

Fall Migration and Nearshore Habitat Requirements
of Ross' Gulls (Rhodostethia rosea)

PART A

The Ross' Gull in Arctic Alaska
in Relationship to Oil and Gas Development:
An Overview of Recent Studies

by

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ABSTRACT

Ross' Gulls (Rhodostethia rosea) were studied in arctic Alaska between 1970 and 1987. After breeding in Siberia, Ross' Gulls arrive in Alaskan arctic seas in numbers sometime after mid-September, when concentrations are found within ice edge habitats and in migration within 300 m of shore. A pronounced eastward migration past Point Barrow and into the Beaufort Sea peaks around the end of September. Reasons for the migration are likely related to foraging. A return westward migration peaks by the middle of October. Undetermined numbers also migrate along the ice edge offshore.

Ross ' Gulls are concentrated between the pack ice and the coast for a six- to eight-week period in the fall, and may include a significant proportion of the world population. During years when the ice pack is close to shore, the presumed effect would be to concentrate the gulls along the coast. These aspects of the life history of Ross' Gulls suggest that the species is at risk from oil pollution in the Chukchi Sea - Point Barrow - Beaufort Sea region, from at least mid-September through October.

Under the terms of the "Convention Between the United States of America and the Soviet Union of Soviet Socialist

Republic Concerning Conservation of Migratory Birds and Their Environment", the United States is responsible to the Soviet Union for conservation of Ross' Gulls while they are in Alaskan waters. It would seem prudent for the appropriate agencies to address this point in any future environmental impact statements and management plans.

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1. INTRODUCTION

Ross' Gull (Rhodostethia rosea) is one of the least known seabirds in the northern hemisphere. Both its nesting grounds in northeastern Siberia (Figure 1) (Buturlin 1906) and most of its known range at sea in the Arctic (Divoky, Part B of this report) have seldom been visited by biologists. Large numbers of Ross' Gulls were first seen migrating past Point Barrow in the fall of 1881 (Murdock 1885), and the species has since been seen there regularly in September and October (e.g., Gabrielson and Lincoln 1959). However, there was little quantitative information about Ross' Gulls in Alaskan waters until the work of George Divoky between 1970 and 1986. Under contract to the U.S. Fish and Wildlife Service, Divoky prepared a comprehensive analysis of his studies, which is presented as Part B of this report. Further reference to Divoky's studies, or "Divoky" in the present overview, refers specifically to Part B of this three-part report. Divoky's studies included both censusing at sea from ships in the Chukchi and Beaufort seas (Figure 1), and systematic counts on land at Point Barrow (Figures 1 and 2).

The purpose of the present overview is to summarize and integrate Part B with the results of the most recent land based migration study at Point Barrow in September - October 1987 (Sanger and Haney, Part C of this report).

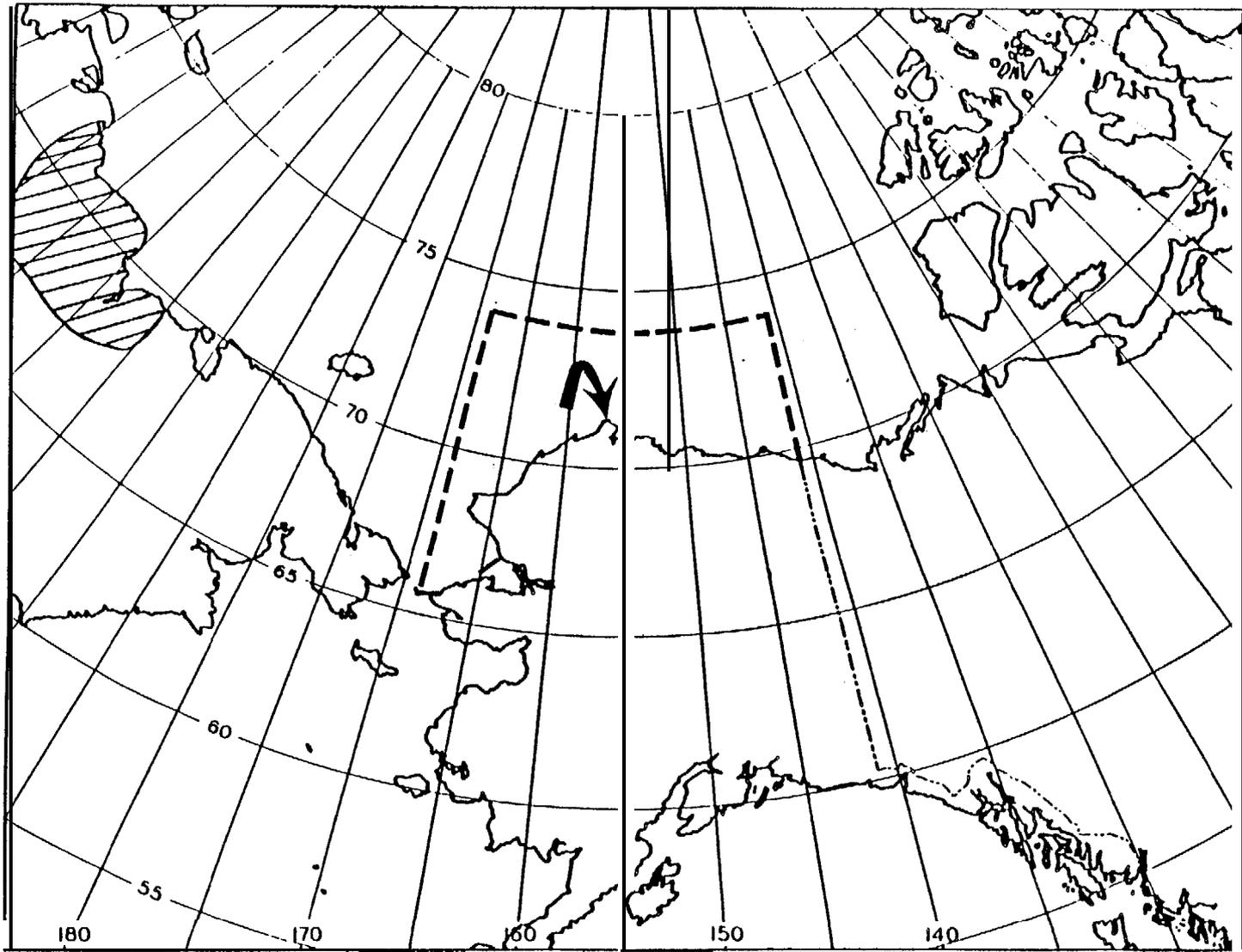


Figure 1. Location of Ross' Gull breeding grounds in Siberia (hatched area), study area discussed in this report (enclosed by dotted line) and Point Barrow (arrow).

2. BACKGROUND

This report focuses on understanding the ecology of Ross' Gulls in Alaskan waters as related to oil and gas development. The potential for adverse impacts to the Ross' Gull population from oil pollution was realized when it became increasingly evident that the species is highly concentrated in numbers, time, and space when it migrates and feeds in the Alaskan arctic, and that oil and gas development was proceeding rapidly in the Alaskan arctic (Divoky). The species occurs in a relatively narrow band between the pack ice and shore within a six- to eight-week period in the fall. Divoky's population estimates for Alaska also suggest that in any given year, a significant proportion of the world population of Ross' Gulls could occur in the nearshore zone of Alaska's arctic.

All of these aspects of the life history of Ross' Gulls suggest that the species would be highly vulnerable to oil pollution or other adverse environmental impacts in the Chukchi Sea - Point Barrow - Beaufort Sea region from at least mid-September through October.

3. RECENT FIELD STUDIES

3.1. Distribution and abundance at sea

Divoky made standard counts of Ross' Gulls during 19 oceanographic cruises in the Chukchi and Beaufort seas that sailed variously between mid-July and October, from 1970 through 1986. Briefly, his procedure was to identify, count, and record the behavior of all birds seen during standard transect counts (usually 15 to 20 minutes) out to 300 m from the ship as it steamed between oceanographic sampling stations.

Aerial surveys of Ross' Gulls were conducted by Divoky in 1976 and 1984, and brief aerial observations were made in 1987 (Part C of this report.)

3.2. Migration studies

Divoky studied the migration of Ross' Gulls at Point Barrow in 1976, 1984, and 1986, and the Minerals Management Service contracted to the U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center (FWS) for a fourth year of study in 1987 (Part C of this report). The procedure was for an observer to station himself at one of two locations at Barrow Spit (Figure 2), and to systematically record the numbers, age,

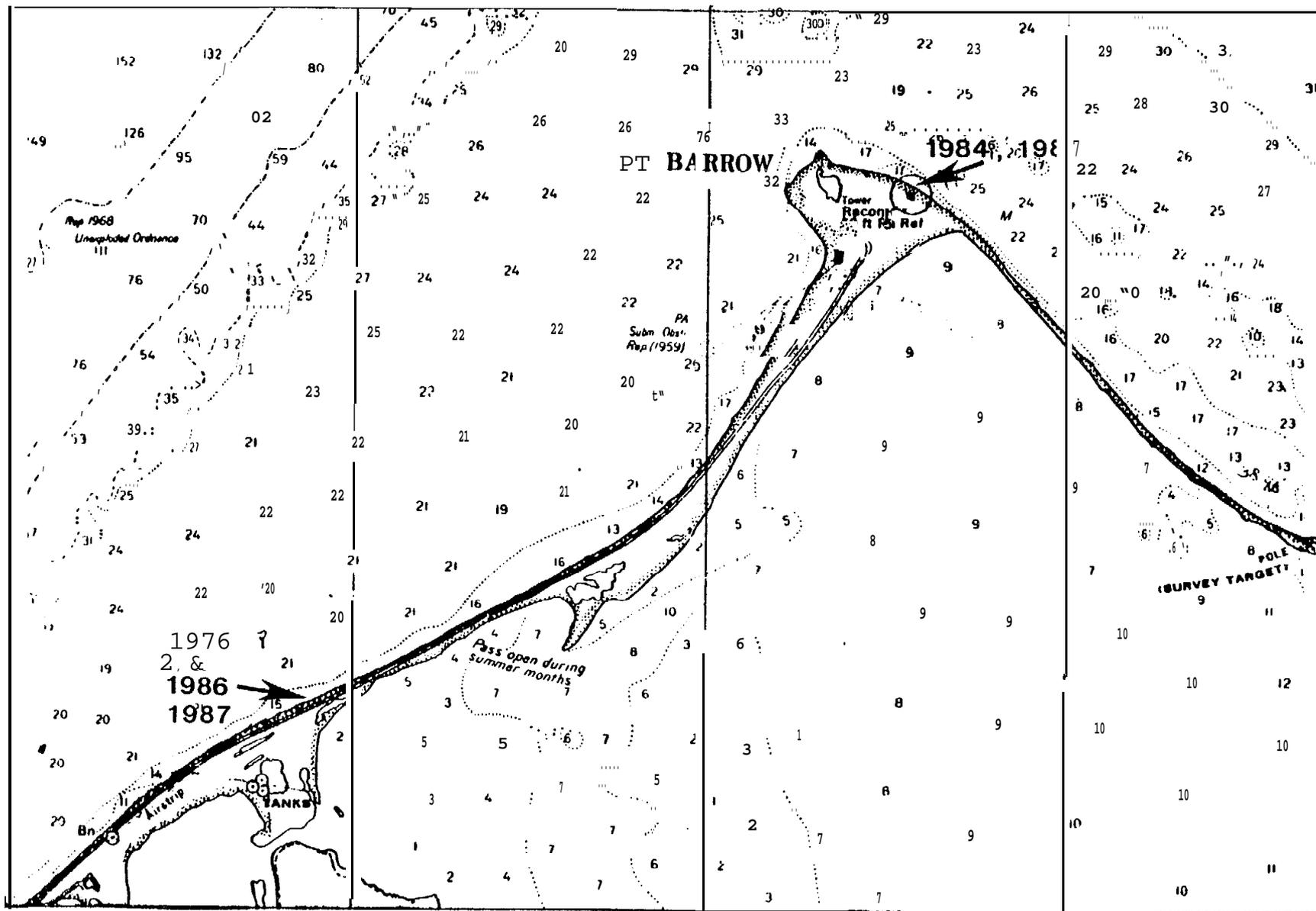


Figure 2 . Location where migrant watches were conducted at Point Barrow in 1976, 1984, 1986, and 1987.

flight direction, and any other behavior seen. These observations allowed units of birds per hour and birds per day to be calculated for birds moving in the two major flight directions (east and west).

4. RESULTS

4.1. Distribution and abundance at sea

Divoky shows that Ross' Gulls are found only as uncommon migrants in arctic Alaska from late May through late July. A minimum of six weeks pass from the time birds leave their Siberian nesting grounds until they arrive in numbers in the Chukchi Sea in mid- to late-September. Data indicate that Ross' Gulls arrive in substantial numbers in Alaskan waters sometime between the end of the first week and the start of the last week in September. Birds seem to be particularly abundant when ice extends to near the shore, such as Divoky encountered in September - October 1970 (Figure 3).

After their arrival in numbers in the Chukchi, a large but unknown portion of the Ross' Gull population moves east past Point Barrow into the Beaufort Sea. The gulls stay briefly in the Beaufort, for some birds this, perhaps, may be as long as a month. Divoky notes that the Beaufort Sea, particularly in the

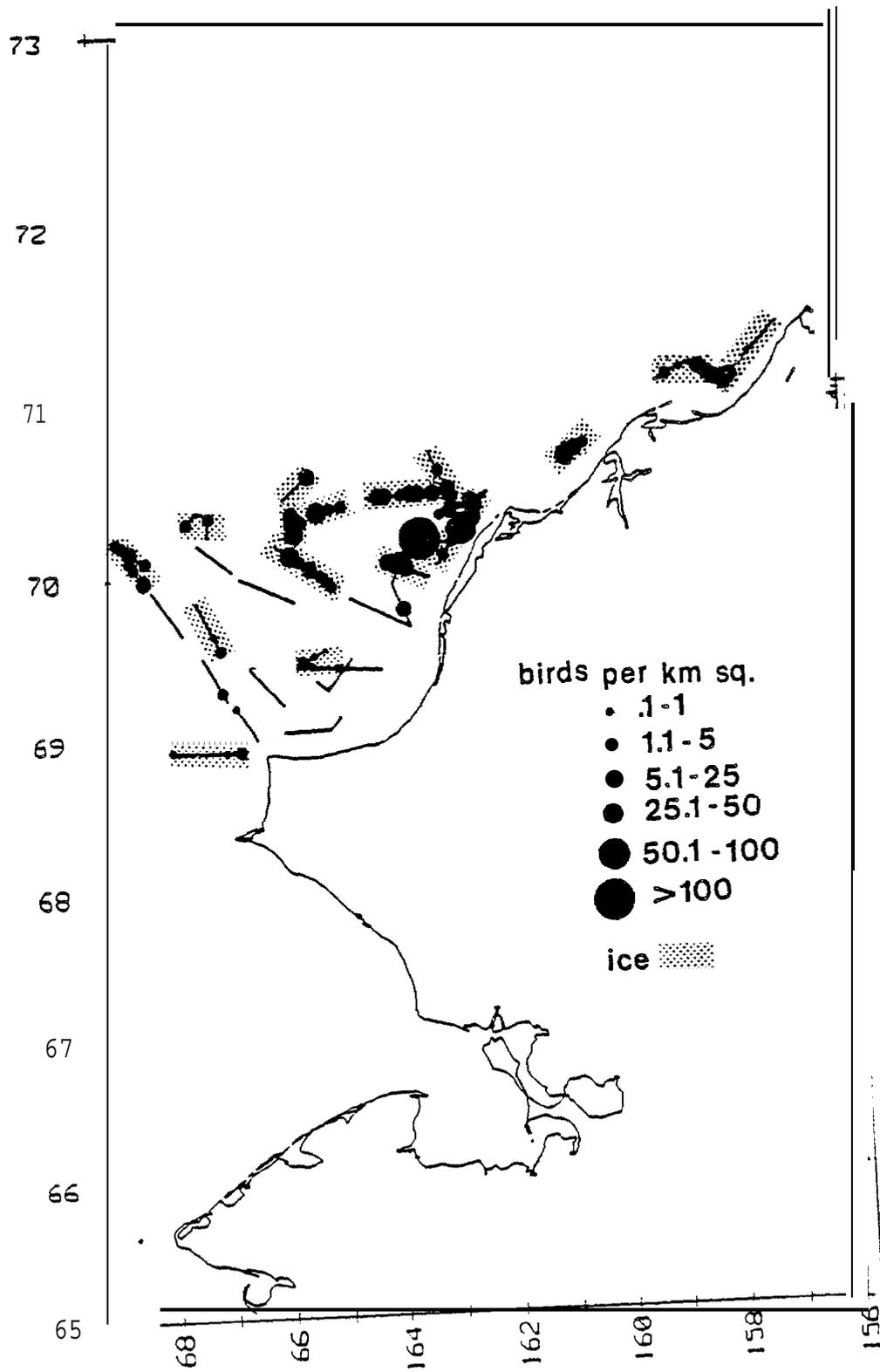


Figure 3. Densities of Ross' Gull in the Chukchi Sea from 24 September 17 October 1970.

vicinity of the Plover Islands, is an important foraging area for several species of surface-feeding seabirds. As the Beaufort Sea begins freezing, the gulls return west past Point Barrow. This return migration to the west is a major finding of Divoky's work, and it is the first conclusive evidence that Ross' Gulls do not winter in the arctic basin in numbers as formerly believed (Bailey 1948).

Where the Ross' Gull population goes after that, however, remains largely conjecture. Divoky believes that after their movement westward past Point Barrow, a good portion of the population continues southward through the Chukchi and Bering seas to winter in the Sea of Okhotsk, south of eastern Siberia (Figure 4). Birds have frequently been sighted in spring, flying northward in Siberian river valleys, from the direction of the Sea of Okhotsk, toward their nesting grounds (Dementiev and Gladkov 1969).

4.2. Migration past Point Barrow

Divoky's observations of Ross' Gull movements at point Barrow in 1984 and 1986, and the U.S. Fish and Wildlife Service's studies in 1987, give three years of data that may be compared directly (Figure 5). Except for a few birds seen as early as September 21 in 1987, in all three years, the eastward

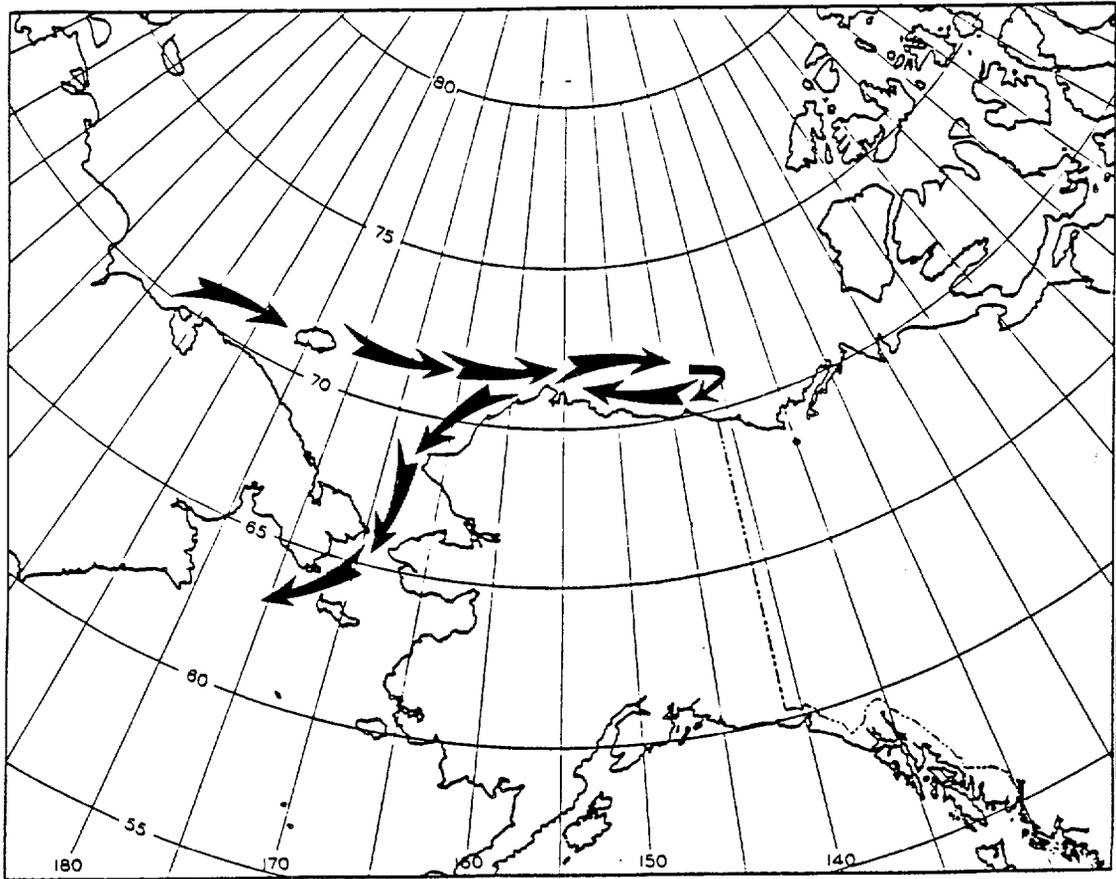


Figure 4. General pattern of migration of Ross' Gull in Alaskan waters from September through November.

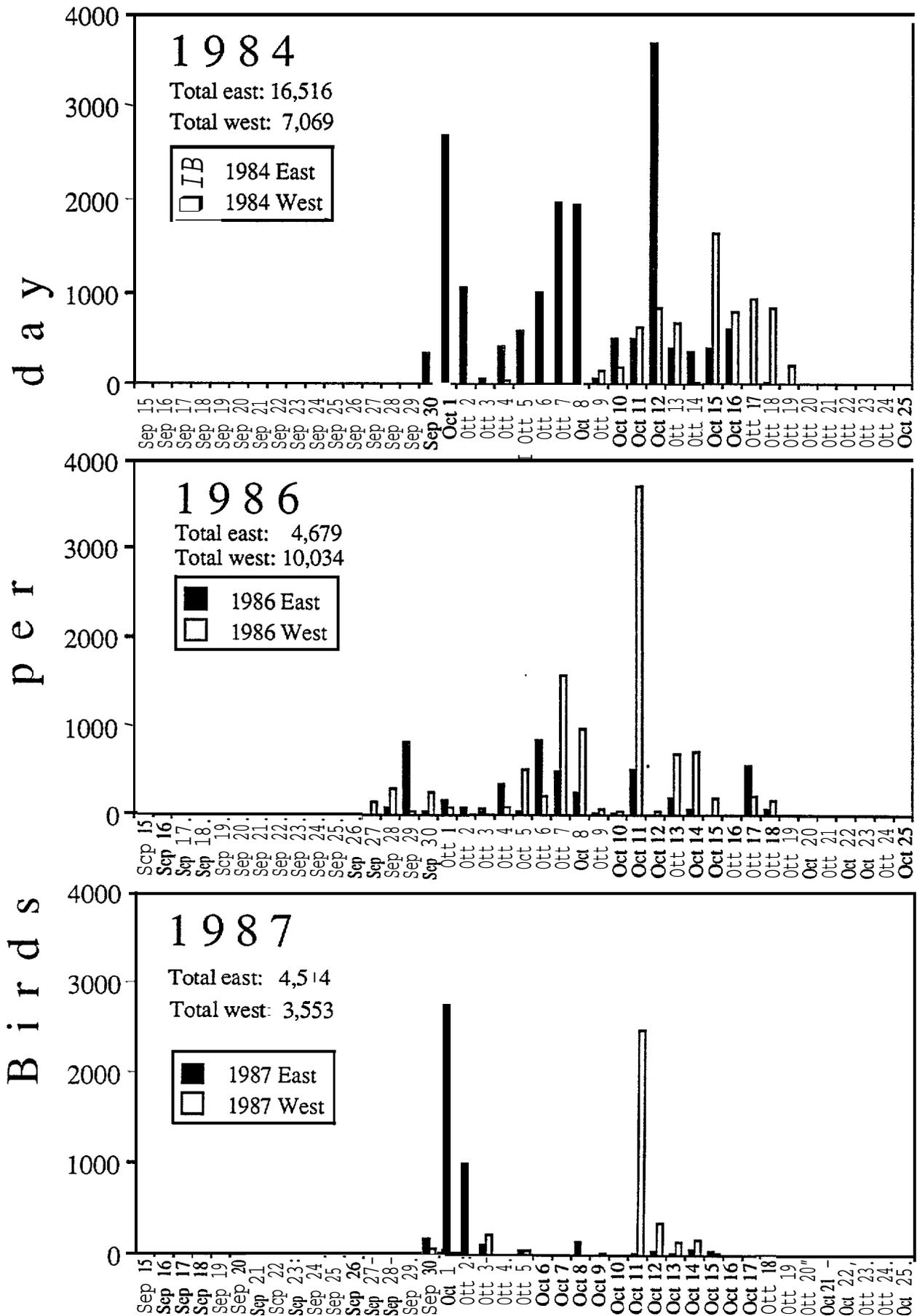


Figure 5. - Projected total east and west passage rates for Ross' gulls at Pt. Barrow. Adapted from Parts B and C of this report.

migration occurred in earnest between September 29 and October 1. Similarly, although it appears that the 1987 observations may not have included the last of the westward migrants, in all three years the westward migration seems to have ended within a narrow range of calendar dates, October 14 to October 19.

Further comparisons among the three years (Table 1) show other similarities, but differences as well. In three years of comparable studies, projected numbers of gulls varied; 1984 and 1986 involved from 10,000 to 16,000 birds migrating over several days, while the 1987 migration involved only about 4,500 birds and peaked sharply on one or two days only for both eastward and westward movements. These data are open to individual interpretation but it is evident that the timing and duration of migrations in 1984 and 1986 were similar, although half again as many birds were seen in 1984 as in 1986. Nineteen-eighty-four (1984) also stood out with a projected 1,000 or more birds moving east on seven of the 17 days that the migration lasted (Figure 5).

Nineteen-eighty-seven (1987) was different from both 1984 and 1986 because far fewer birds were seen and the duration of both the eastward and westward movements occurred on two days, and a large pulse of westward migrants was seen on one day only.

Table 1. Comparison of eastward and westward migrations of Ross' Gulls at Point Barrow, Alaska, in 1984, 1986, and 1987.

Year	Eastward Migration				Westward Migration			
	Begin	End	Days	Birds	Begin	End	Days	Birds
1984	Sep 30	Ott 16	17	16,516	Ott 09	Ott 19	11	7,069
1986	Sep 29	Ott 17	19	4,679	Ott 05	Ott 18	14	10,034
1987	Ott 01	Ott 02	2	4,514	Ott 11	Ott 12	2	3,553

4.3. Population estimates

Based on his pelagic studies, Divoky speculates on the population size of Ross' Gulls. Pelagic observations give information on birds per square mile of sea surface, which can be extrapolated to a population estimate for the area censused. Divoky believes that his 1970 pelagic census in the Chukchi Sea (Figure 3) provided relatively good data and he derived population estimates of 21,000 to 38,000 Ross' Gulls within the ice edge habitat surveyed during the cruise. Similarly, 23,000 Ross' Gulls were estimated as present in the western Beaufort Sea in 1986.

4.4. Migration at Point Barrow in relation to wind direction

Wind speed and direction vectors for Point Barrow in 1987 (Figure 6) indicate more or less typical wind conditions for that time of year (Edward Wentworth, National Weather Service, pers. comm.). Winds were predominantly from the east during both easterly and westerly movements of Ross' Gulls. Together with the wind direction data presented by Divoky for 1984 and 1986, it appears that there is no clear relationship between flight direction of Ross' Gulls and wind direction.

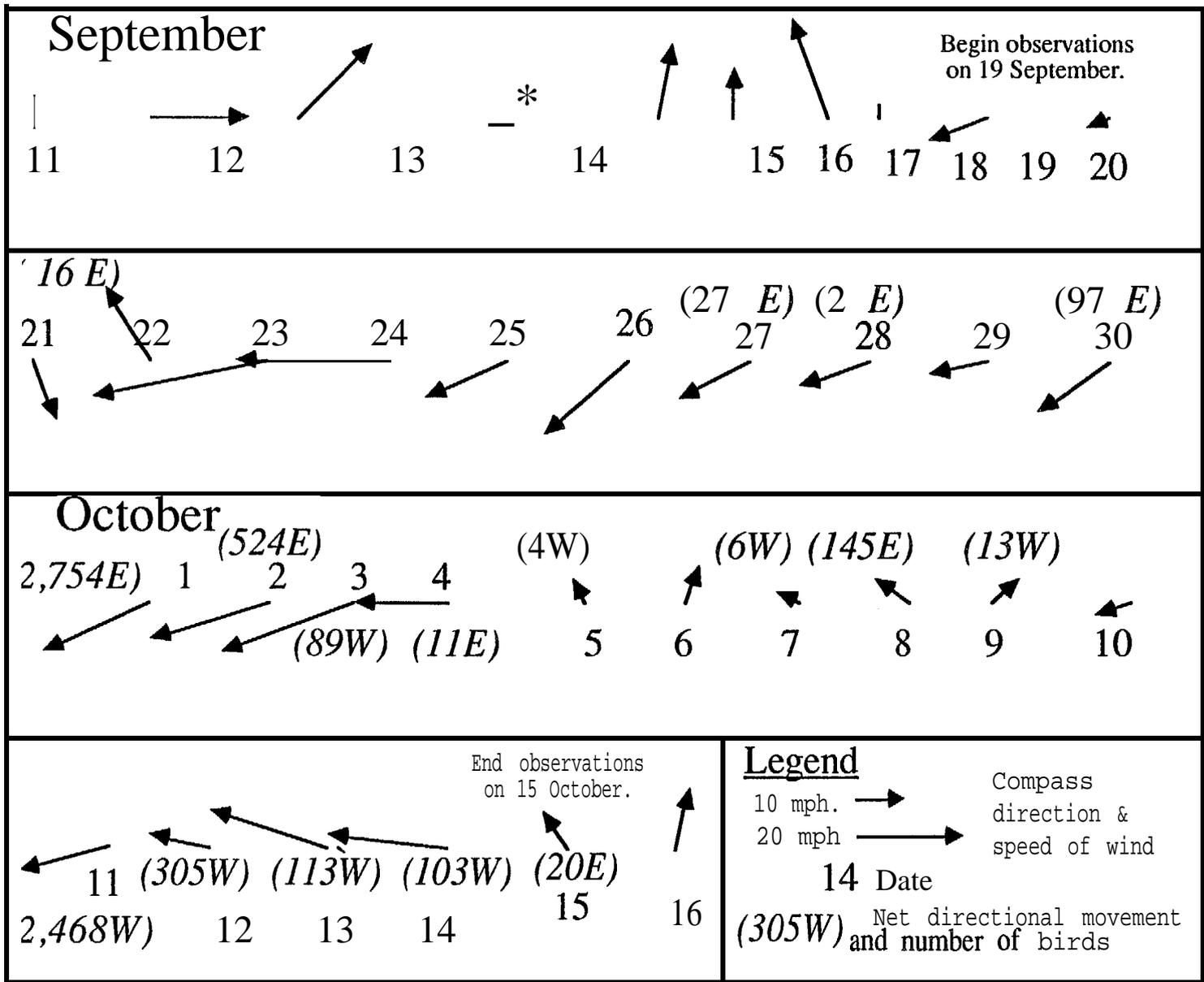


Figure 6. Net directional movement of Ross' gulls and corresponding daily wind speed and direction vectors at Pt. Barrow, Alaska, September - October 1987. Wind data from National Weather Service.

4.5. Habitat requirements of Ross' Gulls

There are three major habitats or areas that are critical for Ross' Gulls while they are in arctic Alaskan waters: 1) their coastal migration corridor - a zone within 300 m of shore; 2) the western Beaufort Sea, especially in the vicinity of the Plover Islands; and 3) ice edge habitat wherever it occurs in the Chukchi and Beaufort seas. Also, based on Haney's observations at Point Barrow in 1987 (Part C of this report), it appears that the bight immediately west of Point Barrow proper. is an important loafing and feeding area for Ross ' Gulls.

5. DISCUSSION

Recent studies of Ross' Gulls in Alaska indicate that the species occur in variable, but sometimes large numbers, for several weeks in the fall between the shores of the Chukchi and Beaufort seas and the ice edge. Three years of comparable data show that an eastward movement of gulls past Point Barrow peaks around the end of September, and a return movement to the west peaks about two weeks later. Projected total numbers of Ross' Gulls that migrated varied among years, and ranged from totals of 4,514 to 16,516 birds headed west, and 3,553 to 10,034 birds moving to the west.

Divoky's pelagic shipboard and serial surveys showed that many Ross' Gulls feed and migrate at the ice edge, a factor that must have a significant influence on the number of birds that migrate close to shore. During years when the ice edge is relatively far offshore, fewer birds may migrate close to shore. Conversely, the occurrence of ice close to shore would have the effect of concentrating the gulls, funneling them closer still to oil and gas development activities. Thus, in those years when the ice pack is close to shore, Ross' Gulls would seem to be particularly susceptible to possible oil pollution or other adverse events.

The three years of shore-based migration studies discussed here (Figure 5) dramatically increases our knowledge of the Ross' Gull migration in arctic Alaska, and they prove that Ross' Gulls return west past Point Barrow rather than overwintering in the arctic basin (Divoky). They also form a solid, albeit modest beginning for migration data that was collected and analyzed in a standard format. However, considering the variability among the years in numbers of birds seen and in the duration of the movements, these studies should be regarded as only a beginning toward understanding the movements and ecology of Ross' Gulls in arctic Alaska. In particular, we still have only vague ideas about the differences between shoreline and ice edge components of the

migration and the influence of distance offshore of the pack ice on overall migration dynamics.

As discussed in detail by Divoky, it is still unknown why Ross' Gulls undertake what seems to be a rather lengthy migration into the Beaufort Sea only to turn around and backtrack a short time later. Divoky's suggestion that availability of prey in the Beaufort is the main reason for Ross' Gulls moving there seems plausible. Furthermore, it is reasonable to assume that the gulls gain energetically and nutritionally from their brief visit to the Beaufort. A simple way to test this assumption may be to collect Ross' Gulls during their peak movements in both directions, and then measure and compare their nutritional states. The nature of the species' prey base in the Beaufort is another important question that needs to be addressed.

All of this information should be useful to resource management agencies which are responsible for conserving and managing the Ross' Gull population while it is in Alaskan waters. It would appear that environmental impact statements and management plans need to specifically address the timing of both the eastward and westward migrations, how close to shore the ice occurs in any given year and its influence on concentrating Ross' Gulls, and the nature and importance of the species' presumed prey base in the Beaufort Sea.

Finally, the fact that essentially the entire Ross' Gull population breeds in the Soviet Union adds an international twist to management considerations. Under the terms of the "convention Between the United States of America and the Union of Soviet Socialists Republic Concerning Conservation of Migratory Birds and Their Environment", the United States is responsible to the Soviet Union for conservation of Ross' Gulls while they are in Alaskan waters. It would seem prudent for the appropriate agencies to address this point in any future environmental impact statements and management plans.

6. ACKNOWLEDGEMENTS

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