Migratory Seabirds off Petite-Terre :

Results from a 2001 – 2004 survey in Guadeloupe, French West Indies.

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The context

Although pelagic seabird enthusiasts tend to consider the Caribbean Sea rather unappealing (e.g. Ballance 2004), the eastern, Atlantic-facing, coasts of the Lesser Antilles have more to offer. A variety of shearwaters and petrels, mostly belonging to highly migratory species, have already been recorded there. Summarizing these species' status, Raffaele et al. (1998) repeatedly suggested that they are under-represented in records due to their occurrence far offshore. For example, they regarded Audubon's Shearwater as 'not likely to be seen except from a boat far offshore' (Raffaele et al. 1998: 219). Despite such gloomy forecast, Anthony Levesque decided to look for seabirds directly from shore when in 2001 he assumed his position as a warden at Nature Reserve of Petite-Terre in the Guadeloupe archipelago, French West Indies. Preliminary experience in mainland France taught him that sea-watching from a coastal vantage point might be productive provided one is armed with patience, good optics, and some luck. Not long after beginning in April 2001 his effort was rewarded, and within three months numbers of tubenoses he found were redefining the regional status of several species. A year-round survey was thus set up, then repeated in 2002, 2003, and 2004 in order to determine both constancy and interannual variation in the area's seabird occurrence.

The survey

The observations were carried out from 2001 to 2004 from Petite-Terre, in the Guadeloupe archipelago: at 16°15'N – 61°7'W (see map below) is one of the easternmost islands in the Lesser Antilles. Periods of 15 minutes non-stop observation were carried out from the top of a cliff (c. 7m asl), looking through a tripod-mounted telescope (x20-60 zoom lens used at x30 during search). A short rest was systematically taken between two consecutive 15mn-periods, which were designed as to take place within each one-hour period of each day (i.e. 6 to 7am and so on.). The distribution of observation effort was uneven as the main passage periods have been given extra coverage in order to better document the birds' status at that time (Fig. 1), and because of other personnel responsibilities (wardening duties on this Nature Reserve left more free time at early and late hours, Fig. 2). Simultaneous, co-ordinated, observations from the study spot and from a boat using GPS positioning have shown that large birds were detected through the telescope when passing up to 4 NM (nautical miles) off at sea, with much of the observed passage occurring between 1 NM and 3 NM from the islet.

Data obtained during each 15mn-period (including 'zero' data) has been pooled both per hour and per month, leading to the calculation of the mean number of individuals of a given species observed per hour during a given month. Multiplied by the number of hours with daylight and the number of days per month, this allows a rough estimate of the number of birds that have been passing through the study area over a given period.

Terns and Noddies were not censused because they breed locally and move in any direction.

The senior author is responsible for most of the field work. The junior author, who has long experience with shearwaters and has been particularly involved in the study of taxa related to the Manx Shearwater, joined for ten days in April 2004, mostly to assist in checking the validity of identification characters used in the separation of Manx Shearwater from Audubon's Shearwater *Puffinus lherminieri*.

The results, which concern nine Procellariiformes species, are to be published in the journal *North American Birds* (Levesque & Yésou in prep.).

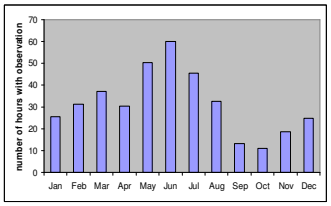


Figure 1. Distribution of observation effort per month (N = 380 hours). The effort was kept low in autumn (down to 11 hours in October, i.e. on average one 15mn observation period every three days) due to the very low frequency of birds detected at that time of the year. Conversely, in order to determine year to year consitency of seabird occurence, the coverage was intensified during months where records from previous years suggested that passage may occur.

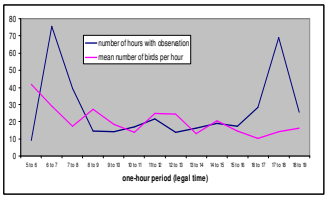
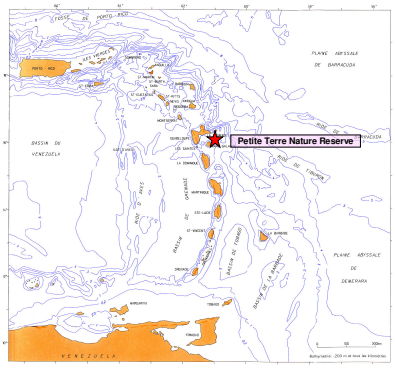


Figure 2. Distribution of observation effort and evolution of average bird frequency through the day. The observation effort peaks in the first and last part of the day due to work schedule on the Nature Reserve, leaving more free time before 8am and after 5pm, local time. Low observation effort in the very first and last hours of the day is linked to seasonnal year variations in dawn and sunset time. The mean number of birds per hour (nine species of Procellariiformes, data pooled) tends to decrease throughout the day (r = – 0.71).



Results

From April 2001 to December 2004, 7768 seabirds (17 species) were sampled during 380 hours of sea-watching (Tab. 1). Among them, 99% were Procellariiformes (9 species).

The Manx Shearwater (N=2543) was never recorded alive in waters surrounding Guadeloupe until 2001 (Levesque & Jaffard, 2002).Thus it was a great surprise when it proved to be the most abundant Procellariiforme species (34% of all tubenoses recorded and 40% of all shearwaters). From these observations, it can be estimated that on average an amazing 26000 Manx Shearwaters are passing by the observation spot in February-May each year, 72% of them in March. There is much yearly variation in passage intensity, however, and only c. 18000 birds have occured in 2002 but over 33000 in 2004.

The second most abundant species is the Greater Shearwater (N=2051) which occurred in June and July (extremes 26 May and 23 July). The highest count was on 11 June 2003 with 261 in 2.5 hours. We thus estimate that on average about 14150 Greater Shearwaters pass close to the coast of Guadeloupe each year.

The Cory's Shearwater (N=627) has a wide migration period and could be observed almost the year round but 74% were recorded in June. It is estimated that about 3000 Cory's Shearwater pass in June and July yearly.

Although Sooty Shearwaters migrate en masse to the Northern Atlantic, they were scarcely observed (N=10) compared to Greater Shearwaters. This suggests that their specific requirements keep them much farther offshore.

The Black-capped Petrel was seen in early 2004 (N=3), and four more gadfly petrels *Pterodroma sp.* during the same period most likely were this species. These observations are of great interest as this petrel had not been reported in Guadeloupe since breeding ceased to be reported in the 18th or early 19th century (Pinchon 1976).

Storm-petrels were also observed in good number (N=1108). The Wilson's Storm-petrel (N=765) is far commoner than the Leach's Storm-petrel (N=46). However, 28% of the Storm-petrels remained unindentified. It can be estimated that on average about 8000 Wilson's Storm-petrels pass Guadeloupe in March–June each year.

The Bulwer's Petrel, which was never recorded in Guadeloupe before, was seen with certainty on 11 June 2003 following a period of strong easterlies lasting several days (wind speeds 50–80 kph), and was again suspected 12 June and 5 July 2003.

The last 1% represents 8 species : 4 Jaegers/Skuas (Parasitic, N=53 ; Pomarine, N=30 ; Long-tailed, N=5 , South Polar Skua, N=2), 4 Boobies/ Gannet (Masked, N=14 ; Brown, N=9 ; Red-footed, N=2 ; Northern Gannet, N=1).

Discussion

This four-year survey has brought to light that many species previously considered rare in fact occur in large numbers in coastal waters off the Guadeloupe archipelago. The previous poor state of knowledge on these species' status may be explained simply by the absence of observations from an appropriate vantage point. Potential observers may have been deterred by earlier statements suggesting that pelagic species only occur far at sea. It is now obvious that many pelagic seabirds do fly over near-shore waters, and we are convinced that various east-facing sites along the Caribbean arc should prove to be seawatching-productive.

The observed seasonal pattern of most species agrees with previous knowledge about their migrations in the northwestern Atlantic. The spring appearance of Manx Shearwaters also agrees with the known timing of their northbound return migration as illustrated by its status off southeastern North America (Lee 1995, Keith & Keith 2003). The observations reported here, however, indicate much greater abundance than previously thought. With an estimated average of 26000 Manx Shearwaters each year in coastal waters, this passage must primarily involve birds from the bulk of the West European breeding population returning from South American winter quarters. Probably based more on deduction than fact, their distribution during the non-breeding season in the North Atlantic was usually mapped as occurring no farther west than c. 40°W (e.g. Cramp & Simmons 1977, Brooke 1990, Carboneras 1992). It is now clear that it extends much further westward, at least during northbound migration.

This previously unsuspected migration route was brought to light thanks to sea-watching, a way of bird recording almost ignored in the Lesser Antilles until this survey. In North America, similar land-based observations of seabirds moving past North Carolina (Buckley 1973) were forerunners to the development of important vessel-born studies of bird distribution and biology at sea in this area. Will seabird benefit from a similar attention off the Antilles ?

Manx Shearwaters	2543	***Large Shearwaters sp.***	377
Audubon's Shearwaters	581	**Wilson's Storm-petrels**	765
Small b&w Shearwaters sp.	206	**Leach's Storm-petrels**	46
Greater Shearwaters	2051	***Storm-petrels sp.***	297
Cory's Shearwaters	627	**Bulwer's Petrel**	1 (+2)
Sooty Shearwaters	10	**Skuas & Jaegers**	186
Black-capped Petrel	3 (+4)	**Boobies and Gannets**	69

Table 1. Numbers of seabirds per species
passing within a 4 NM distance off Petite-Terre, Guadeloupe, 2001-2004.

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