Pelagic birds of the southern South Atlantic Bight

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Abstract

This paper summarizes records of pelagic seabirds from 1901 offshore trips in the central and southern South Atlantic Bight, from Georgia to central Florida. Most of these records have not been previously published or summarized. Additionally, the status of several other species not yet recorded in offshore waters is considered, either because the species has been recorded farther north, off North Carolina, or in the South Atlantic Bight in inshore waters or as a beachcast specimen. Finally, this paper identifies gaps in present knowledge of seabird distribution in the region.

Introduction

Pelagic bird distribution is still one of the great ornithological frontiers of the southeastern United States. Few data are available for seabirds in the waters from Florida to southernmost North Carolina, in the so-called South Atlantic Bight. Other than J. Christopher Haney's 173 days of seabird surveys made between 1982 and 1985 from Florida to the Carolinas (see references in Literature section), there have been no regular surveys of birds made in this region, and for this reason, there are gaps in knowledge of the distribution, abundance, and seasonality of many of the species that are found here. The exhaustive *Birdlife of Florida* (Stevenson and Anderson 1994) includes very few records from offshore waters, as there have been no regularly scheduled pelagic trips out of any Florida port. Most of the state's records of pelagic species are from dead or moribund individuals washed up on the beaches. Likewise, Georgia (Beaton et al. 2003) and South Carolina (Post and Gauthreaux 1989, Post and McNair 1993) have relatively few records of truly pelagic species from their territorial waters compared to states to the north.

J. Brian Patteson's birding trips off North Carolina, which began with a regular schedule in 1993, have provided a wealth of data on the segment of the Gulf Stream between Oregon Inlet and Hatteras and offer just a hint at what probably remains to be documented off states farther to the south. His discovery of at least five tubenose species new to North American waters—and his evidence that several other taxa once thought rare are in fact regular visitors to these waters—indicates how little is really known about the movements of pelagic species off the Southeast. This paper summarizes previously unreported data from the area of the Atlantic Ocean off the states of Georgia and Florida and suggests avenues for future research.

The South Atlantic Bight

The "South Atlantic Bight" is a convenient term that describes the offshore waters that extend from about Cape Hatteras, North Carolina to West Palm Beach, Florida. A bight is defined as a long, gradual bend or recess in the coastline that forms a large, open bay. The label—if not entirely accurate in oceanographic terms (bights are usually more tightly bounded embayments) or in geographical terms (the South Atlantic lies south of the Equator)—is nevertheless useful because the region has many features that distinguish it from neighboring regions. Here, the Continental Shelf varies from 40 to 140 km wide and is covered patchily (20 per cent of the shelf bottom) by rock reefs supporting algae and animals, known as hardground reefs (or "live bottoms"). This is a higher percentage of hard bottom than is found in regions to the north and in the Gulf of Mexico, with the exception of the Florida Keys. The Bight is strongly influenced by the Gulf Stream as it flows through the Straits of Florida and heads northward toward Cape Hatteras before it veers northeastward into the North Atlantic. Over this distance of approximately 1120 km (700 mi), the Stream lies just 2 km off the coast of Florida at West Palm Beach, up to 50 km off Cape Canaveral, passing about 170 km

and sustaining an abundant food web. Even today, the shelf off Georgia is still in the process of being discovered and mapped by marine biologists and oceanographers. It seems clear that the relatively small area of these shelf floor outcroppings in relation to the vastness of the so-called Georgia Embayment of the South Atlantic Bight has an impact on the numbers and species of birds to be seen on Georgia pelagic trips. Furthermore, since Haney's original reports, at least 21 well-designed near-shore artificial reefs have been created by the Georgia Department of Natural Resources, and eight U. S. Navy communications towers have been constructed some 50-90 km offshore.

Pelagic trips organized by Wigh since 2002, currently conducted by Bob Zaremba and Pierre Howard—including many day and overnight trips on which Wigh has been the guest of either the National Oceanic and Atmospheric Administration or the Skidaway Institute of Oceanography—are consistently finding pelagic birds over these reefs, some of which are in nearshore (littoral) waters. These discoveries present substantial evidence that pelagic species in Georgia waters are influenced not simply by certain physical characteristics of water masses but also by the topography of the seafloor, its communities and prey resources. It is likely that patterns of seabird occurrence described in the 1980s are now changing in response to new artificial reefs, which have begun to mature.

In spite of what we have learned in over 20 years of trips (Table 2, summarizing 154 excursions offshore), the difficulty of getting to and staying in the Gulf Stream and deep water off Georgia has restricted our knowledge of abundance and distribution on the eastern edge of the South Atlantic Bight. Some of the species for which we have very few data, such as Black-capped Petrel and the larger storm-petrels (*Oceanodroma* spp.), are more closely identified with deeper ocean. It is likely that institutional largess, and a sizable vessel, will be required to canvas this still-remote area more thoroughly.

Western edge of the Gulf Stream off Ponce de Leon Inlet, north-central Florida

This data set consists of sight records from 29 fishing trips taken by R. D. Wallace out of Ponce de Leon Inlet, Volusia County, Florida between 2002 and 2006 (Table 3). These trips were made either in Wallace's own boat or other non-commercial boats. Bird species and numbers were recorded along with weather data and location. These trips were to the western edge of the Gulf Stream, approximately 70-75 km offshore. This area is located inside the Continental Shelf in an area known as "The Steeples." This region extends some 80 km from north to south (29° 40' to 28° 40' N latitude) at depths from 54-120 m, with many coral seamounts on the ocean floor. The coral heads range in height from 6 to 21 m and cause upwellings, rips, and weedlines in the area. This location is a well known to sports fishermen.

The majority of these trips were made between April and October, and the majority of the species recorded are typical of the Gulf

Table 1. Pelagic birds observed by Captain Johnnie Johnson off Florida's central Atlantic coast, 1956-1980. *Compiled by, and courtesy of, Charles B. Buhrman.*

Species/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total individuals
Yellow-nosed Albatross							1						1
Black-browed Albatross									1				1
Black-capped Petrel					2	1	1						4
Cory's Shearwater					174	606	110	411	23	990	312	1	2627
Greater Shearwater	2	2		2	27	1944	612	176	814	249	31		3859
Sooty Shearwater	2			1	2		5	11	5		3		29
Manx Shearwater	3		1	1		1							27
Audubon's Shearwater	3					6	62	69	196	9	31	14	390
unidentified shearwater	3				7	189	58	16	10	394	155	9	841
Wilson's Storm-Petrel			3	21	1420	1955	2013	1629	253	3	2		7299
Leach's Storm-Petrel						3	3						6
Band-rumped Storm-Petrel							1						1
White-tailed Tropicbird			1		8	3	2	12	4	6			36
Red-billed Tropicbird							1						1
Masked Booby				3		3	2	11	3	3	2		27
Brown Booby	4	11	2	2	2	2	2	1	3	5	5	1	38
Northern Gannet	6019	9144	4201	89	6					23	142	1766	21390
Red-necked Phalarope	182	806	50	250	120		3	144	183	11	2		1751
Red Phalarope	1988	1821	1065	342	275	2	12	2669	1319	5	11	667	10165
unidentified phalarope	1547	158	4	10	152		2	415	281	17	1		2587
Black-legged Kittiwake	364	293	15	11						2	63	200	948
Brown Noddy						1	1						2
Sooty Tern		1		15	26	13	9	160	92	24	1	1	342
Bridled Tern				142	411	170	187	647	428	29	3	1	2049
Roseate Tern	140	122	137	146	188	146	166	173	159	108	111	105	188
Arctic Tern					7								7
Pomarine Jaeger	167	151	104	19	57	6	2	4	40	24	299	154	1027
Parasitic Jaeger	72	56	58	4	6	1	1		10	6	76	67	357
Long-tailed Jaeger	2	1			1						1	3	8
unidentified jaeger	447	361	284	33	15	90	3	3	54	114	528	350	2282
Dovekie	1											122	123
Thick-billed Murre												1	1
Total species recorded	15	11	11	15	17	17	21	14	16	16	17	14	29
Number of days of observation	140	122	137	146	188	146	166	173	159	108	111	105	1701

and sustaining an abundant food web. Even today, the shelf off Georgia is still in the process of being discovered and mapped by marine biologists and oceanographers. It seems clear that the relatively small area of these shelf floor outcroppings in relation to the vastness of the so-called Georgia Embayment of the South Atlantic Bight has an impact on the numbers and species of birds to be seen on Georgia pelagic trips. Furthermore, since Haney's original reports, at least 21 well-designed near-shore artificial reefs have been created by the Georgia Department of Natural Resources, and eight U. S. Navy communications towers have been constructed some 50-90 km offshore.

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Sooty Shearwater	2			1	2		5	11	5		3		29
Manx Shearwater	3		1	1		1							27
Audubon's Shearwater	3					6	62	69	196	9	31	14	390
unidentified shearwater	3				7	189	58	16	10	394	155	9	841
Wilson's Storm-Petrel			3	21	1420	1955	2013	1629	253	3	2		7299
Leach's Storm-Petrel						3	3						6
Band-rumped Storm-Petrel							1						1
White-tailed Tropicbird			1		8	3	2	12	4	6			36
Red-billed Tropicbird							1						1
Masked Booby				3		3	2	11	3	3	2		27
Brown Booby	4	11	2	2	2	2	2	1	3	5	5	1	38
Northern Gannet	6019	9144	4201	89	6					23	142	1766	21390
Red-necked Phalarope	182	806	50	250	120		3	144	183	11	2		1751
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Black-legged Kittiwake	364	293	15	11						2	63	200	948
Brown Noddy						1	1						2
Sooty Tern		1		15	26	13	9	160	92	24	1	1	342
Bridled Tern				142	411	170	187	647	428	29	3	1	2049
Roseate Tern	140	122	137	146	188	146	166	173	159	108	111	105	188
Arctic Tern					7								7
Pomarine Jaeger	167	151	104	19	57	6	2	4	40	24	299	154	1027
Parasitic Jaeger	72	56	58	4	6	1	1		10	6	76	67	357
Long-tailed Jaeger	2	1			1						1	3	8
unidentified jaeger	447	361	284	33	15	90	3	3	54	114	528	350	2282
Dovekie	1											122	123
Thick-billed Murre												1	1
Total species recorded	15	11	11	15	17	17	21	14	16	16	17	14	29
Number of days of observation	140	122	137	146	188	146	166	173	159	108	111	105	1701

Stream: Bridled Tern (*Onychoprion anaethetus*), Wilson's Storm-Petrel (*Oceanites oceanicus*), Audubon's Shearwater (*Puffinus lherminieri*), Cory's Shearwater (*Calonectris diomedea*), Red-necked Phalarope (*Phalaropus lobatus*), Red Phalarope (*P. fulicarius*), and all three jaegers: Parasitic (*Stercorarius parasiticus*), Pomarine (*S. pomarinus*), and Long-tailed (*S. longicaudus*). Migrating passerines are frequently encountered in spring and fall trips. This region is the one of the areas that has been visited by birders and researchers in previous trips off of the Florida coast (P. W. Sykes, Jr., pers. comm.), but only few records of individual species are published (Stevenson and Anderson 1994).

East of the Gulf Stream off central Florida

This data set consists of records from 14 trips by Wallace to an area locally known as "The Other Side," located from 166-276 km off Ponce Inlet, Florida. This area lies beyond the eastern edge of the Gulf Stream on the Blake Plateau at depths of 750-900 m. This is a region in which the Antilles Current, flowing north along the eastern side of the Bahamas, mixes with the Gulf Stream. The eastern edge of the Gulf Stream is characterized by large rips, weedlines, and a decrease in surface temperature by 1-2° F. There are numerous canyons and small seamounts that cause upwellings. Within the past 10 years, it was discovered that large schools of Yellowfin Tuna and other tuna species migrate northward through this region, primarily during the summer months from June to September. Occasionally, these fish are found throughout the year, even in winter. Associated with these tuna schools are large flocks of Sooty Terns (*Onychoprion fuscatus*), sometimes numbering in the thousands, up to three species of shearwaters, sometimes numbering in the hundreds, three storm-petrel species, jaegers, South Polar Skuas, and frequently tropicbirds. Fishermen use high-powered radar on their boats to find the flocks of tuna-following birds at a distance of up to 10 km. In addition to tuna, there are often marlin and dolphin present, as well as cetaceans such as Sperm Whales (*Physeter macrocephalus*), Short-finned Pilot Whales (*Globicephalus macrorhynchus*), and Atlantic Spotted Dolphins (*Stenella frontalis*).

This area has not been birded previously, and until Wallace began making these trips, it was not known to be a significant summer feeding ground for Sooty Terns in such large numbers. Greater Shearwater (*Puffinus gravis*), characterized by Stevenson and Anderson (1994) as an irregular visitor to nearshore waters west of the Gulf Stream, is the most common shearwater during June, with Cory's Shearwater increasing in numbers in July, and the Greaters all but gone by late July. Cory's is seen regularly fairly close to land, sometimes within sight of the coast (Stevenson and An-

Table 2. Pelagic species records for Georgia (all sources combined, representing 154 excursions), 1932-2006.

Species/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total individuals
Northern Fulmar		1											1
Black-capped Petrel		6			1	10		9	22				48
Cory's Shearwater				1	13	383	1039	802	58	450	188		2934
Greater Shearwater		1			14	138	200	56		7	8	1	425
Sooty Shearwater					2	1							3
Manx Shearwater	3	11						1		3	1	2	21
Audubon's Shearwater					3	31	12	210	18	8	160	84	526
Wilson's Storm-Petrel					25	163	12	21	8				229
Leach's Storm-Petrel					18	6							24
Band-rumped Storm-Petrel						10	1	1	1				13
White-tailed Tropicbird					1	2		3					6
Red-billed Tropicbird						1							1
Masked Booby	1				1	1		3	2				8
Brown Booby					1			4				1	6
Northern Gannet	√	√	√	√	√					6	105	√	—
Magnificent Frigatebird					1		2					3	
Red-necked Phalarope	60	250		5				66	11	4	34	26	456
Red Phalarope	40	1817	2	1	52			2			999	203	3114
Little Gull		1											1
Sabine's Gull								1					1
Black-legged Kittiwake		9	1								1		11
Brown Noddy								2	1				3
Sooty Tern					7	15		186	20				228
Bridled Tern					19	43	2	215	64	12	2		357
Black Tern					5	40		1235	43				1323
Arctic Tern				5	2				1				8
South Polar Skua						1	1			1	1		4
Pomarine Jaeger		2	1			1		2	1	6	7		20
Parasitic Jaeger		9	2					1	1	1	5		19
Long-tailed Jaeger								3					3
Dovekie											†		(see note)
Razorbill	1	196											197
Total species recorded	6	12	5	5	16	17	7	21	13	10	13	7	32
Days of observation	2	13	5	4	24	31	14	27	7	7	10	9	157

† = In November 1932, during the most far-reaching wreck of the species recorded on the Atlantic coast, "thousands" passed a ship off Tybee Island, headed to the south. Specimens were recovered from Florida and Cuba.
√ = Common to uncommon; numbers not recorded.

Table 3. Pelagic species recorded in the western Gulf Stream, off Ponce Inlet, Florida, by R. D. Wallace, 2002-2006.

Species/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total individuals
Black-capped Petrel				15									15
Cory's Shearwater					18	70	167	25	200	2140	1		2620
Greater Shearwater							3				2		5
Manx Shearwater	4						1		1	2			9
Audubon's Shearwater				5	9	6	18		4		8		50
Wilson's Storm-Petrel					39	20	35	5					99
Leach's Storm-Petrel				1	1	2	1						5
Band-rumped Storm-Petrel					4	1	1						6
White-tailed Tropicbird				1									1
Red-billed Tropicbird					1								1
Masked Booby					1						1		2
Northern Gannet			100	113	13					1	100		327
Magnificent Frigatebird									2				2
Red-necked Phalarope					15			5					20
Red Phalarope							1				1		2
Brown Noddy					2		2			1			5
Sooty Tern				6	17	3	32		20				78
Bridled Tern				35	88	14	87	30	30	1			285
Black Tern								6					6
Pomarine Jaeger	1			18					2	1	8		29
Parasitic Jaeger					1				2	1			4
Long-tailed Jaeger									1				1
Total species recorded	2	0	1	8	13	7	11	5	9	7	7	0	22
Days of observation	1	0	1	4	7	4	6	1	1	3	1	0	29

derson 1994), but "the Other Side" appears to be a significant feeding ground for Greater Shearwaters on their way to summer feeding grounds in the North Atlantic Ocean.

Because of the great distance offshore, and the requirement of good weather conditions to go that far in relatively small private fishing boats, there have been a very limited number of trips made to this area. However, the productivity and species diversity of the region appears to be greater than any other location off of the east coast of Florida and perhaps rivals the seabird diversity and densities found off Cape Hatteras. May, probably the best month overall for movement of gadfly petrels (*Pterodroma* spp.), at least off Cape Hatteras, has been almost unexplored. It is possible that new species for Florida, such as Trinidade Petrel (*P. arminjoniana*), Fea's Petrel (*P. feae*), Bermuda Petrel (*P. cahow*), and even Cape Verde Shearwater (*Calonectris edwardsii*)—all documented off North Carolina—may be found in this region, along with various rare or vagrant species of storm-petrel. It also suggests that the possibility of locating seabird flocks over tuna schools using radar could lead to new discoveries in other areas of the South Atlantic Bight.

Discussion

There are numerous limitations in the existing data, as noted above; most available information comes from fishing excursions rather than birding trips or ornithological research cruises. Unlike pelagic birding trips made off North Carolina, little effort has been made to chum or draw species into the boat for close observation—although in the case of Johnnie Johnson's excursions, bottom fishing on charter boats creates a somewhat similar situation. Data are also skewed in that trips are weather dependent, and most trips have been made in summer, during the calmest weather conditions. Species present during the windier seasons of fall, winter, and spring are under-represented in the data.

The lacunae in our knowledge of the South Atlantic Bight's avifauna are many, particularly off Georgia, but our understanding of seabird migration through the region is perhaps the largest of these. There have been very few trips in spring and fall, certainly the best times of year for species diversity, and thus very few data on seabird migration in the region. Recent GPS satellite tagging of Greater Shearwaters (Ronconi 2007) shows a "figure-eight" migrational pattern as they follow trade wind and ocean current patterns between the North and South Atlantic Ocean, and suggests that they should be most common in the late spring as they move to the North Atlantic. Trips to the "Other Side," east of the Gulf Stream on the Blake Plateau, have shown that this is a consistent feeding ground for this and other species. Yet some Greater Shearwaters occur all year in the Bight. How many other species show a similar migration pattern?

Likewise, few trips have been made during winter, primarily because the frequent high winds associated with cold fronts make going offshore next to impossible, even in large craft. Haney (1987) found that Black-capped Petrels were present every month of the year in the Gulf Stream (except January, when he did not survey offshore waters), and, similarly, Lee (1995) found that a few non-breeding Manx Shearwaters (*Puffinus puffinus*) were found offshore all year. Johnson's data also support this observation, as do data from adjacent waters of the Carolinas (J. B. Patteson, pers. comm.). Alcids, which are considered very rare south of Cape Hatteras, appear erratically and typically in very low numbers in the winter months. However, on rare occasions, incursions appear in larger numbers in

Table 4. Pelagic species recorded in the region east of the Gulf Stream off Ponce Inlet, Florida, by R. D. Wallace, 2002-2006.

Species/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total individuals
Albatross species							1						1
Black-capped Petrel				5			2	1					8
Cory's Shearwater						181	875	260			1		1317
Greater Shearwater						251	402	2					65
Manx Shearwater				2		1							3
Audubon's Shearwater				4		410	400	11			1		826
Wilson's Storm-Petrel						11	45	28					84
Leach's Storm-Petrel						2	2						4
Band-rumped Storm-Petrel				4		5	1						10
White-tailed Tropicbird				1		1	4						6
Masked Booby								1					1
Red footed Booby				1									1
Northern Gannet				60							50		110
Magnificent Frigatebird						3	1						4
Red-necked Phalarope							3	6					9
Red Phalarope								30					30
Brown Noddy						20	11	5					36
Sooty Tern				550		1800	4850	1150					8350
Bridled Tern				40		214	160	9					423
Black Tern						3		9					12
Arctic Tern						2	1						3
South Polar Skua						2	1						3
Pomarine Jaeger				18		2	1				6		27
Parasitic Jaeger											1		1
Total species recorded	0	0	0	10	0	16	16	12	0	0	5	0	24
Days of observation	0	0	0	2	0	3	5	3	0	0	1	0	14

the southern South Atlantic Bight. For example, Johnson found Dovekies (*Alle alle*) off Florida only twice, but on one occasion, 122 were counted. (Most other records of alcids off Florida are from birds washed ashore.) In February 2005, Wigh found 106 Razorbills (*Alca torda*) off the southeastern coast of Georgia, 52 of which were at 31° N, 80° 36.29' W; thus, appears likely that this species enters Florida waters during such irruptions. Alcids of all species are probably more of more regular occurrence offshore than is currently known, but no observers have ventured out to seek them. The "Other Side," on the Blake Plateau, east of the Gulf Stream is an area of rich productivity, teeming with tuna and smaller fish, and potentially one of the richest areas for birdlife in the Bight, both in terms of diversity and densities. Virtually no birding trips have been made to this region during migration, or winter, yet catches of tuna, marlin, and dolphin have been reported from all seasons. Since fishermen locate the tuna schools by using radar to spot the feeding flocks of birds, there must be some bird activity here year-round. This could be a possible spot for alcids as well, as many species winter far offshore farther north.

Species summaries

The following brief descriptions summarize the status of pelagic species that have occurred in the South Atlantic Bight.

Albatrosses (*Thalassarche* spp.). Vagrant, known from only three sightings. Most documented sightings in North Atlantic Ocean and Gulf of Mexico are of Atlantic Yellow-nosed Albatross (*T. c. chlororhynchos*), of which J. Johnson reported one on 13 July 1958. Johnson also observed a Black-browed Albatross (*T. melanophrys*) on 13 September 1974. An albatross observed 166 km east of Ponce Inlet, Florida by Wallace 3 July 2004 was not formally identified to species but was thought to be a juvenile Yellow-nosed (and submitted as such) and was certainly a *Thalassarche*.

Northern Fulmar. Rare winter visitor, probably more frequent than is currently known. The only firm records from Florida involve beached birds, one at Satellite Beach, in the Melbourne area of Brevard County 19 April 2005 (Anderson 2005b). Haney (1983, 1986c; also Haney et al. 1986) recorded the species off Georgia on at least seven trips, mostly in February. More winter excursions are needed to clarify the status of this species.

Black-capped Petrel. Regular to common spring migrant, April–May, in the Gulf Stream or in the "Other Side" off central Florida, with a few present June–August (Figure 1). Because the species breeds on Hispaniola and possibly Cuba and occurs in large numbers off Cape Hatteras May–October, and in at least moderate numbers off South Carolina as well (N. Dias, pers. comm.), many individuals must at least pass through the offshore waters of the southern South Atlantic Bight. Small numbers have been observed migrating northward along eastern Bahamas in April–May (Wallace, pers. obs.) A few are apparently present in the Gulf Stream year-round (Haney 1987).

Fea's/Zino's Petrel (*Pterodroma feae/madeira*). One sight report off Georgia 9 November 1984 (Haney et al. 1993). Fea's Petrels are observed annually off Cape Hatteras in late spring and summer (May–August) and probably occur throughout the Bight in spring and summer, especially far offshore. Zino's Petrel, difficult to distinguish in the field from Fea's,

Figure 1. This Black-capped Petrel, photographed about 166 km off Ponce Inlet, Florida in May 2007, shows a dusky gray rather than white collar, which is true of a minority of birds recorded in the southern South Atlantic Bight. *Photograph by R. D. Wallace.*

Figure 2. This Cory's Shearwater is apparently of the *borealis* subspecies, in which the underside of the primaries appears strongly brown against the white underwing coverts; in the nominate subspecies, rarely recorded in the South Atlantic Bight (but confirmed by Georgia specimens), the underside of the primaries appears more whitish. This bird was photographed 74 km off Ponce Inlet, Florida in June 2007. *Photograph by R. D. Wallace.*

Figure 3. This Greater Shearwater, photographed 74 km off of Ponce Inlet, Florida in June 2007, was one of many foraging in the vicinity. Recent pelagic trips to the "Other Side" of the Gulf Stream have proven that this species, formerly thought to be scarce off Florida, is actually quite common during spring migration. *Photograph by R. D. Wallace.*

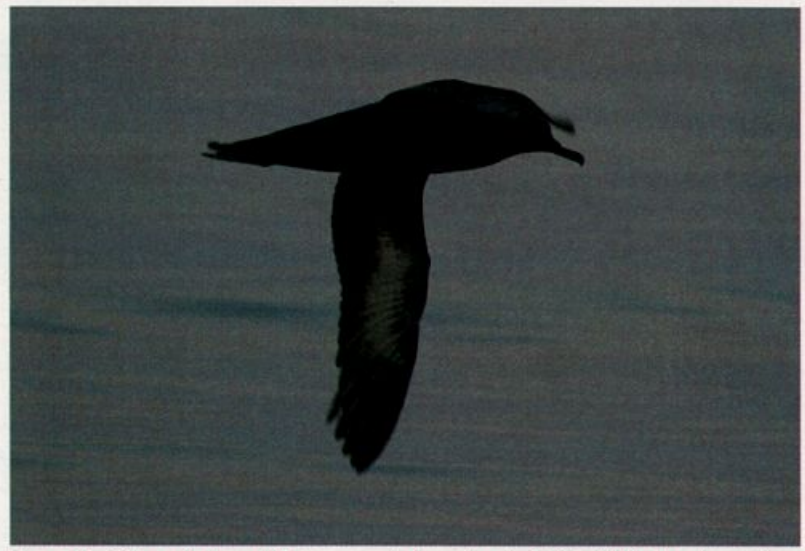

Figure 4. Sooty Shearwater is surprisingly uncommon in the southern South Atlantic Bight, though seawatches from shore during spring migration, particularly during strong easterly winds, may indicate that it is more numerous than current records indicate. This individual was photographed 11 km off Ponce Inlet, Florida in May 2007. *Photograph by R. D. Wallace.*

has not been recorded off North Carolina with certainty, but several candidates have been photographed (e.g., *North American Birds* 59: 527).

Bulwer's Petrel (*Bulweria bulwerii*). One report off Florida in May, over 185 km offshore of Jacksonville (Haney 1985).

Cory's Shearwater. Common in summer and fall, May–November. Found in the Gulf Stream, and often inshore, sometimes within sight of land. Often in flocks of hundreds around tuna schools east of the Gulf Stream. Both subspecies, *diomedea* and *borealis*, are documented by specimen (Figure 2), but the former appears to be rather rare.

Greater Shearwater. Common May–October offshore. Relatively rare inshore (Kale 1963, Stevenson and Anderson 1994) but found in flocks of hundreds around tuna schools east of the Gulf Stream during June–July, with numbers declining through the summer. Smaller numbers sometimes found in fall and winter in the Gulf Stream (Figure 3).

Sooty Shearwater (*Puffinus griseus*). Rare to uncommon spring and early fall migrant, mostly May–June, August–September (Figure 4). There are scattered reports from Florida throughout the year (Stevenson and Anderson 1994).

Manx Shearwater. Uncommon but regular spring and fall migrant. Some individuals can be seen off east coast of Florida all year, especially during winter months (Lee 1995).

Audubon's Shearwater. Common throughout the Bight, April–November, peaking in September (Figure 5). Sometimes seen close to land, especially during strong easterly winds.

Leach's Storm Petrel (*Oceanodroma leucorhoa*). Rare migrant, seen primarily April–June but also occasionally in fall.

Band-rumped Storm-Petrel. Uncommon but regular in small numbers May–September in the Gulf Stream, chiefly along edges and eddies (see Haney 1985, Dias 2007; Figure 6).

Figure 5. Small shearwaters bear closer scrutiny in the South Atlantic Bight. The status of Manx Shearwater, a species formerly thought quite rare in the Bight, has been only recently clarified (Lee 1995), and it is clearly a regular migrant and wintering bird. There is a specimen of a "Little Shearwater"—split by some authorities now as Baroli's Shearwater—from South Carolina in August 1883 (Peters 1924), so pelagic observers should take care to identify small shearwaters with great care. Records of Baroli's from Nova Scotia (September 1986, September 2003) and Massachusetts (August 2007) hint that more records from the Bight are possible. The other North Atlantic taxon formerly combined with Little Shearwater—*boydi*—which nests in the Cape Verde Islands and is sometimes combined with Baroli's as Macaronesian Shearwater (Sangster et al. 2005), is unrecorded in North America but could certainly occur. Boyd's Shearwater lacks the stark whitish face of Baroli's and thus could more easily pass for an Audubon's Shearwater. These Audubon's Shearwaters were photographed 74 km off Ponce Inlet, Florida in May 2007. *Photograph by R. D. Wallace.*

Wilson's Storm Petrel. Common to very common in summer (April–September) in Gulf Stream throughout the Bight. Frequently found in large flocks, often in the middle of the Gulf Stream.

White-tailed Tropicbird (*Phaethon lepturus*). Uncommon but regular (e. g., seen on 36% of trips by Wallace) April–October on the "Other Side" of the Gulf Stream east of central Florida (Figure 7, Frontispiece); regularly observed in the Gulf Stream farther north to Cape Hatteras.

Red-billed Tropicbird (*P. aethereus*). Very rare April–October in the Gulf Stream throughout the Bight.

Magnificent Frigatebird (*Fregata magnificens*). Uncommon but regular in the Gulf Stream April–November throughout the Bight; sometimes seen close to shore.

Brown Booby (*Sula leucogaster*). Rare visitor April–October, with most records in summer (Figures 8, 9).

Masked Booby (*S. dactylatra*). Rare visitor April–October, with most records in summer.

Red-footed Booby (*S. sula*). Rare vagrant, with one record of dark morph by Wallace from the "Other Side" of the Gulf Stream, 132 km east of the central Florida mainland, on 3 April 2007 (Figure 10). The species is rarely recorded from the Atlantic side of Florida, with the most recent record being from inshore waters: one light-morph bird at Boynton Inlet, Palm Beach County 8-9 November 2003 (B. Pranty, pers. comm.). The northernmost record in the western North Atlantic

Figure 6. Band-rumped Storm Petrels are uncommon but regularly present in small numbers in the southern South Atlantic Bight. This photograph, taken 110 km off Ponce Inlet, Florida in May 2007, shows that in a few individuals, the tips of the toes (but not the feet) can project past the tail tip; in most, no part of the foot is visible past the end of the tail. *Photograph by R. D. Wallace.*

Figure 7. Adult White-tailed Tropicbirds are far more commonly seen in the South Atlantic Bight than are nonadults (the ratio is perhaps 40:1), which leads some observers to suspect that juveniles forage closer to nesting areas or elsewhere. This adult was photographed 184 km off Ponce Inlet, Florida in June 2007 (same individual in Frontispiece). *Photograph by R. D. Wallace.*

Figure 8. This juvenile Brown Booby on the R7 SABSOON (U. S. Navy tower), 62 km east of Tybee Island, Georgia, was photographed 19 August 2004. It shows very pale yellow legs; Red-footed Booby of the same age would show dusky pinkish or even orangish legs. *Photograph by R. D. Wigh.*

Figure 9. This juvenile Brown Booby, the same individual as in Figure 8, shows a heavier head/bill and broader wings than Red-footed (see Figure 10). *Photograph by R. D. Wigh.*

Figure 10. This photograph of a subadult Red-footed Booby, taken 138 km off Ponce Inlet, Florida on 3 April 2007, furnishes one of very few records for Atlantic off Florida. Compared to the Brown Booby in Figure 9, this is a slenderer bird, in wings, head/neck, and tail, and the tail appears longer. The underwing coverts of younger Red-footed Boobies tend to be more uniformly dark than those of young Browns, which are contrastingly pale or white, recalling the adults'. Juvenile Red-footeds are invariably dark, and this bird is probably about one year old, thus about two years away from definitive adult plumage, though from this photograph, it is difficult to ascertain whether this youngster will turn out to be a light or a darker morph as an adult. The nominate subspecies is the only subspecies recorded in the Atlantic Basin. *Photograph by R. D.Wallace.*

Figure 11. These adult Bridled Terns, photographed 74 km off Ponce Inlet, Florida in April 2005, show single white outer rectrices, which is apparently typical of the *melanopterus* subspecies of western Africa rather than the *recognitus* subspecies of the Caribbean; more study is needed of the variation in such plumage characters within subspecies. *Photograph by R. D. Wallace.*

Figure 12. Pomarine Jaeger is by far the most common jaeger observed in the South Atlantic Bight and has been recorded in all months. This second-cycle bird with rather interesting barred neck and speckled head was photographed 12 November 2006 about 64 km off Ponce Inlet, Florida. "Poms" can often be lured for closer views with chum. *Photograph by R. D. Wallace.*

comes from South Carolina, a beached bird that later died, found 27 July 1986 on Edisto Island, Charleston County (Post and Gauthreaux 1989; *Chat* 51.3: 65).

Northern Gannet (*Morus bassanus*). Common to abundant November–April, usually inside of the Gulf Stream. Often seen in flocks of hundreds feeding over baitfish, often within sight of land. During migration, often seen flying in long lines low over the water in the Gulf Stream.

Red Phalarope. Uncommon to common migrant and winter visitor (July–May), with peaks occurring in January–February and in August, chiefly along western edge of Gulf Stream.

Red-necked Phalarope. Uncommon to common migrant and winter visitor, July–May, with peaks occurring in February, April, and September, chiefly along western edge of the Gulf Stream (see Haney 1985).

Black-legged Kittiwake (*Rissa tridactyla*). Uncommon to rare in winter, November–March, more common in northern part of Bight, rarer farther south.

Sabine's Gull (*Xema sabini*). Rare migrant in spring and fall, usually far offshore.

Arctic Tern (*Sterna paradisaea*). Rare to uncommon spring and rare fall migrant, mostly far offshore, April–May and July–August.

Sooty Tern. Common to abundant around tuna schools on the "Other Side," April–October, far offshore of central Florida. Uncommon to rare in the Gulf Stream throughout the Bight. Sometimes thought to move north of breeding grounds only when driven by storms (Stevenson and Anderson 1994), but clearly forages regularly in the Bight outside the context of storms.

Bridled Tern. Common in the Gulf Stream, especially along edges, April–October, but rare inshore of the Stream (Figure 11). Less regular farther north in the Bight.

Brown Noddy (*Anous stolidus*). Rare in the Gulf Stream, uncommon but regular around tuna schools on the "Other Side," far offshore of Florida, April–October. Previously thought to move north of breeding grounds only when driven by storms (Stevenson and Anderson 1994).

South Polar Skua (*Stercorarius maccormicki*). Very rare in summer May–August in the Gulf Stream, occasionally inshore, and rare but regular offshore around tuna schools.

Pomarine Jaeger. Present year-round. Common in migration in the Gulf Stream August–October and April–May, uncommon to common in winter November–March, usually inshore of the Stream, with a few present June–July, especially far offshore around tuna schools.

Parasitic Jaeger. Common in migration August–October and April–May, uncommon to common in winter November–March; a few present during summer. Often seen from shore during migration.

Long-tailed Jaeger. Rare migrant, March–May and August–November.

Common Murre (*Uria aalge*). Very rare winter visitor to the northern Bight, December–February. Most records from inshore waters.

Thick-billed Murre (*U. lomvia*). Very rare winter visitor to the northern Bight, December–February. Most records from inshore waters.

Razorbill. Irruptive, rare to locally common in winter, December–February, primarily north of Florida, though may occur farther south periodically. Florida records are entirely coastal (Stevenson and Anderson 1994, Anderson 2005a).

Dovekie. Irruptive, rare to locally common in winter, December–February, primarily north of Florida, though may occur farther south periodically.

Atlantic Puffin (*Fratercula arctica*). Irruptive, rare winter visitor to Bight, December–February. The southernmost records in the Bight are of single beached birds at North Jupiter Beach, Martin County 6 December 1986 (Brooks 1988) and another from St. Augustine Beach, St. John's County, Florida 23 December 2004 (Anderson 2005a; photograph at <http://www.fosbirds.org/RecordCommittee/images/2005/04-558.html>). There are no other records from Florida.

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