

The breeding birds of Funk Island, Newfoundland: an historical perspective

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FUNK ISLAND, the last and possibly the only breeding ground of the Great Auk (*Pinguinus impennis*) in North America, holds a focal position in ornithological lore and legend. Many popular articles about the island (e.g. Garrity, 1960; Russell, 1965; Bruemmer, 1971) and a 1975 documentary film by D.N. Nettleship, have been produced. Although systematic treatments of the island's avifauna exist (Lucas, 1888a; Tuck, 1961), no report has attempted to draw together what is known into an historical perspective. The written accounts relating to Funk Island afford a rare opportunity in this regard, since the descriptive material spans a period of almost 450 years from the first in 1534 by Jacques Cartier to the present day.

Here we review the literature and much of the unpublished information, primarily that of the late Leslie M. Tuck (see Montevecchi, 1981), concerning the breeding birds of Funk Island. Many problems arise with an historical avifauna analysis covering a time span of this magnitude. Past accounts occur in diverse and often obscure literature and are written with varying degrees of uniformity, reliability and precision. Observer interests and efforts are not always comparable. We have attempted to standardize our use of all sources of information and as a result have eliminated some of them. In the present paper we synthesize what is known about the nesting birds of Funk Island over the past 450 years.

METHODS

Study Area.—The "Funks" (49° 46' N, 53° 11' W), two small bunkers and a

larger (0.8 × 0.4 km) granitic rock approximately 14 m at its highest point, are about 60 km NNE of Cape Freels, Newfoundland (Fig. 1). Funk Island was first discovered by Europeans during early voyages to the New World, probably by Cortereal in 1501, and appeared on a map in 1503 drawn by Pedro Reinel, a cartographer, who labelled a "Y.-dos-Aves" or "Island of Birds," near the location of Funk Island (Har-

risse, 1900). The first descriptive documentation was by Cartier during his voyage to North America in 1534 (Biggar, 1924). The largest rock, Funk Island, is aptly named as a place of panic and/or stifling smell. The enormous number of murrelets and amount of guano produced annually easily satisfy two of the meanings of funk.

Funk Island is a low lying rock most of which is washed over by the sea

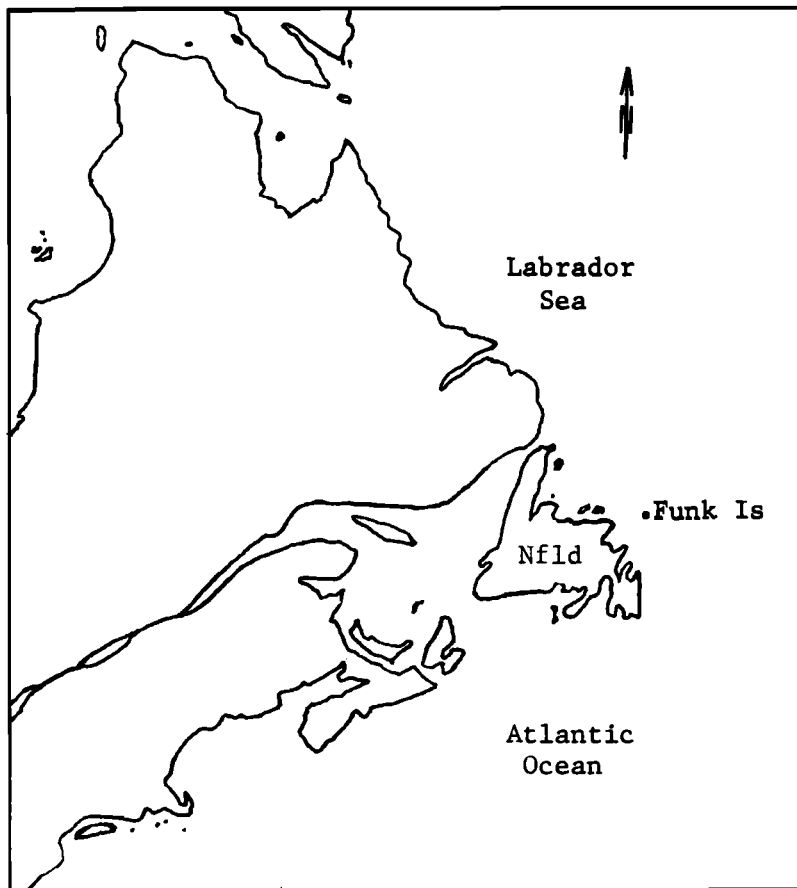


Figure 1. Map of Eastern Canada, showing Newfoundland and Funk Island.

during the fall and winter. One area of the island, high enough to afford protection from the waves, supports predominantly grassy vegetation. In addition to lichens and mosses, at least 16 plant species have been identified at one time or another (Lucas, 1888a; L.M. Tuck, unpubl.). Stone huts and pounds were built on the grassy knoll by men who in the summers of the 18th century went to Funk Island to kill Great Auks (Cartwright, 1792; Lucas, 1888a,b). A cairn of large granitic slabs now marks this site (Fig. 2). These large rocks have been sculptured by winter sea ice, leaving much of the island's surface pocked with shallow depressions.

The northwestern shore slopes gradually into the sea and was likely a landing spot used by Great Auks (L.M. Tuck, *pers. comm.*). The southwestern and northeastern sides are precipitous, dropping about 6-10 meters to the water. The northeastern head of the island is separated by a fault that runs west to east, terminating in a rugged bight known as Indian Gulch. The favored landing ledge, "the Bench", is about 55 meters west of the island's northeastern tip. An alternative landing site, "Landing Rock", in the southwestern cove, has also been used.

The cold waters of the Labrador Current flowing south from the Hudson and Davis straits, surround Funk Island. Primary biotic productivity of these waters is very high and support an abundance of zooplankton, fishes, seals and whales. This cold, productive water is responsible for the large numbers of seabirds nesting on the island (see also Tuck, 1961; Nettleship and Tull, 1970; Olson *et al.*, 1979).

Historical Analysis.—In the course of our literature review, we restricted ourselves to written accounts by individuals who either landed on Funk Island or documented the existence of Great Auks in Newfoundland. The single exception is Templeman (1945), who because of rough seas was unable to land on Funk, but made careful observations of the breeding birds from about 100 meters offshore. Owing to the popular fiction that surrounds Great Auks and Funk Island, there has been a proliferation of accounts in historical and recent times which are often based on second-hand information, speculation and exaggeration. As a consequence we were highly selective in our choice of literature and have used only direct reports of



Figure 2. Great Auk skulls and assorted bones exhumed from the grassy knoll which surrounds the cairn on Funk Island (photo: WAM).

species diversity and abundance.

The data in Table 1 are presented as population indicators and not as systematically obtained census figures which may not be strictly comparable. Early accounts often allowed us to draw inferences regarding a species' relative abundance (*i.e.*, large or small numbers). When such inference was not possible and a species was mentioned, it was recorded as present. Conversely, when a species was noted as absent or

not mentioned in what appeared to be an attempt to give a full avifaunal account a 0 was recorded. Many estimates were based on partial counts and subjective impressions rather than standardized census techniques.

The following are a series of accounts of all the birds known to have bred or presently breeding on Funk Island. The history of the Greak Auk and circumstances surrounding its extinction are treated more extensively.

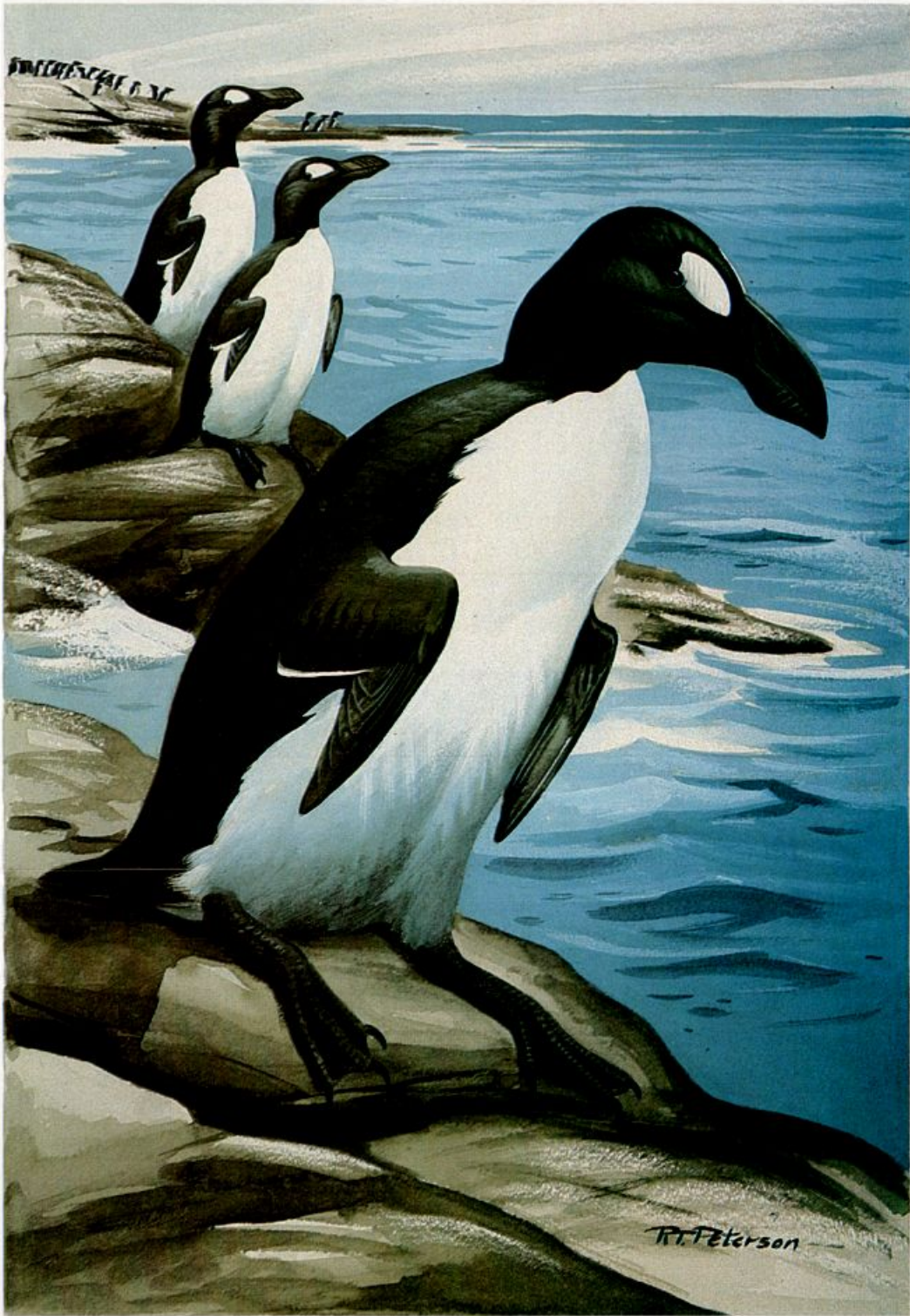


Figure 3. *Great Auks on Funk Island.* A Roger T. Peterson watercolor, commissioned by the Newfoundland government for "The Birds of Newfoundland" by Peters and Burleigh (1951). Courtesy of the Department of Tourism Recreation and Culture, Government of Newfoundland.

RESULTS

PREVIOUS NESTERS

Great Auk (*Pinguinus impennis*).—The Beothucks, an extinct race of Newfoundland Indians, apparently took eggs of auks and other seabirds, making one to two trips annually to Funk Island (Cartwright, 1792). Canoe paddles and arrowheads have been found on the island in Indian Gulch, hence the name (Lloyd, 1874). Cartier, and M. Hore in 1536 (Jameson, 1906) found the seabirds on Funk Island a good source of fresh meat, especially the flightless Great Auk (Fig. 3). Sir Humphrey Gilbert (1583, cited in Lucas, 1888a) and Sir Richard Whitbourne (1620, p.9) both refer to the salting of auks. Whitbourne (1620) noted that these auks “multiply so infinitely” on Funk Island that they were often driven “hundreds at a time” onto gang planks and into waiting boats. A statement by Whitbourne is so frequently quoted, as to serve as an epitaph for the Great Auk, “. . . God had made the innocency of so poor a creature, to become such an admirable instrument for the sustenation of man.” This bird was taken on a regular basis by many of the French, English and Spanish fishing ships along the northeastern coast of Newfoundland. In the *English Pilot* (1767), Great Auks were illustrated as a navigation indicator of the Newfoundland Grand Banks (see Fig. 4 in Lysaght, 1971; see also Harvey, 1892; Shaw, 1940).

Throughout the 16th, 17th and 18th centuries the Great Auks on Funk Island were relentlessly persecuted for their feathers and meat. These birds were herded into stone-walled pounds, then boiled in large caldrons (Allen, 1876), and as there was no wood on the island, fat from the bodies fueled the fires (Harvey, 1892). After the feathers were removed, carcasses were heaped and are now, through decay, the substrate of the grassy knoll (see Fig. 2).

In 1785, one of the first warnings of the auk's extermination was made by Captain George Cartwright (1792). Magistrates in St. John's enforced a ban on egg and bird poaching by publicly flogging offenders (Elliot, 1786). The embargo was too late, and the bird was extinct on Funk Island in the early 1800s. The last known pair was killed in 1844 on Eldey Island, Iceland (Grieve, 1885).

Arctic Tern (*Sterna paradisaea*).—First recorded nesting on Funk Island in 1841 by P. Stuvitz, Arctic is the only tern species known to have bred there (Milne, 1875). During the late 1800s, large numbers were recorded nesting. They have not been observed breeding on the island since 1952 (L.M. Tuck, unpubl. data). The reasons for their disappearance are not clear, although competition for nesting sites with murrelets and predation by *Larus* gulls are possibilities.

PRESENT NESTERS

Northern Fulmar (*Fulmarus glacialis*).—The fulmar, the most recent breeding arrival to Funk Island, was first observed displaying there in 1959 by L.M. Tuck and J. Fisher. The first breeding pair was found in 1975, and the population increased slowly to nine pairs in 1980. Fulmars are extending their breeding range in a southerly direction on both sides of the Atlantic (Fisher, 1966; Montevecchi *et al.*, 1978; Lock, 1979). On Funk Island they nest beneath rocks, in crevices and on low ledges in the rocky habitat surrounding the grassy knoll. Fulmar numbers will likely continue to increase

on Funk Island and on other islands around Newfoundland (Montevecchi *et al.*, 1978).

Gannet (*Morus bassanus*).—The gannet colony was present on Funk Island when Cartier visited in 1534 and was gone sometime before Lucas' visit in 1887, although Gannets were still remembered by some local people (Lucas, 1888a). The reason for the extinction of this gannetry is not documented, although human exploitation is very possible since the Great Auk had been decimated about the same time. Fishermen used gannets for bait and apparently had little regard for them, as they were thought to be competitors for surface shoaling fish, *e.g.*, herring and mackerel (Tuck, 1961).

Wynne-Edwards (1935) passed by Funk Island in 1934 and saw no indication of nesting Gannets. In July 1936, Gilliard (1937) landed and found seven nesting pairs near the grassy knoll. Gilliard suspected that because Wynne-Edwards passed north of the island, he might not have seen the nesting Gannets. Since the colony was re-established, the population has increased substantially from seven to approximately 4000 pairs in about 40 years (Fig. 4). The rapid population growth through immigration was likely related to the slight warming of the Labrador Current which led to the more northerly migration of mackerel (Tuck, 1961).

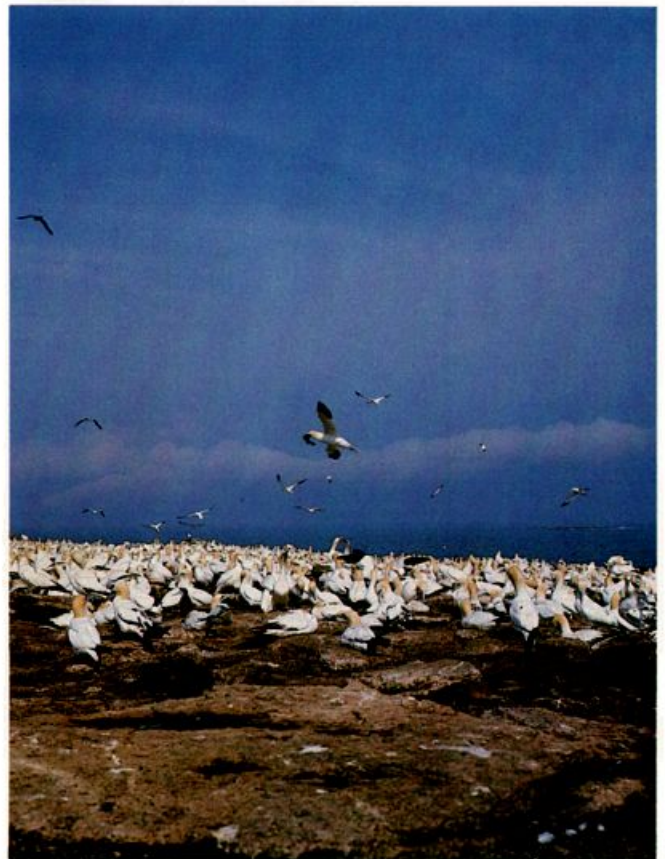


Figure 4. Gannet colony dispersed over the flat NW end of Funk Island (photo: WAM).

Great Black-backed (*Larus marinus*) and Herring gulls (*L. argentatus*).—Within the last 30-40 years these two large gulls began nesting on Funk Island. The populations seem to have increased in recent years. Tuck (1961) and Nettleship (1972) have previously reported that these Larids do not interact in a significant way with other seabirds nesting on Funk Island. This is no longer the case, and since 1977 we have documented extensive predation of Common (Thin-billed) Murres' eggs and chicks (Fig. 5).



Figure 5. Great Black-backed Gull carrying off a Thin-billed (Common) Murre egg (photo: WAM).

Black-legged Kittiwake (*Rissa tridactyla*).—Kittiwakes have nested on Funk Island for at least the past 45 years and may have begun nesting there when the foreign fishery on the Funk Island Banks expanded. Breeding pairs and nests were first counted in 1978 and recounted in 1979. All previous figures were simple estimates. L.M. Tuck (*pers. comm.*) found that kittiwakes nesting in the northern fault of the island occasionally lost nests during severe storms, which may have contributed to the varied numbers reported. With the exception of Thick-billed Murres, kittiwake is the only species that nests exclusively on the island's cliffs.

Razorbill (*Alca torda*).—These crevice- and cliff-nesters, were first observed nesting on Funk Island by Milne in 1874, the same year puffins were first reported. Funk Island and elsewhere in Newfoundland lie near the southern limit of the Razorbill's breeding range, where populations are usually small. Razorbills, like Thick-billed Murres, breed most commonly farther north in Labrador where some colonies exceed several thousand pairs (Lock, 1979). The fluctuating population estimates on Funk Island probably reflect in part the difficulty in locating breeders and varied observer effort over the years.

Common (Thin-billed) Murre (*Uria aalge*).—These murres were present on Funk Island when Cartier arrived in 1534 (Tuck, 1961, p.57), although they were not noted again until

1874 when Milne (1875) visited. Lucas (1889) reported small numbers of murres in 1887 and attributed their decline since 1874 to intensive eggging activities. Since then the breeding population has grown exponentially. In the 1950s, murres nested in three distinct colonies at the northeastern and southwestern ends and center of the island (Tuck, 1961). There is now a fairly continuous band of nesting murres from one end of the island to the other (Fig. 6). Based on the systematic estimate in 1975, it appears that the 1959 figure of 500,000 breeding pairs by Tuck and J. Fisher is probably high (D.N. Nettleship, *pers. comm.*). The 1975 estimate of 396,461 breeding pairs represent about 80% of the North American population (Birkhead and Nettleship, 1980).

Thick-billed Murre (*Uria lomvia*).—These murres were first reported breeding on Funk Island in 1951. The only concentration is on a narrow ledge at the mouth of Indian Gulch that can only be seen from one or two locations and may have been overlooked during previous censuses (*e.g.*, Lucas, 1888a; Peters and Burleigh, 1951). Unlike their congeneric relatives, Thick-billed Murres do not appear to have increased in numbers. The breeding population has remained relatively constant, as Tuck (1961, p.59) states for the years 1951-59 they "did not change appreciably" from 250 pairs. The lack of ocean-facing cliff ledges on the island may limit the population, as their selection of nest-sites is much more restricted than that of Common Murres (Tuck, 1961). Thick-billed Murres nest primarily in the Arctic, and Funk Island is close to the southern extent of the breeding range overlapping with the more southerly distributed Common Murre (Tuck, 1961; Brown *et al.*, 1975).



Figure 7. A Common Puffin outside a burrow near the cairn on Funk Island (photo: IRK).

Common Puffin (*Fratercula arctica*).—Puffins were first recorded on Funk Island about 75 years after the Great Auk's demise (Milne, 1875). The population appears to have remained constant in recent years around 1000 breeding pairs, although owing to difficulties with censusing no systematic counts have been made. Nest burrows are dug in soil made up mostly of humus from decomposed Great Auks (Fig. 7). Available nesting habitat is limited by the humus deposits, and the present population is likely close to an upper limit.

Four of the five eastern North American Alcids nest on Funk Island. Black Guillemots (*Cepphus grylle*), the fifth, are not unexpected. These birds have been observed in the immediate vicinity of the island, although there are no nesting records.

Common Raven (*Corvus corax*).—Although not reported as a breeder on Funk Island prior to 1978, it is possible that a pair, whose nest was observed in the same spot in the northern fault near Indian Gulch in 1978 and 1979, may have previously nested on the island. We found no evidence of a raven's nest in 1980.



Figure 6. Thin-billed (Common) Murres on Funk Island in July 12, 1972 (photo: Leslie M. Tuck).

DISCUSSION

OVER THE YEARS Funk Island has been visited by Indians, explorers, fishermen, merchants, sealers, naturalists and biologists. The initial reason for going to Funk Island was to obtain fresh eggs and meat. Once a commercial market was established for feathers, objectives changed and the large, flightless auks were exploited to extinction. Even the soil from their decomposed bodies was taken from the island in 1863 and sold as fertilizer in St. John's, Baltimore and Washington D.C. Later, naturalists went to Funk Island to obtain bones. Most visitors have produced long lasting effects which largely determined the species composition (*cf.*, Ainley and Lewis, 1974).

Seven of the nine seabirds presently breeding on Funk Island usually nest on cliff ledges or steep grassy areas. The relative inaccessibility of such nest-sites is a deterrent to predators. The remoteness of Funk Island provides the needed inaccessibility of nest-sites and five of these seven species nest on the flat ground areas of the island. The presence of the Great Auk, however, turned

Funk Island into a landmark and while not threatened by the usual predators, the birds became easy prey for human beings. After human disturbance ceased, there has been an increase in avian predators (gulls, ravens). For instance in 1969, Nettleship (1972) used Funk Island as his predator-free (gulls) control in his study of puffins. In recent years the gull population has produced a significant predatory effect on murres and possibly puffins.

In 1964, Funk Island was established as a Provincial Wildlife Sanctuary and is presently protected from all unauthorized human activity. There are other factors, however, that bear directly on the success of the breeding birds of Funk Island. Since 1976, capelin stocks have sharply declined (Akerhead *et al.*, 1979), apparently a result of the increased offshore fishery. These fish are the Alcids' most important food during the breeding season, and shortages may adversely affect their success in the near future.

THE COMMERCIALLY viable reserves of petroleum in the offshore regions

of Newfoundland and Labrador pose new potential problems for the birds of Funk Island. At present many oil companies have permits for exploration along the coast. Biologists are currently surveying seabird movements and colonies in an attempt to assess potential hazard areas if a blowout or oil spill were to occur (*e.g.*, Brown, 1979; Lock, 1979). All seabirds are vulnerable to surface oil, but Alcids are most susceptible because of their fishing and diving habits (Tuck, 1959; Brown *et al.*, 1973; Nettleship, 1977; King and Sanger, 1979; Mudge, 1979). The most critical time of year is during fledging, from mid-July to early August. Murre chicks fledge before flight feathers are fully developed and are accompanied by the flightless adults which are then in a simultaneous postnuptial molt. Over 1,000,000 murre adults and fledglings from Funk Island swim north in the Labrador Sea and are all highly susceptible to oiling. During this time, a single spill or the deliberate flushing of oil by vessels, even if hundreds of miles away, could easily cause incredible devastation. While external oiling is likely the major cause of petroleum-related mor-

TABLE 1.

Historical compilation of the counts and estimates of the breeding birds of Funk Island.¹

Year	Previous nesters		Present nesters									Sources ²
	Great Auk	Arctic Tern	Northern Fulmar	Northern Gannet	Great Black-backed Gull	Herring Gull	Black-legged Kittiwake	Razorbill	Thin-billed Murre	Thick-billed Murre	Atlantic Puffin	
1534	large #			+					+			1, 12
1535	large #			+					?			1, 12
1615	large #			?					?			2
1767	+			?					?			3
1785	small #			?					?			4
1818-23	+			?					?			5
1826-31	+			?					?			6
1841	0	+		?					?			7
1874		large #		0				small #	large #		+	7
1887		large #	0	0	0	0	0	small #	small #		large #	8
1936		?	0	7	+	?	+	+	10,000		+	9
1940		?	?	>100	?	?	+	small #	large #		+	10
1945		0	0	200	0	0	1,000	250	15,000		1,000	11
1951		0	0	150-500	?	small #	<1,000	500	40,000	>75	1,000	12, 13
1952		17	0	6-800	?	+	+	+	50,000	+	+	12, 13
1953		0	0	6-800	?	+	+	+	25-60,000	200	+	12, 13
1956			0	>1,204	5	25	500	50	60-150,000	250	1,000	12, 13
1958			0	2,601	+	+	+	200	400,000	+	+	12
1959			displaying	2,768	+	+	175	+	500,000	250	1,000	12
1967			displaying	2,960	+	+	175	>200	+	250	1,000	13
1969			0	2,796	<----15----->		>100	200	+	+	500-1,000	13, 14, 15
1970			?	2,760	+	+	+	+	+	+	+	13
1972			0	4,051	+		+	+	396,461	+	+	15, 16
1975			1	3,933	>100		+	+	+	+	+	17
1977			3	+	+	+	+	+	+	+	+	18
1978			6	3,871	+	+	608	+	+	+	+	19, 20
1979			7	+	+	+	810	+	+	+	+	20
1980			9	+	>100	>100	+	+	+	+	+	17, 20

¹All numbers refer to pairs. + refers to a breeding species, when no indication of population size was given in the original account.

? refers to a species as possibly breeding, when an original account was ambiguous or lacking. See text for further explanation.

²(1) Biggar 1924; (2) Whitbourne 1620; (3) Lysaght 1971; (4) Cartwright 1792; (5) Forbush 1912; (6) Allen 1876; (7) Milne 1875; (8) Lucas 1888a, c, 1889; Palmer 1890; (9) Gilliard 1937 a, b; (10) Templeman 1945; (11) Peters & Burleigh 1951; (12) Tuck 1961, Garrity 1960; (13) L.M. Tuck unpubl. reports & files; (14) Nettleship 1972; (15) Brown *et al.* 1975; (16) Birkhead & Nettleship 1980; (17) D.N. Nettleship pers. comm.; (18) Montevicchi *et al.* 1978; (19) Montevicchi *et al.* 1980; (20) This report.

tality, there are also other lethal and sub-lethal affects, such as toxic hydrocarbons, dispersants used in oil spills and ingestion of oil through preening and feeding. Funk Island is a most important breeding site and although now protected from human exploitation and disturbance, the birds cannot be protected from the deliberate discharge or accidental spillage of oil. Enforcement of effective legislation, to restrict negligent shipping activities in the vicinity of

breeding areas, is urgently needed.

SUMMARY

AN HISTORICAL ANALYSIS of the breeding birds of Funk Island over the past 450 years is presented. Funk Island is especially suitable for this type of study owing to the lengthy time span for which nesting records exist. The Great Auk caused this small and remote island to become widely known. In the

16th through 18th centuries Funk Island was visited regularly by foreign ships to obtain Great Auks for provisions and by local boats for the auk's commercially valuable feathers. Human activity has partly shaped the species composition seen today. Three species became locally extinct (one completely) and one (the Gannet) eventually re-established. During this century five new species began breeding on the island, probably because of minimal human disturbance

All present breeders have stable or slightly increasing populations. Past, present and future ecological factors relating to the success of the breeding birds of Funk Island are discussed.

ACKNOWLEDGMENTS

WE ARE VERY GRATEFUL to Drs. W. Earl Godfrey and H. Ouellet of the Canadian Museum of Natural Sciences for reviewing the manuscript, to Dr. D.N. Nettleship of the Canadian Wildlife Service for commenting on the population estimates and for providing an unpublished population estimate for the Gannets, and to J. Porter and R. Purchase for field assistance. The Department of Tourism, Recreation and Culture, Government of Newfoundland kindly allowed us to reproduce the Great Auk figure, which was photographed for us by B. Hansen of Memorial University of Newfoundland, and to the artist for consent to publish.

We are especially indebted to the late Dr. Leslie M. Tuck for his knowledge of and enthusiasm for Funk Island, and for initiating the first of our research visits there. Transportation to Funk Island was provided by the Canadian Coast Guard and Department of Fisheries and Oceans. Our research was supported by a Natural Sciences and Engineering Research Council of Canada Grant (No. A0687) and a Memorial University of Newfoundland Vice-President's Grant to WAM.

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