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STUDY TITLE: Avian Community Ecology in Norton Bay, Alaska.

REPORT TITLE: Avian Community Ecology of the Akulik-Inglutalik River Delta, Norton Bay, Alaska.

CONTRACT NUMBER(S): BLM: IA7-08; Research Unit No. 458.

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PROJECT MANAGER(S): Outer Continental Shelf Environmental Assessment Program (OCSEAP).

AFFILIATION: National Oceanic and Atmospheric Administration.

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KEY WORDS: Norton Basin; Alaska; biology; birds; seabirds; waterfowl; shorebirds; nesting; breeding; diversity; abundance; distribution; migration; productivity; habitat; terrestrial; tundra; intertidal; shipboard observations; floral zones; climate; survey; census; subsistence; Norton Sound; Alaska Region.

BACKGROUND: The Akulik-Inglutalik River Delta, located in the Norton Bay (Norton Sound) region of western Alaska, represents a major breeding site for seabirds. Because the Norton Sound area exhibited a high potential for future petroleum exploration and development, baseline studies were deemed necessary to document avian diversity and abundance in this region. Prior to this study, little was known regarding the abundance and diversity of birds utilizing this area, except that it was biologically rich. This study was conducted as part of the Outer Continental Shelf Environmental Assessment Program, administered by the National Oceanic and Atmospheric Administration. Funding was provided by the U.S. Department of the Interior, Bureau of Land Management (now the Minerals Management Service). These agencies were responsible for obtaining data needed to predict the environmental impacts resulting from oil and gas activities in Alaskan waters, including the possible effects of anticipated oil and gas activity on birds within the Akulik-Inglutalik River Delta.

OBJECTIVES: (1) To determine avian diversity and abundance on the Akulik-Inglutalik River Delta of Norton Sound, western Alaska; (2) To determine bird arrival and departure dates; (3) To determine the characteristics of the nesting season and avian productivity; (4) To determine breeding habitats; (5) To document mammal abundance and distribution on the Delta; (6) To measure the extent of bird-mammal interaction; (7) To document the flora of the region; and (8) To document the climate of the region.

DESCRIPTION: The study was conducted during the summer months of 1976 and 1977. Censuses were completed along the northeastern shore of Norton Sound, northeast Bering Sea. The boundaries of the study area were delimited along on the north and south by the Koyuk and Ungalik Rivers, respectively. Between 10 May and 20 September, daily counts (at a minimum) were completed within the study area. Twice daily counts were made during peak migration seasons (i.e., 10 May to 15 June; 1 August to 20 September). Census counts were conducted using a spotting scope of all birds present on the Delta.

To enumerate nesting birds in a tundra area, a 1 km long transect was established. A detailed study of nesting was done within a 2 x 0.3 km plot divided into 2,500 m^2 sections. Other study plots were established in upland tundra and intertidal mudflat habitats. Birds utilizing areas along the Akulik and Inglutalik Rivers were studied, with observations conducted from a small boat operated in river waters.

SIGNIFICANT CONCLUSIONS: More than 100 species of birds utilizing the Akulik-Inglutalik River Delta were documented. Of these, 18 species were determined to be common nesters, 14 were uncommon nesters, and 7 were potential nesters. Another six species were found to be common but non-nesting migrants. Compared to other areas of western Alaska, the Akulik-Inglutalik River Delta had a comparable breeding avifauna but greater diversity of migrants. Nesting densities of most species, including waterfowl, were low, as compared to those from optimum habitats elsewhere in Alaska. However, in appropriate habitats, the Delta supported moderate breeding densities of Arctic and red-throated loons, Arctic terns, and sandhill cranes. Human activity in this area would undoubtedly reduce breeding success of these species because these birds were already being adversely affected by humans in the Delta.

STUDY RESULTS: The diversity of birds utilizing the Akulik-Inglutalik River Delta was high, with a total of 103 species being observed during the course of the study effort. Of the avifauna noted, 18 species were determined to be common nesters, 14 were uncommon nesters, and 7 were potential nesters. Another six species were found to be common but non-nesting migrants. Compared to other areas of western Alaska, the Akulik-Inglutalik River Delta had comparable breeding avifauna but a greater diversity of migrants. Nesting densities were low, with the majority having densities of <3 nests/km^2. Breeding birds characterized as abundant in the Delta nested in relatively low densities as compared to those from optimum habitats elsewhere in Alaska.

Waterfowl breeding activities in the Delta were surprisingly low, accounting for <0.5 nests/km^2. This characteristic was potentially attributed to a lack of suitable habitat. In appropriate habitats, the Delta supported moderate breeding densities of: Arctic loons, Gavia arctica (i.e., 4 nests/km^2); red-throated loons, Gavia stellata (i.e., 2 to 3 nests/km^2); Arctic terns, Sterna paradisaea (i.e., 8 to 10 nests/km^2); and sandhill cranes, Grus canadensis (i.e., 2 to 3 nests/km^2). Human activity in this area would undoubtedly reduce breeding success of these species because these birds were already being adversely affected by humans in the Delta.

Hunting or "egging" by Natives probably had little effect on breeding bird numbers or productivity, as these activities on the Delta were minimal. Red foxes (Vulpes fulva) preyed to some extent on loons, sandhill cranes, and waterfowl. Grizzly bears (Ursus horribilis) were observed four times during the study. On one occasion, a whistling swan (Olor buccinator) nest was raided by bears. Potentially, grizzly bears could be important bird predators but no quantitative estimates of their predation rates were available. Avian predators including marsh hawks (Circus cyaneus), parasitic jaegers (Stercorarius parasiticus), shrikes (Lanius excubitor), and short-eared owls (Asio flammeus). A limited amount of predation by these birds was observed during the study but, in general, densities of these predators were low.

Potential productivity (i.e., number of eggs laid per species) was quite variable, ranging from <1 egg/km^2 for some waterfowl (e.g., common eider [Somateria mollissima], oldsquaw [Clangula hymenalis], and pintail [Anas acuta]) to >50 eggs/km^2 for some shorebirds [e.g., dunlin (Calidris alpina), northern phalarope (Phalaropus lobatus), semipalmated sandpiper (Calidris pusilla), and western sandpiper (Calidris mauri)].

Sandhill cranes, noted at abundance levels of up to 2,800 individuals/day, used the Delta for feeding and staging during spring migration; as many as 16,000 sandhill cranes used the Delta on any given day in mid-September. This would make it a very significant area during both spring and especially fall migration periods. During the spring migration, black brant (Branta nigricans) (i.e., up to 1,800/day), snow geese (Chen hyperborea), whistling swans (i.e., up to 300/day) used the Delta for feeding and staging. In autumn, migrating Canada geese (Branta canadensis), white-fronted geese (Anser albifrons), and pintails used the Delta.

Relatively large numbers of migrating shorebirds fed and staged throughout the area in August and September. An estimated 10,000 to 20,000 dunlins migrated through the Delta near the end of August. Fairly large numbers of semipalmated and western sandpipers (i.e., 300 and 450/day, respectively), and northern phalaropes (up to 475/day) migrated through the Delta in July and August; however, no significant numbers of spring-migrating shorebirds were observed along coastal areas of the Delta. These birds probably bypassed the Delta and flew directly north from the Yukon Delta to the Seward Peninsula.

Intertidal mudflats and delta pond edges were important feeding areas for breeding and migrant birds. Concentrations of Arctic terns, Canada geese, dunlins, glaucous gulls (Larus hyperboreus), pintails, western sandpipers, and whimbrels (Numenius phaeopus) used mudflat habitats extensively from late August to early September.

Savannah sparrows (Passerculus sandwichensis) and lapland longspurs (Calcarius lapponicus) were the major passerine migrants using the Delta. Large numbers of sparrows (i.e., 240 individuals/day) moved through the area in early August. Longspurs entered the area slightly later in mid-August, with peak numbers being somewhat higher (i.e., 800 individuals/day).

STUDY PRODUCT(S): Shields, G. F. and L. J. Peyton. 1978. Avian Community Ecology of the Akulik-Inglutalik River Delta, Norton Bay, Alaska. A final report by the University of Alaska for the U.S. Department of the Interior, Bureau of Land Management Alaska OCS Office, Anchorage, AK and the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, OCS Environmental Assessment Program, Anchorage, AK. Contract No. AA851-IA7-08; Research Unit No. 458. 103 pp.

The report(s) cited above has/have been included within the report series entitled "Environmental Assessment of the Alaskan Continental Shelf, Final Reports of Principal Investigators," Volume 5, Biological Studies (March 1979), pp. 289-607 (NTIS No. PB82-171794/AS).

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