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THE DISTRIBUTION OF MARINE BIRDS
ON
GEORGES BANK AND ADJACENT WATERS

Progress Report No. 4
for Period
October - December 1978

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MANOMET BIRD OBSERVATORY
Manomet, MA 02345

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Abstract

From 27 September to 14 December 1978, MBO observers participated in 8 cruises from the U. S. mid-Atlantic area of the outer continental to western Nova Scotia. The U. S. National Marine Fisheries Service, Federal Republic of Germany, Peoples Republic of Poland and U. S. Coast Guard were the agencies that provided at-sea platforms. The greater portion of the survey coverage involved the Southern New England-Georges Bank-Gulf of Maine area, where 779.32 km² were sampled. Bird densities were greatest in the Georges Bank area where averages in excess of 30 birds/km² were recorded during the final quarter of 1978.

All data collected during 1978 has been submitted to U.S.F.W.S. Migratory Bird and Habitat Research Laboratory in Laurel, MD for punching. Fifteen of 24 MBO cruises conducted in 1978 have been submitted to USFWS-MBHRL for punching and the remaining 9 have been transcribed. Seven of 16 MBO cruises conducted in 1976 have been transcribed

The progress report describes briefly the scope of investigations undertaken and discusses significant results obtained. The principal investigator has devoted 100% of his time to the project in the fourth quarter of 1978 (October - December) and will devote full time to the first quarter of 1979 (January - March).

1. Bird distribution: Delaware Bay to western Nova Scotia.

From 27 September to 14 December 1978, six cruises were made by MBO staff observers and two cruises by volunteers. Research vessels from the U. S. National Marine Fisheries Service, Federal Republic of Germany and Peoples Republic of Poland, and U. S. Coast Guard cutters were the platforms utilized (Table 1). Reports were written for each cruise and are appended to the progress report.* Table 2 lists the regions surveyed during the fourth quarter with summary data on bird densities and area sampled from fixed-area transects. In addition, 1049 10-minute total bird counts (no fixed-area) were made at the same time that fixed-area transects were conducted. Total bird count data

*Distribution List B only.

TABLE 1.

List of Dates, Vessel, Cooperating Agencies,
Ports of Departure, and Observers
For MBO Cruises Made in the Fourth Quarter of 1978

<u>MBO Cruise No.</u>	<u>Cruise Dates</u>	<u>Vessel</u>	<u>Cooperating Agency and Port</u>	<u>Observer</u>
7821	27 Sept-5 Oct	CGC DUANE	USCG (Portland, ME)	A. W. Nickerson
7822	1-19 Oct	R/V ANTON DOHRN	Fed. Rep. of Germany/ NMFS (Woods Hole, MA)	K. D. Powers
7823	3-23 Oct	CGC VIGOROUS	USCG (New London, CT)	G. L. Pittman
7824	13 Oct-1 Nov	R/V WIECZNO	Peoples Rep. of Po- land/NMFS (Woods Hole, MA)	A. W. Nickerson
7825	26 Oct-17 Nov	R/V ANTON DOHRN	Fed. Rep. of Germany/ NMFS (Woods Hole, MA)	A. F. Mason
7826	30 Nov-14 Dec	R/V ALBATROSS IV	NMFS (Woods Hole, MA)	E. G. Perkins
7827	6-9 Dec	R/V DELAWARE II	NMFS (Woods Hole, MA)	A. B. MacLachlan
7828	4-12 Dec	CGC DECISIVE	USCG (Newcastle, NH)	G. L. Pittman

TABLE 2.

Regional Summary of Bird Densities Using Fixed-Area Transects
Conducted in Fourth Quarter of 1978

<u>Region</u>	<u>Number of Transects</u>	<u>Area Surveyed (KM²)</u>	<u>Total Birds (TB)</u>	<u>Relative Density (TB/KM²)</u>
Georges Bank	392	353.26	12517	35.43
Gulf of Maine	324	256.18	7816	30.51
S. New England	205	169.88	2763	16.26
W. Nova Scotia	19	16.93	528	31.18
North Coastal	4	2.60	14	5.38
South Coastal	31	24.30	290	11.93
Mid-Atlantic	25	24.91	116	4.66
Off Continental Shelf	49	46.36	299	6.45

are compiled in summary tables and are graphically illustrated with selected species distribution maps in each cruise report.* A list of possible cruises for the first quarter of 1979 is presented in Table 3.

A narrative summary of bird distributions by species and species groups for October - December 1978 is as follows:

Fulmars, shearwaters and storm-petrels. Northern Fulmars (*Fulmarus glacialis*) had returned to the Georges Bank area in September after their brief absence in August only. Although a few records of this species were recorded in the mid-Atlantic area in October, their densest distribution was further north on the Northern Edge and Northeast Peak of Georges Bank. In December flocks of 30-60 fulmars were found around the fishing activities of Jeffreys Ledge in the Gulf of Maine.

Cory's Shearwaters (*Puffinus diomedea*) were recorded until late-October and primarily in Southern New England waters. One sighting of this species was made in Massachusetts Bay in October. It is noteworthy that the abundance of Cory's was substantially lower in the Georges Bank area in 1978 compared to 1977 MBO records. The data reflect that this species just did not arrive into the area in last year's numbers opposed to a failure in food supply to hold them here.

Greater Shearwaters (*P. gravis*) were by far the most abundant species in the Georges Bank area probably through November. Several flocks of over a hundred Greaters were found on the Northeast Peak in December. The northeast parts of Georges Bank and the Great South Channel held thousands of this species during October and November. Corroborated with 1977 MBO data there appears to be a substantial influx of this species into the Georges Bank area in October (Note: after their breeding season has begun in the Southern Hemisphere).

Sightings of Sooty Shearwaters (*P. griseus*) were made in each month of the reporting period in the Georges Bank/Gulf of Maine area. The sighting in December is a new MBO record for that month.

Several sightings of Manx Shearwaters were made in October and early November.

Scattered sightings of both Wilson's and Leach's Storm-Petrels were recorded in October in the Gulf of Maine/Georges Bank area. Several sightings of unidentified storm-petrels were made in November and December in slope waters southeast of Georges Bank.

Gannets. Primarily immature (first-year) Gannets were first to appear in the Gulf of Maine/Georges Bank area in early October. In late October the sub-adult/adult part of the population arrived in greater numbers around Jeffreys Ledge and the northern entrance of the Great South Channel. Their movement

*Distribution List B only.

TABLE 3.

Tentative Schedule of MBO Cruises to be Conducted
in First Quarter of 1979 (January-March)

<u>Cruise Dates</u>	<u>Vessel and Agency</u>	<u>Port of Departure</u>
2 - 23 Jan	CGC DECISIVE	Newcastle, NH
16 Jan - 6 Feb	CGC VIGILANT	New Bedford, MA
23 Jan - 13 Feb	CGC INGHAM	Norfolk, VA
29 - 31 Jan	R/V OCEANUS (WHOI)	Woods Hole, MA
? Feb	R/V DELAWARE II (NMFS)	Woods Hole, MA
? Feb	R/V ANTON DOHRN (FRG/NMFS)	Woods Hole, MA
5 - 26 Mar	R/V OCEANUS (WHOI)	Woods Hole, MA

further south to mid-Atlantic areas in November was more scattered and more coastal than the northward passage in spring, which is principally offshore. Although their abundance was greatly reduced, Gannets were still prevalent in the Gulf of Maine and Georges Bank in December.

Phalaropes. Phalaropes were infrequently recorded in small flocks throughout the reporting period. Sightings were most frequently recorded in western Gulf of Maine from Jeffreys Ledge to the Great South Channel and to a lesser extent on Browns Bank and the northeast and southern slopes of Georges Bank. Red Phalarope (*Phalaropus fulicarius*) was the only species identified.

Jaegers and skuas. Pomarine Jaegers (*Stercorarius pomarinus*) were common in offshore waters of Georges Bank and the Gulf of Maine in October and November. Parasitic Jaeger (*S. parasiticus*) sightings were less frequent and were limited to more coastal areas from the Gulf of Maine to the mid-Atlantic states.

Skuas were common throughout the offshore areas of the Gulf of Maine and Georges Bank. Those birds identified to species were thought to be *Catharacta skua*; however, a possible sighting of a light-phased *C. maccormicki* was made in mid-October on Jeffreys Ledge.

The presence of fishing activity appeared to influence the distribution of both jaegers and skuas.

Gulls and terns. Large flocks (up to 1000 birds) of both Great Black-backed (*Larus marinus*) and Herring Gulls (*L. argentatus*) were associated with fishing activities on Georges Bank, Gulf of Maine and Southern New England waters in October to November. By December only Jeffreys Ledge and Cultivator Shoals were holding large numbers of either species. The December data seem to separate out a more northerly winter range of *L. marinus*, while *L. argentatus* probably became abundant into mid-Atlantic areas.

Although present in September, Black-legged Kittiwakes (*Rissa tridactyla*) were not common on Georges Bank until late October. Their distribution in December extended south to Delaware Bay, but their numbers were greatest in the Gulf of Maine at this time. Flocks of 50-100 kittiwakes were associated with fishing activities around Jeffreys Ledge and Cultivator Shoals in December.

A "comic" tern (*Sterna* sp.) was observed in the Great South Channel on 3 October and an unidentified tern was recorded in central Gulf of Maine on 1 October.

Alcids. Two sightings of single unidentified large alcids (*Uria* or *Alca torda*) were recorded in the Gulf of Maine during December.

A Common Puffin (*Fratercula artica*) was seen on 7 December near Cultivator Shoals.

Nine sightings of Dovekies (*Alle alle*) were made in the Gulf of Maine and on Georges Bank in December.

2. Data transcription. Data collected during this reporting period has been transcribed, proofed and sent to U.S.F.W.S. Migratory Bird and Habitat Research Laboratory (MBHRL) for punching. Thus, all 1978 data have been forwarded to MBHRL. Although data from 15 cruises conducted in 1977 have been transcribed, proofed and sent to MBHRL for keypunching, all 1977 MBO seabird data has been transcribed. Data from 7 of 16 MBO cruises conducted in 1976 have been transcribed but not proofed.
3. Investigation of food resources. A meeting was held with Dr. Thomas Azarovitz, NMFS, in November concerning release of summaries of selected species from NMFS groundfish data file at Woods Hole. An agreeable format of data retrieval was discussed and a concluding meeting is to be held in January.

The National Marine Fisheries Service has agreed to make 8-10 hours of dedicated time to an MBO observer to collect bird specimens with a launch on the June-July R/V ALBATROSS IV MARMAP survey of ichthyo/zooplankton from Cape Hatteras to Nova Scotia. The cruise should provide information on the distribution of available prey items and birds as well as those prey that the birds are selecting through a stomach contents analysis.

The P.I. attended a workshop on multi-species fisheries management models for Georges Bank on 18-19 December at Harvard U. by invitation of the New England Fisheries Management Council and NMFS.

DISTRIBUTION LISTS

List A

Senator Edward M. Kennedy

Congressman Gerry Studds

Ralph Andrews, USFWS/OBS, Boston

H. C. Boyar, NOAA/NMFS, Woods Hole

Kenneth Sherman, NOAA/NMFS, Narragansett

Philip Stanton, Wildlife Rehabilitation Center, Upton, MA

R.G.B. Brown, Canadian Wildlife Service, Halifax

List B

Contracting Officer, DOE

Kathleen S. Anderson, MBO

Principal Investigator

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 27 September - 5 October 1978

Cruise No. 7821

INTRODUCTION

The following report summarizes bird and mammal observations made by Albert W. Nickerson, Staff Biologist, Manomet Bird Observatory, on continental shelf waters of New England aboard U.S. Coast Guard Cutter DUANE, 27 September - 5 October, 1978. The mission of the Coast Guard patrol was offshore law enforcement, search and rescue. The observer was on board on a non-interference basis primarily to collect information on the distribution, abundance, behavior and oiling of seabirds.

Manomet Bird Observatory gratefully acknowledges the cooperation of the U. S. Coast Guard for allowing an observer to join the patrol. The observer thanks CDR Leo N. Schowengerdt, the officers and crew of USCGC DUANE for their generous assistance aboard ship. Financial support for M.B.O. Seabird Studies is provided by the U. S. Department of Energy under Contract No. EE-78-S-02-4706.

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled

in 10 minutes cruising time. A transect count provides information on relative density, i.e. birds per km^2 . A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1 - 6 summarize the relative density and relative abundance bird data and list sightings of rare or infrequently observed coastal and marine bird species and marine mammals. Figure 1 graphically illustrates the cruise track during daylight hours and Figure 2a-g indicates the distribution of seven bird species using the greatest total bird count of each species per 10-minute square latitude/longitude block surveyed.

Most of the cruise was spent in central Gulf of Maine as USCGC DUANE performed a search and rescue mission. Very little fishing activity was noted, and its affect on bird distribution was minimal.

Greater Shearwaters were by far the most abundant and widespread species observed, and almost three times as many were seen than the total of Great Black-backed and Herring Gulls. Notably absent were Gannets. Only one individual, an immature, was seen during the cruise. Fourteen Pomarine Jaegers

were present, half of which appeared to be full adults. Of the eight skuas seen, all were solid colored, ranging in hue from dark to ruddy brown and were believed to be Northern Hemisphere birds (*Catharacta skua skua*).

Migrating land birds frequently landed on the ship, notably at least two individual Peregrine Falcons, two Ospreys and three Kestrels.

TABLE 1.

Seabird Density in Selected Regions in Fixed Area Transects*

27 September - 5 October 1978

Region	Number of Transects	Total Km ² Surveyed (Tkm ²)	Total Birds (TB)	Mean Density ² (TB/Tkm ²)	Density Range (TB/Km ² Transect)
Gulf of Maine	62	35.1	1275	36.32	0 - 171.0

* Only one region was covered during Cruise No. 7821.

TABLE 2.

Number of Birds Per Species In Selected Regions*

(Using Fixed-Area Counts Only)

27 September - 5 October 1978

<u>Species</u>	<u>Gulf of Maine</u>
Common Loon	5
Northern Fulmar	25
Greater Shearwater	914
Sooty Shearwater	1
Leach's Storm-Petrel	1
Wilson's Storm-Petrel	1
Gannet	1
White-winged Scoter	1
Black Scoter	2
Pomarine Jaeger	9
Great Skua	5
Great Black-backed Gull	137
Herring Gull	172
Black-legged Kittiwake	1

* Only one region was covered during Cruise No. 7821

TABLE 3.

List of Rare or Infrequent Bird Sightings

27 September - 5 October 1978

Species	Number	Date	Location	Remarks
Great Skua	1	9-28	43°01'N, 68°37'W	Solid, slightly ruddy brown.
Pomarine Jaeger	1	9-28	43°05'N, 68°33'W	Lt. Adult, sitting on the water.
Pomarine Jaeger	1	9-28	43°05'N, 68°33'W	Immature, sitting on the water.
Pomarine Jaeger	3	9-28	42°59'N, 68°32'W	Lt. Adult, sitting on the water.
Great Skua	1	9-28	42°50'N, 68°36'W	Solid, slightly ruddy brown, some hackling.
Pomarine Jaeger	1	9-28	42°48'N, 68°37'W	Lt. Adult, traveling NW.
Pomarine Jaeger	2	9-28	42°36'N, 68°31'W	Immature, molting coverts.
Great Skua	1	9-28	42°49'N, 68°23'W	Solid dark brown.
Pomarine Jaeger	2	9-28	42°49'N, 68°20'W	Immature, robbing gull.
Pomarine Jaeger	1	9-29	42°42'N, 67°23'W	Lt. adult.
Pomarine Jaeger	1	9-29	42°40'N, 67°23'W	Immature.
Great Skua	1	9-29	42°39'N, 67°33'W	Pirating.
Pomarine Jaeger	2	9-30	42°59'N, 67°51'W	Ad. and Immature, traveling west.
Black-legged Kittiwake	1	9-30	42°59'N, 67°51'W	First winter.
Leach's Storm-Petrel	1	9-30	42°56'N, 67°48'W	Flying.
Unid. tern	1	10-1	43°02'N, 67°38'W	Diving.
Great Skua	1	10-1	43°03'N, 67°52'W	Solid slightly ruddy brown, slight hackling.

Cruise No. 7821

TABLE 3. (continued)

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Great Skua	1	10-1	43°03'N, 67°50'W	Solid slightly ruddy brown.
Great Skua	1	10-1	42°59'N, 67°50'W	Solid slightly ruddy brown, molting coverts.
Leach's Storm-Petrel	1	10-2	42°44'N, 68°03'W	
Great Skua	1	10-2	42°35'N, 68°03'W	Solid brown.
Leach's Storm-Petrel	1	10-4	42°41'N, 68°02'W	
Gannet	1	10-5	43°19'N, 69°30'W	

TABLE 4.

List of Marine Mammal Sighting:

27 September - 5 October 1978

Species	Number	Date	Location	Remarks
Unid. whale	2	9-28	42°49'N, 68°20'W	Spouting.
Unid. dolphin	5	9-29	42°40'N, 67°23'W	Surfacing.
Unid. rorqual	1	9-29	42°46'N, 67°40'W	Spouted 7 times, sounded.
Humpback Whale	1	10-1	43°02'N, 67°50'W	Spouted, showed flukes, dove.
Unid. rorqual	1	10-2	42°39'N, 68°06'W	Spouting.
Unid. rorqual	1	10-2	42°37'N, 68°05'W	Spouting.
Humpback (poss.)	1	10-2	42°39'N, 68°06'W	Spouting, same as above?
Fin Whale (prob.)	1	10-4	42°45'N, 68°23'W	Spouted 3 times, dove.
Unid. whale	2	10-5	43°22'N, 69°45'W	Spouted.

TABLE 5.

List of Non-Marine Bird Sightings

27 September - 5 October 1978

Species	Number	Date	Location	Remarks
Mourning Dove	1	9-28	43°05'N, 68°33'W	Circling ship.
Parula Warbler	2	9-28	43°05'N, 68°33'W	On ship.
Dark-eyed Junco	1	9-28	42°47'N, 68°40'W	On ship.
Peregrine Falcon	1	9-28	42°49'N, 68°23'W	Perched on mast.
American Robin	1	9-29	42°42'N, 67°23'W	Flying.
Cape May Warbler	1	9-29	42°42'N, 67°23'W	On ship.
White-throated Sparrow	1	9-29	42°40'N, 67°24'W	Circling ship.
Dark-eyed Junco	2	9-29	42°39'N, 67°25'W	On ship.
Kestrel	2	9-29	42°44'N, 67°40'W	Circling ship.
Ruby-crowned Kinglet	1	9-29	42°48'N, 67°41'W	On ship.
Osprey	1	9-29	42°52'N, 67°43'W	Flew to ship.
White-throated Sparrow	3	9-30	42°56'N, 67°49'W	On ship.
Song Sparrow	1	9-30	42°56'N, 67°49'W	On ship.
Dark-eyed Junco	2	9-30	42°56'N, 67°49'W	On ship.
Redstart	1	9-30	42°56'N, 67°49'W	On ship.
Rusty Blackbird	1	9-30	42°56'N, 67°49'W	On ship.
Peregrine Falcon	1	9-30	43°01'N, 67°49'W	Flew to ship.
Osprey	1	9-30	43°02'N, 67°50'W	On ship.
White-throated Sparrow	1	10-1	43°02'N, 67°50'W	On ship, banded.
Black-throated Blue Warbler	1	10-3	42°41'N, 68°08'W	On ship.

Cruise No. 7821

TABLE 5. (continued)

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Myrtle Warbler	1	10-3	42°36'N, 68°04'W	On ship.
Kestrel	2	10-3	42°36'N, 68°04'W	Flying around ship.
Kestrel	1	10-5	43°20'N, 69°37'W	Flying around ship.
White-throated Sparrow	1	10-5	43°24'N, 69°49'W	On ship.
Black Duck	2	10-5	43°26'N, 69°54'W	Traveling south.

TABLE 6. Summary of Transect or Station Census Data.

VSCGL Duane

Observers

A. W. Nickerson

[illegible]

Observers A. W. Nickerson

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

USCGC DUANE

Observers

A. W. Nickerson

Transect ☐ Station ☐ No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Date (GMT) Oct.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Region*	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.
Latitude (to nearest min.)	43-03	43-03	43-02	43-01	43-00	43-03	43-03	43-02	43-01	42-59	43-03	43-03	42-59	42-59	42-59
Longitude (to nearest min.)	67-45	67-47	67-50	67-53	67-56	67-55	67-52	67-49	67-49	67-52	67-56	67-53	67-50	67-53	67-56
Water depth (meters)	165	192	221	201	201	194	201	192	190	190	190	190	185	198	199
Total fixed-area (F.A.) birds	29	9	1	2	7	11	74	29	8	15	17	49	45	14	10
Area Sampled (km ²)	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Density (F.A. birds/km ²)	63.0	19.6	2.2	4.3	15.2	23.9	160.9	63.0	17.4	32.6	15.2	106.5	77.9	30.4	21.7
Species	Number Observed														
Greater Shearwater F.A.	17	2	0	2	7	7	65	25	4	12	1	48	44	7	2
Tot.	24	7	7	20	16	16	69	33	17	22	31	48	46	21	11
Northern Fulmar F.A.	3	2			0	4				1					
Tot.	4	6			4	5				4					
Leach's Storm-Petrel F.A.														1	
Tot.														1	
Wilson's Storm-Petrel F.A.		0													
Tot.		1													
Great Skua F.A.							1						1		1
Tot.							1						1		1
Great Bl.-bk. Gull F.A.	4	4	1		0	0	7	4	4		1	1		4	3
Tot.	4	4	4		4	2	7	4	8		6	1		15	13
Herring Gull F.A.	5	1	0	0			1			2	5			2	4
Tot.	6	3	1	9			1			6	10			12	12

Observers A. W. Nickerson

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

Observers

A. W. Nickerson

Transect ☐ Station ☐ No.	61	62
Date(GMT) Oct.	5	5
Region*	G.M.	G.M.
Latitude(to nearest min.)	43-24	43-26
Longitude(to nearest min.)	69-49	69-54
Water depth(meters)	124	161
Total fixed-area(F.A.)birds	14	6
Area Sampled(km ²)	0.93	0.93
Density (F.A. birds/km ²)	15.1	6.5
Species	Number Observed	
Greater Shearwater F.A.	8	2
Tot.	18	12
Black Duck F.A.		0
Tot.		2
Herring Gull F.A.	6	4
Tot.	14	5

FIGURE 1. Approximate cruise track during daylight hours, 27 September - 5 October 1978.

FIGURE 2a. Distribution map of
Northern Fulmar,
27 Sept.-5 Oct. 1978.

FIGURE 2b. Distribution map of
Greater Shearwater,
27 Sept.-5 Oct. 1978.

FIGURE 2c. Distribution map of
Wilson's Storm-Petrel,
27 Sept.-5 Oct. 1978.

FIGURE 2d. Distribution map of
Pomarine Jaeger,
27 Sept.-5 Oct. 1978.

FIGURE 2e. Distribution map of
Great Skua, 27 Sept. -
5 Oct. 1978.

FIGURE 2f. Distribution map of
Great Black-backed
Gull, 27 Sept. -
5 Oct. 1978.

FIGURE 2g. Distribution map of
Herring Gull, 27 Sept.-
5 Oct. 1978.

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 1 - 19 October 1978

Cruise No. 7822

INTRODUCTION

The following cruise report is a summary of bird and mammal observations made by Kevin D. Powers, Staff Biologist, Manomet Bird Observatory, aboard The Federal Republic of Germany (FRG) R/V ANTON DOHRN from 1 - 19 October 1978. The objective of the cruise was to determine the distribution and relative abundance of bottom and pelagic fish stocks with special reference to Atlantic Herring, mackerel, and squid. The areas of interest were Georges Bank, Southern New England, Gulf of Maine (Stellwagen Bank and Jeffreys Ledge), and Western Nova Scotia (Browns and German Banks). The observer was aboard on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the cooperation of Federal Republic of Germany for permitting observations aboard the R/V ANTON DOHRN. The observer thanks the master, Captain Johannes Spohn, officers, and crew of the R/V ANTON DOHRN for their assistance and cooperation aboard ship. Special thanks are extended to Dr. Holger Dornheim, Chief Scientist, and oceanographers, Gerd Wegner and Bernd Burckert, for supplying background and environmental data throughout the cruise. Finally, acknowledgement is extended to H. C. Boyar, Vessel Coordinator, and the National Marine Fisheries Service for arranging passage aboard ship, and

Department of Energy for support (DOE Contract No. EE-78-S-02-4706).

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled in 10 minutes cruising time. A transect count provides information on relative density, i.e. birds per km^2 . A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1 - 6 summarize the relative density and abundance bird data, and list sightings of rare or infrequently observed bird species, non-marine bird species, and marine mammals. Figure 1 indicates the approximate cruise track during daylight hours. Figure 2(a-h) graphically illustrates the distribution of eight bird species using the greatest total count of each

species per 10-minutes square latitude/longitude block surveyed.

The cruise objective and cruise track allowed the observer to visit areas intensively fished by American and Canadian vessels and observe bottom fish species composition and abundance in those areas. The greatest densities of birds were associated with fishing vessels. The Northeast Peak, Northern Edge, and Great South Channel on Georges Bank, and Stellwagen Bank and Jeffreys Ledge in the Gulf of Maine had the greatest densities of birds and fishing vessels. Greater Shearwater, Great Black-backed Gull, and Herring Gull were the most abundant and widespread bird species. Together those three species made up 97 percent of the total number of birds counted in the fixed-area transects. Although the greatest densities of fish and birds were encountered in the same areas, the birds were following fishing vessels for escapes from the trawl nets being hauled in and for "trash" or commercially undesired fish being discarded after the catch had been sorted. No "natural" feeding assemblages were observed in those areas. The observer noted shearwaters and gulls scavenging on squid (*Ilex* and *Loligo*) and young age classes of silver hake (*Merluccius bilinearis*) and haddock (*Melanogrammus aeglefinus*).

Greater Shearwater was the most abundant species in each offshore region surveyed. Herring Gulls were twice as abundant as Great Black-backed Gulls on Georges Bank and Southern New England, and equally as abundant in the Gulf of Maine and Western Nova Scotia. Cory's Shearwaters were limited to Southern New England, and probably the Southwest Part of Georges Bank, although the latter area was not surveyed. Northern Fulmars have returned and were recorded in each offshore area, except Southern New England. Infrequent sightings of Leach's and Wilson's Storm-Petrels

were made on Georges Bank and Western Nova Scotia, particularly the Northeast Peak/Browns Bank area.

Gannets were recorded throughout the cruise and 87 percent of 55 gannets seen were juvenile or "hatch year" birds. Apparently they disperse or migrate south before adults and subadults. The first age class to move north in the spring is adult.

Pomarine Jaegers representing all age classes and skuas were common in the areas being fished. All sightings of skuas are listed in Table 3. Although not all skuas were identified to species, those seen at close range were Great Skuas.

TABLE 1.

Seabird Density In Selected Regions Using Fixed-Area Transects

1 - 18 October 1978

<u>Region</u>	<u>Number of Transects</u>	<u>Total Birds (TB)</u>	<u>Total Area Sampled (Tkm²)</u>	<u>Mean Density (TB/Tkm²)</u>	<u>Density Range (TB/Km²/Transect)</u>
Georges Bank	95	4958	83.51	59.37	1.08 - 668.63
Gulf of Maine	35	1818	32.28	56.32	0 - 325.49
W. Nova Scotia	19	528	16.93	31.18	0 - 193.55
S. New England	20	412	17.52	23.52	0 - 130.11
South Coastal	2	7	1.68	4.17	1.19 - 7.14

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TABLE 2.

Total Number of Birds Counted Per Species In Selected Regions

Using Fixed-Area Transects.

1 - 18 October 1978

<u>Species</u>	<u>GB</u>	<u>GM</u>	<u>WNS</u>	<u>SNE</u>	<u>SC</u>
Northern Fulmar	77	29	6		
Cory's Shearwater	1			27	1
Greater Shearwater	2660	677	430	306	
Leach's Storm-Petrel	1		1		
Wilson's Storm-Petrel	2		4		
Gannet	10	12	4	1	
Unid. Scoter	6				
Oldsquaw	3				
Red Phalarope	13				
Unid. phalarope		2			
Pomarine Jaeger	9	5	1	8	
Parasitic Jaeger		1			
Unid. jaeger		1			
Great Skua	2	2	4	1	
Unid. skua	2		1	1	
Great Blk-backed Gull	744	548	32	16	2
Herring Gull	1424	526	44	52	4
Blk-legged Kittiwake	4	15	1		

TABLE 3.

List of Rare or Infrequently Recorded Marine Bird Species

1 - 18 October 1978

Species	Date	Number	Location	Remarks
Unid. skua	10-1	1	41°02'N, 70°35'W	(Prob. GRSK)
Great Skua	10-1	1	40°51'N, 70°29'W	ASY, Pirating, scavenging
Sooty Shearwater	10-3	1	40°42'N, 68°59'W	In with lg. flock of GRSH when trawl was about to come up.
Great Skua	10-3	1	40°42'N, 68°59'W	In with lg. flock of GRSH when trawl was about to come up.
"Comic" tern	10-3	1	40°42'N, 68°59'W	In with lg. flock of GRSH when trawl was about to come up.
Wilson's Storm-Petrel	10-3	2	41°00'N, 69°00'W	
Great Skua	10-3	1	41°09'N, 68°58'W	In molt. Scavenging on dead fish.
Great Skua (prob.)	10-4	1	41°35'N, 68°26'W	
Leach's Storm-Petrel	10-4	1	41°23'N, 68°25'W	Found on ship, collected.
Leach's Storm-Petrel	10-4	1	41°52'N, 68°02'W	
Leach's Storm-Petrel	10-5	1	41°58'N, 67°54'W	
Great Skua	10-6	1	42°15'N, 68°36'W	In molt.
Great Skua	10-6	1	42°02'N, 68°32'W	
Double-crested Cormorant	10-7	1	42°54'N, 70°06'W	Traveling N.
Unid. phalarope	10-7	2	42°54'N, 70°06'W	
Parasitic Jaeger	10-7	1	42°22'N, 70°17'W	ASY light phase - long tail.
Sooty Shearwater	10-7	1	42°00'N, 69°51'W	

TABLE 3. (continued)

Species	Date	Number	Location	Remarks
Surf Scoter	10-7	1	41°53'N, 69°50'W	Traveling N.
Northern Phalarope	10-9	1	41°17'N, 69°09'W	
Parasitic Jaeger	10-10	1	41°01'N, 70°37'W	Immature, light phase
Oldsquaw	10-11	3	41°57'N, 67°50'W	Traveling WSW, females
Unid. scoter	10-11	6	42°10'N, 67°10'W	Traveling N.
Great Skua	10-12	1	42°09'N, 66°36'W	Molting
Great Skua	10-12	1	42°07'N, 66°15'W	
Red Phalarope	10-12	10	42°07'N, 66°15'W	
Red Phalarope	10-12	3	42°10'N, 66°13'W	
Red Phalarope	10-12	11	41°57'N, 66°06'W	
Unid. skua	10-13	1	42°27'N, 65°37'W	
Leach's Storm-Petrel	10-13	1	42°27'N, 65°37'W	
Wilson's Storm-Petrel	10-13	2	42°27'N, 65°37'W	
Unid. phalarope	10-13	1	42°40'N, 65°48'W	
Great Skua	10-13	1	42°43'N, 65°53'W	
Great Skua (prob.)	10-13	2	42°42'N, 65°53'W	
Unid. phalarope	10-13	12	42°46'N, 65°57'W	Traveling SE
Unid. phalarope	10-13	25	42°46'N, 65°56'W	
Great Skua	10-13	4	42°47'N, 66°00'W	
Wilson's Storm-Petrel	10-14	2	42°53'N, 66°26'W	
Leach's Storm-Petrel	10-14	1	ca. 42°26'N, 66°27'W	Landed on ship; banded and released
Great Skua	10-16	1	41°19'N, 66°36'W	Immature

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TABLE 3. (continued)

<u>Species</u>	<u>Date</u>	<u>Number</u>	<u>Location</u>	<u>Remarks</u>
Great Skua	10-16	1	41°07'N, 66°46'W	
Brant	10-16	2	41°12'N, 66°51'W	Traveling NNE
Great Skua	10-17	1	41°09'N, 67°07'W	
Leach's Storm-Petrel	10-17	1	41°02'N, 66°58'W	
Great Skua	10-17	1	40°45'N, 67°00'W	
Great Skua	10-18	1	41°03'N, 68°58'W	

TABLE 4.

List of Marine Mammals
Observed from 1-18 October 1978

Species	Number	Date	Location	Remarks
Finback (prob.)	1	10-7	42°31'N, 70°13'W	Surfaced, dove
Minke (prob.)	1	10-7	42°23'N, 70°18'W	Curious with stationary ship
Humpback	2	10-7	42°13'N, 70°12'W	Almost struck by ship
Humpback (prob.)	3,3	10-7	42°13'N, 70°12'W	
Unid. rorqual	2	10-7	42°11'N, 70°16'W	
Unid. rorqual	1	10-7	42°07'N, 69°47'W	
Unid. cetacean	1	10-9	41°20'N, 69°24'W	Rorqual or pilot whale
Unid, rorqual	1	10-9	41°19'N, 69°20'W	
White-sided Dolphin	12	10-12	42°09'N, 66°09'W	Bow riding, porpoising
Unid. dolphin	5	10-13	42°40'N, 65°48'W	Feeding? Bird association
Unid. rorqual	1,1	10-14	42°49'N, 66°24'W	
Grampus	10-12	10-15	41°38'N, 65°58'W	
White-sided Dolphin	7	10-16	41°07'N, 66°27'W	Rode bow wave
Finback (prob.)	1	10-18	41°30'N, 68°43'W	Approached by ship

TABLE 5.

List of Non-Marine Bird Species
Recorded From 1-18 October 1978

Species	Date	Number	Location	Remarks
Yellow-rumped Warbler	10-3	2	41°06'N, 68°54'W	
Dark-eyed Junco	10-3	1	41°06'N, 68°54'W	
Swamp Sparrow	10-3	1	41°06'N, 68°54'W	
Ovenbird	10-3	1	41°06'N, 68°54'W	
Merlin	10-3	1	41°14'N, 68°41'W	Female
Yellow-rumped Warbler	10-4	3	41°37'N, 68°27'W	2 Immatures
Green-winged Teal	10-5	1	42°23'N, 68°08'W	Female, traveling E
Blackpoll Warbler	10-7	2	43°01'N, 70°16'W	1 moribund, 1 banded
White-throated Sparrow	10-7	2	43°01'N, 70°16'W	1 immature moribund
Yellow-shafted Flicker	10-7	1	43°01'N, 70°16'W	
Northern Yellow-throat	10-7	1	43°01'N, 70°16'W	Female
Northern Yellow-throat	10-7	1	42°27'N, 70°10'W	Female
White-throated Sparrow	10-7	1	42°27'N, 70°10'W	Immature
Song Sparrow	10-7	1	42°27'N, 70°10'W	AHY
Black-throated Green Warbler	10-7	1	42°27'N, 70°10'W	AHY, male
Song Sparrow	10-9	1	41°20'N, 69°24'W	AHY

TABLE 5. (continued)

Species	Date	Number	Location	Remarks
Mourning Dove	10-9	1	41°20'N, 69°24'W	AHY
Bufflehead	10-9	1	41°29'N, 69°29'W	Traveling SW
Gray Catbird	10-9	1	41°19'N, 69°20'W	
Nashville Warbler	10-9	1	41°19'N, 69°20'W	
Mourning Warbler	10-9	1	41°19'N, 69°20'W	
Common Grackle	10-9	1	41°19'N, 69°20'W	
Eastern Meadowlark	10-9	1	41°19'N, 69°20'W	Immature
Northern Pintail	10-10	1	41°02'N, 70°39'W	Trav. W, female
White-throated Sparrow	10-10	1	41°03'N, 70°43'W	AHY
Dark-eyed Junco	10-11	1	42°10'N, 67°21'W	
Yellow-rumped Warbler	10-11	2	42°10'N, 67°21'W	
Water Pipit	10-11	1	42°10'N, 67°21'W	
Purple Finch	10-11	1	42°00'N, 67°10'W	Female
Brown-headed Cowbird	10-12	1	42°10'N, 66°42'W	
Meadowlark	10-16	1	41°27'N, 66°47'W	Adult, on ship for 2 days
White-throated Sparrow	10-16	1	41°27'N, 66°47'W	Immature
Mourning Dove	10-16	2	41°27'N, 66°47'W	
Dark-eyed Junco	10-16	2	41°19'N, 66°36'W	
Nashville Warbler	10-16	1	41°19'N, 66°36'W	
Yellow-rumped Warbler	10-16	1	41°07'N, 66°32'W	

TABLE 5. (continued)

Species	Date	Number	Location	Remarks
Cedar Waxwing	10-16	1	41°15'N, 66°55'W	Immature
Sharp-shinned Hawk	10-16	1	41°15'N, 66°55'W	
Gray Catbird	10-16	1	41°07'N, 66°46'W	
Brown-headed Cowbird	10-17	1	41°05'N, 67°04'W	1 moribund
Yellow-rumped Warbler	10-17	1	40°58'N, 67°12'W	Captured, died
Dark-eyed Junco	10-18	2	41°29'N, 68°45'W	Immature and adult
Yellow-rumped Warbler	10-18	2	41°29'N, 68°45'W	Immatures
White-throated Sparrow	10-18	1	41°17'N, 68°46'W	Immature

Table 6. Summary of Transect or Station Census Data.

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Observers K.D. Powers

Transect ☒ Station ☐ No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date (GMT) October	01	01	01	02	02	02	02	02	02	02	02	02	03	03	03
Region*	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE
Latitude (to nearest min.)	41-07	41-04	41-02	40-46	40-51	40-56	40-53	40-49	40-43	40-43	40-42	40-42	40-42	40-50	40-57
Longitude (to nearest min.)	70-47	70-40	70-35	70-40	70-29	70-18	70-15	70-14	70-12	70-00	69-56	69-48	68-59	69-00	69-00
Water depth (meters)	36	41	47	59	51	44	33	39	39	45	50	51	68	76	83
Total fixed-area (F.A.) birds	15	8	6	24	119	5	121	6	5	8	18	11	44	6	10
Area Sampled (km ²)	0.75	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.84	0.75	0.84	0.84	0.75	0.84	0.84
Density (F.A. birds/km ²)	20.00	8.60	6.45	25.81	127.96	5.38	130.11	6.45	5.95	10.67	21.43	13.10	58.67	7.14	11.90
Species	Number Observed														
Cory's Shearwater F.A.				2		1	5	4	2	3	3	3		1	
Tot.				2		1	5	6	2	3	3	3		1	
Greater Shearwater F.A.	12	8	3	18	100	0	87	0	2	5	15	7	43	2	3
Tot.	12	10	4	20	100	1	87	11	7	5	19	10	43	3	4
Unnet F.A.				1											
Tot.				1											
Pomarine Jaeger F.A.					2	2	3	0	1						
Tot.					2	2	3	3	1						
Unid. Skua F.A.			1												
Tot.			1												
Great Skua F.A.				1											
Tot.				1											
Great Blk-backed Gull F.A.	1		2		4		2	1						1	5
Tot.	1		2		4		2	2						1	7
Herring Gull F.A.	2		0	3	12	2	24	1	0	0	0	1	1	2	2
Tot.	2		1	3	12	2	24	10	6	5	2	1	1	3	10

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Transect ☒ Station ☐ No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Date (GMT) October	03	03	03	03	03	03	03	03	03	04	04	04	04	04	04
Region*	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB
Latitude (to nearest min.)	41-00	41-05	41-09	41-06	41-09	41-11	41-13	41-14	41-18	41-23	41-35	41-37	41-41	41-46	41-47
Longitude (to nearest min.)	69-00	69-00	68-58	68-54	68-50	68-49	68-44	68-41	68-39	68-25	68-26	68-25	68-19	68-15	68-29
Water depth (meters)	91	97	95	93	87	87	76	65	77	70	85	29	60	73	48
Total fixed-area (F.A.) birds	4	9	40	4	14	1	51	247	1	34	31	138	98	82	5
Area Sampled (km ²)	0.84	0.84	0.65	0.56	0.56	0.75	0.84	0.75	0.84	0.84	0.84	0.84	0.65	0.75	0.65
Density (F.A. birds/km ²)	4.76	10.71	61.54	7.14	25.00	1.33	60.71	329.33	1.19	40.48	36.90	164.29	150.77	109.33	7.69
Species	Number Observed														
Northern Fulmar F.A.							3							1	1
Tot.							3							1	1
Greater Shearwater F.A.	1	8	2	3	8	1	2	15	1	20	26	18	10	80	4
Tot.	3	8	2	3	8	3	2	15	3	20	36	18	25	95	5
Wilson's Storm-Petrel F.A.	2														
Tot.	2														
Great Skua F.A.			1												
Tot.			1												
Great Blk-backed Gull F.A.	0		22	0	3	0	40	145	0	12	3	105	47	0	
Tot.	1		22	7	5	3	45	160	31	12	4	105	154	65	
Herring Gull F.A.	1	1	15	0	3	0	6	87	0	2	0	15	41	1	
Tot.	4	1	15	8	9	4	10	96	7	2	1	15	56	23	
Blk-legged Kittiwake F.A.				1											
Tot.				1											
Unid. skua F.A.											1				
Tot.											1				
Pomarine Jaeger F.A.											1				
Tot.											1				

Table 6. Summary of Transect or Station Census Data.

R/V ANTON DOHRN

Observers K.D. Powers

Transect ☒ Station ☐ No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Date (GMT) October	4	4	5	5	5	5	5	5	5	5	5	6	6	6	6
Region*	GB	GB	GB	GB	GB	GB	GM	GM	GM	GM	GM	GM	GM	GM	GM
Latitude (to nearest min.)	41-48	41-49	41-51	41-54	41-58	42-03	42-08	42-12	42-14	42-20	42-23	42-15	42-09	42-02	41-55
Longitude (to nearest min.)	68-05	68-02	67-41	67-55	67-54	67-59	68-04	68-06	68-09	68-09	68-08	68-36	68-32	68-32	68-32
Water depth (meters)	50	100	36	64	125	200	231	201	186	197	180	188	188	183	178
Total fixed-area (F.A.) birds	91	66	72	151	34	120	121	0	3	6	20	73	67	14	15
Area Sampled (km ²)	0.84	0.84	0.93	0.75	0.93	0.93	0.93	0.84	0.93	0.93	0.93	0.84	0.84	0.93	0.93
Density (F.A. birds/km ²)	108.33	78.57	77.42	201.33	36.56	129.03	130.11	0	3.23	6.45	21.51	86.90	79.76	15.05	16.13
Species	Number Observed														
Northern Fulmar F.A.	1			1	1						1		1	1	
Tot.	1			1	1						1		1	1	
Greater Shearwater F.A.	78	13	23	2	29	40	100	0	3	5	18	20	29	10	15
Tot.	90	43	23	10	44	80	175	100	43	45	31	23	44	45	60
C net F.A.	1														
Tot.	1														
Unid. large gull F.A.		0													
Tot.		30													
Great Blk.-backed Gull F.A.	5	10	20	37	0	0	20	0	0	0	0	10	5	2	0
Tot.	5	10	20	57	30	32	60	10	78	1	2	10	16	7	7
Herring Gull F.A.	6	43	29	110	0	80	0	0	0	0	1	42	32	0	0
Tot.	6	43	29	138	62	138	157	46	160	55	31	42	103	16	12
Pomarine Jaeger F.A.				1	3		1								
Tot.				1	3		1								
Leach's Storm-Petrel F.A.					1										
Tot.					1										
Blk-legged Kittiwake F.A.										1					
Tot.										1					
Great Skua F.A.												1		1	
Tot.												1		1	

Observers K.D. Powers.

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Table 6. Summary of Transect or Station Census Data.

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Observers K.D. Powers

Transect ☒ Station ☐ No.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Date (GMT) October	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9
Region*	GM	GM	GM	GM	GM	GB	GB	GB	GB	GB	GB	GB	GM	GM	GB
Latitude (to nearest min.)	42-11	42-10	42-10	42-07	42-07	42-03	41-53	41-37	41-30	41-29	41-19	41-23	41-24	41-18	41-15
Longitude (to nearest min.)	70-16	70-16	70-01	69-58	69-47	69-49	69-50	69-37	69-29	69-29	69-20	69-09	69-05	69-09	69-09
Water depth (meters)	28	26	101	193	180	157	78	61	67	64	74	152	156	148	35
Total fixed-area (F.A.) birds	55	126	75	3	29	1	1	54	77	12	2	51	117	54	4
Area Sampled (km ²)	0.84	0.75	0.84	0.93	0.93	0.93	0.93	1.02	0.93	0.93	0.93	0.93	0.93	0.84	0.84
Density (F.A. birds/km ²)	65.48	168.00	89.29	3.23	31.18	1.08	1.08	52.94	82.80	12.90	2.15	54.84	125.81	64.29	4.76
Species	Number Observed														
Northern Fulmar F.A.			1	2	2	0	0	1	0	1		1		2	1
Tot.			1	2	4	1	1	1	1	1		1		2	1
Greater Shearwater F.A.	35	35	0	1	7	1	0	30	53	1	2	34	2	50	3
Tot.	60	60	75	16	19	9	20	34	76	11	3	36	37	50	78
net F.A.			1											1	
Tot.			1											1	
Surf. Scoter F.A.							0								
Tot.							3								
Great Blk-backed Gull F.A.	2	20	15	0	5	0	1	5	8	0		5	65	0	0
Tot.	52	20	40	18	40	5	10	5	13	10		5	75	26	2
Herring Gull F.A.	15	70	58	0	15	0	0	18	16	10		11	50	1	0
Tot.	115	70	128	47	106	17	39	18	36	15		12	70	76	93
Blk-legged Kittiwake F.A.	3	1													
Tot.	7	1													
Unid. lg. gull F.A.		0													
Tot.		50													
White-winged Scoter F.A.										0					
Tot.										2					

Table 6. Summary of Transect or Station Census Data.

R/V ANTON DOHRN

Observers K.D. Powers

[illegible]

Table 6. Summary of Transect or Station Census Data.

R/V ANTON DOHRN

Observers KDPowers

Transect ☒ Station ☐ No.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Date(GMT) October	11	11	11	11	12	12	12	12	12	12	12	12	12	12	12
Region*	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB
Latitude(to nearest min.)	42-07	42-03	42-04	42-10	42-06	42-10	42-08	42-06	42-06	42-07	42-09	42-10	42-05	42-00	41-54
Longitude(to nearest min.)	67-19	67-14	67-13	67-10	66-46	66-42	66-30	66-21	66-22	66-15	66-09	66-13	66-10	66-07	66-04
Water depth(meters)	73	48	50	128	77	144	98	92	92	88	184	194	94	96	99
Total fixed-area(F.A.)birds	11	2	12	22	34	144	84	62	112	61	98	20	44	48	1
Area Sampled(km ²)	0.93	0.93	0.84	0.93	0.93	0.93	0.84	0.75	0.84	0.93	0.93	0.93	0.93	0.93	0.75
Density (F.A. birds/km ²)	11.83	2.15	14.29	23.66	36.56	154.84	100.00	82.67	133.33	65.59	105.38	21.51	47.31	51.61	1.33
Species	Number Observed														
Northern Fulmar F.A.			1	1		2	5		2	1	1	2	0		1
Tot.			1	1		2	5		2	1	1	2	1		1
Greater Shearwater F.A.	1	2		1	12	115	55	43	51	47	96	15	42	37	
Tot.	2	5		2	19	140	605	949	306	224	98	55	45	39	
net F.A.					0						1				
Tot.					1						1				
Great Blk-backed Gull F.A.	3		6	11	5	8	9	7	25	1		0	1		
Tot.	3		14	11	24	10	309	132	77	8		4	4		
Herring Gull F.A.	7	0	5	3	17	19	15	12	34	2			1	11	
Tot.	9	18	33	5	88	36	515	262	87	15			4	13	
Unid. large gull F.A.				0											
Tot.				52											
Unid. scoter F.A.				6											
Tot.				6											
Pomarine Jaeger F.A.					0										
Tot.					1										
Red Phalarope F.A.										10		3			
Tot.										10		3			
Great Skua F.A.										0					
Tot.										1					

Table 6. Summary of Transect or Station Census Data.

R/V ANTON DONRIN

Observers K. D. Powers

[illegible]

Table 6. Summary of Transect or Station Census Data.

R/v ANTON DOHRN

Observers K.D. Powers

[illegible]

Table 6. Summary of Transect or Station Census Data.

R/V ANTON DOHRN

Observers KD Powers

[illegible]

Table 6. Summary of Transect or Station Census Data.

R/U ANTON DOHRN

Observers KD Powers

[illegible]

Figure 1. Approximate cruise track during day-light hours, 1-18 October 1978.

Figure 2a. Distribution map of
Northern Fulmar,
1-18 October 1978.

Figure 2b. Distribution map of
Cory's Shearwater,
1-18 October 1978.

Figure 2c. Distribution map of
Greater Shearwater,
1-18 October 1978.

Figure 2d. Distribution map of
Gannet, 1-18 October
1978.

Figure 2e. Distribution map of
Pomarine Jaeger,
1-18 October 1978.

Figure 2f. Distribution map of
Great Black-backed
Gull, 1-18 October
1978.

Figure 2g. Distribution map of
Herring Gull, 1-18
October 1978.

Figure 2h. Distribution map of
Black-legged
Kittiwake, 1-18
October 1978.

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 3 - 23 October 1978

Cruise No. 7823

INTRODUCTION

The following cruise report is a summary of bird and mammal observations made by Galen L. Pittman, Staff Biologist, Manomet Bird Observatory, aboard the U.S. Coast Guard Cutter VIGOROUS from 3-23 October 1978. The mission of the patrol was search and rescue and offshore law enforcement. The observer was aboard on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the U.S. Coast Guard for permitting an observer to join the patrol. The observer thanks CMR. Stanley Powers, the officers, and crew of the U.S.C.G.C. VIGOROUS for their assistance and cooperation aboard ship, and the Department of Energy for support (DOE Contract No. EE-78-S-02-4706).

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled in 10 minutes cruising time. A transect count provides information on rela-

tive density, i.e. birds per km². A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1 - 6 summarize the relative density and abundance bird data, and list sightings of rare or infrequently observed bird species, non-marine bird species, and marine mammals. Figure 1 graphically illustrates the cruise track during daylight hours. Figure 2a-h indicates the distribution of seven bird species and one species group observed, using the greatest total bird count of each species per 10-minute square latitude/longitude block surveyed.

This cruise track and subsequent observations along with those made during MBO cruise No. 7822 (1-19 October 1978) form a most complimentary survey scheme during virtually the same period of time. Therefore, comments on bird distribution will take this complete distributional picture into account.

Greater Shearwaters, Herring Gulls, and Great Black-backed Gulls were widespread and abundant in the Gulf of Maine and Georges Bank, particularly in association with fishing activity. Large gull numbers were particularly high on the Northern Edge of Georges Bank. These three species accounted for

70% of the birds in fixed area transects for these two regions. Areas covered in Southern New England waters and farther south yielded much smaller numbers of these three species.

Gannets and Kittiwakes were widespread in low numbers north of and including eastern Southern New England. Of 105 Gannets sighted 85% were sub-adults or juveniles. Fulmars and jaegers were common in the Gulf of Maine and Georges Bank. Fulmar abundance dropped off south of these regions whereas jaegers were equally numerous in the southern regions, particularly the southern slope waters of Georges Bank and Southern New England.

Finally, Cory's Shearwaters were limited to Southern New England and farther south with one sighting on Stellwagen Bank on October 16. Ten skuas, including a light phase South Polar Skua on Jefferys Ledge on October 17, were sighted usually near fishing activity.

TABLE 1.

Seabird Density in Selected Regions Using Fixed-area Transects

3 - 23 October 1978

Region	Number of Transects	Total Birds (TB)	Total Area Sampled (TKm ²)	Mean Density TB/TKm ²)	Density Range (TB/TKm ² /Transect)
Georges Bank	84	3014	86.03	35.04	0 - 1107.69
Southern New England	55	768	42.51	18.07	0 - 676.09
Gulf of Maine	54	449	42.41	10.59	0 - 139.13
Off Continental Shelf	32	155	30.95	5.01	0 - 96.72
Middle Atlantic	13	29	15.00	1.93	0 - 10.75
South Coastal	1	16	0.37	43.24	
North Coastal	3	3	2.23	1.35	1.08 - 1.54

TABLE 2.

Number of Birds Per Species in Selected Regions

Within Fixed Area Transects

3 - 23 October 1978

Species	Georges Bank	Southern New England	Gulf of Maine	Off Conti- nental Shelf	Middle Atlantic	South Coastal	North Coastal
Common Loon	1	2	-	-	-	-	-
Unid. loon	1	1	6	-	-	-	-
Northern Fulmar	144	6	22	2	-	-	-
Cory's Shearwater	1	31	1	3	-	-	-
Greater Shearwater	1175	406	269	6	1	-	0
Manx Shearwater	1	-	-	-	-	-	-
Unid. large shear- water	-	5	-	100	-	-	-
Unid. small shearwater	-	1	-	1	-	-	-
Unid. shearwater	20	-	-	-	-	-	-
Wilson's Storm- Petrel	-	-	-	5	-	-	-
Unid. storm- petrel	-	-	-	2	-	-	-
Gannet	28	8	29	-	-	-	-
Double-crested Cormorant	-	13	-	-	-	13	-
Unid. cormorant	-	125	-	-	-	-	-
Unid. scoter	-	-	11	-	-	-	-
Pomarine Jaeger	6	6	-	5	8	-	-

Cruise No. 7823

TABLE 2. (continued)

<u>Species</u>	<u>Georges Bank</u>	<u>Southern New England</u>	<u>Gulf of Maine</u>	<u>Off Conti- nental Shelf</u>	<u>Middle Atlantic</u>	<u>South Coastal</u>	<u>North Coastal</u>
Parasitic Jaeger	-	1	1	-	2	-	-
Unid. jaeger	12	6	2	3	1	-	-
Great Skua	2	-	-	-	-	-	-
Unid. skua	2	-	-	-	-	-	-
Great Black- backed Gull	469	28	38	6	1	-	1
Herring Gull	447	101	36	21	16	2	2
Ring-billed Gull	-	3	1	-	-	-	-
Laughing Gull	-	1	-	-	-	-	-
Black-legged Kittiwake	65	9	11	-	-	-	-
Unid. large gull	639	15	22	1	-	1	-
Unid. gull	1	-	-	-	-	-	-

TABLE 3.

List of Rare or Infrequent Bird Sightings

3 - 23 October 1978

Species	Number	Date	Location	Remarks
Greater Shearwater	1	10-3	40°39'N, 71°38'W	Dovekie-like - deformed bill
Unid. small shearwater	1	10-4	40°11'N, 73°30'W	
Parasitic Jaeger	2	10-5	38°22'N, 73°26'W	Sitting in water
Parasitic Jaeger	1	10-5	38°32'N, 73°22'W	Ad. inter. phase
Parasitic Jaeger	1	10-6	38°54'N, 72°54'W	Immature ?
Wilson's Storm-Petrel (?)	2	10-6	39°21'N, 72°17'W	
Audubon's Shearwater (Poss.)	1	10-7	39°04'N, 71°30'W	"Very small UNSS"
Unid. storm-petrel	3	10-8	40°02'N, 68°54'W	
Wilson's Storm-Petrel	5	10-8	40°02'N, 68°54'W	
Unid. skua	1	10-8	40°16'N, 68°24'W	Dark phase
Manx Shearwater	1	10-8	40°26'N, 67°41'W	
Great Skua (?)	1	10-9	42°01'N, 66°00'W	
Great Skua	1	10-9	42°01'N, 66°01'W	Wing coverts molting
Great Skua	1	10-9	42°00'N, 66°15'W	
Unid. skua	1	10-9	42°02'N, 66°22'W	Dark phase
Parasitic Jaeger	1	10-11	40°10'N, 69°44'W	Feeding on surface
Manx Shearwater (?)	1	10-11	40°08'N, 70°14'W	Flushed by ship
Parasitic Jaeger	1	10-16	42°18'N, 70°20'W	Ad. inter. phase

TABLE 3. (continued)

Species	Number	Date	Location	Remarks
Unid. skua	1	10-17	43°02'N, 69°06'W	Flushed by ship
Unid. skua	1	10-17	43°02'N, 69°01'W	Dark phase
South Polar Skua (?)	1	10-17	43°02'N, 69°02'W	Light phase
Unid. skua	1	10-19	40°52'N, 67°58'W	Dark phase - wing coverts molting
Unid. skua	1	10-19	41°09'N, 68°58'W	"Mottled dark brown"
Red Phalarope	15	10-21	40°57'N, 69°01'W	Flushed by ship
Pomarine Jaeger	36	10-4- 23	See cruise track	

TABLE 4.

List of Marine Mammal Sightings

3 - 23 October 1978

Species	Number	Date	Location	Remarks
Unid. dolphin	1	10-5	38°27'N, 73°29'W	Breaching - 3 X
Spotted Dolphin (prob.)	20-25	10-7	38°44'N, 72°00'W	Porpoising
Unid. whale	1	10-8	40°27'N, 67°37'W	Surfacing
Common Dolphin (prob.)	100+	10-8	40°45'N, 66°50'W	Surfacing
Pilot Whale	4-5	10-9	42°02'N, 66°02'W	Surfacing - 1 or 2 breaching
Unid. rorqual	2	10-10	41°38'N, 68°58'W	Surfacing
Humpback Whale	3-4	10-16	42°18'N, 70°15'W	Bird interaction
Humpback Whale	1	10-16	42°22'N, 70°18'W	Breaching
Unid. whale	1	10-17	43°06'N, 69°53'W	Surfacing
Right Whale	1	10-17	43°03'N, 70°10'W	Surfacing
Finback Whale (poss.)	1	10-17	43°03'N, 70°10'W	Surfacing
Unid. whale	1	10-17	43°03'N, 70°10'W	Surfacing
Right Whale	2-3	10-17	43°06'N, 70°12'W	Surfacing
Humpback Whale	1-2	10-17	43°03'N, 70°12'W	Surfacing and diving
Unid. rorqual	2-3	10-19	41°10'N, 68°58'W	Breaching
Unid. rorqual	2	10-20	41°17'N, 69°02'W	Surfacing

TABLE 5.

List of Non-Marine Bird Species,

3 - 23 October 1978

Species	Number	Date	Location	Remarks
Purple Finch	1	10-3	40°58'N, 71°42'W	
Snow Goose	30	10-4	40°27'N, 74°03'W	Flying S
Ruby-crowned Kinglet	1	10-7	38°44'N, 72°00'W	Banded
Mourning Dove	1	10-7	39°06'N, 71°26'W	
Winter Wren	1	10-8	40°22'N, 67°58'W	
American Robin	1	10-8	40°27'N, 67°37'W	
Blackpoll Warbler	1	10-8	?	Found dead
Swamp Sparrow	1	10-8	40°50'N, 66°45'W	
Brown-headed Cowbird	1	10-11	40°13'N, 69°41'W	
LeConte's Sparrow	1	10-14	40°01'N, 69°48'W	
Unid. sandpiper	1	10-15	41°04'N, 71°22'W	Flying
Purple Finch	1	10-16	42°25'N, 70°27'W	Female, banded
Brown-headed Cowbird	1	10-17	42°56'N, 68°48'W	
American Woodcock	1	10-17	43°02'N, 69°06'W	Flying NW
Unid. passerines	10	10-17	43°06'N, 69°59'W	
Rusty Blackbird	1	10-17	43°06'N, 69°59'W	
Hermit Thrush	1	10-17	43°10'N, 70°03'W	Banded
Song Sparrow	1	10-17	43°10'N, 70°03'W	Banded
American Goldfinch	7	10-17	43°04'N, 69°18'W	
Savannah Sparrow	1	10-17	43°05'N, 70°04'W	Banded

TABLE 5. (continued)

Species	Number	Date	Location	Remarks
Cedar Waxwing	1	10-17	43°06'N, 70°12'W	
White-throated Sparrow	1	10-18	41°46'N, 69°12'W	
Song Sparrow	1	10-18	41°43'N, 69°08'W	
Savannah Sparrow	1	10-18	41°20'N, 68°42'W	Banded
Evening Grosbeak	1	10-18	41°10'N, 68°33'W	
American Kestrel	1	10-19	40°50'N, 67°58'W	Female flying around boat
Sharp-shinned Hawk	1	10-19	40°49'N, 67°58'W	Flying around boat
Peregrine Falcon	1	10-19	41°10'N, 69°02'W	Flying around boat
Mourning Dove	1	10-20	41°17'N, 69°02'W	
Lincoln's Sparrow (?)	1	10-21	40°52'N, 68°53'W	
Unid. meadowlark	1	10-21	40°52'N, 68°53'W	
Yellow-breasted Chat(?)	1	10-21	40°52'N, 68°53'W	
Sanderling	3	10-21	40°54'N, 68°56'W	
American Robin	1	10-21	41°02'N, 69°07'W	
Brown-headed Cowbird	1	10-21	41°02'N, 69°07'W	
Rusty Blackbird	1	10-21	41°12'N, 69°19'W	
Yellow-rumped Warbler	17	10-4-21	See cruise track	6 Banded
Dark-eyed Junco	9	10-8-21	See cruise track	1 Banded

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers

Galen L. Pittman

Transect ☒ Station ☐ No.	1	2	3	4	5	6	7
Date (GMT) October 1972	3	3	3	3	4	4	4
Region*	SNE	SNE	SNE	SNE	SNE	SNE	SNE
Latitude (to nearest min.)	40-06	40-58	40-47	40-33	40-24	40-25	40-23
Longitude (to nearest min.)	71-14	71-42	71-39	71-32	73-47	73-57	73-43
Water depth (meters)	13	43	58	68	36	11	36
Total fixed-area (F.A.) birds	16	0	1	6	11	125	0
Area Sampled (km ²)	1.39	0.93	0.93	1.53	1.39	0.93	0.93
Density (F.A. birds/km ²)	11.51	0.00	1.08	3.92	7.91	135.56	0.00
Species	Number Observed						
Greater Shearwater (FA)	4	0	0	6			
(TOT)	4	20	3	6			
Cory's Shearwater (FA)	6						
(TOT)	6						
G + Black-backed Gull FA					2	2	
(TOT)					2	2	
Unid. Cormorant (FA)						125	
(TOT)						125	
Unidentified Jaeger (FA)				0			
(TOT)				1			
Unid. Large Shearwater (FA)	5						
(TOT)	5						
Unid. Loon (FA)	1						
(TOT)	1						
Herring Gull (FA)		0	1		6		
(TOT)		30	1		6		
Common Loon (FA)					1		
(TOT)					1		
Unid. Large Gull (FA)		0	0				
(TOT)		22.5	1				
Pink-billed Gull (FA)					2		
(TOT)					2		
L. Bird (FA)		0		0			
(TOT)		50		1			
Unid. Gull (FA)					0		
(TOT)					7		

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers Gale L. Pittman

Transect ☒ Station ☐ No.	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Date (GMT) October 1990	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5
Region*	SNE	SNE	SNE	SNE	SNE	SNE	SNE	OCS	MA	MA	MA	MA	MA	MA	MA
Latitude (to nearest min.)	40-02	40-13	40-15	40-11	40-13	40-02	39-53	38-26	38-20	38-18	38-27	38-32	38-37	38-30	38-41
Longitude (to nearest min.)	73-42	73-39	73-34	73-30	73-27	73-19	72-15	73-38	73-38	73-38	73-29	73-22	73-25	73-31	73-42
Water depth (meters)	20	23	29	34	42	51	64	450	130	180	110	55	77	62	62
Total fixed-area (F.A.) birds	6	1	3	5	2	4	2	0	6	0	0	3	0	0	0
Area Sampled (km ²)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.74	0.74	1.39	1.39	1.39	1.39	1.39	1.39
Density (F.A. birds/km ²)	6.45	1.08	3.23	5.37	2.15	4.30	2.15	0.00	8.11	0.00	0.00	2.16	0.00	0.00	0.00
Species	<div> <div>NONE</div> <div>Number Observed</div> <div>NONE</div> <div>NONE</div> </div>														
Northern Fulmar (FA)				2											
(TOT)				2											
Isitic Jaeger (FA)									1				0		
(TOT)									1				1		
Unid. Small shearwater (FA)				1											
(TOT)				1											
Pomarine Jaeger (FA)						1			5			1	0		
(TOT)						1			5			1	3		
Great Black-backed Gull (FA)		0	0	0	1								0		
(TOT)		1	2	1	3								1		
Herring Gull (FA)	5	1	2	0	1	3	0		0			1	0		
(TOT)	5	4	3	3	1	3	1		1			1	2		
Laughing Gull (FA)	1														
(TOT)	1														
Black-legged Kittiwake (FA)				2											
(TOT)				2											
Unid. Large Gull (FA)	0						2					0			
(TOT)	2						2					1			
Unid. Jaeger (FA)												1			
(TOT)												1			
Unid. Bird (FA)											0			0	
(TOT)											1			2	

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers Galen L. Pittman

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers Galen L. Pittman

Transect ☒ Station ☐ No.	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Date (GMT) <u>October 1972</u>	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7
Region*	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS	OCS
Latitude (to nearest min.)	33-53	33-53	38-34	38-37	39-39	38-41	38-42	38-50	38-52	38-53	38-53	39-04	39-11	39-11	39-09
Longitude (to nearest min.)	72-00	72-02	72-37	72-20	72-14	72-01	72-02	71-52	71-45	71-41	71-34	71-30	71-26	71-30	71-25
Water depth (meters)	373	435	2500	3000	2350	1940	2560	2560	3000	2380	2350	2500	2560	2480	2500
Total fixed-area (F.A.) birds	0	0	0	0	0	5	0	0	0	5	0	104	1	1	0
Area Sampled (km ²)	0.93	1.20	1.39	1.39	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Density (F.A. birds/km ²)	0.00	0.00	0.00	0.00	0.00	5.38	0.00	0.00	0.00	5.23	0.00	96.72	1.08	1.08	0.00
Species	<div style="display: flex; justify-content: space-between;"> NONE NONE NONE NONE Number Observed NONE </div>														
Greater Shearwater (FA)						1				2		1		0	
(TOT)						1				2		1		15	
Cory's Shearwater (FA)												1	1	0	
(TOT)												1	1	5	
Large Shearwater (FA)												100		0	0
(TOT)												100		30	3
Unid. Small Shearwater (FA)												1			
(TOT)												1			
Unid. Storm Petrel (FA)										2					
(TOT)										2					
Unid. Jaeger (FA)												1			
(TOT)												1			
Green Black-backed Gull (FA)						4		0							
(TOT)						4		1							
Herring Gull (FA)		0				0	0			1	0		0	1	
(TOT)		2				1	1			1	1		1	1	

TABLE 6. Summary of Transect or Station Census Data.

USCGC VTBOROV

Observers

Galen L. Pittman

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers Galen L. Pittman

Transect ☒ Station ☐ No.	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
Date (GMT) October 1978	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9
Region*	OC5	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB
Latitude (to nearest min.)	40-18	40-22	40-24	40-26	40-29	40-29	40-31	40-34	40-35	40-37	40-41	42-01	42-05	42-08	42-00
Longitude (to nearest min.)	58-10	67-58	67-48	67-41	67-37	67-28	67-22	67-15	67-08	67-00	66-55	66-00	66-02	66-06	66-15
Water depth (meters)	375	135	143	275	280	302	274	439	241	320	194	102	95	88	73
Total fixed-area (F.A.) birds	0	5	0	2	0	0	1	4	2	0	0	276	128	26	30
Area Sampled (km ²)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.53	0.93	0.93	0.93
Density (F.A. birds/km ²)	0.00	5.38	0.00	2.15	0.00	0.00	1.08	4.30	2.15	0.00	0.00	30.39	137.63	27.96	32.25
Species	NONE														
	NONE														
	Number Observed														
Northern Fulmar (FA)			0						0	0	0	60	10	5	5
(TOT)			1						1	1	1	80	10	10	20
Greater Shearwater (FA)										0		200	40	10	10
(TOT)										1		250	40	25	40
1 x Shearwater (FA)				1											
(TOT)				1											
Unid. Shearwater (FA)													20		
(TOT)													20		
Great Skua (FA)												1			1
(TOT)												1			1
Pomarine Jaeger (FA)							1	1	1		0				
(TOT)							1	1	1		1				
Unid. Jaeger (FA)				1					1						4
(TOT)				1					1						4
Great Black-backed Gull (FA)		2										5	38	1	10
(TOT)		2										5	38	16	40
Herring Gull (FA)					0			3			0	5		0	0
(TOT)					1			3			2	5		5	35
Unid. Large Gull (FA)		3										5	20	10	0
(TOT)		4										5	20	10	90

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers

Galen L. Pittman

Transect ☒ Station ☐ No.	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
Date (GMT) October 1978	9	9	9	9	9	9	9	9	9	9	9	10	10	10	10
Region*	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GM	GM	GM	GM
Latitude (to nearest min.)	42-02	42-00	41-52	41-52	41-53	41-55	41-57	42-02	42-05	42-08	42-12	42-30	42-59	42-57	42-26
Longitude (to nearest min.)	66-22	66-31	66-32	66-29	66-18	66-22	66-24	66-34	66-39	66-39	66-48	66-41	66-42	66-46	66-46
Water depth (meters)	79	79	69	77	77	73	79	71	73	93	201	174	179	205	201
Total fixed-area (F.A.) birds	250	36	2	5	5	6	3	5	0	57	8	41	7	38	7
Area Sampled (km ²)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.46	0.46	0.46	0.46
Density (F.A. birds/km ²)	268.82	38.71	2.15	5.38	5.38	6.46	3.23	5.38	0.00	61.29	8.60	89.13	15.22	82.61	15.22
Species	Number Observed														
Northern Fulmar (FA)	10	15	1	1	2	2			0	2	2				
(TOT)	25	20	1	1	7	7			4	5	4				
Greater Shearwater (FA)	40	20		4	2	3	0	5	0	20	5	40	5	35	5
(TOT)	65	30		4	15	8	2	10	9	25	8	40	7	60	20
Gannet (FA)					1					1					
(TOT)					1					1					
Unid. Jaeger (FA)														1	
(TOT)														1	
Great Black-backed Gull (FA)	80	1	1			1	2	0		15				2	
(TOT)	80	2	1			1	2	1		15				2	
Herring Gull (FA)	120	0				0	1	0		19		1	2		2
(TOT)	125	2				2	3	1		24		1	2		3
Unid. Loran Gull (FA)					0										
(TOT)					20										
Black-legged Kittiwake (FA)											1				
(TOT)											1				
Unid. Bird (FA)									0	0					
(TOT)									120	50					

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers

Galen L. Pittman

Transect ☒ Station ☐ No.	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
Date (GMT) October 1978	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11
Region*	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	SEF
Latitude (to nearest min.)	42-24	42-23	42-21	42-20	42-18	42-12	42-10	42-07	42-03	42-01	41-56	41-50	41-45	41-42	40-13
Longitude (to nearest min.)	69-49	68-50	68-52	68-54	68-55	68-54	68-56	68-56	68-56	68-56	68-57	68-58	68-59	69-00	69-4
Water depth (meters)	201	193	203	203	207	176	155	137	124	124	172	150	155	183	82
Total fixed-area (F.A.) birds	0	2	1	2	0	1	0	6	0	0	3	1	2	3	2
Area Sampled (km ²)	0.46	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.65
Density (F.A. birds/km ²)	0.00	4.35	2.17	4.35	0.00	2.17	0.00	13.04	0.00	0.00	6.52	2.17	4.35	6.52	3.08
Species	Number Observed														
Northern Fulmar (FA)			1					1							
(TOT)			1					1							
Greater Shearwater (FA)	0	0	0	0	0	0	0	5	0	0	3	0	2	3	1
(TOT)	15	25	35	5	3	5	12	17	5	17	10	10	12	13	2
Unid. Jaeger (FA)						1									
(TOT)						1									
Great Black-backed Gull (FA)			0		0	0	0	0	0	0	0	0	0	0	
(TOT)			1		6	22	32	32	14	32	6	30	30	30	
Herring Gull (FA)	0	2	0	0	0	0	0	0	0	0	0	1	0	0	1
(TOT)	1	2	7	10	8	16	21	21	18	21	17	20	21	21	1
Ring-billed Gull (FA)				1											
(TOT)				1											
Black-legged Kittiwake (FA)				1											
(TOT)				1											
Unid. Large Gull (FA)											0				
(TOT)											3				

Observers

Galen L. Pittman

[illegible]

Observers Galen L. Pittman

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers Galen L. Pittman

Transect ☒ Station ☐ No.	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157
Date (GMT) <u>October 1978</u>	16	16	16	17	17	17	17	17	17	17	17	17	17	18	18
Region*	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM	GM
Latitude (to nearest min.)	42-12	42-15	42-18	42-56	43-02	43-07	43-04	43-04	43-05	43-06	43-06	43-10	43-06	41-55	41-54
Longitude (to nearest min.)	70-22	70-21	70-20	68-48	68-54	69-06	69-18	69-29	69-42	69-53	69-59	70-03	70-12	69-26	69-22
Water depth (meters)	40	73	52	165	142	115	183	155	101	155	128	51	174	210	201
Total fixed-area (F.A.) birds	0	0	13	37	9	4	4	0	6	14	27	11	17	10	26
Area Sampled (km ²)	0.65	0.65	0.65	1.11	1.48	1.67	1.67	1.67	1.67	1.67	1.11	0.65	0.46	1.02	1.39
Density (F.A. birds/km ²)	0.00	0.00	20.00	33.33	6.08	2.40	2.40	0.00	3.59	8.38	24.32	16.92	36.96	9.80	18.70
Species	Number Observed														
Unid. Loon (FA)							3				3				
(TOT)							3				3				
Northern Fulmar (FA)				5	1	4						1	1	4	0
(TOT)				5	2	4						1	1	7	3
Peter Shearwater (FA)	0		4	25	0	0		0	6			4	1	5	20
(TOT)	2		4	30	8	1		5	6			4	20	15	37
Cory's Shearwater (FA)			1												
(TOT)			1												
Gannet (FA)			2		1	0				12	3	1	1	1	1
(TOT)			2		1	1				12	4	2	1	1	1
Unid. Scoter (FA)					2						9				
(TOT)					2						9				
Parasitic Jaeger (FA)			1												
(TOT)			1												
Unid. Skua (FA)						0									
(TOT)						1									
Great Black-backed Gull (FA)				1	4	0	1			1	10	3	7		1
(TOT)				1	5	10	2			2	10	5	1500		1
Herring Gull (FA)		0	4	2	1					1	2	1	5		1
(TOT)		3	4	2	3					1	2	1	500		1
Black-legged Kittiwake (FA)			1									1	2		
(TOT)			1									1	2		
Large Gull (FA)	0	0		4		0	0		0		0	0			3
(TOT)	500	100		4		300	1		4		1020	105			3
Unid. Bird (FA)						0				0		0			
(TOT)						100				500		20			

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers

Galen L. Pittman

Transect ☒ Station ☐ No.	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172
Date (GMT) <u>October 1978</u>	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Region*	GM	GM	GM	GM	GM	GM	GB	GB	GB	GB	GB	GB	GB	GB	GB
Latitude (to nearest min.)	41-50	41-46	41-43	41-43	41-38	41-26	41-20	41-15	41-10	41-04	40-59	40-51	40-48	40-52	40-53
Longitude (to nearest min.)	69-17	69-12	69-08	69-13	68-58	68-48	68-42	68-38	68-33	68-27	68-24	68-28	68-37	68-43	68-35
Water depth (meters)	198	190	190	165	113	137	91	60	60	44	53	44	58	55	55
Total fixed-area (F.A.) birds	31	1	0	3	0	1	62	3	1	3	0	1	2	2	3
Area Sampled (km ²)	0.93	0.93	0.93	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
Density (F.A. birds/km ²)	33.33	1.08	0.00	2.16	0.00	0.72	44.67	2.16	0.72	2.16	0.00	0.72	1.44	1.44	2.16
Species	Number Observed														
Common Loon (FA)												1			
(TOT)												1			
Northern Fulmar (FA)	0	0	0	0			0		1				1	0	0
(TOT)	4	1	1	1			1		1				3	1	1
Shearwater (FA)	10	0	0	0	0	0	0	0	0	0	0	0	1	0	0
(TOT)	35	7	15	15	6	6	10	5	1	2	2	6	8	7	6
Gannet (FA)	1		0				1	1							
(TOT)	1		1				1	2							
Herring Gull (FA)	4	1		1	0		5	1		1			0	2	
(TOT)	4	2		2	3		5	1		1			1	2	
Great Black-backed Gull (FA)	1	0		2	0		15	1	0						
(TOT)	1	1		2	3		15	6	1						
Unid. Large Gull (FA)	15					0	600	0	0					0	
(TOT)	15					500	600	10	1					51	
Black-legged Kittiwake (FA)						1				2					3
(TOT)						1				2					3
Unid. Bird (FA)								0							
(TOT)								500							

TABLE 6. Summary of Transect or Station Census Data.

p USCGC VIGOROUSObservers Galen L. Pittman

Transect ☒ Station ☐ No.	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187
Date (GMT) <u>October 1978</u>	18	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Region*	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB
Latitude (to nearest min.)	40-51	40-52	40-54	40-49	40-53	40-55	40-57	41-00	41-03	41-03	41-06	41-09	41-11	41-07	41-00
Longitude (to nearest min.)	68-15	67-57	67-59	67-58	68-05	68-12	68-23	68-38	68-47	68-53	68-56	68-58	68-59	69-03	69-24
Water depth (meters)	70	55	48	71	71	51	51	55	64	73	84	97	99	97	75
Total fixed-area (F.A.) birds	2	23	3	1	2	0	1	2	25	71	5	65	720	5	4
Area Sampled (km ²)	1.39	0.46	0.46	0.46	1.30	1.39	1.39	1.39	1.39	0.46	0.65	0.65	0.65	1.39	1.39
Density (F.A. birds/km ²)	1.44	50.00	6.52	2.17	1.54	0.00	0.72	1.44	17.99	154.34	7.69	100.00	1107.69	3.60	2.88
Species	Number Observed														
Northern Fulmar (FA)	0				1		1	0	2						2
(TOT)	1				1		1	1	2						2
Greater Shearwater (FA)	1	12	0	0	0		0	1	20	70	5	50	430	0	0
(TOT)	2	12	4	4	1		1	15	50	110	15	150	660	3	23
net (FA)														3	
(TOT)														3	
Pomarine Jaeger (FA)			1												
(TOT)			1												
Unid. Jaeger (FA)			0							1					
(TOT)			1							1					
Unid. Skua (FA)												1			
(TOT)												1			
Great Black-backed Gull (FA)			2	1	0	0	0	0	2	0	0		145		0
(TOT)			2	5	6	2	1	6	5	5	1		220		15
Herring Gull (FA)		9	0	0	0	0	0	0	0	0	0	13	145	1	2
(TOT)		9	2	11	18	13	14	18	5	13	2	13	220	4	20
Black-legged Kittiwake (FA)		2			1			1	1		0	1		1	
(TOT)		2			1			1	1		1	1		1	
Unid. Large Gull (FA)	1													0	
(TOT)	1													2	
Unid. Bird (FA)												0			0
(TOT)												50			25

TABLE 6. Summary of Transect or Station Census Data.

USCGC VIGOROUS

Observers Galen L. Pittman

Transect ☒ Station ☐ No.	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202
Date (GMT) October 1978	19	19	19	20	20	20	20	20	20	20	20	20	20	21	21
Region*	SNE	GB	GB	GM	GM	GM	GM	GM	GM	GB	GB	GB	GB	GB	GB
Latitude (to nearest min.)	40-55	41-00	41-09	41-59	41-53	41-44	41-34	41-24	41-17	41-12	41-07	41-05	41-06	40-51	40-52
Longitude (to nearest min.)	69-11	69-09	68-59	68-59	68-55	68-55	68-58	69-01	69-02	69-01	69-00	69-02	69-26	68-51	68-53
Water depth (meters)	57	60	92	144	152	161	128	146	146	108	88	82	79	68	69
Total fixed-area (F.A.) birds	0	0	4	64	2	1	6	0	33	58	10	8	6	13	0
Area Sampled (km ²)	0.93	1.39	1.67	0.46	0.93	0.93	0.93	0.93	0.46	0.46	0.46	1.67	0.65	0.46	0.46
Density (F.A. birds/km ²)	0.00	0.00	2.40	139.13	2.15	1.08	6.45	0.00	71.74	126.09	21.74	4.79	9.23	28.26	0.00
Species	Number Observed														
Northern Fulmar (FA)			2	1				0	1	0				2	
(TOT)			2	1				1	1	1				2	
Greater Shearwater (FA)	0	0	0	55	0	1	5	0	30	30	10	5	4	8	0
(TOT)	1	6	2	65	42	1	15	1	60	70	15	10	4	11	8
C. MCT (FA)				1	0					1					
(TOT)				1	1					1					
Unid. Jaeger (FA)												1			
(TOT)												1			
Great Black-backed Gull (FA)		0	0	2	0	0	1	0	2	6	0	0	2	1	
(TOT)		2	1	2	91	2	5	4	2	13	4	3	2	1	
Herring Gull (FA)	0		2	2	2		0	0	0	21	0	1		2	
(TOT)	1		2	2	93		5	3	2	27	2	5		2	
Black-legged Kittiwake (FA)				3								1			
(TOT)				3								1			
Unid. Large Gull (FA)		0	0		0		0		0						
(TOT)		6	50		2		5		5						
Unid. Bird (FA)										0					
(TOT)										50					

TABLE 6. Summary of Transect or Station Census Data.

P USCGC VIGOROUS

Observers Galen L. Pittman

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Observers Galen L. Pittman

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TABLE 6. Summary of Transect or Station Census Data.

p. USCGC VIGOROUS

Observers Galen L. Pittman

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FIGURE 1. Approximate cruise track during daylight hours, 3-23 October 1978. (Northern Sector)

FIGURE 2a. Distribution Map of
Northern Fulmar, 3-23
October 1978,
(Northern Sector).

FIGURE 2b. Distribution Map of
Cory's Shearwater,
3-23 October 1978,
(Northern Sector).

FIGURE 2c. Distribution Map of
Greater Shearwater,
3-23 October 1978,
(Northern Sector).

FIGURE 2d. Distribution Map
of Gannet,
3-23 October 1978,
(Northern Sector).

FIGURE 2d. Distribution Map of
Gannet, 3-23 October,
1978, (Southern Sector).

FIGURE 2e. Distribution Map of
Stercorarius species,
3-23 October 1978,
(Northern Sector).

FIGURE 2f. Distribution Map of Great Black-backed Gull, 3-23 October, 1978, (Northern Sector).

FIGURE 2g. Distribution Map of
Herring Gull, 3-23
October 1978,
(Northern Sector).

FIGURE 2h. Distribution Map of Black-legged Kittiwake, 3-23 October, 1978, (Northern Sector).

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 13 October - 1 November 1978

Cruise No. 7824

INTRODUCTION

The following cruise report is a summary of bird and mammal observations made by Albert W. Nickerson, Staff Biologist, aboard Polish research vessel WIECZNO from 13 October - 1 November 1978. The purpose of the cruise was to conduct a larval herring survey in cooperation with the U.S. National Marine Fisheries Service, Woods Hole, Massachusetts. The observer was aboard the vessel on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the cooperation of the Peoples Republic of Poland for allowing an observer to join the cruise and H. C. Boyar, National Marine Fisheries Service, for arranging passage. The observer thanks the captain, officers and crew of R/V WIECZNO for their generous assistance aboard ship.

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled

in 10 minutes cruising time. A transect count provides information on relative density, i.e. birds per km^2 . A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1-6 summarize the relative density and relative abundance bird data, and list sightings of rare or infrequently observed bird species, non-marine species, and marine mammals. Figure 1 graphically illustrates the cruise track during daylight hours and Figure 2a-f indicate the distribution of six bird species per 10-minute square latitude/longitude block surveyed. Greater Shearwaters remained to be by far the most abundant and widely distributed species present, and were seen in 93% of the 10-minute square blocks of latitude/longitude surveyed. Gannets appeared to be entering the Georges Bank area since considerably larger numbers were observed in locations revisited later during the cruise period.

On 29 October at and around $40^{\circ}50'N$, $69^{\circ}00'W$, areas of very high biological activity were encountered. At 1045 hours EDT a "natural" feeding assemblage of at least a thousand birds was observed from a distance of 0.5 to 2 miles where many mackerel-sized fish were jumping. The composition was

estimated to be 75% Greater Shearwater, 12% Herring Gull, 7% Great Black-backed Gull, 3% Gannet and 3% Black-legged Kittiwake. A Manx Shearwater, 125 Red Phalaropes and a Pomarine Jaeger were also present. One hour later at 41°00'N, 69°00'W three fishing vessels were seen with approximately 2500 birds of a similar species composition feeding in their wake. At least four Fin Whales and one Humpback Whale were seen within the general area of the sighting.

A wide variety of land birds were observed on and around the ship (Table 5), including a White-rumped Sandpiper, a Woodcock, a Short-eared Owl, a Northern Shrike which killed a recently banded Common Yellowthroat, and a Dickcissel.

TABLE 1.

Seabird Density in Selected Regions Using Fixed-Area Transects

13 October - 1 November 1978

Region	Number of Transects	Total Km ² Surveyed (TKm ²)	Total Birds (TB)	Mean Density ₂ (TB/TKm ²)	Density Range (TB/Km ² /Transect)
Off Continental Shelf	2	1.86	12	6.45	1.08 - 11.83
Southern New England	49	45.10	387	8.58	0 - 55.91
Georges Bank	56	52.08	540	10.36	0 - 97.85
Gulf of Maine	44	40.08	442	11.03	0 - 47.31
Southern Coastal	2	1.86	5	2.69	0 - 5.38

TABLE 2.

Number of Birds Per Species in Selected Regions

(Using Fixed-Area Transects Only)

13 October - 1 November 1978

<u>Species</u>	<u>Off Continental Shelf</u>	<u>Southern New England</u>	<u>Georges Bank</u>	<u>Gulf of Maine</u>	<u>Southern Coastal</u>
Common Loon		1			
Northern Fulmar		5	49	25	
Greater Shearwater	1	214	379	227	4
Gannet		41	3	22	
Red Phalarope			6	3	
Pomarine Jaeger		2	1	1	
Unid. jaeger		1			
Great Skua			1	2	
Great Bl.-bk. Gull		21	16	56	1
Herring Gull	11	78	83	105	
Black-legged Kittiwake		22	2	2	

TABLE 3.

List of Rare or Infrequent Bird Sightings

13 October - 1 November 1978

Species	Number	Date	Location	Remarks
Sooty Shearwater	1	10-15	41°55'N, 69°50'W	Flying
Pomarine Jaeger	1	10-16	40°48'N, 69°05'W	Immature; sitting with Greater Shearwaters.
Red Phalarope	7	10-16	40°48'N, 69°05'W	Sitting, flew.
Manx Shearwater	1	10-16	40°48'N, 69°05'W	Sitting, flew.
Surf Scoter	8	10-17	41°14'N, 70°57'W	Flying west.
White-winged Scoter	2	10-17	41°14'N, 70°57'W	Flying East.
Pomarine Jaeger	1	10-18	41°44'N, 68°30'W	Lt. Ad., Flying.
Great Skua	1	10-19	42°15'N, 68°30'W	Solid ruddy brown.
Pomarine Jaeger	1	10-19	42°11'N, 68°10'W	Sub-ad., flying.
Great Skua	1	10-19	42°10'N, 68°00'W	Solid ruddy brown.
Pomarine Jaeger	1	10-20	40°31'N, 68°00'W	Sub-ad., flying.
Unid. jaeger	1	10-20	40°30'N, 67°30'W	Immature, traveling N.
Pomarine Jaeger	1	10-20	40°45'N, 67°30'W	Flying.
Pomarine Jaeger	1	10-21	42°15'N, 67°06'W	Flying.
Great Skua	1	10-22	41°15'N, 66°30'W	Ruddy, slightly darker above.
Great Skua	1	10-22	41°42'N, 66°30'W	In mid moult.
Red Phalarope	6	10-23	41°30'N, 66°00'W	Sitting, flew.
Pomarine Jaeger	1	10-25	40°57'N, 69°16'W	Immature, pirating kittiwakes.
Red Phalarope	11	10-25	40°44'N, 69°10'W	Sitting, flew.

TABLE 3 (continued)

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Pomarine Jaeger	1	10-26	41°56'N, 49°20'W	Adult, in moult.
Red Phalarope	1	10-27	43°00'N, 70°00'W	Traveling south.
Northern Phalarope	1	10-27	42°55'N, 70°00'W	Traveling south.
Red Phalarope	3	10-27	42°42'N, 69°56'W	Sitting, flew.
Red Phalarope	125	10-29	40°50'N, 69°00'W	Flying.
Manx Shearwater	1	10-29	40°50'N, 69°00'W	Feeding.
Pomarine Jaeger	1	10-29	40°50'N, 69°00'W	Sub-adult.
Parasitic Jaeger	1	10-29	41°16'N, 68°58'W	Light Phase
Pomarine Jaeger	1	10-30	41°38'N, 69°24'W	Lt. adult.
Unid. jaeger	1	10-30	41°40'N, 69°39'W	Lt. adult.
Pomarine Jaeger	1	10-30	41°40'N, 69°39'W	Subadult.
Pomarine Jaeger	1	10-31	41°00'N, 69°15'W	Immature, traveling.

TABLE 4.

List of Marine Mammal Sightings

13 October - 1 November 1978

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Unid. rorqual	1	10-19	42°14'N, 68°02'W	Four blows at 20 sec. intervals.
Unid. dolphin	1	10-21	41°52'N, 67°00'W	Porpoised 4 times.
Unid. dolphin	1	10-21	41°35'N, 66°59'W	Porpoised 8 times.
Pilot Whale	6	10-23	41°30'N, 65°59'W	Traveling west.
Sei Whale (prob.)	1	10-27	42°48'N, 70°00'W	Blew 4 times.
Fin Whale (poss.)	1	10-28	41°30'N, 68°28'W	Blew 5 times, sounded.
Humpback Whale	1	10-28	41°30'N, 69°40'W	Blew 3 times, sounded.
Fin Whale (prob.)	1	10-28	41°34'N, 69°44'W	Surfacing.
Fin Whale (prob.)	1	10-28	41°36'N, 69°47'W	Surfacing.
Humpback Whale	2	10-28	31°37'N, 69°40'W	Surfacing.
Fin Whale	1	10-29	41°15'N, 69°00'W	Blew 6 times.
Humpback Whale	1	10-29	41°15'N, 69°00'W	Showed flukes.
Fin Whale	2	10-29	41°15'N, 69°00'W	Four blows each.
Unid. whale	1	10-21	40°47'N, 69°15'W	Blew once.

TABLE 5.

List of Non-Marine Bird Sightings

13 October - 1 November 1978

Species	Number	Date	Location	Remarks
Dickcissel	1	10-15	42°18'N, 70°00'W	
Northern Oriole	1	10-15	42°18'N, 70°00'W	
Chipping Sparrow	1	10-15	42°18'N, 70°00'W	Immature.
Song Sparrow	1	10-15	42°18'N, 70°00'W	
Myrtle Warbler	1	10-15	42°18'N, 70°00'W	
House Wren	1	10-16	41°00'N, 69°16'W	Banded.
Red-winged Blackbird	1	10-16	41°00'N, 69°16'W	
Myrtle Warbler	1	10-16	41°00'N, 69°16'W	
Swainson's Thrush	1	10-16	40°59'N, 69°15'W	
White-throated Sparrow	1	10-16	41°45'N, 69°00'W	
Hermit Thrush	1	10-16	41°45'N, 69°00'W	
Myrtle Warbler	1	10-16	40°46'N, 69°07'W	
Palm Warbler	1	10-16	40°44'N, 69°13'W	
Brown-headed Cowbird	1	10-16	40°45'N, 69°30'W	
Sharp-shinned Hawk	1	10-17	41°01'N, 70°35'W	
Sharp-shinned Hawk	2	10-17	40°47'N, 70°13'W	Flying NW
Purple Finch	1	10-18	41°15'N, 68°30'W	
Dark-eyed Junco	2	10-18	41°15'N, 68°30'W	One banded.
Song Sparrow	1	10-18	41°15'N, 68°30'W	
Parula Warbler	1	10-18	41°15'N, 68°30'W	Dead on ship.
Brown Creeper	1	10-18	41°15'N, 68°30'W	Dead on ship.

TABLE 5 (continued)

Species	Number	Date	Location	Remarks
Prairie Warbler	1	10-18	41°44'N, 68°30'W	
Short-eared Owl	1	10-19	42°27'N, 68°30'W	
Brown-headed Cowbird	1	10-19	42°27'N, 68°30'W	
Meadowlark	1	10-19	42°15'N, 68°30'W	Banded.
Bay-breasted Warbler	1	10-19	42°12'N, 68°06'W	
Myrtle Warbler	1	10-20	40°30'N, 67°54'W	
Sharp-shinned Hawk	1	10-20	40°40'N, 67°30'W	
Sanderling (poss.)	1	10-20	40°40'N, 67°30'W	Flying high.
Myrtle Warbler	1	10-21	42°15'N, 67°16'W	
Palm Warbler	2	10-21	42°15'N, 67°16'W	
Golden-crowned Kinglet	1	10-21	42°15'N, 67°06'W	
Dark-eyed Junco	2	10-21	41°44'N, 67°00'W	
White-throated Sparrow	1	10-21	41°44'N, 67°00'W	
Song Sparrow	1	10-21	41°44'N, 67°00'W	
Greater Yellowlegs	1	10-22	41°40'N, 66°30'W	Flew past ship, called
Mourning Dove	1	10-22	41°42'N, 66°30'W	
Song Sparrow	1	10-24	41°37'N, 69°10'W	
Dark-eyed Junco	1	10-24	41°37'N, 69°10'W	
Goldfinch	1	10-24	41°37'N, 69°10'W	
Song Sparrow	1	10-25	41°00'N, 69°16'W	
Dark-eyed Junco	1	10-25	41°00'N, 69°16'W	
Brown-headed Cowbird	2	10-25	40°52'N, 69°30'W	
Northern Shrike	1	10-25	40°53'N, 69°37'W	

TABLE 5 (continued)

Species	Number	Date	Location	Remarks
Common Yellowthroat	1	10-25	40°53'N, 69°37'W	Banded, later killed by Shrike.
White-rumped Sandpiper	1	10-25	40°49'N, 69°35'W	Flew around ship.
Woodcock	1	10-28	41°40'N, 69°00'W	Flew around ship.
Dark-eyed Junco	2	10-28	41°40'N, 69°00'W	
Meadowlark	1	10-28	41°35'N, 69°00'W	Banded.
Palm Warbler	2	10-28	41°30'N, 69°30'W	
Song Sparrow	1	10-28	41°30'N, 69°30'W	
Starling	1	10-29	40°45'N, 69°11'W	
Myrtle Warbler	2	10-29	40°45'N, 69°11'W	
Meadowlark	1	10-29	40°45'N, 69°11'W	Banded 28 Oct.
House Sparrow	1	10-30	41°40'N, 69°39'W	
Common Grackle	1	10-30	41°59'N, 69°50'W	
Red-winged Blackbird	1	10-30	41°38'N, 69°24'W	Male

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TABLE 6. Summary of Transect or Station Census Data.

p R/V WIECZNO

Observers

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Transect ☒ Station ☐ No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Date (GMT) <u>Oct. 1978</u>	18							✓		19					
Region*	G.B.	G.B.	G.B.	G.B.	G.B.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.	G.M.
Latitude (to nearest min.)	41-20	41-25	41-30	41-35	41-40	41-45	41-45	41-45	41-45	42-15	42-06	42-00	42-06	42-11	42-15
Longitude (to nearest min.)	68-30	68-30	68-30	68-30	68-30	68-30	68-40	68-47	69-00	68-30	68-30	68-30	68-21	68-10	68-02
Water depth (meters)	68	80	88	93	145	197	182	168	155	170	177	179	183	183	201
Total fixed-area (F.A.) birds	4	2	8	2	17	19	5	44	16	18	17	12	9	13	0
Area Sampled (km ²)	0.43														
Density (F.A. birds/km ²)	4.30	2.15	8.60	2.15	18.26	20.44	5.38	47.31	17.20	19.35	18.28	12.90	9.68	13.98	0
Species	Number Observed														
Northern Fulmar F.A.	2					2		2			0	2	1		
Tot.	2					3		2			2	2	1		
Greater Shearwater F.A.	2	2	6	2	12	7	5	35	5	15	11	10	2	4	0
Tot.	12	14	16	3	47	34	20	99	17	92	131	33	29	14	2
Gannet F.A.							0	1			0		1		0
Tot.							1	1			1		1		1
Great Bl.-bk. Gull F.A.		0	2		1	1	0	2	2				5	5	
Tot.		3	6		5	12	1	4	11				6	11	
Herring Gull F.A.	0		0		4	9	0	4	9	2	6	0		2	0
Tot.	1		9		16	28	10	21	19	13	36	7		2	1
Unid. Gull F.A.	0														
Tot.	100														
Black-legged Kittiwake F.A.														2	
Tot.														2	
Great Skua F.A.										1					
Tot.										1					

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TABLE 6. Summary of Transect or Station Census Data.

R/V. WIECZNO

Observers A. W. Nickerson

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TABLE 6. Summary of Transect or Station Census Data.

R/V. WIECZNO

Observers A.W. Nickerson

Transect ☐ Station ☐ No.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Date (GMT) Oct. 1978	22	→	23	—											→
Region*	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.	G.B.
Latitude (to nearest min.)	42-00	42-05	41-35	41-30	41-30	41-36	41-38	41-40	41-44	41-46	41-48	41-53	41-57	42-00	42-02
Longitude (to nearest min.)	66-30	66-30	65-59	65-59	66-00	66-13	66-20	66-27	66-38	66-44	66-51	67-00	67-12	67-18	67-20
Water depth (meters)	82	82			267	95	86	79	62	60	62	62	38	48	42
Total fixed-area (F.A.) birds	8	10	43	23	11	17	12	1	2	0	0	0	0	1	1
Area Sampled (km ²)	0.93														→
Density (F.A. birds/km ²)	8.60	10.75	46.24	24.73	11.83	18.28	12.90	1.08	2.15	0	0	0	0	1.08	1.08
Species	Number Observed														
Northern Fulmar F.A.	2	0	5	1		2	2		0		0	0		0	
Tot.	2	2	13	6		10	9		1		1	1		1	
Greater Shearwater F.A.	6	10	38	20	5	15	10	1	2	0	0		0	1	
Tot.	12	35	73	60	16	40	30	6	11	1	1		2	2	
Linnet F.A.															1
Tot.															1
Red Phalarope F.A.					6										
Tot.					6										
Great Bl.-bk. Gull F.A.			0	2							0				
Tot.			2	5							1				
Herring Gull F.A.		0	0	0			0		0	0	0		0	0	0
Tot.		3	14	4			2		2	14	13		2	6	1

TABLE 6. Summary of Transect or Station Census Data.

R/V WIECZNO

Observers

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Transect ☒ Station ☐ No.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Date (GMT) Oct. 1978	23				24			25							
Region*	G.B.	G.B.	G.B.	G.B.	G.M.	G.M.	G.M.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.C.	S.N.E.	S.N.E.	S.N.E.
Latitude (to nearest min.)	42-03	42-04	42-02	41-59	41-37	41-38	41-42	41-00	40-54	40-54	40-52	40-55	40-51	40-49	40-47
Longitude (to nearest min.)	67-23	67-28	67-32	67-36	69-10	69-14	69-21	69-16	69-16	69-21	69-30	69-39	69-36	69-35	69-29
Water depth (meters)	49	46	37	48	168	182	176	90	55	29	20	40	27	26	37
Total fixed-area (F.A.) birds	46	0	1	2	5	4	12	1	18	2	0	0	1	1	0
Area Sampled (km ²)	0.93				0.65			0.93							
Density (F.A. birds/km ²)	49.46	0	1.08	2.15	7.69	6.15	18.46	1.08	19.35	2.15	0	0	1.08	1.08	0
Species	Number Observed														
Common Loon F.A.								0							
Tot.								4							
Northern Fulmar F.A.	0	0		1	0				1						0
Tot.	5	3		2	1				1						1
Greater Shearwater F.A.	45	0	1	0	5	2	10	0	4	0		0	0		0
Tot.	145	100	8	2	20	12	42	9	19	4		1	1		7
Gannet F.A.						2	2		1	0					
Tot.						2	3		10	1					
Red Phalarope F.A.															
Tot.															
Great Bl.-bk. Gull F.A.	0			1				0							
Tot.	20			1				1							
Herring Gull F.A.	0	47	0	0			0	0			0				0
Tot.	60	47	1	1			8	4			1				9
Black-legged Kittiwake F.A.	1						0	1	12	2		0	1	1	0
Tot.	1						2	8	34	8		1	4	3	4

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Black-legged Kittiwake

TABLE 6. Summary of Transect or Station Census Data.

R/V WIECZNO

Observers

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Transect ☒ Station ☐ No.	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Date (GMT) Oct 1978	29				→ 30							→ 31			
Region*	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.C.	S.N.E.	S.N.E.	S.N.E.	S.N.E.	S.N.E.
Latitude (to nearest min.)	40-45	40-50	40-55	41-00	41-38	41-39	41-40	41-46	41-45	41-59	41-00	40-55	40-50	40-45	40-43
Longitude (to nearest min.)	69-00	69-00	69-00	69-00	69-24	69-30	69-39	69-43	69-49	69-50	69-15	69-15	69-15	69-15	69-19
Water depth (meters)	70	79	90	102	137	110	82	110	55	66	59	55	60	55	55
Total fixed-area (F.A.) birds	44	0	53	0	19	24	6	33	23	5	3	2	2	2	42
Area Sampled (km ²)	0.93														
Density (F.A. birds/km ²)	47.31	0	55.91	0	20.43	25.80	6.45	35.48	23.66	5.38	3.23	2.15	2.15	2.15	45.16
Species	Number Observed														
Northern Fulmar F.A.						0	0	0							2
Tot.						1	1	1							2
Greater Shearwater F.A.	44	0	35	0	15	20	5	12	15	4	1	1	2	2	5
Tot.	59	750	110	1875	50	60	22	46	50	14	8	9	12	17	25
Manx Shearwater F.A.		0													
Tot.		1													
Gannet F.A.		0	0	0	1	1	0	2	0		0	0	0	0	35
Tot.		30	5	75	1	1	4	8	2		2	3	8	6	39
Red Phalarope F.A.		0													
Tot.		125													
Pomarine Jaeger F.A.		0			1							1			
Tot.		1			1							1			
Great Black-backed Gull		0	1	0	1		0		1	1					
Tot.		70	6	175	1		1		1	1					
Herring Gull F.A.	0	0	17	0	1	3	0	19	7	0			0	0	0
Tot.	4	120	67	300	8	18	10	30	19	3			10	10	2
Black-legged Kittiwake		0	0	0							2	0	0		0
Tot.		30	6	75							2	55	40		4
Unid. Gull F.A.							0								
Tot.							150								
Unid. Jaeger F.A.							1								
Tot.							1								

Observers

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Transect ☒ Station ☐ No.	151	152	153
Date(GMT) Oct, 1978	31	31	31
Region*	S.N.E.	S.N.E.	S.N.E.
Latitude(to nearest min.)	40-36	40-32	40-44
Longitude(to nearest min.)	69-22	69-27	69-31
Water depth(meters)	51	58	65
Total fixed-area(F.A.)birds	6	2	3
Area Sampled(km ²)	0.93		
Density (F.A. birds/km ²)	6.45	2.15	3.22
Species	Number Observed		
Greater Shearwater F.A.	5	1	0
Tot.	20	48	3
Gannet F.A.			1
Tot.			1
Herring Gull F.A.			1
Tot.			1
Black-legged Kittiwake	1	1	1
Tot.	3	1	1

FIGURE 1. Cruise track during daylight hours, 13 October - 1 November 1978.

FIGURE 2a. Distribution map of
Northern Fulmar,
13 October -
1 November 1978.

FIGURE 2b. Distribution map of
Greater Shearwater,
13 October -
1 November 1978.

FIGURE 2c. Distribution map of
Gannet, 13 October -
1 November 1978.

FIGURE 2d. Distribution map of
Great Black-backed
Gull, 13 October -
1 November 1978.

FIGURE 2e. Distribution map of
Herring Gull,
13 October -
1 November 1978.

FIGURE 2f. Distribution map of
Black-legged Kittiwake,
13 October -
1 November 1978.

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 26 October to 17 November 1978

Cruise No. 7825

INTRODUCTION

The following cruise report is a summary of bird and mammal observations made by Ann F. Mason, Staff Biologist, Manomet Bird Observatory, aboard the R/V ANTON DOHRN from 26 October - 17 November 1978. The objective of the cruise was to participate in the larval Atlantic herring patch study in the waters of Georges Bank and the Gulf of Maine. The observer was aboard on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the cooperation of Federal Republic of Germany for permitting observations aboard the R/V ANTON DOHRN. The observer thanks the master, Captain Johannes Spohn, officers, and crew of the R/V ANTON DOHRN for their assistance and cooperation aboard ship. Special thanks are extended to Dr. Gunnar Joakimsson, chief scientist, and Norbert Klages, for background information regarding possible food organisms collected in the nets. Finally, acknowledgement is extended to H. C. Boyar, Vessel Coordinator, and the National Marine Fisheries Service for arranging passage aboard ship, and Department of Energy for support (DOE Contract No. EE-78-S-02-4706).

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled in 10 minutes cruising time. A transect count provides information on relative density, i.e. birds per km^2 . A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four knots or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1 - 6 summarize the relative density and relative abundance bird data, and list sightings of rare or infrequently observed bird species, non-marine bird species, and marine mammals. Figure 1 graphically illustrates the cruise track during daylight hours. Figures 2a-f indicate the distribution of six bird species using the greatest total count of each species per 10-minute square latitude/longitude block surveyed.

Fulmars were found primarily in the Northeast Peak of Georges Bank and in lesser concentrations along the Northern Edge. They were sparse in the

more southern or coastal regions.

Concentrations of up to 600 Greater Shearwaters were seen along the Northern Edge and at the Northeast Peak. An especially large concentration of about 2,400 birds was found near Nantucket Shoals at $40^{\circ}45'N, 69^{\circ}15'W$. In other areas of the bank, in coastal waters, and in the deep waters of the continental shelf, they were seen consistently but in low numbers. Four Manx Shearwaters were sighted in the vicinity of $40^{\circ}43'N, 69^{\circ}13'W$.

Gannets were present in most areas within 100 miles of Cape Cod and decreased in numbers out to 200 miles, beyond which none were seen. Concentrations of up to 100 birds were observed diving for fish in the vicinity of feeding Finback whales at $41^{\circ}35'N, 69^{\circ}45'W$ on 3 November. At $42^{\circ}02'N, 69^{\circ}43'W$, Gannets were sighted every few minutes for the 2-1/2 days that the ship spent there. Another group of 25 Gannets were observed diving for food at $41^{\circ}57'N, 69^{\circ}53'W$ on 10 November. A third group of Gannets were also observed with a group of 20 gulls circling over and diving at jumping fish at $41^{\circ}26'N, 67^{\circ}00'W$ on 14 November. These numbers do not appear in tables and maps based on data from the ten minute counts, because the ship was never moving over 4 knots due to the nature of its research. Subadults seemed to be the dominant age class. Next in order of abundance were adults and then first year birds.

Eighteen jaegers were seen during the cruise, five of which were definitely identified as immature Pomarines and not of the dark phase. They were often chasing kittiwakes or herring gulls for food. One unidentified skua was seen at $42^{\circ}13'N, 68^{\circ}48'W$.

Great Black-backed Gulls were seen in all areas except off the continental shelf and along the southern edge of Georges Bank. They were always outnumbered by Herring Gulls. Greatest concentrations were in the vicinity of fish-

ing boats (especially at the Northeast Peak) or coastal areas. Herring Gulls were present in all areas with a large concentration of about 2500 milling around the fishing boats at the Northeast Peak. Age class distribution of Herring Gulls varied with the area. Immature Great Black-backs, however, consistently outnumbered adults in all areas. Almost every night during the cruise, about 60 gulls (both Herring and Black-backed) and about 15 Greater Shearwaters flew alongside the ship and were observed feeding on the Atlantic Saury (*Scomberesox saurus*). The lights over the work deck were allowing them to see the fish.

Black-legged Kittiwakes were present in most areas. On 14 November they were seen several times with fish in their mouths at approximately $41^{\circ}45' - 42^{\circ}02'N$, $67^{\circ}00'W$ and were often being chased by jaegers or Great Black-backed Gulls. The largest concentration of about 40 Black-legged Kittiwakes was at $41^{\circ}35'N$, $60^{\circ}45'W$ on 3 November. At $42^{\circ}02'N$, $69^{\circ}41'W$ on 8 November, concentrations of up to 15 were seen and at one time were the most abundant species present. These birds (as with the Gannets mentioned earlier) are not represented in the 10-minute counts because the ship was stationary or moving at less than four knots while in the area. Adults and immatures seemed evenly distributed.

Ring-billed Gulls were seen occasionally amidst flocks of Herring and Great Black-backs, particularly within 40 miles of shore.

An oil slick, about 100 feet long, and 25 feet wide, was sighted at $41^{\circ}44'N$, $67^{\circ}04'W$ on 30 October.

TABLE 1.

Seabird Density in Selected Regions in Fixed-Area Transects

26 October - 16 November 1978

<u>Region</u>	<u>Number of Transects</u>	<u>Total Km² Surveyed (Tkm²)</u>	<u>Total Birds (TB)</u>	<u>Mean Density₂ (TB/Tkm²)</u>	<u>Density Range (TB/Km²/Transect)</u>
South Coastal	7	5.12	38	7.42	0 - 30.36
Southern New England	59	43.75	1030	23.52	0 - 643.37
Georges Bank	115	94.97	3020	31.80	0 - 755.42
Gulf of Maine	21	16.57	898	54.19	0 - 821.69
Off Continental Shelf	14	12.62	130	10.30	0 - 30.12

TABLE 2.

Number of Birds Per Species in Selected Regions

Using Fixed-Area Counts

26 October - 16 November 1978

<u>Species</u>	<u>South Coastal</u>	<u>Southern New England</u>	<u>Georges Bank</u>	<u>Gulf of Maine</u>	<u>Off Conti- nental Shelf</u>
Northern Fulmar	0	5	134	1	11
Greater Shearwater	4	649	1100	682	89
Manx Shearwater	0	2	0	0	0
Wilson's Storm-Petrel	0	0	1	0	0
Gannet	9	20	25	18	0
Pomarine Jaeger	0	1	0	0	0
Jaeger, sp.	0	2	3	0	1
Great Black-backed Gull	5	46	175	32	3
Herring Gull	12	268	914	154	7
Black-legged Kittiwake	7	35	56	4	17
Ring-billed Gull	1	1	3	7	0
Unid. large gull	0	1	602	0	0
Phalarope sp.	0	0	7	0	2

TABLE 3.

List of Rare or Infrequent Marine Bird Sightings

26 October - 16 November 1978

Species	Number	Date	Location	Remarks
Unid. jaeger	1	10-26	41°08'N, 70°50'W	
Unid. jaeger	1	10-26	41°05'N, 70°42'W	
Common Loon	2	10-30	41°50'N, 67°50'W	Traveling E, 60 feet above water.
Unid. jaeger	1	10-30	41°53'N, 67°02'W	Traveling SW
Unid. skua	1	10-31	42°13'N, 66°48'W	Traveling NE, then dove with gulls at fish or garbage astern.
Double-crested Cormorants	1	11-1	41°53'N, 66°33'W	Circled ship and headed W.
Great Cormorant	1	11-2	41°15'N, 69°00'W	Flew from N, landed on water. Returned 1/2 hour later, circled ship, landed on water, and dove.
White-winged Scoter	1	11-2	41°20'N, 68°58'W	Traveling N.
Unid. jaeger	1	11-3	41°35'N, 69°35'W	Traveling SW low over water.
Unid. jaeger	1	11-3	41°31'N, 69°45'W	
Unid. jaeger	1	11-4	40°58'N, 69°19'W	Chasing kittiwake with food.
Manx Shearwater	2	11-4	40°43'N, 69°13'W	
Manx Shearwater	2	11-4	40°44'N, 69°15'W	Sitting, then flying.
Double-crested Cormorants	7	11-5	41°00'N, 71°20'W	Flying 15 feet above water.
Unid. jaeger	1	11-5	40°35'N, 71°01'W	
Unid. phalaropes	70	11-5	40°30'N, 71°00'W	Flying W, 5-30 feet above water.

TABLE 3 (continued)

Species	Number	Date	Location	Remarks
Unid. jaeger	1	11-6	40°12'N, 70°00'W	Chasing gulls feeding on ship's garbage.
Unid. jaeger	1	11-6	40°12'N, 69°30'W	
Pomarine Jaeger	1	11-6	40°12'N, 69°24'W	AHY. Chasing Herring Gull.
Unid. loon	3	11-9	41°59'N, 69°42.5'W	Traveling S, 300' above water.
Unid. loon	4	11-10	41°55'N, 69°52'W	Traveling S, 100' above water.
Peep	1	11-11	41°57'N, 69°53'W	Flying N.
Unid. jaeger	1	11-12	40°13'N, 68°23'W	Flying N, low over water, chasing a gull.
Unid. jaeger	1	11-12	40°14'N, 68°20'W	Traveling N, low over water.
Unid. jaeger	1	11-13	42°04'N, 67°29'W	Traveling N, 10' above water.
Pomarine Jaeger	1	11-13	41°41'N, 67°29'W	AHY. Chasing Black-legged Kittiwake.
Unid. jaeger	1	11-13	41°37'N, 67°28'W	AHY
Unid. phalaropes	7	11-14	40°56'N, 67°00'W	
Great Blue Heron	1	11-14	41°37'N, 67°00'W	Immature. Traveling S, 60' above water.
Pomarine Jaeger	1	11-14	41°45'N, 67°00'W	AHY. Chasing Black-legged Kittiwake carrying fish in mouth around ship several times.
Pomarine Jaeger	2	11-14	42°01'N, 67°00'W	AHY. Chasing Black-legged Kittiwake.
Wilson's Storm-Petrel	1	11-15	40°46'N, 66°25'W	Flying SE, low over water.

TABLE 3 (continued)

Species	Number	Date	Locatio	Remarks
Unid. phalaropes	2	11-15	40°49'N, 66°19'W	Flying N, low over water.
Wilson's Storm-Petrel	2	11-15	40°56'N, 66°04'W	Flying N, low over water.
Great Blue Heron	1	11-16	40°53'N, 68°32'W	Traveling NW, almost landed on ship.
Unid. storm-petrel	1	11-16	40°41'N, 69°19'W	
Double-crested Cormorant	1	11-17	40°59'N, 71°01'W	

TABLE 4.

List of Marine Mammal Sightings

26 October - 16 November 1978

Species.	Number	Date	Location	Remarks
Saddleback Dolphin	6	10-27	41°38'N, 66°35'W	Traveling SE.
Unid. dolphin	10+	10-27	41°45'N, 66°10'W	Porpoising.
Finback (prob.)	3+	10-28	42°11'N, 66°31'W	Spouting.
Finback (prob.)	1	10-28	42°10'N, 66°30'W	Spouting, sounded, surfaced again.
Finback (prob.)	3	10-28	42°10'N, 66°30'W	Spouting, heading E. Sounded. Five Greater Shearwaters above. Surfaced again 5 times at 3-8 minute intervals.
Finback	1	10-28	42°10'N, 66°30'W	Spouting and surfacing very close to ship. Sighted 2 more times at 5 minute intervals. Two Greater Shearwaters above.
Finback (prob.)	1	10-28	42°10'N, 66°39'W	Spouted 4 times, sounded, surfaced again 5 minutes later.
Finback (prob.)	1	10-28	42°10'N, 66°40'W	Spouting, sounded.
Finback (prob.)	1	10-31	42°12'N, 66°45'W	Spouting.
Finback (prob.)	1	10-31	42°13'N, 66°46.5'W	Spouting, gulls and shearwaters above. Surfaced again 15 minutes later.
Unid. porqual	1	11-1	42°04'N, 66°34'W	Spouting.
Unid. dolphin	1	11-1	41°01'N, 66°36'W	Porpoising.
Finback (prob.)	2	11-2	41°20'N, 68°48'W	Spouting.

TABLE 4 (continued)

Species	Number	Date	Location	Remarks
Finback (prob.)	3	11-2	41°19'N, 68°19'W	Spouting, then sounded, 15 GRSH above.
Finback (prob.)	2	11-2	41°17'N, 68°54'W	Spouting
Finback (prob.)	4	11-2	41°15'N, 69°00'W	Spouting, heading NE, surfaced again 3 other times at 5-10 minute intervals.
Finback (prob.)	2	11-2	41°15'N, 69°00'W	Spouting, heading NE, sounded.
Finback (prob.)	2	11-2	41°16'N, 68°59'W	Spouting, surfaced again 15 minutes later.
Finback (prob.)	7	11-3	41°35'N, 69°40'W	Spouting, feeding. Fish jumping & gannets diving in the area.
Finback (prob.)	1	11-3	41°35'N, 69°45'W	Spouting.
Finback (prob.)	1	11-3	41°30'N, 69°37'W	Spouting, heading WSW.
Finback (prob.)	2	11-3	41°29'N, 69°10'W	Surfacing, sounded.
Finback (prob.)	3	11-3	41°25'N, 69°07'W	Surfacing.
Finback (prob.)	4	11-3	41°22'N, 69°05'W	Spouting.
Finback	10+	11-3	41°20'N, 69°05'W	Spouting, surfacing, feeding. Fish jumping in area.
Unid. rorqual	1	11-4	40°42'N, 69°15'W	Spouting.
Saddleback dolphins	9-10	11-5	40°29'N, 71°04'W	Porpoising, heading NE
Saddleback dolphins	5+	11-5	40°20'N, 70°50'W	Playing alongside ship, feeding, riding bow.
Unid. dolphins	1	11-6	40°15'N, 70°00'W	Porpoising.
Saddleback dolphins	1	11-6	40°00'N, 69°00'W	Porpoising, heading SE

TABLE 4 (continued)

Species	Number	Date	Location	Remarks
White sided dolphins	3	11-7	42°05'N, 69°43'W	Porpoising, heading S. Gulls above.
White-sided dolphins	25	11-7	42°05'N, 69°43'W	Leaping, porpoising alongside ship. Im- matures present. Bird interaction.
Unid. rorqual	1	11-7	42°05'N, 69°43'W	Spouting.
Finback (prob.)	2	11-8	42°01'N, 69°44'W	Heading N, sounded.
Finback (prob.)	2-3	11-8	42°01'N, 69°44'W	Spouting, sounded.
Finback (prob.)	1	11-8	42°01'N, 69°44'W	Spouting, heading SE, sounded.
Finback (prob.)	2	11-8	42°01'N, 69°42'W	Spouting, heading SW; Greater Shearwaters above.
Finback (prob.)	3	11-8	42°01'N, 69°42'W	Spouting.
Unid. dolphin	2	11-8	42°01'N, 69°42'W	Porpoising.
Finback (prob.)	1-2	11-8	42°01'N, 69°42'W	Spouting, sounded.
Finback (prob.)	3	11-9	41°59'N, 69°43'W	Spouting, heading W.
Finback (prob.)	1	11-9	42°00'N, 69°43'W	Spouting, sounded. Surfaced again 10 minutes later.
Finback (prob.)	1	11-9	42°00'N, 69°43'W	Spouting.
Unid. rorqual	1	11-9	42°00'N, 69°44'W	Traveling SE
Finback (prob.)	1	11-9	42°00.5'N, 69°44'W	Spouting, surfacing. Gulls overhead. Sur- faced again 10 minutes later, feeding.
Finback (prob.)	2-7	11-9	42°00'N, 69°44'W	Spouting, surfacing, milling around for about an hour.

TABLE 4 (continued)

Species	Number	Date	Location	Remarks
Finback	5+	11-9	42°00'N, 69°44'W	Feeding, moving slowly E. Greater Shearwaters and Gulls overhead.
Finback (prob.)	3	11-10	41°55'N, 69°52'W	Surfacing, heading S.
Finback (prob.)	2	11-10	41°55'N, 69°52'W	Spouting, heading W.
Finback (prob.)	1	11-10	41°55'N, 69°52'W	Spouting, heading S, sounded.
Finback (prob.)	1	11-10	41°55'N, 69°52'W	Spouting.
Humpback	2	11-10	41°57'N, 69°53'W	Spouting, sounded, heading N.
Finback (poss.)	1	11-11	41°57'N, 69°53'W	Spouting, heading SE
Saddleback dolphins	2	11-12	40°30'N, 68°00'W	Feeding, porpoising.
Saddleback dolphins	10+	11-12	40°45'N, 68°00'W	Riding bow, porpoising.
Finback (prob.)	2	11-13	41°59'N, 68°00'W	Spouting.
Finback (prob.)	1	11-13	42°09'N, 67°31'W	Spouting.
Finback	1	11-13	42°08'N, 67°30'W	Spouting, sounded.
Saddleback dolphin	5+	11-13	41°15'N, 67°30'W	Feeding, porpoising, riding bow.
Saddleback dolphin	6+	11-14	41°05'N, 67°30'W	Riding bow wave.
Saddleback dolphin	300+	11-14	41°05'N, 67°00'W	Traveling SW, adults and immatures.
Saddleback dolphin	30	11-14	41°14'N, 67°00'W	Traveling SW. Greater Shearwaters and Gulls above.
Saddleback dolphin	20	11-14	41°15'N, 67°00'W	Rode bow, leaping, then headed SW.

TABLE 4 (continued)

Species	Number	Date	Location	Remarks
Saddleback dolphin	6	11-14	41°17'N, 67°00'W	Rode bow - possible spaghetti tag seen on one.
Pilot whale	5	11-15	40°57'N, 66°02'W	Surfacing, traveling slowly NW.
Pilot whale	20-25	11-15	41°19'N, 66°01'W	Traveling south. 20 Greater Shearwater above.
Sperm whale	1	11-16	40°41.5'N, 69°18'W	Spouting, surfacing, sounded.

TABLE 5.

List of Non-Marine Bird Sightings

26 October - 16 November 1978

Species	Number	Date	Location	Remarks
American Woodcock	1	10-26	40°40'N, 70°10'W	AHY female
Unid. sparrow	1	10-27	41°45'N, 66°10'W	
Myrtle Warbler	1	10-28	42°04'N, 66°31'W	
Eastern Meadowlark	1	10-28	42°05'N, 66°31'W	
Mourning Dove	1	10-28	42°15'N, 66°40'W	
Unid. Sparrow	1	10-28	42°15'N, 66°40'W	
Myrtle Warbler	2	10-28	42°10'N, 66°39'W	Immature
Myrtle Warbler	1	10-28	41°55'N, 66°40'W	Immature
Cedar Waxwing	1	10-28	41°50'N, 66°40'W	Immature
Myrtle Warbler	1	10-29	42°12'N, 67°20'W	Immature
Blue Jay	1	10-29	42°02'N, 67°20'W	
Brown-headed Cowbird	1	10-30	41°47'N, 67°41'W	Male
Myrtle Warbler	1	10-30	41°47'N, 67°50'W	
Brown-headed Cowbird	4	10-30	41°42'N, 67°50'W	2 males, 2 females
Unid. sparrow	1	10-30	41°49'N, 67°03'W	
Red-winged Blackbird	1	10-30	41°53'N, 67°02'W	Immature male
Red-winged Blackbird	1	10-31	42°04'N, 66°44'W	Immature male
Slate-colored Junco	1	11-1	41°52'N, 66°32'W	
Red-winged Blackbird	1	11-1	41°53'N, 66°33'W	
Eastern Meadowlark	1	11-3	41°40'N, 69°32'W	
Slate-colored Junco	2	11-3	41°35'N, 69°35-45'W	
Myrtle Warbler	1	11-4	41°30'N, 69°38'W	Immature

TABLE 5 (continued)

Species	Number	Date	Location	Remarks
Brown-headed Cowbird (?)	2	11-5	40°21'N, 71°17'W	Female
Vesper Sparrow (?)	3	11-6	40°12'N, 70°00'W	
Brown-headed Cowbird	1	11-6	40°12'N, 70°00'W	
Horned Lark (?)	1	11-6	40°08'N, 69°17'W	Immature
Horned Lark	1	11-7	41°48'N, 69°34'W	Immature
Unid. Warbler	1	11-7	41°48'N, 69°34'W	
Palm Warbler	3	11-7	42°06'N, 69°43'W	Immature
Red-winged Blackbird	1	11-7	42°06'N, 69°43'W	Female
Palm Warbler	2	11-7	42°05'N, 69°43'W	Immature
Myrtle Warbler	1	11-7	42°05'N, 69°43'W	Immature
Red-winged Blackbird	1	11-7	42°05'N, 69°43'W	Female
Brown-headed Cowbird	3	11-8	42°01'N, 69°41'W	Male
Common Yellowthroat	1	11-9	42°00'N, 69°41'W	Immature male
Myrtle Warbler	1	11-9	41°58'N, 69°42'W	Immature male
Horned Lark(?)	1	11-9	42°00'N, 69°43'W	Immature
Common Yellowthroat	1	11-9	42°00'N, 69°43'W	Immature male
Evening Grosbeak	1	11-10	41°57'N, 69°53'W	
Unid. warbler	1	11-10	41°57'N, 69°53'W	
Vesper Sparrow (?)	2	11-10	41°55'N, 69°52'W	
Unid. sparrow	1	11-10	41°55'N, 69°52'W	
Brown-headed Cowbird	1	11-10	41°57'N, 69°53'W	Male
Horned Lark (?)	1	11-11	41°57'N, 69°53'W	Immature
Song Sparrow	1	11-16	40°55'N, 68°25'W	

TABLE 5 (continued)

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Unid. warbler	1	11-16	40°55'N, 68°25'W	
Myrtle Warbler	2	11-16	40°52'N, 68°38'W	
Unid. warbler	2	11-16	40°52'N, 68°38'W	
Horned Lark	1	11-16	40°51'N, 68°44'W	
Song Sparrow	1	11-16	40°51'N, 68°50'W	
White-throated Sparrow	1	11-16	40°51'N, 68°50'W	
Unid. warbler	2	11-16	40°51'N, 68°50'W	
Unid. sparrow	2	11-16	40°41'N, 69°19'W	
Brown-headed Cowbird (?)	1	11-16	40°40'N, 69°25'W	

Observers AFM

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

2 ANTON DORN

Observers AFM

Transect ☐ Station ☐ No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Date (GMT)	10/27	10/27	10/27	10/27	10/27	10/27	10/28	10/28	10/28	10/28	10/28	10/28	10/28	10/28	10/28
Region*	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB	GB
Latitude (to nearest min.)	41-48	41-53	41-58	42-01	42-02	42-04	42-10	42-15	42-10	42-10	42-00	41-55	41-53	41-45	41-45
Longitude (to nearest min.)	66-12	66-10	66-12	66-14	66-16	66-31	66-30	66-35	66-39	66-40	66-40	66-40	66-40	66-40	67-07
Water depth (meters)	88	92	88	88	90	82	210	240	190	78	75	72	70	59	60
Total fixed-area (F.A.) birds	26	20	10	9	6	35	6	17	16	50	11	3	1	4	8
Area Sampled (km ²)	.83	.93	.93	.93	.93	.74	.46	.83	.74	.74	.74	.74	.74	.74	.83
Density (F.A. birds/km ²)	31.33	21.50	10.75	9.68	6.45	47.30	13.04	20.48	21.62	1.35	14.86	4.05	1.35	5.41	9.64
Species	Number Observed														
Northern Fulmar	FA			2		3	3		2						
	TOT			2		3	4		2						
Greater Shearwater	FA	26	20	10	7	6	25	2	3	10	50	8	0	1	4
	TOT	35	120	30	20	14	58	6	3	10	101	17	31	66	25
Gannet	FA														
	TOT														
Great Black-backed Gull	FA		0				2	0	0	4	0	0	1		0
	TOT		4				4	1	2	4	502	4	1		4
Herring Gull	FA	0	0	0	0	0	4	1	14	0	0	3	2	0	0
	TOT	7	28	110	25	16	11	5	34	85	508	155	22	25	1
Black-legged Kittiwake	FA						1								
	TOT						1								
Unident. Gull Large Gulls	FA									0					
	TOT									2000					

Observers AFM

[illegible]

P Anton Dohrn Observers AFM

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

Anton Dohrn

Observers AFM

Transect ☐ Station ☐ No.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Date (GMT)	10/30	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2	11/2
Region*	EB	EB	EB	EB	EB	GM	GM	GM	GM	GM	GM	GM	GM	EB	EB
Latitude (to nearest min.)	41-49	41-32	41-28	41-25	41-20	41-17	41-15	41-17	41-19	41-25	41-27	41-25	41-23	41-22	41-25
Longitude (to nearest min.)	67-03	68-30	68-34	68-39	68-46	68-54	69-00	68-59	68-58	68-59	69-04	69-08	69-11	69-19	69-23
Water depth (meters)	60	100	97	110	95	128	146	149	153	142	131	130	126	82	43
Total fixed-area (F.A.) birds	1	1	46	15	6	9	6	10	11	7	15	20	8	4	0
Area Sampled (km ²)	.74	.83	.83	.83	.83	.83	.83	.93	.93	.93	.83	.83	.83	.83	.83
Density (F.A. birds/km ²)	1.35	1.20	55.42	18.07	7.23	10.84	7.23	10.75	11.83	7.53	18.07	24.10	9.64	4.82	0
Species	Number Observed														
Northern Fulmar	FA														
	TOT														
Greater Shearwater	FA	1	1	31	5	4	4	2	2	5	3	6	10	6	4
	TOT	3	4	81	27	10	21	22	33	43	28	8	35	9	8
Cormorant	FA											3	2	0	0
	TOT											3	2	2	1
Great Black-backed Gull	FA	0	0	0	3	0	0	3	2	4	0	9	3	0	0
	TOT	8	16	20	17	1	5	3	4	4	10	14	3	7	5
Herring Gull	FA	0	0	15	4	0	5	1	4	1	4	0	4	0	0
	TOT	5	17	108	53	3	15	1	7	16	12	10	4	1	7
Black-legged Kittiwake	FA			2		0			1						
	TOT			2		1			2						
Tukey, sp	FA														
	TOT														
Ring-billed Gull	FA			1											
	TOT			1											
Unid. Larvic Gull	FA				2							0			
	TOT				2							5			

Observers AFM

Transect ☐ Station ☐ No.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Date (GMT)	11/2	11/2	11/3	11/3	11/3	11/3	11/3	11/3	11/3	11/3	11/3	11/3	11/3	11/3	11/3
Region*	GB	GB	GB	GB	GB	GB	SC	SC	SC	SC	GB	GB	GB	GB	SM
Latitude (to nearest min.)	41-28	41-40	41-41	41-38	41-35	41-35	41-33	41-32	41-31	41-30	41-30	41-30	41-30	41-30	41-30
Longitude (to nearest min.)	69-29	69-35	69-30	69-32	69-35	69-45	69-47	69-48	69-45	69-43	69-38	69-32	69-28	69-13	69-11
Water depth (meters)	35	89	114	82	72	36	32	28	28	28	34	40	46	97	155
Total fixed-area (F.A.) birds	1	5	7	15	7	22	17	1	4	9	5	8	35	23	34
Area Sampled (km ²)	.83	.65	.37	.65	.65	.65	.56	.56	.65	.56	.56	.56	.56	.56	.37
Density (F.A. birds/km ²)	1.20	7.69	18.92	23.08	10.77	33.85	30.36	1.79	6.15	16.07	8.93	14.29	62.5	41.07	91.89
Species	Number Observed														
Northern Fulmar	FA														
	TOT														
Greater Shearwater	FA	1	2	3	9	0	9		1		2	2	4	25	15
	TOT	1	2	3	18	3	14		1		2	2	29	26	15
Gannet	FA		0			3	1	5			2	0	0		4
	TOT		4			5	4	8			6	1	9		4
Great Black-backed Gull	FA		2	3	6	0		2	0	1	1	1	2	5	1
	TOT		2	3	7	1		2	3	2	1	1	7	5	1
Herring Gull	FA	0	1	1		0		4		3	2	1	2	3	1
	TOT	2	1	1		2		5		7	5	4	2	6	2
Black-legged Kittiwake	FA					12	6		0	1	1		2	1	
	TOT					32	7		5	1	1		2	1	
Taupo Petrel	FA				1				0						
	TOT				1				1						
Unidentified Large Gull	FA		0		0										
	TOT		1		1										
Ring-billed Gull	FA									1				1	
	TOT									1				1	

TABLE 6. Summary of Transect or Station Census Data.

R/V ANTON DOHRN

Observers AFM

Transect ☐ Station ☐ No.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Date (GMT)	11/3	11/3	11/3	11/4	11/4	11/4	11/4	11/4	11/4	11/4	11/4	11/4	11/4	11/4	11/4
Region*	GM	GM	GM	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE	SNE
Latitude (to nearest min.)	41-29	41-24	41-22	40-58	40-54	40-50	40-50	40-51	40-51	40-46	40-43	40-40	40-38	40-36	40-40
Longitude (to nearest min.)	69-10	69-07	69-05	69-19	69-19	69-06	69-04	69-00	69-00	69-08	69-13	69-18	69-22	69-29	69-29
Water depth (meters)	138	160	160	60	52	64	70	89	82	54	50	46	53	60	54
Total fixed-area (F.A.) birds	11	11	12	11	13	7	5	25	49	5	536	13	5	18	4
Area Sampled (km ²)	.37	.37	.65	.56	.56	.46	.46	.83	.83	.83	.83	.83	.83	.93	.93
Density (F.A. birds/km ²)	29.73	29.73	18.46	19.64	23.21	15.22	10.87	30.12	59.04	6.02	645.78	15.66	6.02	19.35	4.82
Species	Number Observed														
Northem Fulmar	FA										0				
	TOT										1				
Greater Shearwater	FA		5	5		2		5	12	20	5	530	1	3	15
	TOT		21	6		2		7	14	60	6	2395	3	3	15
Gannet	FA	5	2	2	1					0	0	1	2	0	1
	TOT	5	4	2	1					1	2	1	2	1	2
Great Black-backed Gull	FA		3	2		2	2	0	2	18				0	
	TOT		3	2		2	3	1	2	18				1	
Herring Gull	FA	4	1	3	3	3	3		3	7	0	3	10	2	2
	TOT	4	1	4	3	5	6		5	7	2	3	10	2	4
Black-legged Kittiwake	FA	2			7	6	1	0	8	4					
	TOT	2			7	15	2	5	8	4					
Jaeger Sp.	FA														
	TOT														
Pomarine Jaeger	FA				0										
	TOT				1										
Unid. Large Gull	FA				0			0							
	TOT				2			1							
Manx Shearwater	FA														
	TOT										2				
											2				

Observers AFM

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

R/V. ANTON DOHRN

Observers

AFM

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

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Observers AFM

[illegible]

Observers AFM

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

RV Anton Dohrn

Observers AFM

Transect ☐ Station ☒ No.	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Date (GMT)	11/13	11/13	11/13	11/13	11/13	11/13	11/14	11/14	11/14	11/14	11/14	11/14	11/14	11/14	11/14
Region*	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB
Latitude (to nearest min.)	42-10	42-05	41-57	41-51	41-41	41-37	40-56	41-04	41-09	41-19	41-22	41-30	41-37	41-42	41-51
Longitude (to nearest min.)	67-30	67-29	67-32	67-31	67-29	67-27	67-00	67-00	67-00	67-00	67-00	67-00	67-00	66-59	66-50
Water depth (meters)	202	65	28	40	46	102	82	74	71	66	65	65	65	68	69
Total fixed-area (F.A.) birds	2	482	1	0	0	2	14	53	17	14	13	8	1	10	4
Area Sampled (km ²)	.74	.93	.93	.83	.74	.74	.93	.93	.93	.93	1.02	1.02	1.02	.93	.93
Density (F.A. birds/km ²)	2.70	518.28	1.08	0	0	2.70	15.05	56.99	18.28	15.05	12.74	7.84	0.98	10.75	4.35
Species	Number Observed														
Northern Fulmar	FA	1	26					15	3	5	6			2	2
	TOT	1	26					15	3	5	6			3	2
Greater Scaupwater	FA	1	40				6	22	13	7	6	4	0	2	1
	TOT	1	40				6	25	13	11	11	8	2	2	4
Gannet	FA		1							1	1		0	0	
	TOT		1							1	1		2	4	
Great Black-backed Gull	FA		15											3	
	TOT		15											3	
Herring Gull	FA		400	0	0	0	1	1	16	1			1		0
	TOT		500	1	4	1	2	5	16	5			6		1
Black-legged Kittiwake	FA			1		0						4		3	1
	TOT			1		1						4		6	2
Jacquer, sp.	FA					1									
	TOT					1									
Pomarine Jaeger	FA				0										
	TOT				1										
White-bellied Gull	FA							0							
	TOT							4							
Ring-billed Gull	FA									1					
	TOT									1					
L. Phalarope	FA						7								
	TOT						7								

TABLE 6. Summary of Transect or Station Census Data.

RV Anton Dobin

Observers AEM

[illegible]

RV. Arthur Dolan

Observers

AFM

[illegible]

TABLE 6. Summary of Transect or Station Census Data.

RV. Aisha Dobson

Observers

AFM

Transect ☐ Station ☐ No.	211	212	213	214	215	-16
Date(GMT)	11/16	11/16	11/16	11/16	11/16	11/16
Region*	SNE	SNE	SNE	SNE	SNE	SNE
Latitude(to nearest min.)	40-40	40-39	40-39	40-39	40-39	40-40
Longitude(to nearest min.)	69-24	69-30	69-34	69-39	69-42	69-47
Water depth(meters)	55	52	52	57	57	46
Total fixed-area(F.A)birds	4	5	2	8	1	9
Area Sampled(km ²)	.56	.56	.46	.46	.46	.46
Density (F.A. birds/km ²)	7.14	8.93	11304	17.31	2.17	19.57
Species	Number Observed					
Northern Fulmar FA	1					
TOT	1					
Greater Shearwater FA				0		
TOT				1		
Gannet FA	2	0			1	
TOT	2	1			1	
Great Black-backed Gull FA						
TOT						
Herring Gull FA	1	5	2	7	0	8
TOT	1	10	7	8	4	33
Black-legged Kittiwake FA			0	1	1	
TOT			2	1	1	

Figure 1. Approximate cruise track during daylight hours, 26 October - 17 November 1978.

Figure 2a. Distribution map of
Northern Fulmar,
26 October -
17 November 1978.

Figure 2b. Distribution map of
Greater Shearwater,
26 October -
17 November 1978.

Figure 2c. Distribution map of
Gannet, 26 October -
17 November 1978.

Figure 2d. Distribution map of
Great Black-backed
Gull, 26 October -
17 November 1978.

Figure 2e. Distribution map of
Herring Gull,
26 October -
17 November 1978.

Figure 2f. Distribution map of
Black-legged Kittiwake, 26 October -
17 November 1978.

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 30 November - 14 December 1978

Cruise No. 7826

INTRODUCTION

The following report is a summary of bird and mammal observations made by Eleanor G. Perkins, Volunteer Observer, aboard the National Marine Fisheries Service R/V ALBATROSS IV from 30 November - 14 December 1978. The objective of the cruise was to determine larval fish distribution and abundance in the Southern New England, Georges Bank, and Gulf of Maine regions. The observer was aboard on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the cooperation of the National Marine Fisheries Service for permitting an observer to join the cruise and thanks H. C. Boyar, Vessel Coordinator (NMFS), for arranging passage. The observer thanks the Master, Captain Walter E. Beatteay, officers and crew of the R/V ALBATROSS IV, and Chief Scientist, George Bolz, for their assistance aboard ship. Manomet Bird Observatory seabird studies are funded by the Department of Energy (DOE Contract No. EE-78-S-02-4706).

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data

were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled in 10 minutes cruising time. A transect count provides information on relative density, i.e. birds per km². A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1 - 5 summarize the relative density and abundance bird data, and list sightings of rare or infrequently observed marine bird species and marine mammals. A single corvid (Raven or Crow) observed at 42°15'N, 67°51'W on 12 December was the only non-marine bird sighted. Figure 1 indicates the approximate cruise track during daylight hours. Figure 2(a-f) graphically illustrates the distribution of six bird species using the greatest 10-minute total count of each species per 10-minute square latitude/longitude block surveyed.

No large concentrations of any species were found. Fulmars were recorded only on Georges Bank and the Gulf of Maine. An unsuspected surprise was a rela-

tive abundance of Greater Shearwaters on the Northeast Peak of Georges Bank, and scattered records of this species in Wilkinson Basin and Great South Channel. Both Herring and Great Black-backed Gulls were common throughout the area surveyed in roughly equal abundances. Kittiwake sightings were scattered throughout the cruise. The only positively identified alcid was Dovekie, which was recorded on Georges Bank and 20 miles NE of Provincetown in the Gulf of Maine.

TABLE 1.

Seabird Density In Selected Regions Using Fixed-Area Transects

30 November - 14 December 1978

<u>Region</u>	<u>Number of Transects</u>	<u>Total Birds (TB)</u>	<u>Total Area Sampled (Tkm²)</u>	<u>Mean Density (TB/Tkm²)</u>	<u>Density Range (TB/km²/Transect)</u>
Georges Bank	36	468	31.56	14.83	0 - 155.38
Gulf of Maine	29	210	24.73	8.49	0 - 45.95
S. New England	18	140	17.28	8.10	0 - 23.81
Off Continental Shelf	1	2	0.93	2.15	

Cruise No. 7826

TABLE 2.

Number of Birds Per Species In Selected Regions (Using Fixed-Area Counts Only).

30 November - 14 December 1978

<u>Species</u>	<u>Georges Bank</u>	<u>Gulf of Maine</u>	<u>S. New England</u>	<u>Off Continental Shelf</u>
Common loon		1		
Northern Fulmar	23	15		
Greater Shearwater	167	13	2	
Unid. storm-petrel	4			
Gannet	26	14	36	
White-winged Scoter		2		
Red-breasted Merganser			1	
Common Eider		22		
Unid. phalarope		5		
Unid. jaeger	1		1	
Great Blk-backed Gull	90	32	10	
Herring Gull	106	44	35	2
Unid. large gull		13	46	
Ring-billed Gull			1	
Black-legged Kittiwake	38	47	8	
Dovekie	13	2		

TABLE 3.

List of Rare or Infrequent Marine Bird Sightings

30 November - 14 December 1978

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Unid. storm-petrel	4	12-1	41°10'N, 66°16'W	
Unid. phalarope	20	12-2	42°28'N, 67°00'W	
Unid. phalarope	20	12-3	42°15'N, 67°35'W	
Unid. phalarope	5	12-5	42°18'N, 69°33'W	
Unid. phalarope	3	12-5	41°00'N, 69°14'W	
Unid. jaeger	1	12-2	41°05'N, 66°59'W	Light phase
Unid. jaeger	1	12-2	41°20'N, 66°59'W	Light phase
Dovekie	2	12-1	41°00'N, 66°30'W	
Dovekie	20	12-2	41°28'N, 67°00'W	
Dovekie	12	12-2	41°46'N, 67°02'W	
Dovekie	1	12-2	41°05'N, 66°59'W	
Dovekie	1	12-4	41°18'N, 68°31'W	
Dovekie	2	12-5	42°17'N, 68°50'W	
Dovekie	2,1	12-13	42°10'N, 69°52'W	

TABLE 4.

List of Marine Mammal Sightings

30 November - 14 December 1978

Species	Number	Date	Location	Remarks
White-sided Dolphin	4	11-30	42°23'N, 65°47'W	Around ship at night
Pilot Whale	6	12-1	41°51'N, 66°04'W	Two probable calves in tight pod at surface
White-sided Dolphin	100-150	12-1	41°30'N, 66°01'W	Moving E, then approached boat
Pilot Whale	8-10	12-1	41°03'N, 66°26'W	Surfacing
White-sided Dolphin	10-12	12-2	42°15'N, 67°51'W	HEGU following them
Finback (prob.)	3	12-3	42°16'N, 67°58'W	
White-sided Dolphin	8	12-4	40°21'N, 68°31'W	Approached and swam under ship
Finback (prob.)	1	12-3	42°13'N, 67°59'W	
White-sided Dolphin	10	12-4	40°29'N, 68°30'W	Rode bow wave for 10 min.
Unid. whale	2	12-12	41°45'N, 69°39'W	RIWH or SPWH?
Finback (prob.)	1	12-12	41°45'N, 69°39'W	
White-sided Dolphin	10	12-12	41°48'N, 69°37'W	30 Gannets circling above them

TABLE 5. Summary of Transect and/or Station Census Data

Observer EG Perkins

[illegible]

[illegible]

TABLE 5. Summary of Transect and/or Station Census Data

Ship R/V ALBATROSS IV Observer EG Perkins

[illegible]

[illegible]

[illegible]

FIGURE 1. Cruise track during daylight hours,
30 November -
14 December 1978.

FIGURE 2a. Distribution map of
Northern Fulmar,
30 November -
14 December 1978.

FIGURE 2b. Distribution map of
Greater Shearwater,
30 November -
14 December 1978.

FIGURE 2c. Distribution map of
Gannet, 30 November -
14 December 1978.

FIGURE 2d. Distribution map of
Great Black-backed
Gull, 30 November -
14 December 1978.

FIGURE 2e. Distribution map of
Herring Gull,
30 November -
14 December 1978.

FIGURE 2f. Distribution map of
Black-legged Kittiwake,
30 November -
14 December 1978.

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 6 - 9 December 1978

Cruise No. 7827

INTRODUCTION

The following cruise report is a summary of bird and mammal observations made by Andrew B. MacLachan, Volunteer Observer, aboard the National Marine Fisheries Service R/V DELAWARE II from 6 - 9 December 1978. The objective of the cruise was a winter clam survey in the mid-Atlantic region. The observer was aboard on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the National Marine Fisheries Service for permitting an observer to join the cruise, particularly H. C. Boyar, Vessel Coordinator, NMFS, for arranging passage. The observer thanks the Captain and officers of the DELAWARE II and the Chief Scientist for their assistance and cooperation aboard ship. Manomet Bird Observatory seabird studies are supported by the Department of Energy (DOE Contract No. EE-78-S-02-4706).

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts,

Cruise No. 7827

and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled in 10 minutes cruising time. A transect count provides information on relative density, i.e. birds per km^2 . A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1-6 summarize the relative density and abundance bird data, and list sightings of rare or infrequently observed bird species, non-marine bird species and marine mammals. Figure 1 graphically illustrates the cruise track during daylight hours. Figure 2a-d indicates the distribution of four bird species using the greatest total bird count of each species per 10-minute square latitude/longitude block surveyed.

A uniform distribution of species and number of birds were recorded on this cruise. A relatively greater density of Herring Gulls was found in the New York harbor area. The greatest fishing activity was also noted in this area. Sixty-six percent of the 42 Gannets sighted were adults. Sporadic loon sightings occurred at the entrance to Delaware Bay (ca. $38^{\circ}35'N$, $74^{\circ}50'W$). A Greater Shearwater and Great Skua were separately sighted near $39^{\circ}07'N$, $73^{\circ}50'W$.

TABLE 1.

Seabird Density in Selected Regions Within Fixed Area Transects

06 - 09 December 1978

Region	Number of Transects	Total km ² Surveyed (Tkm ²)	Total Birds (TB)	Mean Density ₂ (TB/Tkm ²)	Density Range (TB/Km ² /Transect)
South Coastal	19	15.27	224	14.67	1.35 - 98.46
Southern New England	4	3.72	26	6.99	4.30 - 10.75
Middle Atlantic	12	9.91	87	8.78	1.08 - 22.58

TABLE 2.

Number of Birds Per Species in Selected Regions

(Using Fixed-Area Transects Only)

06 - 09 December 1978

Species	South Coastal	Southern New England	Middle Atlantic
Unidentified loon	1		
Gannet	20	1	6
White-winged Scoter	17		
Unid. duck	20		
Great Black-backed Gull	44	1	12
Herring Gull	100	19	55
Ring-billed Gull	14		
Black-legged Kittiwake	8	3	14
Unid. large gull		2	

TABLE 3.

List of Rare or Infrequent Marine Bird Sightings

06 - 09 December 1978

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Unid. phalaropes	8	12-7	39°54'N, 73°30'W	Flying WNW
Greater Shearwater	1	12-8	39°05'N, 73°45'W	
Great Skua	1	12-8	39°10'N, 73°52'W	Sitting in water, then flying.
Common Loon	1	12-8	39°06'N, 74°37'W	Sitting, diving.
Red-throated Loon	1	12-9	38°36'N, 74°59'W	
Unid. loon	4	12-9	38°36'N, 74°59'W	
Unid. loon	1	12-9	38°35'N, 74°57'W	
Unid. loon	3	12-9	38°33'N, 74°50'W	

TABLE 4.

List of Non-Marine Bird Sightings

06 - 09 December 1978

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Swamp Sparrow	1	12-7	39°55'N, 73°40'W	

TABLE 5.

List of Marine Mammal Sightings

06 - 09 December 1978

<u>Species</u>	<u>Number</u>	<u>Date</u>	<u>Location</u>	<u>Remarks</u>
Unid. porpoise	1	12-7	39°56'N, 73°54'W	Blew, showed fin, sounded.

TABLE 6. Summary of Transect and/or Station Census Data

Ship Delaware II Observer ANDREW MACLACHLAN

Transect ☒ Station ☐ No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Date (GMT) <i>December</i>	6	6	6	6	6	6	6	6	6	6	7	7	7	7
Region*	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SE	SE
Latitude (to nearest min.)	40-30	40-32	40-32	40-31	40-31	40-30	40-24	40-24	40-18	40-18	39-56	39-55	39-55	39-55
Longitude (to nearest min.)	73-24	73-31	73-34	73-43	73-48	73-51	73-54	73-54	73-42	73-42	73-54	73-49	73-42	73-42
Total fixed-area (FA) birds	3	6	4	5	7	1	26	14	64	23	6	6	6	5
Total count (TOT) birds	5	156	134	30	32	3	96	514	114	25	6	51	6	15
Area Sampled (km ²)	.83	.83	.83	.83	.93	.74	.83	.83	.65	.83	.83	.93	.93	.93
Density (FA birds/km ²)	3.61	7.23	4.82	6.02	7.53	1.35	31.33	16.87	98.46	27.11	7.23	6.45	6.45	6.45
Species	Number Observed													
<i>Gannet</i> FA		2	1					2						1
TOT		2	1					2						1
<i>Great Black-backed Gull</i> FA			2	2	1		7	1	25	0	1			
TOT			2	2	1		7	1	25	1	1			
<i>Herring Gull</i> FA	3	3	1	3	6	1	6	11	39	3	5	6	4	5
TOT	5	3	13	3	6	3	6	11	39	4	5	9	4	14
<i>Ring-billed Gull</i> FA		1					13							
TOT		1					13							
<i>Thorn-tailed Kite</i> FA													2	
TOT													2	
<i>Unid. Large Gull</i> FA		0		0	0		0	0	0			0		
TOT		150		25	25		70	500	50			42		
<i>Unid. Duck</i> FA										20				
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Ship Delaware II Observer ANDREW MACLACHLAN

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FIGURE 1. Approximate Cruise Track
During Daylight Hours,
6-9 December 1978.

FIGURE 2c. Distribution map of Herring Gull, 6-9 December 1978.

FIGURE 2d. Distribution map of Black-legged Kittiwake, 6-9 December 1978.

MANOMET BIRD OBSERVATORY SEABIRD STUDIES

Cruise Report, 4 - 12 December 1978

Cruise No. 7828

INTRODUCTION

The following cruise report is a summary of bird and mammal observations made by Galen L. Pittman, Staff Biologist, Manomet Bird Observatory, aboard the U.S. Coast Guard Cutter DECISIVE from 4 - 12 December 1978. The mission of the patrol was search and rescue and offshore law enforcement. The observer was aboard on a non-interference basis primarily to collect information on the distribution and abundance of marine birds.

The Manomet Bird Observatory gratefully acknowledges the U.S. Coast Guard for permitting an observer to join the patrol. The observer thanks CMR David Parr, the officers, and crew of the U.S.C.G.C. DECISIVE for their assistance and cooperation aboard ship, and the Department of Energy for support (DOE Contract No. EE-78-S-02-4706).

METHODS

Information was collected and put into four major field sets: event data, location data, environment data, and bird and mammal data. Bird data were collected using the following designs: transect censuses, total bird counts, and general observations. A transect census is a count of all birds by species within a fixed area, 300 m laterally by the distance (m) traveled in 10 minutes cruising time. A transect count provides information on relative density, i.e.

birds per km². A total bird count is a count of all birds by species within sight of the ship for a period of 10 minutes. A total bird count includes ship-followers and provides information on relative abundance, i.e. birds seen per 10-minutes. Both methods require that the ship be moving on a constant course at a fixed speed of four kts or faster, and that visibility be at least one km during the counting period. Both techniques were employed simultaneously.

Marine mammals observed were identified to species when possible and note was made of the location and time of sighting, number sighted, behavior and other pertinent factors.

OBSERVATIONS

Tables 1 - 5 summarize the relative density and abundance bird data, and list sightings of rare or infrequently observed bird species and marine mammals. No non-marine birds were sighted. Figure 1 graphically illustrates the cruise track during daylight hours. Figure 2a-f indicates the distribution of six bird species using the greatest total bird count of each species per 10-minute square latitude/longitude block surveyed.

Great Black-backed Gulls, Herring Gulls, and Kittiwakes were widespread and abundant throughout the Gulf of Maine, especially where fishing activity occurred. Northern Fulmars were also widespread and common but their presence and numbers were not so decidedly linked to fishing activity. A flock of 30 fulmars were observed feeding at 41°47'N, 68°43'W on 7 December, independent of fishing boats. Gannets were infrequent but regularly sighted, mostly as singles, throughout the Gulf of Maine. However, a natural feeding assemblage was observed at southern Jeffery's Ledge on 5 December. Approximately 100 total birds composed of Herring Gulls, Great Black-backed Gulls, Kittiwakes, fulmars and at least 50 gannets were in the flock. Overall 88% of all gannets

sighted were adults while no first winter birds were recorded.

Eight Greater Shearwaters and 7 alcid sightings were scattered throughout the Gulf of Maine. One Sooty Shearwater was observed following a fishing boat on Cultivator Shoals on December 12th. And finally, two notable sightings were a flock of 28 Red Phalaropes on Cultivator Shoals on December 12 and 2 Great Skuas harassing 2 Herring Gulls at $42^{\circ}54'N$, $67^{\circ}34'W$ in the center of the Gulf of Maine, totally removed from any fishing activity.

TABLE 1.

Seabird Density in Selected Regions Using Fixed Area Transects

4 - 12 December 1978

<u>Region</u>	<u>Number of Transects</u>	<u>Total Km² Surveyed (Tkm²)</u>	<u>Total Birds (TB)</u>	<u>Mean Density₂ (TB/Tkm²)</u>	<u>Density Range (TB/Km²/Transect)</u>
Gulf of Maine	7	63.79	2724	42.95	0.00 - 4754.05
Georges Bank	6	5.11	517	101.17	2.15 - 489.25
North Coastal	1	0.37	11	29.73	

Cruise No. 7828

TABLE 2.

Number of Birds per Species in Selected Regions Using Fixed-Area Transects

4 - 12 December 1978

<u>Species</u>	<u>Gulf of Maine</u>	<u>Georges Bank</u>	<u>North Coastal</u>
Northern Fulmar	244	10	-
Greater Shearwater	5	-	-
Gannet	22	-	-
Oldsquaw	1	-	-
Common Eider	3	-	-
Unidentified scoter	1	-	-
Unidentified duck	1	-	-
Red Phalarope	1	-	-
Unid. phalarope	10	-	-
Glaucous Gull	1	-	-
Great Black-backed Gull	1359	271	2
Herring Gull	620	166	7
Black-legged Kittiwake	372	70	2
Unid. large gull	14	-	-
Unid. gull	65	-	-
Dovekie	2	-	-
Common Puffin	1	-	-
Unidentified large alcid	2	-	-

TABLE 3.

List of Rare or Infrequent Marine Bird Sightings

4 - 12 December 1978

Species	Number	Date	Location	Remarks
Greater Shearwater	1	12-5	43°06'N, 69°30'W	
Unid. phalaropes	5	12-5	42°57'N, 70°04'W	
Unid. alcid	1	12-6	43°47'N, 67°30'W	
Greater Shearwater	1	12-6	43°32'N, 67°26'W	
Greater Shearwater	1	12-6	43°03'N, 67°26'W	
Great Skua	2	12-6	42°54'N, 67°34'W	Harassing 2 Herring Gulls in unison.
Unid. large alcid	1	12-6	42°48'N, 67°37'W	Flying W.
Greater Shearwater	1	12-6	42°49'N, 67°38'W	
Common Puffin	1	12-7	41°36'N, 68°34'W	Flying NE.
Greater Shearwater	1	12-7	41°36'N, 68°34'W	
Greater Shearwater	1	12-7	41°40'N, 68°36'W	
Greater Shearwater	1	12-7	41°49'N, 68°44'W	
Unid. loon	1	12-7	42°04'N, 68°57'W	Flying WSW.
Unid. large alcid	1	12-7	42°04'N, 68°57'W	Flying WSW.
Unid. phalarope	5	12-9	43°12'N, 69°20'W	Flying NNW.
Greater Shearwater	1	12-9	43°23'N, 68°50'W	
Dovekie	1	12-9	43°09'N, 68°49'W	Dove to escape boat.
Canada Goose	23	12-10	43°00'N, 69°38'W	Flying SW.
Glaucous Gull	1	12-10	42°57'N, 69°34'W	Ad., milling around fishing boat.
Common Loon	1	12-11	42°53'N, 70°19'W	Flying SSW.
Unid. alcid	1	12-11	42°54'N, 70°21'W	Flying E.
Sooty Shearwater	1	12-12	41°43'N, 68°06'W	Following fishing boat.
Dovekie	1	12-12	41°41'N, 68°28'W	Dove to escape boat.
Red Phalarope	28	12-12	41°41'N, 68°28'W	Flying W.

TABLE 4.
List of Marine Mammal Sightings
4 - 12 December 1978

Species	Number	Date	Position	Remarks
Minke (poss.)	1	12-7	41°47'N, 68°43'W	
Unid. rorqual	1	12-7	41°51'N, 68°46'W	
White-sided Dolphin (poss.)	5-10	12-7	42°08'N, 69°40'W	
White-sided Dolphin (prob.)	3-5	12-8	42°08'N, 69°44'W	Adults and young.
Finback or Sei	2	12-8	42°08'N, 69°43'W	Porpoising?
Right Whale	5-6	12-11	42°52'N, 70°26'W	Playing (?), making contact with each other at surface.
<u>Balaenoptera sp.</u>	1	12-11	42°50'N, 70°24'W	
Humpback	2-3	12-11	42°53'N, 70°27'W	
Finback or Sei	2	12-11	42°53'N, 70°27'W	
Minke (poss.)	1	12-11	43°00'N, 70°14'W	
Finback	1	12-11	43°00'N, 70°07'W	Right lip white.
Finback or Sei	1	12-11	43°00'N, 70°07'W	
Humpback	2	12-12	41°42'N, 68°22'W	Diving
Finback (poss.)	1	12-12	41°42'N, 68°27'W	Surfacing repeatedly.
Finback or Sei	1	12-12	41°42'N, 68°27'W	
Humpback	2	12-12	41°41'N, 68°28'W	Diving
Humpback	1	12-12	41°47'N, 68°34'W	Rolling--diving.
Finback (prob.)	1	12-12	41°49'N, 68°42'W	

TABLE 5. Summary of Transect and/or Station Census Data

Ship USCGC Decisive Observer Galen L. Pittman

[illegible]

TABLE 5. Summary of Transect and/or Station Census Data

Ship USCGC Decisive Observer Galen L. Pittman

[illegible]

Observer

Galen L. Pittman

[illegible]

Ship USCGC Decisive Observer Galen L. Pittman

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TABLE 5. Summary of Transect and/or Station Census Data

Ship USCGC Decisive Observer Galen L. Pittman

[illegible]

TABLE 5. Summary of Transect and/or Station Census Data

[illegible]

FIGURE 1. Approximate cruise track during daylight hours, 4-12 December 1978.

FIGURE 2a. Distribution map of Northern Fulmar, 4-12 December 1978.

FIGURE 2b. Distribution map of
Greater Shearwater,
4-12 December 1978.

FIGURE 2d. Distribution map of
Great Black-backed
Gull, 4-12 December
1978.

FIGURE 2f. Distribution map of Black-legged Kittiwake, 4-12 December 1978.