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BIRDS IN NEARSHORE WATERS OF THE YUKON-KUSKOKWIM DELTA, ALASKA

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ABSTRACT - Summer and fall aerial and boat surveys of birds within 12.5 km of the shoreline of the central and southern portions of the Yukon-Kuskokwim Delta were conducted between 1973 and 1979. Of 32 species observed, seaducks (10 species) and shorebirds (seven species) predominated. Density of non-waterfowl species averaged 28.4 birds/km with peak numbers occurring after mid-July. In eight aerial surveys in July and August, waterfowl density averaged 16.7 birds/km (range 0.1 to 71.1). Waterfowl density during a boat survey in late August was 595.8 birds/km while the average for the three boat surveys performed was 212.8 birds/km . Density of all waterfowl species was 71.1 birds/km in the highest density aerial survey on 14 July. Waterfowl numbers were greatest within eight km of the mean high tide line. Flocks of three species of scoters made up the majority of all birds observed averaging 59.5 birds/km .

The significance of the Yukon-Kuskokwim Delta as a production and migratory staging area for waterfowl and shorebird species is well known (Nelson 1887, Murie 1924, Dufresne 1924, Conover 1926, Gillham 1941, 1942, Brandt 1943). Numerous studies have dealt with species which occur on coastal mudflats or in nearshore waters of the delta (Holmes 1972, Dau 1974, Mickelson 1975, Petersen 1976, Strang 1976, Eisenhauer and Kirkpatrick 1977). Birds have been studied at several coastal locations, (Kessel et al. 1964, Dau 1972, Holmes and Black 1973, Gill et al. 1978) but information from nearshore waters is lacking. Coastal waters of the delta up to 15 km offshore are less than five meters in depth. Exceptions to this pattern exist in the vicinity of Cape Romanzof and Cape Vancouver where depths are approximately 10 meters. Increasing threats to coastal habitats by petroleum exploration in Norton Sound and elsewhere in the Bering Sea which could impact this area prompted this study.

METHODS AND STUDY AREA

The study area includes 575 km of marine habitats extending from 59 45 N to 61 45 N latitude. The area substratum is unvegetated sand and mud approximately one-third of which is intertidal. Eelgrass (Zostera spp.) occurs sporadically around Nunivak Island. Water depth at high tide is up to five meters and the tidal range is approximately three meters. The adjoining vegetated fringe of the Yukon-Kuskokwim delta is characterized by wet sedge and grass meadows less than one meter above mean high tide. The study area is an ancestral portion of the delta which is eroding due to the action of wind, water and ice. The area's climate is maritime from May through November with numerous periods of fog, rain and high winds. From December through April, the area is blanketed by ice and snow which effectively extend the shoreline many kilometers offshore.

Nine aerial and three boat surveys were conducted in nearshore waters of the delta from Scammon Bay to Cape Avinof (Fig. 1) between 1 July and 29 September, 1973, 1975, and 1979 (Table 1). A float equipped Cessna 185 aircraft was used to perform surveys in 1973 and 1975. Surveys followed the same route but were of variable length ranging from 120 to 220 km. Survey altitude was 75 to 120 m and airspeed was 160 km/hr. Each survey covered an area 0.8 km in width with observations being made from both sides of the aircraft. Observers defined their viewing area by reference to markings on the aircraft wing struts. Timing of each survey was at or near a high tide

as birds occurred closer to shore at these times. Flight routes generally paralleled the coastline approximately four km offshore; however, slight deviations in flight route were made to determine species and number of flocked birds. Sightings made during aerial surveys were recorded on maps of the area. Sightings made during boat surveys were recorded in field notebooks or on small portable tape recorders.

Three surveys were made in small boats powered by outboard motors. A 21 July 1975 boat survey was performed using two observers while three observers participated on 27 August to 1 September 1975 surveys. One person acted as recorder in all three surveys. Boat surveys were performed in calm to light seas and during periods of good visibility.

The geography of the Angyoyaravak Bay area did not allow accurate definition of the boat survey route followed on 21 July 1975; however, other boat surveys were straight routes between recognizable points of land (Fig. 1). Observations from aerial and boat surveys were combined for the distribution analysis presented (Figs. 2-4).

In addition to surveys performed during this study, I used my unpublished incidental observations of birds on the Yukon-Kuskokwim Delta from May through October, 1971 to 1980.

RESULTS AND DISCUSSION

Summaries of birds seen by species groups and in total suggest that densities were greater on boat surveys (X=303,SD=323 birds/km) than on aerial surveys (X 24,SD=33 birds/km) probably due to increased visibility and observation time in boat surveys (Table 2). Boat survey data may be closer approximations of the actual numbers of birds using the survey area because of these factors.

Most of the eiders and scoters observed during aerial and boat surveys were either molting or in fall staging assemblages.

Distribution patterns of birds observed are shown chronologically in Figures 2-5. Cormorants and kittiwakes were grouped due to their similar distribution. Species or species groups are discussed individually in the following annotated listing.

Loons

Pacific Loons (Gavia pacifica) occurred throughout the area from July to early September (Figs. 2 and 5). The largest flock observed contained 10 birds south of Kangirlvar Bay on 1 September 1975. Red-throated Loons (G. stellata) were more numerous than Pacific Loons on July and August surveys while Pacific Loons predominated in September. In the area from Cape Romanzof to Hazen Bay; Pacific Loons made up 14 of 16 total loon sightings in September.

Pacific and Red-throated Loons may move from onshore to offshore areas on ebbing tides. Pacific Loons forage more

often on freshwater lakes than do Red-throated Loons (Petersen 1976) thus accounting for their relatively low numbers offshore, although they are the more common nesting species in the area.

Cormorants

The Pelagic Cormorant (Phalacrocorax pelagicus) is the predominant nesting cormorant species on Nunivak Island (Richie 1978) and at Cape Pierce (Petersen and Sigman 1977). During the study it occurred as singles or pairs in the vicinity of Cape Vancouver and Cape Romanzof. Double-crested Cormorants (P. auritus) and Red-faced Cormorants (P. urile) are uncommon in the area (Petersen and Sigman 1977; Richie 1978). All observations obtained during this study are probably of Pelagic Cormorants (Fig. 2).

Approximately 200 Pelagic Cormorants were observed near Cape Vancouver on 1 September 1975 while less than 10 cormorants were observed in that area on 28 September 1979 (Fig. 5).

Geese

Single flocks of six and seven Emperor Geese (Chen canagicus) were observed flying south in the vicinity of Cape Vancouver on 1 September 1975. The Emperor Goose is a common spring and fall migrant along the coastline of the Yukon-Kuskokwim Delta with numbers of fall migrants peaking from late August to early September (Eisenhauer and Kirkpatrick 1977; King and Dau 1981).

Brant (Branta bernicla) were observed only on 1 September 1975 when seven birds flew south over Hazen Bay. A flock of

20 Cackling Canada Geese (B. canadensis minima) moving south over Kangirlvar Bay on 1 September 1975 was the only sighting of this species although they and Brant are both common fall migrants in the area (King and Dau 1981). Goose and Brant observations are shown in Figure 3.

Eiders

Single or pairs of Common Eiders (Somateria mollissima) were observed primarily during aerial surveys in late August. Exceptions were a flock of six at Cape Romanzof on 17 July 1975, two flocks of 15 and 50 in Angyoyaravak Bay on 21 July 1975 and flocks of 15 and 200 "female" plumaged birds near Cape Avinof on 27 August 1975.

In September, most Common Eiders were observed in flocks. Over 200 "female" plumaged birds were observed on 1 September 1975 flying south in the vicinity of Cape Vancouver. Flocks of unidentified "female" plumaged eiders totalling an estimated 700 birds were also observed in the area on that date and were probably also this species. Approximately 175 birds, mostly males, occurred in scattered groups from Cape Romanzof to Kinia River on 28-29 September 1979. Common Eiders molt in small scattered flocks along the coastline of the Yukon-Kuskokwim Delta and around the periphery of Nunivak Island (King and Dau 1981). Males predominate in these flocks and probably represent segments of the local breeding population. By late August, those birds departed the area. Small numbers of Common Eiders, predominately subadult males

and female plumaged birds, winter in ice-free areas along the south side of Nunivak Island (King and Dau 1981).

King Eiders (S. spectablis) were observed three times. On 3 July 1975, a flock of approximately 70 birds, predominately males, was seen between Hooper and Kokechik Bays. On 10 July 1973, a flock of 300, of equal sex ratio, was seen northeast of Cape Vancouver. On this date, all males were in mottled plumage and some were capable of flight. Four birds were seen northeast of Cape Vancouver on 14 July 1975. Apparently all the groups seen during the first two weeks of July were in passage as no subsequent sightings were made. Adult female and young King Eiders are common in passage along the north side of Nunivak Island from mid-September to mid-October (Gill et al. 1978). In early November another similar flight of "female" plumaged birds and later adult males occurs in the same area (R. Davis, pers. comm.). Movements observed on Nunivak Island are primarily in an easterly direction and it is possible that those birds may linger in offshore waters of the adjacent Yukon-Kuskokwim Delta. Small numbers of King Eiders winter in ice-free areas along the south side of Nunivak Island.

Seven flocks of two to 72 Spectacled Eiders (S. fischeri) were present in the area from Hooper Bay to Cape Romanzof during an aerial survey on 1 July 1973. Those flocks were mostly adult males. It is believed that by mid-July, those birds moved to molting areas farther north as none were seen during later surveys. No molting of Spectacled Eiders is

known to occur in or to the south of the study area. However, Nelson (1883) reported male Spectacled Eiders in eclipse plumage west of Stuart Island in September which suggested that molting may occur in the Norton Sound area to the north. A single female Spectacled Eider and another with a brood of flight stage young were observed north of Nelson Island on 22 August 1975. Post-fledging young appear to migrate north as family groups, with breeding females departing the nesting grounds in late August and early September (Dau and Kistchinski 1977).

Estimated flocks of 100, 150, 300, 500 and 1,000 molting Steller's Eiders (Polysticta stelleri) were observed near Cape Avinof along the seaward side of barrier islands on 27 August 1975. Those flocks were predominated by males and most of the birds flapped along the surface of the water, appearing to be flightless. However, one flock of eight females was seen flying in a southerly direction. Thirty-five males and two females were seen in this area on 28 September 1979 (Fig. 5).

Steller's Eiders are uncommon nesters on the Yukon-Kuskokwim Delta, however, they have been commonly observed during spring and fall migration at various coastal locations in the area. During fall migration, an early to mid-September easterly passage of adult females and young occurs along the north side of Nunivak Island in conjunction with a similar movement of King Eiders. Scattered flocks of Steller's Eiders, predominated by males, occur around Nunivak Island in summer

and fall (R. Davis, pers. comm.). Distribution and abundance of combined eider species are presented in Figure 3.

Harlequin Duck (Histrionicus histrionicus)

Fifteen birds seen near Dooksook Lagoon on the southwest coast of Nunivak Island on 28 September 1979 were the only sightings during the study. Harlequin Ducks occur throughout the summer on Nunivak Island but otherwise are uncommon in the study area (Richie 1978; Swarth 1934).

Oldsquaw (Clangula hyemalis)

One adult male was seen flying south near Cape Vancouver on 1 September 1975 and single groups of two, three, four and five were seen during the 28 to 29 September 1979 surveys. Oldsquaw are common during spring migration and uncommon during fall migration at coastal locations along the Yukon-Kuskokwim Delta. It is a common molting species on some of the larger inland lakes and sightings of pairs and small flocks in the Baird Inlet area in early September suggest that molting may occur there.

Scoters

Among the three scoter species (Melanitta perspicillata, M. nigra, M. fusca), only the Black Scoter nests on the Yukon-Kuskokwim Delta. However data collected during this study show that coastal waters from Scammon Bay to Cape Avinof provide important habitat for all three species.

Large assemblages of molting scoters were present from mid-July through August mostly in the Hazen Bay, Cape Vancouver and Cape Avinof areas (Fig. 3). Males predominated

in these largely single species flocks. Scoters observed were flightless until mid-August and were primarily engaged in foraging activities. After the flightless period, scoters gradually shifted to more southerly portions of the study area and by late September many had migrated from the area.

Surf Scoters were the most common of the three species observed, outnumbering Black Scoters by 100-fold. The White-winged Scoter was the least common of the three species, comprising 0.2% of all scoter sightings. From late July to 1 September, 35 groups of dark-winged scoters (either Surf or Black Scoters) were seen in the study area. Three of these groups contained in excess of 1,000 birds.

By late September, nearly one-half the number of scoters seen in July and August had departed the study area and remaining concentrations were very localized (Fig. 5). Distribution and abundance of combined scoter species are presented in Figure 3.

Red-Breasted Merganser (Mergus serrator)

A flock of approximately 200 Red-breasted Mergansers, predominately males, was observed near Cape Vancouver on 14 July 1975. Another flock of 16 birds, also predominated by males, was observed flying north in the vicinity of Cape Avinof on 27 August 1975. Red-breasted Mergansers are uncommon nesters on the Yukon-Kuskokwim Delta and are uncommon spring and fall migrants.

Shorebirds

Four Black-bellied Plovers (Squatarola squatarola) were seen near the barrier islands off Cape Avinof on 27 August 1975 and one Golden Plover (Pluvialis dominica) was seen flying south over Hazen Bay on 1 September 1975. Five large flocks of Bar-tailed Godwits (Limosa lapponica) totalling an estimated 5,000 birds were seen near the barrier islands off Cape Avinof on 27 August 1975 and flocks of 1,000 and 2,000 were seen near the mouth of the Kolavinarak River the following day (Fig. 4).

Two flocks of unidentified dowitchers, numbering 20 and 50 birds, were seen flying south over Hazen Bay on 1 September 1975. These were probably Long-billed Dowitchers (Limnodromus scolopaceus) which are common fall migrants in coastal and inland habitats of the Yukon-Kuskokwim Delta. On 28 September 1979, between Cape Avinof and Kangirlvar Bay, flocks of 100, 500 and 2,000 Dunlin (Calidris alpina) or Rock Sandpipers (C. ptiliocnemis) were observed. Based on phenology of the season, it could be expected that most were Rock Sandpipers. Both species are abundant fall migrants in the intertidal and vegetated fringe zone of the Yukon-Kuskokwim Delta (R. Gill, pers. comm.).

One Red Phalarope (Phalaropus fulicarius) was observed off Cape Avinof on 27 August 1975 and 17 scattered observations of singles or pairs were made from 28 to 29 September 1979. Red and Red-necked Phalaropes (P. lobatus) are common to the outer Yukon-Kuskokwim Delta and appear to occupy offshore waters

only during fall migration. Small numbers of both species have been seen in the fall in Angyoyaravak and Hazen Bays.

Red Phalaropes begin their fall migration in late June while Red-necked Phalaropes begin fall migration in mid-June with peak numbers occurring in the third week of July (R. Gill, pers. comm.). Late migrating phalaropes observed during this study may be from other breeding areas. All shorebird species were combined for the presentation of distribution and abundance in Figure 4.

Jaegers

Individual Parasitic Jaegers (Stercorarius parasiticus) were seen throughout July from Cape Romanzof to Hazen Bay (Fig. 4). This species and the Long-tailed Jaeger (S. longicaudus) are common nesters on the Yukon-Kuskokwim Delta and along with the Pomarine Jaeger (S. pomarinus) appear to follow predominately coastal migration routes during spring migration. A highly dispersed pattern appears to dominate the fall migration of these species.

Gulls and Terns

Twenty-five observations of Glaucous Gulls (Larus hyperboreus) numbering up to 100 birds per sighting were made during July. The larger groups were in the vicinity of river mouths and offshore barrier islands. Single birds and small groups predominated along open coastlines and in offshore waters (Fig. 4). The Glaucous Gull is one of the last species to depart the area in the fall. Fall flocking begins in early September with peak numbers occurring in mid-October as inland

waterbodies begin to freeze. Four large flocks, one exceeding 1,500 birds, were seen along the north side of Hazen Bay on 15 October 1977.

Mew Gulls (L. canus) were common in the Angyoyaravak Bay and Hazen Bay areas on 14 July 1975 (Fig. 4). Two birds were seen in the Hazen Bay area on 21 July 1975. About 20 were seen off Cape Avinof on 15 October 1977. Large numbers nest on the delta and our failure to observe them in substantial numbers during this study may suggest that most Mew Gulls use inland migration routes.

Eighteen flocks of Black-legged Kittiwakes (Rissa tridactyla) totalling approximately 2,000 birds were seen from late July through early August in the vicinity of Cape Vancouver (Fig. 2). Fewer than 10 birds were seen in the vicinity of Cape Romanzof on 1 July 1973. Only two birds were seen in the entire study area on 28 and 29 September 1979 (Fig. 5). Two Sabine's Gulls (Xema sabini) were observed during surveys on 28 and 29 September 1979, one each in Angyoyaravak and Kangirlvar Bays.

Arctic Terns (Sterna paradisaea) were common near the barrier islands north of Cape Romanzof on 1 July 1973. Two single birds were seen on 3 July 1973 off Hooper Bay and six singles and a flock of 50 were seen in the area between Hooper Bay and Nelson Island on 24 July 1975.

Seabirds

One murre seen near Cape Vancouver on 24 July 1975 and three others on 28 September 1979 were the only sightings during the

study period. Large numbers of Common Murres (Uria aalge) nest on Nunivak Island, however, birds were not seen in that area on 28 September 1979.

A Horned Puffin (Fratercula corniculata) observed off Cape Vancouver was the only sighting of this species. A beached bird was found prior to the study south of Cape Romanzof suggesting possible use of this area also. Horned Puffins nest commonly on Nunivak Island (Richie 1978), but none were seen there on surveys in late September.

The Fork-tailed Storm Petrel (Oceanodroma furcata) was encountered three times during the 28 to 29 September surveys. Single birds were seen off Cape Vancouver and Kangirlvar Bay and a flock of 12 was seen south of Nunivak Island. Other reports from the area are of one and two birds east of Cape Etolin on the north side of Nunivak Island on 16 September 1975 and of 20 to 30 birds seen near Napaskiak following a severe southwesterly storm (R. Baxter, pers. comm.).

Aerial and boat surveys conducted from July through September fill an important gap in our knowledge of critical habitats along the coastal fringe of the Yukon-Kuskokwim Delta. Tidal mudflats and onshore areas adjacent to nearshore waters of the delta are extensively used by shorebirds and waterfowl during summer and early fall. Our results suggest that the waters within at least 12.5 km from shore are an important feeding, molting and fall staging area for several species of waterfowl. Most waterfowl use occurred within

eight km of shore. Densities of waterfowl during July aerial surveys were as high as 71.1 birds/km . The highest waterfowl densities, 595.8 birds/km , were encountered during a late August boat survey. Average waterfowl density, primarily scoters, was a minimum of 12.6 birds/km on aerial transects in late September.

Seabirds (X=0.2 birds/km) and jaegers (X=0.02 birds/km) were uncommon in the study area. Small numbers of loons (X=0.2 birds/km) were also seen in the study area. Gulls (X=9.6 birds/km), terns (X 3.6 birds/km) and kittiwakes (X=2.2 birds/km) occurred in low to moderate numbers in the study area.

Bird use of the study area from May to October is not well documented and these surveys provide only preliminary data for a high use period. An intensive analysis of the temporal and spatial distribution and abundance of birds along the coastal fringe and in nearshore waters of the delta from late April to July and September to November is needed.

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