Status and subspecific identity of White-faced Storm-Petrels in the western North Atlantic Ocean

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SINCE 1885, THERE HAVE BEEN AT least 47 records of White-faced Storm-Petrels (*Pelagodroma marina*) in the western North Atlantic Ocean (Table 1). Some of the earliest records are of pelagic sightings from vessels crossing the Atlantic Ocean. Others, particularly in recent years, have been recorded on day trips or short cruises within 100 miles of the coast from Cape Hatteras, North Carolina, north to waters off southern New England. Twelve were collected as specimens; ten of these have been preserved and photographs exist of an eleventh permitting identification of the subspecies that reaches North American waters.

Although the species is widespread in the Southern Hemisphere, it breeds in only two island groups in the eastern North Atlantic, each represented by a different subspecies. The Salvage Islands (Ilhas Selvagens, 30°N, 16°W) harbor the subspecies *P. m. hypoleuca,* and the Cape Verde Islands (Ilhas do Cabo Verde, 16°N, 24°W) are inhabited by *P. m. eadesi.* Both subspecies have been reported to occur in North American waters (American Ornithologists' Union 1957; Palmer 1962; Bourne 1966; Buckley and Wurster 1970; Cramp and Simmons 1977; and Jouanin and Mougin *in* Mayr and Cottrell 1979) but, in reality, the specimen evidence presented here indicates that only the Cape Verde birds occur in the area.

The first specimen (U.S.N.M. 105408, formerly mounted, not lost, *contra* Roselaar 1975), an unsexed adult molting its outer wing feathers, was captured on board the "Albatross" at 40°34′18″N, 66°09′W, about 200 miles off Nantucket Island, Massachusetts, September 2, 1885 (Ridgway 1885). The second was collected at 39°40′N, 71°02′W, approximately 60 miles south-southeast of Block Island, Rhode Island, August 18, 1953, three days after hurricane *Barbara* (Gordon 1955). It was photographed on board and later deposited as a pickle in the American Museum of Natural History, New York. The photographs (examined) clearly show unworn, pointed primaries and conspicuous, white-tipped wing coverts indicating immaturity. The specimen can no longer be located, perhaps having been dissected for anatomical stud-

Photo/Alan Brady.

Table 1. Records of White-faced Storm-Petrels in the western North Atlantic Ocean.

#	*Locality*	*Date*	*Number*	*Reference*
1	32°N, 40°45′W	Apr 17, 1966	1	*Sea Swallow* 20:51
2	42°N, ca 415 mi E of New York	May 3, 1946	1	Wood, 1947
3	Hudson Canyon	May 26, 1976	1	*American Birds* 30:818
4	34°N, 36°W	June 12, 1964	1	*Sea Swallow* 18:22
5	6 mi off Avalon, NJ	late July 1973	1	T. Koebel, *pers. comm.*
6	38°29′N, 72°42′W	Jul 31–Aug 9	1	*American Birds* 39:32
7	42°N, 47′W	Aug 5, 1971	1	*Sea Swallow* 24:79
8	Milford Point, CT	Aug. 6, 1966†	1*	Lauro, 1976
9	45°45′N, 36°15′W	Aug 6, 1971	1	*Sea Swallow* 24:79
10	40°29′N, 55°22′W	Aug 11, 1964	1	*Sea Swallow* 19:65
11	SE of Oregon Inlet, NC	Aug 14, 1984	1*	*American Birds* 39:41, NCSM #10363
12	SE of Oregon Inlet, NC	Aug 16, 1984	1*	*American Birds* 39:41
13	39°48′N, 71°02′W	Aug 18, 1953	1*	Gordon, 1955
14	43°50′N, 57°30′W	Aug 18, 1967	1	Buckley & Wurster, 1970
15	45°32′N, 43°27′W	Aug 19, 1957	5	Buckley & Wurster, 1970
16	Hydrographer Canyon	Aug 19, 1985	1	*American Birds* 40:255, *P*
17	Georges Bank, MA	Aug 22, 1983	2	*American Birds* 38:175
18	off Oregon Inlet, NC	Aug 23, 1985	1	NCSM seabird records
19	50 mi ESE Chincoteague NWR, VA	Aug 24, 1980	1	*American Birds* 35:166
20	41°44′N, 51°58′W	Aug 25, 1945		Nicholson, 1946
21	38°45′N, 74°40′W	Aug 26, 1972	1	Barnhill & DuMont, 1973, *P*
22	off Oregon Inlet, NC	Aug 27, 1985	1	NCSM #10973
23	off Cape Hatteras, NC	Aug 28, 1983	1	*American Birds* 38:189, *P*
24	38°54′N, 69°30′W	Aug 29, 1967	1–3	Buckley & Wurster, 1970
25	off Oregon Inlet, NC	Aug 29, 1985	2* +2	NCSM #10964, 10967; NCSM seabird records
26	37°27′N, 71°55′W	Aug 30, 1979	1	*American Birds* 34:147
27	38 mi off Oregon Inlet, NC	Aug 31, 1977	1*	Lee & Rowlett, 1979
28	40°34′N, 66°09′W	Sep 2, 1885	1*	Ridgway, 1886
29	40°08′N, 69°04′W	Sep 2, 1982	1	Powers & Russell, *in lit*
30	off Avalon, NJ	Sep 5, 1973	1	*American Birds* 30:818
31	Hydrographer Canyon	Sep 7, 1985	1	*American Birds* 40:255
32	400 mi off E coast USA	1st wk Sep 1959	1*	Roselaar, 1975
33	85–100 mi SE of Cape May, NJ	Sep 10, 1980	1 + 1	*American Birds* 35:162
34	40°00′N, 67°51′W	Sep 10, 1982	1*	USNM 572200
35	Hudson Canyon	Sep 11, 1980	1	*American Birds* 35:162
36	39°18′N, 76°16′W	Sep 19, 1979	1	*American Birds* 34:144
37	59.6 mi E of Assateague Is., VA	Sep 21, 1985	1	*American Birds* 40:91
38	34 mi NE off Oregon Inlet, NC	Sep 24, 1977	1*	Lee & Rowlett, 1979
39	30 mi N of Cape Cod, MA	Oct 1, 1946	1	Abbott, 1946
40	Oregon Inlet, NC	Oct 2, 1971†	2	*American Birds* 26:45
41	40°36′N, 35°12′W	Oct 4, 1970	1	*Sea Swallow* 24:70
42	40°30′N, 35°15′W	Oct 5, 1970	1	*Sea Swallow* 24:79
43	off Hatteras, NC	Oct 9, 1983	2	*American Birds* 38:189
44	45°–46°N, 37°–45°W	Oct 16–17, 1944	several	Rankin & Duffy, 1946
45	17°N, 65°W	Nov 18, 1958	1	*Sea Swallow* 12:13
46	45°30′N, 56°45′W	Dec 5, 1966	1	*Sea Swallow* 22:46
47	off North Carolina	Fall 1977	several	Lee and Rowlett, 1979

*† record associated with a storm, * specimen, P photographed*

ies It was measured, compared and identified as "typical of the eastern North Atlantic or Cape Verde Island race" by the late Robert C. Murphy at the time of deposit. Gordon (1955) was presumably unaware of Bourne's (1953) new name for the Cape Verde population when he called his specimen *P. m. hypoleuca.*

The third specimen (R.M.N.H. Leiden 28121), an immature male in fresh plumage, was collected aboard "a ship bound for Rotterdam 400 miles off the east coast of the United States" at approximately 42°N, 66°W, assuming the ship departed from New York during the first week in September, 1959 (Roselaar 1975). The fourth specimen (unnumbered, Connecticut Audubon Society, Bird Craft Sanctuary Museum, Fairfield, Connecticut), an unsexed immature bird in fresh plumage, was wrecked on the beach at Milford Point, Connecticut, after hurricane *Belle* August 6, 1966 (Lauro 1976). The fifth and sixth specimens were collected 38 and 34 miles respectively off Oregon Inlet, North Carolina, August 31 and September 24, 1977 (Lee and Rowlett 1979). The first North Carolina specimen was destroyed by a cat but the second, an adult in body molt with worn wings and tail, is preserved in the Smithsonian (U.S.N.M. 52782). The seventh specimen (U.S.N.M. 572200), an adult male in heavy body molt with worn wings and tail, has not been reported previously. It was collected by Edward H. Backus at 40°N, 67°51′W, on the Georges Bank in slope water beyond the 1000-meter isobath, September 10, 1982.

Five additional specimens were collected off North Carolina in August, 1984 and 1985, and are reported here for the first time. The first (N.C.S.M. 10362) was taken at 35°24′N, 74°47′W, southeast of Oregon Inlet, August 14, 1984, and the second, also an adult male (N.C.S.M. 10363) at 35°37′N, 74°47′W two days later. Both adult males were in primary and secondary molt with mostly fresh body feathering, but worn tails. In 1985, an adult female (N.C.S.M. 10973) was taken east of Oregon Inlet August 27, where two adult males (N.C.S.M. 10964, 10965) were collected two days later. The molt state of the three was similar to that of the earlier specimens.

Geographic variation in the species is discussed by Murphy and Irving (1951) and Bourne (1953). Southern Hemisphere birds breeding in higher latitudes in the Tristan da Cunha Group (*P. m. marina*) and New Zealand (*P m maoriana,* possibly not distinct from *marina*) are darker, more heavily pigmented and have shorter bills, wings and legs, and longer, more forked tails than those from more tropical latitudes in the North Atlantic, in Australia (*P m. dulciae*) and in the Kermadecs (*P m. albiclunis*). Australian birds resemble those of the Salvage Islands; Kermadec birds have whitish, not gray rumps. White-faced Storm-Petrels also formerly bred on St. Helena in the South Atlantic "several hundred years" ago (tarsal length intermediate between tropical and high-latitude specimens—Olson 1975) and on Ile Amsterdam in

Table 2. Specimens of White-faced Storm-Petrel from the Western North Atlantic Ocean.

Museum No.	Locality	Date	Sex	Age	Wing (span)	Tail	Tail Fork	Culmen	Tarsus	Mid Toe	Weight	Molt
USNM 105408	40°34′N, 66°09′W	Sep 2, 1885	u	ad		69	5.5	19	44	34.5		P 1–5 new, 6 9/10, 7 3/4, 8 1/4, 9 missing, 10 broken; S in molt; tail old; body worn
AMNH Lost	39°48′N, 71°02′W	Aug 18, 1953	u	1st y	158 (414)	70.6		19.4	44.4	36.9		none
RMNH 28121	400 mi off E coast USA	1st wk Sep 1959	m	1st y	154	68	3	17.9	45.4	36.9		none
CT AUD SOC	Milford Pt, CT	Aug 6, 1966	u	1st y	154	62.5	5.5	18	41.5	35		none
USNM 527825	34 mi off Oregon Inlet, NC	Sep 24, 1977	m	ad	159 (424)	71	9	19	47	36	47.6	Wings and tail old, body molt
USNM 572200	40°00′N, 67°51′W	Sep 10, 1982	m	ad	159	67.5	2.5	19	45.5	36	47.1	Wings and tail old, body molt
NCSM 10362	35°24′N, 74°47′W	Aug 14, 1984	m	ad	[157] (409)	75	7.5	19	41.5	35	48.4	P1–5 new, 6 1/2, 7 1/4, 8–10 old, tail old; body molt
NCSM 10363	35°37′N, 74°47′W	Aug 16, 1984	m	ad	[155, (415)]	72	6	18.5	41.5	37	50.6	P 1–2 new, 3 missing, 4–10 old; inner pair S old, rest new; tail old; body molt
NCSM 10973	E of Oregon inlet, NC	Aug 27, 1985	f	ad	[138 (384)]	76	6.5	19	45	39	51.5	P1–6 new, 7–10 in growth; S in molt; tail old; body molt
NCSM 10965	E of Oregon Inlet, NC	Aug 29, 1985	m	ad	[138 (389)]	[72]	[8]	18	47	38	53.3	P1–7 new, 8 9/10, 9 3/4, 10 2/3, inner S old, rest new; body molt
NCSM 10964	E of Oregon Inlet, NC	Aug 29, 1985	m	ad	[143 (386)]	72.5	5	19	[35.5]	30	47.9	P1–6 new, 7 9/10, 8 7/8, 9 2/3, 10 1/2; inner S old, rest new; tail old; body molt

the Indian Ocean (Jouanin and Paulian 1960). The most extreme tropical form is the Cape Verde race, *eadesi.* The variation in facial pattern and relative proportions of the bill, legs, and tail-fork result in birds of very different appearance in the North Atlantic compared with those in the South Atlantic and South Pacific oceans. These differences in bill length, facial pattern, and extension of the feet beyond the tail are even noticeable in flight. Compare the detailed illustrations in Cramp and Simmons (1977) and the National Geographic Society Field Guide (1983), based on North Atlantic specimens, with the drawings in Sclater (1971), Harper and Kinsky (1978), Falla, Sibson and Turbot (1979), and Harrison (1983; large figures), based largely on South Pacific birds.

The ten western North Atlantic specimens and the photographs show the short wings, short, slightly-forked tail and long legs and toes typical of low latitude birds and the long bill and great extent of white on the forehead and cheek that Bourne (1953) used in differentiating *eadesi* from *hypoleuca* (Table 2). In Cape Verde *eadesi,* the white of the breast and throat is continuous with the broad superciliary, setting off the narrow, dark, eye mask. Salvage Island birds are darker on the back and have less white on the forehead and a more diffuse dark mask that virtually isolates the narrow white superciliary. These characters however would be difficult, and probably impossible, to distinguish on birds in flight. One North Carolina specimen (N.C.S.M. 10964) has middle toes and tarsi (both legs broken during collection) that are significantly shorter than those in the rest of the western North Atlantic series. In all other characters, however, it appears to be *eadesi,* and was even in the same molt schedule as typical *eadesi* collected in August.

No information has been published on molt in the North Atlantic populations of this species owing to a lack of molting specimens. In the Pacific, however, adults begin body molt before migration and the inner primaries begin molt shortly after arrival on the winter grounds. The tail molt begins after wing molt is complete (Cramp and Simmons 1977). The same molt pattern is apparent in North Atlantic adults. Body molt is already in progress and early August birds are molting inner primaries. Among the western North Atlantic specimens it is possible to separate adults and immatures on the basis of feather wear and molt. During fledging, body plumage and wing coverts grow rapidly and are subject to some wear. Juvenile wing quills, which grow out

Table 3. Records of White-faced Storm-Petrels in the eastern North Atlantic Ocean.

#	*Locality*	*Date*	*Number*	*Reference*
1	Colonsay, Scotland	Jan 1, 1897	1*	Clarke, 1897; Bourne, 1967
2	28°30′N, 15°W	Jan 9, 1963	1	*Sea Swallow* 17:26
3	off Mauretania	Jan 15, 1967	1	Lambert 1971
4	14°N, 17°30′W	Jan 17, 1963	1	*Sea Swallow* 17:26
5	Btw Ifni, Morocco, & Lanzarote, C. I.	Feb 9	3	Heim de Balsac & Mayaud, 1962
6	Madeira	Feb 19, 1908†	1*	Schmitz, 1899
7	11°05′N, 17°07′W	Feb 20, 1961	1	*Sea Swallow* 15:19
8	29°30′N, 15°W	Mar 16, 1963	1	*Sea Swallow* 17:26
9	20 mi E of Salvages	Mar 17, 1888?		Bannerman, 1914
10	34°N, 13°30′W	Mar 17, 1963	3	*Sea Swallow* 17:26
11	La Orotavo, Tenerife, Canary Islands	Mar 20, 1887		Reid, 1888; Bannerman, 1914
12	22°30′N, 17°W	Mar 31, 1972	2 (?)	*Sea Swallow* 24:69
13	230 mi NW of Bathurst, Gambia	Mar		Bannerman, 1951
14	34°N, 18°30′W	Apr 11, 1965	1	*Sea Swallow* 18:58
15	25°N, 15°30′W	Apr 14, 1963	1	*Sea Swallow* 18:22
16	near Salvages	Apr 23, 1895	numbers	Ogilvie-Grant, 1896
17	Azores	May 6, 1912	1*	Bannerman, 1914; Cramp and Simmons, 1977
18	15°55′N, 18°00′W	May 8, 1947		Bierman & Voous, 1950
19	15°N, 17°W	May 8, 1966	3	*Sea Swallow* 22:46
20	18°30′N, 18°20′W	May 9, 1947	many	Bierman & Voous, 1950
21	22°N, 17°30′W	May 10, 1947		Bierman & Voous, 1950
22	26°N, 16°W	May 11, 1947		Bierman & Voous, 1950
23	28°25′N, 15°20′W	May 12, 1947		Bierman & Voous, 1950
24	off Agadir, Morocco	May 25	26	Heim de Balsac & Mayaud, 1962
25	off Villa Cisneros, "Mauretania"	May 27	3	Heim de Balsac & Mayaud, 1962
26	Canary Islands	every spring	several	Mead-Waldo, 1893
27	28°47′N, 15°13′W	June 5, 1962	1	*Sea Swallow* 16:26
28	31°45′N, 11°30′W	June 12, 1969	1	*Sea Swallow* 24:69
29	30°06′N, 15°02′W	June 14, 1976	1	*Sea Swallow* 34:37
30	btw Lisbon & Madeira	June, 1851		Berthelot quoted in Bolle, 1855
31	N of Canary Islands to Cape Verde	late July 1966	1–3	Lambert 1971
32	40°N, 9°52′W	Aug 13, 1962	several	*Sea Swallow* 15:19
33	47°18′N, 7°23′W	Aug 24, 1963	1	Buckley & Wurster, 1970
34	48°40′N, 6°25′W (approx.)	Aug 27, 1963	1	Buckley & Wurster, 1970
35	btw Cape Verde Islands & mainland	Aug		Bannerman, 1951
36	20°25′N, 17°51′W	Sep 24, 1974	1	*Sea Swallow* 34:37
37	33°30′N, 13°W	Sep 26, 1962	1	*Sea Swallow* 17:26
38	15°N, 17°W	Sep 28, 1966	3	*Sea Swallow* 22:46
39	N of Canary Islands to Cape Verde	mid Oct 1966	1–3	Lambert 1971
40	Cape Verde Islands	Oct 24, 1973		Harris & Hansen, 1974
41	9°34′N, 26°09′W	Oct 26, 1973	1	Harris & Hansen, 1974
42	21°22′N, 18°26′W	Oct 30, 1981	2	*Sea Swallow* 32:17
43	13°30′N, 18°W	Nov 14, 1947	1	Bierman & Voous,1950
44	btw Monster & Teerheijde, Netherlands	Nov 19, 1974	1*	Andriesen & Tekke, 1976
45	Walney Island, England	Nov, 1890	1*	Macpherson,1891; valid? Bourne, 1967
46	near Madeira			Tristram cited in Schmitz, 1899; Bannerman, 1914
47	Tejina, Tenerife, Canary Islands		1*	Cabrera y Diaz, 1893; Bannerman, 1914
48	Shores of Tenerife, Canary Islands		1*	Moquin-Tandon in Webb & Berthelot, 1841
49	Azores			Drouet, 1861

*† record associated with a storm, * specimen*

later, are relatively fresher. Juvenile body plumage is uniformly dull and somewhat worn at the beginning of summer; some of these worn juvenile feathers may even be replaced in August and September. In recently-fledged young birds, the tips of the six inner primaries are conspicuously tipped with white, as are the secondaries and rump feathers. In newly molted adults, the inner primaries are all dark in contrast to the white-tipped secondaries. In juveniles, the primary coverts are narrow, rounded and uniformly gray (brownish when worn), whereas in adults, they are broad and squared and the innermost have white tipping. The ends of the secondary coverts of juveniles are somewhat lighter than the rest of the feathers, but not broadly tipped with white as in newly molted adults, which consequently, show a conspicuous white wing bar. Juveniles also often show a pale collar.

At sea, even at a distance, the White-faced Storm-Petrel is distinctive in color pattern and behavior among western North Atlantic storm-petrels. Its white underparts and gray back and wings are very different from the white rumps and black bodies and wings of Wilson's (*Oceanites oceanicus*), Leach's (*Oceanodroma leucorhoa*), and Band-rumped (*O. castro*) storm-petrels. Its erratic bounding and bouncing, kangaroo-like, side-to-side flight, in which it uses its long dangling legs to push off from the wave crests, is totally unlike the flight behavior of the other three species when they are foraging. *Pelagodroma* show very little wing movement, even when in rapid flight. In calm weather, White-faced Storm-Petrels also sail on stiffly outstreched wings low over the surface like flying fish but regularly hit the surface with their feet. Like Wilson's Storm-Petrel, it does not avoid ships as the two *Oceanodroma* species do but, while feeding, it may even be closely approached by maneuvering a boat slowly and indirectly. During fall migration, when Red (*Phalaropus fulicaria*) and Red-necked (*P. lobatus*) phalaropes are in gray basic-plumage, they show superficially similar color and pattern, but their flight is higher above the water, more direct, and faster. They are also far more social, generally observed in flocks, whereas White-faced Storm-Petrels are mostly solitary off our coasts. Phalaropes alight on the water to swim and "spin" while feeding, in

contrast to the storm-petrel which seldom, if ever, swims.

Birds seen off North Carolina were generally solitary but the four seen August 29, 1985, were all within an area of several square kilometers. These birds were in flocks of hundreds of feeding Wilson's Storm-Petrels that appeared to be foraging in oily slicks associated with numerous dolphins and whales.

Food habits of White-faced Storm-Petrels are poorly documented. The birds feed from the surface while pattering with out-stretched wings. Hagen (1952) reports that South Atlantic birds (*P. m. marina*) had fed on copepods and euphausiid crustaceans. Stomach contents of birds collected in North Carolina waters contained fish scales, otoliths (largest 3 mm), an entire, but partly digested fish, at least 65.2 mm long and 13.5 mm deep, an unidentified egg mass, small crustacean larvae (less than 1.5 mm), a small pebble (1 mm), and at least six marine water striders (*Halobates micana*).

The 14 records of White-faced Storm-Petrels in the entire North Atlantic, up to 1967, were summarized by Buckley and Wurster (1970), but they overlooked some early records and many additional birds have appeared on both sides of the Atlantic since then (Tables 1 and 3). The growing interest in pelagic bird study in the eastern United States accounts for most of the recent records in the western North Atlantic. Most of the specimens and sightings were recorded since 1970. There are multiple records for all years since 1976 except 1978 and 1981. All but eight of the 47 records in the western North Atlantic fall between August 5 and October 17, a schedule that is more compatible with the timing of breeding in the Cape Verde Islands than in the Salvage Islands. Birds return to the Cape Verdes in November, lay January to March and have young almost ready to depart in late June (Murphy 1924; de Naurois 1969; Cramp and Simmons 1977). Salvage Island birds have a breeding timetable that is almost two months later. They return during the winter, lay March to May and depart in late July-mid September (Jouanin and Roux 1965). White-faced Storm-Petrels encountered in the western North Atlantic before August or after October are probably failed breeders or immature birds without reproductive responsibilities.

Photo/Alan Brady.

Only two records, both storm related, are from on shore on the United States east coast: at Milford Point, Connecticut, and two birds at Oregon Inlet, North Carolina. Most of the rest range 45–415 miles off the coast over deep waters of the Continental Shelf and Slope, generally north or west of the Gulf Stream, but there are two records from within nine miles of shore. The Cape Hatteras region appears to be the southern limit of occurrence in the western North Atlantic (Lee 1984). The route White-faced Storm-Petrels take in crossing the Atlantic Ocean is unknown for there are too few records for the mid Atlantic. Presumably, however, they follow a temperate route for there is only one record (Table 1:45, presented without details) for tropical latitudes in the central or western Atlantic.

Published coastal and pelagic records are remarkably few in the eastern North Atlantic, even in the immediate vicinity of the breeding grounds in the Salvage and Cape Verde Islands (Table 3). Such sightings of familiar and common birds probably go unreported. There are reliable specimen records for Scotland (identified as *hypoleuca*—Bourne 1967), the Netherlands ("tentatively" identified as *eadesi*—Andriesen and Tekke 1976), and the Azores, Madeira, and Canary Islands. Shipboard sightings are mainly from two high traffic areas, between West Africa and the Cape Verde Islands and between the Canary Islands and Madeira. It seems therefore that many birds stay near the breeding grounds all year, although they apparently do not visit the islands on which they nest except for reproduction.

The number of records and the regularity of their seasonal occurrence in the western North Atlantic indicates that White-faced Storm-Petrels are not merely storm-blown waifs in American waters. Some adults and first-year birds from the Cape Verde Islands may migrate northwestward in late summer to feed and to molt (adults only) in Continental Shelf and Slope waters off the eastern United States briefly before returning to the eastern North Atlantic late in the fall. The scant molt evidence available from specimens shows that molt of flight feathers is not as synchronized between individuals in this species as it is in most nonbreeding seabirds summering off the east coast of North America. Surface temperatures, salinity and productivity in shelf and slope waters off the eastern United States from August to October, when White-faced Storm-Petrels are feeding and molting in the area, are similar to those off northwest Africa during the spring and early summer when they are breeding (Sverdrup, Flemming and Johnson 1942; F. A. O. 1972; Gorschkov 1978). In particular, surface temperature ranges between 20° and 25°C when the

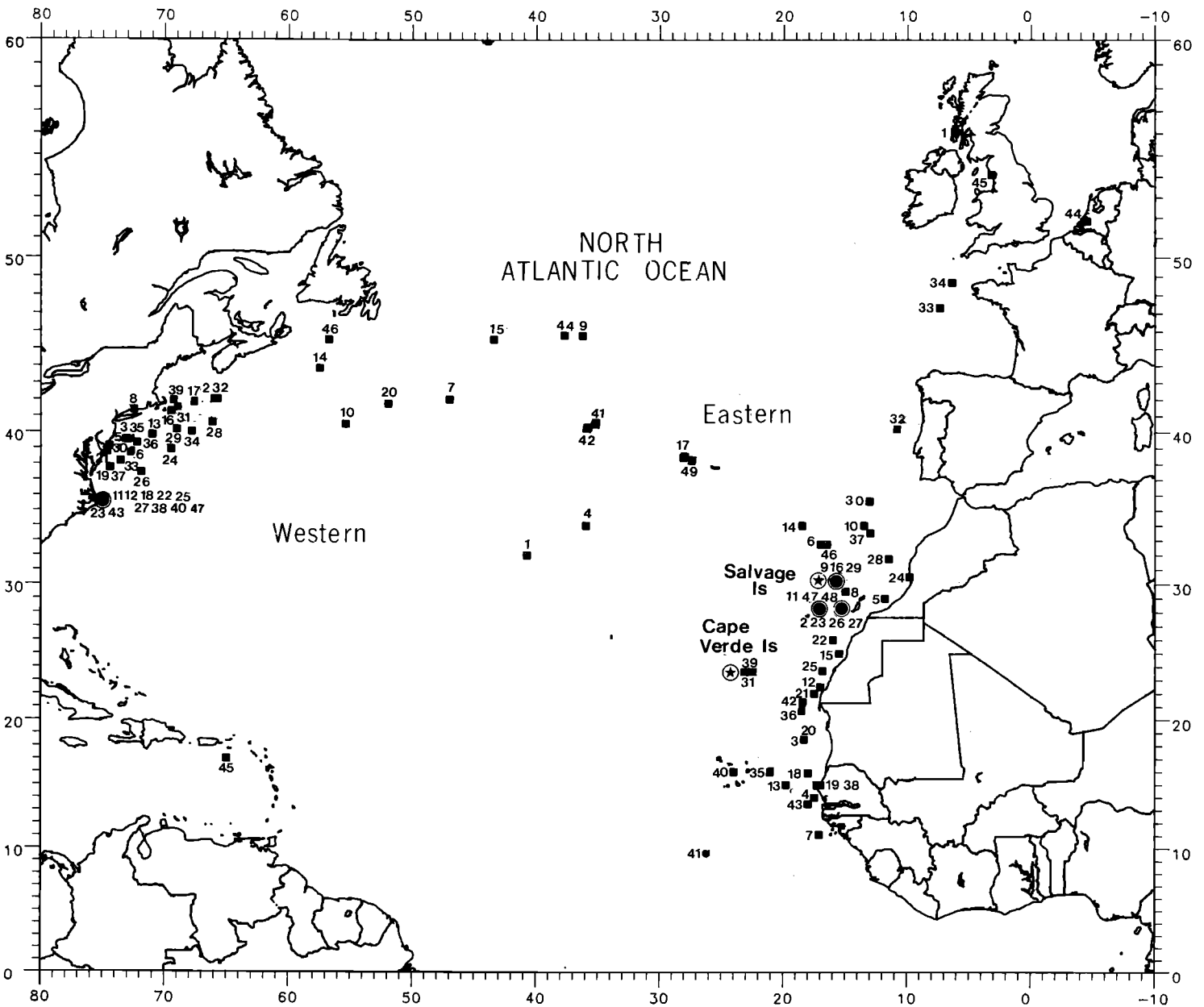

Figure 1. *Records of White-faced Storm-Petrels in the North Atlantic Ocean. Numbers refer to Table 1 (west of 30° W) and Table 3 (east of 30° W). Bordered circles represent three or more records off North Carolina and in the Salvage and Canary Islands Bordered stars indicate sites of breeding colonies in the Salvage and Cape Verde Islands*

birds are present in both areas, but is above 25° from August through November in the Cape Verde Islands, when the birds are absent. Surface water temperatures recorded for six August records, at the time of sighting off North Carolina, ranged from 20.1–27.2°C. While water temperatures were high, the general site is inshore of the influence of the Gulf Stream (Lee 1984). All but one of the sightings off the North Carolina coast have been over deep water (300–500 fathoms) northeast of Oregon Inlet, where seabird density is low. Despite extensive coverage of other zones in the region, the only other area where the species was seen in Carolina waters were two single birds off Cape Hatteras.

White-faced Storm-Petrels therefore, show the same sort of regular transoceanic migrations between areas with similar oceanographic conditions in the Indian (Mörzer Bruyns and Voous 1964; Bailey 1966; Voous 1965), Pacific (Murphy 1936; Lèvêque *et al.* 1966; Harris and de Vries 1968; Imber 1984; Watson and Angle ms.), and South Atlantic oceans (Dabbene 1922). Such trans-Atlantic migration is also well documented for other procellariforms that breed in the eastern Atlantic (*e.g.* Cory's Shearwater, Common Shearwater, Little Shearwater, and Band-rumped Storm-Petrel, and various gulls (Cramp & Simmons 1977, Lee *in press*).

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White-faced Storm-Petrel. Photo/Richard Bowen.

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