

# Post-breeding aggregations of roosting terns in south Dublin Bay in late summer

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A series of 26 evening counts of terns was carried out in Dublin Bay in August and September between 2013 and 2016. The survey area encompassed the whole of Sandymount Strand in the south of Dublin Bay, while on two occasions Dollymount Strand, about 5 km to the north, was surveyed simultaneously. The maximum number of terns recorded at Sandymount Strand was 6,645 in 2013, 2,264 in 2014, 4,035 in 2015 and 17,440 in 2016. These data are broadly consistent with previous surveys undertaken between 1959 and 2010, but the peak of 17,440 terns recorded in 2016 is the second highest total ever recorded at the site. The numbers recorded at Dollymount Strand were much lower, but were not insignificant. Five tern species were recorded: Black *Chlidonias niger*, Sandwich *Sterna sandvicensis*, Common *Sterna hirundo*, Roseate *Sterna dougallii* and Arctic *Sterna paradisaea*. There were considerable fluctuations in the numbers recorded on consecutive surveys, indicative of a high turnover rate. The large numbers involved, ringing controls, and the presence of Black Terns, which do not breed locally, show that terns are drawn to the roost from further afield than the Dublin, or Irish Sea, colonies.



## Introduction

Conservation of migratory species requires knowledge of key staging sites used on migration, and adequate protection being bestowed on these sites. Sandymount Strand forms part of the South Dublin Bay and River Tolka Estuary Special Protection Area, designated under the European Union Birds Directive. Roseate Tern *Sterna dougallii*, Common Tern *Sterna hirundo* and Arctic Tern *Sterna paradisaea* use Sandymount Strand as a post-breeding staging site, and they

are listed as qualifying interests to the designation (NPWS 2015).

The use of south Dublin Bay as a major night roosting site for terns between the end of the breeding season and their departure to their wintering grounds was first noted in 1959 (Merne *et al.* 2008), and evening counts have taken place

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**Plate 168.** Tern roost at Sandymount Strand, Co. Dublin (Dick Coombes).

sporadically since then. In 1960, 27 evening counts took place (Merne *et al.* 2008). More recently, a single count was conducted in 1996 (Newton & Crowe 1999), 13 counts between 2002 and 2004, 20 counts in 2006 and 22 counts in 2007 (Merne *et al.* 2008), with a further ten counts in 2010 (Merne 2010).

This post-breeding roost is located within about 30 km of three important breeding colonies; Rockabill (Common, Roseate and Arctic Tern), Dublin Port (Common and Arctic Tern) and Dalkey Islands (Common, Roseate and Arctic Tern), and it is likely that many of the terns that occur in the Sandymount roost originate from these. Typically, the number of terns using Sandymount Strand builds from late July onwards when birds disperse from the breeding colonies. There are roosting terns present at Sandymount Strand for up to two months each year, building reserves for migration and commencing their moult (Cabot & Nisbet 2013, Ginn & Melville 1983). Five species of tern, namely: Black Tern *Chlidonias niger*, Sandwich Tern *Sterna sandvicensis*, Common Tern, Roseate Tern and Arctic Tern have been recorded regularly, and Little Tern *Sternula albifrons* has been reported occasionally. A small number of other large gatherings of pre-migratory terns have been documented; in the southeast of Ireland close to the Lady's Island Lake colony (Wexford), on the east coast of England at Teesmouth, Cleveland and on the west coast of England at Seaforth, near Liverpool.

Surveys were carried out between 2013 and 2016 as part of the wider Dublin Bay Birds Project, which aims to collate baseline data for waterbirds and seabirds in Dublin Bay throughout the year. This paper summarises the results of these tern roost surveys, and puts these numbers in the context of the number of birds likely to be in the Dublin Bay area at this time of the year, based on the number of birds at the nearby colonies and the likelihood of turnover in the number of staging birds.

Methods

Sandymount Strand is located in south Dublin Bay (53.32° N, 6.19° W) on the coast of County Dublin. The intertidal sandflats between Poolbeg and Dun Laoghaire were searched for terns on 26 evenings during August and September between 2013 and 2016 (Table 1). The surveys were undertaken as the birds congregated to roost at dusk. Survey days were chosen when high water occurred within one to two hours of sunset. This ensured that the area available for roosting terns (i.e. exposed sand) was relatively small (compared with low water) and facilitated counting, as the birds were relatively close to the observers. All counts took place between 17:30 and 21:20, with counts starting two hours before sunset and continuing until light levels were insufficient for counting, which tended to be around 15

Table 1. Dates of dusk tern surveys at Sandymount Strand, south Dublin Bay, 2013–2016.

Date	2013	2014	2015	2016
11 August	-	-	-	✓
12 August	-	-	✓	✓
13 August	-	-	-	✓
15 August	✓	-	-	-
16 August	✓	-	-	-
18 August	-	✓	-	✓
19 August	-	✓	-	-
25 August	-	-	✓	-
26 August	-	-	✓	-
29 August	✓	-	-	✓
30 August	✓	-	-	✓
2 September	-	✓	-	-
3 September	-	✓	-	-
7 September	-	-	✓	-
8 September	-	-	✓	-
12 September	✓	-	-	-
13 September	✓	-	-	-
14 September	-	-	-	✓
15 September	-	✓	-	-
16 September	-	✓	-	-
21 September	-	-	✓	-
25 September	✓	-	-	-

minutes after sunset. All counts took place in fair weather and in good light conditions. Each year, either six or seven surveys were conducted, between 11 August and 25 September. While the surveys in each year were spread throughout August and September, counts often took place on consecutive evenings in order to avail of suitable tidal conditions.

At least two observers were present during each survey session. In 2013, three of the surveys (29 August, 12 September and 13 September) were conducted with one observer on the West Pier at Dun Laoghaire, a vantage point at the southern end of the bay, and the other on the strand at Merrion Gates located approximately mid-way along the strand. The first observer directed his/her telescope across the mouth of the bay (to the Bailey Lighthouse in Howth) and counted the terns as they flew into the bay. The second observer counted the terns as they settled on the beach. All counts were time-referenced so that both surveyors could compare their totals at the end of the survey to minimise double-counting of birds. In all other counts the observers took up vantage points on Sandymount Strand (Table 2), either working together from the same place, or if the flock settled in several disparate locations, counting in different areas of the strand and adding their totals later. All tern species were counted and included in the totals. The presence, but not the abundance, of different tern species was recorded on

**Table 2.** Approximate vantage points used during dusk tern surveys at Sandymount Strand, south Dublin Bay, 2013-2016 (in order of frequency of use).

Vantage point	Coordinates
Sandymount Baths	53.3238° N, 6.2037° W
Merrion Gates	53.3152° N, 6.2003° W
Boooterstown Strand	53.3113° N, 6.1923° W
Irishtown Strand	53.3335° N, 6.2073° W
Dun Laoghaire west pier	53.3040° N, 6.1351° W

each survey, but due to difficulty in accurately identifying the different species at distance and in poor light, birds were not identified to species level during the counts. When time allowed, and when flocks had settled within suitable observation distances, the presence of Black, Sandwich, Common, Roseate and Arctic Terns was recorded.

The survey was concentrated in the core roosting area, but outlying areas were repeatedly scanned with telescopes to determine if there were satellite flocks present. When

present, these flocks were counted to ensure that all birds were accounted for. The surveyors counted synchronously, each counting the same flock and comparing totals afterwards. However, on one occasion, due to the very large numbers of birds, surveyors counted different parts of the flocks and combined their totals. Binoculars were used to locate the flocks and telescopes (Swarovski and Optricon, each with 20-60 zoom) were used to carry out the counts. Birds were generally counted when settled on the ground in units of five. However, when birds were disturbed or 'dreading' (which was frequent), it was necessary to count in units of 50 or 100 individuals. When possible, these approximate counts were followed with more accurate counts when the birds resettled. In 2016, two counts were conducted on Dollymount Strand, which is about 5 km to the north of Sandymount Strand and located on the eastern side of North Bull Island, to determine if the area was being used as an alternative or additional roosting area. Three surveyors took part in these counts, which were conducted synchronously with the Sandymount Strand counts on 29 and 30 August.

During all counts where both surveyors counted the same flock of birds, each surveyor counted separately, logging the



**Plate 169.** Map of Dublin Bay with the primary area used by roosting terns on Sandymount Strand delineated.

totals and the time, so that they could be compared at the end of each survey evening. The average of the final count from both surveyors is considered the total number of birds in the roost on that evening. To maximise consistency in counting, at the beginning of each season, both surveyors counted several distinct flocks from the same vantage point and compared their respective totals for each.

The count period ranged from 30 days (in 2014) to 42 days (in 2013). There was a difference of seven days in the first survey of each season, with surveys starting earliest in 2016 (11 August) and latest in 2014 (18 August). The last count of each season took place in the second half of September, with the latest survey taking place on 25 September 2013.

Results

Surveyors obtained a high level of consistency when counting flocks, and differences were generally less than 10% of the total. The numbers of terns (all tern species combined) recorded at Sandymount Strand in south Dublin Bay in August and September between 2013 and 2016 are shown in Figure 1. The maximum number was 6,645 in 2013, 2,264 in 2014, 4,035 in 2015 and 17,440 in 2016. The total number of terns at Dollymount Strand on 29 and 30 August 2016 was 300 and 650, respectively.

Five tern species were recorded during the study period: Black, Sandwich, Common, Roseate and Arctic Tern. Common and Arctic Terns were recorded in each of the 26 dusk surveys. Sandwich Terns were recorded on 23 surveys, Roseate Terns on 24, and Black Terns on 15 surveys (Table 3). The vast majority of birds were Common Terns; Arctic and Roseate terns were the next most prevalent, and Sandwich and Black Terns were only recorded in numbers of less than ten.

On the ten occasions when the numbers on consecutive evenings could be compared (Table 4), there were often considerable differences in the totals; greater than 10% on nine occasions, greater than 40% on four occasions and greater than 70% on two occasions.

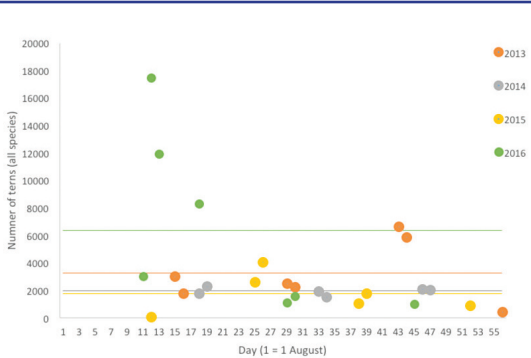


Figure 1. Total number of all species recorded during dusk tern surveys at Sandymount Strand, south Dublin Bay, 2013–2016 (horizontal lines represent the average for each year).

Discussion

During all counts the peak numbers of birds were recorded towards the end of the survey session at dusk, and there was no apparent reduction in the number of birds arriving at the roost as dusk approached. On each occasion it is highly likely that birds continued to arrive after the light levels had diminished and prevented further counts, therefore the figures presented in this paper must be considered minima. The average number of terns recorded in each year between 2013 and 2016 is broadly consistent with those recorded previously. An average of 2,845 terns was recorded in 2010 (Merne 2010), averages of 3,868 and 2,344 were recorded in 2006 and 2007 respectively (Merne *et al.* 2008), and an average of 1,230 was recorded between 2002 and 2004 (Merne *et al.* 2008). In 1998 and 1999 total counts of 2,000 and 5,040 were recorded (Newton & Crowe 1999), and an average of 1,850 was recorded in 1960 (Merne *et al.* 2008).

However, the number of surveys per season in the present study (6-7) was considerably lower than during many

Table 3. Number of dusk tern surveys at Sandymount Strand, south Dublin Bay, 2013–2016, in which each of the five tern species was recorded.

Year	Number of surveys	Black Tern	Sandwich Tern	Common Tern	Roseate Tern	Arctic Tern
2013	7	2	5	7	5	7
2014	6	6	6	6	6	6
2015	6	3	6	6	6	6
2016	7	4	6	7	7	7
Total	26	15	23	26	24	26



**Table 4.** Differences in numbers recorded on successive days during dusk tern surveys at Sandymount Strand, south Dublin Bay, 2013–2016, ordered by magnitude of the difference.

Initial survey date	Subsequent survey date	Year	Initial survey total	Subsequent survey total	Difference (%)
11 August	12 August	2016	3,003	17,440	83
15 August	16 August	2013	3,010	1,765	-71
12 August	13 August	2016	17,440	11,800	-48
7 September	8 September	2015	1,048	1,795	42
25 August	26 August	2015	2,617	4,035	35
2 September	3 September	2014	1,908	1,496	-28
18 August	19 August	2014	1,766	2,264	22
12 September	13 September	2013	6,645	5,835	-14
29 August	30 August	2013	2,500	2,252	-11
15 September	16 September	2014	2,065	2,040	-1

of the previous surveys (20–22) (Merne *et al.* 2008), which increases the likelihood that seasonal peaks could have been missed, and there is currently insufficient information to determine if the seasonal patterns of occurrence has changed over time.

The large number of terns recorded on 12 August 2016 was exceptional when compared with other recent years. However, it is not possible to comment on whether such large accumulations had occurred in other years but remained undetected. Perhaps such an aggregation is a rare and short-lived event, like the estimated 20,000 to 30,000 terns that were reported on 31 August 1996 (Newton & Crowe 1999).

Due to the distance that birds were observed from, often in suboptimal light conditions, priority was given to obtaining accurate counts rather than determining the proportion of the different species using the roost. Of the five tern species that were recorded, three (Common, Roseate and Arctic Tern) breed in Dublin, while the closest colonies for the other two species are the Netherlands (Black Tern, BirdLife International 2004)) and Counties Down and Wexford (Sandwich Tern). Little Terns, which breed about 30 km to the south at Kilcoole (Wicklow) and about 50 km to the north at Baltray (Louth), were not recorded in any of the surveys.

The presence of Black Terns suggests that some proportion of other tern species may come from at least as far away as the Netherlands. However, their presence can also inform us on the rate of turnover within the roosting flock. Black Terns were recorded in each season and in 15 out of the 26 surveys overall. This species is also reported to the Irish Birding website ([www.irishbirding.com](http://www.irishbirding.com)) by birdwatchers each August and September. The 71 Black Terns (51 at Merrion Strand and 20 at North Bull Island) reported to the Irish Birding website on 23 August 2015 was remarkable, and would undoubtedly have attracted the attention of many local birdwatchers. On the following four evenings, Black Terns

were reported to the website, but the greatest number reported was just five, despite the presence of larger numbers of birdwatchers than usual. While all observers may not have submitted their records of Black Terns to the website, it is likely that if the same large numbers were present as were reported on 23 August, this fact would be unlikely to have gone unnoticed. This apparent short-lived peak possibly reflects how transient Black Terns (and possibly other tern species as well) are in Dublin Bay.

The extent of turnover of the other tern species in the roost is not known, but is likely to be considerable. The high level of disparity between consecutive counts, given the consistency in surveyors and survey methods, lends strong support to this suggestion. Surveys were conducted on three consecutive evenings, between 11 and 13 August 2016, and the total number of birds recorded was 3,003, 17,400 and 11,890 respectively. While it cannot be ruled out that the high number of birds that roosted at Sandymount Strand on 12 August were present in Dublin, away from the survey area, on the preceding and succeeding evenings, nevertheless, it suggests a very high rate of turnover with several thousand birds spending just a single night at the Sandymount roost. Whether this level of turnover reflects distinct migratory waves, or if the numbers at the roost on a given evening are driven by weather and other variables, or a combination of both, is not known. A higher frequency of surveys in Dublin Bay, in concert with similar survey effort at other night roosting sites in the Irish Sea would be required to elucidate this.

A colour-ringing scheme for Common and Arctic Terns was initiated in 2015 to investigate recruitment within the Dublin Port colony. A high level of re-sightings of these individually identifiable birds could be generated at the roost, and these data could go some way to revealing how long individual birds spend in the roost each season.

Based on the number of nesting terns at the three nearby tern colonies in Dublin (Rockabill, Dalkey Islands and Dublin Port), and the associated productivity values between the 2013 and 2016 breeding seasons, there has been an estimated 10,184 to 11,430 terns (juveniles and post-breeding adults) in Dublin at the end of each breeding season (Burke *et al.* 2014, 2015, 2016, Butler & Newton 2016, Kearney *et al.* 2013, Newton 2010, Newton *et al.* 2013, Tierney *et al.* 2014, 2015, 2016). However, there is evidence that some of the birds using the roost are coming from further afield than the Dublin colonies. The count of 17,440 terns on 12 August 2016 and the estimated 20,000 to 30,000 terns reported on 31 August 1996 (Newton & Crowe 1999) illustrate that the Dublin totals are at least occasionally augmented by birds from other colonies. Furthermore, while the majority of captures (for ringing) of ringed birds at the roost are those that were ringed in the Dublin breeding colonies, birds ringed in Norway, Scotland and England have also been captured (Niall Tierney, own data). It is also known that at Rockabill, where there is an extensive programme of ring-reading throughout the breeding season, individual terns from foreign colonies occur during the latter part of the breeding season (Rockabill dataset, unpublished).

The importance of Dublin Bay for post-breeding terns, and the protected status of the site, is endorsed by the current set of counts. It is recommended that the programme of counts, in conjunction with ringing (and colour-ringing) are continued to facilitate further detailed assessments of the origins and migratory patterns of the birds that are using this staging area, and to further demonstrate the importance of the site for discrete populations of terns in both a national and international context.

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