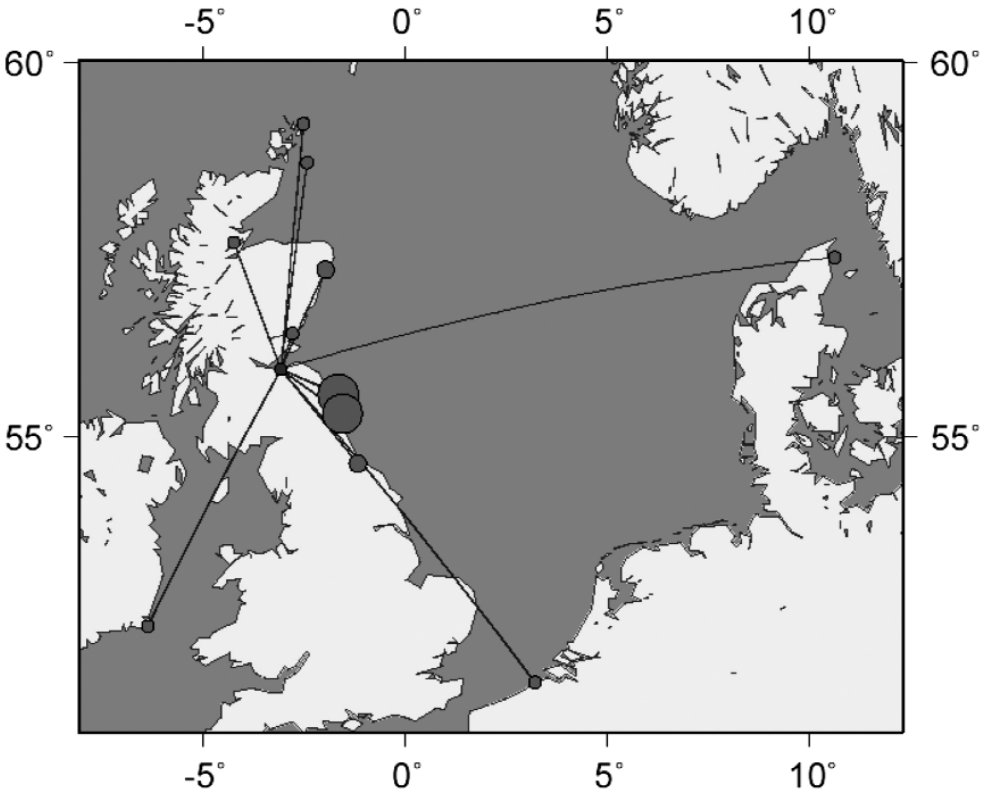

Figure 1. ***Ringing locations of Sandwich Terns resighted in the Forth of Firth in the period 2000–2004. Size of marks are proportional to number of birds [n=32]***

ringed as nestlings, and their ages at resighting are shown in Table 2. The oldest, 19 years old, was ringed as a nestling at the Farne Islands on 20 July 1984, and resighted at the Joppa Rocks on 9 August 2003. This bird was about to make its journey to Africa for the twentieth time.

Table 2. ***Age distribution of resighted Sandwich Terns in the Forth of Firth***

Age	0	3	4	5	12	14	15	16	19
Number	19	1	2	1	1	1	2	1	1

Colour Rings

Several Sandwich Terns were seen with a combination of colour rings, usually in addition to their metal rings. None of the colour rings had readable inscriptions, and the combinations of colours used did not identify individuals. Moreover, it turned out to be difficult to discover the origin of the few colour ringed Sandwich Terns that were observed apart from colour ringed birds from Grampian and the Farne Islands.

The 19 year-old Sandwich Tern ringed at the Farne Islands had 2 blue celluloid colour rings which, when I saw it nearly 2 decades later, were almost completely faded to a light grey color. I understand newer colour rings hold their colour for longer.

Discussion

The Firth of Forth is well known as an area which attracts large numbers of Sandwich Terns in the post breeding period. Wernham *et al* (2002) noted that post fledging dispersal around the coasts of Britain and Ireland and across the North Sea to the Netherlands and Denmark commences in late June, and that during July and August dispersal occurs in both directions between the Netherlands and Britain. Murray *et al* (1998) report that terns visit the Forth from as far as the Sands of Forvie to the north and the Farne Islands to the south. The data presented in this short paper confirm this, but also show that some terns come from the Netherlands, Belgium, and Ireland.

Observations of tern roosts can clearly provide much interesting information on migrating terns. Unpublished observations mainly of colour ringed Sandwich Terns from the Moray Firth to the Scottish Border showed a similar pattern of origins to this study (A Smith pers comm).

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