



THE GREATER SHEARWATER IN MARYLAND

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The 1969 Disaster

On June 16, 1969, the following bulletin was issued by the Smithsonian Institution's Center for Short-lived Phenomena: "A major bird kill is now occurring along a 100 mile strip of coast of North Carolina--from Beaufort in the south up to Oregon Inlet in the north. Dead and dying birds have been found washed up on the oceanside beaches of the Cape Hatteras islands. ...The kill seems to be confined to the Shearwater species, with a ratio of 50:1 Greater Shearwaters to Sooty Shearwaters found dead. There is no known reason for the massive mortality." Dead Greater Shearwaters were later reported from South Carolina to Delaware.

In response to the bulletin and the knowledge that several birds had been found on the beach at Chincoteague National Wildlife Refuge, Virginia (pers. comm., C. O. Handley, Jr. and J. E. Gordon), we organized a one-day trip to Assateague Island, Maryland, to look for shearwaters. On June 19 we walked about 6.5 miles of beach south of Assateague Island State Park (10.0 to 16.5 miles south of Ocean City Inlet). We found 18 dead Greater Shearwaters (*Puffinus gravis*), which constitute the first specimen records for Maryland (Table 1). All were found along the high water line mixed with other flotsam. We searched diligently for other pelagic birds on the beach, but found none.

Condition of the Birds

The condition of the birds fell roughly into three categories: 1) Two birds, numbers 9 and 15, were partly buried in the sand and were badly decomposed; they had probably been dead for at least five days. 2) The plumage of fifteen birds was completely water-soaked and mixed with sand. All were in various stages of decay, and many were infested with maggots. We estimated that they had been dead for several days. 3) The last bird, number 18, had probably been dead no more than 12 hours and was in a good state of preservation; the eye was full and round, and the bird was not decayed, water-soaked, or infested with maggots. It weighed only 481 grams, which is very light compared with an average of 870 grams for five breeding male Greater Shearwaters from Tristan da Cunha Islands (Hagen, 1952).

This bird was prepared as a museum study skin (USNM 532283) by W. T. Van Velzen.

Table 1. Location, age, sex and measurements (in millimeters) of 18 Greater Shearwaters from Assateague Island, Maryland.

Spec- imen No.	Miles S. of Ocean City Inlet	Age	Sex	Cul- men	Wing Chord	Tail	Tar- sus	Wing Spread	Length	Prepa- ration
1	10.6	--	♂	49	334	119	64	1171	528	Skeleton
2	11.2	--	♂	47.5	341	122	64	1158	492	Skeleton
3	11.6	--	♀	46	330	116	63	1128	473	Skeleton
4	11.9	--	♀	45	341	116	63	1150	486	Skeleton
5	12.2	--	-	42	307	118	61	1119	501	Skeleton
6	12.3	Adult	♀	46.5	(318)	119	61	(1079)	504	Skeleton
7	12.6	--	♂	47.5	340	115	62	1170	522	Skeleton
8	12.8	--	♀	46	341	121	63	1137	498	Skeleton
9	12.9	--	-	47	-	-	-	-	-	Skull Only
10	13.7	--	♂	46	341	118	62	1158	488	Skeleton
11	13.7	--	♂	46.5	336	122	65	1120	476	Skeleton
12	14.3	--	♀	46	342	-	63	1170	-	Skeleton
13	14.4	Adult	♀	47.5	(323)	117	63	(1107)	492	Skeleton
14	14.8	--	-	42.5	345	123	62	1140	511	Skeleton
15	15.6	--	-	48	337	119	62	-	-	Skeleton
16	15.6	--	♀	42.5	330	116	60	1115	497	Skeleton
17	16.3	--	♂	45.5	336	118	62	1161	506	Skeleton
18	16.3	Adult	♂	48	327	116	62	1120	480	Skin
Mean, 7 males				47.1	336.4	118.6	63.0	1151	499	
Mean, 7 females				45.6	336.8*	117.5	62.3	1140*	492	
Mean, all 18				46.1	335.2*	118.4	62.5	1145*	497	
Maximum				49	345	123	65	1171	528	
Minimum				42	307	115	60	1115*	473	

*Molting birds, numbers 6 and 13, not included.

The birds that were not too badly decomposed were extremely emaciated, suggesting that they had not eaten for several days before dying. The stomach contents of 15 shearwaters were examined. Squid beaks, numbering from one to a dozen, were found in each stomach. A wide variety of other items included small stones, seeds, small snails, pieces of cork, wire, plastic and an onion. Laboratory analyses of live and dead birds from North Carolina revealed no apparent cause for the mass mortality.

Measurements

Measurements of the culmen, wing, tail, tarsus and total length were taken to confirm species identification before the specimens were skeletonized (Table 1). Although the males averaged slightly larger in all

measurements except wing chord, the difference between males and females was not statistically significant by any of the measurements taken.

Molt

Since young birds leave the breeding grounds with fully grown plumage, it was hoped that wing molt could be used as a character to age the Maryland specimens. However, only two specimens showed any primary wing molt and this was nearly complete. In specimen number 6 the outer two primaries in both wings were growing. In number 13 the outer three primaries of the right wing and primaries 8 and 9 of the left wing were growing while the outer left primary was an old worn brown feather. In number 18 the tail but not the wing was molting. All other specimens were in very fresh plumage, indicating that they were either adults just completing the molt or birds of the year. Probably most were immatures.

Maryland Status

The Greater Shearwater is an abundant bird ranging throughout the North and South Atlantic Oceans (Fig. 1). It is recorded as a casual visitor to the Maryland coast and has been seen here on only five previous occasions (Table 2). Spring records from May 9 to June 19 represent the period of northward migration in this area. The November 4 record must be of non-breeding or subadult birds. More field work in late May and June, particularly offshore, would probably reveal that the Greater Shearwater is of annual occurrence in Maryland coastal waters.

Table 2. Previous Records of Greater Shearwaters in Maryland.

<u>Date</u>	<u>Number</u>	<u>Location</u>	<u>Reference</u>
May 9-13, 1949	5 or 6	"a short distance offshore from Ocean City"	Stewart & Robbins, 1958
May 14, 1955	2	"a short distance offshore from Ocean City "	Stewart & Robbins, 1958
May 17, 1947	7	"a short distance offshore from Assateague Island"	Stewart & Robbins, 1958
June 3, 1963	2	"offshore from Ocean City Inlet"	Dyke, 1963
Nov. 4, 1961	2	"offshore from 94th Street North Ocean City"	Robbins, 1962

Breeding

Until recently, very little had been recorded about the nidification and breeding range of this species. Although originally described to science by O'Reilly in 1818 from birds collected around Greenland and Newfoundland, it was almost a century later that the Greater Shearwater's breeding grounds were discovered in the Tristan da Cunha Islands of the South Atlantic Ocean. Most of the detailed information is found in three reports (Rowan 1952, Hagen 1952, and Elliot 1957) on which the following account is largely based.

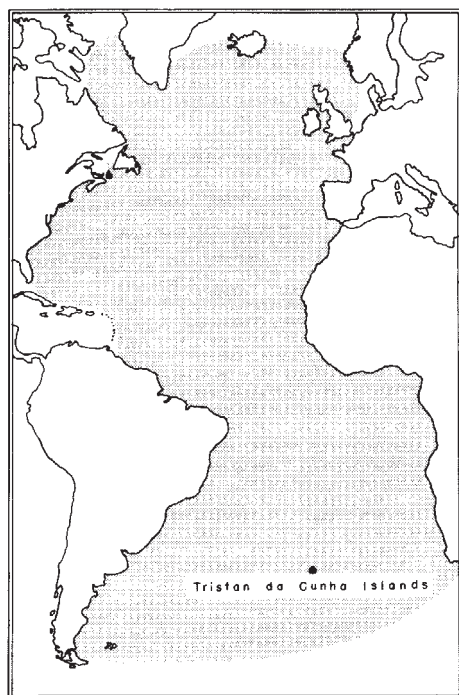


Fig. 1. Range of Greater Shearwater

The Tristan da Cunha Islands form a group of three small volcanic islands located near the center of the South Atlantic Ocean. The largest island of the group, Tristan da Cunha, is not inhabited by the Greater Shearwater. The smallest is Nightingale Island, less than one square mile in extent. Using a careful sampling procedure, Rowan (1952) estimated that the number of Greater Shearwaters on Nightingale Island was four million. On Inaccessible Island, which is about four square miles in area, Elliot estimated not less than 300,000 birds. Recently, Swales (1965) reported the Greater Shearwater from uninhabited, volcanic Gough Island, about 220 miles SSE of Tristan da Cunha, where "...the total population must be very large, possibly hundreds of thousands." This species is an unconfirmed breeder on Kidney Island, Falkland Islands (Cawkell and Hamilton, 1961).

The "Petrel" as the Greater Shearwater is known to the Tristan Islanders arrives on the islands in early September. The nesting burrows,

which survive from year to year, are redecorated in preparation for a new nesting season. Much calling and courtship activity occurs during this period and the pair defends the burrow from later arrivals, which find little or no room to establish a nesting territory. A white egg, about two by three inches in size, is laid in a chamber at the end of a three-foot burrow. The single egg, which is the normal clutch size for Procellariiformes, is laid about November 11. Egg laying is highly synchronized, with all the eggs laid within a one-week period. Both parents take turns incubating the egg and feeding at sea. The incubation period has been estimated at 55 days with eggs hatching in the first week of January. The downy young chick, bluish-gray above and paler below, is fed by both adults.

Migration

Young and old leave the nesting grounds from late April to mid-May, beginning their long migration to the northern hemisphere. Some reach the Grand Banks off Newfoundland by the end of May, a distance of over 8,000 miles, in only four to six weeks.

Hagen (1952) banded 811 Greater Shearwaters on Nightingale Island in January and February, 1938; five were later recovered (Table 3).

Table 3. Recoveries of adult Greater Shearwaters banded by Y. Hagen on Nightingale Island.

Band No.	Date Banded	Date Recaptured	Recapture Location	Miles fr. Nightingale Is.*
1100	Feb. 6, 1938	June 15, 1938	Off E. coast of Newfoundland	8420
967	Jan. 31, 1938	June 20, 1938	Off S coast of Newfoundland, 45°48'N., 50°00'W.	8050
1288	Feb. 10, 1938	Aug. 4, 1938	"Lille Hellefiskebank", off W. coast of Greenland, 65° N., 53°40'W.	9645
1038	Feb. 6, 1938	**	"near Greenland"	8930
1251	Feb. 10, 1938	"Spring" 1940	George, Cape Colony, South Africa	1720

* Our calculations; approximate great circle distance in nautical miles.

** No date of recovery given; letter dated Feb. 8, 1940.

The Greater Shearwater is widely distributed in the northern North Atlantic during the northern hemisphere's summer. In June and July they seem to be more concentrated off the North American coast, while in August and September larger numbers are reported from European waters, from which the homeward migration begins.

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