Environmental Assessment of the Alaskan Continental Shelf

Final Reports of Principal Investigators
Volume 15. Biological Studies

U.S. DEPARTMENT OF COMMERCE
National Oceanic & Atmospheric Administration
Office of Marine Pollution Assessment

U.S. DEPARTMENT OF INTERIOR
Bureau of Land Management

December 1981
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The facts, conclusions and issues appearing in these reports are based on interim results of an Alaskan environmental studies program managed by the Outer Continental Shelf Environmental Assessment Program (OCSEAP) of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, and primarily funded by the Bureau of Land Management (BLM), U.S. Department of Interior, through interagency agreement.

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Identification, Documentation and Delineation of Coastal Migratory Bird Habitat in Alaska.

BY

Paul D. Arneson
Alaska Department of Fish and Game

FINAL REPORT
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Studies Conducted October 1975-November 1979

(September 1980)
Identification, Documentation and Delineation of Coastal Migratory Bird Habitat in Alaska.

Paul D. Arneson
Alaska Department of Fish & Game
1 July 1980
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I. SUMMARY OF OBJECTIVES, CONCLUSIONS AND IMPLICATIONS WITH RESPECT TO OCS OIL AND GAS DEVELOPMENT

Between October 1975 and August 1978, 33 coastal surveys were conducted for marine birds in seven regions of southcentral Alaska. The two major objectives of this study were to determine seasonal density and distribution, critical habitats, migratory routes and breeding locales in littoral and estuarine habitats for principal bird species and to delineate bird habitat types seaward of the storm-tide line. In Lower Cook Inlet more specific objectives were outlined.

Bird species were combined into 17 species groups for density analyses and each group was rated for vulnerability to oil spills using the index designed by King and Sanger (1979).

Thirty-nine habitat types were used in the final analyses of habitat preferences of birds. Many habitats corresponded to those used by Hayes et al. (1977) in their oil spill susceptibility index.

Northeast Gulf of Alaska

Spring - In Northeast Gulf of Alaska, a May survey further substantiated the importance of Controller Bay-Copper River Delta-Orca Inlet to migrating birds. In this spring survey, shorebirds were the most dense bird group. The protected mudflats used by shorebirds have a high susceptibility to spilled oil. In adjacent areas at Wingham and Martin Islands gulls and alcids reached high densities. In this region, and in all areas during the time of this study, large gulls were observed to use a variety of habitats, and were therefore, less vulnerable to severe impacts from oil spills. Certain bird species migrating past Cape St. Elias on Kayak Island crossed the remaining portion of the Gulf of Alaska and were, therefore, less vulnerable to impacts of oil and gas development in Northeast Gulf of Alaska than birds following the coastline. South of Kayak Island birds densities were highest in Icy Bay.

Summer - Icy Bay was used in summer by non-breeding sea ducks. Onshore facilities placed there would adversely affect that bird subpopulation. Outer sand beaches were used by gulls and terns.

Kodiak

Winter - Wintering birds in the Kodiak Archipelago were most abundant in the Chiniak/Kizhuyak Bay section. Sea ducks and other waterfowl species were the most numerous wintering birds. Birds were concentrated in protected bay/fjord habitats, and contamination from oil and gas development entering Kodiak's bays could affect large flocks of wintering birds.

Lower Cook Inlet

Spring - In Lower Cook Inlet during spring, shorebirds were abundant on mudflats in all bays on the west side of the Inlet and in Kachemak Bay. Sea ducks were numerous from Anchor Point to Ninilchik and in Kamishak Bay. High densities of scaup, a diving duck, were found in many bays adjoining Kamishak Bay. If impacts from oil and gas development contaminated
prey organisms in mud substrates on which many of these shorebirds, sea and diving ducks fed, the effects could be long-lasting. An oil spill during spring could also directly oil several thousand sea and diving ducks.

Gulls were found throughout the Inlet and would, therefore, not be vulnerable to impacts of oil and gas development. However, kittiwakes were concentrated around Tuxedni and southwest Kamishak Bays and would be impacted if oil spills or disturbance occurred in that area.

Summer - Sea ducks were abundant in summer because non-breeding flocks remained in Kachemak and Kamishak Bays and underwent molt there. Flightless waterfowl would succumb to any catastrophic oil spill.

Although gulls were more numerous than other bird groups, they were also more widespread in distribution, selected a wider variety of habitats and could avoid potential threats. Kittiwakes and alcids were most dense near the Chisik Island colony and would be particularly vulnerable to impact at that location.

Fall - In fall, overall bird densities in Lower Cook Inlet dropped markedly from spring and summer population levels. Gulls and sea ducks remained the predominant bird groups but occurred in substantially lower densities than in other seasons. Gulls remained well dispersed, but sea ducks were concentrated in outer and inner Kachemak Bay. Dabbling ducks frequented bay, lagoon and fluviatile waters of Chinitna, Tuxedni and Kachemak Bays. Canada Geese staged on saltmarshes of Tuxedni Bay. McNeil Cove was used by waterfowl and a relatively large number of shorebirds. All these bays contain habitats susceptible to oil spills, and birds most frequently used habitats with the highest susceptibility ratings.

Winter - Birds shifted from the west side of Lower Cook Inlet to the ice-free southeast side in winter. This was true even in relatively mild winters during the study. There were three times the number of birds on the east side as the west. Kachemak Bay (both inner and outer) contained the most birds, and sea ducks predominated. Potential impacts on birds from oil and gas development would be greatest in this area. Spilled oil would contaminate several vulnerable species and their food sources. However, predominant northeast winds in winter may push spilled oil into Shelikof Strait and away from Kachemak Bay.

South-Alaska Peninsula

Fall - On the southern portion of South-Alaska Peninsula in fall, large numbers of geese used susceptible lagoon habitats. Low densities of other species were found.

Winter - In winter, alcids and sea ducks, the two most vulnerable species groups, were the most abundant birds. A few thousand kittiwakes were in the vicinity of colony sites. Mostly exposed (and, therefore, less susceptible to oil spills) habitats were surveyed. The status of bird populations on protected nearshore waters was not determined.
North-Alaska Peninsula

Spring - Estuaries on North-Alaska Peninsula in spring were used by large numbers of geese, gulls and sea ducks. Nelson and Izembek Lagoons supported the most birds. Populations of diving and dabbling ducks and shorebirds were densest in Kvichak Bay where these birds used mudflats of bays and rivers. Any spilled oil entering the estuaries would remain in place a long time, and therefore, oil would impact birds in all seasons for several years. Habitats most used by birds have the highest susceptibility rating to potential impact from oil spills.

Summer - Only offshore waters on the southern end of the Peninsula were surveyed in summer. Densities of 400 to over 1000 shearwaters/km² were recorded. Their habits make them relatively vulnerable to oil spilled offshore in summer.

Fall - Bird densities recorded on North-Alaska Peninsula estuaries in fall were the highest observed in all surveys. Geese (mostly Brant, Emperor and Canada) comprised over half the total birds. Sea ducks were second in abundance followed by shorebirds. Izembek Lagoon, Nelson Lagoon, Port Moller and Cinder River contained the highest densities. Birds either used habitats highly susceptible to oil or they were vulnerable due to their propensity for marine waters. Estuaries on North-Alaska Peninsula should be given the greatest degree of protection from impacts of oil and gas development because of the great densities of birds found there and the regional, national and international importance of those birds.

Winter - In winter, bird densities in this region dropped substantially. Nevertheless, sea ducks were common in protected waters, and gulls fed and roosted on exposed sand beaches. Impacts would be less in winter, but spilled oil would likely remain to affect spring and fall migrating bird populations.

North-Bristol Bay

Spring - Spring bird densities in North-Bristol Bay were the lowest of the four regions surveyed in spring. A wide variety of bird groups was found in low to moderate densities. This region, particularly Kvichak Bay, was a part of the migration corridor for shorebirds. Scaup and Black Scoters used inshore waters extensively. Flounder Flats supported high scaup densities on two successive spring surveys. Geese were most abundant in Nanvak Bay, and gull and alcid populations were greatest near Capes Peirce and Newenham colonies. No lease areas are currently being considered near this region and, therefore, the potential for impact is less. Spilled oil from other areas that reached North-Bristol Bay would have changed its consistency and would not likely affect birds greatly.

Aleutian Shelf

Winter - The Aleutian Shelf region was surveyed in winter, and high densities were recorded despite poor survey conditions. Sea ducks were the most abundant group and were found in all sections in almost equal densities. They were found in exposed habitats more than protected.
Emperor Geese and Rock Sandpipers wintered in all sections. Highest densities for six species groups were found on Samalga Island at the western edge of the survey region. A catastrophic oil spill would do the most damage to wintering birds of the region. Most of the Aleutian Shelf habitats are low on the oil spill susceptibility index of Hayes et al. (1977).
II. INTRODUCTION

Alaska's 54,700 km of coastline provides a wide variety of habitats for breeding, migrating and wintering birds. Coastal cliffs, talus slopes, coastal meadows, barrier islands and other physiographic features provide ample nesting habitat. Migrating birds use coastal terrain for migration corridors and frequently stage on such habitats as river deltas and floodplains, lagoons, embayments and intertidal mudflats. The numerous ice-free bays and fjords in the Gulf of Alaska provide wintering habitat for many species of birds. This great habitat diversity supports an equally diverse avifauna. About 134 species of birds common in southcentral Alaska occur on coastal marine environments during at least part of their life cycle.

Because this nearshore and littoral region is so crucial to Alaska's marine birds, it was essential to assess the magnitude of bird use of this area with respect to which geographic areas received most use, and in which habitats within a geographic region bird use was occurring by season. In the past, most bird survey work along the coast had been for waterfowl and in most cases data were not quantitative. Areas of heavy bird use near population centers were obviously documented, but many uninhabited areas had not been looked at, particularly on a seasonal basis. Other surveys only looked at offshore bird use. King and McKnight (1969) specifically tried to determine bird use of nearshore waters by flying a sawtooth pattern out to 19 km in Bristol Bay, but little information was gathered on bird use of littoral and supratidal habitats. This study was designed to quantify bird use along the coast, in nearshore waters, and in supratidal regions.

Objectives of the project and regions studied since the inception of the study have been:

FY 1976-Gulf of Alaska, Bristol Bay; FY 1977-Bristol Bay, Aleutian Shelf.

1. To summarize and evaluate existing literature and unpublished data on the distribution, abundance, behavior and food dependencies of birds associated with littoral and estuarine habitats.

2. To delineate the storm-tide line and characterize vegetative types (bird habitats) seaward of the storm-tide line.

3. To determine seasonal density and distribution, critical habitats, migratory routes and breeding locales for principal bird species in littoral and estuarine habitats.

FY 1978-Lower Cook Inlet

Winter, Kamishak/Outer Kachemak Bays

1. To determine the winter distribution and abundance of marine birds in relation to ice conditions and other environmental parameters.

2. To attempt to determine the cause of various winter bird distribution patterns.
Spring-Kamishak Bay

1. To determine distribution and abundance of waterfowl and shorebirds species.
2. To determine critical habitats for these species groups.
3. To determine periods of peak usage and duration of usage in spring for these species groups.
4. To determine, if possible, food organisms used by these species groups during migration staging.

Summer-Kamishak Bay

1. To determine species composition and abundance of marine birds on colonies.
2. To determine as many aspects as possible of the breeding biology of marine birds on the colonies.
3. To determine, whenever possible, the food habits of nesting marine birds and their young.
4. To determine changes in abundance of breeding populations of marine birds on colonies visited in 1976.
5. To make other incidental observations of habitat use, forage areas, migration areas and abundance of non-colonial marine birds.

Oil and gas development and its various related activities have been recognized as posing the greatest potential threat to marine birds in Alaska. Catastrophic spills could impact large numbers of sea ducks and other seabirds utilizing nearshore areas for foraging. If oil contaminates estuaries or onto mudflats, thousands of waterfowl and shorebirds could be affected. Chronic pollution, although less obvious, may be as devastating to birds as a catastrophic spill. Food organisms will likely be destroyed by small chronic spills, and this, in turn, will have deleterious effects on birds if it continues for long periods of time.

This study helped provide baseline information on seasonal abundance of birds and identify which habitats various species of birds selected during different seasons. Those habitats found most important to birds can, hopefully, be protected in the event of a spill or avoided by onshore development and vessel traffic.

III. CURRENT STATE OF KNOWLEDGE

Most of the information on bird use of coastal habitats in southcentral Alaska has been summarized in previous annual reports of this research unit (Arneson 1976, 1977 and 1978). In general, few bird surveys were conducted which included all species using subtidal, littoral and supratidal habitats. Most surveys had been for popular game ducks and geese, and often these surveys were only qualitative in nature. Other
Bird research has been on specific sites covering limited geographic area and dealt with one or few species. Also, little work has been done on a seasonal basis; in particular, winter months have been neglected.

For the Northeast Gulf of Alaska lease area, including Prince William Sound, the best bird information is found in Isleib and Kessel (1973). Their species accounts of each bird included use by season, relative magnitude of this use and habitats used. They emphasized the importance of the Copper River Delta and Orca Inlet where densities of 250,000 shorebirds per square mile were recorded and where as many as 20 million birds staged during spring migration.

Until Outer Continental Shelf Environmental Assessment Program (OCSEAP) bird research began, little was reported about coastal use by birds of the Kodiak Archipelago except in winter. The U.S. Fish and Wildlife Service conducted winter boat surveys in 1973 and 1975 and the Alaska Department of Fish and Game has conducted aerial counts of waterfowl. In 1977 an aerial survey by the U.S. Fish and Wildlife Service duplicated their earlier boat surveys in coverage; however differences in species composition were evident between boat and aircraft surveys (Trapp 1977). The aerial survey recorded more dabbling and diving ducks, Harlequin Ducks, scoters and gulls while boat surveys, which did not get into shallow or estuarine waters, reported more eiders, Oldsquaws and alcids. Densities recorded for the 1973 and 1975 boat surveys were 129 and 147 birds/km², respectively, while the 1977 aerial survey had 101 birds/km². No intensive coastal surveys have been made in other seasons of the year along most of the Kodiak Archipelago.

Prior to 1976, little coastal bird work had been done in the Lower Cook Inlet lease area except for cursory surveys of the Kachemak Bay region. A study was conducted in 1976 by the Marine and Coastal Habitat Management Section, Alaska Department of Fish and Game (ADFG) in cooperation with this research unit to assess seasonal distribution and abundance of marine birds. Data from that study were summarized in Erikson (1977) and the habitat preference and density information will be presented in this report.

No specific surveys have been conducted along the south side of the Alaska Peninsula for bird habitat preference, and little work has been done on distribution and abundance by season. Effort has been directed at documenting seabird colony locations in summer. Although incidental information has been gathered on general distribution and abundance of other marine birds besides seabirds in summer, few data have been gathered in other seasons. Waterfowl surveys were conducted in winter 1970 and fall 1972 in many of the bays on the south side of the Alaska Peninsula but no records were kept of other bird species.

More surveys have been conducted, for the north side of the Alaska Peninsula so there is more knowledge of bird distribution and abundance. Surveys by ADF&G in the late 1960's and early 1970's documented use of the estuaries by waterfowl. Other investigators have reported use of nearshore and pelagic waters by marine birds (King and McKnight 1969, Bartonek and Gibson 1972). Little habitat is available for nesting seabirds but extensive estuarine saltmarshes and mudflats provide ideal staging habitat for waterfowl and shorebirds.
Habitat on the north side of Bristol Bay is more diversified and thus supports breeding seabirds as well as staging waterfowl and shorebirds. The ice pack during severe winters precludes much bird use of this area in winter. Again, waterfowl surveys in the early 1970’s provided most of the knowledge of birds using coastal areas, although many colonies had been documented and pelagic surveys conducted.

Bird use of the final region under consideration, the Aleutian Shelf lease area, has received little quantitative assessment. Murie (1959) summarized most qualitative data for parts of the region and colonies have been documented for some of the islands (Sowls et al. 1978). Otherwise, very little is known of seasonal bird use of coastal areas within this region.

IV. STUDY AREA

Coastal bird surveys under this research unit were conducted in the Gulf of Alaska and Bristol Bay from Cape Fairweather to Cape Newenham (Fig. 1). The study area was further subdivided into seven survey regions: 1-Northeast Gulf of Alaska, 2-Kodiak Archipelago, 3-Lower Cook Inlet, 4-South-Alaska Peninsula, 5-North-Alaska Peninsula, 6-North-Bristol Bay and 7-Aleutian Shelf.

Northeast Gulf of Alaska - This region is bounded on the south by Cape Fairweather and on the north by Cordova (Fig. 2). Much of the area consists of exposed sand or gravel beaches which are the result of downdrift from glacial outwash streams. The coastline is broken by two major glacial fjords, Icy Bay and Yakutat Bay, and by two large river deltas, the Copper and Bering Rivers. Extensive mudflats are found at the mouths of both rivers and also in adjoining Orca Inlet. Frequent seismic activity often changes these habitats quite drastically. An earthquake in 1899 uplifted the head of Yakutat Bay over 14 meters (Ruby 1977). The Good Friday Earthquake of 1964 uplifted the Copper River Delta and surrounding areas nearly 2 meters, causing brackish areas to become freshwater.

Storms, which are frequent and severe in fall and winter, also alter the geomorphology through erosion and deposition.

Kodiak Archipelago - Two major islands, Kodiak and Afognak, and several minor islands make up this mountainous archipelago (Fig. 3). The major islands are nearly bisected by long, narrow fjords and bays. Afognak Island and the extreme northeastern part of Kodiak Island are heavily forested with Sitka spruce (Picea sitchensis). The remainder of Kodiak is largely alpine tundra, and dense alder (Alnus crispa) thickets with cottonwood (Populus balsamifera) groves at heads of bays. Beach rye (Elymus sp.) and sedge/grass areas are found in small lagoons and on sandspits, but these habitats are not abundant on Kodiak. Nearly 60 percent of the archipelago has a rocky substrate--exposed or sheltered rocky headlands or eroding wave-cut platforms (Hayes and Ruby 1979). Gravel and mixed sand/gravel are the next most abundant substrates. Sand beaches are scarce and are generally found only on the south end of the island.
Fig. 1. Study area in southcentral Alaska subdivided into survey regions.
Fig. 2. Survey Region 1: Northeast Gulf of Alaska with place names.
Fig. 3. Survey Region 2: Kodiak archipelago with place names.
Maritime climates prevail on the Kodiak Archipelago. Warm ocean currents moderate winter conditions and, therefore, bays and fjords freeze over only during the most severe cold spells. Winds are strongest from westerly directions in winter and from the east during summer storms (Hayes and Ruby 1979).

**Lower Cook Inlet** - For this study, Lower Cook Inlet was defined as those portions of the inlet below the Forelands, as far as Cape Douglas on the western side and to Gore Point on the southeast (Fig. 4). It included all of Kachemak Bay exclusive of the Barren Islands. Lower Cook Inlet is physically more diverse than other regions studied. The southeast portion is predominantly sheltered rocky bays and fjords. With its maritime climate, these waters are generally ice-free in winter and provide winter habitat for several marine bird species. From Homer to Kenai, the shoreline is mostly sand beaches with a bluff at the high tide line. Waters are increasingly turbid to the north and in winter ice floes from Upper Cook Inlet are frequently found as far south as Ninilchik. Two large river deltas, Kenai and Kasilof, comprise the most productive bird habitat in this portion of coastline. In contrast to the straight, sandy northeast side, the west side of Lower Cook Inlet is broken up by several bays which are relatively shallow and have extensive intertidal mudflats on their periphery. Winter weather in this area is more severe than on the east side, and bays are frequently ice-choked.

Because of the Aleutian Range on the west and Kenai Mountains on the east, winds are generally funneled up and down the inlet, predominantly southwest in spring and summer, and northeast in fall and winter (Hayes et al. 1977). Bays on the west side frequently have localized, strong westerly winds in summer as air masses from Bristol Bay move through mountain passes.

**South-Alaska Peninsula** - This area (Fig. 5), like Kodiak and southeast Lower Cook Inlet, has numerous rocky bays and fjords with few large lagoons and proportionately fewer sandy beaches. Maritime weather keeps the area relatively ice-free in winter, but strong winds, heavy precipitation, and fog make it inhospitable for much of the year. Few permanent settlements have been established along the entire coastline. These conditions make it difficult to obtain bird information on a seasonal basis, yet conditions are not too severe to preclude substantial bird usage.

**North-Alaska Peninsula** - The north side of the Alaska Peninsula (Fig. 5) differs considerably from the south side. Most exposed portions are long sand or sand/gravel beaches with low beach ridges or high bluffs at the high tide line. No trees occur along the coast and the vegetation is largely that of arctic tundra and scrub thickets. Several large lagoons and embayments partitioning the coastline provide a wide variety of important bird habitats. At the mouths of these estuaries there are barrier islands and/or spits, and around their perimeters there are mudflats, sedge marshes and river floodplains. Rocky habitats are present only in Port Moller, at the southern portion of the Peninsula and on Unimak Island. Unimak is included in this region because of its similarities and proximity to the Alaska Peninsula.
Fig. 4. Survey Region 3: Lower Cook Inlet with place names.
Fig. 5 Survey Regions 4 and 5: South- and North-Alaska Peninsula with place names.
Fig. 5 (cont.). Survey Regions 4 and 5: South- and North-Alaska Peninsula with place names.
During severe winters all estuaries are ice-filled and pack ice covers Bristol Bay to the southern portion of this region. Low pressure systems frequently move up the coast bringing strong southeasterly winds and heavy precipitation.

**North-Bristol Bay** - This region includes a variety of habitats between the Kvichak River and Cape Newenham (Fig. 6). The eastern portion largely consists of extensive sand beaches with several large river deltas. Rocky cliffs are more common on the western portion with the largest at Capes Peirce and Newenham. A few small lagoons and bays are found in this section of coast, but only limited protected waters are available to birds. Rock cliffs which are common on Hagemeister and the Walrus Islands, provide abundant nesting habitat for seabirds.

Weather is similar to that on the Alaska Peninsula. Frequent storms come into Bristol Bay bringing heavy precipitation and strong southeast winds. The area is normally ice-covered in winter when pack ice moves down from the north.

**Aleutian Shelf** - Only the portion of the Aleutian Islands from Unimak Pass to Samalga Island was covered in this study (Fig. 7). Much of the coastline in this area is rock, either cliffs or boulder beaches. Gravel beaches are common at heads of the many bays, but sand beaches are rare. Few lagoons or embayments are present, and those that exist are quite small.

Storms are frequent in the Aleutians with high winds and heavy precipitation. Fog often enshrouds the islands. Because of the maritime climate, winter temperatures are moderate and there is little ice build-up in bays.

Strong tidal currents pass between islands and likely cause upwelling of food organisms for birds.

V. METHODS

**Aerial Surveys**

Several aerial bird survey techniques were used in the course of this project, depending upon the region surveyed and circumstances. Twin-engine amphibious and single-engine, fixed-wing aircraft and a helicopter were utilized at different times. Airspeed varied from 95 to 225 km/hour and survey altitude from 30 to 45 meters.

Along straight beaches with narrow supratidal zones, the survey aircraft flew 100-200 meters seaward of the waterline. The most frequently used technique involved observers on both sides of the aircraft. The shoreside observer enumerated all birds visible to the high waterline while the oceanside observer recorded all birds within 200 meters of the aircraft. For analyses, it was assumed the shoreside observer was looking at a mean width of 170 meters. Therefore, the total width of the "transect" was 370 meters parallel to the coast. Concentrations of birds outside this zone were recorded, but were not included in analyses.
Fig. 6. Survey Region 6: North-Bristol Bay with place names.
Fig. 7. Survey Region 7: Aleutian Shelf with place names.
In estuarine and coastal floodplain habitat, a total count of birds was attempted; or in some cases, transects were flown. Techniques for obtaining a total count entailed flying back and forth over the estuary or supratidal zone at close enough intervals to get "total" coverage.

While flying over open water between islands or while purposely flying pelagic, nearshore transects, both observers attempted to record all birds within 200 meters of the aircraft. Poor observation conditions or faster flying aircraft necessitated reduction of this zone to 100 meters.

For the winter survey of the Kodiak Archipelago, it was assumed that frequent poor winter weather conditions would preclude the practical use of the standard shoreline survey technique. Therefore, a stratified random census technique was used. The region was separated into eight basic habitat units, stations were numbered and the stations to be surveyed were randomly selected using a table of random numbers. We flew only preselected count units plus a few extra units suspected of being important to birds.

Only one observer was present on certain surveys, particularly when aircraft of opportunity were used (e.g. on marine mammal surveys). When this occurred, a fixed-distance (100 or 200 meters) technique was used when transects or offshore areas were flown. While flying along the coast, the observer counted all birds within the zone from the aircraft to the high tide line. For analysis, it was assumed that the width of the zone in the latter case was 170 meters. In this way, all density figures are based on area and not solely on distance.

Station Designation

The shoreline of each region was subdivided into "stations" or count units to facilitate recording bird locations. A requirement of the station designation scheme was that unit boundaries be easily identifiable at low altitudes while counting birds. Therefore, recognizable geographic features were used as starting and ending points and stations were of variable size. In most instances they were between 2 and 16 kilometers in length.

For analyses in this report, stations were combined into more meaningful and manageable sections of coastline. An attempt was made to maintain similar physiographic features within each section or at least to use logical starting and ending points.

Parameters Recorded

All observations were recorded on cassette-type tape recorders. Information recorded included the following: bird identification to lowest taxon possible (order, family, genus, species), bird numbers and habitat type in which the bird was found. Any other useful information including activity, sex, color phase and counting method was recorded when obtainable. Weather observations were recorded at the start of each flight and a coded survey condition was noted as often as conditions changed. Time was recorded at the start and end of each station.
Survey Priorities

Priority of selection of regions for surveying was based largely upon presumed importance of the area to bird populations, vulnerability of the area to oil development and the proposed OCS planning schedule for oil lease sale areas (the earliest lease sale areas were surveyed first). The amount of existing knowledge about certain areas and the extent of current research being conducted by other organizations or individuals also influenced which areas most needed research emphasis.

Species Group Designations

Because of the large quantity of data generated by the surveys and because of limited time and space for this report, certain abbreviations in the analyses were necessary. First, birds were consolidated into 17 ecological groupings plus an eighteenth "catch-all" group. The groupings were those which are most frequently seen in coastal environments. The eighteenth group consists of birds that did not fit into the previous 17 groups (such as ptarmigan [Lagopus spp.] or Belted Kingfishers [Megaceryle alcyon]) and unidentified birds. Few swans (Olor spp.) or jaegers (Stercorarius spp.) were observed but their numbers were combined with their nearest phylogenetic relatives, geese and gulls, respectively. In many cases, data on a species or species group basis were available but could not be presented here. For this report, dabblers (or dabbling ducks) included: Mallard (Anas platyrhynchos), Gadwall (A. strepera), Pintail (A. acuta), Green-winged Teal (A. crecca), Northern Shoveler (A. clypeata), European Wigeon (A. penelope) and American Wigeon (A. americana). Divers (or diving ducks) included: Canvasback (Aythya valisineria), Redhead (A. americana), Ring-necked Duck (A. collaris), Greater Scaup (A. marila), Lesser Scaup (A. affinis), Common Goldeneye (Bucephala clangula), Barrow's Goldeneye (B. islandica) and Bufflehead (B. albeola). Sea ducks included: Oldsquaw (Clangula hyemalis), Harlequin Duck (Histrionicus histrionicus), Steller's Eider (Polysticta stelleri), Common Eider (Somateria mollissima), King Eider (S. spectabilis), Spectacled Eider (S. fischeri), White-winged Scoter (Melanitta deglandi), Surf Scoter (M. perspicillata) and Black Scoter (M. nigra). Mergansers included: Common Merganser (Mergus merganser) and Red-breasted Merganser (M. serrator) Raptors included hawks, eagles, falcons and owls.

Habitat Type Designation

The habitat preference analysis also required abbreviation. During surveys, 473 different habitat combinations were recorded using the scheme in Table 1. These were consolidated into 39 habitat types plus four partially identified types (Table 2). Four habitat types were excluded because a total of less than 200 birds was seen on them. The substrate for each habitat type was designated as often as possible to be able to compare those habitats with the oil spill vulnerability index of Hayes et al. (1977).
Table 1. Four digit coding system used to classify habitats during coastal bird surveys. For each bird observation, one item for each column was recorded.

<table>
<thead>
<tr>
<th>CODE</th>
<th>WATER TYPE</th>
<th>PHYSIOGRAPHIC FEATURE</th>
<th>SUBSTRATE TYPE</th>
<th>COVER TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Indeterminable from air</td>
<td>Indeterminable</td>
<td>Indeterminable from air</td>
<td>Indeterminable from air</td>
</tr>
<tr>
<td></td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>Undetermined</td>
</tr>
<tr>
<td>2</td>
<td>Combination of below</td>
<td>Combination of below</td>
<td>Combination of below</td>
<td>Combination of below</td>
</tr>
<tr>
<td>3</td>
<td>Bay</td>
<td>Beach</td>
<td>Mud</td>
<td>Bare</td>
</tr>
<tr>
<td>4</td>
<td>Lagoon</td>
<td>Coastal Floodplain</td>
<td>Sand</td>
<td>Elymus - beach rye</td>
</tr>
<tr>
<td>5</td>
<td>Embayment</td>
<td>Salt Chuck</td>
<td>Gravel</td>
<td>Carex - sedge</td>
</tr>
<tr>
<td>6</td>
<td>Fjord</td>
<td>Inter-tidal area</td>
<td>Large rocks</td>
<td>Zostera - eelgrass</td>
</tr>
<tr>
<td>7</td>
<td>Unprotected shoreline</td>
<td>Tide Upwelling</td>
<td>Mud and sand</td>
<td>Mixed grass</td>
</tr>
<tr>
<td>8</td>
<td>Brackish pond or lake</td>
<td>Sand Spit</td>
<td>Sand and gravel</td>
<td>Mixed forbs</td>
</tr>
<tr>
<td>9</td>
<td>Fresh water pond or lake</td>
<td>Barrier Island</td>
<td>Sand, gravel and rocks</td>
<td>Algae - kelp</td>
</tr>
<tr>
<td>A</td>
<td>Lotic Environment</td>
<td>Other Island</td>
<td>Water</td>
<td>Coniferous trees</td>
</tr>
<tr>
<td>B</td>
<td>Open water (Pelagic)</td>
<td>River Delta</td>
<td>Land ice</td>
<td>Deciduous trees</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>Stream Delta</td>
<td>Sea ice (floating)</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>Cliff</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>Manmade structure</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>River Bank</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 2. Coastal habitats used in analyses of bird surveys.

I. Offshore Waters (pelagic and inshore transects)

II. Exposed Inshore (coastal) Waters
   A. Open Water
   B. Tideflats (Mud and Mud/Sand)
   C. Beach
      (1) Sand and Sand/Gravel
      (2) Gravel and Sand/Gravel/Rock
      (3) Rock
   D. Islands (Barrier and other) and Pinnacles
      (1) Upland Soil*
      (2) Sand Beach
      (3) Gravel Beach
      (4) Rock Beach

III. Protected Nearshore Waters (estuarine)
   A. Bays and Fjords
      (1) Open Water
      (2) Tideflats (Mud and Mud/Sand)
      (3) Beach
         a. Sand and Sand/Gravel
         b. Gravel and Sand/Gravel/Rock
         c. Rock
      (4) Islands (Barrier and other) and Pinnacles
         a. Upland Soil
         b. Sand Beach
         c. Gravel Beach*
         d. Rock Beach
   B. Lagoons and Embayments
      (1) Open Water
      (2) Tideflats (Mud and Mud/Sand)
      (3) Beach
         a. Sand and Sand/Gravel
         b. Gravel and Sand/Gravel/Rock
         c. Rock
      (4) Islands (Barrier and other) and Pinnacles
         a. Upland Soil
         b. Sand Beach
         c. Gravel Beach

IV. Sedge/grass Saltmarshes (includes those from exposed inshore waters, bays and fjords, lagoons and embayments, brackish and freshwater ponds and tideguts/sloughs).

V. Fluviatile Waters (streams and rivers)
   A. Exposed Deltas
      (1) Open Water
      (2) Bare Substrate
         a. Mud
         b. Sand
         c. Gravel
         d. Rock*
   B. Protected Alluvia (river waters, banks, floodplains and deltas from bays, fjords, lagoons and embayments).
      (1) Open Water
      (2) Bare Substrate
         a. Mud
         b. Sand
         c. Gravel
      (3) Vegetated Floodplain

VI. Dry Coastal Upland (includes tundra, subterranean soil)*

VII. Unidentified Habitats
    A. Exposed Inshore
    B. Bay/Fjord
    C. Lagoon Embayment
    D. Protected Alluvial

* Habitats dropped from analyses because of low bird usage
Season Designation

The following definitions were used for seasons: spring-April, May; summer-June, July, August; fall-September, October, November; winter-December, January, February, March. This breakdown is arbitrary, and migrating birds did not strictly follow this pattern. Many marine birds did not reach their wintering areas until well into November so this month was included as a "fall" month. During the course of the study, there were three unusually mild winters. Therefore, cold weather did not force certain bird species to final wintering areas until late in the fall or early winter.

Habitat Mapping

The second major objective of this project was to map habitat types in the high tide to supratidal zones of the coastline. This was done in snow-free months from aircraft at an altitude of 90-120 meters. Information on substrate type, height and slope of the bank at high tide line, type of vegetation and stormtide line were color-coded onto USGS 1:63,360 or 1:250,000 maps. Information concerning the mapping project, including areas of coverage, was summarized in Arneson (1977). Formal presentation of this information is beyond the scope of this report. An atlas on both scales of maps is located at Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage, Alaska.
VI. RESULTS

From October 1975 to August 1978, 33 surveys were conducted by observers from this research unit (Table 3). Twenty-nine surveys were conducted using fixed-wing aircraft, two using a rubber raft, one using a helicopter and one from a stationary platform. For analyses, the latter survey was omitted, and the other surveys were combined by season within each region.

For correct interpretation of the tables and figures in this report, it is essential to understand more about our data collection procedures and how bird behavior or distribution patterns may affect the results. In many cases, surveys in the same lease area and in the same season but different years were not duplicated station by station. Therefore, different amounts of a given habitat were searched, perhaps biasing results toward, or away from, certain habitats. For example, there were two types of surveys done in successive fall seasons on North-Alaska Peninsula. The first year the entire coastline and all estuaries were surveyed. To save time (i.e. money) the second year, we spent more time searching estuaries (where most birds are normally found). Therefore, habitats found in estuaries will be overemphasized and exposed beaches underemphasized in the habitat-usage analysis. Also, when we flew surveys in conjunction with marine mammal surveys, we searched types of habitats different from our normal coastal bird surveys. One must be familiar with survey trackline maps for each region to properly interpret the tabular and pictorial data.

Information on the quantities of each habitat type that were searched for each survey was not collected. Also, the time spent surveying specific habitat types was not recorded. Therefore, data on habitat usage presented in the following discussion only reflect habitat types in which the birds were found at the time of the survey.

When the coastline was flown in summer, we did not normally count birds in breeding colonies. For large colonies, it was impossible to get an accurate count from the air. Also, it was often hazardous for the aircraft to get too close. We did, however, count concentrations of roosting or feeding birds in the vicinity of colonies.

Birds' habitat preference and behavior also affected our counts. For example, tubenoses seldom occur nearshore and, therefore, we found them in large numbers only when doing pelagic transects. Shorebirds were most easily counted when they flushed. Consequently, when they remained on the ground, particularly the rock-dwelling species, they were frequently underestimated or likely overlooked entirely. Passerines were likely present in larger numbers than we found, but they, too, were small and were seldom observed unless flushed. Bird species which dove at the approach of aircraft were also likely underestimated. This was probably most true for grebes, cormorants and several sea duck species. Bird distributions also changed with the tides, time of day, and weather conditions and a one-time survey may have missed the period of peak occurrence.
<table>
<thead>
<tr>
<th>File Identification Number</th>
<th>Date of Survey</th>
<th>Season</th>
<th>Region Surveyed</th>
<th>Observers</th>
<th>Type of Survey</th>
<th>Number of Stations Surveyed</th>
<th>Total Time in Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT7602</td>
<td>9-11, 18 Feb 76</td>
<td>W</td>
<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen, W. Ballard</td>
<td>Shoreline</td>
<td>170</td>
<td>10:00</td>
</tr>
<tr>
<td>FT7604</td>
<td>1-9 May 76</td>
<td>Sp</td>
<td>Northeast Gulf of AK</td>
<td>P. Arneson, D. Eriksen, R. H. I. Isakson</td>
<td>Shoreline</td>
<td>42</td>
<td>9:06</td>
</tr>
<tr>
<td>FT7605</td>
<td>3, 9-1, 13 May 76</td>
<td>Sp</td>
<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Shoreline</td>
<td>168</td>
<td>11:43</td>
</tr>
<tr>
<td>FT7606</td>
<td>17-20 May 76</td>
<td>Sp</td>
<td>N. Bristol Bay</td>
<td>P. Arneson, D. Eriksen</td>
<td>Shoreline</td>
<td>110</td>
<td>9:20</td>
</tr>
<tr>
<td>FT7607</td>
<td>21-25 June 76</td>
<td>Su</td>
<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Shoreline-One Side</td>
<td>20</td>
<td>2:02</td>
</tr>
<tr>
<td>FT7608</td>
<td>24 July 76</td>
<td>Su</td>
<td>Northeast Gulf of AK</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects-One Side</td>
<td>24</td>
<td>6:18</td>
</tr>
<tr>
<td>FT7609</td>
<td>30-31 July 76</td>
<td>Su</td>
<td>N. AK Peninsula</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects-One Side</td>
<td>24</td>
<td>6:18</td>
</tr>
<tr>
<td>FT7610</td>
<td>16 June 76</td>
<td>Su</td>
<td>N. AK Peninsula</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects-One Side</td>
<td>24</td>
<td>6:18</td>
</tr>
<tr>
<td>FT7611</td>
<td>5, 6 March 76</td>
<td>W</td>
<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects</td>
<td>7</td>
<td>1:33</td>
</tr>
<tr>
<td>FT7612</td>
<td>1 April 76</td>
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<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects</td>
<td>7</td>
<td>1:33</td>
</tr>
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<td>Sp</td>
<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects</td>
<td>7</td>
<td>1:33</td>
</tr>
<tr>
<td>FT7614</td>
<td>24 June 76</td>
<td>Su</td>
<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects</td>
<td>7</td>
<td>1:33</td>
</tr>
<tr>
<td>FT7615</td>
<td>30 Sept 76</td>
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<td>Lower Cook Inlet</td>
<td>P. Arneson, D. Eriksen</td>
<td>Pelagic Transsects</td>
<td>7</td>
<td>1:33</td>
</tr>
<tr>
<td>FT7727</td>
<td>30 Sept-2 Oct 76</td>
<td>F</td>
<td>Lower Cook Inlet</td>
<td>D. Kurshej, D. Eriksen</td>
<td>Shoreline</td>
<td>176</td>
<td>10:15</td>
</tr>
<tr>
<td>FT7702</td>
<td>15, 14 Nov 76</td>
<td>F</td>
<td>N. AK Peninsula</td>
<td>P. Arneson, D. Eriksen</td>
<td>Shoreline-Estuary</td>
<td>36</td>
<td>10:01</td>
</tr>
<tr>
<td>FT7703</td>
<td>28 Feb-3 Mar 77</td>
<td>W</td>
<td>N. AK Peninsula, Aleutian Shelf</td>
<td>P. Arneson, D. McDonald</td>
<td>Shoreline</td>
<td>167</td>
<td>8:48</td>
</tr>
<tr>
<td>FT7704</td>
<td>4 March 77</td>
<td>W</td>
<td>N. AK Peninsula, S. AK Pen.</td>
<td>P. Arneson, D. McDonald</td>
<td>Pelagic Transsects, Shoreline</td>
<td>59</td>
<td>11:19</td>
</tr>
<tr>
<td>FT7705</td>
<td>16-18 March 77</td>
<td>W</td>
<td>S. and N. AK Pen.</td>
<td>P. Arneson, D. McDonald</td>
<td>Shoreline (helicopter)</td>
<td>28</td>
<td>4:52</td>
</tr>
<tr>
<td>FT7706</td>
<td>6-7 May 77</td>
<td>Sp</td>
<td>N. AK Peninsula</td>
<td>P. Arneson, D. McDonald</td>
<td>Shoreline</td>
<td>136</td>
<td>12:10</td>
</tr>
<tr>
<td>FT7707</td>
<td>10-12 May 77</td>
<td>Sp</td>
<td>N. Bristol Bay</td>
<td>P. Arneson, D. McDonald</td>
<td>Shoreline</td>
<td>46</td>
<td>3:18</td>
</tr>
<tr>
<td>FT7708</td>
<td>13 May 77</td>
<td>Sp</td>
<td>N. Bristol Bay</td>
<td>P. Arneson, D. McDonald</td>
<td>Pelagic Transsects (raft)</td>
<td>18</td>
<td>5:45</td>
</tr>
<tr>
<td>FT7709</td>
<td>17 June-14 July 77</td>
<td>Su</td>
<td>N. Bristol Bay</td>
<td>P. Arneson, D. McDonald</td>
<td>Pelagic Transsects (raft)</td>
<td>18</td>
<td>5:45</td>
</tr>
</tbody>
</table>

Table 3. List of all surveys conducted in southcentral Alaska for Research Unit #1.
On the density maps that follow, it was impossible to plot all station densities. Therefore, only sectional densities are presented. If high densities occurred within each section, their locations were plotted on the maps. The scheme used to designate high densities combined a minimum density with a minimum number of that species grouping. Any value exceeding both those assigned in Table 4 was plotted on the density maps as a "site of high density."

NORTHEAST GULF OF ALASKA (NEGOA)

Two surveys were conducted in the NEGOA region (Fig. 8). The spring 1976 survey covered the entire area thoroughly. In Controller Bay, Copper River Delta and Orca Inlet equidistant transects were flown because the areas were too large for total coverage. Only one observer was present on the summer 1976 survey, and only three sections of exposed beach and the southern portion of Icy Bay were surveyed. For data summary, the coastline was subdivided into 11 sections (Fig. 9).

SPRING

Density - An overall bird density of 151 birds/km² was found for NEGOA in spring 1976 (Table 5). Maps of bird densities by sections are shown in Figs. 10-27. Shorebirds and gulls were the most abundant groups with 67 and 45 birds/km², respectively. Shorebird populations were most dense on the Copper River Delta, Orca Inlet and Controller Bay (Fig. 22) where large areas of intertidal mudflats are found. Large flocks of Black-legged Kittiwakes (Rissa tridactyla) roosted on the beach and water near their colony on Martin Islands in Section 9. Because the area was small in this section, densities of gulls (774 birds/km²) for this section were magnified. The inclusion of counts of birds near colonies in Section 7 also helped increase gull densities to 163 birds/km². Sections 7 and 9 also had the highest alcid densities of 81 and 33 birds/km², respectively. Alcids (mostly murres) had arrived at their colony sites by the early May survey but roosted mainly on adjacent waters.

Densities for all other bird groups were much less. This was more a result of the timing of the survey in relation to spring migration than to lack of use of the area. For example, geese and dabblers moved through the area in late April. The survey in early May was timed to catch the peak of shorebird migration, and it also occurred during peak tern and, possibly, gull, migrations. The mean density was 9/km² for sea ducks and 7/km² for dabblers, divers and terns. Sea duck densities were highest in Icy Bay at 46 birds/km². Total numbers of sea ducks were greatest in Section 3, Russell and Nunatak Fjords. Scoters were the most abundant (84%) sea duck and Surf Scoters were the prevalent (76%) identified scoter.

Dabbling ducks were densest in Controller Bay (Section 8) with 17 birds/km² and most numerous in Section 3 (2020 individuals). Pintails were the most numerous (721) dabbler species identified in NEGOA followed by American Wigeon (549) and Mallards (473). Diving ducks, primarily Greater Scaup were densest (23 birds/km²) and most numerous (2288 individuals) in Russell and Nunatak Fjords (Section 3). Goldeneyes were the next most abundant diver but were one-fourth as numerous as scaup.
Table 4. Minimum density and total number criteria used to designate sites of high density.

<table>
<thead>
<tr>
<th></th>
<th>Minimum density (birds/km²)</th>
<th>Minimum number in station</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Other Passerine</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>
Fig. 8. Tracklines of aerial bird surveys in Northeast Gulf of Alaska, 1976.
Fig. 9. Physiographic subdivision of Northeast Gulf of Alaska for bird density analysis. Each numbered section contains several survey stations.
Table 5. Bird density by section of coastline in Northeast Gulf of Alaska, spring and summer 1976. See Figure 9 for section boundaries. (T=trace).

<table>
<thead>
<tr>
<th>Bird Group</th>
<th>Section of Coastline</th>
<th>Spring Densities (birds/km²)</th>
<th>Summer Densities (birds/km²)</th>
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</tr>
<tr>
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<td>T T T T T T T T T T</td>
<td></td>
</tr>
<tr>
<td>Grebe</td>
<td>T T T T T T T T T</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Tubenose</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Cormorant</td>
<td>T T T T 7 T 1 1 1 1 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Goose and Swan</td>
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<td>Dabbler</td>
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<td>1</td>
<td></td>
</tr>
<tr>
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<td>3 2 252 88 49</td>
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<tr>
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<tr>
<td>Raptor</td>
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<td>T T T T T T T T</td>
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<tr>
<td>Crane</td>
<td>T</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Shorebird</td>
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<td>T 13 14 7</td>
<td></td>
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<tr>
<td>Gull and Jaeger</td>
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<tr>
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<td>33 4 19 48 32</td>
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<tr>
<td>Alcid</td>
<td>T T T T 81 33 T 4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Corvid</td>
<td>T T T T T T T T</td>
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<td>Other Passerine</td>
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<td>T</td>
</tr>
<tr>
<td>Other Bird</td>
<td>1 T T T T T</td>
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</tr>
<tr>
<td>TOTAL</td>
<td>48 41 101 69 194 122 393 192 849 296 440 151</td>
<td>143 22 330 827 373</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 10. Total bird density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 11. Loon density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 12. Grebe density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 13. Tubenose density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. No tubenoses were sighted.
Fig. 14. Cormorant density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 15. Goose and swan density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 16. Dabbling duck density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 17. Diving duck density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 18. Sea duck density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 19. Merganser density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 20. Raptor density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 21. Crane density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 22. Shorebird density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 23. Gull and jaeger density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 24. Tern density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 25. Alcid density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 26. Corvid density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 27. Passerine (other than corvid) density by section in Northeast Gulf of Alaska during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Spring migration of Arctic Terns (*Sterna paradisaea*) was near a peak in NEGOA at the time of the survey. Large flocks roosted at mouths of streams and on sandspits reaching highest densities in Icy Bay (34 birds/km²) and on the coast from Yakutat Bay to Icy Bay (23 birds/km²). Numbers of terns were also high (1751) from Cape Fairweather to Ocean Cape in Section 1 but the area searched was larger and, therefore, the density was less.

All other bird groups had densities less than 10 birds/km². The peak migration period for geese had already passed and those on the Copper River Delta had established breeding territories in fresh water areas above the supratidal survey region. Most geese were in estuaries of Section 1 (532 individuals) and on the Copper River Delta (457). Merganser populations, although never dense, were found most frequently in Section 1 where one-half of the total for NEGOA were found (403 of 815). Red-throated Loons (*Gavia stellata*) were the most common (72%) of identified loons. Loons were most abundant in Sections 2 and 10 with 150 and 164 individuals, respectively. Cormorants were abundant only in the Kayak Island vicinity where several small colonies were located. There were 7 birds/km² and 262 individuals in that section. Raptors [95% of which were Bald Eagles (*Haliaeetus leucocephalus*)] were found in every section, but were most numerous in Section 1 (49) and Section 6 (46). All sectional densities for raptors were 1 bird/km² or less. Few corvids [Common Ravens (*Corvus corax*) or Northwestern Crows (*C. caurinus*)] were observed in the entire region.

Habitat Usage - Because survey coverage included most NEGOA stations in spring, most littoral habitat types were searched for birds. However, no offshore transects were surveyed in this region and, therefore, offshore-dwelling species such as shearwaters and other tubenoses were not observed. Habitat preferences of each species group and observations of species groups on each habitat type for the spring survey are shown in Figures 28 and 29, respectively.

Loons were found in almost equal numbers in three water types, bay water, protected delta water and exposed inshore water. Cormorants shared nearshore water habitats with loons but were also frequently found on intertidal rocks where they dried their plumage. Geese and dabblers selected similar habitats and were most frequently seen at river mouths on floodplains, mudflats or on fluvial water. Over half of the diving ducks were on bay waters and most of the remainder on protected delta water. Only 6 percent were on exposed inshore waters. Sea ducks, the third most abundant species group, were found primarily on bay/fjord waters (67%) with lesser amounts on exposed inshore water (25%) and protected delta water (8%). Mergansers preferred the mouths of rivers and streams where over three-fourths of the mergansers were found.

Bald Eagles were uniformly dispersed along the entire coastline and were found in a variety of habitats. The predominant habitat for eagles was exposed sand beaches (43%) where they frequently roosted on drift logs and fed on carrion washed ashore. Most cranes overfly NEGOA in spring (Isleib and Kessel 1973) and those few we saw (80) were flying along exposed inshore waters. Shorebirds were by far the most abundant species.
Fig. 28. Northeast Gulf of Alaska, Spring, 1976. Habitat preference of marine birds as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 29. Northeast Gulf of Alaska, Spring, 1976. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
group, and the importance of the mudflats of the Copper River Delta, Orca Inlet and Controller Bay was further substantiated. Shorebirds were found on a greater variety of habitat types (16 of 26) than was expected, but this was probably a result of the wide diversity of species observed. Each species had its own habitat requirements; some preferred brackish floodplains, some rock beaches and others mudflats.

Six species of gulls were found in all but 3 of the 26 different habitat types. They were most frequently seen along exposed inshore waters (22%), on exposed sand beaches (17%), or at colony sites on exposed island rock (14%). Densest concentrations of breeding gulls were on barrier islands of the Copper River Delta. A sandy substrate along exposed beaches and in protected deltas was selected by terns for roosting, and they were frequently seen flying along exposed beaches and over delta mudflats in migration and feeding. Receding glaciers have left deposits of sand or gravel moraine providing habitat for nesting Arctic and Aleutian Terns (*Sterna aleutica*). Few alcids except murres had returned to breeding sites at the time of the survey and 99 percent of the murres were rafted on exposed inshore waters near their colonies. Few corvids or other passerines were observed, and those that were used a variety of habitats.

Protected delta mud was the habitat type used by the largest number of birds (35,233) but 92 percent of these were shorebirds. The next most used habitat, exposed inshore water (16,431 birds), had all 16 bird groups present. Over half the birds found in this type were gulls (52%); 22 percent were alcids and 12 percent sea ducks. Other groups were present in small numbers.

Other habitats with high bird usage were bay mudflats (11,632) and bay water (11,102), but the same pattern of usage was found as in the two habitats mentioned above. Shorebirds comprised 95 percent of the birds on the mudflats, and a variety of species were found in bay water. Sea ducks were the most abundant species group in bay water (46%); diving ducks were second (30%), followed by gulls (9%). Protected delta water was another habitat used by most species groups (14 of 16). Shorebirds, diving ducks and dabbling ducks were the groups most frequently found in this habitat (24%, 23% and 19%, respectively).

**SUMMER**

**Density** - The abbreviated survey in NEGOS in late July provided data on summering populations of gulls and terns along the exposed beaches and of sea ducks in Riou Bay. Gulls were most common on the section of beach from Icy Cape to Cape Suckling where 677 gulls/km² and 14,343 individuals were recorded. The section south of Yakutat had 106 gulls/km² and 2608 individuals. Those sections also had the densest tern populations with 48 birds/km² in Section 6 and 33 birds/km² in Section 1. Sea ducks were found in all sections surveyed but were densest in Section 5. Over 1,000 scoters were found summering in Riou Bay. These may have been non-breeders that spent the entire summer in the area, or they could have
been breeding males that had returned to saltwater to molt. Most of the 1867 scoters recorded in Section 6 were observed at Cape Yakataga. Sea ducks were frequently concentrated at promontories along exposed coasts. Substrates were usually mixed at these capes but included much rock. This and current patterns may have concentrated food organisms.

Shorebirds were the only other relatively abundant bird group seen on this short summer survey, and Sections 4 and 6 had highest densities with 13 and 14 birds/km², respectively. Only four other species groups were recorded (all in small or trace densities). These were loons, cormorants, raptors and corvids.

**Habitat Usage** - Because of limited coverage on this survey, little can be said for bird usage of NEGOA habitats in summer. The data are summarized in Figs. 30 and 31. We recorded birds on only six habitat types. Most birds (76%) were on exposed sand beaches; however, this was the habitat most searched for birds. Eighty-eight percent of the birds on this habitat were gulls and 10 percent were terns. Exposed inshore water was the next most used habitat (12% of the total birds) followed by exposed rock beaches (8%) and bay water (4%). This represents most of the habitats searched on the summer survey. Eighty-nine percent of both gulls and terns were observed flying over, or roosting on, exposed sand beaches. Nine percent of the gulls and 69 percent of the shorebirds were found on exposed rock beaches. On this survey, sea ducks were found on exposed inshore waters most frequently (66%) with the remainder on bay waters (29%) or roosting on exposed sand beaches (5%).

**Spring Migration, Cape St. Elias** - In spring 1977 and 1978, W. Cunningham and S. Stanford were placed at Cape St. Elias on Kayak Island to obtain marine mammal data. As time permitted, they also conducted sea watches for birds and recorded other information including first arrival dates, peak migration periods and migration directions. The 1977 information was briefly summarized by Arneson (1978). Following is a brief account of what occurred in 1978. It is hoped that a detailed report of the birds of Kayak Island will be published in the future.

Birds migrating past Cape St. Elias chose one of several flight paths (Fig. 32). Most flew around the Cape and back up the northwest side of Kayak Island or easterly towards the mainland. Others flew north, northwest, west or even southwest toward Middleton Island. Flocks of some species were observed crossing over Kayak Island and many proceeded directly up the coast bypassing Kayak Island.

Some birds stopped to rest and feed near the Cape; others migrated past low to the water, and some were migrating so high as to be visible only with binoculars. Certain species passed by the Cape only during a short time span in spring, others passed by the Cape on diurnal migrations to and from roosting and feeding areas, while still others nested at colonies on the Cape. Flocks of some species migrated directly past, or over, the Cape while others seldom came closer than a kilometer or more. Following is a brief account by species group of the spring migration status of various birds at Cape St. Elias.
Fig. 30. Northeast Gulf of Alaska, Summer, 1976. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 31. Northeast Gulf of Alaska, Summer, 1976. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 32. Bird migration past Cape St. Elias, Kayak Island. Most migrants turned at the Cape and flew up the northeast coast of the island. Others flew north, northwest or west. A small percentage flew southwest toward Middleton Island or over Kayak Island. An unknown portion continued up the mainland coast past Controller Bay.
Loons - Common Loons (*G. immer*) were first observed on 29 March 1978 and were observed almost daily thereafter. Red-throated and Arctic Loons (*G. arctica*) were first recorded on 12 April and were seen almost daily afterward. From sea watch counts, as many as 10 loons per minute were migrating past the Cape from 8 May to 20 May with a peak of 20 loons per minute on 16 May. It was estimated that as many as 10,000 loons per day were migrating past during this peak period. Frequently they would stop to feed and rest in rafts numbering up to several hundred in a cove about 2 km southeast of the lighthouse. Others fed in a small area at the tip of a reef just west of the pinnacle at the Cape. On June 3, when seas were calm, loons were sighted "everywhere" out to 3 km. When migrating, their path beyond the Cape was usually back up the island's northwest coast but was occasionally due north or west. Their migrating flocks were frequently mixed with other species including cormorants, Brant (*Branta bernicla*), dabblers, scoters and murres. Migration was reduced from thousands of birds per day to hundreds per day after the first week of June. At that time almost all loons observed were Arctic Loons.

Grebes - Horned Grebes (*Podiceps auritus*) passed the Cape in small numbers from 18 April to 12 May and at times stopped in nearshore waters. Only one Red-necked Grebe (*Podiceps grisegena*) was sighted, on 22 May. Grebes normally migrate at night and would pass unnoticed at Cape St. Elias.

Tubenoses - Individual shearwaters (*Puffinus spp.*) were observed on 10 and 21 April; on 2 May several thousand appeared and remained until the end of the observation period at the end of June. On 21 May, although seas were calm and visibility excellent for observation, no shearwaters were sighted. Generally, flock size varied from a few hundred to several thousands. They fed in scattered clusters in an arc from southeast of the Cape to due north, seldom getting closer than 2 km from shore. Occasionally they fed near the reef west of the pinnacle. Occasionally dead shearwaters washed ashore (some were oiled), but beaches were not conducive to systematic beached bird surveys. Only one storm-petrel (*Oceanodroma spp.*) was observed on 20 June.

Cormorants - Pelagic (*Phalacrocorax pelagicus*) and Red-faced Cormorants (*P. urile*) were resident in the area and were seen on the arrival date of the observers, 22 March, and daily thereafter. Double-crested Cormorants (*P. auritus*) were first seen on 12 April. However, cormorants that wintered farther south did migrate past the Cape. Migration occurred from mid-April until about 5 May. After that, local movements of resident breeders past the Cape obscured migratory patterns. Three-to six-hundred per day were counted during the peak of migration. Their paths were generally close to the pinnacle and then up the northwest coast of Kayak Island. Others crossed the Gulf in a westerly or northwesterly direction.
Geese and Swans - Brant were the only common species to migrate past the Cape. Their migration began 3 April and continued until 15 June. Migration occurred daily throughout the month of May. Their flight pattern was generally well offshore (up to 5 km) south of the Cape and continued in a west or northwest direction. Brant occasionally stopped and rested on the cove southeast of the Cape, and some returned easterly when fog or inclement weather prevented migration to the west. Flocks of swans and Canada Geese (Branta canadensis) were observed only 4 and 8 times, respectively: swans from 13-22 April and Canadas from 23 March to 23 April. The earliest flock of swans was 5 km south of the pinnacle and headed west southwest across the Gulf. Swans and Canada Geese both flew northwest from the pinnacle or up the northwest coast of the Island. White-fronted Geese (Anser albifrons) were seen only once on 22 April and no Snow Geese (Chen caerulescens) were recorded. It was assumed that most of these birds continued straight up the coast to the Copper River Delta bypassing Kayak Island.

Dabblers - Mallards and Pintails first appeared on 6 April but 14 April was the date when heavy migration began. On that day Mallards, Pintails, Green-winged Teal, Northern Shovelers and American Wigeon rounded the Cape and flew back up the northwest side of Kayak Island. The peak of pintail migration was 25 April when 8,543 were observed passing the Cape. In 1977 this occurred on 26 April. The 1978 peak decreased on 28 April, but migrants of most dabbler species passed daily until 22 May. Late migrants were seen on several days after that. Most migrating dabblers at the Cape flew in a westerly or northwesterly direction over the Gulf, thereby bypassing the Copper River Delta. Others flew up the northwest coast of Kayak Island and back toward the mainland. Dabblers seldom stopped near the Cape; however, they did utilize brackish ponds on the uplifted southern shore of the island. Migrating flocks were frequently consisted of mixed dabbler species or even other species of birds.

Divers - Only two diving duck species groups were observed in the 1978 migration. A total of 17 Goldeneyes was observed on three days in March and one subsequent to that. Scaup appeared on 14 April, 5 May, almost daily from 8 to 21 May and sporadically in June. The largest number was 186 on 8 May and most migrants continued up the northwest coast of the Island. Because divers are normally nocturnal migrants, they did not show up in many counts. They appeared to be a minor constituent of the Cape St. Elias avifauna.

Sea ducks - Six species of sea duck were observed at Cape St. Elias. Oldsquaws and King Eider were observed only once. Oldsquaws are nocturnal migrants (Bellrose 1976), and probably fly overland toward the interior from southeast Alaska wintering grounds (Palmer 1975). They probably would not be expected in large numbers. King Eiders were rare winter visitants in the area and would also not be expected. Harlequin Ducks were resident in small numbers throughout
the observation period and apparently did not migrate past the Cape. Three scoter species were the most abundant sea duck migrants. Black Scoters wintered at the Cape and frequently fed in shallow water on both sides of the pinnacle. White-winged Scoters, first observed on 28 March, were present in small numbers until migration began and their numbers increased. Surf Scoters were less commonly observed as winter residents in 1978 but were the most abundant migrant. On 14 April flocks of scoters began flying past the Cape and continued until 1 July. The first peak for migrating Surf Scoters was from 14 to 26 May. A maximum count of 1245 individuals occurred on 20 May. A second minor peak occurred from 2 to 10 June and a third larger peak from 19 to 28 June. White-winged Scoters were second in abundance with 25 to 100 observed migrating daily from 14 April to 16 May, with a second peak from 2 to 10 June as with Surf Scoters, and the largest number observed on 19, 20, 23 and 24 June. When resident Black Scoters left by 4 April, a second migration period occurred. Scattered individuals flew past the Cape from 16 April to 16 May. The most seen was 284 on 5 May and none were seen after 16 May. Flocks of mixed scoter species were frequently seen, and other species, commonly Green-winged Teal, were also observed migrating with scoters. Their flight path was most often around the Cape and up the northwest coast of Kayak Island, but occasionally scoters would travel northwest across the Gulf.

Mergansers - Small numbers of Red-breasted Mergansers wintered at the Cape and were present when observation began. They were observed feeding on both sides of the Cape and pinnacle on sculpins (Cottidae) and an abundant supply of blennies (Stichaeidae). Migrants appeared on 14 May when 85 passed the Cape and continued up the northwest coast of Kayak Island. Small numbers of individuals (5 to 50) were seen in early June, after which none were seen. Common Mergansers were observed only in late April. Some stopped to feed nearshore and others migrated up the northwest coast in the same flight pattern as Red-breasted Mergansers.

Raptors - Cape St. Elias was not a part of the migration corridors for raptors. Two Peregrine Falcons (Falco peregrinus) were observed: one on 20 April and another on 12 May. It is unknown whether these were the endangered subspecies F. p. anatum or more common F. p. pealei. A Merlin (F. columbarius) was seen on 26 April and a Marsh Hawk (Circus cyaneus) on 8 May. No other migrating raptors were recorded. Bald Eagles were resident in the area (3 active nests were found), and 5 to 12 were seen almost daily at the pinnacle scavenging on dead sea lion pups and other carrion or, occasionally, taking a bird that nested at the pinnacle colonies. A large part of the total population were non-breeding, immature birds.

Cranes - No Sandhill Cranes (Grus canadensis) migrated past Cape St. Elias in 1978 (only one in 1977). It appears, therefore, that this species must have followed along the coast to Controller Bay and continued to the Copper River Delta.
Shorebirds – Although 13 species of shorebirds were identified, only two were observed regularly at the Cape, Black Oystercatchers (*Haematopus bachmani*) and Rock Sandpipers (*Calidris ptilocnemis*). Suitable habitat for other species was not prevalent at the Cape. Black Oystercatchers were resident on Kayak Island in small numbers (about 8 at the Cape). This species also migrated past the Cape in relatively large numbers (20-65 per day) in April. Rock Sandpipers were present on the first day of observation, 22 March, and migrating flocks of up to 100 individuals stopped occasionally at the Cape to feed in intertidal rock habitat. None were seen after May 20. Other species like Whimbrels (*Numenius phaeopus*), Wandering Tattlers (*Heteroscelus incanus*), Surfbirds (*Aphriza virgata*) and several sandpiper species, infrequently stopped to feed. After a severe storm that piled kelp and other algae in thick windrows on the beach, shorebirds of several species were observed feeding on amphipods (Talitridae) that were abundant in the algae. Semipalmated Plovers (*Charadrius semipalmatus*) and least Sandpipers (*Calidris minutilla*) nested along the beach on both sides of the island. Northern Phalaropes (*Phalaropus lobatus*) were recorded on only 5 days, but on 15 May several thousand were observed well offshore alternately feeding and migrating in a westerly direction. On 20 May 850 phalaropes migrated past the Cape, and only small numbers were seen subsequently.

Jaegers and Gulls – Although all three jaeger species were observed migrating past the Cape, Parasitic Jaegers (*Stercorarius parasiticus*) were the most common. The first was sighted 21 April and the most (11) on 29 May. Almost all rounded the Cape and headed up the northwest coast. Glaucous-winged Gulls (*Larus glaucescens*) were resident on the Island. An estimated 1-500 were seen in March soon after arrival of the observers. Migration began the second week in April and continued into the first week of May. Local movements past the Cape by resident gulls obscured migration patterns after that. Up to 25 Herring Gulls (*L. argentatus*) were observed migrating past or feeding and roosting in the area. Only two Bonaparte's (*L. philadelphia*) and no Mew Gulls (*L. canus*) were sighted. One would assume they must follow the mainland coast or travel well offshore in their migration. Migration patterns of Black-legged Kittiwakes were obscured by a large diurnal movement past the Cape of birds nesting near Cape St. Elias. In the morning and early afternoon Kittiwakes flew around the Cape and up the northwest coast toward colonies at Wingham and Martin Islands. After 17:00 most reversed the direction and flew up the southeast side of Kayak Island toward the mainland. This diurnal movement involved 10-15,000 birds. As many as 436 Black-legged Kittiwakes per minute were recorded in sea watches. This mass movement ended about 22 May. Subsequently, only a few hundred passed the Cape each day. Occasionally kittiwakes stopped to rest on the water at Cape St. Elias in rafts of 1,000 or more. They also frequently joined feeding rafts of loons, murres and puffins in the vicinity of the Cape.
Terns - Although thousands of terns migrate up the coast of NEGOA in spring, none were seen at Cape St. Elias in 1977 or 1978. They must have followed the mainland coast past Kayak Island or migrated far offshore.

Alcids - The normal migration pattern for most alcids are from offshore wintering areas to coastal breeding areas. Therefore, migration of alcids past Cape St. Elias would not be expected. Most movements were to feeding and roost areas by birds nesting in the vicinity. Murres (Uria spp.) had already arrived at the Cape when observations began on 22 March. By March 26,500 murres were rafted on nearshore waters. These birds flew back and forth past the Cape, roosted and fed in the vicinity but did not come ashore until 7 April. At times there were due north diurnal movements past the pinnacle in the morning, with returns in a southeasterly direction in the evening. This pattern was followed by a minimum of 10,000 murres on 15 April. Whether this represented a migration or diurnal movements of birds from colonies at Wingham and Martin Islands was uncertain. The murres could possibly have been feeding in the gyre northwest of Kayak Island. Frequently in the evening during the last 3 weeks of April, a raft of several hundred to over 1,000 murres congregated 1 to 3 km west of the lighthouse at the Cape. Several hundred Tufted Puffins (Lunda cirrhata) often joined this raft of birds. Tufted Puffins arrived at Cape St. Elias on 15 April and the population subsequently increased to several hundred birds. Although there was much movement by puffins back and forth past the Cape, no specific migration pattern was noted.

There were far fewer (less than 1,000 vs. 6,000) Tufted Puffins nesting at the pinnacle than reported by Isleib and Haddock in Sowls et al. (1978). Horned Puffins (Fratercula cornicolata) were reported as being "found largely at colonies from Cape St. Elias westward" by Isleib and Kessel (1973) but Horned Puffins were not observed in 1977 or 1978 at Cape St. Elias. Marbled Murrelets (Brachyramphus marmoratus) were the next most commonly observed alcid, and this bird may nest on the island. They were observed occasionally in April and early May, but after 29 May they were seen regularly, feeding near the Cape or flying past in both directions. As many as 60 to 70 were observed on some days. Ancient Murrelets (Synthliboramphus antiquus) and Cassin's Auklets (Ptychoramphus aleuticus) were sporadically observed but never abundant. An estimated 150 Cassin's Auklets per hour flew easterly past the Cape most of the day on 18 May. At that time mating was observed so it appeared that this auklet may nest near Cape St. Elias. Pigeon Guillemots (Cepphus columba) were observed on only 10 days; the most observed was three.

Corvids - Common Ravens were the only corvid regularly observed at the Cape. A family group exploited the nesting murres, gulls and cormorants and scavenged on the beach. Northwestern Crows were seldom seen and no more than three individuals were present at one time.
Other Passerines - Although many were recorded on the island, few directly used marine habitats. However on 14 May Steller's Jays (Cyanocitta stelleri), American Robins (Turdus migratorius) Varied Trushes (Ixoreus naevius), Savannah Sparrows (Passerculus sandwichensis) and Fox Sparrows (Passerella iliaca) fed with shorebirds on amphipods and insects that were in the windrows of algae on the beach.

KODIAK

Only one coastal bird survey was conducted by this research unit in the Kodiak lease area. A stratified-random survey design was used in winter 1976 (Arneson 1976). Eight strata were preselected in the stratification: exposed waters-forested, protected waters-forested, heads of bays-forested, exposed waters-tundra/alder, protected waters-tundra/alder, heads of bays-tundra/alder, estuaries-lagoons and embayments and low tundra/sand beach. Count units were randomly selected within each stratum (Fig. 33). Because of the stratification, all coastal habitats found on Kodiak may not have been searched.

Two observers recorded all birds within a section of bay or along an exposed coast rather than along an entire coast as in other surveys. This increased the observational area for birds beyond 400 meters from the tideline but decreased it for those birds near the tideline. All major islands of the archipelago were surveyed.

For analysis, the survey area was divided into five sections (Fig. 34) which were based partially on habitats and exposure: Section 1 - Afognak/Shuyak is almost entirely forested, Section 2 - North side is only partially forested and protected by Chiniak and Kizhuyak Bays, Section 3 - West side has a tundra/alder shore but is exposed to Shelikof Strait, Section 4 - East side is exposed to Gulf of Alaska and has a tundra/alder shore, and Section 5 - South side has several low, sand/gravel beaches.

WINTER

Density - In the 1976 Kodiak winter survey, we found an average bird density of 39 birds/km² (Table 6). Over half of the birds were sea ducks (20 birds/km²). Diving and dabbling ducks were a distant second and third with densities of 5 and 4 birds/km², respectively. Alcid densities were slightly higher than densities of gulls and shorebirds (3 vs. 2 birds/km²). On a percentage basis, the relative abundance was seabirds 51 percent, divers 13 percent, dabblers 10 percent, alcids 9 percent, gulls 5 percent and shorebirds 4 percent.

Bird densities by section are depicted in Figs. 35-52. Most sea ducks were in the Chiniak/Kizhuyak section of Kodiak Island (44 birds/km²) and the Gulf of Alaska side (23 birds/km²). Of identified sea ducks, 40 percent were scoters, 28 percent Oldsquaws, 22 percent eiders and 11 percent Harlequin Ducks. Sixty-three percent of the identified scoters were Black, 20 percent Surf and 18 percent White-winged. Steller's Eiders comprised 69 percent of the identified eiders, 22 percent were King Eiders and 9 percent Common Eiders.
Fig. 33. Count areas sampled during aerial bird survey along Kodiak archipelago, Winter 1976. A stratified random design was used. This was survey number 7603 conducted from 22 February to 3 March, and 21–24 March; total time of survey was 9 hours, 51 minutes.
Fig. 34. Physiographic subdivision of Kodiak archipelago for bird density analysis. Each numbered section contains many count areas.
Table 6. Bird density by section of coastline in Kodiak Archipelago, winter, 1976. See Figure 34 for section boundaries. (T=trace).

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<th>Bird Group</th>
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</tr>
<tr>
<td>Loon</td>
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<td>Grebe</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>Tubenose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cormorant</td>
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<td>2</td>
</tr>
<tr>
<td>Goose and Swan</td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>Sea Duck</td>
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<tr>
<td>Merganser</td>
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<td>T</td>
</tr>
<tr>
<td>Raptor</td>
<td>T</td>
<td>T</td>
</tr>
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<td>Crane</td>
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<td>2</td>
</tr>
<tr>
<td>Corvid</td>
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<td>T</td>
</tr>
<tr>
<td>Other Passerine</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Other Bird</td>
<td>T</td>
<td>T</td>
</tr>
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<td><strong>TOTAL</strong></td>
<td>40</td>
<td>67</td>
</tr>
</tbody>
</table>
Fig. 35. Total bird density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 36. Loon density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 37. Grebe density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 38. Tubenose density by section in Kodiak archipelago during winter as determined by aerial survey. No tubenoses were sighted.
Fig. 39. Cormorant density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 40. Goose and swan density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 41. Dabbling duck density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 42. Diving duck density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 43. Sea duck density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 44. Merganser density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 45. Raptor density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 46. Crane density by section in Kodiak archipelago during winter as determined by aerial survey. No cranes were sighted.
Fig. 47. Shorebird density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 48. Gull and jaeger density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 49. Tern density by section in Kodiak archipelago during winter as determined by aerial survey. No terns were sighted.
Fig. 50. Alcid density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 51. Corvid density by section in Kodiak archipelago during winter as determined by aerial survey.
Fig. 52. Passerine (other than corvid) density by section in Kodiak archipelago during winter as determined by aerial survey.
Highest densities of diving ducks were recorded in the Afognak/Shuyak section (14 birds/km²) and divers were least abundant in the Shelikof and southern sections (both 2 birds/km²). Over 90 percent of the divers in the Afognak, Shelikof and southern sections were goldeneyes. The remainder in those three sections were Bufflehead. In Section 2, the Chiniak area, 50 percent of the divers were scaup, 47 percent goldeneye and 3 percent Bufflehead. Diving ducks in Section 4 consisted of 60 percent goldeneyes, 35 percent Buffleheads and 5 percent scaups. Overall, 76 percent of the diving ducks were goldeneyes, 13 percent scaups and 11 percent Buffleheads.

Ninety-nine percent of identified dabbling ducks were mallards. Dabblers reached highest densities (8 birds/km²) in Section 3 on stream deltas at heads of bays and in coastal lagoons. They were least abundant on the southern portion of Kodiak. Gadwalls, Pintails and American Wigeons were all identified, but occurred in small numbers.

Alcids, the next most dense species group (3 birds/km²), were found in greatest abundance on the eastern side of Kodiak, particularly in Kiliuda and Ugak Bays. There, large rafts of murres were observed both in and out of count units. Murres comprised 83 percent of all alcids observed. One alcid/km² was recorded for the Afognak section and only a trace was recorded for the southern end.

Chiniak Bay was the area of densest wintering gull populations (4 birds/km²), and the southern end of Kodiak was next with three gulls/km². The three other sections had only one bird/km². Of identified gulls, 76 percent were Glaucous-winged and 24 percent Mew Gulls.

Shorebird densities were consistently moderate (1 or 2 birds/km²) in all but the southern section where only a trace was found. Twenty percent of the shorebirds were Black Oystercatchers, and the remainder were unidentified small and medium shorebirds. Rock Sandpipers were identified in small numbers and likely comprised most of the unidentified shorebirds.

Cormorants and corvids were the only other groups with a density greater than one bird/km² and Section 1 had the greatest corvid densities (2 birds/km²). Ninety-five percent of the corvids were Northwestern Crows, and the remainder were Black-billed Magpies (*Pica pica*) (3%) and Common Ravens (1%). Loons, mergansers and raptors were observed in all sections but in only trace amounts. Emperor Geese (*Philaetus omnica*ic*a*) were recorded only in Sections 4 and 5, and only five grebes were observed.

Section 2, Chiniak/Kizhuyak Bays, had the highest bird densities of the five sections with 67 birds/km². Forty-eight birds/km² were found in Section 4, the eastern side, and 40 birds/km² were observed in Section 1, Afognak/Shuyak Islands. The western side had 28 birds/km², and the southern side had the lowest density - 20 birds/km².
Habitat Usage - As mentioned previously, the sampling techniques required more searching for birds in open waters of bays/fjords thereby increasing numbers found in that habitat type. Habitat preferences of each species group and what species groups were found on each habitat type are shown in Figs. 53 and 54, respectively. All species groupings observed with the exception of "Other Passerines" were recorded in bay/fjord water, and 78 percent of all birds were in that habitat type. Fifty-nine percent of birds in bay water were sea ducks, 16 percent diving ducks, 11 percent alcids and 7 percent dabbling ducks. All grebes, almost all alcids, 91 percent of the mergansers and diving ducks, 89 percent of the sea ducks and loons and 80 percent of the cormorants were found on bay water.

Lagoon/embayment waters were a distant second in habitats used by wintering birds on the Kodiak survey. Five percent of all birds were found in that habitat. Almost 94 percent of the birds in lagoon waters were waterfowl. Most (44%) were sea ducks, 28 percent were dabblers and 20 percent divers. However, only 5 percent of all sea ducks selected that habitat, plus 15 percent of the dabblers and 7 percent of the divers.

Exposed inshore water was the third most used habitat, but only about 4 percent of the birds were found there. Sea ducks and cormorants were the most abundant species groups in exposed inshore water with 85 and 9 percent of the total, respectively. The species group with the largest percentage of its total in exposed inshore water was geese. All were Emperor Geese and 17 percent were found over exposed waters. They frequently flushed from beach habitats and were flying over water when observed.

The only other habitat type on which 2 percent or more of the total birds were found was protected delta water. This habitat was frequently found at heads of bays. Ninety-one percent of the birds on protected delta water were dabblers, however, only 21 percent of the dabblers were found on the habitat. Most (52%) dabblers used bay water, 15 percent used lagoon water and 11 percent used saltmarshes.

Raptors (all were assumed to be Bald Eagles) used the widest variety of habitats. They were found on 10 identified types. Most heavily used were rocky islands or pinnacles and rocky beaches in bays. Over one-fourth were on exposed habitats.

Shorebirds were the most prevalent species group on exposed habitats. Twenty-seven percent of the shorebirds were on exposed sand, gravel or rock beaches. Black Oystercathers comprised 20 percent of all shorebirds and the remainder were unidentified small and medium shorebirds except for a few Rock Sandpipers. It was likely that many of the birds were Rock Sandpipers. Shorebirds also frequently chose rocky beaches of islands in bays (19%), gravel beaches in bays (9%) and were observed flying over bay water (9%).
KODIAK ARCHIPELAGO, WINTER

Loons

Grebes

Tubenoses

Cormorants

Swans and Geese

Dabblers

Divers

Sea Ducks

Mergansers

Raptors

Cranes

Shorebirds

Jaegers and Gulls

Terns
Fig. 53. Kodiak archipelago, Winter 1976. Habitat preference of marine birds as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 54. Kodiak archipelago, Winter 1976. Marine bird usage of habitats as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Sixty-two percent of the gulls were recorded in protected bays and fjords either on water or on various coastal substrates. Another 22 percent were found on lagoon or embayment habitats. Only 13 percent used exposed coastal areas. Many gulls flock to the city of Kodiak in winter when crab processing is underway, but in this survey the Kodiak area was not surveyed.

Because corvids were frequently flying when observed, habitat types were often not recorded for them. Almost three-fourths of the corvids were associated with bay/fjord habitats, 15 percent with lagoons and 7 percent with salt marshes.

For the entire Kodiak survey, a minimum of 37 bird species were found on 16 habitat types.

LOWER COOK INLET

Survey data are more complete for Lower Cook Inlet than for other regions in the study area. In 1976, in conjunction with the Marine and Coastal Habitat Management Section, Alaska Department of Fish and Game, we conducted bird surveys in all four seasons. We flew the entire coastline in each survey and also conducted eight pelagic transects (Fig. 55). In addition, we flew a pelagic survey of Kamishak and outer Kachemak Bays in conjunction with an ADFG marine mammal survey team.

In 1978, field studies were confined to the Lower Cook Inlet region and we completed four spring coastal, one summer coastal, one fall coastal/pelagic and two winter coastal/pelagic surveys (Figs. 56 and 57). These surveys, combined with past information, provide a suitable data base for predicting potential impacts to birds by oil or other development in the region.

The coastline was subdivided into 17 physiographic sections for logical depiction of bird densities (Fig. 58). To summarize bird densities in offshore waters, we used five regions which were termed "natural regions" in the Lower Cook Inlet OCSEAP Synthesis Report (Fig. 58).

SPRING

Shoreline Density - Bird densities by shoreline section for total birds and for each species group are depicted in Figs. 59-76. Lower Cook Inlet had the highest overall bird density in spring when 192 birds/km² were recorded along the coast (Table 7). Over 50 percent of the birds were shorebirds and gulls at densities of 53 and 52 birds/km², respectively. The five waterfowl groups made up most of the remainder: 38 sea ducks/km², 23 divers/km², 15 dabblers/km², 7 geese/km², and 1 merganser/km². Except for alcids with 1 bird/km², no other bird groups were found in anything but trace amounts.

Section 15, on the south side of Kamishak Bay, had the highest combined density (417 birds/km²) in spring. This section also contained the highest densities of shorebirds (216 birds/km²) and sea ducks (117
Fig. 55. Tracklines of aerial bird surveys in Lower Cook Inlet, 1976.
Fig. 56. Tracklines of aerial bird surveys in Lower Cook Inlet, 1977-1978.
Fig. 57. Trackline of boat survey for birds in Kamishak Bay, Summer 1978. This was survey number 7808 conducted from 7 June to 16 August; total time of survey was 69 hours, 46 minutes.
Fig. 58. Physiographic subdivision of Lower Cook Inlet for bird density analysis. Circled numbers 1-17 designate coastal survey sections, each containing several stations. Pelagic surveys were analysed within regions designated by bold numbers 1-5 and bounded by stippled lines.
Table 7. Bird density by section of coastline in Lower Cook Inlet, spring 1976, 1978. See Figure 58 for section boundaries. (T=trace).

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<th>Bird Group</th>
<th>Section of Coastline</th>
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<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 Total</td>
</tr>
<tr>
<td>Loon</td>
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<tr>
<td>Grebe</td>
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</tr>
<tr>
<td>Tubenose</td>
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</tr>
<tr>
<td>Cormorant</td>
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</tr>
<tr>
<td>Goose and Swan</td>
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<td>Merganser</td>
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<tr>
<td>Gull and Jaeger</td>
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<td>Alcid</td>
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|                  | T T T T T T T T T T T T T T |
|                  | T T T T T T T T T T T T T T |
|                  | T T T T T T T T T T T T T T |

TOTAL | 156 120 51 262 78 39 210 332 50 155 24 206 166 173 417 151 21 192
Fig. 59. Total bird density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 60. Loon density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 61. Grebe density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 62. Tubenose density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 63. Cormorant density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 64. Goose and swan density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 65. Dabbling duck density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 66. Diving duck density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 67. Sea duck density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 68. Merganser density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 69. Raptor density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 70. Crane density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 71. Shorebird density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 72. Gull and jaeger density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 73. Tern density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 74. Alcid density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 75. Corvid density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 76. Passerine (other than corvid) density by coastal survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
birds/km²). A flock of over 10,000 shorebirds staged at the mouth of an unnamed stream on the western portion of Section 15. Sea ducks (largely scoters) in large rafts fed in shallow waters west of the mouth of the Douglas River.

Tuxedni Bay, Section 8, had the next densest bird populations at 332 birds/km². Highest densities of gulls (201 birds/km²) and diving ducks (50 birds/km²) were found in this section. Black-legged Kittiwakes from a large colony on Chisik Island contributed most to the high gull density. Many kittiwakes roosted on nearby mudflats and beaches or rafted on the water. They were counted there rather than on the colony site itself. Most diving ducks observed were scaup which lined the waters' edge and fed in shallow water over mudflats throughout most of Tuxedni Bay.

Other sections with over 200 birds/km² included Section 4, the inner part of Kachemak Bay with 262 birds/km²; Section 7, the Redoubt Bay area, with 210 birds/km²; and Section 12, the Iniskin-Iliamna Bay area with 206 birds/km². Kachemak Bay had a variety of bird groups with moderate densities that when summed together gave the high overall density. Sea ducks were densest with 76 birds/km² followed by shorebirds (71 birds/km²), divers (49 birds/km²) and gulls (33 birds/km²). Mergansers reached their highest overall density in Kachemak Bay (95 birds/km²) as did corvids (1 bird/km²). The large concentration of mergansers was observed in China Poot Bay. Redoubt Bay, with a combination of delta mudflats and sedge/grass meadows, provided suitable habitat for staging shorebirds (91 birds/km²), geese (58 birds/km²) and dabbling ducks (40 birds/km²). Because of its extensive mudflats, Iniskin Bay is another important staging area for shorebirds and diving ducks in Lower Cook Inlet. It had 11 shorebirds/km² and 36 divers/km² feeding on intertidal or subtidal habitats.

Loons and Grebes were seen in most sections but never in densities exceeding 1 bird/km². There were no spring sightings of tubenoses on nearshore surveys.

Cormorants were never abundant but reached highest densities in Sections 6 (Chugach Islands vicinity) and 17 (Augustine Island) with 5 and 4 birds/km², respectively. Geese and dabblers were relatively abundant in Redoubt Bay and at the mouths of Kenai and Kasilof Rivers (54 geese and 39 dabbling ducks/km²) and at Swamp Creek on Kalgin Island (40 geese and 84 ducks/km²). High densities of divers were observed in Akumwarvik Bay of Section 14. The area north of Anchor Point to about Ninilchik had high densities of sea ducks. North of Ninilchik in Section 2, densities rapidly decreased. Also, a large raft of scoters and eiders (188 birds/km²) was observed at Chenik Head in Section 13.

Raptors were scattered throughout the Inlet but never in dense concentrations. Most Sandhill Cranes were observed at the mouths of the Kenai and Kasilof Rivers (6 birds/km²) and on Kalgin Island. Additional shorebird concentrations were noticed in Chinitna Bay where a large intertidal mudflat was located. High densities of gulls, not associated directly
with colonies, were in Sections 13 and 14 on the western shore of Kamishak Bay where 55 and 59 gulls/km², respectively, were found. The largest concentration was at Chenik Head at the dividing line between the two sections where 777 gulls/km² were recorded. Few terns and alcids had arrived by the time of the spring surveys.

**Pelagic Density** - Bird densities in offshore waters of the five "natural" regions of Lower Cook Inlet are represented in Figs. 77-94. In offshore waters 15 birds/km² were observed in spring (Table 8). This region, including outer and inner Kachemak Bay, had the highest density (32 birds/km²). Fewest birds were observed in the northern region around Kalgin Island. Most of the birds seen in these offshore waters were sea ducks. A mean of 11 sea ducks/km² was recorded for all regions. Regions 2 and 3 were highest with 15 and 24 sea ducks/km², respectively. Alcids and gulls had the next highest densities overall with only 2 birds/km² each. Regions 3 and 4 had the most alcids (7 and 8 birds/km², respectively). Other bird groups were only observed in trace amounts. Cormorants were seen in all but the northern region. Tubenoses were recorded only for the Kennedy Entrance area of Regions 1 and 4 when shearwaters began arriving to summer in Alaskan waters.

**Habitat Usage** - Habitat preferences of each species group and what species groups were found on each habitat type for spring surveys are presented in Figs. 95 and 96. The habitats in Lower Cook Inlet supporting the widest variety and greatest number of bird groups in spring were: exposed inshore water, open water of bays and fjords, mudflats of bays and fjords, open water of bays and lagoons, sedge/grass saltmarshes, protected delta water and alluvial floodplains. Both loons and grebes most frequently used exposed inshore and protected bay waters. Loons also were often found on protected delta water (16% of total). Cormorants selected exposed inshore water 31 percent of the time, bay rock beaches 25 percent of the time and 12 other identified habitats in varying amounts. Sixty-five percent of the geese were found on floodplains at river mouths. Saltmarshes and protected alluvial water were most heavily used by dabbling ducks. Most diving ducks staged on bay waters in spring and fed near intertidal mudflats. Like loons and grebes, sea ducks were observed on exposed inshore and protected bay waters. Bay waters were used by 35 percent of the mergansers while 20 percent were found on lagoon waters and 15 percent on exposed inshore waters.

Raptors used a variety of habitats, but most used protected bay and lagoon areas. Almost 80 percent of the Sandhill Cranes were observed on floodplains at the mouth of rivers. Although over 50 percent of the shorebirds were on bay mudflats, 22 percent were on exposed delta gravel, and a variety of other habitats were used in small amounts. As in other lease areas, gulls have the most ubiquitous distribution. In Lower Cook Inlet they were found on all but one habitat, but most (42% of total) were found on lagoon-type habitats. Few terns had yet arrived, and alcids preferred exposed inshore waters. Corvids (in this case mostly Northwestern Crows) used both bays and lagoons but most frequently were on gravel or mixed sand/gravel/rock beaches.
Fig. 77. Total bird density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 78. Loon density by pelagic survey section in Lower Cbook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 79. Grebe density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 80. Tubenose density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 81. Cormorant density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 82. Goose and swan density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. No geese or swans were sighted.
Fig. 83. Dabbling duck density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 84. Diving duck density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 85. Sea duck density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 86. Merganser density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 87. Raptor density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 88. Crane density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. No cranes were sighted.
Fig. 89. Shorebird density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 90. Gull and jaeger density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 91. Tern density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 92. Alcid density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Fig. 93. Corvid density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. No corvids were sighted.
Fig. 94. Passerine (other than corvid) density by pelagic survey section in Lower Cook Inlet during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter.
Table 8. Pelagic densities of birds by region in Lower Cook Inlet, spring and summer 1976, 1978. See Figure 58 for region boundaries. (T=trace).

<table>
<thead>
<tr>
<th>Bird Groups</th>
<th>Spring Densities (birds/km²)</th>
<th>Summer Densities (birds/km²)</th>
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<tr>
<td></td>
<td>Region 1 2 3 4 5 Total</td>
<td>Region 1 2 3 4 5 Total</td>
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<tr>
<td>Loon</td>
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<tr>
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</tr>
<tr>
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<td>T     T     T     T     T</td>
</tr>
<tr>
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<td>0     0     0     0     0</td>
</tr>
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<td>Dabbler</td>
<td>T     T     T     T     T</td>
<td>0     0     0     0     0</td>
</tr>
<tr>
<td>Diver</td>
<td>T     T     T     T     T</td>
<td>T     T     T     T     T</td>
</tr>
<tr>
<td>Sea Duck</td>
<td>5     15    24    T     T     11</td>
<td>58    7     T     1     T     17</td>
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<tr>
<td>Merganser</td>
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<td>T     T     T     T     T</td>
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</tr>
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<td>0     0     0     0     0</td>
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<td>T     T     T     T     T</td>
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<tr>
<td>Tern</td>
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<td>1     1     T     T     T     T</td>
</tr>
<tr>
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<td>3     4     2     3     T     3</td>
</tr>
<tr>
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<td>0     0     0     0     0</td>
</tr>
<tr>
<td>Other Passerine</td>
<td>0     0     0     T     T     T</td>
<td>0     0     0     T     T     T</td>
</tr>
<tr>
<td>Other Bird</td>
<td>T     T     T     T     T</td>
<td>T     T     T     T     T</td>
</tr>
<tr>
<td>TOTAL</td>
<td>11    18    32    10    1     15</td>
<td>73    13    12    16    3     26</td>
</tr>
</tbody>
</table>
Fig. 95. Lower Cook Inlet, Spring 1976, 1978. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 96. Lower Cook Inlet, Spring 1976, 1978. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Twenty percent of the total birds seen in spring surveys in Lower Cook Inlet were found on bay water habitat. Diving and sea ducks in about equal numbers comprised over 90 percent of the birds using bay waters. Bay mudflats and exposed inshore waters were the next most used habitats with 17 and 16 percent of the total birds, respectively. On bay mudflats 82 percent of the birds were shorebirds, 9 percent gulls and 5 percent dabbling ducks, while on exposed inshore waters 64 percent of the birds were sea ducks, 21 percent gulls and 9 percent diving ducks. The only other habitats supporting significant numbers of birds were exposed delta gravel (7%) and alluvial floodplain (6%). Only three bird groups were found on the former: shorebirds (91%), gulls (8%), and dabblers (1%). On floodplains, 48 percent of the birds were shorebirds, 41 percent geese, 6 percent dabblers, 4 percent gulls and 2 percent cranes with traces of raptors and terns.

In all, 30 identified coastal habitat types were used in spring by birds in Lower Cook Inlet.

SUMMER

Shoreline density - Coastal bird densities dropped from 192 to 130 birds/km² between spring and summer (Table 9). The largest decreases in density were for shorebirds, geese, dabblers and divers. There were slight increases in densities of gulls, alcids and cormorants, and the density of sea ducks remained the same. Section 8, Tuxedni Bay, had the highest summer density 538 birds/km². As in spring, much of this high bird use represented kittiwakes at their colony on Chisik Island. In summer, alcids also occupied the colony and 103 birds/km² were enumerated on nearby waters. Sea duck densities were higher in summer than spring (49 vs. 22 birds/km²) in Tuxedni Bay. Diving ducks were much reduced from spring to summer (50 to 7 birds/km²). Section 8 had the second highest summer density for divers after Chinitna Bay which had 8 birds/km². Summer densities were also second highest for dabblers in Tuxedni Bay where 13 birds/km² were recorded.

Augustine Island had the second highest overall summer bird density (254 birds/km²) for Lower Cook Inlet. Gulls, the densest group at 97 birds/km², fed and roosted in large flocks around the periphery of the island. Many of the shorebirds, the next densest group (78 birds/km²), were observed late in July and were likely early fall migrants. A large raft of mixed Horned and Tufted Puffins at Burr Point raised the alcid density to 28 birds/km². Non-breeding sea ducks feeding in coastal waters off Augustine Island had a summer density of 45 birds/km².

Two other sections had densities over 200 birds/km² in summer. Kachemak Bay's 229 birds/km² were mostly gulls and sea ducks with 111 and 109 birds/km², respectively. Section 14, in the southwestern corner of Kamishak Bay, with a density of 203 birds/km², had mostly sea ducks (105 birds/km²) and gulls (68 birds/km²) with some alcids (11 birds/km²) and a relatively high cormorant density (7 birds/km²).

Tubenoses and cormorants were densest (both with 9 birds/km²) in Section 6, the Chugach Island area. High density stations for both species were
Table 9. Bird density by section of coastline in Lower Cook Inlet, summer 1976, 1978. See Figure 58 for section boundaries. (T=trace).

| Bird Group          | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | Total |
|---------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| Loon                | T  | T  | T  | T  | T  | T  | T  | T  | T  | 1  | T  | T  | T  |    |    |    |    |
| Grebe               | T  |    |    |    |    |    |    |    |    |    |    |    |    | T  | T  |    |    |
| Tubenose            |    | T  |    | T  | 9  |    |    |    |    |    |    |    |    | T  | T  | 1  |    |    |
| Cormorant           | T  | T  | T  | T  | 9  | T  | 4  | 4  | 3  | 5  | 3  | 4  | 7  | 3  | T  | 3  | 3  |    |
| Goose and Swan      | T  |    | T  |    |    | 1  |    |    |    |    |    |    |    | T  | T  | T  |    |    |
| Dabbler             | 1  | 1  | T  |    | 4  | 13 | 3  | 22 |    |    |    |    |    |    | T  | 2  | 4  | 2  | T  |
| Diver               | 2  | T  |    |    |    |    | 7  | 8  |    |    |    |    |    |    | 1  |    |    |    |
| Sea Duck            | T  | 7  | 93 | 109| 5  | 2  | 2  | 49 | 3  | 20 | 15 | 96 | 31 | 105| 57 | 1  | 45 | 38 |
| Merganser           | 1  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |    |    |    |    |
| Raptor              | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |    |    |    |    |
| Crane               | T  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Shorebird           | 1  | 1  | 2  | T  | T  | T  |    | 1  | 2  | 3  | 2  | T  | 78 |    |    |    |    |
| Gull and Jaeger     | 155| 8  | 35 | 111| 14 | 92 | 34 | 362| 68 | 33 | 19 | 68 | 49 | 5  | 97 | 70 |    |    |
| Tern                | 3  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | T  |    |    |    |
| Alcid               | T  | T  | 1  | 103| 24 | 3  | 16 | 5  | 11 | 9  | 28 | 10 |    |    |    |    |    |    |
| Corvid              | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |    |    |    |    |    |    |    |    |
| Other Passerine     | T  | T  | T  | T  | 1  | 1  | 1  | T  | 2  | 1  | T  | T  |    |    |    |    |    |    |
| Other Bird          | T  | T  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| **TOTAL**           | 160| 17 | 130| 229| 20 | 112| 43 | 538| 78 | 113| 30 | 152| 64 | 203| 130| 13 | 254| 130|
found in that section: 10,000 tubenoses/km² at Nagahut Rocks and 601 cormorants/km² at Perl Rock. In summer, dabblers were densest in Chinitna Bay at 22 birds/km².

Besides high density sea duck areas in Kachemak and Akumwarvik Bays, others were found in Iniskin/Iliamna Bays (96 birds/km²) and the Bluff Point area of outer Kachemak Bay (93 birds/km²). In both summers 1976 and 1978, a large raft of non-breeding scoters numbering several thousand was observed in the Iniskin/Iliamna area. Section 1's (Kenai/Kasilof River) density of 160 birds/km² was made up almost entirely of gulls (155 birds/km²) and some terns (3 birds/km²). Almost 1500 gulls were observed on Nordyke Island, qualifying it as a high density site. Gulls were also dense (92 birds/km²) in Section 6, the Chugach Island area, where several small gull and kittiwake colonies were located. The section with the lowest total density in summer, Kalgin Island, did have the highest tern density (4 birds/km²).

Pelagic density - In summer offshore bird densities increased to 26 birds/km² for transects surveyed in Lower Cook Inlet (Table 8). Region 1, the central portion of the Inlet, had by far the greatest overall density - 73 birds/km². Regions 2, 3, and 4 were all comparable with densities of 13, 12 and 16 birds/km², respectively. The lowest density (3 birds/km²) was found in the northern portion, Region 5. Sea ducks had the highest density with 17 birds/km² for all regions. The highest density for a single region was 58 sea ducks/km² in Region 1. Almost 4,000 of the sea ducks were Surf and White-winged Scoters. Gulls and alcids were the only two bird groups found in all regions. Regions 1 and 3 had the most gulls with 8 and 9 birds/km², respectively. The total summer pelagic density for gulls in Lower Cook Inlet was 4 birds/km². Only 3 alcids/km² were found in summer with almost equal densities in Regions 1 through 4. Two regions, 1 and 4, had tubenoses present for an overall density of 2 birds/km², but most were in Region 4, the Kennedy Entrance area, with 11 birds/km². Terns were the only other bird group with densities of one or more birds/km² and both Regions 3 and 5 had densities of one bird/km². Bird groups present in trace amounts included loons, cormorants, mergansers, shorebirds and passerines.

Habitat Usage - Habitat preferences of each species group and the species groups present on each habitat type are shown in Figs. 97 and 98, respectively. In summer, 44 percent of the marine birds were found along exposed coastal habitats in Lower Cook Inlet, 40 percent in bays or fjords, 6 percent on protected delta areas, 3 percent in lagoons and 2 percent on exposed delta habitats. Of identified habitats, bay waters had the largest numbers of birds present (20%), followed by exposed inshore water (16%), bay sand beach (6%), bay mudflats (4%), exposed rock beach (4%), and bay rock beach (3%). In all, 32 habitats with birds present were identified.

Of 165 loons, 35 percent were found along exposed inshore waters, 31 percent on exposed delta water, 11 percent on both offshore and bay waters and 6 percent in protected delta water. Most tubenoses observed on the coastal surveys used exposed inshore waters. Cormorants were
Fig. 97. Lower Cook Inlet, Summer 1976, 1978. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
LOWER COOK INLET, SUMMER

Offshore water
Exposed inshore water
Exposed mudflats
Exposed sand beach
Exposed gravel beach
Exposed rock beach
Exposed island sand
Exposed island gravel
Exposed island rock
Bay water
Bay mudflats
Bay sand beach
Bay gravel beach
Bay rock beach
Bay island upland
Bay island sand
Bay island rock
Lagoon water
Lagoon mudflats
Lagoon sand beach
Lagoon gravel beach
Lagoon rock beach
Lagoon island upland
Lagoon island sand
Fig. 98. Lower Cook Inlet, Summer 1976, 1978. Marine bird usage of habitats as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
primarily found on three habitats: exposed inshore water (31%), exposed island rock (28%) and exposed rock beach (27%). Lagoon and bay waters were the habitats used by most dabbling ducks (38% and 26%, respectively) while diving and sea ducks preferred bay and exposed inshore waters (79% and 16% for diving ducks and 57% and 25% for sea ducks, respectively). Mergansers were found most on exposed inshore water (52%) and lagoon water (31%). Almost two-thirds of the shorebirds were on lagoon mudflats and the remainder were distributed among 20 other habitat types. Gulls, too, were widespread on 31 identified habitat types. Fifty percent were on exposed, 36 percent on bay, 10 percent on protected delta, 3 percent on exposed delta and 2 percent on lagoon habitats. Protected delta habitats were preferred summer habitat for 38 percent of the terns in Lower Cook Inlet, while 26 percent of the terns were on exposed, 24 percent on bay, and 12 percent on salt marsh habitats. Eighty-six percent of the alcids were on exposed inshore and offshore waters.

For Lower Cook Inlet in summer, all but three habitat types were used predominantly by one species group. On 21 habitat types, gulls comprised 73 percent, or more, of the total birds seen. Sea ducks predominated (73% or more) on five habitats: offshore water, exposed island gravel, bay and lagoon water and bay island sand. Seventy-one percent of the birds on protected delta water were dabblers, 94% on lagoon mudflats were shorebirds and 89% on bay island upland were passerines (excluding corvids).

On exposed inshore waters two bird groups predominated: sea ducks (49%) and alcids (32%). For saltmarshes, 47 percent were gulls and 29 percent were dabblers; on exposed delta mud, 62 percent were gulls and 38 percent dabblers. On unclassified exposed inshore, bay, lagoon and alluvial habitats gulls predominated.

FALL

Shoreline density - In fall, shoreline densities of 66 birds/km² (Table 10) were one-half of summer and one-third of spring densities. The largest drop was in gull densities which went from 70 birds/km² in summer to 26 birds/km² in fall. There also was a significant decrease in sea duck densities from 38 birds/km² in spring and summer to 14 birds/km² in fall. Most alcids had departed for pelagic waters by the late September/early October survey. Only a trace of alcids remained inshore, whereas 10 birds/km² were present in summer. Migrating dabblers and geese increased fall densities of those groups to 15 and 30 birds/km², respectively, from 3 birds/km² and trace numbers in summer. Corvids, too, increased as Common Ravens and Northwestern Crows left timbered breeding grounds and came to the coast for fall and winter. No cranes or terns were sighted on fall surveys.

Four sections in Lower Cook Inlet had fall bird densities greater than 100 birds/km². Section 4, Kachemak Bay, had the highest fall density with 152 birds/km². Gulls predominated in that section at 66 birds/km². Dabblers and sea ducks accounted for most of the remainder of birds in Kachemak Bay (38 and 29 birds/km², respectively). Diving ducks and corvids were most dense in Kachemak Bay in fall, but only seven and three birds/km², respectively, were found.
Table 10. Bird density by section of coastline in Lower Cook Inlet, fall 1976, 1977. See Figure 58 for section boundaries. (T=trace).

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<thead>
<tr>
<th>Bird Group</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<th>11</th>
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A fall density of 125 birds/km² in Section 14, the McNeil Cove/Akumwarvik Bay area, was the second highest. Nearly half of the birds were shorebirds (54 birds/km²). Sea ducks (32 birds/km²) and dabbling ducks (29 birds/km²) made up most of the remainder. Only eight gulls/km² were found in that region.

Most of the birds in Section 8, Tuxedni Bay, which had a density of 111 birds/km², were dabblers (47 birds/km²) and geese (41 birds/km²). Few gulls and sea ducks were found (17 and 5 birds/km², respectively). However, Section 3, with 105 birds/km², had mostly sea ducks (78 birds/km²) and again few gulls (19 birds/km²). This section also had cormorants (4 birds/km²), alcids (2 birds/km²) and loons (1 bird/km²).

Tubenoses were sighted only in Section 6 and in trace amounts. Cormorants densities were highest in the southeastern portion of Lower Cook Inlet, particularly in Section 6 (14 birds/km²). Two sites of high cormorant density were in Section 6 with 1500 and 123 birds/km² and others were in Section 5 (2950 birds/km²) and Section 4 (2060 birds/km²). These high densities represent large flocks on relatively small island-type stations. Geese were present in measurable quantities in only three sections. Most were in Tuxedni Bay with small amounts at the head of Kachemak Bay and at the mouth of the Douglas River. Chinitna Bay (Section 10) had the highest dabbler density (60 birds/km²). Mergansers were also most dense in that section (3 birds/km²). Besides Section 4, mentioned earlier, gulls were abundant in Section 15 on the south side of Kamishak. Fall densities (50 birds/km²) in that section were comparable to summer densities (49 birds/km²).

Pelagic density - Offshore densities in fall dropped to only 9 birds/km² for Lower Cook Inlet (Table 11). Sea ducks, gulls, alcids and tubenoses were the most frequently observed species (3, 2, 2 and 1 birds/km², respectively). Six other groups were recorded in trace amounts. Region 3, Kachemak Bay, had the greatest density - 44 birds/km². Here gulls, sea ducks, alcids and diving ducks comprised 16, 13, 9 and 5 birds/km², respectively. Diving ducks were found only in this region.

Almost equal densities of alcids, gulls, sea ducks and tubenoses were found in Region 1 (total density: 8 birds/km²). Four of five birds/km² in Section 2 (Kamishak Bay) were sea ducks. Tubenoses comprised five of the total seven birds/km² in Section 4. Section 5 had the lowest density (1 bird/km²) and sea ducks were the predominant species group. Sea ducks, gulls and loons were the only groups sighted in all five regions.

Habitat Usage - During in fall surveys of Lower Cook Inlet, birds selected bay and exposed inshore waters in almost equal numbers - each with 20 percent of the total. Likewise, these habitats were used by the widest variety of bird groups recorded. Exposed inshore waters were used by all groups except geese, and bay waters by all groups except raptors and shorebirds. Most of the birds in exposed inshore waters were sea ducks (59%) followed by gulls (20%), dabbling ducks (9%) and cormorants (6%). Sea ducks (37%) predominated on bay waters followed closely by dabbling...
Table 11. Pelagic densities of birds by region in Lower Cook Inlet, fall and winter 1976, 1978. See Figure 58 for region boundaries. (T=trace).

<table>
<thead>
<tr>
<th>Bird Group</th>
<th>Fall Densities (birds/km²)</th>
<th>Winter Densities (birds/km²)</th>
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ducks (34%). Gulls comprised 18 percent, diving ducks 6 percent and cormorants 3 percent of the birds observed on that habitat. Habitat preferences of each species group and what species groups were found on each habitat type are shown on Figs. 99 and 100.

Exposed habitats, in general, were the ones most used by birds (42% of the total). Exposed mudflats were the third most important habitat with 12 percent of the total use. Gulls (80%) and dabblers (19%) were the groups most frequently using the mudflats. Sixty-two percent of the almost 2,000 birds on exposed gravel were shorebirds.

Thirty-one percent of the birds were found in protected bay/fjord habitats. Besides bay water, the habitats most used were bay gravel beach (3%), bay mudflats (2%) and bay rock beach (2%). On all three habitats, gulls were the predominant species group.

Lagoon and protected delta habitats each had 11 percent of the total birds. For lagoons, most birds were observed on the water (6% of total). Over half the birds on lagoon water were dabblers (52%), 23 percent were sea ducks and 16 percent gulls. Lagoon mudflats were used by 4 percent of the birds and 99 percent of the birds on this habitat were gulls. Six percent of the total birds were found on protected delta water. Over 90 percent of the birds found were dabblers. On protected delta mud (2% of total), 72 percent of the birds were gulls and 23 percent dabblers.

Four percent of all birds were on saltmarshes. Ninety-eight percent of these birds were geese. Two percent of the birds were observed on exposed delta habitats. Most of these were dabbling ducks.

Gulls were the most abundant bird group found in the fall Lower Cook Inlet surveys (40% of the total). They were observed on 26 of 28 identified habitats. Twenty-five percent used exposed mudflats, 10 percent exposed inshore water, 9 percent lagoon mudflats and 9 percent bay water. The rest were scattered on the remainder of the habitats.

Twenty-three percent of the birds were dabbling ducks. Most (30%) were on bay water while 23 percent used protected delta water, 14 percent lagoon water and 8 percent exposed inshore water. Sea ducks made up 21 percent of the birds and 57 percent of this group were found on exposed inshore water. Thirty-five percent used bay water and 7 percent lagoon water.

Cormorants and geese were the only other groups comprising a significant portion of the total birds, each with 5 percent. Cormorants were found largely on five habitats: exposed rock beach (30%), exposed inshore water (25%), bay island rock (13%), exposed island rock (13%) and bay water (11%). Eighty-one percent of the geese were found on saltmarshes, 14 percent on alluvial floodplains and 5 percent on exposed island rock.
Fig. 99. Lower Cook Inlet, Fall 1976-1977. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 100. Lower Cook Inlet, Fall 1976-1977. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Almost three-fourths of the shorebirds, which comprised less than 3 percent of the total birds, were on exposed gravel beaches. Six percent were on exposed mudflats, 5 percent on bay rock beach, 4 percent on exposed sand beach, and 3 percent on both exposed rock beach and protected delta mud. Diving ducks made up less than 2 percent of birds seen; almost two-thirds of these were observed on bay water and 21 percent were on exposed inshore water. Corvids were the only other group with over 1 percent of the total and most of these were on unspecified habitats, likely because they were flying and could not be associated with a particular habitat.

WINTER

Shoreline Density - In winter coastal densities of birds dropped to over one-half of their fall densities, 66 to 32 birds/km² (Table 12). The largest decrease was in gull densities (26 birds/km² in fall to 3 birds/km² in winter). When fall migrating dabblers (15 birds/km²) left the area, a wintering population of 2 dabblers/km² remained. Sea duck densities were about the same in winter as in fall (15 vs. 14 birds/km²). A slight increase in density was noted for diving ducks and shorebirds, from 1 bird/km² in fall to 4 birds/km² in winter for divers and from 2 to 5 birds/km² for shorebirds. Corvid densities remained the same fall and winter and were slightly higher than in spring and summer.

In winter, there was a marked difference in densities between the east and west sides of the Inlet. A density of 47 birds/km² was observed on the six eastern sections. Section 4, in inner Kachemak Bay, had the highest density, 99 birds/km². Several species groups made up that total. One-third were sea ducks (33 birds/km²) plus 23 divers/km², 20 dabblers/km², 12 shorebirds/km² and 5 corvids/km². There was 1 bird/km² for mergansers, gulls and alcids. A density of 82 birds/km² was found on the north side of outer Kachemak Bay (Section 3). Most of the birds in this section were sea ducks (43 birds/km²) and gulls (29 birds/km²). Four birds/km² were recorded for both cormorants and shorebirds in Section 3. The only winter site of high density was 321 corvids/km² on Cohen Island in Section 5 on the south side of outer Kachemak Bay. The north portion of the eastern side of the Inlet (Section 1) had only a trace of birds and Section 2 had 14 birds/km².

On the west side, the overall density was 16 birds/km². Except for Section 8, with a density of 81 birds/km², densities were low in all sections for all bird groups. Most of the birds in Section 8 represented two large flocks of shorebirds in Tuxedni Channel which resulted in a density of 75 shorebirds/km². Twenty-seven sea ducks/km² were found in Section 12, and the remaining densities were 10 birds/km² or less. Many of the sections had few bird types present and one, Section 14, had no birds at all. Gull densities were highest in Section 15 at 5 birds/km². Sea ducks, alcids and gulls were the most frequently observed groups.

Pelagic Density - Five birds/km² were recorded in offshore waters for Lower Cook Inlet in winter (Table 11). Sea ducks were the most abundant
Table 12. Bird density by section of coastline in Lower Cook Inlet, winter 1976, 1978. See Figure 58 for section boundaries. (T=trace).

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<td>32</td>
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</table>
group (3 birds/km²) followed by gulls and alcids with 1 bird/km² each. Region 3, Kachemak Bay, had the greatest density (18 birds/km²) and led other regions in species group densities for alcids (8 birds/km²), sea ducks (7 birds/km²) and gulls (3 birds/km²). Sea ducks had a density of 4 birds/km² in both Sections 1 and 2. Only sea ducks were present in Region 5 (1 bird/km²). Cormorants, sea ducks, gulls and alcids were each found in Regions 1-4. Tubenoses, in this case Northern Fulmars (Fulmarus glacialis), were present in Region 1 only.

Habitat Usage - In winter, birds of Lower Cook Inlet concentrated on four basic habitat types: bay water (32%), exposed inshore water (28%), lagoon water (12%) and bay mudflats (11%). Fourteen other habitat types were used but in lesser intensities. Combined bay/fjord areas provided habitat for 48 percent of the birds, exposed habitats 34 percent and lagoon/embayment habitats 15 percent. Only 3 percent were on river/stream deltas, 2 percent on protected and 1 percent on exposed.

Diagrams of winter habitat preferences of each species group and of what species groups were found on each habitat type are shown on Figs. 101 and 102. On bay waters, 62 percent of the birds were sea ducks and 27 percent diving ducks. Seventy-five percent of the birds on exposed inshore waters were sea ducks, 16 percent gulls and 5 percent cormorants. Waterfowl species predominated on lagoon/embayment water; 39 percent of the birds were dabblers, 36 percent sea ducks, 22 percent divers and 3 percent mergansers.

Forty-seven percent of the winter birds in Lower Cook Inlet surveys were sea ducks. Forty-five percent were found on exposed inshore waters, 42 percent on bay waters and 10 percent on lagoon waters. Shorebirds were next most abundant (17% of total), and 33 percent were on bay mudflats. Almost half of the shorebirds were on unspecified bay habitats. When birds were sighted in the air, as shorebirds often were, the habitat from which they flushed often was unknown. Diving ducks made up 12 percent of the total and were most commonly found on bay water (72%) and lagoon water (23%). One-half the gulls, which made up 9 percent of the total, were observed on exposed inshore waters, 10 percent on exposed sand beach, 6 percent on exposed rock beach and an additional 13 percent on unspecified exposed habitats. Most of the rest were on exposed delta habitats: 8 percent sand, 5 percent gravel and 3 percent water. Only 6 percent of the gulls were on protected habitats. The only other bird group found in relatively high numbers (dabblers) were observed on lagoon waters 86 percent of the time, on bay water 9 percent and protected delta mud 4 percent. Raptors, although found in small numbers, were recorded on the most habitat types (11).

SOUTH - ALASKA PENINSULA

Three aerial surveys were conducted in this region (Fig. 103 and 104). One in fall 1976 covered only the southern three sections from Cold Bay to Unimak Island (Fig. 104). The first winter survey covered only
Fig. 101. Lower Cook Inlet, Winter 1976, 1978. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 102. Lower Cook Inlet, Winter 1976, 1978. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 103. Tracklines of aerial bird surveys along North- and South-Alaska Peninsula, 1977. Continued on next page.
Fig. 103 (cont.). Tracklines of aerial bird surveys along North- and South-Alaska Peninsula, 1977.
Fig. 104. Tracklines of aerial bird surveys along North-Alaska Peninsula, 1975 and 1976. Continued on next page.
Fig. 104 (cont.). Tracklines of aerial bird surveys along North-Alaska Peninsula, 1975 and 1976.
Unimak Island (Section 8). Another winter survey was conducted in mid-March 1977 in conjunction with an ADF&G marine mammal survey (Fig. 103). On this survey only one bird observer was present, and the trackline was generally offshore or in exposed nearshore waters as we headed between islands or promontories that were traditional hauling areas for sea lions. Few protected habitats were searched, and the species densities and habitat selection recorded reflected this.

The region was subdivided into eight sections (Fig. 105) following the winter trackline. The first section corresponds to the boundary of the Shelikof Strait area. The rest, up to Cold Bay, encompasses island groups or the coastline between. These groups from Cold Bay to Scotch Cap, sections are more typical coastal physiographic areas.

FALL

Density - Bird density information for South-Alaska Peninsula is pictorially displayed in Figs. 106-123. Fall bird densities were high (279 birds/km²) in the three sections surveyed (Table 13). Most of the birds were geese (227 birds/km², 82 percent of the total) including Brant, Canada and Emperor geese. Gull densities were only 17 birds/km², dabblers 14 birds/km², sea ducks 10 birds/km², divers 4 birds/km², cormorants 3 birds/km² and shorebirds 1 bird/km².

Of the three sections surveyed, Section 7 (Morzhovoi Bay area) had the highest bird densities (363 birds/km²) and Section 8, the south side of Unimak Island, the lowest (90 birds/km²). Geese comprised over 90 percent of the birds in Section 7 and 75 percent of the birds in Section 6. Most of the geese were found in lagoons at the heads of both bays. Highest goose densities were found at Old Man's Lagoon in Cold Bay and Big Lagoon in Morzhovoi Bay (over 1,000 and 2,000 birds/km², respectively). Geese were not found in Section 8 in fall. Its avifauna was comprised of gulls (69 birds/km²), sea ducks (11 birds/km²) and cormorants (10 birds/km²). Dabblers were most abundant in Section 6 where 20 birds/km² were recorded. The remaining bird groups were seen in small or trace amounts. Although tubenoses were not recorded during the 20 October 1975 survey, on 17 October 1976, when we mapped the area and were not recording birds except for incidental observations, tens of thousands of shearwaters were feeding in scattered groups throughout Morzhovoi Bay. They were, most likely, opportunistically feeding there and may not visit the bay in fall on a regular basis. Also on that mapping flight, we observed hundreds of Emperor Geese along the coast to Pavlof Bay, the terminus of our flight.

Habitat Usage - Only a few habitats were recorded during the abbreviated fall survey. Information is depicted in diagrams in Figs. 124 and 125. Only seven discrete habitats on which birds were found were recorded for this area. Eighty-four percent of the birds observed were in lagoon habitats, 6 percent in bays and 5 percent in both saltmarsh and exposed inshore habitats. On lagoon waters, 97 percent of the birds were geese and on lagoon beaches 84 percent were geese. On bay waters only 41
Fig. 105. Physiographic subdivision of North- and South-Alaska Peninsula for bird density analysis. The North-Alaska Peninsula survey region is labeled with the smallest circled numbers. Each numbered section contains several survey stations. (Figure continued on next page.)
Fig. 105 (cont.). Physiographic subdivision of North- and South-Alaska Peninsula for bird density analysis. The North-Alaska Peninsula survey region is labeled with the smallest circled numbers. Each numbered section contains several survey stations.
Table 13. Bird density by section of coastline in South-Alaska Peninsula, fall 1976, winter 1977. See Figure 105 for section boundaries. (T=trace).

<table>
<thead>
<tr>
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<th>Fall Densities (birds/km²)</th>
<th>Winter Densities (birds/km²)</th>
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<td>Total</td>
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<tr>
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<tr>
<td>Cormorant</td>
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<td>335</td>
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<td>Merganser</td>
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<td>Crane</td>
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<td><strong>TOTAL</strong></td>
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* Not surveyed.
Fig. 106. Total bird density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 106 (cont.). Total bird density by section along North- and South Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 107. Loon density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 107 (cont.). Loon density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 108. Grebe density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 108 (cont.). Grebe density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 109. Tubenose density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 109 (cont.). Tubenose density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 110. Cormorant density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 110 (cont.). Cormorant density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 111. Goose and swan density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 111 (cont.). Goose and swan density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 112. Dabbling duck density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 112 (cont.). Dabbling duck density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 113. Diving duck density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 113 (cont.). Diving duck density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 114. Sea duck density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 114 (cont.). Sea duck density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 115. Merganser density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 115 (cont.). Merganser density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 116. Raptor density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 116 (cont.). Raptor density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 117. Crane density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 117 (cont.). Crane density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 118. Shorebird density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 118 (cont.). Shorebird density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 119. Gull and jaeger density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 119 (cont.). Gull and jaeger density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 120. Tern density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 120 (cont.). Tern density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 121. Alcid density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 121 (cont.). Alcid density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 122. Corvid density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 122 (cont.). Corvid density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 123. Passerine (other than corvid) density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic. (Figure continued on next page.)
Fig. 123 (cont.). Passerine (other than corvid) density by section along North- and South-Alaska Peninsula during four seasons as determined by aerial surveys. Densities read from left to right: spring, summer, fall, winter. Spring, fall and winter were coastal surveys; summer surveys were pelagic.
Fig. 124. South-Alaska Peninsula, Fall, 1975. Habitat preference of marine birds as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
SOUTH-ALASKA PENINSULA, FALL

- Offshore water
- Exposed inshore water
- Exposed mudflats
- Exposed sand beach
- Exposed gravel beach
- Exposed rock beach
- Exposed island sand
- Exposed island gravel
- Exposed island rock
- Bay water
- Bay mudflats
- Bay sand beach
- Bay gravel beach
- Bay rock beach
- Bay island upland
- Bay island sand
- Bay island rock
- Lagoon water
- Lagoon mudflats
- Lagoon sand beach
- Lagoon gravel beach
- Lagoon rock beach
- Lagoon island upland
- Lagoon island sand
Fig. 125. South-Alaska Peninsula, Fall, 1975. Marine bird usage of habitats as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.

Loons
Grbes
Tubenoses
Cormorants
Swans and Geese
Dabblers
Divers
Sea Ducks
Mergansers
Cranes
Shorebirds
Jaegers and Gulls
Terns
Alcids
Corvids
Passerines
Unknowns
Traces
percent were geese, 33 percent sea ducks and 18 percent cormorants. Most of the birds on saltmarshes were dabbling ducks (69%) diving ducks (20%) and gulls (7%). Sixty percent of the birds on exposed inshore waters were sea ducks, 20 percent were gulls and 10 percent cormorants.

Habitat preferences of birds are discussed for only those seven groups with sample sizes over 100 individuals. Of 418 cormorants, 72 percent were in bay habitats and the rest (28%) were on exposed inshore waters. Ninety-four percent of the geese used lagoon waters while 72 percent of the dabblers were in saltmarshes and 26 percent on lagoon waters. Similarly, diving ducks mostly used saltmarsh habitats (70%) and lagoon water (28%). Sea ducks were divided among four habitats: 47 percent on exposed inshore water, 21 percent on bay water, 20 percent on lagoon water and 12 percent on saltmarsh. Few shorebirds were seen, but of those recorded 59 percent were on lagoon mudflats and 34 percent on unspecified bay habitats. Most habitats on which gulls were found were not classified to substrate. Forty-one percent were on bay habitats, 30 percent on exposed habitats, 23 percent on lagoon habitats and 6 percent on saltmarsh.

WINTER

Density - Sixty-seven birds/km² were found on exposed portions of the south side of the Alaska Peninsula in winter 1977 (Table 13). Alcids comprised 44 percent of the total, sea ducks 26 percent, gulls 14 percent, geese and cormorants 5 percent each and shorebirds 4 percent. Two subdivisions of the trackline (Sections 3 and 4) had over 100 birds/km² and one, Section 6, had 99 birds/km². Most of the 138 birds/km² in Section 3 were alcids (92 birds/km²). Nearly all were murres near the colony on Spitz Island where 200,000 murres breed in summer months (Sowls et al. 1978). The 90 alcids/km² in Section 4 were found mainly in four locations. Rafts of murres containing up to 3,000 birds were found at The Haystacks, Murre Rocks, Chernabura Island and Bird Island (all in the Shumagin Islands). Both sea ducks and gulls had densities of 20 birds/km² in Section 3, and their densities were 18 and 6 birds/km², respectively, in Section 4. Other bird groups had similar but lower densities on these two high density sections.

Sea ducks densities were highest (41 birds/km²) in Section 6, the Cold Bay area, followed by 26 birds/km² south of Unimak Island (Section 8). There was a significant increase in densities of sea ducks in Section 6 and 8 between fall and winter (13 and 11 birds/km² in fall to 41 and 26 birds/km² in winter). Of sea ducks identified at least to genus on South-Alaska Peninsula, 69 percent were scoters, 12 percent both eiders and Oldsquaw and 6 percent Harlequin Ducks. Over 80 percent of identified scoters were Black, 11 percent were White-winged and 7 percent Surf. Most of the identified eiders were Steller's (57%) and King (32%).

Densities of gulls were highest in Section 6, the Cold Bay area, at 26 birds/km². In Section 8 there was a large drop in density between fall and winter (69 to 12 birds/km²). Geese (all Emperors) reached highest densities in Section 1, the Shelikof Strait area, where 10 birds/km²
were found. Cormorants were found in almost equal densities (2-4 birds/km²) in all sections surveyed. Shorebirds and loons were found in all sections; shorebirds in densities up to 7 birds/km² and loons only in trace amounts. Dabblers were found in only four of the sections, but 9 birds/km² wintered in Section 6. Bald Eagles were regularly seen on small islands offshore but never in high densities.

Habitat Usage - Based on our survey, nothing definite can be said about habitat preferences of birds on South-Alaska Peninsula in winter because of the type of survey conducted. The nature of the survey was to search exposed rocky habitats and, therefore, most birds were found there. Winter habitat usage data are presented in Figs. 126 and 127. Only 16 habitat types were recorded. Eighty-five percent of the birds were on exposed habitats. Most (68% of total) were on exposed water while 7 percent were on exposed island rock and 5 percent on exposed rock beach. On exposed inshore water over one-half (55%) the birds were alcids, 32 percent sea ducks and 9 percent gulls. On exposed island rock, the majority of birds were Emperor Geese, and on rock beaches cormorants predominated. Gulls and shorebirds also were common on rocky habitats.

Seven percent of the total birds were on offshore waters, of which 88 percent were alcids and 8 percent sea ducks. The percentage of birds observed on this habitat appeared inordinately low considering the amount of time spent and distance covered in pelagic waters.

On this survey, bay habitats had 5 percent of the birds. Over 70 percent of these birds were sea ducks and over one-fourth were Emperor Geese. Sixty-five percent of the birds on lagoon waters were sea ducks while on saltmarshes most birds were diving and dabbling ducks.

Sample sizes were relatively large for six species groups, and this gave the best indication of habitat selection by these bird groups. Cormorants utilized exposed inshore water (32%) and exposed rock beach (31%) to the same extent, and 23 percent were on exposed island rock. Geese (all Emperors) were mostly on exposed island rock (46%) but also on bay waters (24%) and exposed inshore water (9%). Eighty-three percent of the sea ducks were on exposed inshore waters and 13 percent were on bay water. Shorebirds were found most often on exposed island rock (39% of total) and on exposed rock beach (36%). Eleven habitats were used by gulls, but the majority were on four types: exposed inshore water (45%), exposed sand beach (14%), exposed island rock (13%) and exposed rock beach (10%). Almost 86 percent of the alcids were on exposed inshore water and the remainder were on offshore water.

NORTH - ALASKA PENINSULA

Nine separate surveys were conducted in the North-Alaska Peninsula region, each with varying amounts of coverage and with variable types of habitats searched. Two spring surveys were completed in 1977: the first was an abbreviated survey by helicopter covering only the northwestern 14 stations from Cape Horn to Egegik Bay; the second, by fixed-wing
SOUTH-ALASKA PENINSULA, WINTER

Loons

Grebes

Tubenoses

Cormorants

Swans and Geese

Dabblers

Divers

Sea Ducks

Mergansers

Raptors

Cranes

Shorebirds

Jaegers and Gulls

Terns

NONE

NONE
Fig. 126. South-Alaska Peninsula, Winter, 1977. Habitat preference of marine birds as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 127. South-Alaska Peninsula, Winter, 1977. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
aircraft, covered the entire shoreline to St. Catherine Cove in Bechevin Bay. Both summer surveys were pelagic and both were conducted in conjunction with marine mammal surveys. In fall, two surveys were conducted, one in October 1975 and one in October 1976. The first covered most of the coast from Naknek River to Otter Point on Unimak Island including the estuaries. On the second survey, estuaries were covered from Egegik to Bechevin Bay. Three partial winter surveys were conducted and, in general, only coastal areas and not estuaries were searched for birds. Some offshore water was surveyed on one winter survey.

For data summary, the coast from Cape Horn in the Kvichak River to Scotch Cap on Unimak Island was subdivided into 23 sections (Fig. 105). Section boundaries changed when there was a major change in physiographic features. In general, sections denoted exposed coast and various types of estuaries. Bird density data for all seasons are shown by section in Figs. 106-123.

**SPRING**

Density - The mean density for North-Alaska Peninsula in spring was 141 birds/km² (Table 14). Highest density (849 birds/km²) was in Section 16, Nelson Lagoon followed distantly by Section 20, Applegate Cove of Izembek Lagoon, with 358 birds/km². Eleven sections had densities over 100 birds/km². The lowest section (No. 22) had a density of 44 birds/km². Section 23 was not surveyed in spring.

Geese had the highest overall density - 60 birds/km². Next were gulls (31 birds/km²) and sea ducks (26 birds/km²), both of which were observed in all sections. Dabblers numbered 11 birds/km², shorebirds 9 birds/km² and the rest were 2 birds/km² or less. Only tubenoses were not observed.

Nelson Lagoon had the highest densities for three bird groups: geese (388 birds/km²), sea ducks (233 birds/km²) and gulls (208 birds/km²). All geese were Emperors and sea duck species composition was 88 percent Steller's Eider, 9 percent Black Scoter and 3 percent Common Eider.

Applegate Cove in southwestern Izembek Lagoon had a goose density of 319 birds/km²; however, almost 100 percent were Brant and a trace were Emperors. Section 9, Port Heiden, was the only other area with goose densities over 100 birds/km² at 118 birds/km². Emperor Geese made up 98 percent, Canada Geese 1 percent and Brant 1 percent of these birds.

Dabbling ducks densities were highest at Port Heiden (Section 9) at 40 birds/km² and in Section 1 at the mouth of Kvichak River with 34 birds/km². Ugashik Bay (Section 5) and Mud Bay (Section 15) were next highest with 24 and 22 dabblers/km², respectively. Pintails comprised 91 percent of the total identified dabblers. Diving ducks were most common on the north end of the region.

Densities of shorebirds were greatest on four sections. Sections 1, 3, 7 and 15 had 26, 33, 23 and 20 birds/km², respectively. A rapid change
Table 14. Bird density by section of coastline in North-Alaska Peninsula, spring 1977. See Figure 105 for section boundaries. (T=trace).

<table>
<thead>
<tr>
<th>Bird Group</th>
<th>Section of Coastline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 Total</td>
</tr>
<tr>
<td>Loon</td>
<td>T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Grebe</td>
<td>T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Tubenose</td>
<td>0 T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Cormorant</td>
<td>1 T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Goose and Swan</td>
<td>8 2 T 2 3 T 8 118 45 3 1 5 62 388 1 16 78 319 T 1 60</td>
</tr>
<tr>
<td>Dabbler</td>
<td>34 12 3 9 24 15 40 8 2 1 22 6 2 2 2 11</td>
</tr>
<tr>
<td>Diver</td>
<td>10 3 11 6 2 1 1 T 3 2 1 2 T T T T 2</td>
</tr>
<tr>
<td>Sea Duck</td>
<td>1 7 20 19 4 33 3 30 13 59 24 53 73 28 5 233 25 50 20 26 28 5 26</td>
</tr>
<tr>
<td>Merganser</td>
<td>12 1 T 1 T T T T T T T T T T T T T T 1</td>
</tr>
<tr>
<td>Raptor</td>
<td>1 T T T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Crane</td>
<td>26 33 6 16 7 4 23 T 10 5 1 T 20 8 8 3 1 T 3 9</td>
</tr>
<tr>
<td>Shorebird</td>
<td>30 45 12 14 8 39 8 13 20 7 38 167 76 31 31 208 48 5 22 11 87 38 31</td>
</tr>
<tr>
<td>Gull and Jaeger</td>
<td>30 45 12 14 8 39 8 13 20 7 38 167 76 31 31 208 48 5 22 11 87 38 31</td>
</tr>
<tr>
<td>Tern</td>
<td>1 T T T 1 1 6 1 9 1 2 1 T T 5 4 1 1</td>
</tr>
<tr>
<td>Alcid</td>
<td>1 T T T 1 T T T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Corvid</td>
<td>1 T T T T T T T T T T T T T T T T T T T T T T</td>
</tr>
<tr>
<td>Other Passerine</td>
<td>1 T T 1 1 T T 1 1 1 1 T T T T T T T T</td>
</tr>
<tr>
<td>Other Bird</td>
<td>123 103 53 69 49 82 60 53 205 66 124 227 155 66 143 849 86 79 124 358 119 44 * 141</td>
</tr>
</tbody>
</table>

* No survey.
in species composition was noted between the helicopter and fixed-wing surveys that were only days apart. Black-bellied plovers (*Pluvialis squatarola*), common on 6 May 1977, were absent on 10 May 1977. Few shorebirds were seen on 10 May in the stations duplicating the 6 May survey.

Other than at Nelson Lagoon, gulls were abundant only in Section 12 where 167 birds/km² were found. Many of these were kittiwakes at Cape Seniavin. In most cases, higher gull densities occurred on sections with exposed beaches rather than protected estuaries. Tern migration was just beginning an upswing and highest recorded densities were 9, 6, 5 and 4 birds/km² in Sections 8, 6, 16 and 17, respectively.

Loons, Bald Eagles and Common Ravens were observed in most sections but only in trace densities. Sandhill Cranes were found only on the northern half of the region, and with measurable amounts (1 bird/km²) only in Section 1.

**Habitat Usage** - Birds on North-Alaska Peninsula during spring were distributed on a variety of habitats. Information on habitat usage by birds in spring is presented in Figs. 128 and 129. Of the 30 identified habitats on which birds were found in spring, nine habitats had 5,000 or more birds. The most used habitat was lagoon water where 28 percent of the birds were found. Almost 80 percent of the birds on this habitat were geese and most of the remainder (16%) were sea ducks. Lagoon mudflats were the next most used areas, and 12 percent of the birds were found there. Fifty-four percent of the birds on lagoon mudflats were geese, 20 percent sea ducks, 13 percent dabblers, 7 percent gulls and 5 percent shorebirds. Protected delta mudflats, used by 10 percent of the birds, supported mostly geese (65%), plus many gulls (15%) and dabblers (14%). Lagoon island sand, fourth in percent usage with 8 percent, was used most commonly by geese (49%). Additionally, 29 percent of the birds were gulls and 20 percent sea ducks on this habitat. The fifth most used habitat at just under 8 percent of the total, protected delta water, was used most by sea ducks (47%), dabblers (27%) and gulls (10%). Exposed inshore water and exposed sand beach each had 5 percent of the birds. On exposed water 69 percent of the birds were sea ducks and 19 percent gulls. On sand 86 percent were gulls and 9 percent shorebirds. Three percent of the birds were on bay water, most were sea ducks (73%) plus 10 percent each for diving ducks and gulls.

Of the over 200,000 birds recorded on spring surveys in the region, only eight species groups numbered over 1,000. Geese comprised 43 percent of the total and were found on principally four habitats. Over half (52%) were on lagoon water, 15 percent on lagoon mudflats, 15% on protected delta mud and 10 percent on lagoon island sand. Dabblers were most commonly found on protected delta water (28%), lagoon mud (20%), protected delta mud (17%) and saltmarsh (16%). Twenty-eight percent of diving ducks were on bay water, 27 percent on protected delta water, 19 percent on exposed inshore water and 16 percent on saltmarsh. Sea ducks also were found on a variety of habitats: 24 percent on lagoon water, 20
Fig. 128. North-Alaska Peninsula, Spring, 1977. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 129. North-Alaska Peninsula, Spring, 1977. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis.

Numbers at upper left are sample size.
percent on protected delta water, 18 percent on exposed inshore water, 13 percent on each of bay water and lagoon mudflats and 9 percent on lagoon island sand. Sixty-six percent of the mergansers were on protected delta water plus 11 percent each on exposed inshore and bay water.

Shorebirds and gulls were found in small percentages on the greatest diversity of habitats. Shorebirds were found in twenty habitats but most often used protected delta areas (48% of the birds). Gulls were found in 30 of 31 habitats, with exposed sand beach being the predominant habitat (19% of the birds on it) followed by lagoon island sand (11%) and lagoon sand beach (10%). In all, 60% of the gulls were recorded on sand substrate in exposed and protected areas. Nineteen percent of the terns were also on, or flying over, exposed sand beaches. The second most frequently used habitat by terns was exposed inshore water (17%), followed by protected delta water (11%) and lagoon island sand (9%).

Overall, birds selected lagoon habitats 54 percent of the time, protected deltas 23 percent, exposed habitats 12 percent, bays 7 percent, and both saltmarshes and exposed delta habitats 2 percent.

SUMMER

Pelagic Density - The brief survey in June 1976 covered only seven stations offshore from Section 17, and the 39 pelagic transects in July were nearest the six exposed sections from Port Moller to Unimak Pass. The overall summer bird density in these waters was 432 birds/km² (Table 15). Over 90 percent of the birds, or 402 birds/km², were shearwaters. At the time of the survey in late July, the waters northeast and southwest of Amak Island supported scattered, large flocks of these birds. A small percentage of the total population was enumerated in the transect width, and it was assumed that several million shearwaters were present. Sectional breakdown of shearwater densities was likely not a true indicator of bird distribution, but pelagic waters off Section 19 (on the east side of Amak Island) had 1375 shearwaters/km². Numbers of shearwaters dropped off as we proceeded up the coast from Moffett Lagoon.

Gulls were the next most abundant group with 16 birds/km². The high density area was just north of Nelson Lagoon with 65 birds/km². Large gulls predominated in Section 16, whereas farther south kitiwakes were as abundant as Glaucous-winged Gulls. Murres were the predominant alcid and the greatest density occurred southwest of Amak Island at 33 birds/km². Sea duck densities were highest near Port Moller but only 4 and 5 birds/km² were recorded for the two sections 13 and 16, respectively. Terns were observed in all sections but only in trace amounts.

Habitat Usage - Except for a few birds on the inshore portion of the transects, all birds were in offshore waters.
Table 15. Pelagic densities of birds by section of coastline in North-Alaska Peninsula, summer 1976. See Figure 105 for section boundaries. (T=trace).

<table>
<thead>
<tr>
<th>Bird Group</th>
<th>Section of Coastline</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Loon</td>
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<td>T</td>
</tr>
<tr>
<td>Tubenose</td>
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</tr>
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<td>Cormorant</td>
<td>2</td>
<td>T</td>
</tr>
<tr>
<td>Goose and Swan</td>
<td>0</td>
<td></td>
</tr>
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<td>Dabbler</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Diver</td>
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<td></td>
</tr>
<tr>
<td>Sea Duck</td>
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<td>5</td>
</tr>
<tr>
<td>Merganser</td>
<td>0</td>
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<td>Raptor</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Crane</td>
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<td></td>
</tr>
<tr>
<td>Shorebird</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Gull and Jaeger</td>
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<td>T</td>
</tr>
<tr>
<td>Tern</td>
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<td>7</td>
</tr>
<tr>
<td>Alcid</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Corvid</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Other Passerine</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Other Bird</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>22</td>
<td>76</td>
</tr>
</tbody>
</table>
Density - The north side of the Alaska Peninsula, in fall, provided ideal staging habitat for waterfowl and other bird groups. The mean fall density was 453 birds/km² and of that number 268 birds/km² were geese (Table 16). Over one-half of the geese were Brant (59%), 23 percent Canada Geese and 17 percent Emperor Geese. Only a trace of Snow Geese and no White-fronted Geese were seen on the October surveys. Mean densities for sea ducks were 97 birds/km², shorebirds 41 birds/km², dabblers 23 birds/km² and gulls 19 birds/km². Remaining bird groups had densities of 1 bird/km² or less.

Seventeen sections had densities of over 100 birds/km², and on one, densities exceeded 1,000 birds/km². The latter section was No. 20, the Applegate Cove portion of Izembek Lagoon. Geese (mostly Brant) accounted for 932 of 1044 birds/km² in Section 20.

On the first survey in October 1975, it was found that Brant were difficult to census because they frequently flushed upon approach of the aircraft and flew to areas not yet counted, potentially being counted repeatedly. For that reason, Brant numbers from the first survey may be exaggerated to some extent but this did not greatly affect mean densities when lumped with such large numbers. Section 20 would still remain the one with the highest bird density in the region. In Applegate Cove 76 percent of the geese were Brant, 20 percent Canada Geese and 4 percent Emperor Geese. Almost all of the sea ducks (66 birds/km²) in Section 20 were Steller's Eiders.

The section with the second highest bird density was Nelson Lagoon (No. 16) with a density of 746 birds/km². In this area sea ducks were the most abundant bird group at 420 birds/km². Species composition was 55 percent Steller's Eiders, 2 percent large eiders (King and Common) and 42 percent scoters (99% Black). The goose density was 168 birds/km² with almost all Emperors and only a trace of Canadas. High shorebird densities were also noted, 100 birds/km². In October, most of the shorebirds were likely Rock Sandpipers. Section 13, Port Moller, had a bird density of 618 birds/km², the majority of which were sea ducks (360 birds/km²). However, 156 geese/km² were observed (most of which were Emperors), and the highest gull density (86 birds/km²) for fall in the region was recorded in Section 13.

Three other sections supported bird densities over 400 birds/km². Section 6, 7 and 14 had densities of 428, 499 and 451 birds/km², respectively. In Sections 6 and 14 sea ducks were the predominant bird group with 369 and 321 birds/km², respectively. In Section 7, three groups comprised the largest percentages of the total: shorebirds (164 birds/km²), geese (156 birds/km²) and sea ducks (113 birds/km²).

Second highest goose densities were found in Section 19, the central portion of Izembek Lagoon, with 256 birds/km². Next was Section 23 with 198 geese/km². One-hundred dabblers/km² were also found in Section 23, but densities of both geese and dabblers largely represent Swanson
Lagoon densities because the trackline did not go beyond Otter Point on Unimak Island. Other high dabber densities were found in Section 11, Seal Islands, with 49 birds/km² and Section 5, Ugashik Bay, with 41 birds/km². Diving ducks were abundant only in Section 14, Herendeen Bay, at a density of 15 birds/km².

About the only birds in Section 1 were gulls, and the second highest density for that bird group was found there (81 birds/km²). Other high gull densities were recorded in Sections 14 and 21 with 65 and 64 birds/km², respectively. Of the identified gulls in fall, the majority were Glaucous-winged (93%). Low percentages of kittiwakes (4%) and Mew Gulls (2%) were recorded. During a mapping flight in October 1976, while I was not specifically recording bird numbers, 11,500 gulls (both kittiwakes and large gulls) were observed in Bechevin Bay and Isantoski Straits of Section 22.

Section 8 had the lowest fall density with 39 birds/km². The bird group, Other Passerines, had its highest density in that section — 11 birds/km². Most passerines on the coast in fall were Snow Buntings (Plectrophenax nivalis) which fed in beach rye (Elymus sp.) along sand beaches.

Loons were found in most sections, but only occurred in a measurable amount (1 bird/km²) in Section 14. Tubenoses were only found in the Port Moller complex (Sections 13-16), and were measurable only in Section 14 (3 birds/km²). Cormorants were widely scattered but reached a density of 20 birds/km² in Section 22, Bechevin Bay. Raptors were recorded in almost all sections but only in trace amounts. Bald Eagles were the most common raptor but Gyrfalcons (Falco rusticolus), Marsh Hawks and Short-eared Owls were also observed. Alcids were recorded in 14 sections and reached their highest density (3 birds/km²) in Section 14.

Habitat Usage — Because the second fall survey of North-Alaska Peninsula primarily covered estuarine habitats, 70 percent of the total birds were found on lagoon habitats, 21 percent on protected delta habitats and 5 percent in bays. Only 3 percent were on exposed habitats and 2 percent on saltmarshes. On the October 1975 survey, most habitat delineations had not been finalized, and therefore, a large percentage of birds were recorded as using unidentified habitats. Almost 90 percent of the 400,000 birds in unidentified lagoon habitats were geese. Most of these geese were found in Izembek Lagoon, but at the time of the survey a substrate was not specified, and, therefore, they were put into an unidentified category. Information on fall habitat usage by birds is diagrammed in Figs. 130 and 131.

Lagoon water was the most used habitat identified. Twenty-one percent of the birds were found there; 62 percent were geese and 31 percent sea ducks. Brant remained over water at all times and fed on eelgrass (Zostera marina). Canada Geese roosted on lagoon water but frequently fed on nearby tundra. Lagoon water also was used by Emperor Geese for roosting when disturbed from their usual beach habitats. Large rafts of feeding and roosting sea ducks were often observed on the lagoon/embayment water just inside sand/gravel spits.
Table 16. Bird density by section of coastline in North-Alaska Peninsula, fall 1975, 1976. See Figure 105 for section boundaries. (T=trace).

| Bird Group        | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Total |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|     |
| Loon              | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Grebe             | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Tubenose          | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Cormorant         | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Goose and Swan    | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Daboller          | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Diver             | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Sea Duck          | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Merganser         | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Raptor            | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Crane             | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Shorebird         | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Gull and Jaeger   | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Tern              | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Alcid             | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Corvid            | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Other Passerine   | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| Other Bird        | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  | T  |
| TOTAL             | 86 | 111| 119| 96 | 171| 428| 499| 39 | 225| 96 | 327| 65 | 618| 451| 139| 746| 160| 249| 348| 1044| 247| 209| 332| 453 |

Fall Densities (birds/km²)
NORTH-ALASKA PENINSULA, FALL

- Loons
- Grebes
- Tubenoses
- Cormorants
- Swans and Geese
- Dabblers
- Divers
- Sea Ducks
- Mergansers
- Raptors
- Cranes
- Shorebirds
- Jaegers and Gulls
- Terns
Fig. 130. North-Alaska Peninsula, Fall, 1975 and 1976. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 131. North-Alaska Peninsula, Fall, 1975 and 1976. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Eleven percent of the birds used protected delta water, and 83 percent of the birds on this habitat were sea ducks and 11 percent were dabbling ducks. Dabblers in large numbers frequently lined the waters' edge at river mouths. Of the almost 70,000 birds found on protected delta mud 65 percent were shorebirds, 23 percent geese, 8 percent dabblers and 5 percent gulls. Lagoon island sand beaches were used by geese (mostly Emperors), shorebirds, gulls and dabblers (percentages were: 40, 33, 12 and 12, respectively). The next most used habitats were lagoon mudflats and bay water. In the former type, geese and shorebirds predominated (48% and 43%, respectively). Sixty-four percent of the birds on bay water were sea ducks and 32 percent were geese.

Over 3 percent of the one million birds counted in North-Alaska Peninsula were on alluvial floodplain vegetation. Most were geese (81%) and dabblers (15%). Over 16,000 birds were on exposed inshore waters. Sea ducks were the most abundant (83% of total). Gulls were next with only 9 percent of the total. Geese and dabblers were the bird groups most frequently found on saltmarshes (73% and 14%, respectively).

Only five bird groups were found in relatively great abundance in fall on North-Alaska Peninsula. Geese, the most abundant, were found on 14 habitats but mostly used lagoon waters. Sea ducks were found 43 percent of the time on protected delta water, 31 percent on lagoon water, 12 percent on bay water and 6 percent on exposed inshore water. Almost one-half of the shorebirds, the third largest group, were found on protected delta mud. An additional 19 percent used lagoon mudflats and 18 percent used lagoon island sand. Over 54,000 dabblers preferred protected delta water (23%) lagoon water (15%), lagoon island sand (12%), protected delta mud (10%) and alluvial floodplain (9%). Eighteen habitats were used by gulls, the fifth most abundant bird group, and no one habitat was utilized significantly more than others.

WINTER

Although three winter surveys were conducted, coverage was limited and six sections were not surveyed. Other sections were surveyed only partially. A portion of one survey was several hundred meters offshore in pelagic waters.

Density - Bird densities dropped from a high of 453 birds/km² in fall to 53 birds/km² in winter (Table 17). Fourteen bird groups were recorded but only four in measurable numbers: sea ducks, gulls, geese and alcids. They had densities of 33, 13, 3 and 2 birds/km², respectively.

Section 10, the coast between Port Heiden and Seal Islands, had the highest bird densities at 197 birds/km². No other sections had densities over 100 birds/km²; however, three were close with 97, 93 and 87 birds/km² (Sections 22, 4 and 16, respectively). In Section 10, sea ducks comprised 92 percent of the birds recorded, or 182 birds/km². Gulls made up most of the rest (15 birds/km²). Winter use of sections 16 and 22 was primarily by sea ducks and geese. Both had goose densities of 35 birds/km².
Table 17. Bird density by section of coastline in North-Alaska Peninsula, winter 1977. See Figure 105 for section boundaries. (T=trace).

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<th>Section of Coastline</th>
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<tr>
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<td>GREBE</td>
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<td>TUBENOSE</td>
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<td>GOOSE AND SWAN</td>
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<td>DIVER</td>
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<td>SEA DUCK</td>
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<td>MERGANSER</td>
<td>T</td>
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<td>RAPTOR</td>
<td>T</td>
</tr>
<tr>
<td>CRANE</td>
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</tr>
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<td>SHOREBIRD</td>
<td>T</td>
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<td>GULL AND JAEGER</td>
<td>T</td>
</tr>
<tr>
<td>TERN</td>
<td>T</td>
</tr>
<tr>
<td>ALCID</td>
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<td>OTHER PASSERINE</td>
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</table>

* Not surveyed.
Section 16 had a sea duck density of 49 birds/km² and Section 22 a density of 52 gulls/km². The latter section also supported a few diving ducks and mergansers plus a density of 6 cormorants/km². Section 4 mostly had gulls (53 birds/km²) and sea ducks (40 birds/km²).

Geese were also common in Section 13, Port Moller, where 21 birds/km² were recorded. In the winter surveys only Emperor Geese were recorded. However, on an overflight of Applegate Cove (Section 20) when surveys were not being conducted, a flock of about 2,000 Brant was noted. Because of the mild winter, they were able to overwinter at Izembek. The section with the second highest sea duck density (Section 19) had 58 sea ducks/km² and no other measurable bird densities. Eighty-two percent of the identified sea ducks observed on these winter flights were eiders. Scoters were next in abundance with 10 percent followed by Oldsquaw (7%) and Harlequin Duck (1%). Of identified eiders, 79 percent were Steller's, 20 percent King and 1 percent Common. For scoters the percentages of identified birds were: Black 87%, White-winged 13% and Surf trace. Sea ducks were recorded on 17 of the 18 sections surveyed. Only Section 5 did not have sea ducks, but only 2.3 km² of this section were surveyed.

Gulls were also found on all but Section 1. Besides the high gull density in Section 4, gulls were most dense in Section 6 at 35 birds/km². Gulls were frequently observed roosting on, or flying along, the exposed sand beaches. Observed gull densities were greatest in exposed sections, but 80 percent of the area searched on these winter surveys was exposed habitat.

Alcids were the only other group with a measurable density. Almost all alcids were on the most southern sections. The most were in Section 23 (13 birds/km²). Bald Eagles and Common Ravens were scattered throughout the coast in winter, but were not abundant in any section.

**Habitat Usage** - Forty-six percent of the birds observed during winter surveys were found in exposed habitats. An additional 6 percent were on offshore waters and 5 five percent on exposed delta habitats. This ratio of habitat use was biased by the fact that 80 percent of the area surveyed was exposed sections. Lagoon habitats contained 35 percent of the birds and 4 percent were in bays, 3 percent on protected delta habitats and 1 percent on saltmarshes. Information on winter habitat usage is presented in Figs. 132 and 133.

Only five habitats contained 1,000 or more birds. The largest percentage of birds (32%) were on lagoon water and essentially all of these were sea ducks. Exposed inshore water was next with 31 percent of the birds and again the majority (82%) were sea ducks. On exposed sand beaches 13 percent of the birds were found, and 95 percent of these were gulls. Six percent of the birds were on offshore waters and 52 percent of these were alcids and 43 percent sea ducks. Exposed river deltas supported 4 percent of the birds, all of which were gulls. Over 900 birds were seen on bay waters, and sea ducks, geese and cormorants were the most numerous birds (82, 8, and 6%, respectively).
NORTH-ALASKA PENINSULA, WINTER

- **Loons**: 100
- **Grebes**: 17
- **Tubenoses**: NONE
- **Cormorants**: 2,054
- **Swans and Geese**: 21,881
- **Dabblers**: 60
- **Divers**: 50
- **Raptors**: 80
- **Cranes**: NONE
- **Shorebirds**: 15
- **Jaegers and Gulls**: 8,628
- **Terns**: NONE
Fig. 132. North-Alaska Peninsula, Winter, 1977. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
NORTH-ALASKA PENINSULA, WINTER

- Offshore water
- Exposed inshore water
- Exposed mudflats
- Exposed sand beach
- Exposed gravel beach
- Exposed rock beach
- Exposed island sand
- Exposed island gravel
- Exposed island rock
- Bay water
- Bay mudflats
- Bay sand beach
- Bay gravel beach
- Bay rock beach
- Bay island upland
- Bay island sand
- Bay island rock
- Lagoon water
- Lagoon mudflats
- Lagoon sand beach
- Lagoon gravel beach
- Lagoon rock beach
- Lagoon island upland
- Lagoon island sand
Fig. 133. North-Alaska Peninsula, Winter, 1977. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Four species groups numbered over 1,000 individuals. Sea ducks, the most abundant bird group (63% of the total), were found most on lagoon water (51%), and most of the remainder (41%) were on exposed inshore water. One-fourth of the birds were gulls. They were found on 17 of the 19 identified habitats. Almost 50 percent used exposed sand beaches and 17 percent were on both exposed delta sand and exposed inshore water. The rest were found in small numbers on a variety of habitats. Most (60%) of the Emperor Geese were on unidentified bay and lagoon habitats; others used protected delta mud (20%) and protected delta sand (12%). Eighty-six percent of the 1,100 alcids were in offshore waters and the remainder (14%) on exposed inshore waters.

NORTH - BRISTOL BAY

Three spring surveys were conducted in North-Bristol Bay. The first, in May 1976, covered the entire coastline to Cape Newenham and Hagemeister Island (Fig. 134). The second survey, covering only Kvichak Bay, was done by helicopter, and the shoreline from Kvichak River to Kulukak Bay was flown in the final survey. Only aerial pelagic surveys were conducted in the Walrus Island vicinity in spring. In summer, pelagic surveys by raft were conducted in the Walrus Islands.

For analysis, the mainland coast was subdivided into 11 physiographic sections (Fig. 135). Hagemeister Island constituted one section and the Walrus Islands were another.

SPRING

Density - North-Bristol Bay in spring had a mean bird density of 86 birds/km² (Table 18). Bird density data by section are depicted in Figs. 136-153. Four sections had densities exceeding 100 birds/km². The coastline from Capes Peirce to Newenham, Section 11, had the highest density at 466 birds/km². Alcids were the most dense recorded group with 249 birds/km². Over 4,000 Brant were in Nanvak Bay near Cape Peirce, inflating the goose density to 140 birds/km² in Section 11. Although gull densities in Section 11 (34 birds/km²) were high for the region, many gulls were not counted that were on colonies at both Capes Newenham and Peirce. The observation plane had to climb away from the high cliffs where thousands of black-legged kittiwakes flushed from nesting sites and endangering the aircraft (and themselves). Almost 300,000 kittiwakes have been estimated in breeding populations in this section (Sowls et al. 1978).

Section 1 in Kvichak Bay had a density of 259 birds/km². Most birds in this section were shorebirds and dabblers, but gulls, diving ducks and geese were also found in substantial numbers. The brackish alluvial floodplain and adjacent intertidal mudflat supported most of the birds.

The avifauna in Section 3, southern Nushagak Bay, was almost entirely diving ducks. Of the 206 birds/km² found in the section, 171 birds/km² were scaup. There was an almost continuous line of scaup in shallow water of Flounder Flats. Flocks of Black Scoters were mixed in with the scaup but in much lower densities. There were 21 sea ducks/km² in Section 3.
Fig. 134. Tracklines of aerial and boat (7709) surveys in North-Bristol Bay and North-Alaska Peninsula, 1976 and 1977.
Fig. 135. Physiographic subdivision of North-Bristol Bay for bird density analysis. Each numbered section contains several survey stations.
Table 18. Bird density by section of coastline in North Bristol Bay, spring 1976, 1977, summer 1977. See Figure 135 for section boundaries. (T=trace).

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Fig. 136. Total bird density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 137. Loon density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 138. Grebe density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 139. Tubenose density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. No tubenoses were sighted.
Fig. 140. Cormorant density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 141. Goose and swan density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 142. Dabbling duck density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 143. Diving duck density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 144. Sea duck density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 145. Merganser density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 146. Raptor density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 147. Crane density by section in North-Bristol Bay during spring and summer seasons as determined by aerial survey. Densities read from left to right: spring, summer.
Fig. 148. Shorebird density by section in North-Bristol Bay during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 149. Gull and jaeger density by section in North-Bristol Bay during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 150. Tern density by section in North-Bristol Bay during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 151. Alcid density by section in North-Bristol Bay during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 152. Corvid density by section in North-Bristol Bay during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
Fig. 153. Passerine (other than corvid) density in North-Bristol Bay during spring and summer seasons as determined by aerial surveys. Densities read from left to right: spring, summer.
The coast from Kulukak Bay to Togiak, Section 9, was the fourth section with a mean density over 100 birds/km² (121). No one bird group dominated in this section. The largest were sea ducks with 32 birds/km² followed by gulls 24 birds/km², divers 21 birds/km², shorebirds 18 birds/km², cormorants 12 birds/km², alcids 7 birds/km², mergansers 4 birds/km², plus several groups with 2 or fewer birds/km².

The section with the lowest density, Section 13, had 16 birds/km², but this represented only pelagic transects to, from and between the Walrus Islands. A shoreline survey of the islands was not conducted in spring.

For North-Bristol Bay in spring, there was a well-balanced distribution of overall densities in all bird groups. Shorebirds had the highest density at 21 birds/km². This was followed by 13 gulls/km², 12 divers/km², 10 sea ducks/km², 9 dabblers/km², 8 alcids/km² and 7 geese/km². Cormorants occurred at a density of 2 birds/km², three groups had densities of 1 bird/km² and five had traces. No tubenoses were observed.

Loons were observed in all sections but were most dense in Sections 7-10 where 1-2 birds/km² were found. Red-throated Loons were by far the most abundant. They were observed in shallow water all along the coast. Cormorants reached greatest densities of 10 and 12 birds/km² in the two Togiak Bay sections. Besides the large number of geese in Nanvak Bay, concentrations were also found in Osviak Bay and at the mouth of the Kvichak River. At Protection Point all five goose species commonly observed in Alaska (Canada, Brant, Emperor, White-fronted and Snow) were recorded as well as swans, cranes and many duck species. Dabblers were most dense in Section 1 and divers in Section 3. Densities of dabblers were low in all other sections, but densities of divers were moderately high in many of the sections. Scaup made up 99 percent of all diving ducks observed. The difference in dabbler and diver density likely reflected a differential in migration timing rather than absolute bird usage patterns in the area.

Twenty or more sea ducks/km² were recorded in several sections. The highest densities (32 birds/km²) were in Section 9 and next highest in Sections 6 and 12. Composition of identified sea ducks was: 10 percent Oldsquaws, 12 percent Harlequin Ducks, 19 percent eiders, and 59 percent scoters. King Eiders were the prevalent identified eider (45% of the total), while 36 percent of the eiders were Common and 19 percent Steller's. Most of the identified scoters were Black (97%). Three percent were White-winged scoters and only a trace of Surf Scoters as recorded.

Red-breasted Mergansers were relatively common in North-Bristol Bay and Sections 8-10 supported the highest densities (2-4 birds/km²). Sandhill Cranes, although never abundant, were frequently observed (9 of 13 sections). Besides Section 1, where 121 shorebirds/km² were found, the densest concentrations of shorebirds were in Section 8, Kulukak Bay, where 32 birds/km² were found and in outer Kvichak Bay (Section 2) with 24 birds/km². Nearly 5,000 shorebirds were recorded in Section 4 but densities were only 17 birds/km².
Densities of over 10 gulls/km² were observed in all sections except the Nushagak Bay area. In Sections 3-6 only 4 to 6 gulls/km² were found. Many gulls were paired and apparently on breeding territories along the Nushagak River and over 4,000 gulls were counted in those four sections. However, the area searched was large, and gull densities were correspondingly low. Tern migration had reached its peak in May, and the North-Bristol Bay surveys caught at least part of the migration. Terns were observed in all sections except No. 13 and densities up to 4 terns/km² were recorded.

Alcids were found in measurable numbers only beyond Kulukak Bay. The majority (249 birds/km²) were in Section 11 but other concentrations were in Sections 9 and 12. Murres comprised 91 percent of the total identified alcids, Pigeon Guillemots 5 percent and puffins (mostly Tufted) 4 percent. Corvids were most numerous in Section 10 and other passerines in Section 5 but both groups were found only in trace quantities.

Habitat Usage - Habitat preferences of each species group and what species groups were found on each habitat type for the spring survey of North-Bristol Bay are shown in Figs. 154 and 155, respectively. Forty-two percent of the birds were recorded on protected delta habitats, 37 percent on exposed inshore habitats, 12 percent on bay habitats, 4 percent on offshore waters, 3 percent in lagoon habitats, 2 percent on saltmarshes and 1 percent on exposed deltas. Six habitats were used by 3,500 or more birds (4% or more of the total). The remaining 20 identified habitats on which birds were found contained only small numbers of birds.

During the spring surveys most birds were found on exposed inshore waters (22% of the total). Three bird groups predominated in this habitat: alcids (34% of the birds), sea ducks (27%) and divers (23%). Nineteen percent of the birds used protected delta water, and many of these were dabblers (43%), divers (20%), shorebirds (16%) and gulls (9%). Exposed sand beach and bay water were each used by 7 percent of the birds. On sand beaches most birds were gulls and divers (46% and 33%, respectively) and on bay water waterfowl predominated, 52 percent geese, 22 percent divers and 14 percent sea ducks. Four percent of the birds were found on both alluvial floodplain and protected delta mud. On the former habitat, shorebirds, gulls and geese were most abundant (41%, 26%, and 16% respectively). The latter habitat was used most by shorebirds (48%), gulls (23%) and dabblers (16%).

On a species group basis, shorebirds, the most abundant group, were found on 23 of 26 identified habitats, but almost one-half were on unidentified protected alluvial habitats. Thirteen percent were on or flying over protected alluvial floodplains. The remainder was divided among the other habitats. Gulls, too, were on a variety of habitats (22 of 26) but most frequently used exposed sand beaches (22%), protected delta water (11%), alluvial floodplain (7%) and protected delta mud (6%).

Almost 13,000 birds observed during the spring survey were diving ducks (scaup). They were found most on exposed inshore water (35%), protected delta water (27%), exposed sand beaches (17%) and bay water (11%).
Fig. 154. North-Bristol Bay, Spring 1976, 1977. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 155. North-Bristol Bay, Spring 1976, 1977. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<1 percent) category is in parenthesis. Numbers at upper left are sample size.
About 10,000 dabblers and sea ducks were recorded. Dabblers preferred protected delta water (74% of the total) and often roosted and fed at river's edge. Other dabblers were found on bay mudflats (10%) and protected delta mud (6%). Almost all sea ducks were on exposed inshore water (53%), offshore water (28%) or bay water (9%). About one-half the geese used bay water, 16 percent were on protected delta water and 8 percent alluvial floodplains.

Of the almost 9,000 alcids, 77 percent were found on exposed inshore water and 18 percent on exposed rock beach. Three other species groups had sample sizes of over 1,000 birds (cormorants, mergansers and terns.) Cormorants were most often on exposed inshore water, mergansers were on that habitat plus protected delta water and terns used bay habitats most frequently. Loons were more numerous in North-Bristol Bay than in any other region and were found on exposed inshore water 62 percent of the time. Eighteen percent were on protected delta water and 17 percent on bay water.

SUMMER

Density - Only 18 transects were conducted by raft between the Walrus Islands in the summer in North-Bristol Bay. The mean density for all birds was 134 birds/km² (Table 18). Most were alcids (103 birds/km²), followed by cormorants (15 birds/km²), sea ducks (10 birds/km²) and gulls (6 birds/km²). Most of the sea ducks were non-breeding White-winged Scoters.

Habitat Usage - Because these surveys were pelagic transects, most birds were on offshore waters and further evaluation of habitat use was unnecessary.

ALEUTIAN SHELF

Only one winter survey was conducted in this region (Fig. 156). At the time of the survey, weather was generally poor with snow squalls, high winds and rough seas. Parts of some stations were missed and others completely bypassed. The south side of Unalaska Island and the east side of Umnak Island were not surveyed. More birds were present than are represented here.

The subdivision into sections (Fig. 157) was arbitrary. Many of the bays and islands are physiographically similar and were therefore combined into the large sections. Exposure was the only obvious difference. Samalga Island was selected as one section in itself because of its relative importance. Bogoslof Island and the accompanying transects to and from the island were also given sectional status.

WINTER

Density - Bird densities by section for the winter survey of the Aleutian Shelf are shown in Figs. 158-175. The mean density for all birds was 94 birds/km² (Table 19). The section with the highest density of all
Fig. 156. Tracklines of aerial bird surveys along the Aleutian Shelf, 1977.
Fig. 157. Physiographic subdivision of the Aleutian Shelf for bird density analysis. Each numbered section contains several survey stations.
Table 19. Bird density by section of coastline in Aleutian Shelf, winter 1978.
See Figure 157 for section boundaries. (T=trace).

<table>
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<tr>
<th>Bird Group</th>
<th>Section of Coastline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Loon</td>
<td>T</td>
</tr>
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<td>Grebe</td>
<td>T</td>
</tr>
<tr>
<td>Tubenose</td>
<td></td>
</tr>
<tr>
<td>Cormorant</td>
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</tr>
<tr>
<td>Goose and Swan</td>
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</tr>
<tr>
<td>Dabbler</td>
<td>T</td>
</tr>
<tr>
<td>Diver</td>
<td>T</td>
</tr>
<tr>
<td>Sea Duck</td>
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<tr>
<td>Merganser</td>
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<tr>
<td>Raptor</td>
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</tr>
<tr>
<td>Crane</td>
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</tr>
<tr>
<td>Shorebird</td>
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<td>Gull and Jaeger</td>
<td>7</td>
</tr>
<tr>
<td>Tern</td>
<td></td>
</tr>
<tr>
<td>Alcid</td>
<td>4</td>
</tr>
<tr>
<td>Corvid</td>
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</tr>
<tr>
<td>Other Passerine</td>
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<td>Other Bird</td>
<td>T</td>
</tr>
<tr>
<td>TOTAL</td>
<td>75</td>
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</tbody>
</table>
Fig. 158. Total bird density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 159. Loon density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 160. Grebe density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 161. Tubenose density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 162. Cormorant density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 163. Goose and swan density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 164. Dabbling Duck density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 165. Diving duck density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 166. Sea duck density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 167. Merganser density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 168. Raptor density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 169. Crane density by section along the Aleutian Shelf during winter as determined by aerial survey. No cranes were sighted.
Fig. 170. Shorebird density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 171. Gull and jaeger density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 172. Tern density by section along the Aleutian Shelf during winter as determined by aerial survey. No terns were sighted.
Fig. 173. Alcid density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 174. Corvid density by section along the Aleutian Shelf during winter as determined by aerial survey.
Fig. 175. Passerine (other than corvid) density by section along the Aleutian Shelf during winter as determined by aerial survey.
regions in the study was Samalga Island with 3240 birds/km². Over 8,000 birds were estimated in an area of 2.5 km². This was one-fifth of the birds in the entire survey. Samalga Island had the highest densities for all bird groups recorded in measurable amounts. Geese (all Emperors) were first with 1435 birds/km². Shorebirds numbered 1240 birds/km², sea ducks 416 birds/km², gulls 99 birds/km², dabblers (mostly mallards) 30 birds/km² and divers 20 birds/km². At the time of the survey an Arctic fox was observed on the island. Fox predation on birds may be a limiting factor to bird use of the island if foxes are abundant.

Two other sections had bird densities higher than 100 birds/km². Section 7, on the south side of Umnak Island, had 129 birds/km²; most abundant were shorebirds (48 birds/km²) and sea ducks (57 birds/km²). Northwestern Unalaska Island (Section 3) had 51 sea ducks/km², 23 geese/km², 10 gulls and 10 alcids/km² out of a total of 103 birds/km².

The low density of 13 birds/km² was found on the Bogoslof Island - offshore section. Most birds were gulls; however, Northern Fulmars were also found in measurable quantities (1 bird/km²).

Overall, sea ducks were the most abundant bird group with 43 birds/km². Samalga Island had the densest population, and the other sections all had similar densities from 30-57 birds/km² and a mean of 43 birds/km². Composition of sea ducks in the region was 49 percent eiders, 33 percent scoters, 10 percent Harlequin Ducks and 9 percent Oldsquaw. Of identified eiders 65 percent were King, 27 percent Steller's and 8 percent Common. Seventy-three percent of identified scoters were Black, 25 percent White-winged and 2 percent Surf.

Seventeen geese/km² were recorded in the Aleutian Shelf survey, all Emperor Geese. Of over 7,000 observed, one-half were on Samalga Island. Highest densities of shorebirds were found in Sections 6 and 7 with a mean density of 13 birds/km². Except for Samalga Island, gull densities varied from 7 to 14 birds/km² in all sections. The mean was 11 birds/km². Fewer alcids and cormorants were seen. Only 5 alcids/km² were recorded overall, and the greatest density (10 birds/km²) was in Section 3. The majority of alcids were murres. The mean density for cormorants was 4 birds/km² and similar densities were found in all sections but No. 6 where none were sighted.

Habitat Usage - Habitat preferences of each species group and the particular species group found on each habitat type during the winter survey of the Aleutian Shelf region are shown in Figs. 176 and 177. Birds were found on only 11 habitats. There was not as much habitat diversity here as in other regions of the study area. Exposed habitats are more predominant in the Aleutian Shelf, and most birds (62%) were found in that type. Bays provided habitat for 28 percent of the birds, 9 percent were found in offshore waters and less than 1 percent in lagoons.
Fig. 176. Aleutian Shelf, Winter 1977. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 177. Aleutian Shelf, Winter 1977. Marine bird usage of habitats as determined by aerial survey. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
One-fourth of the birds were on exposed inshore water habitat and sea ducks were the most abundant bird on that habitat. Eighty-six percent of the birds on exposed waters were sea ducks, 6 percent were alcids and 3 percent each were cormorants and geese. Bay waters contained 20 percent of the birds and again sea ducks were the most abundant (71%) bird group on the habitat. Others included alcids (15%), gulls (8%) and divers (2%).

Seventeen percent of the birds used exposed gravel beaches. Emperor geese and shorebirds comprised 53 and 45 percent of the birds on this habitat. On pelagic transects between islands, offshore waters were searched, and 9 percent of the birds were found on this habitat. Over 90 percent of the birds found were sea ducks, 4 percent were alcids and 1 percent tubenoses. Exposed rock beach was used by 4 percent of the birds and four species groups were most commonly found on it. These were geese (36%), shorebirds (31%), cormorants (16%) and gulls (14%).

The species group most frequently observed was sea ducks (45% of total) and they were primarily found on three habitats, exposed inshore water (48%), bay water (31%) and offshore water (20%). Over one-half the Emperor Geese, which were second in abundance with 18 percent of the total, were found on an exposed gravel beach. Most of the remainder had flushed from unspecified habitats in bays and along exposed habitats. Of the over 5,600 shorebirds observed on the survey, 55 percent used exposed gravel beaches, 34 percent were on unspecified exposed habitats and 9 percent on exposed rock beach. Only 1 percent were found in protected habitats.

Gull distribution was almost evenly divided between exposed and protected habitats. Fifty-seven percent were dispersed among all exposed habitats used by birds in the region on the winter survey. The remaining 43 percent were on bay habitats but most observations were not specified as to habitat type. Alcids were found on three habitats, bay water (64%), exposed inshore water (29%) and offshore water (7%). Over 1,500 cormorants were recorded, and they most frequently were found on exposed habitats. Only 21 percent were on bay habitats. As in other lease areas, rock was the preferred substrate of cormorants when they were not on the water.

VII. DISCUSSION

Bird Density - Although 33 bird surveys were conducted in this study and many birds were recorded, sample sizes were not large enough and surveys not uniform enough to statistically compare bird densities among regions, among different seasons within regions, or between the same seasons within regions. Nevertheless, obvious differences in bird densities existed between regions (Table 20), these can be interpreted and within the limits of the survey technique and compared to data gathered by others.
Table 20. Comparison of marine birds densities among regions in southcentral Alaska, by season. Data are based on aerial and boat surveys; survey trackline included both shoreline and pelagic areas. Values in Birds/km²; T = trace, p = pelagic survey.

<table>
<thead>
<tr>
<th>Species Grouping</th>
<th>Lower Cook Inlet</th>
<th>S. AK Pen.</th>
<th>N. AK Pen.</th>
<th>N. BR. Bay</th>
<th>AL. Ah.</th>
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<tr>
<td></td>
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<td>T</td>
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</table>

Total: 151 373 39 192 17 130 26 66 9 32 5 279 67 141 432 453 53 86 134 94
Of four regions surveyed in spring, Lower Cook Inlet (LCI) supported the highest mean bird density (192 birds/km²) and North-Bristol Bay (N-BB) the lowest (86 birds/km²). Northeast Gulf of Alaska (NEGOA) and North-Alaska Peninsula (N-AP) had densities intermediate to the extremes (151 and 141 birds/km², respectively). Bird migration in spring generally follows similar patterns from year to year. It begins in April and lasts into June depending upon the species, the prevailing weather, and to a certain extent, the birds' age (non-breeding immature versus breeding adult). The only surveys conducted in April for this study were in LCI. All other spring surveys were in May. The high density for LCI may partially be a result of combining April and May surveys and, therefore, combining migration periods for more species of birds. There may be several reasons why observed bird densities in N-BB were relatively low. Many supratidal bird habitats were still frozen in early May (particularly in 1977), and habitat was not available to some birds. In addition N-BB is so close to prime staging areas farther south that birds migrating to the Yukon-Kuskokwim Delta and farther north do not require a stop to build fat reserves to reach nesting or more suitable staging habitat; or quantities of suitable staging habitat are not sufficient to stop large numbers of birds.

In spring, loons were found in large numbers (over 500) and in measurable densities (1 bird/km²) only in NEGOA and N-BB. In both cases, these were mostly Red-throated and Arctic Loons. Grebes were never observed in abundance. I'm certain more were present, but were not recorded, because they dove at the approach of aircraft so were not counted. Goose densities were quite high (60 birds/km²) in N-AP and quite low (2 birds/km²) in NEGOA. Estuaries on N-AP are a major staging area for migrating Brant, Emperor and Canada Geese. They spend several weeks there before more northern areas open up in spring. It is not known how extensively estuaries in southern NEGOA are used in spring. Geese may continue up the coast to Controller Bay, Copper River Delta or areas farther north and west unless inclement weather stops them. Large numbers could then use areas like Dry Bay until improved weather permitted further migration. Most geese and dabblers migrate through NEGOA in the last half of April; therefore our May survey missed the peak of goose and dabbler migration. Because recorded densities were low, we could not determine which areas in NEGOA are used extensively by those bird groups.

We recorded substantially higher densities of sea ducks, divers and dabblers (38, 23 and 15 birds/km²) in LCI than other regions in spring. This may be the result of the fact that more spring surveys were conducted in LCI, and the surveys covered a broader spectrum of the migration. However, LCI may serve as a crossroads for birds migrating overland to the north and those continuing along the ocean route for the Alaska Peninsula. Areas in Kachemak and Kamishak Bays provided ideal rest habitat for migrating diving and sea ducks.
Mergansers were recorded more frequently in spring. Densities of 1 merganser/km² were seen in each of the four regions in spring, the only season when measurable quantities were observed. Cranes were observed in trace amounts in all four regions. Most migrate on inland routes or overfly the coastal regions in spring.

Shorebird populations were densest in NEGOA and LCI (67 and 53 birds/km², respectively and least dense in N-BB and N-AP, 21 and 9 birds/km². Although all spring surveys were timed to coincide with shorebird migration, there were great differences in densities among regions. The logical interpretation is that shorebirds use the known migration corridor along the coast to major staging areas in Copper and Bering River Deltas. Some species, particularly Western Sandpipers, make a second stop in LCI. From there migration must proceed north and northwest to the Yukon-Kuskokwim Delta and beyond so that few shorebirds use the Alaska Peninsula for staging and only a part of the shorebird population uses N-BB. Some shorebirds using transoceanic routes do use estuaries in N-AP in spring.

Gull densities were relatively high (31-52 birds/km²) in all regions in spring except N-BB where only 13 gulls/km² were found. However, if birds near colonies had been counted and the Walrus Islands had been surveyed, the gull density for N-BB would likely have been more comparable to other regions. Terns were most dense in NEGOA (7 birds/km²) possibly because they are more concentrated along that coastline and disperse as they reach other parts of southcentral Alaska. North-Bristol Bay had the most dense alcid population, but this region also has the largest alcid breeding population of the four regions.

SUMMER

The only complete shoreline survey in summer was in LCI. In NEGOA there was only a partial survey and, therefore, data cannot be realistically compared. In both cases gulls and sea ducks were the most abundant bird groups. Many non-breeding scoters are found in both areas in summer. Gulls nest in large numbers in both areas, but most of the gulls observed in NEGOA were on beaches some distance from any colony. These were likely non-breeding birds that fed in the area and were counted while roosting on the beaches. Terns were abundant in NEGOA and uncommon in LCI. During over 2 months of on-the-ground or water survey work in Kamishak Bay only two terns were sighted. Apparently suitable habitat for terns is present only in the northern portion.

The only other study with comparable nearshore summer surveys for birds in southcentral Alaska was Dwyer et al. (1976). They found a mean density of 30 birds/km² in open water of Prince William Sound and a linear density of 70 birds/km² in shoreline habitats. Black-legged Kittiwakes, Marbled Murrelets, and Glaucous-winged Gulls were the most abundant species in open water. The same species and, additionally, Surf Scoters were abundant in shoreline habitats.
Summer pelagic survey techniques for this study differed enough so that comparisons between regions are not feasible. In LCI both boat and aerial surveys were conducted. Only 26 birds/km² were observed, and most of that number (17 birds/km²) were sea ducks. Boat surveys were conducted between islands of the Walrus Islands in N-BB, and there alcids (murres) were the most abundant (103 birds/km²). The mean density in that region was 134 birds/km². The summer aerial surveys in N-AP coincided with shearwater presence in the area and over 400 birds/km² were recorded. Most of these were shearwaters.

**FALL**

Three regions were surveyed in fall, two thoroughly, N-AP and LCI and one partially, South-Alaska Peninsula (S-AP). Mean densities were: 453 birds/km², N-AP; 279 birds/km², S-AP; and 66 birds/km², LCI. The N-AP fall density was the highest for all seasons in all regions. Estuaries along the Peninsula are prime staging habitat for migrating marine birds (particularly geese). Mean densities for four bird groups were highest in N-AP: geese 268 birds/km², sea ducks 97 birds/km², shorebirds 41 birds/km² and dabbling ducks 23 birds/km².

Geese in S-AP were nearly as abundant as in N-AP but only the southern three sections were surveyed. These sections are adjacent to Izembek Lagoon and Bechevin Bay and all contain eelgrass beds that are attractive to several waterfowl species. Geese primarily concentrated in three areas (Kinzarof, Thin Point/Old Man's and Big Lagoons) in S-AP and had a mean density of 227 bird/km². Brant, Emperor and Canada Geese were the major species. LCI supported densities of only 3 geese/km² in fall and most of those were found in Tuxedni Bay. Brant and Emperor Geese were not found in LCI in fall.

Gulls were the only birds that occurred in higher densities in LCI than in the other regions and the margin of difference was not great. There were 26 gulls/km² in LCI, 19 in N-AP and 17 in S-AP. In LCI there was a decrease in overall bird density from 192 birds/km² in spring and 130 birds/km² in summer to 66 birds/km² in fall. Major decreases resulted from the departure of sea ducks, gulls and alcids from the region.

Shorebirds were much more abundant in N-AP than in LCI or S-AP in fall (41 vs 2 and 1 birds/km², respectively). Certain species (e.g. Dunlin) likely build sufficient fat stores on N-AP estuaries in fall to enable them to bypass staging areas in LCI (Gill 1978). These same N-AP staging areas were used much less in spring by shorebirds than they were in fall (9 vs 41 birds/km²).

The only other nearshore survey in southcentral Alaska to determine bird densities in fall was by King and McKnight (1969) in Bristol Bay. Their technique was to fly a saw-tooth pattern along the coast out to 19 km from shore. Most of their observations were in offshore waters but 80 percent of the birds were within 10 km of shore. They reported 124 birds/km², almost one-half of those were scoters.
WINTER

Winter shoreline bird densities were relatively high in Aleutian Shelf (AlSh) (94 birds/km²), intermediate in S-AP (67 birds/km²) and N-AP (53 birds/km²) and low in Kodiak (39 birds/km²) and LCI (32 birds/km²). Although survey conditions were poor during the AlSh survey, many birds were recorded, particularly sea ducks (43 birds/km²), Emperor Geese (17 birds/km²), shorebirds (13 birds/km²) and gulls (11 birds/km²).

Sea ducks were the most abundant wintering bird recorded in all regions except S-AP, and in that area the survey technique utilized likely made alcids appear more dense than sea ducks even though they weren’t. Predominantly offshore islands were flown in S-AP where many alcid colonies were located. Eiders were the most numerous sea duck in the two Bering Sea regions and scoters predominated in the three Gulf of Alaska regions. Diving and dabbling ducks were most dense in Kodiak and LCI while geese (Emperor’s) prevailed in the three western regions.

Wintering shorebirds were found in all regions, the most (13 birds/km²) in AlSh and the least (trace) in N-AP. Estuaries in N-AP were not searched in winter, and shorebirds may have been found there. However, shorebirds often use rocky habitats in winter and little of that habitat is present in N-AP. Presumably, Rock Sandpipers were the major wintering shorebird. Shorebirds were one bird group that was difficult to observe unless they flushed and, therefore, it was likely that many more were present than were actually recorded.

Gulls were the second most abundant wintering bird, but densities were greatly reduced from those in other seasons. As Black-legged Kittiwakes and other gulls moved offshore to winter, shoreline gull densities were reduced to as low as 2 birds/km² in Kodiak and a high of 13 birds/km² in N-AP. The low number in Kodiak was surprising. On the east coast of the United States, Kadlec and Drury (1968) found that Herring Gulls concentrated at major food sources near cities or at fishing ports. Perhaps on Kodiak most gulls were concentrated in or near the town of Kodiak and because we did not have a count unit there, our counts were low. Trapp (1977) found over 2,000 gulls in a total of 259 km² (8 gulls/km²) in his survey in 1977, whereas we found about 1,800 gulls in 857 km² in 1976. However, we surveyed the entire Archipelago and Trapp (1977) only surveyed Kodiak Island. We found low gull densities on Afognak-Shuyak Islands. The 8,600 gulls recorded on N-AP were scattered all along the exposed sand beaches. Localized food sources such as the canneries in Kodiak are not found in N-AP, and the gulls were dispersed for feeding in winter. The net result of this may be a lower survival rate as suggested by Drury (1979) for the N-AP gulls.

The recorded high alcid density in S-AP was an aberration resulting from the survey type used, and the extremely low density (trace) in LCI can be explained similarly. Alcids were observed on the offshore transects in S-AP but not on shoreline counts of LCI because most were farther offshore. Few were seen on the west side of LCI but many alcids including murres, murrelets and Pigeon Guillemots were found in outer Kachemak Bay.
Corvids had measurable densities (1 bird/km²) only in the two regions where Northwestern Crows were common (Kodiak and LCI). As corvids left spring and summer nesting areas, they became more abundant as scavengers along coastal beaches in fall and winter.

In other winter surveys in southcentral Alaska, techniques differed and results were not directly comparable to this study. From a boat, Dwyer et al. (1976) determined a linear density of 40 birds/km² along the shoreline and an offshore density of 20 birds/km² in Prince William Sound. Sea ducks, gulls and cormorants were the most abundant bird groups on the shoreline, and sea ducks, gulls and alcids predominated in open water. Trapp (1977) found 101 birds/km² in his aerial survey of Kodiak Island compared to 39 birds/km² for this report. Boat surveys by U.S. Fish and Wildlife Service in 1973 and 1975 around Kodiak found 129 and 147 birds/km², respectively (U.S. Fish and Wildlife Service 1973, 1975). Sea, diving and dabbling ducks were the birds most often found by Trapp (1977), whereas alcids and sea ducks were the most abundant birds recorded on the boat cruises.

Survey Technique Evaluation

It has been mentioned several times in this report that density data were not comparable because sampling techniques differed. Elaboration of this statement is warranted. Six types of aerial surveys were used in this study and surveys by others mentioned in the text were different as well. Physiography of the shoreline, number of observers available, and whether aircraft of opportunity were utilized, all helped determine what kind of technique was used. The preferred situation and the technique most used in this study included two observers and a pilot. Coverage was on both sides of the aircraft and approximately a 400 meter strip along the coast was searched for birds. In this case, the area covered was about double that by one observer. Most birds were observed on the shoreside of the aircraft but occasionally large rafts of birds were on the oceanside of the aircraft both within and beyond the 200 meter transect width. When surveying extensive supratidal areas, two observers were better able to accurately census the birds present.

When one observer was used on shoreline counts, the majority of birds were likely recorded because most birds were found on the beach or on nearshore waters. If a specified width was being surveyed so that a density in birds/km² was obtained, the density value would be much higher than in the technique where two observers were used.

Boat surveys add other biases when attempting shoreline counts. More offshore species would be recorded, birds on supratidal habitat may be missed and birds that dive from aircraft may be sighted from a boat.

Because of the observation differences inherent to the various survey techniques, data from different types of surveys are not directly comparable. For example, in this study a stratified-random sampling scheme with two observers was used on the Kodiak Archipelago. Large areas within bays,
including open water, were surveyed. We found 39 birds/km². Trapp (1977) used one observer and flew parallel to the shore around the coast of Kodiak Island only. His observations of 101 birds/km² is not directly comparable to the 39 birds/km² recorded in this study. Each is a good index if surveys are duplicated using the same technique as the previous one. Density values must be properly interpreted and not taken out of context of the type of survey conducted by those who wish to use the data for comparative purposes.

In an evaluation of waterfowl surveys on the east coast, Stott and Olson (1972) questioned the usefulness of aerial surveys to determine trends in wintering populations of sea ducks. Their preferred method was ground censusing with a spotting scope. In comparing the two techniques, they reported that aerial censuses found only 20 to 81 percent of the birds that ground counts did. The situation in New Hampshire is markedly different from that in Alaska. Stott and Olson (1977) surveyed 35 km of coastline (one observer was used on aerial surveys) and had a paved road the entire distance for ground surveys. In this study, survey stations were almost that long but all were in remote areas without roads. In our case, aerial surveys were essential and provided a useful tool as an index for coastal bird populations, but techniques to determine the indices should be standardized.

Spring Migration, Cape St. Elias

Several aspects of the spring bird migration past Cape St. Elias on Kayak Island need further discussion. Large numbers of certain groups of birds bypass the northern portion of NEGOA and Prince William Sound by migrating westerly from the Cape. These birds may not be affected by oil development in northern NEGOA. Other bird groups stop at Kayak Island to rest and feed or migrate diurnally back and forth past the Cape. These birds definitely could be affected by certain oil development related problems. Inclement weather stops many migrating birds and they concentrate in large numbers in southern NEGOA. When weather improves there is an immediate rush of migrating birds past the Cape. There, too, birds could be affected if oil was spilled when they were concentrated or habitat was lost because of development.

The magnitude of the loon migration past Kayak Island was much greater than expected. During the peak of migration, when an estimated 10,000 loons per day passed the Cape, many stopped to feed in rafts in nearshore waters. In May and June hundreds to tens of thousands of shearwaters fed in offshore waters surrounding the Cape. Aquatic birds like these two groups are highly susceptible to contamination by oil.

Some species groups, particularly dabbling ducks, would appear in great numbers during the improved weather after a storm. Because they appeared so quickly, it likely meant that they had waited out the storm in nearby coastal habitats. If this phenomenon occurs every spring, the locations of their stopovers must be found so that adequate protection can be given to the habitat.
Thousands of Black-legged Kittiwakes moved back and forth past the Cape morning and evening for 2 months in spring 1977 and 1978. The exact cause of these diurnal movements was not determined. They moved northerly toward colonies in the morning and away from colonies toward exposed sand beaches in the direction of Cape Suckling in the evening. Whether they moved toward nocturnal feeding grounds and returned to the colony in the day or flew to bathing and roosting sites along the beach in the evening was not determined. Whatever the reason, the large population of birds remained vulnerable to oil pollution for this 2 month period by utilizing coastal habitats.

Murres and puffins from nearby colonies frequently rafted on waters around the Cape and diurnal movements of up to 10,000 murres were observed at the Cape in April. These murres may represent migrating birds from outside NEGOA. Both puffins and murres, because of their aquatic habits, are highly vulnerable to oil spills.

Habitat Usage

Although mentioned previously, the determination of habitat availability for each survey region could not be done for this report. Also, the amount of observation time spent in each habitat type was not recorded on bird surveys. In some surveys all habitat types of the region were searched for birds and in others only a few habitats. Therefore, the data presented on birds' use of habitats merely reflects where we found birds at the time of the survey. An absolute habitat preference by birds could not be determined; instead our data reflect relative habitat selection by birds in those habitats that were searched in this study. Combined information on habitat use by birds is shown in Figs. 178 and 179.

In most cases, the recorded habitat usage data for all birds combined (Table 21) reflected both the habitats which were normally found in the region and what habitats were surveyed within the region. However, several patterns in habitat usage were evident. The best data are available for Lower Cook Inlet because surveys were conducted in all seasons of the year, and similar areas were covered in the surveys. From spring and summer through fall and winter in LCI there was a gradual increase in the percentage of birds using lagoon habitats (Table 21). This amounted to a change from 2 to 15 percent of the birds. Conversely, there was a decrease from 7 to 1 percent in the birds found in exposed delta habitats from spring through winter. In salt marshes and protected delta habitats, most birds were found during migration periods, spring and fall, and in both cases the percentages were identical, 4 percent of the birds in salt marshes in spring and fall and 11 percent of the birds on protected delta in spring and fall. Exposed habitats were used by the most birds in summer and fall (44% and 42%, respectively) and bay habitats received most use in winter and spring (48% and 50%, respectively). Sampling wasn't sufficient in other regions to determine definite seasonal habitat changes within a region.
Fig. 178. Entire Study Area Total, 1975-1978. Habitat preference of marine birds as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of habitat types in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Fig. 179. Entire Study Area Total, 1975-1978. Marine bird usage of habitats as determined by aerial surveys. Percent of birds in each habitat type is shown at perimeter of circle; the number of bird groups in the trace (<3 percent) category is in parenthesis. Numbers at upper left are sample size.
Table 21. Comparison of seasonal and regional use of bird habitats in southcentral Alaska as determined by aerial surveys. Numbers represent percent of the total marine birds found in the survey area for each habitat type.

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324
In comparing seasonal use of habitats among the regions, it was evident that birds used protected delta habitats much more frequently in spring and fall than in winter. From 11 to 42 percent of the birds were found on protected deltas in spring and fall and only 3 percent or less were found there in winter. Exposed delta habitats and salt marshes were used by few birds in all seasons. Other apparent trends likely reflected habitat availability or area surveyed.

Assuming that, in general, birds select similar habitats no matter which region they are in, data from all surveys were combined to get a "mean" habitat preference. By doing this, sampling biases may have been negated. Over 2 million birds were observed on all surveys, and the habitats on which they were found (excluding offshore water) in descending order of usage were: lagoon/embayment (44%), protected delta (19%), exposed (18%), bay/fjord (17%), salt marsh (2%) and exposed delta (1%).

About 0.5 million birds were on the four unidentified habitats. On unidentified exposed habitats most (73%) of the birds were gulls, on unidentified bay 75 percent were gulls, on unidentified lagoon 89 percent were geese and on unidentified protected delta 50 percent were shorebirds and 29 percent gulls.

On five identified habitats (excluding offshore water) there were 100,000 or more birds present. Four of these habitats were water. The most used habitat was lagoon water where 22 percent (337,168) of the birds were found. This was followed by bay water (13%), exposed water (12%) and protected delta water (11%). Protected delta mudflats supported 9 percent of the birds.

Species composition on these most used habitats varied somewhat but waterfowl were found on all five. On lagoon water 64 percent of the birds were geese and 28 percent sea ducks. Four waterfowl groups comprised the majority of birds on bay water. Most (59%) were sea ducks; 17 percent were divers, 9 percent geese and 5 percent dabblers. Sea ducks comprised 55 percent of the birds on exposed inshore water, and gulls and alcids each represented 16 percent of the total. Protected delta water was used most by sea ducks (61%) and dabblers (20%) while protected delta mud was used by shorebirds (61%) and geese (22%).

In looking at what habitats individual species groups used when all surveys were combined, we found that loons and grebes selected similar habitats. Most were on exposed inshore water followed by bay water and protected delta water for both groups. On a species basis, Common Loons were found most on bay water; Arctic Loons were found equally on bay, exposed delta and protected delta water; Red-throated Loons used exposed inshore water and protected delta water (Table 22). Red-necked Grebes used exposed inshore and protected delta water while Horned Grebes used exposed inshore and bay water.
Table 22. Relative use of coastal habitats by common marine bird species of groups as determined from aerial surveys in southcentral Alaska 1975-1978. Numbers represent percent of the total for given species and includes birds combined from all surveys.

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Almost all tubenoses were on offshore water. Cormorants used exposed inshore water, exposed rock beach, bay water and exposed island rock. Swans primarily used protected delta water and salt marshes while geese used lagoon habitats. Brant, Canada and Emperor Geese were the most abundant birds in the study (all three species numbered over 100,000 birds), and all three used lagoon water and mudflats the most. The majority were found in North-Alaska Peninsula where lagoon and embayment habitat is plentiful. Brant were primarily restricted to lagoon water where eelgrass was found. Canada Geese used alluvial floodplains and Emperors used lagoon island sand and protected delta mud. Almost all Snow Geese were on alluvial floodplain.

Dabbling ducks were the most ubiquitous of waterfowl. They were found most abundantly on protected delta water, lagoon water and salt marshes but were found in measurable quantities on eight other habitats. Only subtle differences in habitat selection by the six most common dabbler species were evident. Pintails frequented lagoon island sand much more than other dabblers, Green-winged Teal were often on exposed mudflats and American Wigeon were more abundant on protected delta water and mud.

Over half the diving ducks were on bay water habitats. Most of the remainder used exposed inshore and protected delta water. Scaup, the most abundant diver, mirrored this habitat selection. Goldeneyes used exposed inshore water very little and three-fourths were found on bay water. Twenty-two percent of the Buffleheads used lagoon water, much more than the two other common diver species. Stott and Olson (1973) found in New Hampshire that Buffleheads almost exclusively used protected estuaries but goldeneyes were found in both exposed shoreline and protected waters.

There was an almost equal distribution of sea ducks among four water habitats: bay, protected delta, exposed inshore and lagoon. Analysis by individual species reflected a much different distribution, however, most Oldsquaws and Harlequin Ducks were found on exposed inshore and bay waters. Steller's Eiders were least abundant on exposed inshore and bay water and most abundant on lagoon and protected delta water. Common Eiders used all water habitats including offshore water while King Eiders were found most on offshore water, less on exposed inshore water, still less on bay water and were rare on lagoon and protected delta water. Of the scoters, White-wings were found most on exposed waters, Surfs in bay water and Blacks were the most abundant of the three in protected delta water.

Mergansers, both Common and Red-breasted, used the following habitats in decreasing order of abundance: protected delta water, bay water, exposed inshore water and lagoon water.
Bald Eagles, by a the most numerous raptor, were found on 32 of the 39 original habitat types. They were found most often on exposed sand beaches where they normally were feeding on carrion or roosting on driftwood. Eagles frequently used exposed rock beaches also. Others were scattered over a variety of habitats.

Less than 700 Sandhill Cranes were counted in all surveys and over one-half of these used alluvial floodplains. Most of the remainder were flying along the exposed coast in migration or were on salt marsh and protected delta water habitats.

Because many species of shorebird were observed (although not always identified) and each had its own habitat preferences, shorebirds were recorded on all but a few habitats. They were the second most widespread species group. As a group, they were found most often on protected delta mud, bay mudflats and lagoon mudflats. Habitat selections by species differed markedly. Black Oystercatchers used exposed island rock, bay island rock and exposed rock beach most often. Of identified habitats, plovers were found most on exposed sand beach, however, many used bay habitats that were not specified to substrate type during the survey. Most turnstones, Whimbrels and Rock Sandpipers used exposed rock beach. Bay rock beach was used by over half of the Surfbirds, and dowitchers were found on protected delta mud. Phalaropes utilized exposed inshore water and protected delta water. The preceding discussion does not take into consideration the thousands of shorebirds identified as only small, medium or large. It reflects only those positively identified to species which was a small portion of the total.

The only bird group found on all habitats was the gull/jaeger group. Nearly half the gulls were recorded on exposed habitats, particularly sand beaches and inshore water. About one-fourth were in bay habitats and the rest were dispersed in other habitats. The ubiquitous distribution of gulls in marine habitats is a boon to their survival in the face of increased coastal zone development (oil, gas and other). This and the gulls opportunistic feeding behavior may help populations reach a magnitude detrimental to other colonial nesting seabirds. The most common gulls in southcentral Alaska were Glaucous-winged Gulls, Black-legged Kittiwakes and Mew Gulls. On shoreline habitats there was not much difference among the three species as to which habitats they selected, except that kittiwakes were most frequently found on rocky habitats and Mew Gulls on sandy habitats. Glaucous-winged Gulls were found in small percentages on all habitats. Only about 200 jaegers were recorded on the surveys, and over one-half of these were on protected delta habitats.

Along the coast, terns were found most often on exposed sand beaches or flying over exposed inshore water, and a large percentage used protected delta sand, mudflats and water. Few were observed in bays and even fewer were in lagoons. However, most terns were recorded on spring surveys, and summer habitat selection may be different.
Most alcids selected exposed inshore waters, offshore waters and bay waters. Few were found in any other habitat. Nevertheless, murres and Tufted Puffins were not observed in bay waters as much as Pigeon Guillemots and Horned Puffins. Murres and Tufted Puffins restricted themselves to exposed or offshore waters. Fewer Pigeon Guillemots were observed on rock habitats than expected.

Twenty-eight habitats were used by corvids, but because Northwestern Crows are limited in their distribution, Common Ravens used the widest variety of habitats. Exposed sand beaches were the most common single habitat selected by Common Ravens. Most habitats of Northwestern Crows were not specified but over one-half used bay/fjord habitats. Crows outnumbered ravens five to one, and few Black-billed Magpies were sighted along the coast.

Snow Buntings were the most numerous "other passerine" that could be identified. They were most commonly seen along exposed, sandy beaches feeding in stands of beach rye. Many small sparrows were observed that could not be identified and likely many more were present, but not observed.

**Impacts of Oil and Gas Development**

Many previous studies have discussed the effects of oil on marine birds, particularly in regard to acute oil spills from tankers. A list of these references is found in Vermeer and Vermeer (1974 a,b). More recently, reports have been prepared pertaining to marine birds in Alaska waters. Trapp (1979) discussed threats to habitats that man has caused, or may have caused, on breeding seabirds in Alaska. He singled out the 70 most important seabird colonies in Alaska for discussion and developed a scoring system to determine relative importance of the colonies. ADFG (1978a and 1978b) summarized information on what effects oil and gas development may have on birds and other organisms in Northern Gulf of Alaska and Lower Cook Inlet. An excellent summary of most impacts that oil and gas development may have on biota including birds is provided in Hamilton et al. (1979). Although Lower Cook Inlet is emphasized, the information is applicable to all parts of Alaska. Suggested mitigation procedures are also included. Blackburn and Jackson (in press) presented an evaluation of potential impacts of oil and gas development in Lower Cook Inlet on pelagic and demersal fish. This study included summaries of how various aspects of oil development could affect many forage species used by birds and, therefore, one can infer indirectly how birds may be affected. Because these reports thoroughly summarize direct or indirect effects of oil and gas development on marine birds, discussion in this section will be restricted to results of this study.

King and Sanger (1979) devised a rating scheme for assessing the vulnerability of 176 marine-oriented birds to oil spills in the northeast Pacific region. The scheme was based on range, population, size, habits, mortality and season of exposure of marine birds, and a numerical index of relative
vulnerability was presented for all species. An index to the relative
susceptibility of marine habitats to oil spills based on experience from
oil spills in other parts of the world was adopted by Hayes et al.
(1977). This index is based on geomorphology and not the biota present
in, or on, the substrate. Indices from these reports were then applied
to the bird populations assessed in this study. A mean oil vulnerability
index (OVI) from King and Sanger (1979) was calculated for species
groups used in this report by summing the index values for species
frequently observed in southcentral Alaska and dividing by the number of
species (Table 23). Except for raptors (Bald Eagles) all the highest
ranked birds were those that spend much time on water. Species groups
low on the list are those that either are very abundant and, therefore,
have a lower OVI or they are less frequently found on marine habitats.

The 39 bird habitat types delineated in this report were arranged in
increasing order of vulnerability to oil spills (Table 24) based in part
on the oil spill vulnerability index of Hayes et al. (1977). This
susceptibility index (Table 24) was not based on bird usage of the
habitat but on the probability of contamination, the retention of oil in
the substrate and an assumed rate of oil degradation. The two sections
on water (Nos. 3 and 7 in Table 24) were not considered in the index by
Hayes et al. (1977) but were ranked according to personal communications
with G. H. Ruby. Ranking for water habitats is not for birds on the
water but for the habitat itself.

Discretion must be used when applying these relative indices to determine
the importance of coastal Alaskan habitats in relation to oil development.
The index of Hayes et al. (1977) pertains largely to acute oil spills
from platform blowouts or tanker leaks. Dames and Moore (1979a) discussed
the importance of knowing what biological assemblages are in the substrate
versus knowing only what substrate is present. The vulnerability of
biological assemblages is not always directly related to geological
characteristics. They also stated that occasionally the substrate in
beach faces may differ from the substrate in adjacent low tide terraces.
Applying the Hayes' susceptibility index may, therefore, be erroneous or
at least not detailed enough to discern these differences. The beach
face may be sand, gravel, boulders or a combination of these and rate
fairly high on Hayes' index but have low biological productivity. The
adjacent intertidal terrace may be exposed mudflats (lower on Hayes'
susceptibility index) but be high in productivity. Birds normally would
use the upper beach for roosting and would be less affected if oil
soaked into the gravel or other substrate. However, they feed on the
intertidal portion and would be greatly affected if forage species were
killed by oil. The biological parameters must, therefore, be integrated
with the geophysical at the time of initial surveys to get an accurate
assessment of vulnerability to oil spills.
Table 23. Relative vulnerability of marine bird groups, in southcentral Alaska, to oil spills. Bird groups ranked by mean oil vulnerability index (OVI, see text).

<table>
<thead>
<tr>
<th>Rank</th>
<th>Bird Group</th>
<th>( \bar{x} ) OVI</th>
<th>No. of Species</th>
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<tbody>
<tr>
<td>1</td>
<td>Alcids</td>
<td>77</td>
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<tr>
<td>2</td>
<td>Sea Ducks</td>
<td>70</td>
<td>(9)</td>
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<tr>
<td>3</td>
<td>Cormorants</td>
<td>59</td>
<td>(4)</td>
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<tr>
<td>4</td>
<td>Raptors</td>
<td>58</td>
<td>(1)*</td>
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<td>5.5</td>
<td>Tubenoses</td>
<td>56</td>
<td>(6)</td>
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<td>Mergansers</td>
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<td>7</td>
<td>Loons</td>
<td>55</td>
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<td>8</td>
<td>Divers</td>
<td>52</td>
<td>(7)</td>
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<tr>
<td>9</td>
<td>Geese &amp; Swans</td>
<td>51</td>
<td>(7)</td>
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<tr>
<td>10</td>
<td>Gulls &amp; Jaegers</td>
<td>44</td>
<td>(10)</td>
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<td>11.5</td>
<td>Grebes</td>
<td>43</td>
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<td>Terns</td>
<td>43</td>
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<td>13</td>
<td>Shorebirds</td>
<td>42</td>
<td>(30)</td>
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<td>14</td>
<td>Dabblers</td>
<td>36</td>
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<td>15</td>
<td>Corvids</td>
<td>34</td>
<td>(2)**</td>
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<td>16</td>
<td>Cranes</td>
<td>24</td>
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* Bald Eagle only; other raptors not applicable or rated.
** Black-billed Magpie not included.
Table 24. Assumed relative susceptibility of bird habitats to oil spills. Based in part on oil spill vulnerability index by M.O. Hayes (1977), and personal communication with C.H. Ruby. Arranged in order of increasing susceptibility* within the twelve classifications.

1. Upland vegetation
   a. Dry coastal upland
   b. Bay/fjord island upland soil
   c. Lagoon/embayment island upland soil
   d. Exposed island upland soil

2. Exposed rock substrate
   a. Exposed delta rock
   b. Exposed coast rock beach
   c. Exposed island rock beach

3. Exposed marine waters
   a. Offshore waters
   b. Exposed delta water
   c. Exposed inshore water

4. Exposed sand substrate
   a. Exposed delta sand
   b. Exposed coast sand beach
   c. Exposed island sand beach

5. Exposed mud tideflats
   a. Exposed delta mud
   b. Exposed mud tideflats

6. Exposed gravel substrate
   a. Exposed delta gravel
   b. Exposed coastal gravel beach
   c. Exposed island gravel beach

7. Protected marine water
   a. Protected alluvial water
   b. Bay/fjord water
   c. Lagoon/embayment water

8. Protected sand substrate
   a. Protected alluvial sand
   b. Bay/fjord sand beach
   c. Bay/fjord island sand beach
   d. Lagoon/embayment sand beach
   e. Lagoon/embayment island sand beach

9. Protected rock substrate
   a. Bay/fjord rock beach
   b. Bay/fjord island rock beach
   c. Lagoon/embayment rock beach

10. Protected gravel substrate
    a. Protected alluvial gravel
    b. Bay/fjord gravel beach
    c. Bay/fjord island gravel beach
    d. Lagoon/embayment gravel beach
    e. Lagoon/embayment island gravel beach

11. Protected mud tideflats
    a. Protected alluvial mud
    b. Bay/fjord mud tideflats
    c. Lagoon/embayment mud tideflats

12. Protected sedge/grass marshes
    a. Protected alluvial vegetated floodplain
    b. Sedge/grass saltmarsh

* Criteria for habitat susceptibility are: probability of contamination, retention in the system/substrate and assumed rate of degradation.
Senner (1977) briefly discussed the definition of critical habitat and mentioned how nebulous the concept "critical" can be. His criteria for critical habitat included: number of individual organisms using a region, the relationship between an organism and the habitat in question and the likely effect on the organism if the habitat is degraded. Although not all these criteria were met in this study, a relative determination of "critical" habitats can be estimated keeping in mind the aforementioned limitations.

By combining information from the oil vulnerability index for bird groups, the susceptibility index for bird habitat and other available information, the relative importance of portions of the coastline to birds can be determined with a knowledge of species composition, distribution and abundance and their habitat usage. These "critical habitats" will be discussed by region, season, and what aspects of oil and gas development may be most harmful to birds.

**Northeast Gulf of Alaska**

In spring, loons had a high density on bay waters of Yakutat Bay. Both the oil vulnerability index (OVI) for loons and the oil susceptibility index (OSI) for bay water were of medium rating. Shore-based facilities in Yakutat Bay would likely be located on the south shore and, therefore, the greatest threat to loons congregating on the north shore would be catastrophic or chronic oil spills that damaged the birds themselves or there food resources.

Cormorants were densest at Kayak Island, a rocky, erosional shore rated as having low susceptibility by Ruby (1977). Although cormorants are vulnerable to oil, the residency time of oil reaching Kayak Island's exposed coast would not be long. Sources of oil would likely be large spills at platforms, pipeline leaks or tanker spills.

No dense concentrations of geese, dabbling ducks and diving ducks were found in the May survey of this study; however, estuaries south of Yakutat and the Copper-Bering River Deltas are used by all three groups. Habitats in the latter areas were marked highly susceptible by Ruby (1977), but he neglected to delineate the important protected estuarine tideflats and salt marshes south of Yakutat. Spilled oil would have high residency times in these areas and be detrimental to staging waterfowl for many seasons. Sea ducks were densest in Icy Bay in both spring and summer surveys. This is a proposed location for shore-based facilities, and habitats in the area have a medium to high OSI. Sea ducks, with a high OVI, would be affected by both chronic and acute oil spills as well as by disturbance from aircraft and boat traffic to onshore facilities.

Shorebirds, although rated low on the OVI scale, would be extremely vulnerable in the Controller Bay, Copper River Delta and Orca Inlet sections. The protected mudflats and mud-inhabiting forage organisms of shorebirds are highly susceptible to oil, and if this habitat is degraded,
millions of migrating shorebirds will not be able to build sufficient fat reserves to sustain continued migration. It would be acute spills from present tract locations that would cause the severest damage if oil reached the mudflats.

Thousands of gulls use NEGOA in spring and summer, and most use habitats with a low or medium OSI rating. Their overall OVI is also relatively low. Large gulls use such a variety of habitats and are such catholic feeders that the overall impact of oil and gas development may be less for them. Their low-lying, exposed barrier island breeding sites could become contaminated if oil spilled during a spring tide accompanied by strong winds. Increased air traffic to Cordova, if the city is used for support facilities to offshore drilling, could increase stress on nesting gulls in the Copper River Delta area. Black-legged Kittiwakes, which breed on Martin and Wingham Islands, have more restricted feeding habits and habitat selections. They could become contaminated with oil on their sand beach roost sites or while feeding in nearby waters. Physical disturbance from support facilities near their colonies may affect breeding success.

Terns, with a low OVI, selected habitats rated high on the OSI scale in spring. They were found in protected bays and deltas from Icy Bay to Yakutat Bay and at the mouth of the Ahrnklin River. In summer they used exposed sand beaches but nest sites are found in protected areas. Nesting colonies would be disturbed with increased aircraft traffic, and birds could become contaminated from catastrophic oil spills.

Alcids, which rest on nearshore waters, especially near their colonies at Wingham and Martin Islands, could easily become oiled during an acute spill from any source. Their aquatic habits make them one of the most vulnerable groups even though the OSI for their favored habitat is low. Disturbance at colonies could be another cause of low productivity. If shore-based facilities were near colonies, physical disturbance would flush birds from cliffs allowing eggs to fall off and increasing chances of predation on eggs and chicks.

Kodiak

Sea ducks were by far the most abundant bird group recorded in the winter survey, and this group is rated second only to alcids in vulnerability to oil. They were densest in the Chiniak Bay area and were found on protected bay waters throughout the archipelago. Bay waters had a moderate OSI rate but shoreline substrate and prey organisms of sea ducks may be much more susceptible to oil spills. Krasnow et al. (1979) found that Black Scoters wintering in Chiniak Bay mostly ate blue mussels (Mytilus edulis) and Oldsquaws preyed upon a variety of benthic organisms. If spilled oil harms the food source, even though it does not remain in the bay water habitat for a long period, it will be detrimental to the thousands of wintering sea ducks.
Diving and dabbling ducks, the next most abundant birds, were also found in protected bays and lagoons. Their OVI is lower than sea ducks because they spend more time in freshwater habitats, but in winter freshwater habitats freeze forcing these ducks to saltwater. Bay and lagoon waters have a moderate OSI rating. Dabblers were also commonly found on salt marshes and at mouths of streams. Salt marshes, in particular, are susceptible to oil because of its long residence time in that habitat.

The other abundant wintering bird group, alcids, were found almost exclusively on protected bay waters, and the bays in which they were most conspicuous were Kiliuda, Ugak and Uyak. Murres, the most common alcid, are highly vulnerable to oil and if populations of their food organisms are reduced, the effects would be long lasting. Krasnow et al. (1979) found that murres (n=4) in winter primarily ate walleye pollock (*Theragra chalcogramma*) in Chiniak Bay.

Proposed sites for oil terminals and service bases on Kodiak/Afognak Islands were Three Saints and Kazakof Bays (BLM 1977). During this study, Three Saints Bay was surveyed in its entirety, and sea ducks, alcids and diving ducks were the most abundant wintering bird groups. These birds would be highly vulnerable to spilled oil, either acute or chronic, from base facilities. Shoreline substrates in Three Saints Bay were rated medium to high by Hayes (pers. comm) on his susceptibility scale. Only the head of Kazakof Bay was surveyed in winter 1976 and diving ducks were the predominant species. The heads of all bays consistently contain habitats with the highest OSI rating, are used by large numbers of birds, and should be protected in the event of an oil spill. Kalsin Bay and St. Paul Harbor, also proposed as onshore base sites, are located in the area of densest wintering bird concentrations on Kodiak. Degradation of habitats and disturbances from facilities would be detrimental to those bird concentrations.

Overall in the Kodiak Archipelago, Hayes and Ruby (1979) determined that 34 percent of the shoreline was sheltered rocky headlands, 22 percent sand and gravel beaches, 17 percent eroding wave-cut platforms, 15 percent gravel beaches and 9 percent straight, rocky headlands. Sheltered rocky headlands, gravel beaches and sand/gravel beaches have high to moderate susceptibility to oil. Eroding, wave-cut platforms and straight, rocky headlands have a low susceptibility according to Hayes' index. In the winter survey of Kodiak, only 3 percent of the birds were found on all five of these habitats, however, many were on adjacent waters, particularly in sheltered portions, and would be affected if spilled oil harmed benthic organisms residing in these substrates.

**Lower Cook Inlet**

More information was gathered in Lower Cook Inlet by this research unit than in other regions of the study area. More information about Lower Cook Inlet from other biological and physical disciplines was made available, and a more detailed outline of impacts of oil and gas development...
was requested. Therefore, more emphasis in this section will be placed on various aspects of development in several regions of Lower Cook Inlet. Discussion will be confined to possible effects to birds and their habitat as determined by this study. Other reports have adequately summarized effects on other organisms that are lower on the food chain than birds and which may be preyed upon by birds (Blackburn and Jackson in press., Hamilton et al. 1979 and Calkins 1979).

For example, entrainment by cooling systems will directly affect planktonic organisms but not birds. Drill cuttings and muds may make the water too turbid for pursuit-diving or plunging type birds to locate prey but otherwise do little to birds directly. Nevertheless, the muds may smother or contaminate benthic or planktonic organisms which are important food sources for birds.

Drilling Platforms: Both acute and chronic oil spills may occur on offshore platforms. Because not enough is yet known about the effects of chronic contamination in Alaska waters (although it has been suggested that this form of pollution may be more devastating than a catastrophic spill [Michael 1976]), a discussion of this source of pollution will not be undertaken.

Kachemak Bay - Although no platforms will be placed directly into Kachemak Bay, Dames and Moore (1979b) estimated that Kachemak Bay would be impacted by oil spills within 3 days of a hypothetical spill in the summer. The probability of exposure to oil in Kachemak Bay was 3 percent. Winds, and not current, were the driving force of the hypothetical spill because in the spring and summer, predominant winds are from the southwest (Hayes et al. 1977). No trajectory was predicted for winter months when prevalent winds are from the northeast and north. One would assume there would be a lower probability of oil entering Kachemak Bay in winter because of the prevailing northeast winds. It appeared from Dames and Moore’s (1979b) figures that oil would pass through outer Kachemak Bay and enter the inner Bay.

Regardless of the season, if oil enters outer or inner Kachemak Bay serious damage could be done to bird populations. This region had either the highest, or one of the highest, bird densities in Lower Cook Inlet for all seasons in both pelagic and shoreline areas. Sea ducks, a highly vulnerable species group, were one of the dominant bird groups in all seasons and were found on both protected bay and exposed inshore waters. They, along with diving ducks, an abundant bird group in spring and winter, feed predominantly on benthic bivalves (Sanger et al. 1979) in mud or sand substrates.

Oil spills may not be as detrimental to gulls, the second most dense bird group in Kachemak Bay. They are ubiquitous in distribution and catholic in food habits and, therefore, their vulnerability is relatively low. Many were found at low tide on mudflats and fed upon barnacles, Clinocardium, crabs, and polychaetes (Dames and Moore 1979a), but food habit information for gulls in Lower Cook Inlet is sparse.
In spring shorebirds fed on protected mudflats of Mud Bay and Fox River Flats. These habitats are highly susceptible, and the prey species, Macoma and Mya, would be vulnerable to oil washing ashore. Dabblers, abundant only in the fall survey of Kachemak Bay, were found on bay, lagoon and river waters. According to Crow (1978), dabblers fed predominantly on plant material (Puccinellia hultenii and Triglochin maritima) and bivalves ("pink clams"). These food items are found on salt marshes and protected mudflats, both highly susceptible to oil spills.

During all of the year except summer outer Kachemak Bay had the highest pelagic densities of birds of all regions in Lower Cook Inlet. Alcids and sea ducks, the two most vulnerable groups, were the most abundant birds. Oil on these waters would harm large numbers of these birds. Because waters there are clear (versus turbid in many other parts of the Inlet) congregations of birds feed in this area. A winter concentration of up to 10,000 White-winged Scoters southwest of Bluff Point was documented (Erikson 1977) and has been observed in the same location during three winters. Black-legged Kittiwakes are also commonly observed feeding in Outer Kachemak in summer and fall. If they feed on sand lance (Ammodytes hexapterus) as they did at Chisik Island (Jones and Peterson 1979), any damage to sand lance populations by oil would also be harmful to Kittiwakes.

Lower Central Zone - The Lower Central Zone of Lower Cook Inlet would contain most of the offshore drilling platforms and, therefore, have the greatest potential for acute oil spills. Although the extent of the shoreline in this zone is small, it was singled out as the most critical area in terms of time of impact of oil spilled from platforms and the probability of exposure to spilled oil. The exposed coast from Chinitna Bay to Oil Bay had few birds in all seasons and was rated in the lowest susceptibility categories for the substrate present (Hayes et al. 1977). Sea ducks in spring had the greatest density (21 birds/km²) for that section of coast. In summer 1978, several feeding frenzies containing several hundred Black-legged Kittiwakes and many loons were observed along this coast. The Kittiwakes may have been from the Chisik Island colony. Spilled oil would harm these birds and their food source as well.

Chinitna Bay, also in this zone, had a much richer avifauna than the exposed coast. Densities of about 100 birds/km², or more, were found in all seasons but winter.Extensive mudflats and salt marshes at the head of the bay provide ideal habitat for dabbling and diving ducks, shorebirds and gulls. Late April and May are the most critical periods, when shorebirds, diving and dabbling ducks stage in the area. Dames and Moore (1979a) found that Macoma balthica was the dominant species in the mudflats of Chinitna Bay, and this clam is a common food item of these birds. A colony of almost 1500 birds on Gull Island at the mouth of the bay would be vulnerable to oil throughout the summer. Tufted Puffins, the most abundant bird at the colony, frequently raft in the water around the island and would be particularly vulnerable.
Densities of birds in pelagic waters of the Lower Central Zone were relatively low. Sea ducks were abundant (58 birds/km²) in summer, but most of these birds were comprised of a large flock of almost 4,000 scoters seen on a boat survey past Pomeroy Island. Other high densities in this zone were found in the portion nearest outer Kachemak Bay and Kennedy Entrance. Here, shearwaters and other species gathered in summer months. Both the scoters and shearwaters would be vulnerable to oil on the water as would their benthic and planktonic food organisms.

Kamishak Bay - Dames and Moore (1979b) did not single out areas in Kamishak Bay as high risk for boundary contact zones or probability of exposure to oil spills except on the eastern half of Augustine Island. However, their figures showed that Ursus Cove would likely be impacted and Amakdedori Beach accumulates much drift and would also likely receive oil in the event of a spill. Many vulnerable bird species congregate in Kamishak Bay in spring and summer. Alcids, the most vulnerable species group, are abundant only in summer. Tufted and Horned Puffins and Pigeon Guillemots are common breeders on islands and suitable rocky, shoreline habitats throughout Kamishak Bay. Common murres breed in abundance only on McNeil Islet in the southwest corner of the Bay. These species would be harmed by oil on the water but would be less threatened by oil contamination of shoreline habitats unless the oil affected prey organisms.

Sea ducks were found to be the bird group in Kamishak Bay most likely threatened by oil. They were abundant in spring and summer and they would be more vulnerable than most species because in summer they molt and would be flightless for a few weeks and, thus, would be unable to avoid spilled oil. In spring, sea duck concentrations were from the mouth of Douglas River to Akumwarvik Bay, at Chenik Head and in Bruin Bay. In summer, densest concentrations were in the vicinity of Iniskin Bay and in Akumwarvik Bay. Much of the time, they were on water over intertidal or immediately subtidal to exposed and protected mudflats and eroding, wave-cut platforms. Although the exposed habitats are not highly susceptible to oil spills, the sea ducks using the habitats would be vulnerable. Little work has been done on food habits of birds in Kamishak Bay, but scoters collected in summer 1978 were predominantly eating pelecypods (Nucula tenius, Musculus discors and Macoma balthica) and Harlequin Ducks ate gastropods (Littorina saxatilis and L. sitkana). Sea ducks were the most common wintering bird group in Kamishak Bay but were found in much lower densities and were clustered in various parts of southern Kamishak.

Two other bird groups would be sensitive to spring oil spills in Kamishak Bay. Scaup were abundant in all bays, and they also joined sea ducks in exposed areas. Shorebirds, too, used intertidal mudflats in many of the bays. All small bays within the Kamishak
Bay region were given a high OSI rating by Hayes et al. (1977). Oil would not be easily flushed from the protected mudflats, and it is likely that mortality of pelecypods and other invertebrates fed upon by birds would be heavy. A flock of over 10,000 shorebirds was also found on exposed delta gravel during spring migration. This habitat has a medium susceptibility to oil and food organisms present in the substrate were unknown.

Glaucous-winged Gulls were the only other common bird in Kamishak Bay. They were distributed throughout the Bay, were found on a variety of habitats, and fed in a variety of ways on, presumably, a variety of foods. Some of the habitats were highly susceptible to oil and others were of low susceptibility. The gulls fed on mudflats at low tide, surface-plunged to seize small fish and scavenged on spawned out salmon. Three gulls collected contained *Crangon septumspinosa*, *Clinocardium* sp., and several fish species including *Ammodytes hexapterus*, an unidentified gadid and a greenling (*Hexagrammos* sp.). Hundreds of non-breeding gulls summered in Kamishak Bay and roosted on intertidal sand, gravel and rock throughout the coastline of the bay. Black-legged Kittiwakes were found in relative abundance only near McNeil Cove and did not breed in Kamishak Bay. The widespread distribution of most gull species in Kamishak Bay would likely mean they would be vulnerable to oil spills in the long-term, and more able to rebound from losses with immigration from areas not damaged.

Kennedy Entrance - Dames and Moore (1979b) considered the shoreline from Dangerous Cape to Cape Elizabeth in Kennedy Entrance to be the second most susceptible area to oil spills in Lower Cook Inlet. Spills from proposed nearby wells would be driven quickly ashore by the frequent southwest winds of spring and summer (their model did not include winter data). Only the bays had a high OSI rating by Hayes et al. (1977). Much of the shoreline is exposed rocky habitat. The Barren Islands, an area used by over one-half million seabirds in summer (Bailey 1976), were not studied in this research unit. The extent of winter bird use in the Barren Islands is unknown except for pelagic surveys of Research Unit No. 337. Discussion of impacts in this region will be based on shoreline surveys and a pelagic transect across the mouth of Cook Inlet.

In spring, bird densities along the shoreline of Kennedy Entrance were low. Little typical staging habitat for birds is present. However, in summer, densities of gulls, shearwaters and cormorants increased markedly. The situation for gulls is similar to that mentioned in previous regions. They were found on a variety of habitats and are, therefore, less vulnerable. This was the only region in which shearwaters were found in abundance. They appeared in late spring and remained into the fall. They were found almost exclusively on pelagic waters. Oil may pass quickly through areas used by shearwaters unless a prolonged blowout occurs. Shearwaters
are moderately vulnerable to oil spills and would likely be affected if the spill occurred during their peak of abundance in Kennedy Entrance. Over 100 birds/km² were recorded in offshore waters of Kennedy Entrance by Erikson (1977). Erikson (unpubl. data) found that shearwaters in this area were eating sand lance, and suggested that any damage to their food source would force shearwaters to forage elsewhere in the Gulf of Alaska. Cormorants, spending most of their life on inshore water and, therefore, highly vulnerable to oil spills, reached their greatest Lower Cook Inlet densities in Kennedy Entrance. Several sites with high cormorant densities in the Chugach Islands may be far enough removed from oil spill trajectories to be vulnerable to oil. Summer and fall is the time when most cormorants would be affected in this region. Their exposed rock roost sites would be less affected because oil would have a low residence time on exposed surfaces.

Because the bays bordering Kennedy Entrance remain ice-free in winter, they were a wintering area for sea and diving ducks. The sea ducks began arriving in fall and remained in exposed inshore and bay waters until spring. Because of the high probability that oil would enter Port Graham and Koyuktok Bay (Dames and Moore 1976b), sea ducks with a high vulnerability rating would be impacted. Finally, alcids, although not abundant on shoreline surveys, rest in abundance on Flat Island where Erikson (1977) estimated over 1,800 pairs of Tufted Puffins were breeding. This island colony is in the path of high risk trajectory for oil spills and, therefore, would be severely damaged if the spill occurred from April to September.

Kalgin Island - Because much of this region contains turbid water from glacial streams in Upper Cook Inlet, the Kalgin Island area does not host many feeding seabirds. The area contains the largest seabird colony in Lower Cook Inlet (except for the Barren Islands) on Chisik Island, but low bird densities north of the colony indicated the birds must forage south of this region. The trajectory model of Dames and Moore (1979b) predicted that Chisik Island and areas just north of Chisik would be impacted by oil spills. If not their foraging areas, the birds themselves stand a high risk of being affected. Species in the colony are those highly vulnerable to oil, Horned and Tufted Puffins, Common Murres and Black-legged Kittiwakes. The customary habit of these birds to sit on the water below nesting sites, make them vulnerable to oil on the water.

Much of this region was not included in the geomorphology study by Hayes et al. (1977), but Tuxedni Bay was, and it was given a high rating for oil susceptibility. In spring, these susceptible mudflat habitats were used by diving, sea and dabbling ducks and shorebirds, and in fall, geese and dabbling ducks were the predominant birds of Tuxedni Bay. Oil entering this bay would affect both the birds and the invertebrates on which they feed.
Oil spills may also come ashore on Kalgin Island. Swamp Creek on the east side of the island is the area most used by birds and also is a habitat that is most susceptible to oil spills. Dabbling ducks and geese were the most numerous birds during spring migration. The birds themselves are not as vulnerable as the habitat on which they stage at Swamp Creek.

Three other areas in this region have high OSI ratings and were used by large numbers of birds but were not in locations of high probability of exposure to oil in Dames and Moore (1979b). Mudflats and salt marshes of Bachatna Flats in Redoubt Bay supported densities of over 200 shorebirds, geese and dabbling ducks/km² in spring. The mouths of the Kenai and Kasilof Rivers are also staging habitat for geese, dabblers and cranes. Using Hayes et al.'s (1977) susceptibility rating, the mudflat areas are only moderately susceptible to oil spills, but the adjacent salt marshes would be highly susceptible. Because it is one of few areas used by migrating Snow Geese in spring, the Kenai River flats should be termed critical habitat for these birds. Gulls, too, used Redoubt Bay and the Kenai and Kasilof River mouths but rely heavily on cannery wastes for food and would be most affected if oiled on their roost sites on sand/gravel beaches. Sea ducks were abundant only in the area from Anchor Point to Ninilchik, but this area may be impacted from oil spilled by offshore platforms in the north portion of the lease area.

Bird densities in offshore waters of this region were low in all seasons. Birds from the Chisik Island colony may be traveling as far as 60 km to forage in outer Kachemak Bay and would not be vulnerable to oil spills in offshore waters of the northern portion of Lower Cook Inlet.

Shelikof Straits - This region was not studied as a part of the Lower Cook Inlet lease area. Limited data were gathered on the Alaska Peninsula side in winter 1977 and on the Kodiak Archipelago in winter 1976 and are discussed under those sections. A review of present knowledge of birds in Shelikof Straits was presented in Easton and Spencer (1979). They indicated a paucity of baseline data on birds in this region so that impacts from oil spills are unknown.

### Potential Shore-Based Facilities Tanker Terminals

**Kachemak Bay** - In BLM's development scenario, oil terminal, LNG and production treatment facilities were suggested for the Anchor Point area as was a support base in Homer. Some of the adverse effects of installation of these facilities include habitat destruction during construction, physical disturbance by increased boat and aircraft traffic in the area, chronic, small oil spills during
loading operations and thermal pollution from LNG plants. If the site is located on coastal floodplains near the mouth of Anchor River, some marine bird habitat will be destroyed. Although this is not a major staging or nesting area, various species of waterfowl and shorebirds do use these habitats. The greatest amount of bird use in this area comes from sea ducks feeding in nearshore waters in spring. Erikson (1977) suggested that the heaviest use of this area was in winter. Physical disturbance would likely have a severe impact on sea duck use. Tankers and support vessels travelling to and from terminals would flush birds from their feeding grounds. Because Kachemak Bay has the highest density of marine birds in all seasons for Lower Cook Inlet, the increase in traffic to Anchor Point (either from Homer by helicopters or across outer Kachemak Bay by tankers) may displace birds from traditional feeding areas, or at least increase stress on birds during periods when this may be detrimental to bird populations. Chronic oil spills or other pollution from onshore terminals may have the greatest long-term effects on birds. Due to the proximity of the Anchor Point site to the rich waters of outer Kachemak Bay, any contaminants drawn south into the Bay would affect the entire food chain below birds and, eventually birds would be affected. If closed cooling systems are used at these sites, no direct effects to birds will result. However, some of their prey species may be affected. Thermal pollution from an open cooling system may attract birds to where they would be more concentrated and, therefore, more vulnerable to oil or other pollution. No reports on the effects of thermal pollution on birds in northern waters were found.

Kennedy Entrance - The greatest threat from onshore facilities located in the Port Graham to Port Chatham area would be if pollution (oil, thermal, or other contaminants) entered outer Kachemak Bay and affected marine birds or their food organisms in that area. In waters adjacent to onshore sites, only a few bird groups would be affected. In summer, shearwaters may be adversely impacted by increased tanker traffic to the terminal. Assuming that ballast is properly disposed of into onshore cleaning facilities, physical disturbance caused by the tankers would be the greatest impact. Cormorants, sea ducks and diving ducks may be physically disturbed on inshore waters near terminals in fall and winter, or contaminated if small spills occur at the terminal. Other bird groups use waters near proposed terminal sites but in smaller numbers. Erikson (1977) documented Port Chatham as a goose staging area. Brant fed in eelgrass beds at the head of the bay in spring 1976, but the annual magnitude of annual use by geese is unknown. Increased helicopter traffic to terminal sites may stress Tufted Puffins nesting on Flat Island.
Kalgin Island Area - A production treatment site has been suggested for the north shoreline of Tuxedni Bay, with an overland pipeline to an existing terminal at Drift River. Construction of the facilities would likely have minimal impact on marine birds. However, low level pollution from hydrocarbons and other contaminants into waters near the site could have substantial impact on birds using Tuxedni Bay and Chisik Island. The same discussion for chronic and acute oil spills at drilling platforms applies to onshore facilities. Thousands of birds use Tuxedni Bay in spring, summer and fall, and if food organisms for birds are reduced by chronic pollution, the effects on birds would be substantial. If crew changes at the site required helicopter traffic, a corridor must be established to avoid disturbing seabird colonies at Chisik and Duck Islands. The overland pipeline to Drift River would not impact marine birds. Similarly, the proposed pipeline from Anchor Point to Nikiski would not affect marine birds unless a leak occurred into rivers draining into Lower Cook Inlet.

Pipelines:

Kachemak Bay - The actual pipeline laying operations would have minimal impact on birds. There would be temporary physical disturbance, sediments would be resuspended temporarily and some food organisms of birds would be destroyed. Once production started, a break in the pipeline or chronic leaks from the line would be extremely damaging to the abundant avifauna of outer Kachemak Bay. Details on species composition and critical time periods have already been mentioned in a previous section.

Lower Central Zone - Pipeline laying operations would not substantially affect birds of this zone. Bird densities were low in all seasons throughout the area except for waters adjacent to outer Kachemak Bay and in the vicinity of Chinitna Bay. Spills from pipeline breaks were discussed under drilling platforms. Small, chronic leaks in the leased portion of this zone would be less damaging than those nearer concentration areas for birds.

Kennedy Entrance - A similar discussion, as mentioned above, for pipe laying operations would be true for Kennedy Entrance. Spills from pipeline breakage would be similar to those covered under drilling platform spills.

Kalgin Island Area - The laying of pipe to the Redoubt Point area would cause only temporary disturbance to birds. Discussions of oil spill damage to birds under the drilling platform section apply in the case of pipeline breaks.

Tanker Routes (Tanker Spills Along Routes) See section on drilling platforms for the effects of acute oil spills in each of the regions of Lower Cook Inlet.
Physical Disturbance (Aircraft & Boat Traffic) This topic was discussed under the potential shore-based facilities section. In general, boats continually moving through concentrations of birds on traditional feeding areas may displace them to less productive feeding areas or cause stress detrimental to the birds. If the frequency of the traffic is low, little damage would result. Helicopter traffic is most stressful to birds and invariably causes them to flush. Corridors need to be established around colonies and concentration areas.

South-Alaska Peninsula

No offshore lease sales are planned for this region, except in the Shelikof Straits area, which extends from Cape Douglas to Wide Bay. However, the region could be impacted by development in the southern portion of the Kodiak lease area or if pipelines cross the Alaska Peninsula from the Bering Sea lease areas. Specific locations for onshore facilities are not presently known. Discussion will deal only with the impact having the potential of causing the greatest damage (acute oil spills) under existing conditions. Information from other investigators on habitat susceptibility and nearshore benthos is lacking.

Too few data were gathered in south-Alaska Peninsula for this study to be able to adequately predict effects of oil spills. Only partial surveys were flown in fall and winter. Fall surveys of the southern three sections in the region revealed that geese were the most numerous bird group. Although geese have only a moderate OVI rank, they could be seriously affected because the habitats they use for staging are highly susceptible to oil spills. They fed primarily in lagoons on eelgrass which is found on intertidal mudflats or shallow water areas. Salt marshes, another habitat of high susceptibility, were frequently used by dabbler and diving ducks. Any oil reaching areas where these birds fed or roosted would remain for several years, preventing further use by these birds. Sea ducks were mainly found on exposed waters where oil would harm the birds as it floated toward shore, but where longevity of oil was short. Gulls were on a variety of habitats in fall and impact on them would be minimal in many areas. Spilled oil moving through False Pass poses the greatest threat to gulls during fall in the southern part of this region. Few other highly vulnerable birds were recorded in this survey.

Few shoreline habitats were searched in the winter survey to determine which bird species would be affected by oil development. The species groups most vulnerable to oil, alcids and sea ducks, were the two groups found in greatest numbers. Most alcids (murres) were on the water near known murre colonies and would be vulnerable to oil as long as it remained in the area or if their food populations were diminished by the oil. Sea ducks were scattered throughout the region which is ice-free in winter and would be similarly affected by oil spills. Emperor Geese were most abundant in the Shelikof Strait section. They would be affected if oil contaminated their food sources, including marine algae, barnacles and blue mussels, on exposed rocky shores where the birds were most
frequently found. Cormorants, too, were found along exposed rocky shores throughout the region, but the birds themselves would likely be as vulnerable to oil as their food (largely fishes) because of the cormorants' propensity for water. Black-legged Kittiwakes joined murres on the water near colonies and, as such, would be susceptible to oil on the water. Most of the habitats with the highest OSI rating were not searched in this survey.

North-Alaska Peninsula

As with many of the regions in this study, no specific information on locations of onshore facilities, pipeline corridors or tanker traffic lanes was available for North-Alaska Peninsula. Discussion will be limited to effects on birds and their habitats from acute oil spills. Less variety of coastal habitats is found in this region compared to other regions in the study area and, in general, habitats are either exposed sand and gravel beaches or protected lagoons and embayments. The former has a low susceptibility to oil and latter is highly susceptible. The estuaries also had the highest bird densities in fall of any area studied in southcentral Alaska. Any oil and gas development in this region would have to insure the utmost protection for these estuaries. Only the most numerous bird groups will be discussed, and they will be arranged in order of decreasing vulnerability to oil.

Suitable habitat for nesting alcids (the most vulnerable bird group) is scarce in the region, and this group was abundant only in waters around colonies on Amak Island and Sea Lion Rock in summer. Few were observed inshore in other parts of North-Alaska Peninsula and would not, therefore, be impacted by oil. Sea ducks, on the other hand, were abundant inshore in all seasons of the year. Although many were found on the less susceptible exposed habitats (particularly at promontories along exposed coasts), the greatest concentrations were just inside lagoon and embayment mouths near sand and gravel spits. It is likely they fed on benthic molluscs in the mud and sand of the lagoons, embayments, bays and river deltas. In any season, oil entering these estuaries could affect thousands of sea ducks. For Steller's Eiders the impact would be for a large portion of the North American population.

Cormorants, like alcids, have little suitable nesting and roosting habitat in this region. They were most abundant in the southern portion of North-Alaska Peninsula and would, therefore, be vulnerable only in that region. Their preferred rocky habitats would not be greatly harmed and comparatively few individuals would be affected by oil development. Shearwaters, however, moved into pelagic waters around Amak Island by the hundreds of thousands in summer and could be severely impacted by a large oil spill. More information on this group will likely be presented in the final report of Research Unit No. 337. Mergansers were abundant only in spring and at that time primarily used fluviatile waters that are presumably less susceptible to spilled oil than many habitats.
Moderately vulnerable diving ducks were most common from Egegik north in spring and in Herendeen Bay in fall. Several of the habitats in which they were commonly found (salt marsh, protected alluvial, lagoon and bay waters) are relatively susceptible to oil damage. Diving ducks frequently fed on water over intertidal mudflats, both exposed and protected. If populations of their food organisms, which are often benthic bivalves, are diminished by oil contamination, diving ducks would be affected on their spring and fall migration staging areas.

The mean OVI of 51 (Table 23) for geese and swans suggests only a moderate vulnerability to oil. Low vulnerabilities for Canada, White-fronted and Snow Geese were combined with moderate vulnerabilities for swans and high vulnerabilities for Brant and Emperor Geese to get the mean. Estuaries on North-Alaska Peninsula are used by the entire North American populations of Emperor Geese and Black Brant (Branta bernicla nigricans), both rated 70 OVI points by King and Sanger (1979). Not only do the geese using North-Alaska Peninsula lagoons have a high vulnerability rating, but they also were the group found in greatest densities in both spring and fall and were using habitats that are highly susceptible to oil contamination. The major migration staging area for Brant is Izembek Lagoon where the geese feed on eelgrass. Emperor Geese also eat eelgrass when at Izembek Lagoon but eat other vegetation (marine algae and heath berries) and benthic invertebrates in other lagoons. Canada Geese were found in all estuaries from Swanson Lagoon to Egegik Bay in fall and also at the mouth of the Kvichak River in spring. These geese were found most commonly where salt marsh habitats were abundant. They frequently grazed on halophytic vegetation but also fed on berries in the tundra and flew to marine waters and mudflats for roosting. The population of Snow Geese returning from Wrangel Island in Siberia in the fall normally stages at Ugashik Bay and vicinity. The importance of the North-Alaska Peninsula estuaries to migrating geese cannot be overemphasized. When the value of these estuaries to unique and large populations of sea ducks is added to that of geese, the necessity of protecting the estuaries from degradation by contamination, disturbance, or habitat destruction is multiplied.

Gulls were found in moderate densities throughout the North-Alaska Peninsula region in all seasons and on a wide variety of habitats. Frequently they were observed on flat, sandy beaches which have a low OSI on the Hayes et al. (1977) scale. Black-legged Kittiwakes nested on sandstone bluffs at Cape Seniavin and were observed bathing and roosting on nearby river mouths. Foraging areas were not found. In winter, only large gulls remained but in relatively high densities. Oil development may affect a portion of the population but the overall impact would, presumably, be minimal.

Terns were abundant only in spring surveys but were observed in all offshore sections in summer. By the October surveys, they had left the area. Their use of exposed habitats in spring would make them less vulnerable to impacts by oil pollution in that season. Their summer distribution and habitat use were not discerned in this study.
In spring, shorebirds were most numerous in the northern portion of North-Alaska Peninsula on exposed mudflats. For that reason, impacts of oil and gas development would be less. In fall, the region was utilized more heavily by staging shorebirds. At this time, they frequented all estuaries along the coast. Many fed on intertidal mudflats in lagoons or near river mouths. Gill (1978) reported that Dunlin spent approximately 110 days in Nelson Lagoon building necessary fat reserves to sustain them on a trans-Gulf of Alaska migration to Oregon and California. If oil destroys food required for this flight, serious damage could be done to that and other species of shorebird.

In spring, dabbling ducks, like shorebirds, were most abundant on the northern portion of North-Alaska Peninsula (from Port Heiden to Kvichak River), and in fall dabblers were common in all estuaries of the region. The habitats they preferred in all seasons were those with the greatest susceptibility to oil contamination, salt marshes, protected intertidal mudflats, alluvial floodplains and waters of lagoons and rivers. Dabbling duck populations have a low OVI because they are numerous and widespread in North America. However, certain subpopulations would be threatened if important staging areas were inundated with oil that lasted several years. By adding dabbling ducks and shorebirds to the list of birds using North-Alaska Peninsula estuaries for a necessary migration stop to build fat reserves before continuing migration, it magnifies the importance of these areas and the critical need for their protection.

North-Bristol Bay

No offshore oil and gas lease sales are presently scheduled for the vicinity of the North-Bristol Bay region. Effect of development would likely come from oil spills in lease areas to the southwest. Only those species using the coast in spring and the Walrus Islands in summer were documented in this study.

The most vulnerable species, alcids, were abundant in only the section from Cape Peirce to Cape Newenham, sites of major seabird colonies. In 1976 murres were already present on 28 April and Tufted Puffins arrived on 17 May (Petersen and Sigman 1977). These birds would be vulnerable to oil when rafted in the water below nesting cliffs and when foraging at sea. Their eggs or young would be affected if adults brought oil back to the nests on their feathers.

Sea ducks were not abundant in most of North-Bristol Bay. Densities were greatest in Nushagak Bay and west of Kulukak Bay. Possibly many sea ducks bypass the upper portion of Bristol Bay and migrate north across the bay from North-Alaska Peninsula staging areas. However, several flocks of a few thousand King Eiders were observed in Nushagak Bay on 8 May 1977 outside the survey transect. Black Scoters predominated along the coast. Large quantities of oil on bay and nearshore waters would pose the greatest threat to these birds.
Concentrations of diving ducks (primarily scaup) were recorded in successive spring seasons in the Flounder Flats area of Nushagak Bay. The area was obviously an important staging area, and if oil damaged populations of prey species, or the spill occurred in May and drifted into the bay while scaup were present, serious damage could be done. Mud was the likely substrate under the water from foraging diving ducks. Mudflats in protected areas would retain oil long enough to affect birds for several successive seasons.

Nanvak Bay was the only area where geese occurred in dense concentrations. Oil entering that confined area would damage an important staging area. In other sections, geese were found on alluvial floodplains where the longevity of oil would be great if it got into sedge/grass meadows during a flood tide.

Black-legged Kittiwakes and Mew and Glaucous-winged Gulls were at nesting colonies in large numbers by the May surveys. Away from breeding locations, gulls were in moderate or low densities yet were found in all sections, and as in other regions, used a variety of habitats. Mew Gulls would be affected if oil reached the alluvial floodplains on which they established breeding territories. The vulnerability of kittiwakes would be greatest on exposed inshore waters where the birds rafted or if their food supply were adversely affected by oil. The impact of oil pollution would be greatest for gulls at Cape Peirce, Cape Newenham and the Walrus Islands.

On their migration to more northerly breeding areas, shorebirds used North-Bristol Bay in relatively large numbers. The majority used alluvial mudflats and floodplains. These habitats would be damaged for extended periods if inundated with oil because they are difficult to clean and natural processes would act slowly in these areas. Assuming that these staging areas are necessary to build sufficient energy stores in shorebirds to continue their spring migration, an oil spill could severly affect those populations.

Like shorebirds, dabbling ducks were most dense at the mouth of Kvichak River and they used vulnerable alluvial habitats along with shorebirds. The same discussion about oil impacts as in the preceding paragraph applies here. The probability of oil reaching these habitats has not been calculated.

Other aquatic bird groups of lower densities could be affected if oil reached North-Bristol Bay. Cormorants were on inshore waters near nesting sites and mergansers and loons staged in moderate densities on inshore and fluviatile waters. Oiling of these birds would be common if an acute spill occurred nearshore. Perhaps the toxic, aromatic compounds would be gone from oil travelling a long distance to this area and food organisms of these birds would not be as greatly affected.
Aleutian Shelf

The Aleutian Shelf region, as defined in this study, could be potentially affected by oil and gas development in the St. George Basin lease area, the old Aleutian Shelf lease area south of Umnak and Unalaska Islands and the newly created North Aleutian Shelf lease area north of Unimak Island. Development scenario have not yet been constructed to show where onshore impacts will be. Facilities would likely be placed in this region only for the south Aleutian Shelf lease area and that sale has been indefinitely postponed. Therefore, the likely impacts will be from acute oil spills from the two northern lease areas and increased disturbance resulting from the use of Unalaska Village as a staging area. Time and money constraints allowed only one survey in the region. Winter was chosen because the islands are ice-free in winter, and it was assumed that this area was used by many wintering birds. Also, the severity of storms in winter would increase the likelihood of catastrophic impacts from oil.

Sea ducks were the only bird group abundant in all sections. Most were recorded on exposed inshore waters, a habitat with a low OSI. Exposure time to sea ducks would be relatively short as oil should not remain long on exposed water. Sea ducks found on bay water (the second most frequently used habitat) would be exposed to oil for longer periods of time. The food habits of these birds have not been studied in this region, but they likely eat benthic crustaceans and pelecypods as in other areas. Any oil damage to their prey populations would force these sea ducks to other wintering areas.

The other highly vulnerable seabirds, alcids, were not abundant on nearshore waters during this winter survey. If this is an annual situation, impacts from oil development on alcids would be low. In this season, alcids are more abundant in offshore waters. An estimated 100,000 murres died in a "wreck" from severe storms in outer Bristol Bay in 1970 (Bailey and Davenport 1972), which indicated that many murres were present in offshore waters in winter.

Emperor Geese were recorded in moderate numbers on exposed rocky coasts throughout the region. High numbers were present on northwest Umnak and extremely high densities occurred on Samalga Island. The habitat used by these birds in winter has a low OSI. The birds, too, may be somewhat protected if rebounding wave action prevents most oil from splashing the birds and their feeding areas. Oil contamination of their intertidal food organisms would cause the most long-term harm to wintering goose populations. Oil splashing ashore onto roosting or feeding birds would directly harm the geese.

Large gulls (few small gulls were recorded) were equally abundant in protected and exposed habitats and were moderately dense throughout the region. Greatest concentrations were on Samalga Island. As in other regions, the versatility of gulls in food habits and widespread distribution on various habitats would lessen the impact of oil development on this group.
Shorebirds were abundant in only two locations, on the gravel beaches of Samalga Island and on gravel or rock on the south side of Umnak Island. Presumably, most shorebirds were Rock Sandpipers. Longevity of oil on their exposed habitats is short which would reduce chances of oil-bird contact. A greater threat would be the destruction of prey items through oil contamination. Most Rock Sandpipers winter no farther south than Alaska and damage to wintering habitats could severely impact this uncommon species.

The only other high bird densities were for dabbling and diving ducks on the beach of Samalga Island. Because geese, sea ducks, shorebirds and gulls also reached highest densities on this island, it should unequivocally be classified critical wintering habitat for marine birds, and necessary steps should be taken to protect it from any oil and gas impacts. Surrounding waters and intertidal rocks were also used by many harbor seals and sea otters.

If Dutch Harbor/Unalaska is used for a staging facility for offshore development, there will be substantial increases in helicopter and boat traffic in Unalaska Bay. From ground observations, it was apparent that gurry from active crab canneries has artificially inflated numbers of certain marine bird species near town. Other birds were normally distributed throughout the bay. Physical disturbance will likely displace the more shy species and place some stress on those remaining.

VIII. CONCLUSIONS

Northeast Gulf of Alaska

During the early May survey, shorebirds and gulls were the predominant species groups. The area from Cape Suckling to Cordova had the highest densities of birds and requires the greatest degree of protection from possible impacts of oil and gas development. Shorebirds primarily used protected mudflats, a habitat that is highly susceptible to oil spills. Large gulls used a variety of habitats and, therefore, may be less vulnerable to spilled oil. Alcids would be vulnerable on water near their colonies at Wingham and Martin Islands. More information needs to be gathered during the waterfowl migration period, especially in estuaries south of Yakutat.

Spring migration corridors past Cape St. Elias indicated that some species bypass staging areas at Copper River Delta. Other species used waters around the Cape for feeding and resting and would, therefore, be vulnerable to oil spilled in spring.

During limited summer surveys, gulls were abundant on sand beaches from Icy Cape to Cape Suckling. Non-breeding sea ducks were found in greatest numbers in Icy Bay. No coastal bird survey work has been done in fall and winter in NEGOA, and such surveys are necessary to adequately assess potential impacts of oil and gas development.
Kodiak

Sea ducks were the most abundant wintering marine bird on all but the Afognak/Shuyak section of the Kodiak Archipelago. In that section, diving ducks, the second most numerous species overall, predominated. Low densities of alcids and gulls were also found. Because most of the birds were found in protected bay/fjord habitats, oil contamination reaching these waters would affect over 80 percent of the birds wintering on inshore habitats.

Lower Cook Inlet

During spring coastal surveys, shorebirds were the most abundant bird group and gulls were second in abundance. Gulls were densest in summer and fall while sea ducks predominated in winter. Almost half the gulls in spring and over one-fourth the gulls in summer were Black-legged Kittiwakes associated with the Chisik Island colony. Other gulls were scattered throughout the Inlet in a variety of habitats. Sea ducks were one of the most abundant groups in all seasons. They are very vulnerable to catastrophic oil spills and the habitats and food organisms they select are also highly susceptible to damage from oil. Therefore, they are a group that likely will be highly affected by adverse impacts of oil and gas development.

Both inner and outer Kachemak Bay had one of the highest bird densities for all seasons. In winter, birds concentrated in this area while few were found on the west side of Lower Cook Inlet. Because birds concentrated near Anchor Point, a lower probability of impact from oil and gas development would result if onshore facilities were placed at Cape Starichkof or more northern areas.

Kamishak Bay was important to sea ducks, diving ducks and shorebirds in spring and to sea ducks in summer. North of Tuxedni Bay birds were abundant only at river deltas and salt marshes. These habitats are highly susceptible to oil because of the long retention time.

In offshore waters of Kennedy Entrance, the species group most vulnerable to adverse impact of oil and gas development (excluding Barren Island colonies) would be shearwaters during summer. Sea ducks were the most abundant bird in offshore waters throughout Lower Cook Inlet in all seasons.

South-Alaska Peninsula

Although little bird survey work was conducted in this region, the lagoons of Cold and Morzhovoi Bays were found to be very important to staging geese in fall. Exposed habitats in winter contained several concentrations of murres near islands where they breed in summer. Sea ducks were the only other commonly observed species group on exposed habitats in winter. Both alcids and sea ducks are highly vulnerable to oil spills.
North-Alaska Peninsula

Estuaries on North-Alaska Peninsula were found to have the greatest bird densities of any region in the southcentral Alaska study area. In spring, geese, sea ducks, gulls and dabbling ducks were found in abundance. In fall, the same species groups were found plus shorebirds. Longevity of spilled oil in these estuaries would likely be of a duration to affect bird populations for several years. Several unique bird species use these estuaries exclusively for migration staging and a major portion or all of the North American or world populations would be affected if oil entered the estuaries.

Shearwaters were extremely abundant in offshore waters at the southern end of the Peninsula in summer. In winter, sea ducks were found in both lagoon and exposed inshore habitats and most gulls used exposed sand beaches. Few other bird groups were observed in measurable quantities during winter.

North-Bristol Bay

This region had lower bird densities in spring than other regions of the study area. It is likely on the edge of the migration corridor for shorebirds flying toward breeding grounds. Relatively low waterfowl densities may mean that many ducks and geese fly over Bristol Bay when heading for northern staging and nesting areas. However, Flounder Flats was very important to scaup on two successive spring surveys. Protected delta habitats were those most used by birds. Sea birds from large colonies at Capes Peirce and Newenham and the Walrus Islands were not censused in these aerial surveys.

Aleutian Shelf

Exposed inshore habitats were found to be important wintering habitat for sea ducks, Emperor Geese, Rock Sandpipers and large gulls in the eastern Aleutian Islands. Samalga Island was the section supporting the highest bird densities and merits special protection from adverse impacts of oil and gas development. Inclement weather precluded comprehensive surveys to further substantiate the importance of this region to wintering marine birds.

Species composition and abundance of birds change quickly during spring and fall migrations, and this fact must be taken into consideration when interpreting survey data. One survey per season provides an inadequate data base upon which to make concrete conclusions about bird densities and habitat usage. Coastal bird survey techniques must be identical to allow direct comparison of results. It would be helpful to standardize coastal survey techniques in future studies. Also, habitat availability as well as habitat preferences of birds should be recorded in all surveys.
The substrate of a habitat *per se* is not an absolute indicator of susceptibility to oil spills for birds. Consideration must be given to biological productivity of birds' prey organisms in the substrate types and to the various uses of the substrates (feeding, roosting, nesting).

The relative vulnerability to oil spills of each bird species or group varies markedly. Population size and distribution, reproductive potential, and propensity for marine waters all play a role. In this study, the bird groups with the highest calculated index for potential damage from oil spills were alcids and sea ducks.
LITERATURE CITED


Dames and Moore. 1979b. Oil spill trajectory analysis, Lower Cook Inlet, Alaska. Final project report to Outer Continental Shelf Environmental Assessment Program. 42pp plus appendices.


ACKNOWLEDGMENTS

Many people merit special recognition for contributing to various aspects of this study. First and foremost are those that risked their lives flying at low altitudes in occasionally marginal weather to census birds and map habitat types. Fellow observers were M. Allen, W. Ballard, V. Berns, J. Butcher, W. Donaldson, D. Erikson, J. Faro, M. Isleib, N. Johnson, R. Johnston, D. Kurhajec, R. MacIntosh, D. McDonald, D. Timm and J. Sarvis. The many pilots who returned us safely also deserve a special thanks.

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The painstaking job of figure and diagram drawing was accomplished admirably by L. Anderson, A. Meyer and C. Riedner.

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My tracker, R. Swope, was instrumental in providing much needed support throughout the project.

Lastly, I thank those that indirectly supported the project and apologize to those whom I may have forgotten to acknowledge.
Table A1. Definitions of some habitats used in this study.

<table>
<thead>
<tr>
<th>Water Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protected shoreline: Indented coast where shoreline is three or more times the width of the opening.</td>
</tr>
<tr>
<td>Bay¹: A large estuary with a relatively high degree of flushing.</td>
</tr>
<tr>
<td>Lagoon¹: A relatively shallow estuary with very restricted exchange with the sea and no significant fresh water inflow.</td>
</tr>
<tr>
<td>Embayment¹: A relatively small and shallow estuary with rather restricted flushing and significant freshwater inflow.</td>
</tr>
<tr>
<td>Fjord²: A long, narrow deep inlet from the sea between steep cliffs and slopes. (Characterized by having an underwater sill and shallower water near the mouth - Author.)</td>
</tr>
<tr>
<td>Unprotected shoreline: Coastal shoreland exposed to open ocean with a high energy beach.</td>
</tr>
<tr>
<td>Brackish pond or lake: A body of water within the coastal floodplain that is influenced by saltwater during storm tides.</td>
</tr>
<tr>
<td>Fresh water pond or lake: A body of water containing no measureable salt water and found above the coastal floodplain.</td>
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</table>

<table>
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<tr>
<th>Physiographic Feature</th>
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<tr>
<td>Coastal floodplain: The area of shorelands extending inland from the normal high tide line to the maximum storm water level.</td>
</tr>
<tr>
<td>Salt chuck: An intertidal estuary with a restricted outlet, with or without fresh water inflow.</td>
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Other definitions are self-explanatory.


Table A2. Number of birds in each species group within regions of southcentral Alaska by season as determined from aerial, coastal bird surveys in 1975 – 1978.

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<td></td>
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<td>Mn</td>
<td>Sp</td>
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<td>Geese</td>
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<tr>
<td>Terns</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>Cormorants</td>
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<td>131</td>
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<tr>
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<td>4,660</td>
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<tr>
<td>Sea Ducks</td>
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<td>5</td>
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<tr>
<td>Total area (km²)</td>
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<td>61</td>
<td>857</td>
<td>1138</td>
<td>389</td>
<td>919</td>
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Table A3. Sample sizes of birds observed during aerial and boat surveys in south-central Alaska, 1975-1978. Data arranged by region and season.

<table>
<thead>
<tr>
<th>Species of Group</th>
<th>Date</th>
<th>Arranged by Region and Season</th>
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**Aerial Survey**

<table>
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**Boat Survey**

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**Land Survey**

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* Includes both and walking surveys.
** Best survey
Table A4. Relative index, by season, of bird densities for selected marine species from shoreline surveys in southcentral Alaska.

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- o = no birds  
- t = less than 1 bird/km²  
- + = 1 to 10 birds/km²  
- ++ = 11 to 100 birds/km²  
- +++ = 101 to 1000 birds/km²

* Only represents individuals identified to species (e.g. only 43% of the scoters were identified to species).
AN ANNOTATED BIBLIOGRAPHY OF LITERATURE ON ALASKA WATER BIRDS

by

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Margaret R. Petersen
Robert E. Gill, Jr.
Calvin J. Lensink

U. S. Fish and Wildlife Service
Marine Bird Section, National Fisheries Research Center
1011 E. Tudor Rd.
Anchorage, Alaska 99503

December 15, 1980
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INTRODUCTION

The demand for information on birds in Alaska has surged within the past few years, primarily because of the need to adequately assess the impacts of a wide range of planned developments. The accompanying increase in studies of avian populations has resulted in a growing need for a comprehensive bibliography of Alaska ornithology. An initial effort by Bartonek and Lensink (1978) provided a list of published and unpublished references on marine birds, but this list was only marginally useful because it lacked adequate indexing and annotation of references cited. Their bibliography, however, plus those of Cade (1953) and Gabrielson and Lincoln (1959), provided the basis and primary reference sources for our work.

In the present bibliography, we have attempted to compile all substantive references addressing water birds in Alaska, as this group of birds appears to be most vulnerable to repercussions of development, particularly along the coast. However, the works cited comprise an estimated 70-80% of all literature on birds in Alaska, and this volume thus provides an initial source of references on terrestrial birds. This bibliography, which contains 1554 citations, is current for most journal sources through 1979 and most of 1980. The content of each paper has been summarized, and we have indexed the citations by subject, species, and geographic location to make the bibliography a more useful reference. Furthermore, the bibliography has been designed to facilitate future inclusion of references that have been omitted or that will be published in the rapidly growing body of literature on Alaska birds.

CONTENTS

The bibliography includes both published and unpublished materials. Inclusion of the latter was considered essential because they represent a large part of information available on Alaska birds and are the primary source of data for many areas. Although we have attempted to include most published references, our search of non-technical publications has been cursory, and references to popular publications have been omitted unless they contributed information not available from technical sources.

For references published prior to 1976, we used electronic data reference systems, including the Fish and Wildlife Service Reference Service (Denver Public Library), BIOSIS, NTIS, Ocean Abstracts, and Dissertation Abstracts, to assist in our bibliographic search. However, we found visual searches of key references and periodicals more productive for both number of citations and thoroughness of search. For references published after 1976, we relied entirely on visual search of common journals and hard copy bibliographic sources. These included, but were not limited to: Arctic,
Auk, Canadian Field-Naturalist, Condor, Ecology, Ecological Monographs, Ibis, Journal of Field Ornithology (formerly Bird-Banding), Journal of Wildlife Management, Murrelet, Pacific Seabird Group Bulletin, Wader Study Group Bulletin, Western Birds, Wildlife Review and Wilson Bulletin. American Birds was also reviewed, but only for major articles. Much valuable information in the form of seasonal observations on numbers, distribution, and identification is also included in American Birds, and any effort to study a species or regional avifauna should include a thorough review of this publication.

In choosing references for this bibliography, we have been selective and have omitted general references or papers which include information on Alaska only as part of a larger area or topic, e.g., a book on North American birds and many taxonomic references. However, we have included such references when the reviewer considered them of particular importance to Alaska ornithology. The focus of this bibliography is on reports of field studies conducted in Alaska or other papers dealing specifically with Alaska ornithology.

We have also omitted most Environmental Statements in our list of references although many of them contain excellent discussions or checklists of regional avifaunas. While ornithologists interested in specific areas or regions of the state should be aware of this important source of information, such accounts are nearly always based on primary sources we have included.

We have been most selective in our treatment of unpublished materials. In general, we attempted to include all unpublished materials that contain substantive information not included in formal publications.

The progression of reports emanating to or from government agencies frequently includes field or quarterly reports, annual reports, and final reports. In such progressions, information in quarterly reports may be almost totally redundant of that in annual reports, and information in annual reports redundant of that in final reports. However, at times, useful data are lost with more extensive editing, and field reports often contain information of significant value not summarized elsewhere. In cases for which redundancy was obvious, we cite only the most significant reports, usually the annual or final reports. For other agency reports which form a continuing series, e.g., Annual Reports of National Wildlife Refuges, we have usually cited only the series rather than the contents of individual reports to avoid unnecessary redundancy. However, contents of unusual significance may be cited separately. Of such series, quarterly and annual reports for Federal Aid in Wildlife Restoration issued through 1959 by the U.S. Fish and Wildlife Service and subsequently by the Alaska Department of Fish and Game are among the most important in that they discuss all work conducted under this major program, much of which is never summarized in formal publications.
The bibliography is divided into four sections, each of which is in effect a separate bibliography as listed below:

I. Seabirds
   - Procellariiformes
     - Diomedeidae (albatrosses)
     - Procellariidae (fulmars, shearwaters, and petrels)
     - Hydrobatidae (storm-petrels)
   - Pelecaniformes
     - Phalacrocoracidae (cormorants)
   - Charadriiformes (in part only)
     - Stercorariidae (jaegers and skuas)
     - Laridae (gulls and terns)
     - Alcidae (alcids)

II. Waterfowl and Other Water Birds
   - Gaviiformes (loons)
   - Podicipediformes (grebes)
   - Anseriformes (swans, geese, and ducks)
   - Ciconiiformes (herons)
   - Gruiformes (cranes, rails, and coots)

III. Shorebirds
   - Charadriiformes
     - Haematopodidae (oystercatchers)
     - Charadriidae (plovers)
     - Scolopacidae (sandpipers and allies)
     - Phalaropidae (phalaropes)

IV. Avifauna

The division of the bibliography into four sections is based on both the species addressed and the nature of the reference material. A reference which addresses particular species or group(s) of birds has been placed under the appropriate section(s): seabirds, waterfowl, or shorebirds. A reference was included in the avifauna section if it 1) was of a general nature, usually in narrative form, and contained little specific reference to individual species; 2) treated the entire avifauna of an area, often in the form of annotated accounts or a checklist; 3) represented specimen records of a number of diverse species; or 4) was a detailed paper concerned with a particular species or group of species, yet included, usually in appendices, information on the entire associated avifauna. Papers of this nature, totaling 62, are indicated in the avifauna section by an asterisk preceding the number, showing that the citation also occurs in one or more of the other bibliographies. Many of the references which appear only in the avifauna section contain significant and detailed in-
formation on individual species, and should not be overlooked. In addition, some of these references address species which are not treated elsewhere in the bibliography.

Within the separate sections, each reference includes the citation, a brief summary or evaluation of content, and key words that identify the region and locality of study, family and/or species of concern, and subject of discussion. The particular reviewer's initials appear at the end of each summary. One hundred forty-three of the citations were either not reviewed or have summaries quoted from another source.

A total of 6 regions and 18 subregions are identified (Table 1, Figure 1). The boundaries of regions and subregions are adapted from the U.S. Geological Survey hydrographic divisions for reporting data on water quality and are also used by other federal and state agencies for water resource planning. The boundaries of subregions follow topographic divides between major drainage systems. These often delineate corresponding changes in vegetation or in the distribution and abundance of birds. We consider the identification of regional literature particularly important to agencies or industrial organizations requiring information for evaluating the effects of developments such as hydropower sites, drainage programs, and conversion of land to agriculture; for determining the effects of pollution; or for evaluating resources associated with wildlife refuges, parks, or other major areas of frequent concern. Specific localities to which references pertain have also been identified. All place names are those used by the U.S. Board of Geographic Names and are those which appear on topographic maps published by the U.S. Geological Survey. References which pertain to many regions or to Alaska as a whole are included in the category "Alaska, General."

The taxa of birds which are addressed in a particular reference are identified. Within the sections on seabirds, waterfowl, and shorebirds, families or subfamilies are indicated; particular species are also listed if they are treated in depth or they are few in number. If all or most of the families within the group are addressed in a reference, the key word is simply "seabirds," "shorebirds," or "waterfowl." Within the section on avifauna, the groups of birds which have been addressed are listed as "seabirds," "shorebirds," "waterfowl," and "other." Generally, we have noted in the summary the number or percentage of typically water-associated species addressed in each reference. Specific water bird species are listed only in the rare cases where space allows.

The subject matter of each reference is identified by one or more of 34 relatively broad subject categories (Table 2). Within each of the four sections of the bibliography, citations are listed alphabetically by author and numbered sequentially for indexing. Separate indexes for geographic area, taxonomic group, and subject are provided for the seabird, waterfowl, and shorebird sections. The avifauna section has been indexed by subject and geographic area only.
A bibliography of references, particularly one which includes unpublished materials, is not very useful if cited references are not available. During preparation of this bibliography we have attempted to acquire or identify the source of references cited. Most current publications are available in major libraries. Most unpublished materials and copies of long out-of-print references cited may be examined in the library, U.S. Fish and Wildlife Service, Anchorage, or in reprint files of the Marine Bird Section, National Fisheries Research Center, U.S. Fish and Wildlife Service, Anchorage. While it is not possible for the Service to provide copies of such materials to all persons, serious investigators with specific needs may examine references in the Fish and Wildlife Service office and may be furnished copies of materials they require.

ACKNOWLEDGMENTS

We thank Martha Shepard, Cathy Vitale, and Mary Ferber of the U.S. Department of Interior, Alaska Resources Library, Anchorage, and Janet Ballard, U.S. Fish and Wildlife Service Library, Anchorage, for their help in obtaining many of the lesser known or hard to obtain references. Nancy Harrison (NMH), Jan Greilich (JLG), Patrick Gould (PJG), and Gerald Sanger (GAS) helped by reviewing references and in preparing the final bibliography. Karleen Boskofsky and Marva Stevens are especially thanked for typing the manuscript. This bibliography was initiated with funding provided by the Bureau of Land Management through interagency agreement with the National Oceanic and Atmospheric Administration, and managed by the Outer Continental Shelf Environmental Assessment Program. Additional funding for its completion was provided by the Office of Biological Services and Migratory Bird Programs of the Fish and Wildlife Service.
Table 1. Regions and Subregions

A. ALASKA, GENERAL

B. ALEUTIANS

C. ARCTIC
   1. Beaufort
   2. Chukchi
   3. Kotzebue Sound

D. BERING SEA
   1. Norton Sound
   2. Yukon Delta
   3. Bristol Bay
   4. Bering Sea Islands

E. GULF OF ALASKA
   1. Kodiak
   2. Cook Inlet
   3. Copper River
   4. Northern Gulf
   5. Prince William Sound
   6. Southeastern Alaska

F. INTERIOR ALASKA
   1. Innoko
   2. Kuskokwim
   3. Tanana
   4. Koyukuk
   5. Upper Yukon

G. NORTH PACIFIC
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<td>1</td>
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<tr>
<td>2</td>
<td>Age and sex composition</td>
</tr>
<tr>
<td>3</td>
<td>Anatomy - includes morphology</td>
</tr>
<tr>
<td>4</td>
<td>Annotated list</td>
</tr>
<tr>
<td>5</td>
<td>Archaeology</td>
</tr>
<tr>
<td>6</td>
<td>Behavior</td>
</tr>
<tr>
<td>7</td>
<td>Bibliography</td>
</tr>
<tr>
<td>8</td>
<td>Breeding biology - generally comprehensive, but includes natural history accounts</td>
</tr>
<tr>
<td>9</td>
<td>Checklist - without annotation other than coded summary of abundance or status</td>
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<tr>
<td>10</td>
<td>Disease and parasites</td>
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<tr>
<td>11</td>
<td>Distribution</td>
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<tr>
<td>12</td>
<td>Disturbance, effects of</td>
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<td>*</td>
<td>Evolution (See Taxonomy)</td>
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<tr>
<td>13</td>
<td>Fishing, effects of</td>
</tr>
<tr>
<td>14</td>
<td>Food - includes food resources, foraging, behavior, and trophics</td>
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<tr>
<td>15</td>
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<tr>
<td>16</td>
<td>Habitat - characteristics, requirements, use, protection, etc.</td>
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<tr>
<td>17</td>
<td>Management - laws and regulations, conservation, harvest, protection, etc.</td>
</tr>
<tr>
<td>*</td>
<td>Methods (See Techniques)</td>
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<td>18</td>
<td>Migration - includes wandering, dispersal, staging, etc.</td>
</tr>
<tr>
<td>19</td>
<td>* Molt (See Plumage)</td>
</tr>
<tr>
<td>20</td>
<td>Mortality</td>
</tr>
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<td>Physiology</td>
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<td>22</td>
<td>Plumage - development, molt, etc.</td>
</tr>
<tr>
<td>23</td>
<td>Pollution, effects of - includes incidence of threats, etc.</td>
</tr>
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<td>24</td>
<td>Population dynamics - synthesis of information on population size and structure, growth, reproductive performance, etc.</td>
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<tr>
<td>25</td>
<td>Predation</td>
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<tr>
<td>26</td>
<td>Public interest - popular rather than technical content</td>
</tr>
<tr>
<td>27</td>
<td>Rehabilitation - care of injured, diseased, or oiled birds</td>
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<td>28</td>
<td>Reproduction - reproductive performance, rates, success, etc.</td>
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<td>29</td>
<td>Research - analysis of research needs, programs, etc.</td>
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<td>30</td>
<td>Specimen record - museum's or collector's reference to a particular bird or egg</td>
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<td>Status - well-being of population or species</td>
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</table>
Figure 1. Regional and subregional boundaries of Alaska.
Alaska ornithology had an auspicious beginning when in 1741 Georg Steller, who accompanied the Bering Expedition, obtained specimens and made extensive notes on birds he observed during the voyage. This early promise did not continue, and the first major ornithological accounts were based on the observations and collections obtained during the third voyage (1778 to 1779) of the great English explorer Captain James Cook. Localities described by Cook included Prince William Sound, Unalaska, Cape Newenham, St. Matthew Island, and Norton Sound. The observations and the collections, which included nine type specimens, were subsequently described in Latham's *A General Synopsis of Birds* published in several volumes from 1781 to 1785, and in Pennant's *Arctic Zoology* published in 1785.

Russian scientists did not make a major effort to obtain information on birds until more than a half century later (1840 to 1849) when Ilja Wosmessenski collected specimens for the Academy of Sciences. These specimens are still preserved in the Zoological Institute, Academy of Sciences, USSR, and Gabrielson and Lincoln were able to obtain a list of 341 specimens of 90 species while working on their monograph of the birds of Alaska (Gabrielson and Lincoln 1959).

Interest in Alaska ornithology increased dramatically during the period of American Exploration which was initiated by the Russian-American Telegraph Expedition (1865 to 1867). The scientific party included William Healy Dall, who was placed in charge after the death of Robert Kennicott. When the expedition was abandoned in 1867, Dall remained in Alaska at his own expense to complete work that had been planned. Much of the information obtained by the Telegraph Expedition was from coastal regions visited earlier (Dall 1873, 1874; Dall and Bannister 1869). However, Dall's observations on the Yukon River, which he explored up to Fort Yukon, were a significant contribution, being the first major study of inland habitats.

Dall's work was soon followed by that of Lucien Turner (1874 to 1881) and Edward W. Nelson (1877 to 1885). Both obtained specimens of more than 250 species and subspecies (Turner 1886, Nelson 1887). Nelson's work was particularly important for he described the major faunal areas of Alaska and he was the first to provide extensive information on abundance, behavior, and natural history of individual species of birds.
In the decades following the work of Dall, Turner, and Nelson there was continued wide interest in Alaska avifauna. Most work focused on compilation of regional avifaunas; a few of the important contributors were:

- Murdoch* 1881 - 1883 Pt. Barrow
- McIlhenny 1897 - 1898 Pt. Barrow (see Stone 1900)
- Grinnell 1896 - 1899 Sitka/Kobuk R./Kotzebue Sound
- Osgood 1899 - 1902 Yukon R./Cook Inlet/Alaska Pen.
- Dixon 1907 -1926 Southeastern/Prince William Sound/
  Arctic Coast/Interior
- Swarth 1909 - 1919 Southeastern
- Bent 1911 Bering Sea
- Brooks 1913 Semidi Is./Arctic Coast
- Willett 1912 - 1926 Southeastern
- Bailey 1919 - 1921 Southeastern/Arctic
- Murie, O.J. 1920 - 1937 Interior/Yukon Delta/Alaska Pen./
  Aleutian Is.

This productive period in Alaska ornithology (about 1865 to 1950) culminated in the publication of *Birds of Alaska* by Gabrielson and Lincoln in 1959, which remains the most important reference on Alaska birds. In preparing this monograph, the authors had access not only to published materials and the collections of the Smithsonian and other museums, but also to unpublished reports, notes, and diaries of past and present personnel of the Bureau of Biological Survey, the Alaska Game Commission, and the Fish and Wildlife Service. Thus, *Birds of Alaska* provides a uniquely comprehensive summary of all work that had been accomplished to the time of its publication.

Gabrielson and Lincoln considered the period from about 1900 to 1958 to be the "modern period" in that there was a shift from extensive exploratory work to more intensive surveys of restricted areas. In retrospect, we would include most of the work up to about 1950 in the exploratory period, as emphasis remained on investigation of new regions and on collection of specimens to extend regional lists of species. By the end of this period, the distribution patterns of most species were reasonably well defined.

A much more dramatic shift in direction of ornithological research occurred after World War II. Regional occurrence, range extensions, and records of new species continued to be a matter of interest, but avian research became more diverse. Studies began to address discrete topics such as the ecology and habitat requirements of individual species, the role of birds in ecosystems, the adaptation of birds to Arctic environments, population dynamics, problems related to management, and finally, the probable impacts of myriad development programs or activities.

*See references listed for each of these individuals.*
Within these past three decades, most of the studies on Alaska birds have been directed through a few major contributors. The University of Alaska, primarily through the efforts of Brina Kessel and Daniel Gibson, has been a continuing focal point for information on distribution and zoogeographical relationships of Alaska birds and maintains collections of growing importance. Kessel and Gibson (1978) provided a major supplement to the Birds of Alaska, which extensively revised information on status and distribution for about half of the species originally treated, and extended the list of known species from 321 in 1958 to 387 in 1978. This increase in the recorded number of species reflects the major expansion of ornithological research in recent years.

The Arctic Health Research Center, subsequently incorporated in the Institute of Arctic Biology, University of Alaska, has emphasized studies of physiological adaptations of birds to Arctic environments. Lawrence Irving, former director of the Institute, and his colleagues have also contributed to many other aspects of ornithology and have conducted comprehensive avifaunal studies, including detailed analyses of habitat relationships, for many regions of Alaska.

Since 1951, Frank Pitelka of the Museum of Vertebrate Zoology, Berkeley, with many students and colleagues, has continued work on birds at the Naval Arctic Research Laboratory at Point Barrow, and elsewhere on the Arctic Slope. Work at Barrow has included studies of evolution, population dynamics, breeding behavior, and trophic relationships of shorebirds, as well as studies of time-energy budgets, distribution within biotic communities, and predator-prey relationships.

Research conducted by the Fish and Wildlife Service has focused primarily on collection of information necessary for management of migratory waterfowl, endangered species, and national wildlife refuges. Additional work has addressed populations and habitats likely to be affected by existing or proposed development projects. Annual surveys of breeding populations, assessment of production, and analysis of habitat requirements continue to be of high priority. Although the primary purpose of such surveys is to meet short-term management needs, the accumulated data on populations, reproduction, and distribution provide a unique base for evaluating long-term climatic, physical, biological, or anthropogenic changes in the environment, as well as the cumulative or compensatory relationships of such changes.

National wildlife refuges, particularly Clarence Rhode National Wildlife Range, have also sponsored many in-depth studies of the population dynamics and ecology of individual species. These studies have usually been conducted in cooperation with universities, as such discrete topics are particularly adaptable to research by graduate students. Under similar cooperative agreements with the Fish and Wildlife Service, students of Milton Weller, Iowa State University, have studied the water birds and wetland habitats of the Arctic Slope in relation to petroleum development. The Fish and Wildlife Service expanded these studies during the past five years, and conducted additional studies on the avifauna of Prince William Sound in relation to expanding petroleum development.
The latest major impetus to ornithological research in Alaska began in 1975, with funding through the interdisciplinary Outer Continental Shelf Environmental Assessment Program (OCSEAP), an effort designed to assess potential impacts of offshore petroleum development. Papers by King (1973) and Sowl and Bartonek (1974) had earlier called attention to the woeful inadequacy of information and current research on marine birds. Only crude information had been available on the distribution of populations, on the size, location, and composition of nesting colonies, and on the ecology of individual species. Research on birds of estuarine and marine environments became an important part of OCSEAP in 1976. Although programs of the Fish and Wildlife Service supplement that of OCSEAP, the combined effort is considered by many persons involved to be too little and too late. However, research on marine birds in Alaska between 1976 and 1978 was likely the most concentrated research effort ever directed primarily at non-game species.

This major program has involved scientists from the Fish and Wildlife Service, Alaska Department of Fish and Game, and several universities. It is additionally unique in being truly interdisciplinary, with information being collected simultaneously on oceanography, fisheries, invertebrates, marine mammals, and other physical and biological factors which influence the ecology of marine birds. Preliminary results of this research program are impressive, with most information being summarized in Annual or Final Reports of Principal Investigators published by the National Oceanic and Atmospheric Administration which manages the program for the Bureau of Land Management.

Although funding available from OCSEAP diminished appreciably in 1978 and has continued to decline, that from other sources is expanding and work in ornithology over the long-term appears likely to increase and diversify.
SEABIRDS - BIBLIOGRAPHY


Besides the gastronomic emphasis of this note, there is mention of an unusual concentration of thousands of these birds around Barrow in late September 1928. REG

Arctic - Chukchi (Barrow)
Gulls and terns
Ross' Gull
Subsistence, distribution, abundance


This paper reviews the literature on the diets of seabirds found in the northeastern North Pacific Ocean and Bering Sea, and broadly characterizes the diet of each species. More research is needed on seabird feeding relations so the ecological roles of marine birds can be defined and placed in perspective. MRP

North Pacific
Bering Sea
Seabirds
Food, research


This paper presents data collected on the breeding biology of Horned and Tufted Puffins. Aspects of their breeding biology are compared with information presented in the literature for all puffins. Factors influencing breeding success on East Amatuli Island are assessed. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Alcids
Horned Puffin, Tufted Puffin
Breeding biology

This paper describes and compares aspects of the breeding biology of Horned and Tufted Puffins. The most important factors influencing nesting success are discussed for both species. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Alcids
Horned Puffin, Tufted Puffin
Breeding biology


This paper describes displays and hunting behavior of the Pomarine Jaeger, and describes relationships between their behavior and ecology. A preliminary review of behavior patterns and relationships in the Stercorariinae is included. MRP

Artic - Beaufort (Nuvagapak Pt.)
Jaegers
Pomarine Jaeger
Behavior, taxonomy


This note records the oiling of an estimated 10,000 birds in the Kodiak Island archipelago during February and March 1970, from an unknown source of crude or bunker oil. Those species identified and others probably affected are listed. CMH

Gulf of Alaska - Kodiak
Cormorants, gulls and terns, alcids
Pollution, public interest, mortality


A specimen of Cook's Petrel, collected in the Aleutian Islands, represents the first North American record. CMH

Aleutians - (Adak Is.)
Fulmars and shearwaters
Cook's Petrel
Distribution, specimen record

This paper reports census results for the 17 species recorded on a cruise through the Aleutian Islands and Gulf of Alaska during summer 1944. Numbers and locations are reported in tables, and distribution is briefly discussed for several species. CMH

Gulf of Alaska
Aleutians
North Pacific
Seabirds
Distribution, abundance


This paper discusses the taxonomic status of populations of three gadfly petrels and six storm-petrels, separated on the basis of meristics, plumage, and geographic distribution. Of these species, only Cook's Petrel and Leach's Storm-Petrel are known to occur in Alaska waters. CMH

North Pacific
Fulmars and shearwaters, storm-petrels
Cook's Petrel, Leach's Storm-Petrel
Distribution, taxonomy, anatomy, plumage


Specimens of three species collected at Barrow and Wainwright are recorded, including Least and Crested Auklets. CMH

Arctic - Chukchi (Barrow, Wainwright)
Alcids
Crested Auklet, Least Auklet
Distribution, specimen record


Specimen records of three species of gull collected in September 1929 are reported. REG

Arctic - Chukchi (Barrow)
Gulls and terns
Thayer's Gull, Ivory Gull, Black-legged Kittiwake
Specimen record, distribution

381

Several specimens of Puffinus tenuirostris are reported from the "sea ice" during November and December 1929. Many of the specimens were "caught in the ice, some frozen solidly, and others still alive, too weak to rise." REG

Arctic - Chukchi (Barrow)
Fulmars and shearwaters
Short-tailed Shearwater
Specimen record, distribution


A specimen of Larus canus was misidentified as Larus delawarensis (Bailey and Bishop, Condor 36:169, 1934). REG

Arctic - Chukchi (Barrow)
Gulls and terns
Ring-billed Gull, Mew Gull
Specimen record, distribution


This note presents the first record of a Bean Goose (Anser fabalis serrirostris) collected in North America, and records specimens of six other uncommon species collected on St. Lawrence Island between 1950 and 1953. CMH

Bering Sea - St. Lawrence Is.
Fulmars and shearwaters, gulls and terns
Short-tailed Shearwater, Ivory Gull
Distribution, specimen record


This short note reports specimens of six species not previously recorded from the Barrow region, including the Ring-billed Gull, Parakeet Auklet, and Hudsonian Godwit. REG

Arctic - Beaufort (Colville R., Cape Halkett), Chukchi (Barrow)
Gulls and terns, alcids
Ring-billed Gull, Parakeet Auklet
Distribution, specimen record

This report of a Kittlitz's Murrelet nest found near Cold Bay in July 1972 was the fourth nesting record for this species in Alaska. REG

North Pacific - (Alaska Peninsula)
Alcids
Kittlitz's Murrelet
Reproduction, distribution


This is a brief account of the discovery of a Kittlitz's Murrelet nest, written for the general public. Included are color pictures of the egg, downy young, and nesting habitat. CMH

North Pacific - (Alaska Peninsula)
Alcids
Kittlitz's Murrelet
Public interest


This gives a brief overview of the marine resources found along coastal Alaska, and emphasizes the need for coastal wildlife refuges. MRP

Alaska
Seabirds
Habitat, public interest, management


The area along the south side of the Kenai Peninsula between Cook Inlet and Seward was surveyed from June 19 to July 14, 1976. The largest concentrations of birds are noted. MRP

Gulf of Alaska - Prince William Sound
Fulmars and shearwaters, gulls and terns, alcids
Northern Fulmar, Fork-tailed Storm-Petrel, Glaucous-winged Gull, Black-legged Kittiwake, Common Murre, Kittlitz's Murrelet, Rhinoceros Auklet, Horned Puffin, Tufted Puffin
Abundance, distribution

This paper provides population estimates, by island, of the 18 species of seabirds found breeding on the Shumagin Islands. Most of the data was gathered on reconnaissance surveys during three summers, but information from historical and recent studies is also summarized. The presence of red foxes is discussed in relation to the distribution of seabirds on the islands. CMH

North Pacific - (Shumagin Is.)
Seabirds
Distribution, abundance, annotated list, predation


This paper presents information on the distribution and abundance of seabirds on the Shumagin Islands. The influence of red and arctic foxes on seabird distribution is discussed. MRP

North Pacific - (Shumagin Is.)
Seabirds
Abundance, distribution, predation


The author estimates the populations of diurnal seabirds on 31 islands of the Sandman Reefs. MRP

North Pacific - (Sandman Reefs)
Seabirds
Abundance, distribution


This paper reports on the abundance and distribution of seabirds found on islands and adjacent mainland from Mitrofania to Sutwik during a survey in July 1979. MRP

Gulf of Alaska - Kodiak (Alaska Peninsula)
Seabirds
Abundance, distribution

This paper documents a massive die-off of Common Murres in Bristol Bay during an intense storm in April 1970. Aerial and ground surveys were conducted to determine the number of birds cast ashore and specimens were examined for cause of mortality. CMH

Bering Sea - Bristol Bay (Alaska Peninsula)
Alcids
Common Murre
Mortality


This paper describes habitats used by Arctic and Aleutian Terns in the Sitkalidak Strait area of Kodiak Island. Amount of vegetative cover and nesting chronology are assessed as factors influencing reproductive success. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Gulls and terns
Arctic Tern, Aleutian Tern
Habitat, reproduction


This paper reports on the breeding success and foods of Glaucous-winged Gulls, Black-legged Kittiwakes, and Tufted Puffins in 1977 and 1978. Interspecific differences are noted. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Gulls and terns, alcids
Glaucous-winged Gull, Black-legged Kittiwake, Tufted Puffin
Reproduction, food

A two-year study of the comparative breeding biology and feeding ecology of five species of seabirds was conducted on Kodiak Island. Differences in productivity are discussed in relation to presumed prey availability. Appended is an annotated list of all birds and mammals observed in 1978. Of the 36 species of birds noted, 24 are water-associated. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Gulls and terns, alcids
Glaucous-winged Gull, Black-legged Kittiwake, Arctic Tern, Aleutian Tern, Tufted Puffin
Breeding biology, abundance, food, growth, population dynamics, annotated list


Detailed information on the abundance, habitat use, and reproductive and feeding ecology is presented for Glaucous-winged Gulls, Black-legged Kittiwakes, Arctic and Aleutian Terns, and Tufted Puffins. Sightings of eight species of shorebirds and two other species of seabirds are summarized. CMH

Gulf of Alaska - Kodiak (Sitkalidak Strait)
Gulls and terns, alcids
Glaucous-winged Gull, Black-legged Kittiwake, Arctic Tern, Aleutian Tern, Pigeon Guillemot, Horned Puffin, Tufted Puffin
Breeding biology, food, habitat, growth, abundance

In this paper, the Aleutian Tern and four land bird species are described as new to science. (From T. J. Cade, 1953, A Synoptic Review of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen). CMH

Alaska
Gulls and terns
Aleutian Tern
Specimen record


This paper evaluates aerial survey techniques for estimating bird populations, and reports on the distribution of postbreeding waterfowl in Alaska Arctic coastal waters. MRP

Arctic - Beaufort
Seabirds
Techniques


This paper identifies and discusses potential problems arising from resource development and hunting, describes responsibilities of various management agencies, and suggests specific research projects which should be conducted in the state. CMH

Alaska
Seabirds
Management, research

This paper broadly discusses the bird and mammal resources of the Bering Sea. Their ecological and economic importance, and potential conflicts with mineral and petroleum exploitation and the fishing industry are assessed. Recommendations for research are made. CMH

Bering Sea
Seabirds
Research, management, pollution


The authors report on the distribution and abundance of 32 species of pelagic birds observed in Bristol Bay during July and August 1969. MRP

Bering Sea - Bristol Bay
Seabirds
Distribution, annotated list, abundance


This paper provides a general review of the principal nesting habitats of breeding waterfowl, shorebirds, and seabirds; identifies the state and federal agencies managing these habitats; and discusses the types of resource development which may adversely affect birds. Recommendations for research and for protection of avian habitats are made. MRP

Alaska
Seabirds
Management, research

This research report contains papers presented during the International Symposium on the Conservation of Marine Birds of Northern North America, May 13-15, 1975. Topics include marine environment of birds; status of marine bird populations; the biology and ecology of marine birds in the north; conflicts between the conservation of marine birds and uses of other resources; programs and authorities related to marine bird conservation; and conservation of marine birds in other lands. MRP

Alaska
Seabirds
Abundance, distribution, fishing, food, habitat, management, mortality, pollution, population dynamics, predation, research, status, taxonomy, zoogeography


This paper describes the status and distribution of the species of marine birds breeding along the coasts of the Chukchi and Bering Seas, and identifies gaps in our knowledge of the area. Recommendations for further research are presented. MRP

Arctic - Chukchi
Bering Sea
Seabirds
Distribution, status, research


This note records the occurrence of four species of alcids rare in or new to the St. Lawrence Island area. Measurements of specimens are given, and the potential breeding status of each species is discussed. CMH

Bering Sea - St. Lawrence Is.
Alcids
Dovekie, Black Guillemot, Marbled Murrelet, Ancient Murrelet
Distribution, status, specimen record

Not reviewed.

Bering Sea - St. Lawrence Is.
Alcids
Parakeet Auklet, Crested Auklet, Least Auklet
Habitat, breeding biology, food, anatomy, abundance


This paper traces the adaptive radiation of the Alcidae, through a detailed study of the morphology of the feeding apparatus, body size, and specialized feeding habits of each species. CMH

Alaska
Alcids
Taxonomy, food, anatomy


The author examines the feeding habits of three plankton-feeding alcids nesting on St. Lawrence Island to determine the amount of niche segregation and overlap. Composition of diet, foraging habits, and morphology of feeding apparatus are considered. CMH

Bering Sea - St. Lawrence Is.
Alcids
Parakeet Auklet, Crested Auklet, Least Auklet
Food, anatomy


This paper, based on a four-year study, presents a detailed analysis of segregation in selection of nesting habitat by three species of auklets. All major colonies on the island are catalogued, and population estimates of Least and Crested Auklets are given for each colony. The relationship between nesting densities of these two species and the physical parameters of the habitat are examined. CMH

Bering Sea - St. Lawrence Is.
Parakeet Auklet, Crested Auklet, Least Auklet
Habitat, abundance, breeding biology

Relying largely on information gathered during his own studies of alcids in the Bering Sea region, the author delivers a comprehensive criticism of Cody's comparison (Ecology 54:31-44, 1973) of an alcid community of Washington with one of Iceland. CMH

Bering Sea
Alcids
Breeding biology, food, anatomy


Brief reference is made to specimens of *Phalacrocorax auritus* from Kodiak, Alaska. REG

Gulf of Alaska - Kodiak (Kodiak Is.)
Cormorants
Double-crested Cormorant
Taxonomy


This paper reports general observations of the Ancient Murrelet and other nocturnal species nesting on islands south of the Alaska Peninsula in 1894. Included are notes on behavior, nesting habitat, egg coloration and size, and the taking of birds and eggs for subsistence. "Large" flocks of Crested Auklets were noted at sea. CMH

North Pacific - Alaska Peninsula
Gulf of Alaska - Kodiak (Alaska Peninsula)
Storm-petrels, alcids
Fork-tailed Storm-Petrel, Leach's Storm-Petrel, Ancient Murrelet, Cassin's Auklet, Crested Auklet
Reproduction, habitat, behavior, subsistence, distribution

This note reports two specimens of *Pterodroma gularis* (= *P. inexpsectata*, Scaled Petrel) from Alaska, the first and second records of this species for North America. REG

North Pacific - (Alaska Peninsula)
Aleutians - (Kiska Is.)
Fulmars and shearwaters
Scaled Petrel
Distribution, specimen record


This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Aicds
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status, subsistence


This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Jaegers, gulls and terns
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status


This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Albatrosses, fulmars and shearwaters, storm-petrels, cormorants
Abundance, behavior, breeding biology, distribution, food, status, habitat, migration, plumage

392

The author reports an unusual observation of thousands of Ross' Gulls close to shore at Barrow in late fall 1928. Subsistence use is mentioned, and a description of the fresh, adult winter plumage is given. Ivory Gulls are noted as scarce that fall.

CMH

Arctic - Chukchi (Barrow)
Gulls and terns
Ivory Gull, Ross' Gull
Abundance, plumage, subsistence


This report provides information on the abundance, phenology, activity patterns, reproductive success, and feeding ecology of 11 species of seabirds nesting on Little Diomede Island in 1977. Data on the pelagic distribution of murres and auklets are also presented. Implications of petroleum development are discussed.

CMH

Arctic - Chukchi
Bering Sea - Little Diomede Is., Norton Sound
Cormorants, gulls and terns, alcids
Pelagic Cormorant, Glaucous Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Pigeon Guillemot, Parakeet Auklet, Crested Auklet, Least Auklet, Horned Puffin, Tufted Puffin
Reproduction, status, abundance, food, population dynamics, pollution, disturbance

This report presents information on the abundance, reproductive ecology, and foods of seabirds at several sites in Norton Sound in 1977. Concentrations of waterfowl in coastal habitats are mapped and discussed. Reproductive success of Whistling Swans is summarized. Census techniques, measurements of reproductive success, suggestions for future research, and possible effects of oil development are discussed. CMH

Bering Sea - Norton Sound
Seabirds
Abundance, reproduction, food, techniques, research, pollution, disturbance


The juvenile plumages of certain Arctic gulls are discussed. Reference is made to specimens of *Larus hyperboreus* from St. Michael, Alaska. REG

Bering Sea - Yukon Delta (St. Michael)
Gulls and terns
Glaucous Gull
Plumage, specimen record

53. BISHOP, L.B. 1927. The status of the Point Barrow Gull. Condor 29:204-205

The taxonomy of the Glaucous Gull is discussed, and the Point Barrow population is recognized as a distinct race, *Larus hyperboreus barrovianus*. Measurements are presented. NMH

Alaska
Gulls and terns
Glaucous Gull, Iceland Gull
Taxonomy, anatomy

This paper reports on aspects of phenology, nesting success, and feeding ecology of Arctic Terns on Cooper Island. The melt and movement of ice and the food associated with it are discussed as factors influencing breeding phenology and migration. MRP

Arctic - Beaufort (Cooper Is.)
Gulls and terns
Arctic Tern
Breeding biology, food


This paper reports on the fall migration of Arctic Terns past Cooper Island in 1976. The timing and intensity of migration are discussed in relation to the availability of patchily concentrated food items and sea-ice conditions in inshore waters. MRP

Arctic - Beaufort (Cooper Is.)
Gulls and terns
Arctic Tern
Migration, food


The breeding biology of Fork-tailed Storm-Petrels was studied during 1976 on the Barren Islands. The influence of storms on nesting success is discussed. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Breeding biology

This paper reports on temperatures of eggs and burrows of Fork-tailed Storm-Petrels. The possible effects of extremely low temperatures and of egg neglect on the length of the incubation period are discussed. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Physiology, breeding biology


This paper describes the incidence of egg and chick neglect in the Fork-tailed Storm-Petrel, and discusses the adaptive significance of the ability of embryos and chicks to survive temporary abandonment. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Physiology, breeding biology


This paper reports the incidence of egg neglect in the Fork-tailed Storm-Petrel, and discusses the adaptive significance and costs of egg neglect in Procellariiform birds. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Physiology, breeding biology

This paper presents information on the breeding biology of Fork-tailed Storm-Petrels, and discusses their reproductive strategy. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Breeding biology, growth


Reported are two sightings of Short-tailed Albatross near Attu Island. REG

Aleutians - (Attu Is.)
Albatrosses
Short-tailed Albatross
Distribution


This compilation of seabird observations by bird watchers of the Royal Navy includes several sightings in Alaska waters. NMH

Aleutians
North Pacific
Fulmars and shearwaters, gulls and terns
Short-tailed Shearwater, Ivory Gull
Distribution


"White-crested Cormorant described. Type locality: Kodiak Island." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Cormorants
Double-crested Cormorant
Specimen record, taxonomy

The development of the thermoregulatory capabilities of one kittiwake chick is reported. MRP

Bering Sea - Pribilof Is.
Gulls and terns
Black-legged Kittiwake
Physiology


The author reports the collection of two Dovekies on Little Diomede Island in 1965 and postulates the existence of a small breeding population there. CMH

Bering Sea - Little Diomede Is.
Alcids
Dovekie
Distribution, status


This paper describes in general the physical and demographic characteristics, fish and wildlife resources, and anticipated developments of the region, and outlines conflicts which are likely to arise. Recommendations are presented to mitigate environmental disturbance. CMH

Arctic
Seabirds
Management, disturbance, pollution, research

This paper describes in detail the breeding behavior of the Sabine's Gull, relates it to the species' ecology, and compares it with that of other gulls to clarify taxonomic affinities. CMH

Bering Sea - Yukon Delta (Hooper Bay)
Gulls and terns
Sabine's Gull
Behavior, plumage, anatomy, habitat


This paper describes anti-predator strategies of Aleutian Terns in monospecific and mixed species colonies. MRP

Bering Sea - Norton Sound (Safety Lagoon)
Gulf of Alaska - Copper River (Copper R. Delta)
Gulls and terns
Arctic Tern, Aleutian Tern
Behavior, breeding biology, predation


This paper describes differences in nesting habitat, nesting chronology and success, and growth rates of chicks. Relationships among the feeding ecology, growth rates, and nesting success are discussed. MRP

Gulf of Alaska - Kodiak (Semidi Is.)
Alcids
Rhinoceros Auklet, Horned Puffin, Tufted Puffin
Breeding biology, growth, food

This note describes new breeding colonies of Red-legged Kittiwakes on Buldir Island and Bogoslof Island. MRP

Aleutians - (Buldir Is., Bogoslof Is.)

Gulls and terns

Black-legged Kittiwake, Red-legged Kittiwake

Abundance, distribution


This paper reviews historical information and presents recent data on the colonization of the island by seabirds. MRP

Aleutians - (Bogoslof Is.)

Storm-petrels, gulls and terns, alcids

Distribution, status


This note documents mortality of chicks and adults caused by an unusually severe summer storm. CMH

Aleutians - (Buldir Is.)

Gulls and terns

Black-legged Kittiwake, Red-legged Kittiwake

Mortality

73. CANTWELL, G.G. 1898. A June day on Egg Island. Outing 5:241-244.

This semi-popular article is a narrative of a short expedition to seabird colonies on several islands in southeastern Alaska. The author includes descriptions of the birds, their burrows, and his subsistence use of their eggs. MRP

Gulf of Alaska - Southeastern

Storm-petrels, gulls and terns, alcids

Public interest

An egg procured from a specimen of the Marbled Murrelet is described. NMH

Gulf of Alaska - Southeastern (Long Is.)
Alcids
Marbled Murrelet
Distribution, specimen record


This provides a "description of species noted on a bird rookery 200 miles west of Fort Wrangell." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Southeastern (Wrangell)
Seabirds
Distribution


This report "records in discussion of food of foxes the occurrence of vast numbers of 'Sea Quail' (Simorhynchus cristatellus)." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Pribilof Is. (St. George Is.)
Alcids
Crested Auklet
Abundance, predation


This paper reviews the commercial, subsistence, recreational, scientific, and educational values of marine birds. The need for managers to consider all of the uses of marine birds is stressed. MRP

Alaska
Seabirds
Management, subsistence

Mention is made of a Black-footed Albatross banded at Midway and recovered near Cape Omaney, Alaska. CMH

Gulf of Alaska - Southeastern (Cape Omaney)
Albatrosses
Black-footed Albatross
Distribution, migration


This work "contains a number of pertinent references to Alaskan matters." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Gulls and terns
Distribution, migration


This paper provides information on the foods of 47 species of birds, including six species collected in Alaska. CMH

Alaska
Albatrosses, fulmars and shearwaters, alcids
Black-footed Albatross, Short-tailed Shearwater, Whiskered Auklet
Food


This work "contains (pp. 696-698) a discussion on the status of the Aleutian Tern." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Gulls and terns
Aleutian Tern
Status

This describes the techniques used to estimate the numbers of seabirds nesting on ledges and in crevices of cliffs on the Pribilof Islands. MRP

Bering Sea - Pribilof Is.
Seabirds
Techniques


This paper presents information on the pelagic distribution, breeding biology, molt, and taxonomy of storm-petrels. MRP

Aleutians
North Pacific
Storm-petrels
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Distribution, breeding biology, plumage, taxonomy


Not reviewed.

Alcids
Tufted Puffin


This reports on the occurrence and variation of plastic particles found in stomachs of 1,968 individuals comprising 37 species of marine birds. The incidence of plastic is examined in relation to the feeding habits of each species, and trends noted from 1969 to 1977 are discussed. MRP

Alaska
Seabirds
Pollution, food

This note reports a major spring movement of jaegers north through the Brooks Range in May 1972, and discusses the inconsistency in migratory patterns of this group. MRP

Arctic - Beaufort (Canning R.)
Jaegers
Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger
Migration


This report provides information on the incidental catch of seabirds in drift nets set to catch salmon in the Bering Sea and North Pacific Ocean. Estimates of mortality are presented and ways to reduce mortality are discussed. MRP

North Pacific
Bering Sea
Fulmars and shearwaters, storm-petrels, alcids
Northern Fulmar, Sooty Shearwater, Short-tailed Shearwater, Fork-tailed Storm-Petrel, Thick-billed Murre, Ancient Murrelet, Horned Puffin, Tufted Puffin
Fishing, mortality, research


This reports on gillnet mortality of seabirds on the high seas. MRP

North Pacific
Bering Sea
Fulmars and shearwaters, storm-petrels, alcids
Northern Fulmar, Sooty Shearwater, Short-tailed Shearwater, Fork-tailed Storm-Petrel, Thick-billed Murre, Ancient Murrelet, Horned Puffin, Tufted Puffin
Mortality, management, fishing

This update presents further information on gillnet mortality of seabirds in the Bering Sea. Possible changes in mortality in the future due to a reduction in fishing effort are discussed. MRP

Bering Sea
Fulmars and shearwaters, storm-petrels, alcids
Northern Fulmar, Sooty Shearwater, Short-tailed Shearwater, Fork-tailed Storm-Petrel, Thick-billed Murre, Ancient Murrelet, Horned Puffin, Tufted Puffin
Mortality, fishing, management


This is a report of a short-term study of seabirds on the Forrester Island National Wildlife Refuge in 1977. Emphasis was on establishing permanent study plots, and determining breeding densities for comparison in other years. MRP

Gulf of Alaska - Southeastern (Forrester Island NWR)
Fulmars and shearwaters, storm-petrels, alcids
Northern Fulmar, Short-tailed Shearwater, Fork-tailed Storm-Petrel, Leach's Storm-Petrel, Common Murre, Cassin's Auklet, Rhinoceros Auklet
Abundance, habitat


This report presents information on the abundance, distribution, and reproductive success of seabirds nesting on Forrester and Petrel Islands. An annotated list of 98 species of birds is included. MRP

Gulf of Alaska - Southeastern (Forrester Is. NWR)
Fulmars and shearwaters, storm-petrels, cormorants, gulls and terns, alcids
Annotated list, abundance, habitat, breeding biology, predation, food, growth

This volume contains natural history accounts of all species of Phalacrocoracidae occurring in the Soviet Union. Some information on species occurring in Alaska is included. MRP

Alaska
Cormorants
Abundance, distribution, behavior, breeding biology, food, habitat, migration, status, taxonomy, plumage


This volume contains natural history accounts of all species of cranes, alcids, loons, grebes, tubenoses, and herons occurring in the Soviet Union. Some information on species also occurring in Alaska is included. MRP

Alaska
Albatrosses, fulmars and shearwaters, storm-petrels, alcids
Abundance, distribution, behavior, breeding biology, food, habitat, migration, status, taxonomy, plumage


The author presents a summary of historical records of this species and discusses his observations of the species near Barrow in late September 1975. REG

Arctic - Chukchi (Barrow)
Bering Sea
Gulls and terns
Ross' Gull
Status

406

This paper provides a description of the plumage of adult and immature Ross' Gulls at Barrow in autumn 1975, with notes on their flight, feeding behavior, and molt. Feeding associations with Red Phalaropes and Sabine's Gulls are mentioned. CMH

Arctic - Chukchi (Barrow)
Gulls and terns
Ross' Gull, Sabine's Gull
Plumage, behavior, food


This paper compares the reproductive success of cormorants nesting alone with the success of those nesting in kittiwake colonies. Factors possibly responsible for discrepancies are discussed. MRP

Bering Sea - Bristol Bay (Cape Peirce)
Aleutian Islands - (Buldir Is.)
Cormorants, gulls and terns
Pelagic Cormorant, Red-faced Cormorant, Black-legged Kittiwake
Habitat, reproduction


This report identifies the locations of colonies and reports the number of seabirds breeding in the area. Notes on cormorants, shearwaters, eiders, oystercatchers, murres, puffins, guillemots, murrelets, auklets, kittiwakes, gulls, and terns are included. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Abundance, distribution, breeding biology, annotated list

407

This report presents an annotated list of the 42 species of marine birds observed in Chiniak Bay during the winter of 1976-1977. Information on food habits is presented for a few species. Methods for ageing Marbled Murrelets in winter are suggested. CMH

Gulf of Alaska - Kodiak (Chiniak Bay)
Seabirds
Annotated list, abundance, food, techniques, plumage


The authors describe the landing of at least 6,000 Crested Auklets aboard a fishing vessel between Raspberry Island and Kodiak Island on the evening of January 16, 1977. Measurements of birds are presented. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Alcids
Crested Auklet
Mortality, behavior, anatomy


The authors present data from small boat censuses, and discuss the advantages and disadvantages of censusing by this method. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Fulmars and shearwaters, cormorants, jaegers, gulls and terns, alcids
Abundance, techniques

408

This thesis describes the distribution of birds and mammals observed from a vessel in the eastern Chukchi Sea between September 22 and October 17, 1970. Species accounts are presented; the relation of the ice edge to the distribution of birds and their foods is discussed. MRP

Arctic - Chukchi
Seabirds
Distribution, abundance, food, migration


This paper reports observations of seabirds near the pack ice edge in the Beaufort, Chukchi, and Bering Seas. Concentrations of seabirds were correlated with plankton blooms in and under the ice. MRP

Arctic - Beaufort, Chukchi
Bering Sea
Gulls and terns, alcids
Distribution, food


This initial report includes a preliminary delineation of coastal bird habitat between Cape Lisburne and Demarcation Point, based on physiographic characteristics. Qualitative observations on the densities of seabirds in the Chukchi Sea are presented. The breeding success of Arctic Terns and Black Guillemots on Cooper Island is discussed in relation to food supply. Appended is a paper discussing the pelagic feeding habits of Ivory and Ross' Gulls. CMH

Arctic - Chukchi, Beaufort
Seabirds
Ivory Gull, Ross' Gull, Arctic Tern, Black Guillemot
Habitat, reproduction, food

Data on the diets of Ross' and Ivory Gulls are presented from analysis of stomach contents. The importance of under-ice fauna as food is discussed. NMH

Arctic - Chukchi
Gulls and terns
Ivory Gull, Ross' Gull
Food, habitat


This report presents preliminary results of a study of the distribution, abundance, and feeding ecology of birds associated with pack ice in the Bering, Chukchi, and Beaufort Seas. Information on distribution and abundance, obtained from shipboard cruises, is discussed. Potential impacts from oil spills are assessed. CMH

Arctic - Chukchi, Beaufort
Bering Sea
Fulmars and shearwaters, storm-petrels, jaegers, gulls and terns, alcids
Abundance, distribution, food, pollution


This report maps the distribution and abundance of each species of bird observed during 11 cruises in 1977 in the Bering, Chukchi, and Beaufort Seas. Stomach contents of Black-legged Kittiwakes and Common and Thick-billed Murres are tabulated. An appended report summarizes information on seasonal habitat use, reproductive phenology and success, and foods of birds on Cooper Island from 1975 to 1977. Effects of human disturbance are also discussed. CMH

Arctic - Chukchi, Beaufort
Bering Sea
Seabirds
Distribution, abundance, food, habitat, disturbance

This paper discusses the relationship of sea ice to seabirds. The amount of surface area available for feeding and roosting, the reduction of prey abundance due to ice scour, the decrease in productivity of water covered by ice, and the spring plankton bloom are addressed. MRP

Arctic - Beaufort, Chukchi
Bering Sea
Fulmars and shearwaters, storm-petrels, jaegers, gulls and terns, alcids
Distribution, habitat, food


This paper examines factors influencing the population dynamics of Black Guillemots on Cooper Island. MRP

Arctic - Beaufort (Cooper Is.)
Alcids
Black Guillemot
Breeding biology, population dynamics


This report presents data from two studies. First, pelagic distribution and abundance are mapped for each species observed during surveys of the Beaufort, Chukchi, and Bering Seas. Densities are analyzed in relation to distance from land. In the second study, ground surveys were conducted at 12 coastal sites to determine seasonal use of habitats by birds. Tables indicate relative abundance in each habitat for all species recorded. Results of aerial surveys provide linear densities of birds along the coast. Age ratios of Glaucous Gulls are discussed. CMH

Arctic
Bering Sea
Seabirds
Annotated list, migration, techniques, abundance, age and sex composition

This note presents observations of a Pomarine Jaeger killing and eating an adult Black-legged Kittiwake in the Bering Sea. MRP

Bering Sea
Jaegers, gulls and terns
Pomarine Jaeger, Black-legged Kittiwake
Food, predation


This paper describes the nesting distribution, nest sites, nesting chronology, and production of Black Guillemots. Factors influencing their population dynamics are discussed. MRP

Arctic
Alcids
Black Guillemot
Habitat, population dynamics, reproduction


A correction is made after an analysis of the literature; the Rhinoceros Auklet has not been observed nesting near Metlakahtla, Alaska, but instead near Metlakatla, British Columbia. NMH

Gulf of Alaska - Southeastern (Annette Is.)
Alcids
Rhinoceros Auklet
Distribution


The distribution of breeding seabirds in Norton Sound and the northern Bering Sea is discussed. The physical characteristics of the breeding sites and the two water masses are examined to explain differences in bird distribution. A possible technique for measuring breeding success of kittiwakes is presented. MRP

Bering Sea - Norton Sound
Gulls and terns, alcids
Black-legged Kittiwake, Common Murre, Thick-billed Murre
Distribution, techniques, habitat

This report presents the initial results of a study of the breeding and feeding ecology of the seabirds of the southern Seward Peninsula. Included are results of a census of colonies along the coast. Annotated accounts of 13 species present varying amounts of information on their distribution, reproductive ecology, and foods. CMH

Bering Sea - Norton Sound (Seward Peninsula)
Cormorants, gulls and terns, alcids
Breeding biology, food, distribution, abundance, pollution


The geography, topography, climate, high productivity, and avifauna of the Bering Sea are discussed descriptively. NMH

Bering Sea
Seabirds
Public interest


This paper summarizes results of a workshop held at the Pacific Seabird Group Annual Meeting, January 19-21, 1978. Nesting chronology, clutch size, reproductive success, and food habits are compared for different regions of Alaska. MRP

Alaska
Gulls and terns
Black-legged Kittiwake
Breeding biology, food, population dynamics

413

This paper reports on the phenology, reproductive success, food, and postulated causes of reproductive failure of kittiwakes in the northeastern Bering Sea. MRP

Arctic - Kotzebue Sound (Cape Lisburne, Cape Thompson)
Bering Sea - Norton Sound, St. Lawrence Is., Little Diomede Is.
Gulls and terns
Black-legged Kittiwake
Breeding biology, food


This paper discusses human activities and natural processes that have caused changes in numbers and the distribution of seabirds, and presents a short discussion of theoretical models. Several goals for improving our understanding of the population dynamics and biology of marine birds are identified. MRP

Alaska
Seabirds
Population dynamics, research, management


Population estimates are presented for 11 species of seabirds nesting on King Island in 1976. Information on phenology, reproductive success, and food habits is provided for some. Distribution of waterfowl and seabirds at sea is discussed briefly. CMH

Bering Sea - Norton Sound (King Is.)
Cormorants, gulls and terns, alcids
Distribution, migration, habitat, breeding biology

This paper comprehensively reviews information on the life history strategies and annual cycles of northern seabirds, particularly to determine the periods when they are most vulnerable to environmental stress. MRP

Alaska
Seabirds
Physiology, research


The author argues for species recognition of Kumlien's Gull and Nelson's Gull, both now considered conspecific with Glaucous Gull. He also discusses the Glaucous-winged Gull for comparison. REG

Alaska
Bering Sea - Yukon Delta (St. Michael)
Gulls and terns
Glaucous Gull, Glaucous-winged Gull
Plumage, specimen record, taxonomy


On the basis of meristics and plumage characteristics, the author argues for discarding the proposed barrovianus as a race of the Glaucous Gull. CMH

Arctic
Gulls and terns
Glaucous Gull
Taxonomy, plumage, anatomy

This article describes the treasured resources of the Pribilof Islands. Of particular interest is a description of the spectacular seabird colony then extant on Walrus Island. CMH

Bering Sea - Pribilof Is.
Seabirds
Public interest, status, subsistence


Type A influenza viruses were recovered from 4 of 17 species of birds examined from St. Paul Island and Pt. Barrow. MRP

Arctic - Chukchi (Barrow)
Bering Sea - Pribilof Is. (St. Paul Is.)
Seabirds
Disease and parasites


This note describes the construction and use of a noose device for catching individual seabirds at colonies. REG

Alaska
Seabirds
Techniques


This note describes two Parasitic Jaegers striking and killing an adult male Willow Ptarmigan. MRP

Bering Sea - Yukon Delta (Kashunuk R.)
Jaegers
Parasitic Jaeger
Food, predation

This is a classic work on gulls and includes much information pertinent to Alaska. Under a section on synonomy the author discusses one Alaska form, *Larus nelsoni*, which he considers to be a hybrid form. REG

Alaska
Gulls and terns
Taxonomy, plumage


Data are presented on the species composition and abundance of marine birds in Prince William Sound, Alaska. Shoreline and open water habitats were systematically censused from a fishing boat during the March-April and July-August periods of both 1972 and 1973. Densities and population estimates are provided for the major species in the sound. Accuracy of the survey and potential impacts to avian populations from oil development are discussed. CMH

Gulf of Alaska - Prince William Sound
Seabirds
Abundance, techniques, pollution


The nesting colonies of alcids and kittiwakes in the Aleutian Islands are described in poetic prose. The subsistence use of seabirds by Aleuts prior to World War II is discussed. NMH

Aleutians
Cormorants, gulls and terns, alcids
Red-faced Cormorant, Glaucous-winged Gull, Black-legged Kittiwake, Red-legged Kittiwake, Common Murre, Parakeet Auklet, Crested Auklet, Least Auklet, Tufted Puffin
Public interest, subsistence

This paper reports on the foods brought to chicks and the foraging patterns of adult Pigeon Guillemots at Naked Island in 1978 and 1979. MRP

Gulf of Alaska - Prince William Sound (Naked Is.)

Alcids
Pigeon Guillemot
Food


Two Leach's Storm-Petrels were seen on July 20, 1974, southeast of Hagemeister Island, approximately 400 km north of previous observations in Alaska. REG

Bering Sea - Bristol Bay (Hagemeister Is.)
Storm-petrels
Leach's Storm-Petrel
Distribution


After examining a small series of skins, including some from Alaska waters, the author proposes two new species of Pacific coast Oceanodroma. Both are currently considered forms of O. leucorhoa. REG

Aleutians
Gulf of Alaska
North Pacific
Storm-petrels
Leach's Storm-Petrel
Taxonomy, distribution, specimen record

Using band recoveries and specimen and sight records, the authors describe the distribution of this species. REG

- Gulf of Alaska
- Aleutians
- North Pacific
- Albatrosses
- Laysan Albatross
- Distribution


In Chapter 2 of this comprehensive book, the author summarizes all information available on the Pacific Northern Fulmar. Included is information on the location of all known breeding colonies, reproductive chronology, pelagic distribution, and the cline in color phases. CMH

- Alaska
- Fulmars and shearwaters
- Northern Fulmar
- Distribution, abundance, reproduction, plumage


This short note describes predation by Arctic Terns on young salmon. It mentions shooting of adult terns and destruction of their eggs by fishermen, and briefly discusses abundance and habitat use. CMH

- Bering Sea - Bristol Bay
- Gulls and tern
- Arctic Tern
- Food, habitat, mortality

Movements of birds along the Arctic Coast were studied mainly through the use of six DEW radars. King and Common Eiders are the major species addressed, but information on other water-related birds is included. CMH

Arctic - Beaufort (Lonely, Oliktok, Barter Is.), Chukchi (Pt. Lay, Wainwright, Barrow)
Jaegers, gulls and terns
Pomarine Jaeger, Parasitic Jaeger, Glaucous Gull
Migration


The author proposes further monitoring of bird migration along coastal Alaska. Factors limiting the use of radar for such studies are briefly reviewed. MRP

Alaska
Seabirds
Techniques, research


This note describes the collection of an incubating female and of an egg from a separate incubating bird near Wales in 1934 and 1935, respectively. REG

Bering Sea - Norton Sound (Wales)
Alcids
Kittlitz's Murrelet
Distribution, specimen record

Aerial and shipboard surveys were conducted over coastal and offshore waters of the Kodiak Island archipelago. Annotated accounts are presented for the 58 species of birds observed during the study, which spanned from November 1979 through March 1980. Patterns of distribution are discussed. Data for each species are presented in detailed tables and maps. CMH

Gulf of Alaska - Kodiak
Seabirds
Annotated list, distribution, abundance, habitat


This report describes the numbers and distribution of the ten species of birds sighted along a 1,340 statute mile cruise track from August 3 to 15, 1969. Their distribution and abundance are mapped and correlated with water depth, distance from land, and ice cover. REG

Arctic - Beaufort
Jaegers, gulls and terns, alcids
Abundance, distribution, habitat


Reported are two specimens of Dotterel and one of a Whiskered Auklet in spring 1931. They constitute the first specimens of these species from St. Lawrence Island. REG

Bering Sea - St. Lawrence Is.
Alcids
Whiskered Auklet
Specimen record, distribution

A humerus of this species (= Great Cormorant, Phalacrocorax carbo) was identified from an "Eskimo midden" on Kodiak. The author also mentions a sight record, probably of this species, from the Commander Islands. REG

Gulf of Alaska - Kodiak (Kodiak Is.)
Cormorants
Great Cormorant
Specimen record, distribution, archaeology


This note provides information on specimens collected at Goodnews Bay by D. B. Bull in 1933. MRP

Bering Sea - Yukon Delta (Goodnews Bay)
Gulls and terns
Aleutian Tern
Annotated list, distribution, specimen record


This note records the collection of a Mongolian Plover, Surfbird, and Kittlitz's Murrelet at Goodnews Bay in 1933. REG

Bering Sea - Yukon Delta (Goodnews Bay)
Alcids
Kittlitz's Murrelet
Distribution, specimen record


The author mentions single specimens of Glaucous, Slaty-backed, and Herring Gull collected from the Aleutians by F. L. Beals between 1940 and 1942. REG

Aleutians - (Atka Is., Sanak Is., Unalaska Is.)
Gulls and terns
Glaucous Gull, Slaty-backed Gull, Herring Gull
Specimen record, distribution

The author reports the occurrence of a Crested Auklet and of a Fork-tailed Storm-Petrel far inland, and the weather conditions associated with each incident. He also provides observations on behavior of several species of water birds during a storm at St. Lawrence Island, and briefly discusses possible ties between such behavior and anomalous sightings. CMH

Bering Sea - St. Lawrence Is.
Gulf of Alaska - Cook Inlet (Curry Station)
Interior - Koyukuk (Nulato)
Fork-tailed Storm-Petrel, Crested Auklet
Distribution, behavior


This note reports a Fork-tailed Storm-Petrel feeding on the remains of a gray whale beached at Nelson Lagoon. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)
Storm-petrels
Fork-tailed Storm-Petrel
Food


This paper describes nesting chronology, habitat, and success of Tufted Puffins breeding on small sand islands subject to tidal inundation. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)
Alcids
Tufted Puffin
Reproduction, habitat

This paper summarizes the most recent data on the breeding distribution and abundance of Aleutian Terns in North America. MRP

Alaska
Gulls and terns
Aleutian Tern
Distribution, abundance


This report summarizes published and unpublished information on spring and fall migration routes and staging areas. The species addressed are those thought to be highly vulnerable to oil contamination in Alaska marine waters. REG

Alaska
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Sooty Shearwater, Short-tailed Shearwater, Pelagic Cormorant, Red-faced Cormorant, Black-legged Kittiwake, Common Murre, Tufted Puffin
Migration, habitat, pollution


The distribution and abundance of waterfowl and shorebirds along the northcentral Alaska Peninsula are reported, with maps showing critical feeding and roosting areas. Information on the reproductive success of Common Eiders and Glaucous-winged Gulls is also included. Appended are three papers presented to the Pacific Seabird group in 1977, including: "Unusual nest site selection by Tufted Puffins." CMH

Bering Sea - Bristol Bay (Nelson Lagoon, Herendeen Bay)
Gulls and terns, alcids
Glaucous-winged Gull, Tufted Puffin
Reproduction, abundance, habitat, growth

This note describes the nesting chronology, habitat, and success of Tufted Puffins breeding on small sand islands subject to tidal inundation. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)

Alcids
Tufted Puffin
Habitat, reproduction


This paper includes a description of Larus brachyrhynchus (= L. canus brachyrhynchus, Mew Gull) from Alaska. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Gulls and terns
Mew Gull
Specimen record


This report summarizes seabird observations along 158°W longitude from the Alaska Peninsula to Oahu between October 23 and November 7, 1976. Three general distribution patterns are recognized and discussed. MRP

Gulf of Alaska
North Pacific
Seabirds
Distribution

This reports a preliminary analysis of observations of birds during 43 shipboard cruises in Alaska waters in 1976 and 1977. Relative abundance is summarized for each species by region and month. Distribution and abundance are mapped by month for all species combined. Seasonal mean densities are compared for offshore regions. CMH

Alaska
Seabirds
Distribution, abundance


This entertaining note presents observations of the behavior, plumage, and anatomy of Marbled Murrelets. Use of wings for swimming underwater is described. MRP

Gulf of Alaska - Southeastern (Sitka Bay)
Alcids
Marbled Murrelet
Behavior, plumage, anatomy


In this note, the author describes the storm-petrel colony on St. Lazaria Island during the breeding season. Dimensions of eggs and a description of the nocturnal behavior of adults are also presented. MRP

Gulf of Alaska - Southeastern (St. Lazaria Is.)
Storm-petrels
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Specimen record, behavior

Following examination of a series of skins of Oceanodroma furcata from the northern and southern limits of its range, the authors propose that two forms be recognized: O. f. furcata from the Bering Sea, and O. f. plumbea occurring from the Alexander Archipelago in southeastern Alaska, south to Humboldt County, California. REG

Aleutians
Bering Sea
Gulf of Alaska
Storm-petrels
Fork-tailed Storm-Petrel
Taxonomy, distribution


Not reviewed.

Alaska
Seabirds
Distribution


This paper describes molt in shearwaters during the summers of 1975 to 1977, and discusses the adaptive significance of the timing of molt. MRP

Bering Sea
North Pacific
Fulmars and shearwaters
Sooty Shearwater, Short-tailed Shearwater
Plumage

The distribution of Sooty and Short-tailed Shearwaters in the Gulf of Alaska and Bristol Bay during summers 1975 and 1976 is described and discussed in relation to zones of productivity. MRP

Bering Sea - Bristol Bay
Gulf of Alaska
Fulmars and shearwaters
Sooty Shearwater, Short-tailed Shearwater
Abundance, distribution


This report presents observations of oil contamination in Salt Lagoon on St. Paul Island after the grounding of the F/V Ryuyo Maru No. 2 on November 8, 1979. The impact on the birds and other marine life is discussed. MRP

Bering Sea - Pribilof Is. (St. Paul Is.)
Gulls and terns, alcids
Glaucous-winged Gull, Common Murre, Thick-billed Murre, Crested Auklet
Pollution, checklist


This note reports on the collection of a Dovekie on Little Diomede Island in 1948. CMH

Bering - Little Diomede Is.
Alcids
Dovekie
Distribution, specimen record

This report analyzes results of aerial surveys over Alaska offshore waters between January and October 1976. Summaries of census data are presented by species, by month, and by oceanographic region in 34 tables. Monthly distribution and abundance data are mapped by species for the Beaufort, Chukchi, and Bering Seas in 171 figures. For the Gulf of Alaska, data are mapped by month for all species combined. Observations are briefly discussed. CMH

Alaska
Seabirds
Distribution, abundance


This paper discusses observations of marine birds associating with feeding gray whales, which were bringing benthic food items to the surface. The importance of this food source to birds is discussed. MRP

Arctic - Chukchi
Bering Sea
Fulmars and shearwaters, gulls and terns, alcids
Food, behavior


The author describes a community of at least nine species of marine birds suspected of being partially supported by an association with feeding gray whales in the Bering and Chukchi Seas. REG

Arctic - Chukchi
Bering Sea
Fulmars and shearwaters, gulls and terns, alcids
Food, behavior

This report presents results of the first year of a study on the population dynamics and breeding biology of the Northern Fulmar on the Semidi Islands. CMH

Gulf of Alaska - Kodiak (Semidi Is.)
Fulmars and shearwaters
Northern Fulmar
Breeding biology, abundance, habitat, growth


This report summarizes results of the second year of a study on the reproductive ecology and population dynamics of the Northern Fulmar. Abundance, phenology, and reproductive success are discussed for 12 other species of seabirds. Information on colony attendance and chick growth is presented for some. CMH

Gulf of Alaska - Kodiak (Semidi Is.)
Fulmars and shearwaters, cormorants, jaegers, gulls and terns, alcids
Reproduction, breeding biology, population dynamics, growth, abundance, plumage


This comprehensive thesis presents information on the breeding biology, ecology, and population dynamics of Northern Fulmars. MRP

Gulf of Alaska - Kodiak (Semidi Is.)
Fulmars and shearwaters
Northern Fulmar
Breeding biology, population dynamics, plumage, growth

This paper discusses the breeding chronology and productivity of an expanding colony of Black-legged Kittiwakes. Marked differences between subgroups in the population were observed, and possible explanations are discussed. MRP

Gulf of Alaska - Northern Gulf (Middleton Is.)
Gulls and terns
Black-legged Kittiwake
Reproduction, population dynamics


This report presents a brief synopsis of the results of studies conducted during summer 1977 at one site in the Bering Sea and at seven sites in the Gulf of Alaska. Information on breeding distribution, abundance, habitat, phenology, success, and feeding ecology is summarized for 16 species of marine birds. CMH

Gulf of Alaska
Bering Sea
Seabirds
Distribution, abundance, reproduction, food, habitat

Aspects of reproductive ecology and food habits are discussed for seven species. Recent changes in populations of several species are discussed in relation to habitat use, breeding phenology, and reproductive performance. Breeding phenology and food habits at Middleton Island are compared with those at other colonies in the Gulf of Alaska. CMH

Gulf of Alaska - Northern Gulf (Middleton Is.)
Cormorants, gulls and terns, alcids
Pelagic Cormorant, Glaucous-winged Gull, Black-legged Kittiwake,
Common Murre, Thick-billed Murre, Rhinoceros Auklet, Tufted Puffin
Reproduction, abundance, habitat, status, population dynamics,
food, growth


The author records the discovery of a colony of Rhinoceros Auklets in southeastern Alaska. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Southeastern
Alcids
Rhinoceros Auklet
Distribution


The author describes the type specimen of *Larus nelsoni*, now considered a hypothetical species (A.O.U. Checklist, 1935). CMH

Bering Sea - Norton Sound (St. Michael)
Gulls and terns
Taxonomy, plumage, specimen record

The author provides details of the occurrence of five species of gulls following a ship in southeastern Alaska. CMH

Gulf of Alaska - Southeastern
Gulls and terns
Glaucous-winged Gull, Western Gull, Herring Gull, California Gull, Ring-billed Gull
Distribution


The author questions the identification of terns (S. aleutica) reported nesting in southeastern Alaska. Several distinguishing characteristics are presented for comparing S. aleutica and S. paradisaea. REG

Gulf of Alaska - Copper River (Yakutat)
Gulls and terns
Arctic Tern, Aleutian Tern
Distribution, behavior, plumage


This note provides the first breeding record of the Pacific Common Eider in Glacier Bay. Several seabirds were also observed nesting there, including Horned and Tufted Puffins, Glaucous-winged Gulls, and Pigeon Guillemots. CMH

Gulf of Alaska - Southeastern (Glacier Bay)
Gulls and terns, alcids
Glaucous-winged Gull, Pigeon Guillemot, Horned Puffin, Tufted Puffin
Distribution

This report presents and discusses ledge attendance counts and flight counts of seabirds nesting on St. George Island in 1975. Census techniques are discussed in detail. CMH

Bering Sea - Pribilof Is. (St. George Is.)
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Northern Fulmar, Red-faced Cormorant, Black-legged Kittiwake, Red-legged Kittiwake, Common Murre, Thick-billed Murre, Parakeet Auklet, Crested Auklet, Least Auklet, Horned Puffin, Tufted Puffin
Abundance, techniques


This report provides population estimates for 11 species of seabirds nesting on the Pribilof Islands. Attendance patterns and other factors affecting census techniques are discussed. The estimates are based on a two-year effort. CMH

Bering Sea - Pribilof Is.
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Northern Fulmar, Red-faced Cormorant, Black-legged Kittiwake, Red-legged Kittiwake, Common Murre, Thick-billed Murre, Parakeet Auklet, Crested Auklet, Least Auklet, Horned Puffin, Tufted Puffin
Abundance, habitat, techniques


This report presents a preliminary analysis of the occurrence of helminth parasites in nine species of seabirds collected primarily near Ugaiushak Island. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Fulmars shearwaters, gulls and terns, alcids
Northern Fulmar, Glaucous-winged Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Pigeon Guillemot, Rhinoceros Auklet, Horned Puffin, Tufted Puffin
Disease and parasites

This thesis describes the helminth parasites from 436 birds collected from four locations in Alaska. MRP

Gulf of Alaska
North Pacific
Gulls and terns, alcids
Disease and parasites


This note reports the flushing of a Marbled Murrelet from its nest on an alpine ridge (Pyramid Peak) of Kodiak Island in 1962 and the subsequent collection of the egg. The nest and egg are described. Weight and measurements of the egg are provided. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Alcids
Marbled Murrelet
Distribution, specimen record, habitat


This report presents data on the use of coastal and marine habitats by birds in Port Valdez and Valdez Arm in summer and winter. Results of censuses conducted over various habitats are discussed. Information on reproductive phenology and success is presented for Glaucous-winged Gulls, Black-legged Kittiwakes, and Arctic Terns. Observations of waterfowl broods are provided and discussed. Recommendations are made for protecting critical habitats in the area from possible impacts of oil development. CMH

Gulf of Alaska - Prince William Sound (Port Valdez, Valdez Arm)
Gulls and terns
Glaucous-winged Gull, Black-legged Kittiwake, Arctic Tern
Reproduction, habitat, abundance, pollution, checklist

This note records the observation of a single Dovekie on St. George Island in July 1958. CMH

Bering Sea - Pribilof Is. (St. George Is.)
Alcids
Dovekie
Distribution


Not reviewed.

Gulf of Alaska - Copper River (Copper R. Delta)
Gulls and terns
Aleutian Tern
Breeding biology


This report summarizes results of aerial surveys, provides a description of habitat, and gives information on the production of waterfowl. Included are observations of other nesting species. MRP

Bering Sea - Yukon Delta (Nelson Is.)
Jaegers, gulls and terns
Long-tailed Jaeger, Glaucous Gull, Herring Gull, Sabine's Gull, Arctic Tern
Habitat, abundance, distribution, reproduction

This paper reports on visual and radar observations of spring migration near Wales during May and early June 1978. Murres, Black-legged Kittiwakes, Black Brant, Common Eiders, and Oldsquaw were the primary species observed. Factors affecting the timing of migration are discussed. MRP

Bering Sea - Norton Sound (Cape Prince of Wales)
Gulls and terns, alcids
Migration


A Kittlitz's Murrelet is among the specimens of birds referred to in this note. REG

Arctic - Chukchi (Barrow)
Alcids
Kittlitz's Murrelet
Specimen record, distribution


This report presents preliminary results of a study of 11 species of seabirds nesting on the Pribilof Islands. Included is information on reproductive ecology, foods, distribution of foraging seabirds around the islands, and a preliminary survey of Otter and Walrus Islands. Potential impacts from oil contamination are discussed. CMH

Bering Sea - Pribilof Is.
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Northern Fulmar, Red-faced Cormorant, Black-legged Kittiwake, Red-legged Kittiwake, Common Murre, Thick-billed Murre, Parakeet Auklet, Crested Auklet, Least Auklet, Horned Puffin, Tufted Puffin
Reproduction, growth, food, status, pollution, distribution, abundance

This report summarizes results of the second year of study on the reproductive and feeding ecology of seabirds nesting on the Pribilof Islands. Effects of helicopter disturbance and potential impacts from oil development are also discussed. CMH

Bering Sea - Pribilof Is.
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Northern Fulmar, Red-faced Cormorant, Black-legged Kittiwake, Red-legged Kittiwake, Common Murre, Thick-billed Murre, Parakeet Auklet, Crested Auklet, Least Auklet, Horned Puffin, Tufted Puffin
Reproduction, food, disturbance, abundance, growth, pollution


This article expresses concern for the future of the seabird colonies of the Pribilof Islands, and identifies a need for awareness of human impacts. MRP

Bering Sea - Pribilof Is.
Seabirds
Management, subsistence


This paper summarizes the data available on the distribution and breeding biology of seabirds in the region, and draws broad conclusions about the distribution of breeding species, colony size, and stability of productivity in these colonies. MRP

Bering Sea
Seabirds
Distribution, reproduction

438

This paper reports on a two-year study of kittiwakes on the Pribilof Islands. Nesting chronology, hatching success, and fledging success are compared for the two species. Causes of chick mortality are discussed. MRP

**Bering Sea - Pribilof Is.**

**Gulls and terns**

**Black-legged Kittiwake, Red-legged Kittiwake**

**Habitat, reproduction, mortality**


This report summarizes detailed information on the reproductive and feeding ecology of 11 species of seabirds studied from 1975 to 1977. Shearwaters, storm-petrels, Glaucous-winged Gulls, and Red Phalaropes are also mentioned. Potential impacts from oil development are discussed. CMH

**Bering Sea - Pribilof Is.**

**Seabirds**

**Reproduction, food, growth, disturbance, pollution, distribution, abundance**


This paper reports on geographic and annual differences in nesting chronology, hatching success, and productivity. MRP

**Bering Sea - Bristol Bay (Cape Peirce), Pribilof Is. (St. George Is., St. Paul Is.)**

**Gulls and terns**

**Black-legged Kittiwake**

**Reproduction**

This note describes nest building by Black-legged Kittiwakes on a snowbank on St. Paul Island. MRP

Bering Sea - Pribilof Is. (St. Paul Is.)
Gulls and terns
Black-legged Kittiwake
Habitat


The body temperatures of seven species of birds captured in Alaska and held in captivity at Anchorage were examined at various times of day. REG

Alaska
Gulls and terns
Glaucous Gull, Glaucous-winged Gull
Physiology


Included are annotated accounts of 12 species plus brief comments on their distribution and foraging in relation to the ice margin. REG

Bering Sea
Albatrosses, fulmars and shearwaters, gulls and terns, alcids
Annotated list, distribution, habitat


The authors discuss census techniques and results from a cruise in the northeastern Gulf of Alaska. Primary groups of species observed include loons, gulls, alcids, fulmars, storm-petrels, cormorants, and scoters. MRP

Gulf of Alaska
Fulmars and shearwaters, storm-petrels, cormorants, gulls and terns, alcids
Annotated list, abundance, distribution

This paper presents an annotated list of 76 species of birds observed during the Stoll-McCracken Expedition of the American Museum of Natural History to the Arctic Ocean. Observations were collected between May 4 and October 9, 1928. MRP

Gulf of Alaska
North Pacific
Arctic - Chukchi
Aleutians
Bering Sea - Bristol Bay, Norton Sound
Seabirds
Annotated list, distribution


Sight records of the Whiskered Auklet, Lesser Yellowlegs, Upland Sandpiper, and American Robin on St. Lawrence Island are noted. NMH

Bering Sea - St. Lawrence Is.
Alcids
Whiskered Auklet
Annotated list, distribution


This report addresses the migration, breeding, feeding, staging, and molting of birds at Simpson Lagoon in summer 1977. Tables summarize information on spring and fall migration for the 60 species of birds observed. Nesting densities and reproductive success are summarized for the 13 species breeding in the area. More detailed information on molt, staging, and feeding is presented for Oldsquaws, gulls, terns, and phalaropes. Possible effects of disturbance are briefly discussed. CMH

Arctic - Beaufort (Simpson Lagoon)
Gulls and terns
Glaucous Gull
Habitat, food, abundance, migration, disturbance

This report compares information gathered in 1977 and 1978 to assess the importance to birds of barrier island/lagoon systems. Timing of migration is summarized for 63 species, and nesting densities are presented. The majority of the report addresses habitat use by molting Oldsquaws, and premigratory staging of shorebirds, gulls, and terns. Results of feeding studies are presented for Oldsquaws, phalaropes, and Glaucous Gulls. CMH

Arctic - Beaufort (Simpson Lagoon)
Seabirds, gulls and terns
Glaucous Gull
Food, habitat, abundance, migration


This paper describes the growth and development of thermal regulation of Common and Thick-billed Murre chicks on St. Lawrence Island. The adaptations of adults and chicks to low ambient temperatures are discussed. MRP

Bering Sea - St. Lawrence Is.
Alcids
Common Murre, Thick-billed Murre
Physiology


The author discusses the timing of nesting and molt in relation to each other and to the compressed summer period in the Arctic. REG

Arctic - Kotzebue Sound (Cape Thompson)
Gulls and terns
Glaucous gull
Plumage

This paper discusses possible correlations among lipid levels, timing of migration, and migratory routes of five species of postbreeding Arctic birds, including the American Golden Plover, Western Sandpiper, and Arctic Tern. CMH

Arctic - Kotzebue Sound (Cape Thompson)
Gulls and terns
Arctic Tern
Migration, physiology


This paper reports recent observations of a remnant breeding population of Aleutian Canada Geese on Buldir Island. The island's topography, climate, habitat, and avian and mammalian populations are described. Increased hunting pressure and the introduction of blue foxes to the breeding grounds are assessed as reasons for the decline of the race. CMH

Aleutians - (Buldir Is.)
Storm-petrels, jaegers, gulls and terns, alcids
Parasitic Jaeger, Glaucous-winged Gull, Black-legged Kittiwake,
Thick-billed Murre, Least Auklet
Habitat, distribution


This paper reviews the information available on the effects of introduced animals on insular seabird populations. The need for research on the ecological consequences of animal introductions to islands is stressed. MRP

Alaska
Seabirds
Predation, research
Aspects of reproductive ecology are discussed for four species, particularly Black-legged Kittiwakes and Horned Puffins. Food, predation, disturbance and ectoparasites are assessed as factors influencing production. An annotated list summarizes observations of the 119 species recorded on the islands in 1970, 1971, and 1978. CMH

Gulf of Alaska - Cook Inlet (Tuxedni Wilderness)
Gulls and terns, alcids
Glaucous-winged Gull, Black-legged Kittiwake, Common Murre, Horned Puffin
Abundance, reproduction, food, growth, predation, disease and parasites, annotated list

During a two-year study of seabirds in the Tuxedni Wilderness, nesting distribution, abundance, and productivity were determined for several species. A simulation model was used to test the effects of known reproductive failures on the kittiwake population. REG

Gulf of Alaska - Cook Inlet (Chisik Is., Duck Is.)
Gulls and terns, alcids
Glaucous-winged Gull, Black-legged Kittiwake, Common Murre, Horned Puffin
Abundance, reproduction, food, growth, habitat, predation, disease and parasites, population dynamics

The author notes areas of concentrations of Black-legged Kittiwakes encountered during a winter cruise in the North Pacific and Bering Sea. Age segregation in distribution is noted, and a fall migration route is suggested. CMH

Gulf of Alaska
North Pacific
Bering Sea
Gulls and terns
Black-legged Kittiwake
Distribution, abundance, migration


The subject of fur seals eating birds is discussed and an instance of murre chicks swimming, unharmed, among a mass of seals is described. REG

Bering Sea - Pribilof Is. (St. Paul Is.)
Alcids
Common Murre
Behavior, predation


The author summarizes observations on the distribution and abundance of albatrosses encountered during shipboard cruises between 1947 and 1949. Some notes on behavior are presented. CMH

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Albatrosses
Short-tailed Albatross, Black-footed Albatross, Laysan Albatross
Distribution, behavior, abundance

This paper annotates observations of 34 species recorded between 1947 and 1954. Included are one new record for North America, 9 first records for the Pribilofs, and records of 12 other species rarely seen on the islands. More detailed information is presented on the status of populations of Glaucous-winged Gulls, Red-legged and Black-legged Kittiwakes, and Common Murres. Nesting chronology, abundance, and behavior are compared for the two kittiwakes. A few notes from the Aleutians are included. CMH

Bering Sea - Pribilof Is.
Aleutians
Fulmars and shearwaters, storm-petrels, gulls and terns, alcids
Annotated list, status, reproduction, behavior


The author discusses the unique seabird fauna of the North Pacific, and its vulnerability to oil contamination. He then describes the Pacific Seabird Group, recently formed to help coordinate a professional research effort. NMH

Alaska
Seabirds
Research, pollution, public interest


This paper evaluates the importance of habitats in Alaska to migratory birds, and identifies areas of the state where birds may be threatened by pollution and development. NMH

Alaska
Seabirds
Distribution, abundance, habitat, migration, pollution

Simple instructions and standard format are presented for taking observations at sea. A data bank is proposed. MRP

Alaska
Seabirds
Techniques


Simple instructions and standard format were developed for taking observations at sea. A data bank is proposed. MRP

Alaska
Seabirds
Techniques


This paper presents a method to indicate the relative vulnerability of a marine bird species to oil pollution and related impacts of oil development. Each of 176 species of birds using marine habitats in Washington, Alaska, and British Columbia is ranked on the basis of 20 factors that affect its survival. The needs for such a system as a management tool are discussed. MRP

Alaska
Seabirds
Management, pollution

This paper reviews the information available on seabird mortality incidental to longline and gillnet fishing, and discusses possible implications to the well-being of seabird populations. Possible impacts from the developing Atlantic capelin fishery are also discussed. MRP

Alaska
Seabirds
Fishing, mortality


This volume examines in detail the plumage, functional morphology, and radiation of the alcids, based mainly on studies of specimens at the Zoological Institute of the Academy of Sciences of the USSR. However, information on distribution, ecology, and behavior, much of which was gathered in Alaska, is also synthesized. CMH

Alaska
Alcids
Plumage, taxonomy, anatomy, distribution, migration, breeding biology, food, bibliography


This report presents preliminary results of a study on the seasonal feeding habits of marine birds near Kodiak Island. The aggregate percent volume of prey is presented for four species collected in winter and for seven collected in summer. Possible impacts of petroleum development on prey species are briefly discussed. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Fulmars and shearwaters, gulls and terns, alcids
Sooty Shearwater, Short-tailed Shearwater, Black-legged Kittiwake, Common Murre, Pigeon Guillemot, Marbled Murrelet, Tufted Puffin
Food, pollution

This paper summarizes observations of 47 species of birds recorded during a cruise in fall 1961 in the Bering Sea, North Pacific, and western Gulf of Alaska. The author discusses the importance of food, temperature, seasonal migration, and faunal affinities in determining the distribution of seabirds. CMH

Gulf of Alaska
North Pacific
Bering Sea
Seabirds
Distribution, habitat, migration, food, zoogeography


This paper presents an annotated list of the 44 species of birds observed during a summer cruise between Japan and the western Bering Sea and North Pacific. Population densities are estimated by the number of birds observed per hour, and bird distribution is correlated with air and water temperatures. Forty-one of the species observed are water-associated. CMH

North Pacific
Bering Sea
Seabirds
Annotated list, distribution, habitat, abundance


This note remarks upon environmental influences on migration in the Tubinares. The importance of currents as carriers of the birds' food supply is discussed, as is the role of wind in orientation. Major migration routes are mapped. NMH

North Pacific
Albatrosses, fulmars and shearwaters, storm-petrels
Migration, food

This paper analyzes the distribution of seabirds encountered on a cruise in summer 1954 between the western Bering Sea and Japan. Ocean currents, water and air temperatures, zoogeography, and food supplies are considered. Maps showing the distribution and abundance of each species observed are included. CMH

Aleutians
Bering Sea
Seabirds
Distribution, abundance, habitat, food, zoogeography


This article summarizes the provisions that differ from those in previous treaties and are significant to managing marine birds. Disturbance, subsistence use, and habitat protection are addressed. The full treaty is included. MRP

Alaska
Seabirds
Management


This paper provides an annotated list of the 112 species or subspecies collected and observed on a cruise in the North Pacific. The ship traveled from Vancouver, B.C., to Japan via the Alaska coast and Aleutians in spring, and returned via a more offshore route through the Bering Sea and North Pacific in late summer. Sixty of those species recorded are water-related forms. CMH

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Seabirds
Annotated list

This paper describes nesting habitats used by Tufted Puffins on Fish Island during 1976 and 1977, and compares them with those used by other alcids on the island. Habitat selection is discussed in relation to the presence of predators. MRP

Gulf of Alaska - Prince William Sound (Fish Is.)
Alcids
Pigeon Guillemot, Parakeet Auklet, Horned Puffin, Tufted Puffin
Habitat, reproduction


This thesis investigates the nesting habitat relationships of four species of alcids to determine if competition exists for nest sites on Fish Island. It examines in detail habitat characteristics, breeding chronology, seasonal and diurnal activity patterns, body size and flight capabilities, and interspecific behavioral interactions. A checklist giving the status of the 118 species of birds observed during summers 1976 and 1977 is appended. CMH

Gulf of Alaska - Prince William Sound (Fish Is.)
Alcids
Pigeon Guillemot, Parakeet Auklet, Horned Puffin, Tufted Puffin
Habitat, behavior, anatomy, reproduction, checklist


This article gives a brief overview of the importance of the Pacific Seabird Group in stimulating and supporting research on seabirds. MRP

Alaska
Seabirds
Public interest

451

This paper briefly reviews existing information on Alaska marine birds and describes the research conducted in 1975 and 1976 on each species. CMH

Alaska
Seabirds
Research


This report summarizes observations of marine birds during 21 cruises in Alaska offshore waters in 1975. Data are summarized by species, month, and oceanographic region in 165 tables. Monthly summaries of densities of all birds are depicted on 12 maps. CMH

Alaska
Seabirds
Abundance, distribution


This report summarizes census data obtained from 11 offshore surveys conducted in 1972, 1973, and 1975. Summaries are presented by species, 3-month interval, and oceanographic region in 23 tables. Quarterly summaries of total bird densities are presented on 4 maps. CMH

Alaska
Seabirds
Distribution, abundance

This report presents data from preliminary analyses of the contents of 83 stomachs of 14 species of seabirds. Frequency of occurrence of major prey items and ranges in weights of the contents are presented. CMH

Alaska
Albatrosses, fulmars and shearwaters, storm-petrels, gulls and terns, alcids
Food


This paper identifies and briefly summarizes results of six studies conducted in the Gulf of Alaska in 1978. CMH

Gulf of Alaska
Seabirds
Research, population dynamics, distribution, abundance, breeding biology, food


This paper discusses observations on the populations, breeding biology, and foods of 19 species of marine birds during summer 1976. A checklist presents the breeding status of the 54 species of birds observed. CMH

Gulf of Alaska - Kodiak (Semidi Is.)
Storm-petrels, cormorants, gulls and terns, alcids
Reproduction, food, abundance, checklist

This report includes a set of tables synthesizing information from other sources on the oceanic distribution of seabirds, their diets, and their body sizes. From this synthesis the author presents gross estimates of the annual consumption of foods by seabirds in Alaska waters south of Bering Strait. CMH

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Fulmars and shearwaters, storm-petrels, cormorants, gulls and terns, alcids
Abundance, distribution, food


Gulf of Alaska - Kodiak (Kodiak Is.)
Alcids
Pigeon Guillemot
Specimen record


"Reference is made to specimens of Pterodroma inexpectata, Oceanodroma leucorhoa, and O. furcata from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Fulmars and shearwaters, storm-petrels
Scaled Petrel, Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Specimen record

Not reviewed.

Bering Sea - Pribilof Is. (Walrus Is.)
Seabirds
Public interest


The author provides a list of specimens, mostly eggs, collected on Otter Island in early June 1884. REG

Bering Sea - Pribilof Is. (Otter Is.)
Gulls and terns, cormorants, alcids
Red-faced Cormorant, Black-legged Kittiwake, Red-legged Kittiwake, Common Murre, Parakeet Auklet, Crested Auklet, Horned Puffin, Tufted Puffin
Specimen record


This note describes two nesting attempts by this species near Barrow, and discusses the importance of man-made structures as suitable nesting sites. REG

Arctic - Chukchi (Barrow)
Alcids
Black Guillemot
Status, distribution, habitat


The dynamics of Pomarine Jaeger predation on lemmings is discussed. The author presents the nesting densities and success of jaegers in relation to the densities of lemmings for nine consecutive years. NMH

Arctic - Chukchi (Barrow)
Jaegers
Pomarine Jaeger
Food, reproduction

Not reviewed.

Arctic Jaegers
Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger
Breeding biology, population dynamics, food, predation, growth


This paper reports on food habits, breeding density, and breeding success of Pomarine Jaeger populations and relates these aspects of the jaeger cycle to the brown lemming population. REG

Arctic - Chukchi (Barrow, Wainwright, Cape Sabine) Jaegers
Pomarine Jaeger
Breeding biology, food, population dynamics


This monograph discusses the breeding ecology of the three species of jaeger nesting in northern Alaska. Factors limiting distribution of species and ecological adaptations are discussed. MRP

Arctic Jaegers
Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger
Breeding biology, food, population dynamics


Observations on the nesting of Fork-tailed and Leach's Storm-Petrels on St. Lazaria Island in 1896 are provided. REG

Gulf of Alaska - Southeastern (St. Lazaria Is.) Storm-petrels
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Breeding biology, habitat

The author notes that on St. Lazaria Island Fork-tailed Storm-Petrels may be found nesting alone or in burrows with Leach's Storm-Petrels depending on the habitat surveyed. CMH

Gulf of Alaska - Southeastern (St. Lazaria Is.)
Storm-petrels
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Habitat


Following an examination of specimens, the author suggests that Nearctic and Palearctic Long-tailed Jaegers can be separated into races by the amount of pigmentation. Sexual differences in measurements and pigmentation are also examined. NMH

Alaska
Jaegers
Long-tailed Jaeger
Taxonomy, plumage


This report summarizes a study of the breeding biology of seabirds on the Barren Islands from 1976 to 1979. The report discusses local distribution, abundance, and nesting requirements of breeding seabirds; productivity; types and quantities of food consumed by selected species; and the effect of future oil development on their status. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels, cormorants, gulls and terns, alcids
Abundance, distribution, breeding biology, predation, pollution, food

This report provides standardized techniques for censusing 42 species of colonial seabirds along the Pacific Coast of North America. CMH

Alaska
Seabirds
Techniques


This paper reviews current breeding seabird population estimates, nest-site preferences, and population changes for southeastern Alaska, British Columbia, and Washington. Important research needs are identified. MRP

Gulf of Alaska - Southeastern
Seabirds
Status, abundance, distribution, habitat, research


This paper describes nesting, loafing, and staging habitats; displays; and time and energy budgets of Parakeet Auklets in the Barren Islands. Habitat use during various stages of the breeding cycle is described. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Alcids
Parakeet Auklet
Habitat, behavior

The authors discuss basic behavior patterns of this species and relate them to the reproductive cycle and components of the nesting environment. The study was conducted on East Amatuli Island in 1976. REG

Gulf of Alaska - Kodiak (Barren Is.)
Alcids
Parakeet Auklet
Habitat, behavior


This paper discusses the potential for disastrous and irrecoverable losses to northern marine bird populations and identifies research needs. MRP

Alaska
Seabirds
Pollution, research


During a study of nesting and migrating birds on the eastern Copper River Delta in 1978 and 1979, the authors determined habitat preferences, distribution, abundance, and phenology for the avifauna of the area. Critical habitats are identified and recommendations made for future surveillance and management of populations. Detailed information is presented for Dusky Canada Geese, Sandhill Cranes, and shorebirds. REG

Gulf of Alaska - Copper River (eastern Copper R. Delta)
Cormorants, jaegers, gulls and terns, alcids
Double-crested Cormorant, Parasitic Jaeger, Glaucous-winged Gull, Mew Gull, Bonaparte's Gull, Arctic Tern, Aleutian Tern
Abundance, breeding biology, distribution, food, habitat, management, migration, predation, status, reproduction, checklist

Information gathered in summer 1977 on abundance, habitat use, and reproductive ecology is presented for 10 species of seabirds, with emphasis on storm-petrels and Tufted Puffins. Tables present the status of all species of birds observed in 1976 and 1977. Information on abundance and phenology is included for some species. The susceptibility of each species to oil pollution is assessed. CMH

Gulf of Alaska - Prince William Sound (Wooded Is.)
Storm-petrels, cormorants, gulls and terns, alcids
Abundance, breeding biology, reproduction, habitat, food, status, predation, distribution, checklist


This report presents information on the abundance and breeding biology of seabirds nesting on the Wooded Islands in 1976. Tables list the other species observed on the islands and their breeding status. The abundance of species occurring in littoral and marine areas is briefly noted. Potential effects of oil pollution and disturbance are discussed. CMH

Gulf of Alaska - Prince William Sound (Wooded Is.)
Storm-petrels, cormorants, gulls and terns, alcids
Abundance, breeding biology, reproduction, pollution, disturbance, checklist


This paper presents data on the food habits of adult puffins and the fish brought by adults to young in burrows. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Alcids
Tufted Puffin
Food

The distribution and abundance of 20 species of marine birds nesting in this group of islands are summarized and mapped. Information on breeding biology and feeding ecology is presented for 17 and 11 species, respectively. CMH

North Pacific - (Shumagin Is.)
Storm-petrels, cormorants, gulls and terns, alcids
Abundance, distribution, reproduction, habitat, food


This paper compares and discusses factors influencing the breeding success of Black-legged Kittiwakes at Ugaiushak Island, Chowiet Island, and Big Koniuji Island. MRP

Gulf of Alaska - Kodiak (Ugaiushak Is., Chowiet Is., Big Koniuji Is.)
Gulls and terns
Black-legged Kittiwake
Reproduction


This paper reports the water loss, water vapor conductance, and temperature of eggs of Glaucous-winged Gulls and Black-legged Kittiwakes, and calculates the nest humidity and the ventilation required to remove water vapor from the nest. MRP

Gulf of Alaska - Cook Inlet (Kachemak Bay)
Gulls and terns
Glaucous-winged Gull, Black-legged Kittiwake
Physiology

Glaucous-winged Gulls killed proportionately many more female than male red salmon and were more likely to eviscerate female salmon than males. The mechanisms driving this selection are discussed. REG

Bering Sea - Bristol Bay (Aleknagik L.)
Gulls and terns
Glaucous-winged Gull
Food


Gull and tern predation on young salmon is briefly discussed. The population dynamics of predator and prey, and the potential for the birds having a depressant effect on the salmon population is mentioned. NMH

Alaska
Gulls and terns
Glaucous-winged Gull, Mew Gull, Arctic Tern
Food


Not reviewed.

Bering Sea
North Pacific
Seabirds
Distribution

This paper, based on field work in 1963 and 1964, presents descriptions of several displays of this species and discusses feeding habits, interaction with bears, and the role of juvenile gulls in the feeding regime. REG

Gulf of Alaska - Prince William Sound (Olsen Creek)
Gulls and terns
Glaucous-winged Gull, Mew Gull, Bonaparte's Gull
Behavior, food


The author summarizes specimen records of this species and describes his efforts to secure specimens at Barrow between 1881 and 1883. REG

Arctic - Chukchi (Barrow)
Gulls and terns
Ross' Gull
Specimen record, migration, distribution, plumage


In 1936 and 1937, food items were collected and identified from 28 Bald Eagle nests. Among the identifiable food items were remains of 24 species of water-associated birds, mostly alcids, gulls, and fulmars. REG

Aleutians - (Amak Is., Sankin Is.)
Fulmars and shearwaters, storm-petrels, cormorants, gulls and terns, alcids
Predation


This note records the collection of the first specimen of the Siberian Black-headed Gull in North America. CMH

Aleutians
Gulls and terns
Black-headed Gull
Distribution, plumage, specimen record

This report analyzes census data for murres and Black-legged Kittiwakes at Cape Thompson between 1960 and 1976. Census techniques are discussed. MRP

Arctic - Kotzebue Sound (Cape Thompson)
Gulls and terns, alcids
Black-legged Kittiwake, Common Murre, Thick-billed Murre
Techniques, abundance


Not reviewed.

Arctic - Chukchi (Barrow)
Jaegers
Pomarine Jaeger
Physiology


This paper discusses the need to consider fluctuations in seabird numbers as possible responses to short-term or long-term climatic or oceanographic changes. CMH

Alaska
Seabirds
Distribution, abundance, status, research
This preliminary report discusses primarily the distribution, abundance, and behavior of Short-tailed and Sooty Shearwaters as determined from shipboard surveys. Included is tabular information on the distribution of the 22 other species of marine birds observed during the cruises. CMH

Gulf of Alaska
Bering Sea
Seabirds, fulmars and shearwaters
Sooty Shearwater, Short-tailed Shearwater
Distribution, abundance, behavior, food, pollution

Observations of shearwaters in summer 1976 are mapped and briefly discussed. A list noting relative abundance is included for the other marine birds observed. NMH

Gulf of Alaska
North Pacific
Bering Sea
Seabirds, fulmars and shearwaters
Sooty Shearwater, Short-tailed Shearwater
Abundance, distribution

This paper reports the distribution and abundance of Scaled and Solander's Petrels encountered during three cruises in the North Pacific and Bering Sea in 1974 and 1975. Distribution and migration are discussed in relation to ocean currents and water masses. Field descriptions are provided for the two species.

CMH

North Pacific
Bering Sea
Fulmars and shearwaters
Scaled Petrel
Distribution, migration, habitat, abundance


This detailed report includes sections on the Shishmaref waterfowl project, the Innoko-Iditarod River waterfowl study, the study of goose and brant nesting on the Yukon-Kuskokim Delta, and the study of gull-waterfowl relationships on the Yukon-Kuskokwim Delta. MRP

Arctic - Kotzebue Sound
Interior - Innoko, Koyukuk, Tanana
Bering Sea - Yukon Delta
Jaegers, gulls and terns
Parasitic Jaeger, Long-tailed Jaeger, Glaucous Gull, Mew Gull
Predation, food


This note recounts observations of an apparently territorial battle between two Northern Fulmars in July 1973 beneath a bluff of St. George Island; the fight resulted in the drowning of one of the birds. Also mentioned are observations of Thick-billed Murres fighting to the death. CMH

Bering Sea - Pribilof Is. (St. George Is.)
Fulmars and shearwaters, alcids
Northern Fulmar, Thick-billed Murre
Behavior, mortality

466

The Tufted Puffin is considered in this very general treatment of specialized migration. REG

Bering Sea
Alcids
Tufted Puffin
Migration, distribution


This paper summarizes the general distribution and abundance of all tubinares encountered during a summer cruise between Seattle and Nome. A few notes on behavior are included. CMH

Gulf of Alaska
North Pacific
Bering Sea
Albatrosses, fulmars and shearwaters, storm-petrels
Black-footed Albatross, Northern Fulmar, New Zealand Shearwater,
Sooty Shearwater, Short-tailed Shearwater, Scaled Petrel,
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Distribution, abundance, plumage, behavior


Abundance, nesting habitat, breeding phenology, and productivity of 10 species are discussed, and data collected in 1978 are compared with those of 1975 and 1977. Chick growth and feeding rates are addressed for Black-legged Kittiwakes and Tufted Puffins. An annotated list of the 75 species observed in summer 1978 is appended. REG

Gulf of Alaska - Kodiak (Chiniak Bay)
Cormorants, gulls and terns, alcids
Pelagic Cormorant, Red-faced Cormorant, Glaucous-winged Gull, Mew Gull, Black-legged Kittiwake, Arctic Tern, Aleutian Tern, Tufted Puffin
Abundance, reproduction, growth, habitat, food, annotated list

The 1977 breeding season phenology and productivity are reported for eight species nesting over inner Chiniak Bay and on mainland Kodiak. Population estimates and densities of major breeding species are presented. Incidental notes are summarized for six other species breeding in the area. A list of the prey items taken by nine species of seabirds is presented. CMH

Gulf of Alaska - Kodiak (Kodiak Is., Chiniak Bay)
Pelagic Cormorant, Red-faced Cormorant, Glaucous-winged Gull, Mew Gull, Black-legged Kittiwake, Arctic Tern, Aleutian Tern, Tufted Puffin
Reproduction, abundance, distribution, food


The results of seabird colony censuses are reported and compared with 1972 censuses. Reproductive phenology and success are discussed for major breeding species and results from "sea watch" and shoreline transects are reported. An annotated list of the 90 species observed in summer 1976 is appended. REG

Gulf of Alaska - Prince William Sound (Hinchinbrook Is.)
Gulls and terns, alcids
Glaucous-winged Gull, Black-legged Kittiwake, Arctic Tern, Common Murre, Tufted Puffin
Abundance, reproduction, food, annotated list


This paper reports on reproductive success, chronology, and clutch sizes of kittiwakes of Chiniak Bay and Sitkalidak Strait. Factors influencing reproductive success are discussed. MRP

Gulf of Alaska - Kodiak (Chiniak Bay, Sitkalidak Strait)
Gulls and terns
Black-legged Kittiwake
Reproduction

The first section of this report contains annotated species accounts of breeding and non-breeding marine birds and mammals in the vicinity of Naked Island. The second section is a report on the reproductive ecology of Pigeon Guillemots. Appended is an annotated list of all species observed between May 8 and August 31, 1978. MRP

Gulf of Alaska - Prince William Sound (Naked Is.)
Cormorants, gulls and terns, alcids
Pigeon Guillemot
Annotated list, food, breeding biology


The specimen of Cepphus snowi Stejneger reported by Reichenow from Kenai was probably mislabeled as to origin and should not be added to the list of North American species. CMH

Gulf of Alaska - Cook Inlet (Kenai R.)
Alcids
Distribution, specimen record


Upon examination of 240 specimens of Glaucous Gulls, the author proposes that two races be recognized: L. h. hyperboreus and L. h. barrovianus. CMH

Alaska
Gulls and terns
Glaucous Gull
Taxonomy, plumage, anatomy

This note summarizes observations of foods brought to three eyries between June 30 and August 10, 1971. With the exception of one Larus gull and two "rodents," all foods brought to nests were fish or invertebrates. REG

Gulf of Alaska - Southeastern (Robert Is.)
Gulls and terns
Predation


This summarizes the most important food items for Thick-billed Murres in the northern North Pacific Ocean. MRP

North Pacific
Alcids
Thick-billed Murre
Food


After examination of contents of 163 stomachs, the authors assess the importance of larval and juvenile fishes, euphausiids, amphipods, and squids in providing energy for murres. The influence of murres on salmon populations is discussed. MRP

Bering Sea
Alcids
Common Murre, Thick-billed Murre
Food
291. OGI, H., and T. TSUJITA. 1975. Food and feeding habits of the

The authors examined the stomach contents of 1,855 murres that were captured accidentally in gill nets. MRP

North Pacific
Bering Sea
Alcids
Common Murre, Thick-billed Murre
Food


The authors assess morphometric variations in this species based on a sample of 636 birds from 43 sampling stations. MRP

Bering Sea
Alcids
Common Murre
Anatomy


The authors report the organochlorine residues found in 440 clutches of eggs obtained between 1973 and 1976 from 19 species of seabirds in Alaska. MRP

Alaska
Seabirds
Pollution

This paper reports on the amounts of organochlorine residues found in various seabird eggs. MRP

Gulf of Alaska - Kodiak (Alaska Peninsula)
Bering Sea - Bristol Bay (Shaiak Is., Round Is.)
Aleutians - (Bogoslof Is.)
Cormorants, gulls and terns, alcids
Double-crested Cormorant, Glaucous-winged Gull, Black-legged Kittiwake, Common Murre, Tufted Puffin
Pollution


This paper reports on the occurrence and mean residue levels of various organochlorines in the eggs of several species of seabirds. MRP

Gulf of Alaska
Aleutians
Bering Sea
Seabirds
Pollution


The author discusses the significance of gull predation on waterfowl breeding in Alaska. NMH

Alaska
Gulls and terns
Glaucous Gull, Glaucous-winged Gull, Mew Gull
Predation

This paper "contains original descriptions of Short-tailed Albatross and Tufted Puffin from Bering Sea." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea
Albatrosses, alcids
Short-tailed Albatross, Tufted Puffin
Plumage, specimen record, taxonomy


This volume is the first in a planned series on the birds of North America. Published and unpublished materials are included for each species. Topics include: molts and plumage, field identification, voice, habitat, distribution, migration, reproduction, habits, and food. MRP

Alaska
Albatrosses, fulmars and shearwaters, storm-petrels, cormorants
Abundance, breeding biology, behavior, distribution, food, plumage, habitat, migration, population dynamics, status


In this review, the author mentions the collection of Common Murre eggs from the Pribilof Islands for subsistence use. CMH

Bering Sea - Pribilof Is. (Walrus Is.)
Alcids
Common Murre
Subsistence


A one-sentence reference is made to an "immense raft of shearwaters in the vicinity of the Aleutians." REG

Aleutians
Fulmars and shearwaters
Distribution, abundance

This paper describes the morphological characteristics of Herring and Glaucous-winged Gulls at four colonies in the Gulf of Alaska, and assesses the degree of interbreeding between the two species. MRP

Gulf of Alaska - Copper River (Egg Is., Haenke Is., Dry Bay), Southeastern (Glacier Bay)
Gulls and terns
Glaucous-winged Gull, Herring Gull
Distribution, taxonomy


This paper reports on expanding gull populations and predicts further expansion due to an increase in artificial food sources. MRP

Gulf of Alaska
Gulls and terns
Glaucous Gull, Glaucous-winged Gull, Herring Gull
Pollution, population dynamics


Not reviewed.

Gulf of Alaska - Southeastern (Glacier Bay)
Seabirds
Distribution, abundance

The initial results of a study of the breeding ecology of Herring and Glaucous-winged Gulls in the northeast Gulf of Alaska are reported. Also included is information on recoveries of gulls banded on the colonies. The role of gulls in the transmission of human parasitic and enteric diseases in Alaska is reviewed. CMH

Gulf of Alaska - Copper River, Southeastern
Gulls and terns
Glaucous-winged Gull, Herring Gull
Reproduction, population dynamics, distribution, disease and parasites


A study was conducted in 1976 to test the effects of North Slope crude oil externally applied to eggs during early incubation. CMH

Gulf of Alaska - Copper River
Gulls and terns
Glaucous-winged Gull
Pollution, reproduction, mortality

The results of a two-year study of the breeding biology of the Glaucous-winged Gull x Herring Gull group in the northeast Gulf of Alaska are reported. Information on food habits and band returns is also presented. The role of gulls in the transmission of human parasitic and enteric diseases in Alaska is reviewed. CMH

Gulf of Alaska - Copper River
Gulls and terns
Glaucous-winged Gull, Herring Gull
Breeding biology, food, migration, disease and parasites, taxonomy


North Slope Crude oil was externally applied to eggs of Herring and Glaucous-winged Gulls. The effects on hatching success and incubation behavior are discussed. Much life history information is presented in support of the findings. PJG

Gulf of Alaska - Copper River (Dry Bay, Copper R. Delta, Haenke Is.), Cook Inlet (L. Louise)
Gulls and terns
Glaucous-winged Gull, Herring Gull
Abundance, behavior, breeding biology, distribution, pollution, food

The authors present evidence of interbreeding between these two species in the Glacier Bay region of southeastern Alaska. They discuss the lack of sufficient isolating mechanisms between the two species in the zone of sympatry. REG

Gulf of Alaska - Southeastern (Glacier Bay)
Gulls and terns
Glaucous-winged Gull, Herring Gull
Taxonomy, plumage


This report presents information on the abundance, breeding biology, and predation of seabirds, and on spring migration, molt and foraging areas of loons and waterfowl in 1976. An appended table lists the 132 species of birds recorded from the area between 1963 and 1976; notes are included for those recorded only in 1976. CMH

Bering Sea - Bristol Bay (Cape Peirce)
Cormorants, gulls and terns, alcids
Reproduction, abundance, predation, subsistence, checklist


This major paper makes only brief mention of the migration and distribution of this species in Alaska waters. REG

Gulf of Alaska
Bering Sea
Fulmars and shearwaters
Sooty Shearwater, Short-tailed Shearwater
Migration, distribution

This paper presents rather extensive observations on the breeding behavior of the Pomarine Jaeger, Snowy Owl, and Short-eared Owl near Barrow in 1952 and 1953. Habitat utilization, breeding schedule, and territoriality are discussed for the three species. REG

Arctic - Chukchi (Barrow)
Jaegers
Pomarine Jaeger
Breeding biology, behavior, habitat


This major work describes the breeding near Barrow of three principal brown lemming predators (Pomarine Jaeger, Snowy Owl, and Short-eared Owl) and relates changes in their breeding schedule and population dynamics over a three-year period to a dramatic upswing in numbers of lemmings over this same period. REG

Arctic - Chukchi (Barrow)
Jaegers
Pomarine Jaeger
Breeding biology, behavior, population dynamics, food


This paper describes the type specimen of Larus (= Xema) sabini woznesenskii collected at Hooper Bay. It discusses forms of the Glaucous Gull and Sabine's Gull. (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Bering Sea - Yukon Delta (Hooper Bay)
Gulls and terns
Glaucous Gull, Sabine's Gull
Specimen record, taxonomy

478

This paper reports on predation of Fork-tailed and Leach's Storm-Petrels at Fish Island, Alaska. River otters were the most important predators in 1976 and 1977. MRP

Gulf of Alaska - Prince William Sound (Fish Is.)
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Predation, reproduction


This thesis presents results of a two-year study of the comparative breeding biology of Leach's and Fork-tailed Storm-Petrels. Taxonomy, predation, and chick growth are also treated in depth. An appendix notes the breeding status of the 118 species recorded during the two summers. CMH

Gulf of Alaska - Prince William Sound (Wooded Is.)
Storm-petrels
Fork-tailed Storm-Petrel, Leach's Storm-Petrel
Breeding biology, food, predation, taxonomy, growth, anatomy, checklist


The author has added a postscript to the note by G. G. Cantwell (same citation) describing the color and measurements of the egg. REG

Gulf of Alaska - Southeastern (Long Is.)
Alcids
Marbled Murrelet
Specimen record

This report provides information on the populations and reproductive ecology of seabirds nesting at several sites on the south side of the Seward Peninsula. Most detailed information is presented for Black-legged Kittiwakes and Common Murres. The at-sea distribution of seabirds in relation to the location of the breeding colonies is also discussed. An appended paper (Flock and Hubbard 1979) addresses bird movements through Bering Strait. CMH

Bering Sea - Norton Sound
Seabirds
Abundance, reproduction, growth


The author discusses the difficult question of taxonomic status of the Nearctic gulls of the genus Larus. CMH

Arctic
Bering Sea
Gulls and terns
Glaucous Gull, Herring Gull, Thayer's Gull, Iceland Gull
Taxonomy, plumage


The author discusses the effects of gull and jaeger predation on populations of lemmings. REG

Arctic - Chukchi (Barrow)
Jaegers, gulls and terns
Pomarine Jaeger, Parasitic Jaeger, Long-tailed Jaeger, Glaucous Gull
Predation

480

The author describes the type specimen of Fisher's Petrel (= Scaled Petrel, Pterodroma inexpectata) collected at Kodiak, June 11, 1882 (cf. Ridgway, Auk 12:319-322, 1895). REG

Gulf of Alaska - Kodiak (Kodiak Is.)
Fulmars and shearwaters
Scaled Petrel
Distribution, plumage, specimen record, taxonomy


This is a brief note announcing that the National Museum received specimens of Great Black-backed Gulls. Birds were collected at Herald Island by C. M. Hooper and at Port Clarence by T. H. Bean. These were the first confirmed records from the American side of the Pacific. MRP

Bering Sea - Norton Sound (Port Clarence)
Gulls and terns
Great Black-backed Gull
Distribution, specimen record


The author describes the new species Larus barrovianus, now considered a subspecies of the Glaucous Gull (L. hyperboreus barrovianus). CMH

Arctic - Chukchi (Barrow)
Bering Sea - Norton Sound (St. Michael)
Gulls and terns
Glaucous Gull
Taxonomy, plumage

This paper provides a detailed description and a colored plate of Fisher's Petrel, now considered the Scaled Petrel (Pterodroma inexpectata). The identifying characteristics are compared with those of other closely related species. CMH

Gulf of Alaska - Kodiak
Fulmars and shearwaters
Scaled Petrel
Plumage


Not reviewed.

Gulf of Alaska - Southeastern Seabirds


The author conducted surveys of breeding seabirds from July 1-29, 1978. Habitats and their use by seabirds are described and estimates of breeding populations are presented. Daily species checklists are appended. MRP

Bering Sea - Nunivak Is.
Cormorants, jaegers, gulls and terns, alcids
Abundance, checklist, habitat


The authors present population estimates and descriptions of nesting habitats for 11 species of seabirds on Nunivak Island. MRP

Bering Sea - Nunivak Is.
Cormorants, gulls and terns, alcids
Abundance, habitat

482

The authors describe the pelagic distribution of both species based on at-sea recoveries of banded birds. MRP

Aleutians
North Pacific
Albatrosses
Black-footed Albatross, Laysan Albatross
Distribution, migration


Adult birds were sexed via laparotomy technique and then marked to facilitate identification. Subsequent observations of adult attendance, feeding, and behavior during the chick fledging period are described. MRP

Bering Sea - Pribilof Is.
Alcids
Thick-billed Murre
Breeding biology


The number of days required for rapid yolk formation is reported for 14 species of birds, determined from analysis of eggs collected in Alaska and elsewhere. MRP

Bering Sea - Yukon Delta (Clarence Rhode NWR)
Gulls and terns, alcids
Glaucous Gull, Mew Gull, Sabine's Gull, Arctic Tern, Pigeon Guillemot, Cassin's Auklet
Physiology

The authors estimate the number of days required for yolk formation in selected species of shorebirds, gulls, terns, and alcids. Most of the eggs examined were collected in Alaska. MRP

Bering Sea - Yukon Delta (Old Chevak)
Gulf of Alaska - Northern Gulf (Middleton Is.)
Gulls and terns, alcids

Physiology


This note, based on observations during winter and summer 1953, describes the feeding association of nine species of marine birds with four species of pinnipeds. REG

Arctic
Bering Sea
Fulmars and shearwaters, storm-petrels, gulls and terns
Northern Fulmar, Short-tailed Shearwater, Fork-tailed Storm-Petrel, Glaucous Gull, Ivory Gull, Black-legged Kittiwake, Sabine's Gull, Arctic Tern

Food


Three new forms are described, including one from the eastern Bering Sea (Uria aalge inornata). REG

Bering Sea
Alcids
Common Murre
Taxonomy, distribution

The author questions the unpublished sight record of a "Black-footed Albatross with a pink beak" from a cruise in the Gulf of Alaska in 1956. The author suggests that instead it was actually an immature Short-tailed Albatross. REG

Gulf of Alaska
Albatrosses
Short-tailed Albatross
Distribution, status


The author has summarized observations collected aboard oceanographic vessels during 26 cruises between 1955 and 1967. Annotated accounts are presented for 36 species of birds, all typical marine forms except for Peregrine Falcon and Long-eared Owl. REG

Gulf of Alaska
Aleutians
North Pacific
Seabirds
Annotated list, distribution, abundance


Based upon observations at sea, the standing stock and biomass of seabirds are calculated and summarized by season and oceanographic domain for each ecological group of birds. Annual food consumption and nutrient transfer are estimated, and how seabirds fit into a simple, hypothetical food chain is discussed. CMH

Bering Sea
Gulf of Alaska
North Pacific
Seabirds
Abundance, distribution, food

The author describes the former range of this species, summarizes recent pelagic sightings, and discusses the status of breeding and pelagic populations. REG

Gulf of Alaska
North Pacific
Albatrosses
Short-tailed Albatross
Distribution, status, management


This paper documents the first pelagic specimen records of these two gulls off the Pacific Coast of North America, discusses concurrent pelagic sightings, and summarizes the literature on prior pelagic sightings. Pelagic food habits are also discussed. REG

Gulf of Alaska
North Pacific
Gulls and terns
Glaucous-winged Gull, Herring Gull
Distribution, food, migration, specimen record


This paper summarizes at-sea observations of the Black-footed Albatross in the central and eastern Pacific Ocean. MRP

Aleutians
North Pacific
Albatrosses
Black-footed Albatross
Abundance, distribution

This paper summarizes at-sea observations of the Laysan Albatross in the central and eastern Pacific Ocean. MRP

Aleutians
North Pacific
Albatrosses
Laysan Albatross
Abundance, distribution


The author discusses the pelagic distribution of Tufted Puffins and presents results of a preliminary analysis of stomach contents. MRP

Gulf of Alaska
North Pacific
Aldids
Tufted Puffin
Distribution, food


This final report presents a review of published and unpublished literature pertinent to the feeding ecology of Bering Sea birds. The authors discuss imbalances which may have been created in the ecosystem from commercial fisheries activities, and how those changes may have benefited planktivorous birds. Recommendations for further research are included. MRP

Bering Sea
Seabirds
Food, research, fishing

487

The authors present a preliminary analysis of the stomach contents of 26 species of seabirds collected in Alaska waters. CMH

Gulf of Alaska
Bering Sea
Seabirds
Food


The authors describe the distribution, density, and foods of Black-legged Kittiwakes in the Kodiak Island area from mid-May through mid-September 1977. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Gulls and terns
Black-legged Kittiwake
Distribution, abundance, food


The food habits of five species of seabirds collected in the vicinity of Kodiak Island are described and quantified. Seasonal changes in body weight and fat condition and in prey species taken are examined. The function of interspecific differences in bill width is discussed. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Fulmars and shearwaters, gulls and terns, alcids
Sooty Shearwater, Short-tailed Shearwater, Black-legged Kittiwake, Common Murre, Tufted Puffin
Distribution, food, anatomy

This report summarizes preliminary results from a study of the winter food habits of four species of marine birds in Kachemak Bay. Aggregate percent numbers, volume, and frequency of occurrence of prey species are graphed and tabulated for each bird species. CMH

Gulf of Alaska - Cook Inlet (Kachemak Bay)
Alcids
Common Murre, Marbled Murrelet
Food


This paper reports on the reproductive success of kittiwakes at Wooded Island and Porpoise Rocks. Causes of low production are discussed. MRP

Gulf of Alaska - Prince William Sound (Wooded Is., Porpoise Rocks)
Gulls and terns
Black-legged Kittiwake
Reproduction


This paper describes critical habitats for waterfowl and seabirds in Port Etches and Constantine Harbor. Annotated species accounts and maps delineating critical habitats are included. MRP

Gulf of Alaska - Prince William Sound
Seabirds
Annotated list, habitat

489

This report includes information on the abundance, breeding phenology, and productivity of seabirds using Constantine Harbor and Porpoise Rocks; general accounts of shorebirds, waterfowl, Bald Eagles, and marine mammals; information on breeding populations of Pigeon Guillemots and Parakeet Auklets on Smith and Little Smith Islands; and census information on seabirds of Naked and Storey Islands. MRP

Gulf of Alaska - Prince William Sound
Seabirds
Abundance, distribution, breeding biology, food, annotated list, research


In his analysis of this group, the author discusses the taxonomic status of the Aleutian Tern, whose type was collected at Kodiak. CMH

Alaska
Gulls and terns
Aleutian Tern
Plumage, taxonomy


The breeding biology of Common Eiders was studied on a barrier island in 1971 and 1972. Mechanisms for avoiding predation of eggs by Glaucous Gulls are discussed. MRP

Arctic - Beaufort
Gulls and terns
Glaucous Gull
Predation

This paper describes the interrelationships of eiders and Glaucous Gulls nesting in a mixed colony, but emphasizes the breeding biology of the Common Eider. REG

[Keywords: Arctic - Beaufort, Gulls and terns, Glaucous Gull, Food, predation]


This paper describes two new species of cestodes found in specimens of Sabine's Gulls collected in July and August 1949. MRP

[Keywords: Arctic - Chukchi (Barrow), Beaufort (Alaktak R.), Gulls and terns, Sabine's Gull, Disease and parasites]


This paper describes some cestode parasites found in 37 Black-legged Kittiwakes collected at St. Lawrence Island in August 1950. MRP

[Keywords: Bering Sea - St. Lawrence Is., Gulls and terns, Black-legged Kittiwake, Disease and parasites]
This catalogue of birds in the Leyden Museum lists several species from Sitka, which are questioned by Willet (Condor 16:71-91, 1914). (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Gulf of Alaska - Southeastern (Sitka)
Albatrosses, fulmars and shearwaters, cormorants, alcids
Short-tailed Albatross, Short-tailed Shearwater, Brandt's Cormorant, Crested Auklet, Whiskered Auklet
Distribution, specimen record

This paper describes Corynosoma bipapillum sp. n. (a new species), taken from the posterior gut of a juvenile Bonaparte's Gull collected at Lake George. Also included is a description of Corynosoma constrictum, recovered from Pintail, Lesser Scaup, and White-winged Scoter. MRP

Arctic - Chukchi (Barrow)
Gulls and terns
Disease and parasites


Arctic - Chukchi (Barrow)
Gulls and terns
Physiology

This paper "includes studies on Snow Buntings and arctic gulls at Pt. Barrow." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Arctic - Chukchi (Barrow)
Gulls and terns
Physiology, plumage


This paper "includes studies on Snow Buntings and arctic gulls at Pt. Barrow." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Arctic - Chukchi (Barrow)
Gulls and terns
Physiology


Not reviewed.

Bering Sea - St. Lawrence Is.
Alcids
Parakeet Auklet, Crested Auklet, Least Auklet
Breeding biology


Recommended band sizes are given for nine species of alcids common to St. Lawrence Island. REG

Bering Sea - St. Lawrence Is.
Alcids
Techniques

This note records observations of albinism in the Parakeet, Crested and Least Auklets, and melanism in the Common Murre. CMH

Bering Sea - St. Lawrence Is.
Alcids
Common Murre, Parakeet Auklet, Crested Auklet, Least Auklet
Plumage, specimen record


The author followed five nests to obtain incubation and nestling periods for this species. MRP

Bering Sea
Alcids
Horned Puffins
Reproduction


The author describes the construction and persistence of egg teeth for 21 species of alcids, and discusses the methods of hatching for several of these species. CMH

Bering Sea - St. Lawrence Is.
Alcids
Anatomy, behavior


Not reviewed.

Bering Sea - St. Lawrence Is.
Alcids
Breeding biology

The author recognizes three patterns of post-hatching development in Alcidae: precocial, semi-precocial, and intermediate. The feeding ecologies of the species are discussed as potential factors in the evolution of these developmental patterns and growth rates. CMH

Alaska
Alcids
Taxonomy, growth, food, anatomy


The author presents detailed observations on the breeding biology of Horned Puffins and compares aspects of their ecology to that of Tufted Puffins. MRP

Bering Sea - St. Lawrence Is.
North Pacific
Alcids
Horned Puffin, Tufted Puffin
Breeding biology, zoogeography


This paper examines the relationship between snowmelt and the timing of egg-laying in a population of Least, Crested, and Parakeet Auklets. Gonadal development, nest site tenacity, and food accessibility are considered in relation to availability of nesting habitat. CMH

Bering Sea - St. Lawrence Is.
Alcids
Parakeet Auklet, Crested Auklet, Least Auklet
Breeding biology, physiology, habitat

Using published field observations and information from museum specimens, the author assesses the timing of molt in relation to breeding. MRP

Alaska
Alcids
Kittlitz's Murrelet
Plumage


This paper describes the breeding biology of Parakeet Auklets. Included is information on the pre-egg stage, the egg stage, and the chick stage. MRP

Bering Sea - St. Lawrence Is.
Alcids
Parakeet Auklet
Breeding biology


This paper discusses nesting chronology, abundance, and breeding success of seabirds on St. Lawrence Island in 1976. MRP

Bering Sea - St. Lawrence Is. (Kongkok Bay)
Gulls and terns, alcids
Black-legged Kittiwake, Common Murre, Thick-billed Murre, Crested Auklet, Least Auklet
Abundance, reproduction

This final report provides population estimates and information on reproductive phenology for 12 species of seabirds nesting on the island in 1976. Aspects of breeding biology and feeding ecology are reported for selected species. CMH

Bering Sea - St. Lawrence Is.
Cormorants, gulls and terns, alcids
Abundance, breeding biology, food, growth, status, anatomy, habitat


Not reviewed.

Arctic - Beaufort
Seabirds


This paper discusses the breeding distribution and status of marine birds in the Aleutian Islands, and discusses gaps in the data. Recommendations for further study are given. An annotated list of seabirds breeding in the Aleutians is included. MRP

Aleutians
Seabirds
Distribution, status, research, annotated list


Not reviewed.

North Pacific
Albatrosses, fulmars and shearwaters, storm-petrels

Not reviewed.

Fulmars and shearwaters
Short-tailed Shearwater


This note records the collection of three specimens of this species, including two from St. Michael in 1908. REG

Bering Sea - Norton Sound (St. Michael)
Gulls and terns
Sabine's Gull
Distribution, specimen record


This paper is based on four specimens of Short-tailed Albatross taken by T. H. Bean in "various parts of Alaska." REG

Alaska
Albatrosses
Short-tailed Albatross
Anatomy


The osteology of the skull, sternum, and shoulder girdle of a specimen of Pigeon Guillemot is discussed. REG

Gulf of Alaska - Southeastern
Alcids
Pigeon Guillemot
Anatomy, taxonomy

498

This paper presents data on the distribution and migration of eight species that inhabit the shallow open waters of the southeastern Bering Sea. The distribution of birds and the time, direction, and character of their migration are described in relation to the distribution and abundance of food resources.

Bering Sea
Fulmars and shearwaters, storm-petrels, gulls and terns, alcids
Northern Fulmar, Short-tailed Shearwater, Fork-tailed Storm-Petrel, Glaucous Gull, Glaucous-winged Gull, Black-legged Kittiwake, Red-legged Kittiwake, Thick-billed Murre
Abundance, distribution, migration, food


The authors describe the distribution and abundance of Black-legged and Red-legged Kittiwakes in the Bering Sea and North Pacific. Maps indicate the distribution of Black-legged Kittiwakes over the entire Bering Sea, except for mainland coastal areas.

North Pacific
Bering Sea
Gulls and terns
Black-legged Kittiwake, Red-legged Kittiwake
Distribution


The author summarizes published and unpublished observations on the seasonal distribution of the Short-tailed Shearwater in the Pacific Ocean, and describes their spring and fall migration routes. The timing of migration and routes followed are discussed in relation to the productivity of the different oceanic water masses.

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Fulmars and shearwaters
Short-tailed Shearwater
Migration, distribution, abundance, habitat
382. SHUNTOV, V.P. 1965. On Tubinares and alcids of the Bering Sea. [In Russian.] Ornitologiya 7:276-286.

This paper discusses seasonal distribution and abundance in relation to water temperature and the distribution of food resources. CMH

Bering Sea
Albatrosses, fulmars and shearwaters, storm-petrels, alcids
Distribution, abundance, migration, food, habitat


This paper provides information on the density of birds wintering in the eastern Bering Sea, Aleutians, Kurile Islands, Hokkaido and Khonsyu Islands, Sea of Japan, East China Sea, South China Sea, and Indian Ocean. Latitudinal trends are discussed. MRP

Aleutians
Bering Sea - Bristol Bay
North Pacific
Gulf of Alaska - Kodiak
Albatrosses, fulmars and shearwaters, storm-petrels, gulls and terns, alcids
Laysan Albatross, Northern Fulmar, Short-tailed Shearwater, Fork-tailed Storm-petrel, Glaucous-winged Gull, Black-headed Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Least Auklet
Abundance, distribution


The distribution and movements of the Laysan and Black-footed Albatross are discussed in relation to oceanic currents and biological productivity. (From Oceanographic Abstracts, original not seen.) NMH

Gulf of Alaska
Aleutians
North Pacific
Albatrosses
Black-footed Albatross, Laysan Albatross
Distribution, habitat, migration
The species' assortment, seasonal distribution, migration, population density, numbers and geographic dispersal of seabirds are examined with respect to the existing biological structure of the World Ocean. Considerable attention is given to 17 species, 9 of them common to Alaska waters. The number of seabirds on the World Ocean is estimated and their role as consumers of other animals is discussed. REG

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Seabirds
Black-footed Albatross, Laysan Albatross, Northern Fulmar, Sooty Shearwater, Short-tailed Shearwater, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Tufted Puffin

Distribution, migration, abundance, habitat, zoogeography, status


Incubation rhythms of adults, incubation shifts, hatching, feeding of chicks, and feeding patterns are discussed. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Breeding biology, food


This is the first detailed account of the nesting habits and general breeding biology of the Marbled Murrelet. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Alcids
Marbled Murrelet
Breeding biology

This paper describes the attendance patterns and behavior of nesting Fork-tailed Storm-Petrels, and correlates those observations to environmental factors and food resources. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Behavior, breeding biology


This paper describes the breeding biology of the Marbled Murrelet based on observations of a nest discovered in 1978 on East Amatuli Island. Adaptations to reduce detection of the nest and avoid predators are discussed. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Alcids
Marbled Murrelet
Breeding biology


This report presents a brief summary of results from a study of the nesting ecology of Black-legged Kittiwakes on Chisik Island. An annotated list of 57 species of birds, including 32 water-related forms, summarizes observations on and near Chisik Island. MRP

Gulf of Alaska - Cook Inlet (Tuxedni NWR)
Gulls and terns
Black-legged Kittiwake
Breeding biology, annotated list

This report briefly summarizes and compares two years' data on the nesting ecology of Black-legged Kittiwakes on Chisik Island. The breeding failure of both years is briefly discussed. MRP

Gulf of Alaska - Cook Inlet (Tuxedni NWR)
Gulls and terns
Black-legged Kittiwake
Breeding biology


This paper discusses historical records of distribution and abundance of nesting seabirds in the Gulf of Alaska from 1741 to 1975. An annotated species list and a discussion of population changes during this period are included. MRP

Gulf of Alaska
Seabirds
Distribution, abundance, status, annotated list


This paper briefly describes the seabird resources of Alaska, the lack of a coordinated management program, the threat to seabirds from past, present, and proposed development programs, and management and information needs. CJL

Alaska
Seabirds
Management, research

The author, using information from the "Catalog of Alaskan Seabird Colonies" (Sowls et al. 1978), discusses the distribution of kittiwake colonies in Alaska. MRP

Alaska
Gulls and terns
Black-legged Kittiwake
Distribution, abundance


The author, using information presented in the "Catalog of Alaskan Seabird Colonies" (Sowls et al. 1978), discusses the distribution of puffin colonies in Alaska. MRP

Alaska
Alcids
Horned Puffin, Tufted Puffin
Abundance, distribution


This atlas shows the locations of all known colonies of seabirds in Alaska. Accompanying tables provide estimates of the number of birds of each species at individual colony sites. Appended tables list, by species, the colony sites at which each occurs, providing a useful cross reference to maps. An introductory section provides brief narrative accounts of the distribution, biology, and population status of each species. The catalog identifies more than a thousand colony areas at which about 22.5 million birds occur. CJL

Alaska
Seabirds
Abundance, annotated list, distribution

Not reviewed.

Alcids
Common Murre, Thick-billed Murre


Not reviewed.

Jaegers
Long-tailed Jaeger
Food, pollution


This report presents population estimates for the nine species of seabirds breeding at Cape Thompson and compares them with earlier estimates. Information on phenology, reproductive success, and food habits is provided for some species. CMH

Arctic – Kotzebue Sound (C. Thompson)
Cormorants, gulls and terns, alcids
Abundance, reproduction, food
This report provides information on the numbers, reproductive biology, and feeding ecology of seabirds nesting from Cape Lisburne to Cape Thompson in 1977. Most extensive information is presented for murres and kittiwakes. Implications of petroleum development are discussed. CMH

Arctic - Kotzebue Sound (C. Thompson, C. Lisburne)

Cormorants, gulls and terns, alcids

Pelagic Cormorant, Glaucous Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot, Horned Puffin, Tufted Puffin

Abundance, reproduction, food, subsistence, pollution, disturbance, status

Aspects of population dynamics, reproductive biology, and feeding habits are discussed primarily for Common Murres and Black-legged Kittiwakes, but some information on other species is presented. CMH

Arctic - Kotzebue Sound (C. Thompson, C. Lisburne)

Fulmars and shearwaters, cormorants, gulls and terns, alcids

Black-legged Kittiwake, Common Murre

Abundance, distribution, reproduction, habitat, food

This paper describes nesting habitats of Red-legged and Black-legged Kittiwakes in the Pribilof Islands. Behavioral differences associated with nesting habitat selection are described. MRP

Bering Sea - Pribilof Is.

Gulls and terns

Black-legged Kittiwake, Red-legged Kittiwake

Habitat, behavior

Detailed information is provided on distribution, abundance, and reproductive and feeding ecology of seabirds in the Norton Sound region. Maps depicting waterfowl densities along the coast in fall are presented, along with some brood counts. Shorebirds are discussed in general terms. CMH

Bering Sea - Norton Sound
Cormorants, gulls and terns, alcids
Pelagic Cormorant, Glaucous Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Horned Puffin
Abundance, distribution, habitat, food, reproduction, pollution


The author questions the validity of several statements by Nelson (Birds of the Bering Sea and Arctic Ocean, 1883) regarding four species of Larinae. CMH

Arctic
Bering Sea
Gulls and terns
Glaucous Gull, Glaucous-winged Gull, Lesser Black-backed Gull, Red-legged Kittiwake
Distribution

405. STEJNEGER, L. 1884. Priocella tenuirostris (Aud.) not a bird of Bering Sea or the Arctic Ocean. Auk 1:233-234.

The author notes the misidentification of a Short-tailed Shearwater (Puffinus tenuirostris) by E. W. Nelson (Birds of the Bering Sea and Arctic Ocean, 1883). The author also discusses the possibility of Nelson's misidentifying a dark phase Northern Fulmar as a Short-tailed Shearwater in the Aleutians. CMH

Arctic - Kotzebue Sound
Aleutians
Fulmars and shearwaters
Northern Fulmar, Short-tailed Shearwater
Distribution

This paper is a detailed comparative treatment of the races of both Black and Pigeon Guillemots. References to material from Alaska occurs throughout. REG

Alaska
Alcids
Black Guillemot, Pigeon Guillemot
Taxonomy, distribution


The author provides the first description to science of the downy young of these two species. REG

Bering Sea - Pribilof Is. (Otter Is.)
Alcids
Parakeet Auklet, Crested Auklet
Plumage


This thesis presents results of a study in summer 1968 of the food habits of arctic foxes denning in lowland tundra and sea cliff habitats. Over 1,500 scats were analyzed from 24 dens. The composition of the diet is discussed in relation to availability of prey species. CMH

Bering Sea - St. Lawrence Is.
Seabirds
Predation

The author proposes two new subspecies of Cepphus columba: C. c. adianta of the Pacific Coast from Washington north and west to Umnak Island, and C. c. eureka of coastal California and Oregon. Neither form has subsequently been recognized. REG

Alaska
Alcids
Pigeon Guillemot
Distribution, taxonomy


This paper "contains mensural data from Alaskan specimens. Also distribution and synonymy of all forms pertinent to Alaska. Section on evolutionary history is particularly cogent." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Alcids
Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot
Anatomy, behavior, taxonomy


The comparative feeding behavior and ecology of coastal and inland nesting populations of Glaucous Gulls were studied between 1972 and 1974. Included are chapters on time-energy budgets, harassment, waterfowl nesting among gulls, and factors limiting gull populations. REG

Bering Sea - Yukon Delta
Gulls and terns
Glaucous Gull
Food, breeding biology, behavior

This paper describes variation in pigmentation of iris eye-ring and primary remiges of Glaucous Gulls collected in western Alaska. MRP

Aleutians
Bering Sea
Gulls and terns
Glaucous Gull, Glaucous-winged Gull, Herring Gull
Anatomy, taxonomy, plumage


This paper discusses the incidence of Glaucous Gulls and jaegers near people searching for waterfowl nests and assesses the possible impacts of this association on nesting success. More research on loss of eggs from undisturbed nests is suggested. MRP

Bering Sea - Yukon Delta
Jaegers, gulls and terns
Parasitic Jaeger, Long-tailed Jaeger, Glaucous Gull
Predation


This report provides a description of the nests, nesting habitat, eggs, nesting success, and foods of Mew Gulls and Sabine's Gulls. MRP

Bering Sea - Yukon Delta (Kashunuk R., Old Chevak)
Gulls and terns
Mew Gull, Sabine's Gull
Food, breeding biology

This paper discusses the interactions of marine birds and fish, and identifies areas in which further research is needed. MRP

Bering Sea
Seabirds
Fishing, food, research


This chapter presents data from a three-year study of seabirds at Cape Thompson. Information on phenology, breeding biology, and trophic relationships is presented for 9 species. MRP

Arctic - Chukchi (Cape Thompson)
Cormorants, gulls and terns, alcids
Pelagic Cormorant, Glaucous Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot, Horned Puffin, Tufted Puffin
Abundance, breeding biology, food


This paper summarizes pelagic observations of 29 species of birds in the northern Bering Sea and the Chukchi Sea during a cruise in late summer 1960. Figures depicting abundance, distribution, and movements are presented for several species. REG

Arctic - Chukchi
Bering Sea
Seabirds
Distribution, abundance, annotated list

The author describes a nest found on the Alaska Peninsula. He also provides a description and measurements of several eggs of this species. CMH

North Pacific - (Alaska Peninsula)
Alcids
Kittlitz's Murrelet
Distribution, habitat, anatomy


This paper summarizes observations of all albatrosses observed during 45,000 nautical miles of cruising in the North Pacific during 1945. The numbers of Black-footed Albatross are correlated with sea water temperatures, and the number of jellyfish observed is used as an index of local productivity. CMH

North Pacific
Albatrosses
Black-footed Albatross, Laysan Albatross
Distribution, abundance, habitat


This article provides the first description of the downy young of the Kittlitz's Murrelet plus summarizes the nesting records of the species. REG

Arctic - Chukchi (Cape Thompson)
Alcids
Kittlitz's Murrelet
Plumage, distribution

This paper reports on fall migration of marine birds past Barrow from August 27 to September 16, 1975. Migration is analyzed for each species group in relation to weekly period, time of day, wind conditions, and flock size. Information on age and sex composition is presented for some species. Subsistence hunting activity is also analyzed. CMH

Arctic - Chukchi (Barrow)
Fulmars and shearwaters, jaegers, gulls and terns
Migration, subsistence, age and sex composition


This is a very informative account of the author's experiences in Alaska with this, at the time, very little known alcid. REG

Aleutians
Arctic - Kotzebue Sound
Bering Sea - Pribilof Is.
Gulf of Alaska - Kodiak
North Pacific - (Shumagin Is.)
Alcids
Crested Auklet
Behavior, food, habitat, plumage, reproduction, status, subsis-
tence

423. TRAPP, J.L. Techniques used in reducing oil impact on bird popu-
lations. Presented at Leadership Oiled-Bird Rehabilitation Work-

This paper describes means of deterring marine birds from ap-
proaching the site of oil spills. Well-designed experiments to
test the effects of these deterrent techniques are urged. MRP

Alaska
Seabirds
Pollution, techniques

Not reviewed.

Gulf of Alaska - Kodiak (Alaska Peninsula)
North Pacific - Alaska Peninsula
Aleutians
Seabirds
Distribution, abundance


An aerial survey was conducted over coastal waters of Kodiak Island. Annotated accounts are presented for the species observed, and distribution patterns are discussed. Numbers of birds, densities, and frequency of occurrence are summarized in tabular form for each species. Results are compared with those of previous surveys. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Seabirds
Abundance, habitat, annotated list, distribution


This paper describes quantitatively the impact of human visits on cormorant colonies where the primary predator was the Glaucous-winged Gull. MRP

Aleutians
Cormorants, gulls and terns
Red-faced Cormorant, Glaucous-winged Gull
Disturbance, predation

The author, using data contained in Sowls et al. (Catalog of Alaskan Seabird Colonies, 1978), ranks the seabird colonies in Alaska, and describes a plan to manage and protect seabird nesting habitat. MRP

Alaska
Seabirds
Habitat, management


Over 2,300 regurgitated pellets of Glaucous-winged Gulls were examined from four locations in the western Aleutian Islands. The author examines the composition of their diet in relation to the abundance and vulnerability of the prey species. MRP

Aleutians - (Alaid-Nizki Is., Agattu Is., Little Kiska Is., Buldir Is.)
Gulls and terns
Glaucous-winged Gull
Food


This landmark monograph provides a thorough discussion of the biology of murres. Topics include: evolution and adaptation, distribution and populations, breeding biology, factors affecting populations, and economics. MRP

Alaska
Alcids
Common Murre, Thick-billed Murre
Abundance, distribution, breeding biology, disease and parasites, pollution, predation, status, taxonomy, disturbance, fishing, food, habitat, management, migration, mortality, plumage

The author analyzes the paleogeographic history of the Bering Strait region based primarily on the distribution of the family Alcidae. CMH
Alaska
Alcids
Zoogeography, taxonomy


This paper briefly summarizes the zoogeography and taxonomic relationships of marine birds from north and northwestern North America. MRP
Alaska
Seabirds
Zoogeography, taxonomy


This publication contains the presentations, comments, and summaries of topics discussed at the migratory bird subsistence hunting workshop held January 29-30, 1980, in Anchorage. MRP
Alaska
Seabirds
Subsistence, public interest


The author has summarized records of occurrence of Long-tailed Jaegers in North America, and suggests a migration route through the continental interior. MRP
Alaska
Jaegers
Long-tailed Jaeger
Distribution, migration

This brief note describes the occurrence of shearwaters and other "whale birds" near whales. It also notes that whaling vessels would attempt to find whales by spotting flocks of birds. MRP

Gulf of Alaska - Southeastern (Yakutat)
Fulmars and shearwaters, storm-petrels
Behavior


The author censused birds during a cruise from Hokkaido, Japan, to the Bering Sea and Kodiak. MRP

North Pacific
Bering Sea
Seabirds
Distribution, abundance


The distribution and abundance of birds recorded on a cruise from Hakodate, Hokkaido, Japan, to Kodiak, Alaska, are reported. MRP

Aleutians
Bering Sea
Seabirds
Abundance, distribution, annotated list


This note recounts observations of oiled Common Murres and Glaucous-winged Gulls after a shipwreck in southeastern Alaska in October 1918. CMH

Gulf of Alaska - Southeastern (Lynn Canal)
Gulls and terns, alcids
Glaucous-winged Gull, Common Murre
Mortality, pollution, behavior

The author reports Aleutian Terns near Yakutat in 1916 and 1917, and in Dry Bay in 1917, and discusses the probability of their nesting at those sites. CMH

Gulf of Alaska - Copper River (Yakutat, Dry Bay)
Gulls and terns
Arctic Tern, Aleutian Tern
Distribution


This note records the discovery of a colony of Arctic Terns in Taku Inlet, the most southerly nesting recorded to that date. The author suggests that additional colonies may exist near Yakutat, Dry Bay, and Wrangell, based on observations of adults in these areas. CMH

Gulf of Alaska - Southeastern (Taku Inlet, Wrangell), Copper River (Yakutat, Dry Bay)
Gulls and terns
Arctic Tern
Distribution, habitat


This note is identical to that by the same author in 1920 (Condor 22:157). CMH

Gulf of Alaska - Southeastern (Lynn Canal)
Gulls and terns, alcids
Glaucous-winged Gull, Common Murre
Mortality, pollution, behavior

This paper discusses "observations and specimens from Glacier Bay in August 1921." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Gulf of Alaska - Southeastern (Glacier Bay)
Alcids
Kittlitz's Murrelet
Distribution, specimen record


This note describes a mixed colony of Arctic and Aleutian Terns nesting at the Situk River flats in summer 1922. Mention is made of tern colonies at several other sites in the Gulf of Alaska and on the Alaska Peninsula; but reference to Aleutian Terns is made only once, that being of birds nesting on Isanotski Island in False Pass. REG

Gulf of Alaska - Copper River (Icy Bay, Situk R.), Northern Gulf (Middleton Is.), Kodiak (Kodiak Is.)
North Pacific (Simeonof Is., False Pass)
Gulls and terns
Arctic Tern, Aleutian Tern
Distribution


As part of a study on chlorinated hydrocarbon pollutants in Gyrfalcons, whole body DDE residues of Long-tailed Jaegers, American Golden Plovers, and Whimbrels were determined. MRP

Bering Sea - Norton Sound (Seward Peninsula)
Jaegers
Long-tailed Jaeger
Pollution

The author presents results of shipboard transects in the Gulf of Alaska and provides information on food habits of birds collected during the cruise. MRP

Gulf of Alaska
Seabirds
Abundance, food, distribution


This report presents census data from shipboard transects in the Gulf of Alaska and Bering Sea. MRP

Gulf of Alaska
Bering Sea
Fulmars and shearwaters, storm-petrels, gulls and terns, alcids
Abundance, distribution


The author presents evidence of an arthritic condition in certain joints of bones of Short-tailed Albatross excavated from Aleut middens on Amchitka Island. He suggests that these abnormalities may result from stresses received upon hard landings and/or take-offs. MRP

Aleutians - (Amchitka Is.)
Albatrosses
Short-tailed Albatross
Disease and parasites, archaeology

The authors present data on distribution, abundance, and foods, and relate them to the ice conditions and timing of migration. The observations, gathered during a cruise, are summarized in an annotated species list. Of the 35 species of birds recorded, 30 are marine forms. Distribution is plotted on maps for each species or species group. A table summarizes information on stomach contents for 56 birds of 9 species. CMH

Arctic - Chukchi
Fulmars and shearwaters, cormorants, jaegers, gulls and terns, alcids
Distribution, abundance, food, annotated list, habitat, migration


Censuses were conducted during two shipboard cruises in the western Beaufort Sea during fall 1971 and 1972. In an annotated species list, the authors summarize information on the distribution and food habits of the birds observed. MRP

Arctic
Seabirds
Annotated list, distribution, food


The author records the occurrence of a group of Aleutian and Arctic Terns on Adak Island during the summer of 1951, and postulates that both species breed there. CMH

Aleutians - (Adak Is.)
Gulls and terns
Arctic Tern, Aleutian Tern
Distribution

The author recounts dates when large numbers of Marbled Murrelets were observed near Sitka. NMH

Gulf of Alaska - Southeastern (Sitka)
Alcids
Marbled Murrelet
Distribution


This thesis presents an analysis of major components of niche specificity relative to the summer feeding ecology of Tufted and Horned Puffins on Buldir Island. MRP

Aleutians - (Buldir Is.)
Alcids
Horned Puffin, Tufted Puffin
Food, breeding biology


This paper presents information on the breeding biology of Horned and Tufted Puffins. MRP

Aleutians - (Buldir Is.)
Gulf of Alaska - Kodiak (Ugaiushak Is.)
Alcids
Horned Puffin, Tufted Puffin
Breeding biology

The marine birds of Ugaiushak Island were studied in summer 1977. Abundance, phenology, and production are addressed for each of 15 species. Information on foods and foraging areas, chick growth, relaying and twinning experiments, and colony attendance is presented for some. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Storm-petrels, cormorants, jaegers, gulls and terns, alcids
Reproduction, abundance, predation, food, mortality, growth


The authors describe the populations, breeding biology, food habits, and foraging areas of 21 species of marine birds in summer 1976. A daily checklist of the 50 species observed on the island is appended. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Storm-petrels, cormorants, jaegers, gulls and terns, alcids
Abundance, reproduction, food, checklist


The authors discuss the physiological and ecological significance of interrupted incubation by Fork-tailed Storm-Petrels. Intermittent periods of egg neglect are considered in relation to selective factors influencing temperatures optimal for embryonic development and acquisition of endothermy in chicks, and as an adaption to an unpredictable and dispersed food supply. CJL

Gulf of Alaska - Kodiak (Barren Is.)
Storm-petrels
Fork-tailed Storm-Petrel
Physiology, reproduction, behavior

This paper presents estimates of colony sizes in the Rat Islands. In addition, a new Red-faced Cormorant colony is described, and the incidence of plastic particles in auklet stomachs is discussed. MRP

Aleutians - (Rat Is.)
Fulmars and shearwaters, cormorants, gulls and terns, alcids
Distribution, abundance, pollution


The authors analyzed data presented in Sowls et al. (Catalog of Alaskan Seabird Colonies, 1978) to test the role of competition in structuring seabird breeding communities. MRP

Alaska
Seabirds
Distribution, abundance


The first part of this report discusses in detail the problems associated with censusing marine birds at sea. Current techniques are compared by computer simulations. A new survey technique is described and the results of pelagic surveys using the new technique are presented in terms of detection coefficients and mean densities. The second part discusses the formation and characteristics of feeding flocks, particularly those which contain more than one species. PJG

Gulf of Alaska
Seabirds
Techniques, behavior, food, abundance

524

This brief note details observations of three species new to the island: Short-tailed Shearwater, Common Merganser, and Hermit Thrush. REG

Gulf of Alaska - Southeastern (Forrester Is.)
Fulmars and shearwaters
Short-tailed Shearwater
Annotated list, distribution

460. WILLETT, G. 1920. Comments upon the safety of sea birds and upon the "probable" occurrence of the northern Bald Eagle in California. Condor 22:204-205.

As an example of seabirds' ability to withstand severe weather conditions, the author describes the journey of Ancient Murrelet chicks to sea. CMH

Gulf of Alaska - Southeastern (Forrester Is.)
Alcids
Ancient Murrelet
Mortality, behavior, distribution


The author provides addenda to information appearing in Bent's Life Histories (U.S. Natl. Mus. Bull. 113 and 121) on the occurrence and distribution of certain birds in southeastern Alaska. REG

Gulf of Alaska - Southeastern
Storm-petrels, cormorants, gulls and terns
Fork-tailed Storm-Petrel, Double-crested Cormorant, Brandt's Cormorant, Glaucous-winged Gull, Herring Gull, Mew Gull
Distribution

This paper "describes the nesting habits and the specimens taken at Craig." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Southeastern (Craig)
Alcids
Marbled Murrelet
Habitat, specimen record


The author briefly describes several colonies of nesting Arctic Terns, Mew Gulls, and Glaucous-winged Gulls found in the area in 1945. Information is included on habitat, nesting chronology, behavior, and size of the colonies. CMH

Gulf of Alaska - Southeastern (Alexander Archipelago)
Gulls and terns
Glaucous-winged Gull, Mew Gull, Arctic Tern
Habitat, reproduction, abundance, distribution


This note documents the nesting of this species in southcentral Alaska, approximately 300 miles northeast of its known range in Alaska at that time. REG

Gulf of Alaska - Cook Inlet (L. Louise, Susitna R.)
Cormorants
Double-crested Cormorant
Distribution

The authors describe color variations in plumage and soft parts of specimens of both species and several intermediate forms. The incidence of interbreeding of the two species is discussed. REG

Gulf of Alaska - Cook Inlet (Kenai Peninsula)
Gulls and terns
Glaucous-winged Gull, Herring Gull
Distribution, taxonomy, plumage


This note details the sightings of nine New Zealand Shearwaters between September 16 and 29, 1974 - the first records for this species from Alaska waters. REG

Gulf of Alaska - Northern Gulf, Copper River (Icy Bay)
Fulmars and shearwaters
New Zealand Shearwater
Distribution


The results of 54 beached bird surveys at 15 sites in the Gulf of Alaska during winter 1977-78 are summarized and briefly discussed. CMH

Gulf of Alaska
Fulmars and shearwaters, gulls and terns, alcids
Northern Fulmar, Short-tailed Shearwater, Glaucous-winged Gull, Black-legged Kittiwake, Common Murre, Thick-billed Murre
Mortality, pollution, techniques

527

The author discusses the winter distribution of murres in relation to water depth and prey densities. MRP

Bering Sea
Alcids
Common Murre, Thick-billed Murre
Distribution, food


Archaeological studies in the Aleutians are examined for their contribution to a more accurate reconstruction of albatross population history in the Aleutians and the North Pacific in general. Most of the albatross remains recovered were of the Short-tailed Albatross. REG

Aleutians - (Umnak Is.)
Albatrosses
Short-tailed Albatross, Black-footed Albatross, Laysan Albatross
Archaeology, distribution, abundance
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This note describes the interactions between a brood of five Spectacled Eider ducklings and a pair of adult Arctic Loons. The author describes feeding behavior, parental transport of young, alarm responses, following responses, and preening-resting periods. MRP

Arctic - Beaufort (Storkersen Point)
Loons, ducks
Arctic Loon, Spectacled Eider
Behavior


This paper reviews the literature on the diets of seabirds found in the northeastern North Pacific Ocean and Bering Sea, and broadly characterizes the diet of each species. Additional research on seabird feeding relations is suggested. MRP

North Pacific
Bering Sea
Geese, ducks
Food, research


These reports summarize information from surveys and inventories conducted in Alaska by State Fish and Game personnel. Many reports include results from hunter surveys, reports of banding activities, and information on production. MRP

Alaska
Waterfowl
Management, reproduction, abundance, habitat

This paper briefly discusses general differences in morphology and ecology of Canada Geese, and describes specimens of geese collected in Alaska. MRP

Gulf of Alaska
Aleutians
Interior
Bering Sea
Geese
Canada Goose
Taxonomy, anatomy


This report presents information on banding locations and recoveries of ducks and geese banded in North America. Chapters with information pertinent to Alaska are: "Migration of the Baldpate" by A.G. Smith; "Migration of the Green-winged Teal" by S.H. Low; "Distribution and Migration of Canvas-back Populations" by R.E. Stewart; and "Migration of the Greater Scaup Duck" by J.W. Aldrich. MRP

Alaska
Ducks
Green-winged Teal, American Wigeon, Canvasback, Greater Scaup
Migration


This paper appraises the Recovery Team - Recovery Plan approach to conservation of endangered species in the United States, and summarizes the status of recovery plans for each species. Included is a discussion of the status of the Aleutian Canada Goose and Peregrine Falcon. CMH

Aleutians
Geese
Canada Goose
Status, management

This note records the oiling, from an unknown source of crude or bunker oil, of an estimated 10,000 birds in the Kodiak Island archipelago during February and March 1970. Those species identified and others probably affected are listed. CMH

Gulf of Alaska - Kodiak
Grebes, geese, ducks
Pollution, public interest, mortality


This paper summarizes sight and specimen records of the Yellow-billed Loon in southeastern Alaska in 1920. Anecdotal information is given on behavior and food habits. CMH

Gulf of Alaska - Southeastern
Loons
Yellow-billed Loon
Distribution, abundance, food, behavior


This narrative account describes collecting adult Emperor Geese and their eggs during the spring. Other common species of birds are briefly mentioned. MRP

Bering Sea - Norton Sound (Wales)
Geese
Emperor Goose
Specimen record


Specimen records of Dafila acuta acuta (= Anas acuta) are presented. REG

Arctic - Chukchi (Wainwright)
Bering Sea - Norton Sound (Wales)
Ducks
Pintail
Distribution, specimen record

This paper discusses differences in two forms of *Anser albifrons* with special emphasis on their breeding distribution. REG

Arctic - Chukchi (Wainwright, Barrow)
Bering Sea - Yukon Delta (Igiak Bay)
Geese
White-fronted Goose
Taxonomy, distribution


This note describes specimens of six species of birds collected in June 1928. That of the Red-breasted Merganser and Black Brant represent new nesting records for the area. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Geese, ducks
Brant, Pintail, Black Scoter, Red-breasted Merganser
Specimen record, distribution


This note considers the taxonomic affinities of Pintails from the Seward Peninsula. REG

Arctic - Chukchi (Barrow, Wainwright), Kotzebue Sound
Ducks
Pintail
Distribution, taxonomy


Specimens of Arctic Loon (*Gavia arctica viridigularis*), Dotterel, and Red-throated Pipit are reported. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Loons
Arctic Loon
Distribution, specimen record

This note records the collection of two male Baikal Teal on King Island. CMH

Bering Sea - Norton Sound (King Is.)
Ducks
Baikal Teal
Distribution, specimen record


This paper records a specimen collected on May 13, 1948, in Chatham Strait. CMH

Gulf of Alaska - Southeastern (Chatham Strait)
Loons
Arctic Loon
Specimen record


This note presents the first record of this subspecies of Bean Goose (Anser fabalis serrirostris) collected in North America, and records specimens of six other uncommon species collected on St. Lawrence Island between 1950 and 1953. CMH

Bering Sea - St. Lawrence Is.
Loons, grebes, geese
Arctic Loon, Red-necked Grebe, Bean Goose
Distribution, specimen record


This paper compares the anatomy, physiology, and development of four subspecies of Sandhill Crane. Eggs of Grus canadensis canadensis were collected in Alaska, and chicks hatched from those eggs were included in the study. MRP

Alaska
Cranes
Sandhill Crane
Growth, anatomy, physiology

540

"This study defines and compares variation in the anatomy, physiology and development of four of the six Sandhill Crane subspecies. Eggs from four of the subspecies (including Alaskan)... were collected and transported to the International Crane Foundation where the chicks were hatched and reared under identical conditions." (From Wildlife Review 171:127. Original not seen). CMH

Alaska
Cranes
Sandhill Crane
Anatomy, physiology


This monograph presents a detailed account of the natural history of Trumpeter Swans. Most of the information is from Canada and the lower 48 states; however, information available from Alaska is included. MRP

Alaska
Swans
Trumpeter Swan
Abundance, distribution, breeding biology, habitat, food, management, population dynamics


The author describes a massive die-off of eiders, primarily King Eiders, along the Beaufort Sea coast in spring 1964. He also summarizes other major incidents of massive mortality, and compares these with the much lower mortality caused by subsistence use. CMH

Arctic - Beaufort
Ducks
Common Eider, King Eider
Mortality, subsistence

This paper presents information on the distribution of waterfowl observed in the western Beaufort Sea from August 17 to September 17, 1971. Vulnerability of the species to oil contamination is discussed. NMH

Arctic - Beaufort
Ducks
Oldsquaw
Pollution, distribution


This paper evaluates aerial survey techniques for estimating bird populations, and reports on the distribution of post-breeding waterfowl in Alaskan Arctic coastal waters. MRP

Arctic - Beaufort
Waterfowl
Techniques, distribution, abundance


This paper identifies and discusses potential problems for birds arising from resource development and hunting, describes responsibilities of various management agencies, and suggests specific research projects which should be conducted in the state. CMH

Alaska
Waterfowl
Management, research

This paper provides a general review of the principal habitats of breeding waterfowl, shorebirds, and seabirds; identifies the state and federal agencies managing these habitats; and discusses the types of resource development which may adversely affect birds. Recommendations for research and protection of avian habitats are made. MRP

Alaska
Waterfowl
Management, research


This research report contains papers presented during the International Symposium on the Conservation of Marine Birds of Northern North America, May 13-15, 1975. Topics include: marine environment of birds; status of marine bird populations; the biology and ecology of marine birds in the north; conflicts between the conservation of marine birds and uses of other resources; programs and authorities related to marine bird conservation; and conservation of marine birds in other lands. MRP

Alaska
Waterfowl
Abundance, distribution, fishing, food, habitat, management, mortality, pollution, population dynamics, predation, research, status, taxonomy, zoogeography


This paper discusses the status and distribution of the species of marine birds breeding along the coasts of the Chukchi and Bering Seas, and identifies gaps in knowledge of the area. Recommendations for further research are presented. MRP

Arctic - Chukchi
Bering Sea
Waterfowl
Distribution, status, research
This note reports on a Pintail banded in the Sacramento Valley of California in August and recovered near Wrangell, Alaska, the following October. REG

Gulf of Alaska - Southeastern (Wrangell, Stikine River Flats)
Ducks
Pintail
Migration

This book is an update of Kortright's (1942) classic work, The Ducks, Geese and Swans of North America. Included in this volume is a vast amount of information from unpublished reports and theses, as well as published material, much of it pertinent to Alaska. Species accounts are preceded by chapters that include general information on waterfowl surveys, migration corridors, population dynamics, classification, molts and plumages, migration, conservation, the role of hunting regulations, mortality and disease, and identification. MRP

Alaska
Swans, geese, ducks
Abundance, age and sex composition, anatomy, behavior, breeding biology, disease and parasites, distribution, food, habitat, management, migration, mortality, plumage, population dynamics, status, taxonomy

This paper reviews the abundance and distribution of dabbling ducks breeding in various habitats from the northcentral United States to the Arctic. Management strategies are suggested. MRP

Alaska
Ducks
Mallard, Gadwall, Pintail, Green-winged Teal, Blue-winged Teal, Northern Shoveler, American Wigeon
Abundance, distribution, habitat, management

This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Loons, grebes
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status, subsistence


This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Ducks
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status


This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Swans, geese, ducks
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status


This is one part of the classic series on the life histories of North American birds. Accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Herons, cranes, rails
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status

This paper discusses habitat requirements and facets of the breeding biology of Arctic and Red-throated Loons at Storkersen Point from 1971 to 1975. Spring arrival, abundance, production, distribution of nests, and feeding habits are addressed. MRP

Arctic - Beaufort (Storkersen Point)
Loons
Arctic Loon, Red-throated Loon
Breeding biology, food


This reports information on the abundance, reproductive ecology, and foods of seabirds at several sites in Norton Sound in 1977. Concentrations of waterfowl along coastal habitats in spring and fall are mapped and discussed. Reproductive success of Whistling Swans is summarized. Census techniques, measurements of reproductive success, suggestions for future research, and possible effects of oil development are discussed. CMH

Bering Sea - Norton Sound
Swans, geese, ducks, cranes
Abundance, distribution, reproduction, pollution


The author examines meristic data of Common Loons, including specimens from Alaska, and proposes a new subspecies. REG

Alaska
Loons
Common Loon
Anatomy, distribution, specimen record, taxonomy

Not reviewed.

Bering Sea - Yukon Delta
Cranes
Sandhill Crane
Breeding biology


This study includes information on breeding ecology, distribution and abundance, food habits, and migration and wintering areas. The project included monitoring of a natural population; color-banding; and rearing of a captive chick for information on behavior and food habits. CMH

Bering Sea - Yukon Delta
Cranes
Sandhill Crane
Breeding biology, management, migration, distribution, food


Not reviewed.

Bering Sea - Yukon Delta
Cranes
Sandhill Crane
Techniques, population dynamics


This includes "notes on Anser leucopareius, Aleutian Islands." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Aleutians
Geese
Canada Goose

This paper presents a "description of Spectacled Eider." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Ducks
Spectacled Eider
Specimen record, taxonomy


This thesis discusses the breeding ecology of the Dusky Canada Goose on the Copper River Delta, particularly in light of habitat requirements and the effect of the 1964 earthquake on habitat availability. CMH

Gulf of Alaska - Copper River (Copper R. Delta)
Geese
Canada Goose
Breeding biology, habitat, status


This paper describes in general the physical and demographic characteristics, fish and wildlife resources, and anticipated developments of the region, and outlines conflicts which are likely to arise. Recommendations are presented to mitigate environmental disturbance. CMH

Arctic
Waterfowl
Management, disturbance, pollution, research

The authors discuss the program to increase the population of Aleutian Canada Geese to a safe level. Work includes a study of the geese on Buldir Island, captive propagation, removal of introduced predators, release of captive-raised birds, and a study during migration and on the wintering areas. MRP

Aleutians
Geese
Canada Goose
Research, management


The author presents a case, based on several specimens and observations, for a large and regular spring movement of Brant through the Yukon Basin. REG

Interior - Upper Yukon
Bering Sea - Yukon Delta
Geese
Brant
Migration, distribution


This note records the occurrence of these three species in the central Brooks Range. CMH

Interior - Koyukuk
Ducks
Canvasback, Common Goldeneye, Bufflehead
Distribution

This note presents evidence that both B. c. taverneri and B. c. parvipes occur in the central Brooks Range. REG

Interior - Koyukuk (Brooks Range, Anaktuvuk Pass)
Geese
Canada Goose
Taxonomy, distribution


This study evaluates the status of the Dusky Canada Goose, its population dynamics, and the effects of harvest on the population. MRP

Gulf of Alaska - Copper River (Copper R. Delta), Southeastern Geese
Canada Goose
Management, status, population dynamics


This note records the collection of a male Gadwall near the Arctic coast in summer 1971, representing the northernmost occurrence of the species in continental North America to that date. CMH

Arctic - Beaufort (Prudhoe Bay)
Ducks
Gadwall
Distribution


This paper summarizes the information available to that date on the status of the Trumpeter Swan. Mentioned is a report by Nelson of one nesting at Fort Yukon, Alaska. CMH

Interior - Upper Yukon (Ft. Yukon)
Swans
Trumpeter Swan
Status, distribution, abundance

This report summarizes the numbers of birds banded in the Koyukuk and North Slope areas, and describes the techniques used. MRP

Arctic - Beaufort (Teshekpuk L.)
Interior - Koyukuk
Geese
Canada Goose, Brant, White-fronted Goose, Snow Goose
Techniques


This trip report summarizes observations and problems from aerial waterfowl surveys conducted October 13-20, 1978, between Anchorage and Cold Bay. Appended is a proposed filming procedure for estimating Black Brant numbers in Izembek Lagoon. MRP

Bering Sea - Bristol Bay
Swans, geese, ducks
Techniques, abundance


This report summarizes productivity data collected in 1979 during various projects. This is the beginning of an attempt to assemble and present the Alaska productivity data in a standard manner. MRP

Alaska
Swans, geese
Whistling Swan, Trumpeter Swan, Canada Goose, Brant, Emperor Goose, White-fronted Goose, Snow Goose
Reproduction

A random stratified plot sampling technique was devised to determine the number of waterfowl within a quarter mile of the coastline of the Alexander Archipelago during March. Population estimates and confidence levels are provided for Bald Eagles and for total ducks along coastlines and in open waters. PJG

Gulf of Alaska - Southeastern (Alexander Archipelago)
Ducks
Abundance, techniques


Mention is made of a wigeon banded in Oregon and recovered in Alaska eight years later. REG

Arctic - Chukchi (Shishmaref)
Ducks
American Wigeon
Distribution, migration


Individuals of Whistling Swan, White-fronted Goose, and Pintail, either banded or recovered in Alaska, are mentioned in this summary. REG

Bering Sea - Yukon Delta (Hooper Bay, Chevak), Norton Sound (Golovin)
Swans, geese, ducks
Whistling Swan, White-fronted Goose, Pintail
Migration


The author suggests possible spring and fall migration routes for this species, including its Arctic Alaska, Canada, and Siberia populations. REG

Arctic
Loons
Yellow-billed Loon
Migration

Not reviewed.

Alaska
Ducks
Food


This publication presents a detailed description and analysis of foods eaten by diving ducks. Data from specimens collected in Alaska are included. MRP

Alaska
Ducks
Food


This paper provides information on the foods of 47 species of birds, including six species collected in Alaska. CMH

Alaska
Loons, geese, ducks
Yellow-billed Loon, Emperor Goose, Green-winged Teal
Food


This paper describes the nesting habitat of Dusky Canada Geese in the Copper River Delta before the 1964 earthquake, and describes changes caused by the uplift. MRP

Gulf of Alaska - Copper River (Copper R. Delta)
Geese
Canada Goose
Habitat

This thesis describes the breeding biology of the Spectacled Eider. Topics include migration, nests and nest sites, eggs and egg laying, incubation, reproductive success, broods, and foods and feeding behavior. MRP

Bering Sea - Yukon Delta
Ducks
Spectacled Eider
Breeding biology, food, migration


This paper describes an adult male Spectacled Eider with a black chevron in the throat region. MRP

Bering Sea - Yukon Delta (Hooper Bay)
Ducks
Spectacled Eider
Plumage


This note describes use of a gill net to trap adult female and young Spectacled Eiders. Recaptures and sightings of marked birds provided information on site tenacity and return rates. CMH

Bering Sea - Yukon Delta
Ducks
Spectacled Eider
Techniques, behavior, reproduction


This paper discusses factors influencing nesting and clutch size of Spectacled Eiders, including climatological factors and habitat availability. MRP

Bering Sea - Yukon Delta
Ducks
Spectacled Eider
Reproduction, habitat

This note describes the helminth parasites from 11 Spectacled Eiders collected on the Yukon-Kuskokwim Delta. Parasites are discussed as a possible compounding factor in the mortality of young birds after they leave the breeding grounds. MRP

Bering Sea - Yukon Delta
Ducks
Spectacled Eider
Disease and parasites


The authors review the published and unpublished information available on the distribution and spring migration of Spectacled Eiders. Post-breeding migration routes, molting areas, and wintering distribution of the species are discussed. A wintering area in the Bering Sea is hypothesized. MRP

Alaska
Ducks
Spectacled Eider
Distribution, migration


This paper reports on the phenology of spring migration and nesting of Cackling Geese from 1969 through 1978. Photoperiod, weather, and timing of snow melt and runoff are discussed in relation to timing of arrival and nesting. MRP

Bering Sea - Yukon Delta
Geese
Canada Goose
Reproduction

This paper reports normal behavior of Snow Geese during staging, and evaluates the effects on their behavior of overflights by various types of aircraft. MRP

Arctic - Beaufort
Geese
Snow Goose
Disturbance, behavior


This is a report of a short-term study of seabirds on the Forrester Island National Wildlife Refuge in 1977. Emphasis was on establishing permanent study plots, and determining breeding densities for comparison in other years. MRP

Gulf of Alaska - Southeastern (Forrester Island NWR)
Loons, ducks
Yellow-billed Loon, Surf Scoter
Distribution, annotated list


This paper provides a general description of the subspecies of Canada Geese, and includes measurements from specimens and a brief description of known breeding areas. MRP

Alaska
Geese
Canada Goose
Taxonomy, anatomy, distribution

These volumes address the taxonomic relationships of the waterfowl of the world. Detailed descriptions of species and subspecies of ducks, geese, and swans in Alaska are included. For each species, descriptions of distribution and general habits are included. Volume 4 contains chapters on general habits, the reproductive cycle, ecology, distribution and species relationships, hunting, conservation and management, aviculture, anatomy, and fossil Anseriformes. MRP

Alaska
Swans, geese, ducks
Abundance, distribution, breeding biology, food, habitat, management, migration, plumage, status, taxonomy


This paper describes a new subspecies of White-fronted Goose (*Anser albifrons elgasi*). A breeding range in the taiga zone in Alaska is postulated. MRP

Alaska
Geese
White-fronted Goose
Taxonomy, anatomy, distribution


Four subspecies of *Anser nigricans* (= *Branta bernicla*) are proposed. REG

Alaska
Geese
Brant
Taxonomy

This volume contains natural history accounts of all species of cranes, alcids, loons, grebes, tubenoses, and herons occurring in the Soviet Union. Some information on species also occurring in Alaska is included. MRP

Alaska
Loons, grebes, herons, cranes
Abundance, distribution, behavior, breeding biology, food, habitat, migration, status, taxonomy, plumage


This volume contains natural history accounts of all species of Anseriformes occurring in the Soviet Union. Some information on species also occurring in Alaska is included. MRP

Alaska
Swans, geese, ducks
Abundance, distribution, behavior, breeding biology, food, habitat, migration, status, taxonomy, plumage


This paper presents information on Pintail migration, breeding densities, and production at sites on the Arctic Coastal Plain from 1971 to 1978, and relates those data to wetland conditions in the prairie pothole region. The importance of the availability of rich invertebrate food resources and stable water levels to drought-displaced Pintails is discussed. MRP

Arctic - Beaufort
Ducks
Pintail
Abundance, migration, food, habitat
79. DERKSEN, D.V., M.W. WELLER, and W.D. ELDRIDGE. 1979. Distribu-
tional ecology of geese molting near Teshekpuk Lake National
Bartonek (eds.), Management and Biology of Pacific Flyway

This paper describes the numbers, movements, and habitat require-
ments of geese molting near Teshekpuk Lake from 1976 to 1978.
Recommendations are included for protection of the area from
impacts of petroleum development. MRP

Arctic - Beaufort (Teshekpuk L.)
Geese
Canada Goose, Brant, White-fronted Goose, Snow Goose
Status, research, migration, plumage, habitat, disturbance,
abundance

80. DIXON, J. 1916. Migration of the Yellow-billed Loon. Auk
33:370-376.

This paper presents observations on the migration of Yellow-
billed Loons along the Beaufort Sea coast, and summarizes other
observations. Fall migration routes could not be clearly de-
fined. Observations during spring migration are discussed. MRP

Arctic - Beaufort
Loons
Yellow-billed Loon
Migration


This paper discusses human activities and natural processes that
have caused changes in numbers and the distribution of seabirds,
and presents a short discussion of theoretical models. Several
goals for improving our understanding of the population dynamics
and biology of marine birds are identified. MRP

Alaska
Waterfowl
Population dynamics, research, management

Population estimates are presented for 11 species of seabirds nesting on King Island in 1976. Information on phenology, reproductive success, and food habits is provided for some. Distribution of waterfowl and seabirds at sea is discussed briefly. CMH

Bering Sea - Norton Sound (King Is.)
Ducks
Distribution

83. DUNAGAN, T.T. 1957. Paramonomostomum malerischi n. sp. (Trematoda: Digenea: Notocotylidae) from the Emperor Goose (Phila

A new species of trematode is described from the coecum of an Emperor Goose collected near Nome. CMH

Bering Sea - Norton Sound (Nome)
Geese
Emperor Goose
Disease and parasites


This paper reviews information on the life history strategies and annual cycles of northern seabirds, particularly to determine the periods when they are most vulnerable to stress. MRP

Alaska
Ducks
Common Eider
Physiology, research

The author describes a new species of loon from northeastern Siberia and western Alaska, Gavia viridigularis, now considered G. arctica viridigularis. He considers three Alaska specimens mentioned by Hersey (Auk 34:283-290, 1917) to be this species. CMH

Bering Sea - Norton Sound (St. Michael, Nome), Pribilof Is.
Loons
Arctic Loon
Taxonomy, plumage


This book summarizes published and unpublished data on the natural history of Black Brant. MRP

Alaska
Geese
Brant
Distribution, abundance, breeding biology, foods, migration, predation, management, public interest, plumage, habitat


This is a comprehensive reference on nesting ecology and behavior of Emperor Geese on the central Yukon Delta. Included are observations of wintering birds along the Alaska Peninsula and at Adak Island. MRP

Bering Sea - Yukon Delta (Kokechik Bay), Bristol Bay (Alaska P.)
Aleutians - (Adak Is.)
Geese
Emperor Goose
Breeding biology, behavior, management, research


This brief abstract reports on the nesting success and clutch size of Black Brant on the Yukon-Kuskokwim Delta. MRP

Bering Sea - Yukon Delta
Geese
Brant
Reproduction, subsistence

This report summarizes the June waterfowl transect information for Alaska. MRP

Gulf of Alaska - Copper River
Arctic - Kotzebue Sound
Interior - Innoko, Tanana, Koyukuk, Upper Yukon
Bering Sea - Yukon Delta
Swans, geese, ducks
Status, abundance, distribution


This thesis presents a study of the breeding biology of White-fronted Geese on the Yukon-Kuskokwim Delta. The most important factors controlling reproduction are summarized. MRP

Bering Sea - Yukon Delta
Geese
White-fronted Goose
Breeding biology


This paper reports observations of waterfowl on St. Lawrence Island, Alaska. Changes in status and in the seasonal distribution and abundance are described for several species. Historic and current Eskimo waterfowl harvests are compared to determine changes in abundance of waterfowl. MRP

Bering Sea - St. Lawrence Is.
Swans, geese, ducks
Abundance, checklist, distribution, migration, status, subsistence, zoogeography

Observations of bird migration in springs 1969 and 1970, and fall 1969 are presented. Two species were positively identified, and several others suspected from the radar observations. Migration between Siberia and Alaska was examined by use of automatic camera exposures of the radar screen. MRP

Bering Sea - Norton Sound (Cape Prince of Wales)
Geese, cranes
Snow Goose, Sandhill Crane
Migration, techniques


Bird movements along the Arctic Coast were studied at six DEW radar sites. King and Common Eiders are treated in detail, but other water-related birds are discussed. Some visual observations are presented. CMH

Arctic - Beaufort (Lonely, Oliktok, Barter Is.), Chukchi (Point Lay, Wainwright, Barrow)
Swans, geese, ducks
Whistling Swan, Brant, White-fronted Goose, Snow Goose, Oldsquaw, Common Eider, King Eider
Migration


Spring migration past Pt. Barrow was monitored in 1974. Migration routes and influence of wind on the timing of migration are discussed. MRP

Arctic - Chukchi (Pt. Barrow)
Waterfowl
Migration


Not reviewed.

Arctic
Geese
Snow Goose

This paper describes parental and brood behavior of Emperor Geese before, during, and after departure from the nest. Behavior of captive goslings is also described. MRP

Bering Sea - Yukon Delta (Kokechik Bay)
Geese
Emperor Goose
Behavior


This note reports on three species of birds new to the island and one new to North America. REG

Bering Sea - St. Lawrence Is.
Geese, ducks
White-fronted Goose, Green-winged Teal
Specimen record, distribution


This note presents measurements of Green-winged Teal (Anas crecca nimia) collected in the Aleutian Islands. MRP

Aleutians
Ducks
Green-winged Teal
Taxonomy, anatomy


This paper presents information on the food habits of the American (= Common) Merganser based on analysis of stomach contents from 55 birds. MRP

Gulf of Alaska - Prince William Sound (Unakwik Inlet)
Ducks
Common Merganser
Food

This note documents the collection of a pair of Baikal Teal on St. Lawrence Island. CMH

Bering Sea - St. Lawrence Is.
Ducks
Baikal Teal
Distribution, specimen record


The author reports a population of 350 swans wintering in the vicinity of Ketchikan, which he surmises to be Trumpeter Swans. CMH

Gulf of Alaska - Southeastern (Ketchikan)
Swans
Trumpeter Swan
Distribution, abundance


The author describes the collection of a specimen of Anser fabalis sibiricus on St. Paul Island on April 19, 1946. REG

Bering Sea - Pribilof Is. (St. Paul Is.)
Geese
Bean Goose
Distribution, specimen record


This article presents historical and current information on the importance of Alaska to North America waterfowl populations, and discusses at length problems confronting these populations. Several recommendations are listed to offset the decline of waterfowl populations in Alaska. REG

Alaska
Waterfowl
Management, subsistence

The authors recommend that *Gavia immer elasson* be placed in synonymy and that *G. immer* be restored to its monotypic status.

REG

Alaska
Loons
Common Loon
Taxonomy


The author reports occurrence of a Crested Auklet and a Fork-tailed Storm-Petrel far inland, and describes the weather conditions associated with each incident. He also provides observations on behavior of birds during a storm at St. Lawrence Island, briefly discussing possible ties between such behavior and anomalous sightings.

CMH

Bering Sea - St. Lawrence Is.
Ducks
Oldsquaw, Common Eider, King Eider
Behavior


This report summarizes published and unpublished information on spring and fall migration routes and staging areas. The species addressed are those thought to be highly vulnerable to oil contamination in Alaskan marine waters.

REG

Alaska
Waterfowl, ducks, geese
Brant, Emperor Goose, Steller's Eider, Common Eider, King Eider, White-winged Scoter, Surf Scoter, Black Scoter
Migration, habitat, pollution

The distribution and abundance of waterfowl and shorebirds along the northcentral Alaska Peninsula are reported, with maps showing critical feeding and roosting areas. Information on the reproductive success of Common Eiders is also included. Appended is the paper "Feeding ecology of Steller's Eider." CMH

Bering Sea - Bristol Bay (Nelson Lagoon, Herendeen Bay)
Geese, ducks
Emperor Goose, Pintail, Oldsquaw, Common Eider, Steller's Eider, Black Scoter
Abundance, food, plumage, reproduction, habitat


This paper presents the "original description of the Pacific Eider and the description of the Spectacled Eider from specimens collected in Kotzebue and Norton Sounds respectively." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Arctic - Kotzebue Sound
Bering Sea - Norton Sound
Ducks
Spectacled Eider, Common Eider
Plumage, specimen record, taxonomy


This paper presents the original description of Colombus adamsii (= Gavia adamsii) based on a specimen taken in Bering Strait. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Norton Sound (Bering Strait)
Loons
Yellow-billed Loon
Taxonomy, specimen record

This paper, based primarily on the author's homing study of Semipalmated Plovers, discusses possible mechanisms birds use in navigating during migration. CMH

Arctic - Beaufort (Umiat)
Geese
Snow Goose
Migration


This report summarizes the results of a survey of populations of waterfowl breeding on the North Slope. Census procedures and the efficiency of helicopter surveys are discussed. NMH

Arctic - Beaufort
Waterfowl
Abundance, techniques


The author describes the avian remains excavated from a single Eskimo house occupied in the 16th century. He then discusses the probable means of hunting, the probable uses of each species, and the importance of such excavations for determining historical distribution of avian species. CMH

Arctic - Kotzebue Sound (Noatak R.)
Loons, swans
Arctic Loon, Red-throated Loon, Whistling Swan
Subsistence, distribution, archeology


The author reports on the stomach contents of a downy young Pintail and identifies needs for further studies. MRP

Arctic - Kotzebue Sound (Kobuk R.)
Ducks
Pintail
Food

This report presents observations of oil contamination in Salt Lagoon on St. Paul Island after the grounding of the F/V Ryuyo Maru No. 2 on November 8, 1979. The effects on the birds and other marine life are discussed. MRP

Bering Sea - Pribilof Is. (St. Paul Is.)
Loons, grebes, geese, ducks
Pollution, checklist


This is a brief account of Alaska Natives rounding up flightless waterfowl on the Yukon Delta for subsistence purposes. REG

Bering Sea - Yukon Delta (Nelson Is.)
Geese, ducks
Management, public interest, subsistence


This series of annual reports presents information from waterfowl studies, surveys, and banding programs, and discusses techniques as well as results. Although much of the new data can be found in the Federal Aid in Wildlife Restoration reports, they are summarized and discussed in these reports. MRP

Alaska
Waterfowl
Abundance, distribution, age and sex composition, reproduction, techniques, habitat, mortality

This reports on a waterfowl study conducted in 1957 in the Selawik area. Primary emphasis was on banding and on assessing waterfowl production. MRP

Arctic - Kotzebue Sound (Selawik)
Geese, ducks
Abundance, reproduction


This note presents summer records which indicate a change in population status for five species of ducks in Alaska. The significance of a drought in the Canadian prairies is discussed. CMH

Interior - Tanana (Tetlin)
Gulf of Alaska - Copper River
Ducks
Blue-winged Teal, Redhead, Ring-necked Duck, Canvasback, Ruddy Duck
Distribution, abundance


Data from studies on the Yukon-Kuskokwim Delta and the Copper River Delta are summarized with respect to tidal fluctuation and the timing of the nesting period. Losses from total destruction of nests and from lowered viability of eggs due to flooding are compared. MRP

Bering Sea - Yukon Delta
Gulf of Alaska - Copper River (Copper R. Delta)
Geese, ducks
Mortality

The regions of Alaska with the greatest densities of nesting waterfowl are outlined. The importance of habitat in Alaska for production of North American waterfowl is discussed. NMH

Alaska
Swans, geese, ducks
Public interest


Based on ten years of banding data and a detailed production study in Alaska, this paper provides a comprehensive synthesis of information on breeding and wintering distribution, migration, population estimates, survival rates, harvest, and management of Branta canadensis fulva and B. c. occidentalis. CMH

Gulf of Alaska - Copper River (Copper R. Delta), Southeastern (Glacier Bay)
Geese
Canada Goose
Distribution, abundance, migration, reproduction, management, population dynamics


This paper presents a summary of the population status of this species in North America. The Alaska population is discussed throughout. REG

Alaska
Swans
Trumpeter Swan
Management, status

This paper describes the immigration of large populations of ducks into Alaska from Canadian provinces during times of drought. Factors responsible, routes taken, and reproductive success of displaced ducks are discussed. REG

Alaska
Ducks
Distribution, management, reproduction


This paper summarizes nine years of banding data. Migration routes, wintering areas, mortality factors, and management needs are discussed. REG

Bering Sea - Yukon Delta
Geese
Brant
Migration, mortality, management


This is a major contribution on the biology of Trumpeter Swans in Alaska. Primary study areas were on the Copper River Delta and the Kenai Peninsula. Other information is presented as available. MRP

Alaska
Gulf of Alaska - Copper River (Copper R. Delta), Cook Inlet (Kenai Peninsula)
Swans
Trumpeter Swan
Breeding biology, migration

This note presents a means of ageing Black Brant based on coloration of secondary coverts. Age of first breeding is discussed. NMH

Bering Sea - Yukon Delta
Geese
Brant
Techniques


Records of occurrence of this species in North America are summarized by region and state. Ten records are presented from Alaska, all from islands of the Bering Sea or the Aleutians. REG

Aleutians
Bering Sea
Ducks
European Wigeon
Distribution, status


This report provides a summary of observations of Canada Geese on Kaliktagik and Anowik Islands from 1976 to 1979. The islands may be a previously undescribed nesting area for Aleutian Canada Geese. MRP

Gulf of Alaska - Kodiak (Semidi Is.)
Geese
Canada Goose
Distribution, abundance, anatomy

This report presents a brief synopsis of the results of studies conducted during summer 1977 at one site on the Bering Sea and at seven sites in the Gulf of Alaska. Information on breeding distribution and abundance, nesting habitat, phenology, nesting success, and feeding ecology is summarized for 16 species of marine birds. CMH

- Bering Sea
- Gulf of Alaska
- Ducks
- Common Eider
- Distribution, abundance, habitat, reproduction, food


Copulation by a pair of grebes on open water is described. REG

- Gulf of Alaska - Cook Inlet (Spenard L.)
- Grebes
- Red-necked Grebe
- Behavior


Based on an analysis of band recoveries, this paper examines movements of Pintail to breeding areas in Siberia, Alaska, and northern Canada during years of drought in interior North America. CMH

- Alaska
- Ducks
- Pintail
- Distribution, migration, habitat

The author summarizes the status of *G. arctica* in 1917, when it was considered a separate species from *G. pacifica* (now *G. arctica pacifica*). CMH

Alaska
Loons
Arctic Loon
Distribution, status


This note provides the first breeding record of the Common Eider in Glacier Bay. Observations of Horned and Tufted Puffins, Glaucous-winged Gulls, and Pigeon Guillemots are also mentioned. CMH

Gulf of Alaska - Southeastern (Glacier Bay)
Ducks
Common Eider
Distribution


The author briefly describes the spectacular spring migration of King Eiders along the coast of Norton Sound, and the fall migration of King Eiders, Mallards, and Canada Geese. CMH

Bering Sea - Norton Sound
Geese, ducks
Canada Goose, Mallard, King Eider
Migration, subsistence

Eighty-seven species were recorded, but fewer than a dozen are treated in this short note. The Spotted Sandpiper and Red and Northern Phalaropes are the only shorebirds mentioned, and Bufflehead and Common Goldeneye the only waterfowl. REG

Bering Sea - Yukon Delta (Scammon Bay)
Ducks
Common Goldeneye, Bufflehead
Distribution


Not reviewed.

Interior - Tanana (Minto L.)
Waterfowl
Distribution


This leaflet is a compilation of 180 published and unpublished references on Brant, with emphasis on the Black Brant. CMH

Alaska
Geese
Brant
Bibliography


This report summarizes results of aerial surveys and describes habitat use, reproductive performance, and production of waterfowl. Included are observations of other nesting species. MRP

Bering Sea - Yukon Delta (Nelson Is.)
Waterfowl
Habitat, abundance, distribution, reproduction

The author relates seasonal abundance and availability of aquatic macroinvertebrates to use by water birds. He discusses possible consequences of industrial contamination of aquatic habitats, and makes several recommendations for mitigating ill effects. MRP

Arctic - Beaufort (Pt. Storkersen, Kuparuk R., Colville R., Sagavanirktok R.)
Loons, swans, geese, ducks
Habitat, food, pollution, research, management


This abstract briefly describes the premigratory behavior of Black Brant during the fall, and discusses weather systems associated with their migration. MRP

Bering Sea - Bristol Bay (Izembek Bay)
Geese
Brant
Migration


This paper reports visual and radar observations of spring migration near Wales during May and early June 1978. Murres, Black-legged Kittiwakes, Black Brant, Common Eiders, and Oldsquaw were the primary species observed. Factors affecting the timing of migration are discussed. MRP

Bering Sea - Norton Sound (Cape Prince of Wales)
Geese, ducks
Brant, Oldsquaw, Common Eider
Migration

This dissertation discusses the relationships of the sea-ducks, primarily on the basis of anatomical and plumage characteristics. Many of the specimens examined were collected in Arctic Alaska. CMH

Arctic Ducks Taxonomy, anatomy, plumage


The author briefly describes a sequence of courtship display postures and accompanying vocalizations of a pair of Black Scoters. These are compared with descriptions in earlier accounts. CMH

Bering Sea - Yukon Delta (Igiak Bay) Ducks Black Scoter Behavior


The body temperatures of seven species of birds captured in Alaska and held in captivity at Anchorage were examined at various times of day. REG

Alaska Geese Brant, Emperor Goose Physiology

This paper reports on the incubation temperatures of eggs of seven species of birds, including Pintail and Semipalmated Sandpiper, nesting at Anaktuvuk. The behavior of incubating adults is discussed in relation to temperature of the embryo. MRP

Interior - Koyukuk (Anaktuvuk)
Ducks
Pintail
Physiology, behavior


The southward migration of cranes across the Bering Strait is described. REG

Bering Sea - Norton Sound (Cape Prince of Wales), Little Diomede Is.
Cranes
Sandhill Crane
Migration


This paper summarizes the information on distribution of the Aleutian Green-winged Teal. A specimen was collected at the Malheur National Wildlife Refuge in Oregon. MRP

Aleutians
Ducks
Green-winged Teal
Distribution

These proceedings contain a collection of papers presented at a symposium sponsored by the Northwest Section of the Wildlife Society, February 16, 1979. Major topics include: taxonomy and classification, breeding biology, molt and migration, wintering biology, and status and management. MRP

Alaska
Geese
Canada Goose, Brant, White-fronted Goose, Snow Goose, Ross' Goose
Abundance, distribution, breeding biology, food, management, migration, mortality, physiology, plumage, population dynamics, reproduction, research, status, taxonomy


The author presents general observations of eiders nesting on the western Yukon Delta, including accounts on territoriality, behavior, and rearing of the young. REG

Bering Sea - Yukon Delta (Igiak Bay)
Ducks
Spectacled Eider
Status, behavior


This volume summarizes information on the biology of waterfowl in North America. General discussions of the biology of waterfowl, distribution, migration, hunting, and recreational values, and an identification key precede the species accounts. Within each species account are sections on identification, age and sex criteria, distribution and habitat, general biology, general ecology, and social and sexual behavior. MRP

Alaska
Swans, geese, ducks
Abundance, anatomy, behavior, breeding biology, distribution, food, habitat, migration, plumage, taxonomy, mortality, management

This report analyzes a variety of morphological measurements of the six subspecies of Canada Geese breeding in Alaska, and discusses the reliability of using meristic data to distinguish subspecies. MRP

Alaska
Geese
Canada Goose
Taxonomy, anatomy


Not reviewed.

Ducks
Mallard, Pintail


This thesis reports on summer migration and the Eskimo harvest of waterfowl at Barrow between July 13 and September 7, 1970. Species composition of flocks and prevailing weather conditions during migration are presented; hunting success is analyzed in relation to species, time of day, and age of hunter; and the subsistence value of waterfowl is discussed. MRP

Arctic - Chukchi (Barrow)
Loons, geese, ducks
Management, migration, subsistence

This report addresses the migration, breeding, feeding, and staging/molting of birds at Simpson Lagoon in summer 1977. Tables summarize information on spring and fall migration for the 60 species of birds observed. Nesting densities and reproductive success are summarized for the 13 species breeding in the area. More detailed information on molt, staging, and feeding is presented for Oldsquaw, gulls, terns, and phalaropes. Possible effects of disturbance are briefly discussed. CMH

Arctic - Beaufort (Simpson Lagoon)
Waterfowl
Oldsquaw
Habitat, plumage, food, abundance, migration, disturbance


This report compares information gathered in 1977 and 1978 to assess the importance to birds of barrier island/lagoon systems. Timing of migration is summarized for 63 species, and nesting densities are presented. The majority of the report addresses habitat use by molting Oldsquaws, and premigratory staging of shorebirds, gulls, and terns. Results of feeding studies are presented for Oldsquaw, both phalaropes, and Glaucous Gulls. CMH

Arctic - Beaufort (Simpson Lagoon)
Waterfowl
Oldsquaw
Habitat, anatomy, physiology, plumage, food, abundance

Observations of Emperor Geese in the Hooper Bay area from May to July 1960 suggested a northward molt migration to St. Lawrence Island. MRP

Bering Sea - Yukon Delta (Hooper Bay, Panowat Spit)
Emperor Goose
Migration


This paper reports observations of a remnant breeding population of Aleutian Canada Geese on Buldir Island. The island's topography, climate, habitat, and avian and mammalian populations are described. Increased hunting pressure and the introduction of blue foxes to the breeding grounds are assessed as reasons for the decline of the subspecies. CMH

Aleutians - (Buldir Is.)
Canada Goose, Mallard, Pintail, Green-winged Teal
Geese, ducks
Status, habitat


The author presents counts of adult and first-year Black Brant in October 1963 at Izembek Bay. This information is discussed in relation to a major nesting failure on the Yukon-Kuskokwim Delta that summer. Habitat use and timing of migration are also addressed. CMH

Bering Sea - Bristol Bay (Izembek Bay)
Brant
Geese
Age and sex composition, migration, habitat

The author presents band return data from Steller's Eiders, indicating that those molting in Izembek Bay breed in Siberia. MRP

Bering Sea - Bristol Bay (Izembek Bay)
Ducks
Steller's Eiders
Plumage, migration, techniques


Based on age group counts of Black Brant staging on Izembek Bay during the autumns of 1963-1969, information on reproductive success of the population is presented. CMH

Bering Sea - Bristol Bay (Izembek Bay)
Geese
Brant
Age and sex composition


A technique, based on age-related plumage differences, is presented to assess reproductive success in the population. A simulation model is presented to test variables affecting population structure. REG

Bering Sea - Bristol Bay (Izembek Lagoon), Yukon Delta
Geese
Brant
Age and sex composition, population dynamics, migration, management, subsistence, reproduction, plumage

This paper reviews the information available on the effects of introduced animals on insular seabird populations. The need for research on the ecological consequences of animal introductions to islands is stressed. MRP

Alaska, Geese, ducks, Canada Goose, Common Eider, Predation, research


The authors describe the process of family disintegration in Black Brant at a staging area on the Alaska Peninsula. Age group counts are examined in light of changes in family group behavior. The importance of the area to this and several other species of waterfowl is also mentioned. CMH

Bering Sea - Bristol Bay (Izembek Bay), Geese, ducks, Canada Goose, Brant, Emperor Goose, Pintail, Behavior, habitat, food, abundance, age and sex composition


The source of ferruginous stains on waterfowl is examined. Discussions pertaining to Emperor Geese, Canada Geese, Red-throated Loons, and Northern Phalaropes refer to Alaska birds. REG

Aleutians, Bering Sea - Yukon Delta, Bristol Bay, Gulf of Alaska - Prince William Sound, Loons, geese, Red-throated Loon, Canada Goose, Emperor Goose, Habitat, plumage

This paper presents records of the Whooper Swan on the Aleutian Islands. NMH

Aleutians - (Amchitka Is., Atka Is., Little Kiska Is.)
Swans
Whooper Swan
Distribution


This note presents new distributional records for the Blue-winged Teal, Ring-necked Duck, and European Wigeon. CMH

Interior - Tanana
Gulf of Alaska - Cook Inlet, Kodiak, Southeastern
Ducks
Blue-winged Teal, European Wigeon, Ring-necked Duck
Distribution


This note reports a sight record of a probable Mallard-Pintail hybrid, and gives a description of its plumage and behavior. CMH

Interior - Tanana (Fairbanks)
Ducks
Mallard, Pintail
Plumage, behavior


Not reviewed.

Interior - Tanana
Cranes
Sandhill Crane
Migration

The occurrence of an individual of this species in Alaska in April 1958 is described. REG

Interior - Tanana (Fairbanks)
Cranes
Common Crane
Distribution


This paper suggests that an Alaskan Trumpeter Swan Management Council be founded, identifies agencies that should be represented on it, and describes the issues that should be addressed by such a group. MRP

Alaska
Swans
Trumpeter Swan
Management, research


This paper reports on the status of Trumpeter Swans in Alaska. Changes in the size of breeding populations between 1968 and 1975 are discussed, and possible effects of future changes in land status and economic activity are assessed. MRP

Alaska
Swans
Trumpeter Swan
Status, abundance


This is primarily a note on capture and banding techniques, but it does summarize banding efforts between 1960 and 1962. Fifteen species of ducks were banded, mostly Lesser Scaup. REG

Interior - Upper Yukon (Fort Yukon, Ohtig L.)
Ducks
Techniques, management

King, using the information presented in Klein's paper (Arctic 19:319-336, 1966) on Eskimo waterfowl harvest, discusses the potential for increased waterfowl take in Alaska. He then presents suggestions for future studies of the impacts of subsistence hunting. MRP

Alaska
Swans, geese, ducks, cranes
Subsistence, management


This paper presents data from surveys of Trumpeter Swans in Alaska in 1968. Included are population estimates and information on habitat preferences. MRP

Alaska
Swans
Trumpeter Swan
Abundance, habitat, distribution


Results of a mid-summer aerial waterfowl survey conducted in 1966 over the Arctic Slope are presented, and population estimates for the geese and swans breeding or molting in the region are given. The importance of the Arctic Slope to these species is discussed in relation to other areas of greater nesting concentration and to prospective petroleum development. Better census methods and additional ground studies are suggested. CMH

Arctic - Beaufort
Swans, geese, ducks
Abundance, techniques

This paper describes a three-year effort to trap and band flightless ducks on the northern Yukon Delta. Nine species are addressed, with their natal origins, migration routes, wintering areas, and, for some, longevity discussed. REG

Bering Sea - Yukon Delta (Takslesluk L.)
Ducks
Migration, techniques, subsistence


The author describes and discusses the limitations of five aerial census techniques used to estimate swan populations in Alaska over a 17-year period. These include complete census, random plot census, line transect surveys, random flights, and exploratory flights. REG

Alaska
Swans
Whistling Swan, Trumpeter Swan
Techniques


This report provides a brief summary of the species of geese and ducks observed during surveys. MRP

Bering Sea
Gulf of Alaska
Interior
Geese, ducks
Abundance, status

This paper analyzes recoveries of 12,997 geese banded near Teshekpuk Lake, an important molting area for Canada Geese and Black Brant. MRP

Alaska
Arctic - Beaufort (Teshekpuk L.)
Geese
Canada Goose, Brant, White-fronted Goose, Snow Goose
Migration, abundance, plumage


This paper reports the successful nesting between a female Trumpeter and a male Whistling Swan. The feeding and maintenance of injured and captive swans are also discussed. MRP

Gulf of Alaska - Southeastern (Juneau)
Swans
Whistling Swan, Trumpeter Swan
Behavior, breeding biology, rehabilitation


This paper evaluates the importance of Alaska habitats to migratory birds and identifies areas of the state where birds may be threatened by pollution and development. NMH

Alaska
Waterfowl
Distribution, abundance, habitat, migration, pollution

This paper presents a method to indicate the relative vulnerability of a marine bird species to oil pollution and related impacts of oil development. Each of 176 species of birds using marine habitats in Washington, Alaska, and British Columbia is ranked on the basis of 20 factors that affect its survival. The needs for such a system as a management tool are discussed. MRP

Alaska
Waterfowl
Management, pollution


This paper reports on the abundance and distribution of loons in the National Petroleum Reserve - Alaska during the 1977 and 1978 breeding seasons. Average densities and population estimates are given. MRP

Arctic - Beaufort (National Petroleum Reserve - Alaska)
Loons
Yellow-billed Loon, Arctic Loon, Red-throated Loon
Abundance, distribution


This thesis describes daily and seasonal changes in abundance, distribution, and habitat use of Pintail on the coast of the Yukon Delta. Feeding patterns over the intertidal were correlated with the tidal cycle and the abundance and distribution of invertebrates. MRP

Bering Sea - Yukon Delta
Ducks
Pintail
Food, habitat

591

This paper provides information on the breeding biology, molt migration, flightless period, and foods of Emperor Geese on the Chukotsky Peninsula. Information from Alaska is included for comparison. MRP

Bering Sea
Geese
Emperor Goose
Distribution, habitat, breeding biology, plumage, food, disease and parasites, behavior


This paper presents data on numbers, breeding, and diet of Spectacled Eiders on the Indigirka River Delta, Siberia. Much of the information is compared with that from Alaska. REG

Bering Sea - Yukon Delta
Ducks
Spectacled Eider
Breeding biology, population dynamics, food, status, distribution, behavior, abundance


This paper presents data collected during a survey of the inhabitants of the Yukon-Kuskokwim Delta from April to June 1964 and in February 1965. Estimates are given of the numbers of birds and eggs of each species harvested annually. Patterns of use are also discussed. MRP

Bering Sea - Yukon Delta
Swans, geese, ducks, cranes
Subsistence

This book presents information on molts and plumage, breeding biology, migration, and conservation of ducks, geese, and swans of North America. Observations from Alaska are included. MRP

Alaska
Swans, geese, ducks
Abundance, distribution, breeding biology, habitat, food, management, migration, plumage, public interest, status


This paper presents information on the abundance and distribution of geese and swans on the North Slopes of Alaska and the Yukon. MRP

Arctic - Beaufort
Swans, geese
Whistling Swan, Canada Goose, Brant, White-fronted Goose, Snow Goose
Abundance, distribution


Premigratory dispersal and staging of Snow Geese in Arctic Alaska and Canada are discussed. Included are notes on specific staging areas, estimates of numbers using the region, and calculations of brood size and adult-to-immature ratios. NMH

Arctic - Beaufort
Geese
Snow Goose
Migration, abundance, age and sex composition, distribution

This paper reports on the numbers of geese and swans on the North Slope during fall, identifies staging areas, compares the timing of use among species, and evaluates year-to-year variations. MRP

Arctic - Beaufort
Swans, geese
Whistling Swan, Canada Goose, Brant, White-fronted Goose, Snow Goose
Abundance, distribution, migration


This paper presents information on the staging areas and timing of migration of Snow Geese on the North Slope. The two most important sites were at Walking River and Crow-Phillips. MRP

Arctic - Beaufort
Geese
Snow Goose
Distribution, abundance, migration


This reports preliminary results of a study of the seasonal feeding habits of marine birds near Kodiak Island. The aggregate percent volume of prey is presented for four species collected in winter and for seven collected in summer. Possible impacts of petroleum development on prey species are briefly discussed. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Ducks
Oldsquaw, Black Scoter
Food

This report describes the habitat use, abundance, and reproductive success of Canada Geese in the Port Etches-Constantine Harbor area of Prince William Sound. The subspecies of Canada Goose was not determined. MRP

Gulf of Alaska - Prince William Sound (Hinchinbrook Is.)
Geese
Canada Goose
Reproduction, habitat, abundance, predation


This note reports the presence of a male Ring-necked Duck in Sitka during January. NMM

Gulf of Alaska - Southeastern (Sitka)
Ducks
Ring-necked Duck
Distribution


This article summarizes the provisions that differ from those in previous treaties and discusses their significance to marine bird management. Disturbance, subsistence use, and habitat protection are addressed. The full treaty is included. MRP

Alaska
Waterfowl
Management


The author describes how to construct and use a gillnet to trap flightless waterfowl. CMH

Interior - Upper Yukon
Waterfowl
Canvasback, Black Scoter
Techniques

This preliminary report summarizes results from the 1961 field season, and assesses the importance of the Yukon Flats as a breeding area for ducks. MRP

Interior - Upper Yukon
Loons, ducks, cranes
Abundance, distribution, age and sex composition, reproduction, techniques


This progress report discusses the potential effects on waterfowl from construction of the proposed Rampart Dam, and summarizes data gathered during a field study in 1962. MRP

Interior - Upper Yukon
Loons, grebes, geese, ducks, cranes
Abundance, distribution, age and sex composition, reproduction, management, checklist


This report describes the distribution of recoveries of ducks banded as flightless young. Data from birds banded in Alaska are included. MRP

Alaska
Ducks
Mallard, Pintail, Green-winged Teal, Northern Shoveler, American Wigeon, Canvasback, Lesser Scaup
Distribution, migration

596

The author describes the attack and killing of a downy scaup by an adult loon. REG

Interior - Upper Yukon (Yukon Flats)
Loons, ducks
Arctic Loon, Lesser Scaup
Mortality, behavior


This banding-recapture study indicated that female Black Brant marked with neck bands had significantly poorer nesting success than leg-banded controls or unbanded Brant. Possible causes are discussed. CMH

Bering Sea - Yukon Delta
Geese
Brant
Techniques, reproduction


This report summarizes banding and recovery data for White-fronted Geese. The distribution of various populations is analyzed, and priorities in management and future banding are addressed. A discussion on the Tule White-fronted Goose is included. NMH

Alaska
Geese
White-fronted Goose
Distribution, migration

This paper analyzes observations of Whistling Swans between 1963 and 1971 from low-flying aircraft. Annual variations in productivity are analyzed and correlated with climatic conditions. MRP

Bering Sea - Yukon Delta
Swans
Whistling Swan
Population dynamics, distribution


This paper introduces and briefly summarizes results of six studies conducted in the Gulf of Alaska in 1978. CMH

Gulf of Alaska
Waterfowl
Research, population dynamics, distribution, abundance, breeding biology, food


Discussed are the results of a January 1952 survey of the distribution and numbers of Brant along the Pacific Coast. Survey data from southeastern Alaska are included. REG

Gulf of Alaska - Southeastern
Geese
Brant
Abundance, distribution, management, status

This paper discusses observations on the populations, breeding biology, and foods of 19 species of marine birds during summer 1976. A checklist presents the breeding status of the 54 species of birds observed. CMH

Gulf of Alaska - Kodiak (Semidi Is.)
Ducks
Common Eider
Abundance, reproduction, food, checklist


Mention is made of banding work done on the Yukon Delta on Cackling Geese in summer 1924. REG

Bering Sea - Yukon Delta
Geese
Canada Goose
Migration


From analysis of 39 returns of Cackling Canada geese banded on their breeding grounds, the author suggests a probable fall migration route and the principal winter range of this population. CMH

Bering Sea - Yukon Delta (Hooper Bay)
Geese
Canada Goose, Emperor Goose
Migration, subsistence, food

This paper "mentions the nesting of a colony of American Scaups as well as sets of eggs of Pintails and Merganser serrator." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Ducks
Pintail, Greater Scaup, Red-breasted Merganser
Distribution


This paper "mentions a Pintail killed near Cordova, Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Prince William Sound (Cordova)
Ducks
Pintail
Migration


A pair of this species was observed on May 28, 1959 near the Pitmegea River, two miles from the Beaufort Sea coast. The possibility of nesting is discussed. REG

Arctic - Beaufort (Pitmegea R.)
Ducks
Baikal Teal
Distribution


Mention is made of three banded Pintail recovered in Alaska. REG

Arctic - Kotzebue Sound (Selawik)
Bering Sea - Yukon Delta (Quithlook), Bristol Bay (Dillingham)
Ducks
Pintail
Migration, distribution

This paper presents a general description of waterfowl use of Izembek Bay and Nelson Lagoon during April and May 1958. Twelve different displays of the Black Scoter are briefly described. REG

Bering Sea - Bristol Bay (Izembek Bay, Nelson Lagoon)
Waterfowl, ducks
Black Scoter
Behavior, distribution


This paper describes the behavior and displays of wild Steller's Eiders. Strong tendencies to flock densely and fly readily are examined in light of their survival value and influence on feeding, pairing, and copulatory behavior patterns. The differences between the displays of Steller's and Common Eiders are discussed. MRP

Bering Sea - Bristol Bay (Nelson Lagoon, Izembek Bay)
Ducks
Steller's Eider, Common Eider
Behavior


The authors present maps depicting areas of high waterfowl productivity and regions of potential oil development. The possible impact of such development on breeding and migrating waterfowl is discussed for each region. NMH

Arctic
Bering Sea
Gulf of Alaska
Swans, geese, ducks, cranes
Pollution, distribution

This paper discusses the potential for disastrous and irrecoverable losses to northern marine bird populations and identifies research needs. MRP

Alaska
Waterfowl
Pollution, research


Included is a short discussion of the utilization of eelgrass by waterfowl in Izembek Lagoon. CMH

Bering Sea - Bristol Bay (Izembek Lagoon)
Geese
Canada Goose, Brant
Food


This thesis presents detailed information on the breeding biology of Cackling Canada Geese, and less detailed information on Black Brant, Emperor Geese, White-Fronted Geese and Spectacled Eiders nesting on the study area. MRP

Bering Sea - Yukon Delta
Geese, ducks
Canada Goose, Brant, Emperor Goose, White-fronted Goose, Spectacled Eider
Breeding biology

This monograph presents detailed information on the breeding biology of the Cackling Canada Goose, with additional information on four associated species. The study was conducted from 1969 to 1972 on the Clarence Rhode National Wildlife Range. MRP

Bering Sea - Yukon Delta
Geese, ducks
Canada Goose, Brant, Emperor Goose, White-fronted Goose, Spectacled Eider
Breeding biology


During a study of nesting and migrating birds on the eastern Copper River Delta in 1978 and 1979, the authors determined habitat preferences, distribution, abundance, and phenology for the avifauna of the area. Critical habitats were identified and recommendations made for future surveillance and management of populations. Detailed information is presented for Dusky Canada Geese, Sandhill Cranes, and shorebirds. REG

Gulf of Alaska - Copper River (eastern Copper R. Delta)
Loons, grebes, swans, geese, ducks, cranes
Whistling Swan, Canada Goose, Mallard, Sandhill Crane
Abundance, breeding biology, checklist, distribution, food, habitat, management, migration, predation, status, reproduction


Not reviewed.

Geese
Canada Goose

This bibliography lists over 2,000 references on eiders. MRP

Alaska
Ducks
Steller’s Eider, Common Eider, King Eider, Spectacled Eider
Bibliography


In this account of the wintering habitat and habits of Dusky Canada Geese (Branta canadensis occidentalis), the author briefly discusses their probable breeding grounds. CMH

Gulf of Alaska
Geese
Canada Goose
Distribution


This comprehensive report, based on published information and data from banding studies and surveys, describes the distribution, migration, harvest characteristics, and population dynamics of Green-winged Teal. Additional studies are recommended. MRP

Alaska
Ducks
Green-winged Teal
Distribution, migration, population dynamics, management, research

This paper documents Trumpeter Swans nesting in the lower Copper River basin. Identification of Trumpeter and Whistling Swans is discussed. NMH

Gulf of Alaska - Copper River
Swans
Whistling Swan, Trumpeter Swan
Distribution, plumage


Not reviewed.

Geese
Brant
Physiology, anatomy, food


The taxonomic affinities of nine subspecies of Canada Geese are evaluated through examination of their serum protein patterns. MRP

Gulf of Alaska - Cook Inlet, Copper River
Geese
Canada Goose
Taxonomy


This note reports on poxvirus infection diagnosed in a juvenile Green-winged Teal. This is the first report of avian pox in migratory ducks and the first report of the infection in wild birds in Alaska. MRP

Interior - Tanana (Minto Flats)
Ducks
Green-winged Teal
Disease and parasites

This note reports the range extension of the Hooded Merganser into southwestern Alaska. NMH

Gulf of Alaska - Kodiak (Afognak Is.)
Ducks
Hooded Merganser
Distribution


This brief note describes the reaction of the male when the female of a pair of King Eiders was collected during spring migration. MRP

Arctic - Chukchi (Barrow)
Ducks
King Eider
Behavior


In 1936 and 1937 food items were collected and identified from 28 Bald Eagle nests. Among the identifiable food items were remains of 24 species of water-associated birds, mostly alcids, gulls, and fulmars. REG

Aleutians - (Amak Is., Sankin Is.)
Ducks
Predation


This paper reports on "fat analysis of livers and kidneys from Old Squaw and Red Phalarope." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Arctic - Chukchi (Barrow)
Ducks
Oldsquaw
Physiology

This paper presents data on fatty acids, lipid phosphorus, and cholesterol levels in tissues of four Arctic migratory birds. The significance of variations in lipid patterns among the species is discussed. REG

Arctic - Chukchi (Barrow)
Ducks
Oldsquaw
Physiology, migration


Preliminary results of a study of the spring and fall migration of eiders, their breeding requirements, and their use by natives are presented. Research needs are discussed. MRP

Arctic - Chukchi, Beaufort
Ducks
Steller's Eider, Common Eider, King Eider, Spectacled Eider
Research, food, specimen record, subsistence, migration, breeding biology, anatomy


This dissertation discusses the systematics of the sea-ducks, based primarily on studies of their behavior in Alaska and British Columbia. Detailed descriptions and drawings are provided for many of the displays. CMH.

Alaska
Ducks
Taxonomy, behavior

This paper describes some of the displays of the King Eider, compares the displays of King and Common Eiders, and discusses selection for interspecific isolating mechanisms which result in divergence of the displays. MRP

Arctic - Chukchi (Barrow), Beaufort (Colville R.)
Gulf of Alaska - Cook Inlet (Homer)
Ducks
Common Eider, King Eider
Behavior


This paper presents observations of spring migration of Black Brant and several other early migrants. Flight behavior, body condition during spring migration, and possible migration routes of Black Brant are described. MRP

Bering Sea - Norton Sound (St. Michael)
Swans, geese, ducks, cranes
Whistling Swan, Canada Goose, Brant, Emperor Goose, White-fronted Goose, Pintail, Sandhill Crane
Migration, behavior


This is a compendium of reports on waterfowl studies in Alaska. Results of aerial surveys conducted over northwestern Alaska, the Arctic coast, and the Yukon Delta are presented. Data from nesting and banding studies on the Kashunuk River, Innoko, Pike Lake, and Iditarod areas are summarized. General observations of many species are included. MRP

Arctic - Beaufort, Kotzebue Sound
Bering Sea - Yukon Delta
Interior - Innoko, Koyukuk
Waterfowl
Abundance, distribution, habitat, annotated list, mortality, predation, subsistence, plumage, migration

This report summarizes dates of spring migration of waterfowl at several locations in Alaska. MRP

Alaska
Loons, swans, geese, ducks
Migration


This report provides information from waterfowl surveys of the Seward Peninsula, northwestern Alaska, Arctic Coast, Minto Lakes, and Yukon Delta. Data from banding studies at Minto Lakes, Innoko River, and Lower Yukon areas are reported; results of a nesting study at Minto Lakes are also summarized. MRP

Arctic - Kotzebue Sound
Interior - Innoko, Koyukuk
Bering Sea - Yukon Delta
Swans, geese, ducks
Abundance, migration, plumage, predation


This report provides information from waterfowl surveys of the Yukon Delta, Innoko-Yukon, northwest Alaska, Arctic, Minto Lakes, Seward Peninsula, Fort Yukon, and Lake Louise. Some significant information on Snow Goose and Black Brant migration routes is included. MRP

Alaska
Swans, geese, ducks
Abundance, migration, plumage, predation, habitat

609

This is a compendium of several reports on waterfowl studies: geese nesting on the Yukon-Kuskokwim Delta; gull-waterfowl relationships on the Yukon-Kuskokwim Delta; waterfowl at Shishmaref; and waterfowl in the Innoko-Iditarod River area. Information on other species is included. MRP

Arctic - Kotzebue
Interior - Innoko, Koyukuk, Tanana
Bering Sea - Yukon Delta
Waterfowl
Abundance, distribution, checklist, food, migration, predation, reproduction, plumage, subsistence


This summarizes information collected in 1952 on spring waterfowl migration in Alaska and from banding studies on the Yukon Delta, Copper River Delta, and Minto Lakes area. MRP

Bering Sea - Yukon Delta
Gulf of Alaska - Copper River
Interior - Tanana
Swans, geese, ducks, cranes
Abundance, mortality, plumage, predation, reproduction, migration


This paper describes the waterfowl banding program in Alaska, and includes information on banding techniques, numbers of each species banded, and locations of banding returns. NMH

Arctic
Bering Sea
Gulf of Alaska
Interior
Loons, swans, geese, ducks
Migration, techniques

This short note describes Canada Geese nesting on the steep, often inaccessible 50 to 300-foot cliffs of the upper Colville River. REG

Arctic - Beaufort (Colville R.)
Geese
Canada Goose
Status, distribution, habitat


This reports on several studies conducted in 1953: breeding ground survey of the Yukon Flats; nesting and banding study at Minto Lakes; and banding operations on the Copper River Delta. MRP

Interior - Upper Yukon, Tanana (Minto Lakes)
Gulf of Alaska - Copper River
Ducks
Abundance, distribution, reproduction, mortality, predation, plumage, food


A nest near the junction of the Colville and Itkillik Rivers is reported. REG

Arctic - Beaufort (Colville R., Itkillik R.)
Grebes
Red-necked Grebe
Distribution

This reports on two studies conducted in 1954: nesting and banding at Minto Lakes; and comparative breeding biology of Greater and Lesser Scaup. MRP

Interior - Tanana (Minto Lakes)
Swans, geese, ducks
Greater Scaup, Lesser Scaup
Reproduction, abundance, distribution


This is a compendium of reports on several studies of waterfowl in Alaska in 1954. Included are studies of production on the Yukon Delta, on the Copper River Delta, and at Minto Lakes; banding studies on the Yukon Delta, Innoko and Iditarod River areas, and Copper River Delta; and a breeding ground survey of the Fort Yukon Flats. MRP

Interior - Tanana (Minto Lakes), Innoko, Upper Yukon
Bering Sea - Yukon Delta
Gulf of Alaska - Copper River
Geese, ducks, cranes
Reproduction, abundance, habitat, techniques, mortality, predation


The author presents, mostly in tabular format, a summary of waterfowl bandings and recoveries in and from Alaska between 1948 and 1952. The locations of bandings and recoveries are also given. Most of the information pertains to the Cackling Canada Goose and Black Brant. REG

Alaska
Waterfowl, geese
Canada Goose, Brant
Migration, management, distribution

Several studies conducted in 1955 are reported, including banding and production on the Copper River Delta; nesting in the Selawik area; and a breeding ground survey of the Fort Yukon Flats. MRP

Arctic - Kotzebue Sound (Selawik)
Interior - Upper Yukon (Yukon Flats)
Gulf of Alaska - Copper River
Geese, ducks
Abundance, reproduction, habitat, distribution, mortality, predation


Details of the observations and/or collections of these species are provided. REG

Gulf of Alaska - Southeastern (Juneau)
Ducks, herons, rails
Blue-winged Teal, Snowy Egret, Sora
Distribution, specimen record


This report reviews other reports on the Stikine, presents preliminary information on foods of ducks and geese, identifies needs for further research, and describes management measures. MRP

Gulf of Alaska - Southeastern (Stikine R. Flats)
Geese, ducks
Food, management, research, status

613

This paper describes the breeding range, migratory route, mortality, population, and management needs of this small Canada Goose. REG

Bering Sea - Yukon Delta
Geese
Canada Goose
Management, migration, distribution, mortality, status


This list includes sets of eggs of five species from Alaska. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Geese, ducks
Snow Goose, King Eider
Specimen record


This paper examines traditional and current subsistence activities of the residents of Mekoryuk on Nunivak Island. MRP

Bering Sea - Nunivak Is.
Geese, ducks, cranes
Subsistence

Abundance, nesting habitat, breeding phenology, and productivity of 10 species are discussed, and data collected in 1978 are compared with those of 1975 and 1977. Chick growth and feeding rates are addressed for Black-legged Kittiwakes and Tufted Puffins. An annotated list of the 75 species observed in summer 1978 is appended. REG

Gulf of Alaska - Kodiak (Chiniak Bay)
Ducks
Common Eider
Reproduction, abundance, annotated list


The 1977 breeding season phenology and productivity are reported for eight major species nesting on islands of inner Chiniak Bay and on mainland Kodiak. Population estimates and densities of major breeding species are presented. Incidental notes are summarized for six other species breeding in the area. A list of the prey items taken by nine species of seabirds is presented. CMH

Gulf of Alaska - Kodiak (Kodiak Is., Chiniak Bay)
Ducks
Common Eider, Red-breasted Merganser
Reproduction


The author discusses the significance of gull predation on breeding waterfowl in Alaska. NMH

Alaska
Waterfowl
Predation

This volume is the first in a planned series on the birds of North America. Published and unpublished material is included for each species. Topics addressed for each species include: molt and plumage, field identification, voice, habitat, distribution, migration, reproduction, habits, and food. MRP

Alaska
Loons, grebes, herons
Behavior, distribution, food, plumage, habitat, migration, population dynamics, abundance, status, reproduction


This volume is one of two edited by Palmer on the waterfowl of North America. Published and unpublished material is included for each species. Topics addressed for each species includes: molt and plumage, field identification, voice, habitat, distribution, migration, banding status, reproduction, habits and food. This volume includes swans, geese, and dabbling ducks. MRP

Alaska
Swans, geese, ducks
Abundance, breeding biology, distribution, food, habitat, behavior, migration, plumage, population dynamics, status


This volume is one of two edited by Palmer on the waterfowl of North America. Published and unpublished material is included for each species. Topics addressed for each species includes: molt and plumage, field identification, voice, habitat, distribution, migration, banding status, reproduction, habits, and food. This volume includes eiders, wood ducks, diving ducks, mergansers, and stifftails. MRP

Alaska
Ducks
Abundance, breeding biology, behavior, distribution, food, plumage, habitat, migration, population dynamics, status

Not reviewed.

Arctic - Chukchi (Point Hope)
Waterfowl
Subsistence


This brief report summarizes information on birds banded and broods observed in the vicinity of Lake Louise. Logistics are discussed, and recommendations are made for future studies. NMH

Gulf of Alaska - Copper River (Lake Louise)
Ducks
Mallard, Pintail, Green-winged Teal, American Wigeon, Bufflehead, Oldsquaw, Red-breasted Merganser
Techniques, abundance


This thesis presents information on the breeding biology of Arctic and Red-throated Loons on the Yukon-Kuskokwim Delta. Included are observations of spring phenology, arrival, prenesting behavior, incubation, nests and nest sites, egg sizes, clutch size and chronology, hatching success, and broods of both species. The author discusses factors influencing arrival and nest initiation, hatching success, and brood survival. MRP

Bering Sea - Yukon Delta
Loons
Arctic Loon, Red-throated Loon
Breeding biology

This paper reports on the reproductive success of Arctic Loons and factors influencing it. MRP

Bering Sea - Yukon Delta
Loons
Arctic Loon
Breeding biology


The foods and feeding behavior of Steller's Eiders are reported from a study at Nelson Lagoon. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)
Ducks
Steller's Eider
Food, behavior


Arctic Loons were studied on the Yukon-Kuskokwim Delta during the nesting seasons of 1974 and 1975. Various aspects of their breeding biology discussed in this paper include: spring phenology and loon arrival, nests and nest-sites, clutch-size and chronology, and hatching success. Pond availability, timing of egg-laying, timing of the goose hatch, and predation are discussed in relation to reproductive success of the loons. MRP

Bering Sea - Yukon Delta (Old Chevak)
Loons, geese
Arctic Loon, Canada Goose
Breeding biology, predation

This paper provides information on the population size, molt chronology, food habits, and feeding behavior of Steller's Eiders at Nelson Lagoon. Differences in the timing of molt between age and sex groups, and changes in foods and feeding behavior throughout the summer are discussed. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)
Ducks
Steller's Eider
Food, plumage, abundance


This report provides information on summer populations, feeding ecology, and energetics during the molt of Steller's Eiders on the Alaska Peninsula. MRP

Bering Sea - Bristol Bay (Alaska Peninsula)
Ducks
Steller's Eider
Distribution, abundance, food, physiology


This reports information on the abundance, breeding biology, and predation of seabirds, and on spring migration, molt and foraging areas of loons and waterfowl in 1976. An appended table lists the 132 species of birds recorded from the area between 1963 and 1976; notes are included for those recorded only in 1976. CMH

Bering Sea - Bristol Bay (Cape Peirce)
Loons, geese, ducks
Migration, habitat, plumage, reproduction, predation

This paper discusses geographical, phytogeographical, and zoogeographical evidence for differentiation in Anatidae during the last glaciation. The author presents maps depicting current and surmised historical breeding ranges for the major species. He also compares geographical differentiation in the families Anatidae and Gaviidae, and the genera Calidris and Tringa. NMH

Alaska
Loons, swans, geese, ducks
Zoogeography


Not reviewed.

Gulf of Alaska - Cook Inlet (Chickaloon Flats)
Waterfowl
Habitat


This paper analyzes the recoveries from 4,665 Vancouver Canada Geese banded in Southeast Alaska to determine the relative importance of different wintering areas. MRP

Gulf of Alaska - Southeastern
Geese
Canada Goose
Migration, distribution, research

The mean life span of Vancouver Canada Geese is calculated, based on analysis of 351 recoveries from 3,491 birds banded as adults. The authors compare and evaluate modern and older methods of calculating survival estimates. MRP

Gulf of Alaska - Southeastern (Glacier Bay) Geese
Canada Goose
Population dynamics, techniques


Weights and several other measurements of 309 molting Vancouver Canada Geese captured at Glacier Bay in 1973 are summarized and tested for differences between sexes. Body condition is briefly discussed. CMH

Gulf of Alaska - Southeastern (Glacier Bay) Geese
Canada Goose
Anatomy, physiology, techniques


This article provides measurements of Cackling Canada Geese collected near Old Chevak, Alaska, and in California. MRP

Bering Sea - Yukon Delta Geese
Canada Goose
Anatomy

Aerial surveys of the intertidal areas of Cook Inlet, Kamishak Bay, Nushagak Bay, and the Yukon Delta were conducted May 3-7, 1978, to assess use of the areas by geese and swans during spring migration. Follow-up studies are recommended. MRP

Gulf of Alaska - Cook Inlet
Bering Sea - Bristol Bay, Yukon Delta
Swans, geese
Whistling Swan, Trumpeter Swan, Canada Goose, Brant, Emperor Goose, White-fronted Goose, Snow Goose
Abundance, distribution


This paper presents data on the delay between peak arrival and peak nest initiation by Cackling Geese as it relates to the time required for rapid yolk development. Data available from other studies of Brant, Lesser Snow Geese, and Ross' Geese are reviewed. The plasticity in ovary preparation is discussed in relation to weather patterns that affect spring thaw and the availability of nest sites. MRP

Alaska
Bering Sea - Yukon Delta (Old Chevak)
Geese
Canada Goose, Brant
Physiology, reproduction

This paper reports on fluctuations in weight, lipids, and protein content of the body, breast muscles, and liver, and changes in the size of leg muscles, gizzard, and intestines of adult Cackling Geese. Specimens were collected during various stages of the nesting cycle in Alaska, and during fall migration, winter, and spring migration in California. The lipid and protein reserves stored by the geese during spring migration are discussed in relation to initiation of nesting and control of clutch size. MRP

Bering Sea - Yukon Delta
Geese
Canada Goose
Physiology


This paper analyzes the relative contributions of energy supplied from the diet and that obtained from stored reserves during the annual cycle of Cackling Geese. Methods of meeting increased energy demands in various stages of the cycle are discussed. MRP

Alaska
Geese
Canada Goose
Physiology, food


This paper presents results of analysis of constituents of the femur and tibiotarsus of 10 Cackling Canada Geese collected on the Clarence Rhode NWR in 1974, and 5 Cackling Canada Geese collected on the Sacramento NWR, California, in 1973. The importance of medullary bone is discussed in relation to rapid yolk development and calcium mobilization for egg-laying. MRP

Bering Sea - Yukon Delta (Clarence Rhode NWR)
Geese
Canada Goose
Physiology

This report summarizes banding activities, evaluates banding and trapping techniques, and presents biological information on waterfowl in the Minto Lakes region. Annotated accounts of waterfowl are included. MRP

Interior - Tanana (Minto Lakes)
Swans, geese, ducks
Abundance, distribution, reproduction, predation, annotated list


This popular article recounts the efforts of U.S. Fish and Wildlife Service biologists to restore the endangered Aleutian Canada Goose to its former breeding range. CMH

Aleutians
Geese
Canada Goose
Public interest, status


This paper mentions several locations in Alaska where the Little Brown Crane (= Sandhill Crane) was taken. (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Cranes
Sandhill Crane
Distribution


The Cackling Canada Goose (Branta minima) is distinguished from other Branta species and the specific name minima is proposed. REG

Bering Sea
Geese
Canada Goose
Taxonomy

The author describes a specimen of Velvet Scoter collected at Allokuagik Lake, July 20, 1882. The bird was later determined by Osgood (1904, North Am. Fauna 24) to be a White-winged Scoter (M. deglandi). REG

Bering Sea - Bristol Bay
Ducks
White-winged Scoter
Distribution, specimen record


This note describes the design, construction and use of a trap developed for a goose banding operation at Adams Inlet, Glacier Bay National Monument. NMH

Gulf of Alaska - Southeastern (Adam's Inlet)
Geese
Canada Goose
Techniques


Not reviewed.

Gulf of Alaska - Cook Inlet
Herons
Great Blue Heron
Distribution


The number of days required for rapid yolk formation is reported for 14 species of birds. MRP

Bering Sea - Yukon Delta (Clarence Rhode NWR)
Loons
Arctic Loon, Red-throated Loon
Physiology

Results of a study from 1969-1971 of the habitat, breeding biology, and behavior of the Yellow-billed Loon are presented. Some information on feeding behavior and on interactions with Arctic Loons and diving ducks is also given. CMH

Arctic - Beaufort (Sagavanirktok R.)
Loons, ducks
Yellow-Billed Loon, Arctic Loon
Breeding biology, food


The author reviews the information available on molt migration of waterfowl, and classifies the various types. He discusses the ultimate and proximate causes of a molt migration. Several species in Alaska are discussed, particularly eiders. The need for further studies is emphasized. MRP

Alaska
Waterfowl
Migration, research


This report summarizes preliminary results on the winter food habits of four species of marine birds in Kachemak Bay. Aggregate percent numbers, volume, and frequency of occurrence of prey species are graphed and tabulated for each bird species. CMH

Gulf of Alaska - Cook Inlet (Kachemak Bay)
Ducks
Oldsquaw, White-winged Scoter
Food

This report describes critical habitats for waterfowl and seabirds in Port Etches and Constantine Harbor. Annotated species accounts and maps delineating critical habitats are included. MRP

Gulf of Alaska - Prince William Sound
Waterfowl
Annotated list, habitat


The breeding biology of Common Eiders was studied on a barrier island in 1971 and 1972. Mechanisms for avoiding predation of nests are discussed. Some information on the spring migration of the King Eider is included. MRP

Arctic - Beaufort
Ducks
Common Eider, King Eider
Breeding biology, predation, migration


This paper describes the interrelationships of eiders and Glaucous Gulls nesting in a mixed colony, but emphasizes the breeding biology of the Common Eider. REG

Arctic - Beaufort
Ducks
Common Eider
Breeding biology

This paper describes a new species of cestode parasite taken from Emperor Geese collected on St. Lawrence Island in August and September 1950. MRP

Bering Sea - St. Lawrence Is.
Emperor Goose
Disease and parasites


This paper describes Corynosoma bipapillum sp. n. (a new species) taken from the posterior gut of a juvenile Bonaparte's Gull collected at Lake George. Also included is a description of Corynosoma constrictum, recovered from Pintail, Lesser Scaup, and White-winged Scoter. MRP

Interior - Tanana (Lake George)
Pintail, Lesser Scaup, White-winged Scoter
Disease and parasites


This thesis describes rates of growth and plumage development of known-age Mallard, Canvasback, Lesser Scaup, and Bufflehead ducklings. The possibility of using measurements and plumage characteristics to determine age is discussed. MRP

Interior - Tanana (Tetlin)
Ducks
Mallard, Canvasback, Lesser Scaup, Bufflehead
Plumage, techniques

This report presents information on the relative number of waterfowl hunters in each area in Alaska and changes in numbers during the 10-year period ending June 30, 1971. MRP

Alaska
Waterfowl
Management


This paper describes the roles of the male and female in incubation, territorial defense, and care of the young, and evaluates the ecological significance of their division of labor. CMH

Bering Sea - Yukon Delta (Old Chevak)
Swans
Whistling Swan
Behavior


This report provides information from an intensive survey of the Innoko River region. General life history information, numbers, and distribution of waterfowl are presented. A checklist and notes on common species are included. MRP

Interior - Innoko
Geese, ducks, cranes
Checklist, distribution, mortality, subsistence, reproduction, plumage, techniques

This report summarizes results of a waterfowl banding study conducted in 1952 on the Copper River Delta. Brood size data for ducks and geese are also presented. MRP

Gulf of Alaska - Copper River (Copper R. Delta)
Geese, ducks
Reproduction, techniques


This paper gives the "original description of Emperor Goose, probably from Kanaga or Kyktak, Aleutian Islands." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Aleutians
Geese
Emperor Goose
Specimen record, taxonomy


Aerial surveys of the coast from Cape Lisburne to the Colville River Delta were conducted in late June and early July 1960. Significant Brant breeding populations were located. MRP

Arctic - Beaufort, Chukchi
Geese
Brant
Abundance, reproduction

A total of 619 Western Canada Geese was captured in 1960 by hand netting and use of a wire trap. Methods of capture were compared for efficiency. MRP

Gulf of Alaska - Copper River
Geese
Canada Goose
Techniques, status


Results from brood surveys of puddle ducks in the Minto Lakes area are compared with those from previous years. Wire diver traps and baited traps used to capture ducks for banding are described, and age and sex composition of the birds trapped is noted. The average harvest per day for 110 hunters is given. MRP

Interior - Tanana (Minto Lakes)
Geese, ducks
Age and sex composition, techniques, mortality, status, management


This thesis presents detailed information on the breeding biology, distribution, abundance, and habitat requirements of Trumpeter Swans in Alaska. Recommendations for management and research are included. MRP

Gulf of Alaska - Cook Inlet (Kenai Peninsula), Copper River (Copper R. Delta, Martin R. Flats, Bremner R.)
Swans
Trumpeter Swan
Distribution, abundance, habitat, breeding biology, management, research, checklist

The effects of the March 1964 earthquake on waterfowl habitats in southcentral Alaska are assessed and discussed. REG

Gulf of Alaska - Copper River (Copper R. Delta), Cook Inlet
Swans, geese
Trumpeter Swan, Canada Goose
Habitat


This report summarizes information from waterfowl studies conducted in Alaska in 1964. Included are: Minto Flats breeding drake censuses; a study of productivity on Minto Flats; studies on the Yukon-Kuskokwim Delta; and studies on the Copper River Delta. MRP

Alaska
Interior - Tanana (Minto Lakes)
Bering Sea - Yukon Delta
Gulf of Alaska - Copper River (Copper R. Delta)
Swans, geese, ducks, cranes
Abundance, reproduction, mortality


This report summarizes information from waterfowl studies conducted in Alaska in 1967. General comments on Alaska as well as specific studies are included. Studies reported are: production of waterfowl on the Copper River Delta; waterfowl habitat inventory; ecological survey of waterfowl habitats in the Juneau-Mendenhall area; and a study of Mallards wintering in southeast Alaska. MRP

Alaska
Gulf of Alaska - Southeastern (Juneau-Mendenhall), Copper River
Geese, ducks
Management, habitat, reproduction, abundance

This report summarizes information from waterfowl studies conducted in Alaska in 1966. General comments on Alaska as well as specific studies on Canada Geese of the Copper River Delta, wetland inventory work, and waterfowl use of the Juneau-Mendenhall tidelands are included. MRP

Alaska
Gulf of Alaska - Copper River, Southeastern
Geese, ducks
Management, habitat, reproduction


This is a popular article describing Brant nesting on a portion of the western Yukon Delta. REG

Bering Sea - Yukon Delta (Chevak)
Geese
Brant
Public interest


The author referred to Columbus nigricollis (= Podiceps nigricollis) as a common migrant at Yakutat (Shortt, Contrib. Royal Ontario Mus. Zool. 17, 1939) when instead he meant C. auritus (= P. auritus). REG

Gulf of Alaska - Copper River (Yakutat)
Grebes
Horned Grebe
Distribution

The authors describe the reproductive behavior of the Yellow-billed Loon, and discuss its taxonomic relationship with other species of loons. MRP

Arctic - Beaufort (Alaktak)
Loons
Yellow-billed Loon
Behavior, taxonomy


This note describes the migration of Whistling Swans and research involving individually marked birds. NMH

Alaska
Swans
Whistling Swan
Techniques, migration


The author describes the use of color-coded neck collars on Whistling Swans and the success of band reporting. Details of the continental marking protocol are included. MRP

Alaska
Swans
Whistling Swan, Trumpeter Swan
Techniques


This paper presents information on the reporting rates of neck-collared swans banded in Alaska and northeast Siberia. A similar program of marking Snow Geese is reported from non-Alaska areas, and a program for marking Anser species geese is proposed. MRP

Alaska
Swans
Whistling Swan, Trumpeter Swan
Management, migration, distribution

The effectiveness of Whistling Swan banding and neck-collaring programs is discussed. Notes on migration based upon observations of marked swans are included. NMH

Alaska
Swans
Whistling Swan
Techniques, migration, distribution


The authors describe a banding program for Whistling Swans. Preliminary results on migration patterns based on observations of marked birds and radio tracking are presented. NMH

Alaska
Swans
Whistling Swan
Techniques, migration


This report establishes a sampling base of the hunting harvest of the Mendenhall wetlands, compares game bag checks in 1978 to those of previous years, and recommends ways to improve estimates of the hunting harvest. A sample form, map of the area, and weekly game bag check data are appended. MRP

Gulf of Alaska - Southeastern (Mendenhall Flats)
Geese, ducks
Techniques, abundance, management

The importance of the Yukon-Kuskokwim Delta as a waterfowl production area is established. Limited information is presented on bandings, recoveries, and adult weights. REG

Bering Sea - Yukon Delta
Geese
Canada Goose, Brant, Emperor Goose, White-fronted Goose
Anatomy, distribution


Aspects of population dynamics, reproductive biology, and feeding habits are discussed primarily for Common Murres and Black-legged Kittiwakes, but some information on other species is presented. CMH

Arctic - Kotzebue Sound (Cape Thompson, Cape Lisburne)
Ducks
Common Eider, King Eider
Habitat


Detailed information is provided on distribution, abundance, and reproductive and feeding ecology of seabirds in the Norton Sound region. Maps depicting waterfowl densities along the coast in fall are presented, along with some brood counts. Shorebirds are discussed in general terms. CMH

Bering Sea - Norton Sound
Waterfowl
Distribution, abundance, reproduction, pollution, management

This note provides external measurements of eggs of the Whooping Crane, Aleutian Canada Goose, and Masked Bobwhite Quail. CMH

Aleutians - (Buldir Is.)
Geese
Canada Goose
Anatomy


This presents results of a study in summer 1968 of the food habits of arctic foxes denning in lowland tundra and seacliff habitats. Over 1,500 scats were analyzed from 24 dens. The composition of the diet is discussed in relation to availability of prey species. CMH

Bering Sea - St. Lawrence Is.
Waterfowl
Predation


Diving times of a Common Loon and Oldsquaws were recorded near Petersburg in 1962. MRP

Gulf of Alaska - Southeastern (Wrangell Narrows)
Loons, ducks
Common Loon, Oldsquaw
Food, behavior


The author discusses the summer molt of Arctic birds and provides brief descriptions of birds collected by E.A. McIlhenny at Point Barrow. MRP

Arctic - Chukchi (Point Barrow)
Ducks
Steller's Eider, Common Eider, King Eider, Spectacled Eider, Red-breasted Merganser
Plumage, specimen record

The comparative feeding behavior and ecology of a coastal and inland nesting population of Glaucous Gulls were studied from 1972 to 1974. Included are chapters on time-energy budgets, harassment, waterfowl nesting among gulls, and factors limiting gull populations. REG

Bering Sea - Yukon Delta
Geese, ducks
Canada Goose, Brant, Common Eider
Predation


This paper discusses the incidence of Glaucous Gulls and jaegers near people searching for waterfowl nests and assesses the possible impacts of this association on nesting success. More research on loss of eggs from undisturbed nests is suggested. MRP

Bering Sea - Yukon Delta
Geese
White-fronted Goose
Predation


The author discusses the timing of wing molt for Yellow-billed, Common, Arctic, and Red-throated Loons. His discussion is based in part on examination of specimens of all but the Common Loon collected by the McIlhenny Expedition to Pt. Barrow in 1897-1898. CMH

Arctic - Chukchi (Barrow)
Loons
Yellow-billed Loon, Arctic Loon, Red-throated Loon
Plumage

The author "mentions four specimens of Branta canadensis occidentalis from Prince William Sound." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Prince William Sound
Geese
Canada Goose
Taxonomy, distribution


Mention is made of a record from Cape Vancouver, Nelson Island, Alaska. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) REG

Bering Sea - Yukon Delta (Nelson Is.)
Geese
White-fronted Goose
Specimen record, taxonomy


This paper "mentions records of specimens from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Geese
Canada Goose
Distribution, specimen record, taxonomy

This paper presents observations of King and Common Eiders during migration past Point Barrow from July through September 1953. Age and sex segregation are noted, and patterns of migration are analyzed in relation to weather. Subsistence harvest by Eskimos is discussed, and information on weights, molt, and plumage of collected birds is presented. MRP

Arctic - Chukchi (Point Barrow)
Ducks
Common Eider, King Eider
Age and sex composition, migration, plumage, subsistence, anatomy


Four species new to North America and 11 new to the Pribilof Islands were recorded during summer field seasons from 1964 to 1968. Dates of observations and specimen data are presented. MRP

Bering Sea - Pribilof Is.
Loons, ducks
Common Loon, Surf Scoter
Annotated list, specimen record, distribution


This report analyzes the incidence of ingested lead shot in gizzards of 664 ducks and 57 geese collected at 17 locations in Alaska in 1974. Problem areas are identified, and further research is suggested. MRP

Bering Sea - Bristol Bay
Gulf of Alaska - Kodiak, Cook Inlet, Copper River, Southeastern Geese, ducks
Mortality, pollution, research

This brief article describes methods and analyzes the cost and efficiency of using aircraft to drive flightless Canada Geese on the Copper River Delta. Use of a helicopter and Piper Super Cub are compared. MRP

Gulf of Alaska - Copper River (Copper R. Delta) 
Geese 
Canada Goose 
Techniques


This paper reviews the management of Dusky Canada Geese, and discusses challenges for future managers. MRP

Gulf of Alaska - Copper River 
Geese 
Canada Goose 
Management


This paper analyzes production, mortality, distribution, and inventory data for the Pacific Flyway White-fronted Goose. Total harvest in recent years is discussed in relation to the capabilities of the population to sustain itself. MRP

Alaska 
Geese 
White-fronted Goose 
Abundance, distribution, management, migration, mortality, population dynamics, status

This note reports an observation of wolves removing Mallards from a bait trap near Petersburg. MRP

Gulf of Alaska - Southeastern (Petersburg)
Ducks
Mallard
Predation


This paper reports on fall migration of marine birds past Barrow between August 27 and September 16, 1975. Migration is analyzed for each species group in relation to weekly period, time of day, wind conditions, and flock size. Information on age and sex composition is presented for some species. Subsistence hunting activity is also analyzed. CMH

Arctic - Chukchi (Barrow)
Loons, geese, ducks
Migration, subsistence, age and sex composition


The nomenclature and distribution of all races of the White-fronted Goose are examined; three American races, with accompanying meristic data, are discussed. REG

Alaska
Geese
White-fronted Goose
Distribution, specimen record, taxonomy


This paper describes means of deterring marine birds from approaching the site of oil spills. Well designed experiments to test the effects of these deterrent techniques are urged. MRP

Alaska
Waterfowl
Pollution, techniques

This note provides information on the first specimen and second record of the Spotbill Duck for North America. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Ducks
Spotbill Duck
Distribution, specimen record


This is a review of the distribution and significance of leech parasitism of waterfowl in North America. Included is a previously unpublished occurrence of infestation of Dusky Canada Geese in Alaska. CMH

Gulf of Alaska - Copper River
Geese
Canada Goose
Disease and parasites


This paper briefly summarizes the zoogeography and taxonomic relationships of marine birds from northern and northwestern North America. MRP

Alaska
Waterfowl
Zoogeography, taxonomy
This report provides spring and fall census data of waterfowl, and the number of ducks and geese harvested during a special opening of an area previously closed to hunting on the Fort Richardson Military Reservation. The area appears to be important for migrating puddle ducks and Trumpeter Swans. MRP

Gulf of Alaska - Cook Inlet (Fort Richardson Military Reservation)
Swans, geese, ducks
Abundance, management

This publication contains the presentations, comments, and summaries of topics discussed at the migratory bird subsistence hunting workshop held January 29-30, 1980 in Anchorage. MRP

Alaska
Waterfowl
Subsistence, public interest

This paper lists several species of Acanthocephalan parasites found in Common Eiders and King Eiders collected in Alaska. MRP

Alaska
Ducks
Common Eider, King Eider
Disease and parasites

This abstract identifies studies of Vancouver Canada Geese on National Forest lands in southeast Alaska. MRP

Gulf of Alaska - Southeastern
Geese
Canada Goose
Research

This paper provides information on distribution, habitat use, and reproduction of Vancouver Canada Geese in southeast Alaska. Implications to forest management are discussed. MRP

Gulf of Alaska - Southeastern Geese
Canada Goose
Distribution, habitat, reproduction, management


This note provides observations of Whistling Swans breeding near Bethel. NMH

Bering Sea - Yukon Delta (Bethel) Swans
Whistling Swan
Abundance, distribution


The author presents a narrative account of observations of a pair of Sandhill Cranes nesting on the Yukon Delta in 1929. REG

Bering Sea - Yukon Delta Cranes
Sandhill Crane
Breeding biology


This note presents observations of Ring-necked Ducks in Petersburg. NMH

Gulf of Alaska - Southeastern (Petersburg) Ducks
Ring-necked Duck
Distribution

This report summarizes information from waterfowl studies conducted in Alaska in 1968. General comments on Alaska as well as specific studies are reported. Studies included are: Canada Goose banding on the Copper River Delta; waterfowl bag checks in southcentral Alaska and Cordova; and Mallard banding in southeastern Alaska. MRP

Alaska
Gulf of Alaska - Copper River, Southeastern, Cook Inlet
Geese, ducks
Management, habitat, reproduction, abundance


A study of the marine birds of Ugaiushak Island was conducted in 1977. Abundance, phenology, and production are addressed for each of 15 species. Information on foods and foraging areas, chick growth, relaying and twinning experiments, and colony attendance is presented for some. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Ducks
Common Eider
Reproduction, habitat, abundance


This report on the populations, breeding biology, food habits, and foraging areas of 21 species in summer 1976. A daily checklist of the 50 species observed on the island is appended. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Swans, ducks
Harlequin Duck, Common Eider
Abundance, reproduction, checklist

646

This comprehensive paper includes a brief summary of nesting records of this species in Alaska. Birds are noted to breed in two areas of the interior of Alaska, and possibly in the Aleutians. REG

Alaska
Aleutians
Interior - Tanana, Upper Yukon
Ducks
Redhead
Distribution, migration, status


This report discusses in detail the problems associated with censusing marine birds at sea and discusses the formation and characteristics of feeding flocks, particularly those which contain more than one species. Loons are mentioned. PJG

Gulf of Alaska
Loons
Common Loon, Arctic Loon, Red-Throated Loon
Techniques, behavior, food, abundance


This note provides the first records of the Whooper Swan, Black Scoter, and Sanderling for the Pribilof Islands. Other species are mentioned. CMH

Bering Sea - Pribilof Is.
Swans, ducks
Whooper Swan, Black Scoter
Distribution, Food

This brief note provides observations of three species new to the island: Short-tailed Shearwater, Common Merganser, and Hermit Thrush. REG

Gulf of Alaska - Southeastern (Forrester Is.)
Ducks
Common Merganser
Annotated list, distribution


The results of 54 beached bird surveys at 15 sites in the Gulf of Alaska conducted in winter 1977-1978 are summarized and briefly discussed. CMH

Gulf of Alaska
Ducks
Oldsquaw, Harlequin Duck, Steller's Eider, White-winged Scoter, Black Scoter
Mortality, pollution, techniques


The authors describe the migration patterns of the Aleutian Canada Goose in Alaska and California. They also discuss the effects of hunting closures on the population of this endangered subspecies. MRP

Aleutians - (Buldir Is.)
Geese
Canada Goose
Migration, status, distribution, management

The author describes the capture of a downy young of this species near Ohtig Lake in August 1962. This represents the first "definitive" record of Redheads breeding in Alaska. REG

Interior - Upper Yukon (Ohtig L.)
Ducks
Redhead
Distribution


This note gives weights of 398 ducks, comprising 10 species, captured in August 1962 at Ohtig Lake. MRP

Interior - Upper Yukon (Ohtig L.)
Ducks
Pintail, Northern Shoveler, American Wigeon, Canvasback, Redhead, Greater Scaup, Lesser Scaup, Barrow's Goldeneye, Bufflehead, White-winged Scoter
Anatomy
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ZOOGEOGRAPHY: 26, 91, 273, 348
SHOREBIRDS - BIBLIOGRAPHY


This paper "mentions a set of eggs taken at Point Barrow in 1898." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Arctic - Chukchi (Barrow)
Sandpipers
Dunlin
Specimen record


Not reviewed.

Alaska
Shorebirds
Specimen record


This paper reviews the literature on the diets of seabirds found in the northeastern North Pacific Ocean and Bering Sea, and broadly characterizes the diet of each species. More research on seabird feeding relations is suggested so the ecological roles of marine birds can be defined and placed in perspective. MRP

North Pacific
Bering Sea
Phalaropes
Food, research

The first nest and eggs of this species known to science are described. REG

Bering Sea - Yukon Delta (Mountain Village)
Sandpipers
Bristle-thighed Curlew
Reproduction, habitat, distribution


Not reviewed.

Sandpipers
Curlew Sandpiper
Distribution


This paper presents extensive and detailed descriptions of the reproductive cycle of Semipalmated Sandpipers in Arctic Alaska. REG

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper
Breeding biology, behavior


This comprehensive paper presents a time-energy budget of breeding Calidris pusilla at Barrow, Alaska. A time-activity budget was constructed from observations of marked birds and then converted to an estimate of energy requirements. The adaptive significance of the species' activity pattern is discussed. CMH

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper
Behavior, physiology, food, reproduction

657

Specimen records of two Rufous-necked Sandpipers and a Great Knot are presented. REG

Arctic - Chukchi (Wainwright)
Bering Sea - Norton Sound (Wales)
Sandpipers
Rufous-necked Sandpiper, Great Knot
Specimen record, distribution


Within this note are specimen records of two species of shore-birds, one duck, and one loon collected in June 1929. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Plovers
American Golden Plover, Dotterel
Specimen record, distribution


Specimens of Arctic Loon (Gavia arctica viridigularis), Dotterel, and Red-throated Pipit are reported. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Plovers
Dotterel
Distribution, specimen record


This note documents the first specimen of Hudsonian Curlew (= Whimbrel) from the Wales area. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Sandpipers
Whimbrel
Distribution, specimen record

This note records the first specimen of the Siberian race of the Whimbrel collected in North America. CMH

Arctic - Chukchi (Barrow)
Sandpipers
Whimbrel
Distribution, specimen record


This short note reports specimens of six species not previously recorded from the Barrow region, including the Ring-billed Gull, Parakeet Auklet, and Hudsonian Godwit. REG

Arctic - Beaufort (Colville R., Cape Halkett), Chukchi (Barrow)
Sandpipers
Hudsonian Godwit
Distribution, specimen record


Detailed information on the abundance, habitat use, and reproductive and feeding ecology is presented for Glaucous-winged Gulls, Black-legged Kittiwakes, Arctic and Aleutian Terns, and Tufted Puffins. Sightings of eight species of shorebirds and two other species of seabirds are summarized. CMH

Gulf of Alaska - Kodiak (Sitkalidak Strait)
Oystercatchers, plovers, sandpipers, phalaropes
Black Oystercatcher, American Golden Plover, Lesser Yellowlegs, Wandering Tattler, Black Turnstone, Western Sandpiper, Dunlin, Northern Phalarope
Abundance

This paper evaluates aerial survey techniques for estimating bird populations, and reports on the distribution of postbreeding waterfowl in Alaska Arctic coastal waters. MRP

Arctic Shorebirds Techniques


This paper identifies and discusses potential problems arising from resource development and hunting, describes responsibilities of various management agencies, and suggests specific research projects which should be conducted in the state. CMH

Alaska Shorebirds Management, research


This paper provides a general review of the principal habitats of breeding waterfowl, shorebirds, and seabirds; identifies the state and federal agencies managing these habitats; and discusses the types of resource development which may adversely affect birds. Recommendations for research and for protection of avian habitats are made. MRP

Alaska Shorebirds Management, research

This research report contains papers presented during the International Symposium on the Conservation of Marine Birds of Northern North America, May 13 to 15, 1975. Topics include: marine environment of birds; status of marine bird populations; the biology and ecology of marine birds in the north; conflicts between the conservation of marine birds and uses of other resources; programs and authorities related to marine bird conservation; and conservation of marine birds in other lands. MRP

Alaska
Shorebirds
Abundance, distribution, fishing, food, habitat, management, mortality, pollution, population dynamics, predation, research, status, taxonomy, zoogeography


Arctic - Chukchi (Barrow)
Sandpipers
Spoon-bill Sandpiper
Specimen record, distribution, breeding biology


This is one part in the classic series on the life histories of North American birds. Species accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Sandpipers, phalaropes
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status

This is one part in the classic series on the life histories of North American birds. Species accounts include detailed observations of various aspects of each species' life history. MRP

Alaska
Oystercatchers, plovers, sandpipers
Abundance, behavior, breeding biology, distribution, food, habitat, migration, plumage, status


This note documents the sighting of an American Golden Plover over the North Pacific Ocean in May 1941. CMH

North Pacific
Aleutians - (Unalaska Is.)
Plovers
American Golden Plover
Distribution


Mention is made of concentrations of two species of shorebirds near Safety Lagoon in late August 1977. CMH

Bering Sea - Norton Sound
Sandpipers
Whimbrel, Long-billed Dowitcher
Abundance


Mention is made of an adult and two juvenile Ruddy Turnstones collected at Nome. REG

Bering Sea - Norton Sound (Nome)
Sandpipers
Ruddy Turnstone
Specimen record

662

This short note argues for the recognition of two races of the Dunlin, *Calidris alpina pacifica* and *C. a. sakhalina*, on the basis of measurements. CMH

Alaska
Sandpipers
Dunlin
Taxonomy, plumage


The author proposes the name *L. griseus fasciatus* (now considered an example of the Long-billed Dowitcher, *L. scolopaceus*) for the form of dowitcher breeding in Alaska. The type specimen was collected by H. B. Conover from Hooper Bay, and several other specimens were examined. REG

Bering Sea - Norton Sound (Nome), Yukon Delta (Hooper Bay, Kashunuk R.), Bristol Bay (Izembek Bay)
Sandpipers
Short-billed Dowitcher, Long-billed Dowitcher
Taxonomy, specimen record


This paper describes in general the physical and demographic characteristics, fish and wildlife resources, and anticipated developments of the region, and outlines conflicts which are likely to arise. Recommendations to mitigate environmental disturbance are presented. CMH

Arctic
Shorebirds
Management, disturbance, pollution, research

The breeding biology and behavior of Western Sandpipers are described from observations near Hooper Bay in 1960. The function of distraction displays is discussed in relation to human and other predators. REG

Bering Sea - Yukon Delta
Sandpipers
Western Sandpiper
Behavior, breeding biology


This paper evaluates the geographic variation in Dunlin to determine which races should be recognized. A race in northern Alaska, a race in western Alaska, and a race in northeastern Canada are proposed. MRP

Alaska
Sandpipers
Dunlin
Taxonomy, distribution


The author summarizes the early and more recent records of the Upland Plover (= Upland Sandpiper) north of the Arctic Circle, reviewing its status and distribution in the region. CMH

Arctic - Kotzebue Sound (Kobuk R.)
Interior - Upper Yukon, Koyukuk
Sandpipers
Upland Sandpiper
Distribution, status

Records of Buff-breasted Sandpipers in British Columbia are summarized, and the range and migration of the species are outlined. Included are comments on the sandpiper's Alaska Arctic breeding range. Plumage and sexual dimorphism are discussed.

Arctic - Beaufort
Sandpipers
Buff-breasted Sandpiper
Distribution, migration, plumage, anatomy


This paper reports on the heat-transfer characteristics of young and adult shorebirds. The author discusses heat transfer coefficients and body resistance to heat flow, energy budgets of adults and chicks in relation to body temperature of chicks, and the brooding-activity cycle.

Arctic - Chukchi (Barrow)
Sandpipers, phalaropes
Semipalmated Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Red Phalarope
Physiology, behavior


The behavior of an adult responding to its captured downy chick is described.

Bering Sea - Pribilof Islands (St. Paul Is.)
Phalaropes
Northern Phalarope
Behavior

This reports the effects on shorebirds from habitat alterations near Prudhoe Bay. The effects of loss of habitat due to construction, dust shadows, noise and disturbance, and artificial gravel piers are discussed. MRP

Arctic - Beaufort (Prudhoe Bay)
Shorebirds
Habitat, management, pollution, disturbance


This paper describes seasonal habitat use by shorebirds on the Arctic coastal plains. The susceptibility of shorebird species to disturbances related to outer continental shelf oil development is discussed. REG

Arctic - Chukchi (Barrow)
Shorebirds
Habitat, disturbance, pollution


This preliminary report provides annotated accounts for the 19 species of shorebirds using littoral habitats near Barrow, and for 11 other species of water birds commonly occurring there. Results of censuses taken regularly from July to September 1975 are graphically presented for most species. Qualitative food habits information is provided for 11 species. CMH

Arctic - Chukchi (Barrow, Wainwright), Beaufort
Shorebirds
Habitat, abundance, food

Included in this annual report are annotated accounts for the 19 species of shorebirds and 11 species of other birds commonly using littoral habitats of the Barrow region. Census data are reported for the most common species. Habitat use and foraging ecology are discussed in detail for shorebirds. CMH

Arctic - Chukchi (Barrow, Icy Cape), Beaufort (Elson Lagoon)
Shorebirds
Habitat, abundance, distribution, pollution, food


This report summarizes results of studies in summer 1977 on shorebird seasonal habitat use and trophic relationships in northwestern Alaska. Seasonal densities are also presented for a few other species. Susceptibility of shorebirds to impacts of oil development is addressed. Checklists present the status of bird species observed at Cape Krusenstern and at Wales in 1977. CMH

Arctic - Beaufort, Chukchi, Kotzebue Sound
Bering Sea - Norton Sound
Shorebirds
Abundance, habitat, migration, physiology, food, pollution, disturbance, checklist

This report summarizes information gathered at Prudhoe Bay and several sites in Kotzebue Sound and along the Chukchi Sea coast in summer 1978. Data are presented on seasonal habitat use of the littoral zone by shorebirds, on use of disturbed habitat by shorebirds and passerines, and on food habits of shorebirds. A checklist indicates the status of the 113 species of birds recorded at Cape Krusenstern in 1977 and 1978. Expansion of Aleutian Tern colonies is mentioned. CMH

Arctic - Beaufort, Chukchi, Kotzebue Sound
Shorebirds
Abundance, habitat, disturbance, food, checklist, pollution


Following a comprehensive examination of specimens, the author discusses the distribution and identification of two species of dowitchers. CMH

Alaska
Sandpipers
Short-billed Dowitcher, Long-billed Dowitcher
Taxonomy, distribution, plumage

41. CONOVER, B. 1943. The races of the Knot (Calidris canutus). Condor 45:226-228.

The author suggests two races of Knot (= Red Knot) be recognized: Calidris canutus canutus, and C. c. rufus, with Alaska birds representing the former. REG

Alaska
Sandpipers
Red Knot
Taxonomy, distribution

This paper discusses differences in the distribution, plumage, and meristics of the four races of Rock Sandpiper breeding in the Bering Sea region. REG

Bering Sea
Sandpipers
Rock Sandpiper
Taxonomy, distribution, anatomy, plumage


From a study of a collection of specimens, the author discusses the differences in distribution and plumage of two races of the Solitary Sandpiper. CMH

Alaska
Sandpipers
Solitary Sandpiper
Distribution, plumage


This paper discusses in detail the differences in distribution and plumage of two races of the American Golden Plover. CMH

Alaska
Plovers
American Golden Plover
Distribution, plumage


The author discusses the validity of a number of races of North American shorebirds. Only those accounts for Ruddy Turnstone and Dunlin are pertinent to Alaska. REG

Alaska
Sandpipers
Ruddy Turnstone, Dunlin
Taxonomy, distribution

This note describes a new species (= subspecies) of shorebird, collected on the Pribilof Islands. MRP

Bering Sea - Pribilof Is.
Sandpipers
Rock Sandpiper
Specimen record, taxonomy


This note reports the collection of an adult and a partial set of eggs of Tringa crassirostris (= Calidris tenuirostris) from the Aleutian Islands. This record was subsequently invalidated by Bianchi (Yezhegodnik Zoologicheskogo muzeya Akademii Nauk 14:48-76, 1909). MRP

Aleutians
Sandpipers
Specimen record


This reports on major aspects of the occurrence and variation of plastic particles found in the stomachs of 1,968 individuals comprising 37 species of marine birds. MRP

Alaska
Phalaropes
Pollution, food


This note presents specimen data for several species of shorebirds, an owl, and a nightjar new to the Aleutian Islands. MRP

Aleutians - (Buldir Is., Adak Is.)
Plovers, sandpipers
Mongolian Plover, Ruddy Turnstone, Sanderling, Spoon-bill Sandpiper, Broad-billed Sandpiper, Ruff
Distribution, specimen record

670

An adult banded on St. George Island on May 31, 1966 was found dead in New Zealand on October 28, 1967. REG

Bering Sea - Pribilof Is. (St. George Is.)
Sandpipers
Bar-tailed Godwit
Distribution, migration


This volume contains detailed natural history accounts of all Charadriiform species of the Soviet Union. Reference is made to Alaska for many species. REG

Alaska
Shorebirds
Abundance, distribution, behavior, breeding biology, food, habitat, migration, status, taxonomy, plumage


This paper provides a description of the plumage of adult and immature Ross's Gulls at Barrow in autumn 1975, and describes their flight, feeding behavior, and molt. Feeding associations with Red Phalaropes and Sabine's Gulls are mentioned. CMH

Arctic - Chukchi (Barrow)
Phalaropes
Red Phalarope
Food


The author provides a popular, though useful, account of the nesting and young of the Semipalmated Sandpiper. REG

Arctic - Beaufort
Sandpipers
Semipalmated Sandpiper
Breeding biology, behavior

This is a rather thorough account for this era of the nesting habits of this species. Several interesting photographs are included. REG

Arctic - Beaufort (Demarcation Point)
Sandpipers
Baird's Sandpiper
Breeding biology


The author summarizes all specimen records of birds attributed to North America and presents a detailed account of the species' breeding distribution, nesting habits, plumage, and behavior, based on observations of a population of Siberian birds. REG

Arctic - Chukchi
Sandpipers
Spoon-bill Sandpiper
Behavior, breeding biology, distribution, habitat, plumage, specimen record, taxonomy


A Surfbird nest was located in Mt. McKinley Park. Aspects of the breeding biology, food, habitat, and molt of this species are discussed. NMH

Interior - Tanana (Mt. McKinley National Park)
Sandpipers
Surfbird
Breeding biology, plumage, food


This paper gives details on the breeding distribution, nesting habitat, and breeding behavior of this species. Observations of behavior are based on two nesting pairs and are supplemented by several good photographs. REG

Interior - Tanana (Savage R.)
Sandpipers
Wandering Tattler
Breeding biology, distribution, behavior

The authors determined food preferences and feeding rate coefficients for a small sample of phalaropes eating zooplankton in a controlled environment. Predation preferences and intensity were calculated from the rate of disappearance of zooplankton from the holding cages. REG

Arctic - Chukchi (Barrow)
Phalaropes
Red Phalarope
Food


This paper discusses human activities and natural processes that have caused changes in numbers and distribution of marine birds, and presents a short discussion of theoretical models. Several goals for improving our understanding of the population dynamics and biology of marine birds are identified. MRP

Alaska
Shorebirds
Population dynamics, research, management


The author describes the various molt patterns of shorebirds using four species as examples: Sanderling, Spotted Sandpiper, Dunlin, and Black-bellied Plover. The description of molt for Dunlin is based in part on specimens from Barrow, Alaska. REG

Alaska
Arctic - Chukchi (Barrow)
Plovers, sandpipers
Black-bellied Plover, Spotted Sandpiper, Sanderling, Dunlin
Plumage


Not reviewed.

Arctic
Shorebirds

This paper describes arthropod fallout on snow patches. Eight species of birds which breed in the area used the insect fallout as a source of food. MRP

Interior - Upper Yukon (Eagle Summit)
Plovers
American Golden Plover
Food


This note reports breeding Black Oystercatchers on Round Island, Bristol Bay. This observation extends the breeding range of this species to north of the Alaska Peninsula. MRP

Bering Sea - Bristol Bay (Round Is.)
Oystercatchers
Black Oystercatcher
Distribution


Bird movements along the Arctic Coast were studied through the use of six DEW radars. King and Common Eiders are treated in detail, but other water-related birds are discussed. Some visual observations are included. CMH

Arctic - Beaufort (Lonely, Oliktok, Barter Is.), Chukchi (Point Lay, Wainwright, Barrow)
Plovers, sandpipers
American Golden Plover, Ruddy Turnstone, Semipalmated Sandpiper, Dunlin
Migration

This note records the first collection of eggs of this species in North America. CMH

Bering Sea - Norton Sound (Cape Prince of Wales)
Sandpipers
Rufous-necked Sandpiper
Distribution, specimen record


Reported are two specimens of Dotterel and one of a Whiskered Auklet collected in spring 1931. They constitute the first specimens of these species from St. Lawrence Island. REG

Bering Sea - St. Lawrence Is.
Plovers
Dotterel
Distribution, specimen record


This note provides information on specimens collected at Goodnews Bay by D.B. Bull in 1933. MRP

Bering Sea - Yukon Delta (Goodnews Bay)
Sandpipers
Pectoral Sandpiper
Specimen record, distribution, annotated list

68. FRIEDMANN, H. 1933. The Polynesian Tattler on St. Lawrence Island. Condor 35:78.

Information on the second North American specimen is presented. REG

Bering Sea - St. Lawrence Is.
Sandpipers
Polynesian Tattler
Specimen record, distribution

This note records the collection of a Mongolian Plover, a Surfbird, and a Kittlitz's Murrelet at Goodnews Bay in 1933. CMH

Bering Sea - Yukon Delta (Goodnews Bay)
Plovers, sandpipers
Mongolian Plover, Surfbird
Distribution, specimen record

70. FRIEDMANN, H. 1934. The Ruff on St. Lawrence Island. Condor 36:42.

This note describes the first occurrence of this species on St. Lawrence Island and summarizes records of its occurrence along the Pacific Coast. REG

Bering Sea - St. Lawrence Is.
Sandpipers
Ruff
Distribution, specimen record


This note updates Friedmann's 1935 "Avifauna of Kodiak Island" with details of a Whimbrel collected on Afognak Island in 1916. A second part of the note details the collection of an adult male Mongolian Plover and egg set from Goodnews Bay in 1933, the first nesting record for this species in North America. The note concludes with a discussion of the range of *Falco peregrinus pealei*. REG

Gulf of Alaska - Kodiak (Afognak I.)
Bering Sea - Yukon Delta (Goodnews Bay)
Plovers, sandpipers
Mongolian Plover, Whimbrel
Distribution, specimen record


This note reports on three species of birds new to the island and one new to North America. REG

Bering Sea - St. Lawrence Is.
Sandpipers
Long-billed Dowitcher
Specimen record, distribution

A specimen of Siberian Whimbrel *N. phaeopus variegatus* is reported from St. Lawrence Island in 1938. REG

Bering Sea - St. Lawrence Is.  
Sandpipers  
Whimbrel  
Specimen record, distribution


This note describes the nest and eggs of a Ruff, and includes observations of the female at the nest. MRP

Arctic - Chukchi (Point Lay)  
Sandpipers  
Ruff  
Distribution, behavior


The author provides techniques for distinguishing *Heteroscelus incanus* from *H. brevipes*, and *Capella gallinago delicata* from *C. g. gallinago*. Although he addresses his comments to birders in Hawaii, he does summarize the occurrence of these birds in the Aleutian Islands. CMH

Aleutians  
Sandpipers  
Polynesian Tattler, Wandering Tattler, Common Snipe  
Plumage, distribution


This paper describes the use of Nelson Lagoon by Western Sandpipers and Dunlin during the fall and compares their migration strategies. The use of large cyclonic low pressure systems as an aid to migration is discussed. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)  
Sandpipers  
Western Sandpiper, Dunlin  
Migration

This article summarizes the preliminary results of shorebird studies conducted on the Yukon Delta and northcentral Alaska Peninsula. Migration and wintering areas of Dunlin and Western Sandpiper are discussed. REG

Bering Sea - Yukon Delta, Bristol Bay (Alaska Peninsula)
Sandpipers
Western Sandpiper, Rock Sandpiper, Dunlin
Migration, distribution


This report summarizes published and unpublished information on spring and fall migration routes and staging areas. The species addressed are those thought to be highly vulnerable to oil contamination in Alaska marine waters. REG

Alaska
Sandpipers
Western Sandpiper, Dunlin
Migration, habitat, pollution, disturbance


This paper describes post-breeding concentrations and fall migration of shorebirds in 1976 at Nelson Lagoon, an important staging area for several species. Temporal abundance and habitat use are quantified. MRP

Bering Sea - Bristol Bay (Nelson Lagoon)
Plovers, sandpipers, phalaropes
Distribution, migration, abundance, habitat

The distribution and abundance of waterfowl and shorebirds along the northcentral Alaska Peninsula are reported, with maps showing critical feeding and roosting areas. Information on the reproductive success of Common Eiders and Glaucous-winged Gulls is also included. Appended are three papers presented to the Pacific Seabird Group in 1977: "Autumn migration of Dunlin and Western Sandpipers from the Alaska Peninsula"; "Feeding ecology of Steller's Eider"; and "Unusual nest site selection by Tufted Puffins." CMH

Bering Sea - Bristol Bay (Nelson Lagoon, Herendeen Bay)
Shorebirds
Distribution, abundance, migration, habitat, food


This paper, based primarily on the author's homing study of Semipalmated Plovers, discusses the possible mechanisms birds use in navigating during migration. CMH

Arctic - Beaufort (Umiat)
Plovers
Semipalmated Plover, American Golden Plover
Migration


In an earlier paper (Auk 15:122-131, 1898), the author referred to a specimen of Spotted Sandpiper from Sitka as an example of Baird's Sandpiper. REG

Gulf of Alaska - Southeastern (Sitka)
Sandpipers
Spotted Sandpiper, Baird's Sandpiper
Specimen record, distribution

This report presents observations of oil contamination in Salt Lagoon on St. Paul Island after the grounding of the F/V Ryuyo Maru No. 2 on November 8, 1979. The impact on the birds and other marine life is discussed. MRP

Bering Sea - Pribilof Is. (St. Paul Is.)
Sandpipers
Ruddy Turnstone
Pollution, checklist


The author summarizes all information available on the race of the Rock Sandpiper which nests on the Bering Sea islands. Included are observations on breeding and winter distribution, dates of migration, habitat, nesting chronology and behavior, and foods. Dimensions of 72 eggs are also presented. CMH

Bering Sea - Pribilof Is., St. Matthew Is.
Sandpipers
Rock Sandpiper
Distribution, abundance, reproduction, behavior, habitat, subsistence, food


This note details the collection of an egg set and accompanying pair of adult Bar-tailed Godwits in July 1928. REG

Arctic - Chukchi (Ashookto R.)
Sandpipers
Bar-tailed Godwit
Distribution, specimen record

Records of egg sets from Wales and the Meade River in 1929 and 1934, respectively, are reported. REG

Arctic - Beaufort (Meade R.)
Bering Sea - Norton Sound (Wales)
Sandpipers
Long-billed Dowitcher
Specimen record, distribution


This note describes the eggs of this species. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Sandpipers
Rufous-necked Sandpiper
Distribution, specimen record


The author presents observations of postbreeding godwits on the Yukon Delta in summer 1962. REG

Bering Sea - Yukon Delta (Kashunuk R.)
Sandpipers
Hudsonian Godwit
Distribution, specimen record


From an analysis of morphometric data and banding returns, the authors outline the spring and fall migration routes of different populations of the Semipalmated Sandpiper, including those nesting in Alaska. CMH

Arctic
Sandpipers
Semipalmated Sandpiper
Migration, anatomy

This reports observations of marine birds associating with gray whales which were bringing benthic food items to the surface while feeding. The importance of this food source to birds is discussed. MRP

Arctic - Chukchi
Bering Sea
Phalaropes
Food


This reports on a community of at least nine species of marine birds suspected of being partially supported by an association with feeding gray whales in the Bering and Chukchi Seas. REG

Arctic - Chukchi
Bering Sea
Phalaropes
Food, behavior


The author summarizes all information available on the Spoon-bill Sandpiper, and includes a list of locations where specimens have been collected and a description of the summer plumage. A plate depicts a specimen collected at Bering Strait. CMH

Bering Sea - Norton Sound (Bering Strait)
Sandpipers
Spoon-bill Sandpiper
Specimen record, plumage, distribution


The author, after an examination of specimens collected on St. Paul Island, describes a new species (now considered a subspecies of Dunlin). MRP

Bering Sea - Pribilof Is. (St. Paul Is.)
Sandpipers
Dunlin
Specimen record, taxonomy

The author notes the finding of a Semipalmated Plover nest with five eggs. CMH

Bering Sea - Bristol Bay
Plovers
Semipalmated Plover
Reproduction


The author speculates on the routes and timing of migration of plovers to and from Alaska. REG

Alaska
Plovers
American Golden Plover
Migration


Eighty-seven species were recorded, but fewer than a dozen are treated in this short note. The Spotted Sandpiper and Red and Northern Phalaropes are the only shorebirds mentioned, and Bufflehead and Common Goldeneye, the only waterfowl. REG

Bering Sea - Yukon Delta (Scammon Bay)
Sandpipers, phalaropes
Spotted Sandpiper, Northern Phalarope, Red Phalarope
Distribution


Not reviewed.

Alaska
Phalaropes

Breeding season, habitat, mating, and nesting are discussed. REG

Bering Sea - Yukon Delta (Scammon Bay)
Phalaropes
Northern Phalarope
Breeding biology


Not reviewed.

Arctic - Chukchi, Beaufort
Sandpipers
Food


Not reviewed.

Sandpipers
Dunlin
Abundance, breeding biology


A detailed study of the breeding ecology and nonbreeding phases of the annual cycle of *Calidris alpina* is reported. The adaptiveness of different breeding systems of *Calidris* sandpipers and their ecological and behavioral correlates are discussed. MRP

Arctic - Chukchi (Barrow)
Sandpipers
Dunlin
Breeding biology, migration

The author presents results of a five-year study of the feeding ecology of this species. Food and habitat selection are compared for adults and young. The timing of hatch of Red-backed Sandpipers as related to food availability and climatic conditions is discussed. REG

Arctic - Chukchi (Barrow)
Sandpipers
Dunlin
Food


The pterylography, molts, molt schedule, and criteria for age determination of Dunlin along the west coast of North America are described. The relationships of molt with breeding and migration are discussed. REG

Arctic - Chukchi (Barrow)
Bering Sea - Yukon Delta
Sandpipers
Dunlin
Plumage, migration


This paper presents the results of a nine-year study and compares the densities, territorial activity, and food supplies of Dunlin at Barrow and on the Yukon Delta. REG

Arctic - Chukchi (Barrow)
Bering Sea - Yukon Delta
Sandpipers
Dunlin
Population dynamics, food, habitat, behavior

The results of a four-year study of Western Sandpipers on the western Yukon Delta are reported. Nesting and feeding territories, nesting densities, nest-site tenacity, and the mating system are described. REG

Bering Sea - Yukon Delta
Sandpipers
Western Sandpiper
Distribution, breeding biology, abundance


The influence of length of summer season and of climate on the timing of breeding and molt in the Yukon Delta population of Dunlin is contrasted with that in the more northerly population at Barrow. REG

Bering Sea - Yukon Delta
Arctic - Chukchi (Barrow)
Sandpipers
Dunlin
Breeding biology, plumage


This paper describes the breeding biology, distribution, habitat, molt, and foods of Western Sandpipers. The primary factors thought to influence the scheduling of the breeding season are discussed. MRP

Bering Sea - Yukon Delta (Kolomak R.)
Sandpipers
Western Sandpiper
Breeding biology, migration, plumage

The author provides detailed descriptions of the behaviors observed in breeding Western Sandpipers, and interprets them in terms of their adaptive characteristics. CMH

Bering Sea - Yukon Delta (Kolomak R.)
Sandpipers
Western Sandpiper
Behavior


This abstract briefly describes courtship displays, patterns of vocalization, and expansion of the throat region of White-rumped Sandpipers, and compares these to behaviors of Pectoral Sandpipers. The taxonomic relationship of the two species is discussed. MRP

Arctic - Chukchi (Barrow)
Sandpipers
White-rumped Sandpiper, Pectoral Sandpiper
Behavior, taxonomy


This paper describes the breeding of a small population of this normally Siberian-nesting species which settled at Barrow, Alaska, in 1962. Detailed descriptions of breeding behaviors are presented and contrasted with those of several congeners nesting in the Arctic. REG

Arctic - Chukchi (Barrow)
Sandpipers
Curlew Sandpiper
Breeding biology, taxonomy, behavior

687

This paper focuses on the diets and food exploitation patterns of four widely sympatric sandpipers breeding near Barrow. Factors relieving competition among the four species are discussed. REG

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Dunlin

Food


This report summarizes results of aerial surveys, and describes habitat use, reproductive performance, and production of waterfowl. Included are observations of other nesting species. MRP

Bering Sea - Yukon Delta (Nelson Is.)
Plovers, sandpipers, phalaropes
Semipalmated Plover, American Golden Plover, Black Turnstone, Western Sandpiper, Least Sandpiper, Northern Phalarope
Abundance, distribution, reproduction, habitat


The author relates seasonal abundance and availability of aquatic macroinvertebrates to use by water birds. He discusses possible consequences of industrial contamination of aquatic habitats, and makes several recommendations for mitigating ill effects. MRP

Arctic - Beaufort (Point Storkersen, Colville River, Sagavanirktok R., Kuparuk R.)
Sandpipers, phalaropes
Northern Phalarope, Red Phalarope
Habitat, food, pollution, research, management

The author points out an early reference documenting the disparity in size between the sexes. CMH

Arctic - Chukchi (Barrow)
Sandpipers
Pectoral Sandpiper
Anatomy


The author records the collection of several Hudsonian Godwits on the mudflats of Cook Inlet in July 1951. CMH

Gulf of Alaska - Cook Inlet
Sandpipers
Hudsonian Godwit
Distribution, specimen record


This report summarizes detailed information on the reproductive and feeding ecology of 11 species of seabirds studied from 1975 to 1977. Shearwaters, storm-petrels, Glaucous-winged Gulls, and Red Phalaropes are also mentioned. Potential impacts from oil development are discussed. CMH

Bering Sea - Pribilof Is.
Phalaropes
Red Phalarope
Abundance

Nesting cycles of Lapland Longspurs, Snow Buntings, and Red Phalaropes are examined in relation to the availability of their insect prey. Factors influencing prey utilization are discussed briefly. NMH

Arctic
Phalaropes
Red Phalarope
Food


This paper reports the incubation temperatures of eggs of seven species of birds, including Pintail and Semipalmated Sandpiper, nesting at Anaktuvuk. The behavior of incubating adults is discussed in relation to temperature of the embryo. MRP

Interior - Koyukuk (Anaktuvuk)
Sandpipers
Semipalmated Sandpiper
Physiology


This report summarizes dates of spring migration of shorebirds from 1963 to 1976 in the Copper River Delta area. MRP

Gulf of Alaska - Prince William Sound, Copper River
Shorebirds
Public interest, migration


The timing of migration and numbers of shorebirds passing through the Copper River Delta and eastern Prince William Sound are described. Spring and fall migration are compared. REG

Gulf of Alaska - Prince William Sound, Copper River
Shorebirds
Migration, habitat, abundance
121. JOHNSON, S.R. 1974. First specimen of a robin (Turdus migratorius) and three important sight records from St. Lawrence Island, Bering Sea, Alaska. Condor 76:108.

Sight records of the Whiskered Auklet, Lesser Yellowlegs, Upland Sandpiper, and American Robin on St. Lawrence Island are noted. NMH

Bering Sea - St. Lawrence Is.
Sandpipers
Upland Sandpiper, Lesser Yellowlegs
Annotated list, distribution


This report addresses the migration, breeding, feeding, and staging/molting of birds at Simpson Lagoon in summer 1977. Information on migration, nesting densities, and reproductive success are summarized for all species. Detailed information on molt, staging, and feeding is presented for Oldsquaws, gulls, terns, and phalaropes. Possible effects of disturbance are briefly discussed. CMH

Arctic - Beaufort (Simpson Lagoon)
Shorebirds, phalaropes
Northern Phalarope, Red Phalarope
Habitat, physiology, food, abundance, migration, disturbance


This report compares information gathered in 1977 and 1978. Timing of migration is summarized for 63 species, and nesting densities are presented. The majority of the report addresses habitat use by molting Oldsquaws, and premigratory staging of shorebirds, gulls, and terns. Results of feeding studies are presented for Oldsquaws, phalaropes, and Glaucous Gulls. CMH

Arctic - Beaufort (Simpson Lagoon)
Shorebirds, phalaropes
Northern Phalarope, Red Phalarope
Habitat, physiology, food, abundance, migration

This paper discusses possible correlations among lipid levels, timing of migration, and migratory routes of five species of birds, including the America Golden Plover, Western Sandpiper, and Arctic Tern. CMH

Arctic - Kotzebue Sound (Cape Thompson)
Plovers, sandpipers
American Golden Plover, Western Sandpiper
Migration, physiology


This note reports on a specimen of Black-tailed Godwit from Amchitka Island. The bird was collected in 1961 and represented the second specimen from North America. REG

Aleutians - (Amchitka Is.)
Sandpipers
Black-tailed Godwit
Distribution, specimen record


The author presents weight and size data for single eggs of Pectoral and Baird's Sandpipers from Point Barrow in 1898. REG

Arctic - Chukchi (Barrow)
Sandpipers
Baird's Sandpiper, Pectoral Sandpiper
Specimen record


This paper presents new records for five species, including the Sharp-tailed Sandpiper and four passerines. CMH

Bering Sea - Yukon Delta (Hooper Bay)
Sandpipers
Sharp-tailed Sandpiper
Distribution, abundance, plumage

The source of ferruginous stains on waterfowl is examined. Discussions pertaining to Emperor Geese, Canada Geese, Red-throated Loons, and Northern Phalaropes refer to Alaska birds. REG

Gulf of Alaska - Prince William Sound (Cordova Bay)
Phalaropes
Northern Phalarope
Plumage, habitat


This paper evaluates the importance of Alaskan habitats to migratory birds and identifies areas of the state where birds may be threatened by pollution and development. NMH

Alaska
Shorebirds
Distribution, abundance, habitat, migration, pollution


This paper presents a method to indicate the relative vulnerability of a marine bird species to oil pollution and related impacts of oil development. Each of 176 species of birds using marine habitats in Washington, Alaska, and British Columbia is ranked on the basis of 20 factors that affect its survival. The needs for such a system as a management tool are discussed. MRP

Alaska
Shorebirds
Management, pollution

This note reports the occurrence of a flock of Ruddy Turnstones at Sitka on January 18, 1971. MRP

Gulf of Alaska - Southeastern (Sitka)
Sandpipers
Ruddy Turnstones
Distribution


This is a semi-popular account of the 1948 expedition to locate the nest of this species. The article describes previous attempts to locate a nest and details the finding of the first nest near Mt. Village on June 12, 1948. REG

Bering Sea - Yukon Delta
Sandpipers
Bristle-thighed Curlew
Distribution, habitat


This article summarizes the provisions that differ from those in previous treaties and discusses their significance to management of marine birds. Disturbance, subsistence use, and habitat protection are addressed. The full treaty is included. MRP

Alaska
Shorebirds
Management

This paper discusses observations on the populations, breeding biology, and foods of 19 species of marine birds during summer 1976. A checklist presents the breeding status of the 54 species of birds observed. CMH

Gulf of Alaska - Kodiak (Semidi Is.)
Shorebirds, oystercatchers
Black Oystercatcher
Abundance, habitat, reproduction, food, checklist


The occurrence of Totanus glareola (= Tringa glareola) on Sanak Island is noted. NMH

Aleutians - (Sanak Is.)
Sandpipers
Wood Sandpiper
Distribution, specimen record


Not reviewed.

Arctic - Chukchi (Barrow)
Sandpipers


The significance of tooth and bone fragments in stomachs of Arctic nesting shorebirds is explored and related to calcium requirements in nesting female sandpipers. REG

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Dunlin
Physiology, reproduction, food

The authors, using meristic and plumage criteria, recognize three distinct groups, two of which breed in Alaska. Geographic variations in the races are discussed. REG

Alaska Sandpipers Dunlin Taxonomy, distribution, anatomy, plumage


This paper reports on seasonal changes in abundance of arthropods, and examines them in relation to the peak of shorebird hatch. MRP

Arctic - Chukchi (Barrow) Shorebirds Food


This report summarizes a study on the breeding biology of seabirds on the Barren Islands from 1976 to 1979. The report discusses local distribution, abundance, and nesting requirements of breeding seabirds; productivity; types and quantities of food consumed by selected species; and the effect of future oil development on their biology. MRP

Gulf of Alaska - Kodiak (Barren Is.) Oystercatchers Black Oystercatcher Abundance, distribution, breeding biology, pollution

This paper reviews current breeding seabird population estimates, nest site preferences, and population changes for southeastern Alaska, British Columbia, and Washington. Important research needs are identified. MRP

Gulf of Alaska - Southeastern Oystercatchers
Black Oystercatcher
Status, abundance, distribution, habitat, research


A Semipalmated Sandpiper which was banded in central Kansas was found breeding at Prudhoe Bay. NMH

Arctic - Beaufort (Prudhoe Bay)
Sandpipers
Semipalmated Sandpiper
Migration, distribution


This paper discusses the potential for disastrous and irrecoverable losses to northern marine bird populations and identifies research needs. MRP

Alaska Shorebirds
Pollution, research

697

"Reference is made to specimens of Phalaropus fulicarius and lobatus from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Phalaropes
Northern Phalarope, Red Phalarope
Distribution, specimen record


During a study of nesting and migrating birds on the eastern Copper River Delta in 1978 and 1979 the authors determined habitat preferences, distribution, abundance, and phenology for the avifauna of the area. Critical habitats were identified and recommendations made for future surveillance and management of populations. Detailed information is presented for Dusky Canada Geese, Sandhill Cranes, and shorebirds. REG

Gulf of Alaska - Copper River (Eastern Copper R. Delta)
Plovers, sandpipers, phalaropes
Semipalmated Plover, Common Snipe, Short-billed Dowitcher, Least Sandpiper, Dunlin, Northern Phalarope
Abundance, breeding biology, checklist, distribution, food, habitat, management, migration, predation, reproduction, status


The distribution and abundance of 20 species of marine birds nesting in this group of islands are summarized and mapped. Information on the breeding biology and feeding ecology is presented for 17 and 11 species, respectively. CMH

North Pacific - (Shumagin Is.)
Oystercatchers
Black Oystercatcher
Abundance, distribution, reproduction, habitat, food

Not reviewed.

Sandpipers
Wandering Tattler
Distribution


The author presents records of the Wandering Tattler and Surfbird nesting in Interior Alaska, and describes nesting habitat, adult behavior, and plumage of the downy young. CMH

Interior - Tanana (Alaska Range)
Sandpipers
Wandering Tattler, Surfbird
Habitat, distribution, plumage, behavior


"Reference is made to specimens of Haematopus bachmani from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Oystercatchers
Black Oystercatcher
Distribution, specimen record


This paper discusses "fat analysis of livers and kidneys from Old Squaw and Red Phalarope." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Arctic - Chukchi (Barrow)
Phalaropes
Red Phalarope
Physiology

This paper presents data on fatty acids, lipid phosphorus, and cholesterol levels in tissues of four species of Arctic migratory birds. The significance of variations in lipid patterns among the species is discussed. REG

Arctic - Chukchi (Barrow)
Plovers, sandpipers, phalaropes
American Golden Plover, Dunlin, Red Phalarope
Physiology, migration


This article presents a brief description of displays and copulatory behavior of Buff-breasted Sandpipers, and includes color photographs of the displays. MRP

Arctic
Sandpipers
Buff-breasted Sandpiper
Behavior


This paper analyzes daily mean temperature and wind direction information for 26 summers (1950-1975) at Barrow. Annual differences in densities of breeding shorebirds are discussed in relation to variations in early season environmental conditions on the breeding grounds. MRP

Arctic - Chukchi (Barrow)
Sandpipers, phalaropes
Pectoral Sandpiper, Red Phalarope
Habitat

This paper briefly describes results of a five-year study comparing seasonal habitat use and abundance of shorebirds at a coastal and an inland site in northern Alaska. Overall densities are analyzed in relation to time, degree of polygonization of the tundra, and degree of pond development of the habitat. A checklist presents the status of the shorebird species observed at each site. CMH

Arctic - Chukchi (Barrow, Atkasook)
Shorebirds
Habitat, abundance, checklist


This paper presents observations of spring migration of Black Brant and several other early migrants. Flight behavior, body condition during spring migration, and possible migration routes of Black Brant are described. MRP

Bering Sea - Norton Sound (St. Michael)
Phalaropes
Northern Phalarope
Migration

156. NELSON, E.W. 1884. The breeding habits of the Pectoral Sandpiper (Actodromus maculata). Auk 1:218-221.

The author details his observations of displaying Pectoral Sandpipers during late May 1879. REG

Bering Sea - Norton Sound (St. Michael)
Sandpipers
Pectoral Sandpiper
Behavior

This list includes sets of eggs of five species from Alaska. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Plovers, sandpipers
American Golden Plover, Spotted Sandpiper Specimen record


Not reviewed.

Arctic - Chukchi (Barrow)
Sandpipers
Dunlin


A laboratory investigation of energetics and growth in Dunlin chicks is reported. In this abstract the author only alludes to bioenergetic and thermoregulatory problems faced by the chicks in their natural tundra habitat. NMH

Arctic Sandpipers
Dunlin
Growth, physiology, techniques


Incubation performance of calidridine sandpipers nesting along the Alaska Arctic coast is briefly discussed. Adaptations to compensate for characteristically low ambient temperatures are described. NMH

Arctic Sandpipers
Behavior

Two adult Dunlin banded at Barrow in early summer were recovered in the Soviet Union in October, supporting the idea of an Asiatic wintering ground for the race of Dunlin breeding in Arctic Alaska. REG

Arctic - Chukchi (Barrow)
Sandpipers
Dunlin
Migration


This paper examines incubation regimes of four Arctic nesting sandpipers, and relates incubation schedules to the influence of nesting stage, diurnal rhythms, and prevailing weather conditions. REG

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Dunlin
Breeding biology


Aspects of the metabolic rates of four species of Calidris sandpiper were investigated. The energetic impact of these species on the tundra ecosystem, and their evolutionary relationships are discussed. A simple energy budget model is presented. NMH

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Dunlin
Physiology, behavior, habitat, taxonomy

Not reviewed.

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper


Results are reported of a homing experiment in which four pairs of nesting sandpipers were displaced via airplane from Barrow to interior Alaska. REG

Arctic - Chukchi (Barrow)
Interior - Tanana (Bettles, Fairbanks)
Sandpipers
Semipalmated Sandpiper
Migration


Abundance, nesting habitat, breeding phenology, and productivity of 10 species are discussed. Data collected in 1978 are compared with those of 1975 and 1977. Chick growth and feeding rates are presented for Black-legged Kittiwakes and Tufted Puffins. An annotated list of the 75 species observed in summer 1978 is appended. REG

Gulf of Alaska - Kodiak (Chiniak Bay)
Shorebirds, oystercatchers
Black Oystercatcher
Reproduction, abundance, annotated list

The 1977 breeding season phenology and productivity are reported for eight major species nesting over inner Chiniak Bay and on mainland Kodiak. Population estimates and densities of major breeding populations are presented. Incidental notes are summarized for six other species breeding in the area. A list of the prey items taken by nine species of seabirds is presented. CMH

Gulf of Alaska - Kodiak (Kodiak Is., Chiniak Bay)
Oystercatchers, plovers
Black Oystercatcher, Semipalmated Plover
Reproduction


The results of seabird colony censuses are reported and compared with 1972 censuses. Reproductive phenology and success are discussed for major breeding species and results from "sea watch" and shoreline transects are reported. An annotated list of the 90 species observed in summer 1976 is appended. REG

Gulf of Alaska - Prince William Sound (Hinchinbrook Is.)
Shorebirds, oystercatchers, plovers
Black Oystercatcher, Semipalmated Plover
Abundance, reproduction, annotated list


Records of occurrence of Little Ringed Plovers in North America are reviewed, including two from Alaska. Both records were subsequently challenged (cf. Gabrielson and Lincoln, Birds of Alaska, 1959; Kessel and Gibson, Stud. Avian Biol. 1, 1978). REG

Gulf of Alaska - Kodiak (Kodiak Is.)
Plovers
Little Ringed Plover
Specimen record, distribution

This paper briefly mentions a specimen from the Yukon Delta. At the time, Long- and Short-billed Dowitchers were not yet recognized as separate species. REG

Bering Sea - Yukon Delta
Sandpipers
Short-billed Dowitcher, Long-billed Dowitcher
Taxonomy, distribution


The author records the collection of a Wandering Tattler, which he surmised may have been breeding there. CMH

Interior - Tanana (Mt. McKinley)
Wandering Tattler
Distribution


This brief note describes a Rock Sandpiper swimming to a rock perch in the middle of a pond. MRP

Bering Sea - Pribilof Is. (St. Paul Is.)
Sandpipers
Rock Sandpiper
Behavior


This paper deals largely with taxonomy, and questions the relationships among the Asiatic shorebird Limnodromus semipalmatus and American dowitchers (L. griseus and L. scolopaceus). REG

Alaska
Sandpipers
Short-billed Dowitcher, Long-billed Dowitcher
Distribution, taxonomy

The author presents a critical and detailed analysis of the distribution and taxonomic history of *Limnodromus*. A new form, *L. griseus caurinus*, is proposed from southern Alaska. REG

Alaska
Sandpipers
Short-billed Dowitcher, Long-billed Dowitcher
Anatomy, distribution, migration, plumage, taxonomy


This major paper discusses critical population characteristics of this common north Alaska shorebird. Information on displays, calls, and foods is also presented. REG

Arctic - Chukchi (Barrow)
Sandpipers
Pectoral Sandpiper
Population dynamics, breeding biology, food, behavior


Dr. Pitelka, in these opening remarks at the 1977 shorebird symposium at Asilomar, California, summarizes shorebird distribution along the entire Pacific coast of North America and relates this to the world shorebird fauna. Also discussed are several biological and geographic factors influencing such things as shorebird distribution, migrational timing and movements, winter philopatry, and variation in sex and age ratios among populations of a species over different latitudinal sections of the Pacific coast. REG

Alaska
Shorebirds
Habitat, distribution, migration, age and sex composition

This paper presents a comparative analysis of sandpiper social systems on Arctic and subarctic breeding grounds (24 species in the family Scolopacidae). Four major patterns are recognized and their evolutionary development is discussed. REG

Arctic Sandpipers Taxonomy, behavior


This paper discusses geographical, phytogeographical, and zoogeographical evidence for differentiation in Anatidae during the last glaciation. It also compares geographical differentiation in the families Anatidae and Gaviidae, and in the genera Calidris and Tringa. NMH

Arctic Bering Sea Sandpipers Zoogeography


The author proposes and describes a new race of godwit and compares it with the already known forms. Mention is made of several Alaska specimens. REG

Alaska Bering Sea - Norton Sound, Pribilof Is. Sandpipers Bar-tailed Godwit Taxonomy, plumage, distribution

708

A single egg of Baird's Sandpiper from Barrow is mentioned. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Arctic - Chukchi (Barrow)
Sandpipers
Baird's Sandpiper
Distribution, specimen record


This paper "records Falco gyrfalco and Numenius femoralis." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Sandpipers
Specimen record


This paper presents detailed descriptions of Rock Sandpipers from specimens collected throughout the Aleutians and coastal Alaska north to St. Michael. Included is a description of the Pribilof Island subspecies. MRP

Aleutians
Bering Sea
Sandpipers
Rock Sandpiper
Taxonomy, plumage


This is a short note on the collection of a specimen of this species (= Calidris subminuta) during the trip of the U.S. Revenue Cutter Corwin in 1885. REG

Bering Sea - Pribilof Is. (Otter Is.)
Sandpipers
Long-toed Stint
Distribution, specimen record

The estimated number of days required for rapid yolk formation is reported for 14 species of birds. MRP

Bering Sea - Yukon Delta (Clarence Rhode NWR)
Sandpipers, phalaropes
Bar-tailed Godwit, Ruddy Turnstone, Western Sandpiper, Northern Phalarope, Red Phalarope

Physiology


The estimated number of days required for rapid yolk development is reported for 20 species. MRP

Bering Sea - Yukon Delta (Old Chevak)
Sandpipers, phalaropes
Bar-tailed Godwit, Ruddy Turnstone, Western Sandpiper, Northern Phalarope, Red Phalarope

Physiology


This paper addresses the subspecific status of North American dowitchers, primarily those forms from Canada, but including numerous specimens from Alaska. REG

Alaska
Sandpipers
Short-billed Dowitcher, Long-billed Dowitcher
Taxonomy, distribution, plumage

This note, based on observations during winter and summer 1953, describes the feeding association of nine species of marine birds with four species of pinnipeds. REG

Arctic
Bering Sea
Phalaropes
Red Phalarope
Food


This abstract briefly describes a four-year investigation of a breeding population of Semipalmated Sandpipers near Barrow. Aspects of the breeding biology are summarized. NMH

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper
Breeding biology, population dynamics, predation


This paper proposes and tests a model to determine factors governing clutch size in nidifugous birds. REG

Arctic - Chukchi (Barrow)
Sandpipers
Semipalmated Sandpiper
Reproduction, predation

Based upon observations at sea, the standing stock and biomass of seabirds are calculated and summarized by season and oceanographic domain for each ecological group of birds. Annual food consumption and nutrient transfer are estimated, and how seabirds fit into a simple, hypothetical food chain is discussed. CMH

Gulf of Alaska
North Pacific
Bering Sea
Phalaropes
Abundance, distribution, food


Not reviewed.

Bering Sea - St. Lawrence Is.
Plovers
American Golden Plover


The author hand-raised 10 Pluvialis dominica fulva from St. Lawrence Island to experimentally investigate migratory patterns and orientation abilities in the species. REG

Alaska
Bering Sea - St. Lawrence Is.
Plovers
American Golden Plover
Migration, physiology

Data on multiple clutches and site tenacity in Red Phalaropes are discussed in relationship to the species' social system. REG

Arctic - Chukchi (Barrow)
Phalaropes
Red Phalarope
Breeding biology


This paper describes Polymorphus petrochenkoi sp. n. (a new species) from a Red Phalarope collected at St. Lawrence Island. MRP

Bering Sea - St. Lawrence Is.
Phalaropes
Red Phalarope
Disease and parasites


The authors describe the occurrence of cestodes and trematodes found in five species of shorebirds collected in Bristol Bay in 1960. CMH

Bering Sea - Bristol Bay (Kwichak Bay)
Sandpipers
Greater Yellowlegs, Black Turnstone, Short-billed Dowitcher, Semipalmated Sandpiper, Dunlin
Disease and parasites

713

This thesis presents information on the food habits, feeding ecology, and habitat use of Western Sandpipers and Dunlin during spring migration. MRP

Gulf of Alaska - Copper River (Copper R. Delta)
Sandpipers
Western Sandpiper, Dunlin
Food, habitat, migration


This presents a preliminary analysis of stomach contents of spring migrant Dunlin and Western Sandpipers. Live-trapping techniques are described and evaluated. Included in an appendix are selected observations of spring and fall migration for 45 species of birds. CMH

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds
Western Sandpiper, Dunlin
Food, migration, techniques, annotated list


Migration strategies of Dunlin and Western Sandpipers are compared with reference to their use of the Copper River Delta as a stopover and staging area in spring. REG

Gulf of Alaska - Copper River (Copper R. Delta)
Sandpipers
Western Sandpiper, Dunlin
Migration, food, habitat

This paper reports the foods eaten by 22 Common Snipe collected on the Copper River Delta. MRP

Gulf of Alaska - Copper River (Copper R. Delta)
Sandpipers
Common Snipe
Food


The importance of the Copper River Delta to migrant shorebirds is outlined, and the impact oil exploration will have on the region is discussed. An investigation of the physiological conditions of migrant Western Sandpipers and Dunlin is mentioned. NMH

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds, sandpipers
Western Sandpiper, Dunlin
Pollution, migration, food, physiology, habitat


Not reviewed.

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds
Pollution

This report compares the strategies of Dunlin and Western Sandpipers during spring migration through the Copper-Bering River Delta, with emphasis on the nutritional and physiological aspects. Potential effects of petroleum development are discussed. CMH

Gulf of Alaska - Copper River (Copper-Bering R. Delta), Cook Inlet (Kachemak Bay)
Sandpipers
Western Sandpipers, Dunlin
Migration, food, physiology, habitat, pollution


This presents an analysis of pellets and remains found near nests of Rough-legged Hawks on the Seward Peninsula. Six species of birds were identified as prey, including the American Golden Plover. CMH

Arctic - Kotzebue Sound
Plovers
American Golden Plover
Predation


Detailed information is provided on distribution, abundance, and reproductive and feeding ecology of seabirds in the Norton Sound region. Maps depicting waterfowl densities along the coast in fall are presented, along with some brood counts. Shorebirds are discussed in general terms. CMH

Bering Sea - Norton Sound
Shorebirds
Habitat, management
205. STEPHENSON, R.O. 1970. A study of the summer food habits of the
Alaska, College. 75 pp.

This presents results of a study of the food habits of arctic
foxes denning in lowland tundra and sea cliff habitats. Over
1,500 scats were analyzed from 24 dens. The composition of the
diet is discussed in relation to availability of prey species.
CMH
Bering Sea - St. Lawrence Is.
Shorebirds
Predation


The author refers to four specimens from Alaska. REG

Alaska
Sandpipers
Sanderling
Specimen record, plumage

Condor 29: 274.

This note is an explanation of the author's exclusion of per-
tinent references from a previously published paper (Condor
29:200, 1927). REG

Bering Sea
Sandpipers
Rufous-necked Sandpiper
Distribution

208. SWARTH, H.S. 1927. The Rufous-necked Sandpiper on St. Paul,

A specimen of Rufous-necked Sandpiper taken on St. Paul Island is
noted. NMH

Bering Sea - Pribilof Is. (St. Paul Is.)
Sandpipers
Rufous-necked Sandpiper
Distribution, specimen record
This brief note lists five species of Asiatic birds collected on Nunivak Island. Included are Mongolian Plover, Bullfinch, Japanese Water Pipit, Middendorff's Grasshopper Warbler, and Siberian Accentor.

Bering Sea - Nunivak Is.
Plovers
Mongolian Plover
Distribution, specimen record

Addressing plumage, measurements, distribution, and migratory routes, the author examines the systematic status of four species of birds, including the Solitary Sandpiper.

Gulf of Alaska
Sandpipers
Solitary Sandpiper
Taxonomy, plumage, anatomy, distribution, migration

This provides an "account of breeding grounds including Alaska; its migration southward; its excessive slaughter and need for protection in the United States." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.)

Alaska
Sandpipers
Eskimo Curlew
Distribution, management, migration

This paper discusses breeding distribution and includes specimen data from three sites in Alaska. Characteristics distinguishing Tringa solitaria solitaria and T. s. cinnamomea are discussed. REG

Arctic
Interior
Sandpipers
Solitary Sandpiper
Distribution, taxonomy, specimen record


The author provides details of a sighting of four adult sandpipers near Kivalina in late June 1967. REG

Arctic - Kotzebue Sound (Kivalina)
Sandpipers
Sharp-tailed Sandpiper
Distribution


Details of the first specimen of this species from Alaska are given. REG

Bering Sea - Norton Sound (Nome)
Sandpipers
Rufous-necked Sandpiper
Distribution, specimen record


Because of band wear observed on Ruddy Turnstones, the author suggests incoloy bands be used on shorebirds in place of aluminum or monel bands. REG

Bering Sea - Pribilof Is.
Sandpipers
Ruddy Turnstone
Techniques

This paper, based largely on band returns, discusses the migration and wintering areas of this species. Considerable mention is made of feeding habits and habitat use. REG

Bering Sea - Pribilof Is.
Sandpipers
Ruddy Turnstone
Migration, food, behavior, habitat


The authors describe how they set up and successfully used projected nets for trapping Ruddy Turnstones on the Pribilof Islands. Over 17,000 birds were trapped, including birds of 10 other species captured incidentally. Suggestions are provided for reducing mortality. CMH

Bering Sea - Pribilof Is.
Plovers, sandpipers, phalaropes
Ruddy Turnstone
Techniques


Four species new to North America and 11 new to the Pribilof Islands were recorded during summer field seasons from 1964 to 1968. Dates of observations and specimen data are presented. MRP

Bering Sea - Pribilof Is.
Plovers, sandpipers
Mongolian Plover, Black-bellied Plover, Far Eastern Curlew, Common Sandpiper, Red Knot, Temminck's Stint, Stilt Sandpiper, Buff-breasted Sandpiper
Annotated list, specimen record, distribution

This paper summarizes the taxonomic history of the American Dunlin, and proposes recognition of three races in North America: Calidris alpina arcticola, C. a. pacifica, and C. a. hudsonia. CMH

Alaska
Sandpipers
Dunlin
Taxonomy, plumage


This paper describes the occurrence of Arhythmorhynchus in 16 species of shorebirds from North America, including 14 species collected in Alaska. MRP

Alaska
Plovers, sandpipers
Disease and parasites


The author describes the sightings of two birds in early August 1961. REG

Interior - Tanana (Minto Lakes)
Sandpipers
Willet
Distribution


As part of a study on chlorinated hydrocarbon pollutants in Gyrfalcons, whole body DDE residues of Long-tailed Jaegers, American Golden Plovers, and Whimbrels are presented. MRP

Norton Sound
Plovers, sandpipers
American Golden Plover, Whimbrel
Pollution

Notes on five species of shorebirds nesting near Johnson River are presented. REG

Bering sea - Yukon Delta (Bethel)
Plovers, sandpipers, phalaropes
American Golden Plover, Black-bellied Plover, Hudsonian Godwit, Western Sandpiper, Northern Phalarope

Distribution


During the summer of 1929, the author followed three nesting pairs of godwits. His observations appear here in narrative form. REG

Bering Sea - Yukon Delta (Kwiguk Pass)
Sandpipers
Bar-tailed Godwit
Breeding biology, habitat, behavior


The author presents a detailed account of the breeding biology of this species from the Sitka region. Observations are primarily of five pairs of birds studied during 1940. REG

Gulf of Alaska - Southeastern (Sitka, Kayak Is.)
Oystercatchers
Black Oystercatcher
Breeding biology


The prey items, their distribution, and the feeding methods of this species are described. Data on stomach contents were obtained from 12 individuals collected between March and September 1940. REG

Gulf of Alaska - Southeastern (Sitka Sound)
Oystercatchers
Black Oystercatcher
Food

The plumages of the species, from downy to adult, are described. Some morphometric data are presented. REG

Gulf of Alaska - Southeastern (Sitka)
Oystercatchers
Black Oystercatcher
Growth, plumage


The taxonomy of the oystercatcher clan is examined by comparing the plumage patterns and colors of the downy young of several species. NMH

Alaska
Oystercatchers
Black Oystercatcher
Taxonomy, plumage


This note offers corrections and additions to seashore invertebrates listed in the author's previous papers (Condor 43:175-180; and Wilson Bull. 53:141-156) on the Black Oystercatcher in Alaska. REG

Gulf of Alaska - Southeastern
Oystercatchers
Black Oystercatcher
Food


The author presents observations on nesting tattlers near Eagle Creek, Alaska. REG

Interior - Upper Yukon (Eagle Creek)
Sandpipers
Wandering Tattler
Distribution, breeding biology

This note provides observations on the nesting of this shorebird. REG

Interior - Upper Yukon (Eagle Creek)
Sandpipers
Wandering Tattler
Breeding biology, habitat


Not reviewed.

Interior - Tanana (Mansfield L.)
Plovers
Killdeer
Distribution


This report summarizes results of studies conducted in 1977 on the marine birds of Ugaiushak Island. Abundance, phenology, and production are addressed for each of 15 species. Information on foods and foraging areas, chick growth, relaying and twinning experiments, and colony attendance is presented for some. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Oystercatchers
Black Oystercatcher
Reproduction, abundance, habitat

This report on the populations, breeding biology, food habits, and foraging areas of 21 species in summer 1976. A daily checklist of the 50 species observed on the island is appended. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Shorebirds, oystercatchers
Black Oystercatcher
Abundance, reproduction, checklist


Three downy Wood Sandpipers found on Amchitka Island on July 2, 1969, establish the breeding status of this species in North America. REG

Aleutians - (Amchitka Is.)
Sandpipers
Wood Sandpiper
Distribution


The first part of this report discusses in detail the problems associated with censusing marine birds at sea. Current techniques are compared by computer simulations. A new survey technique is described and the results of pelagic surveys using the new technique are presented. The second part discusses the formation and characteristics of feeding flocks, particularly those which contain more than one species. Phalaropes are mentioned only secondarily. PJG

Gulf of Alaska
Phalaropes
Red Phalarope
Techniques, behavior, food, abundance

This note provides the first records of the Whooper Swan, Black Scoter, and Sanderling for the Pribilof Islands. Other species are mentioned. CMH

Bering Sea - Pribilof Is.
Plovers, sandpipers, phalaropes
American Golden Plover, Wandering Tattler, Black Turnstone, Sanderling, Rock Sandpiper, Red Phalarope
Distribution, specimen record


The first specimen of this species from southeastern Alaska is described. REG

Gulf of Alaska - Southeastern (Douglas Is.)
Sandpipers
Sharp-tailed Sandpiper
Distribution, specimen record


All records of the Hudsonian Godwit in Alaska are summarized. The breeding distribution and timing and routes of migration are discussed. REG

Alaska
Sandpipers
Hudsonian Godwit
Distribution, migration
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This thesis provides information on bird populations and habitat use, and evaluates the immediate effects of crude oil contamination on aquatic macroinvertebrate and bird activity. MRP

Arctic - Beaufort (Pt. Storkersen)
Shorebirds, seabirds, waterfowl
Abundance, distribution, pollution, management


The authors report possible problems confronting birds from petroleum development on Alaska's North Slope. Densities of birds using the area are presented, and the effects on birds of oil on coastal ponds are discussed. MRP

Arctic - Beaufort (Storkersen Pt.)
Shorebirds, seabirds, waterfowl
Abundance, distribution, pollution


This paper presents annotated accounts of 43 species of birds observed in the area of St. Michael. Included are 7 species of seabirds, 15 species of waterfowl, and 8 species of shorebirds. MRP

Bering Sea - Norton Sound (St. Michael)
Shorebirds, seabirds, waterfowl, other
Annotated list

This volume summarizes data on the distribution and habitat use of game mammals, marine mammals, waterfowl, and seabirds. Very general species accounts are presented for seabirds and waterfowl. Maps show breeding, molting, and wintering areas and broad migration routes for the two bird groups combined. CMH

Alaska
Seabirds, waterfowl
Public interest, management, distribution


This volume describes the distribution of the furbearers, small game birds and mammals, raptors, and seabirds within each game management unit. Maps show locations of seabird colonies; lists of the species at each site are presented and cross-referenced to the "Catalog of Alaskan Seabird Colonies" (Sowls et al. 1978). CMH

Alaska
Seabirds, other
Public interest, management, distribution


This is a summary of a paper giving an account and the importance of "invasion of Old World species in Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Zoogeography

This is a checklist of 177 species identified from the greater Anchorage area. The status, relative abundance, and seasonal occurrence of each species are given and seven of the best areas in which to look for the birds are described. REG

Gulf of Alaska - Cook Inlet (Anchorage)
Shorebirds, seabirds, waterfowl, other
Checklist


A complete annotated list of birds encountered and collected on the Arctic expedition is presented. NMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Annotated list


The specimens collected during the Canadian Arctic Expedition of 1913-14 are listed. NMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Specimen record, checklist


A note outlining the route travelled on the Arctic expedition of 1915-1916 is followed by a list of specimens collected. NMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Specimen record, checklist

Not reviewed.

Arctic - Chukchi, Beaufort


This paper reports on 52 species of birds observed between June 12 and July 4, 1970, near Nuvagapak Point, in the Arctic National Wildlife Range. An annotated species list includes information on habitat use, breeding biology, and density. MRP

Arctic - Beaufort (Nuvagapak Pt.)
Shorebirds, seabirds, waterfowl, other
Annotated list, abundance, breeding biology, predation


This note gives an account of spring migration of birds to the Seward Peninsula in 1905. First dates of observations are presented for 13 species of water birds. MRP

Bering Sea - Norton Sound
Shorebirds, seabirds, waterfowl, other
Migration


This report includes a chapter on birds, which summarizes available information on their seasonal occurrence, habitat use, population densities, and migration. Most of the discussion is general, but a checklist synthesized from various sources provides information on general areas of occurrence and nesting area affinities for 163 species. CMH

Arctic - Chukchi, Beaufort
Shorebirds, seabirds, waterfowl, other
Habitat, abundance, migration, checklist
15. ARNESON, P.D. 1976. Identification, documentation and delina-
eation of coastal migratory bird habitat in Alaska, pp. 1-54. In
Environmental Assessment of the Alaskan Continental Shelf, Annual
Reports from Principal Investigators, Vol. 2. NOAA, Environ.
Res. Lab., Boulder, Colo.

This report provides preliminary results of a study evaluating
the importance of coastal habitats of Bristol Bay and the Gulf of
Alaska to birds. Included are a summary of the total numbers of
birds censused on several aerial surveys, plus a breakdown of the
amount of each habitat type available along the north side of the
Alaska Peninsula. CMH

Bering Sea - Bristol Bay
Gulf of Alaska
Shorebirds, seabirds, waterfowl, other
Habitat, distribution, abundance, pollution

16. ARNESON, P.D. 1977. Identification, documentation, and delin-
eation of coastal migratory bird habitat in Alaska, pp. 1-95. In
Environmental Assessment of the Alaskan Continental Shelf, Annual
Lab., Boulder, Colo.

This reports on aerial surveys conducted in 1975 and 1976 in
Bristol Bay and the Gulf of Alaska to determine the seasonal
distribution and abundance of birds in littoral and estuarine
habitats. Important breeding, staging, and wintering areas are
mapped. For each major geographic region, numbers of birds are
summarized by water type, physiographic feature, and substrate
type. CMH

Bering Sea - Bristol Bay
Gulf of Alaska
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat

This report summarizes and discusses results of aerial surveys of Bristol Bay in May 1978 and of Cook Inlet in winter 1977-78 and spring 1978. Included in separate appendices is information on seabirds inhabiting the Walrus Islands during summer 1977; spring migration past Kayak Island; and birds of Tugidak Island. CMH

Bering Sea - Bristol Bay
Gulf of Alaska - Cook Inlet, Kodiak (Tugidak Is.), Prince William Sound (Kayak Is.)
Shorebirds, seabirds, waterfowl, other
Distribution, habitat, checklist, migration


This narrative account describes collecting adult Emperor Geese and their eggs during the spring. Briefly mentioned are other common species of birds. MRP

Bering Sea - Norton Sound (Cape Prince of Wales)
Shorebirds, seabirds, waterfowl, other
Distribution, migration


This paper presents "informal notes on various species nesting locally." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Bering Sea - Norton Sound (Cape Prince of Wales)
Distribution


This 10-part paper provides a summary of the Colorado Museum of Natural History expedition to northwestern Alaska in 1921-1922 and includes much of the information found in Bailey's 1943 "Birds of Cape Prince of Wales, Alaska." The text gives an extensive description of the itinerary and often lengthy annotated species accounts with much anecdotal information. REG

Bering Sea - Norton Sound
Arctic - Chukchi (Wainwright)
Shorebirds, seabirds, waterfowl, other
Annotated list


The author investigated the avifauna of this region between 1919 and 1921 and presents annotated accounts of over 150 forms of which 80 are water-associated. An itinerary and description of localities precedes the species accounts. REG

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Annotated list


This narrative account presents a few observations of birds seen on a cruise of the Bear from Nome north along the Arctic Coast. Of particular interest are the descriptions of the local inhabitants and the general area. MRP

Bering Sea - Norton Sound
Arctic - Kotzebue Sound, Chukchi, Beaufort
Shorebirds, seabirds, waterfowl, other
Distribution

738

This is a major work on the avifauna of the region. It includes a lengthy discussion of the area, the itinerary of the expedition, descriptions of avian habitats, and generally thorough annotated accounts of over 100 species, over half marine-associated. Information was collected during a sixteen-month period in 1921-1922. REG

Bering Sea - Norton Sound (Cape Prince of Wales)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, habitat, distribution


This is an account of a museum collecting expedition to the Arctic Slope of Alaska in 1921-22. It includes a description and history of the region and a narrative of the trip. Species accounts are presented for birds collected on the expedition and those subsequently collected through 1944. NMH

Arctic - Chukchi, Beaufort
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


The authors have compiled all records of the Pt. Barrow avifauna up to 1933. Annotated accounts are presented for 126 species, including 77 water-associated forms. Numerous specimens are reported. REG

Arctic - Chukchi (Barrow)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, distribution

This report provides a general description of the area and its climate, a brief review of fishes and mammals in the area, and a description of bird resources. MRP

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds, seabirds, waterfowl, other
Abundance, habitat


Aerial surveys were conducted in summer 1974 over waters adjacent to proposed refuges to determine species composition, distribution, and abundance of marine birds. Results are summarized by region, season, and distance from shore for each species or species group. All species observed on the surveys are included. Briefly summarized are results of shoreline surveys of the Arctic Coast. CMH

Arctic
Bering Sea
Gulf of Alaska
Shorebirds, seabirds, waterfowl
Distribution, abundance


This paper presents information on the distribution and abundance of seabirds in the Barren Islands. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Shorebirds, seabirds
Abundance, distribution

The species composition, distribution, and abundance of 53 species of birds, including 33 marine species, encountered on the Barren Islands in July 1974 and 1975 are presented. MRP

Gulf of Alaska - Kodiak (Barren Is.)
Shorebirds, seabirds, waterfowl, other
Abundance, checklist


A reconnaissance survey was conducted along 600 miles of coast during summer 1976. Total numbers of each species observed are summarized for 14 segments of the coast. Estimates of numbers of breeding pairs are given for all seabird colonies located. Of the 31 species of marine birds addressed, there are 19 seabirds, 2 raptors, 1 shorebird, 7 seaducks, and 2 loons. CMH

Gulf of Alaska - Prince William Sound (Kenai Peninsula)
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, habitat


This paper provides population estimates, by island, for the 18 species of seabirds found breeding on the Shumagin Islands. Most of the information was gathered on reconnaissance surveys during three summers, but data from historical and recent studies are also summarized. The presence of red foxes is discussed in relation to the distribution of seabirds on the islands. The presence of other species of birds is briefly noted. CMH

North Pacific - (Shumagin Is.)
Shorebirds, seabirds, waterfowl, other
Distribution, abundance

A reconnaissance survey was conducted in the Sandman Reefs in 1978. Total numbers of each species are summarized for each island visited and estimates of numbers of breeding pairs are given for each colony. Of the 47 species of birds observed, 35 were water-oriented. MRP

North Pacific (Sandman Reefs)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat


This report summarizes results of a two-year study of the comparative breeding and feeding ecology of five species of seabirds nesting on Kodiak Island. Differences in productivity are discussed in relation to prey availability. Appended is an annotated list of all birds and mammals observed in 1978. Of the 36 species of birds noted, 24 are water-associated. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list


Not reviewed.

Alaska

This comprehensive work summarizes observations from Alaska for several species, and includes the original description of *Rissa tridactyla pollicaris*. CMH

Alaska
Shorebirds, seabirds, waterfowl
Black-legged Kittiwake
Behavior, distribution, habitat, plumage, specimen record


Alaska
Specimen record


This paper presents a list, by state and province, of bird collections in the U.S. and Canada. The number and types of specimens, the species groups represented, and the geographic areas of origin are listed for each collection. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Specimen record


Not reviewed.

Arctic
Specimen record

This report assesses the bird resources of the Arctic Slope and examines potential threats from oil development and other sources of pollution. Information is summarized from published and unpublished sources and from reconnaissance surveys conducted in 1969. A checklist of the 171 species recorded north of the Brooks Range indicates their occurrence within three physiographic provinces and along the coast of the Chukchi Sea. Waterfowl species are discussed in greatest detail. Subsistence use is briefly addressed. CMH

Arctic - Chukchi, Beaufort
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, habitat, subsistence, pollution


Observations on the distribution and abundance of 32 species of pelagic birds in a portion of Bristol Bay were made during July and August 1969. Distribution and relative abundance data are presented. MRP

Bering Sea - Bristol Bay
Shorebirds, seabirds, waterfowl
Distribution, annotated list, abundance


The authors have compiled a bibliography, referenced by geographic area, of some 500 published and unpublished citations dealing with birds of coastal Alaska. A narrative summary of the pertinent literature is presented for each of four major geographic areas. Included in a separate section are references on hazards to marine birds. REG

Alaska
Shorebirds, seabirds, waterfowl, other
Bibliography

This is a brief introduction to 11 studies conducted in 1976.

Bering Sea
Gulf of Alaska
Shorebirds, seabirds, waterfowl
Habitat, reproduction


This paper provides often detailed accounts of specimens collected in Alaska during a cruise from Sitka to Icy Cape between May and October 1880. Seventy-seven species are addressed, 39 of them water-associated. REG

Arctic
Bering Sea
Gulf of Alaska
North Pacific
Shorebirds, seabirds, waterfowl, other
Specimen record, annotated list, distribution


This paper details the avifauna collected and observed during a trip along the Arctic Slope in summers 1951 and 1952. Within the annotated accounts are discussions of behavior and chronology as well as meristic data from specimens. REG

Arctic
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, anatomy


This book addresses "Alaska matters with some mention of birds." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Not reviewed.

Alaska
Shorebirds, seabirds, waterfowl, other


This paper resulted from ornithological investigations conducted throughout the Aleutian Islands and on Bogoslof, St. Paul, Walrus, St. Matthew and Hall Islands during the spring and summer of 1911. Some 50 species of marine or water-associated birds are treated in annotated accounts. REG

Aleutians - (Bogoslof Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list


This study assesses the importance of aquatic habitats to birds of the area, and develops a wetland classification system. Recommendations to reduce deleterious effects to wetland communities from petroleum development are presented. MRP

Arctic - Beaufort (Pt. Storkersen)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, management, pollution, abundance, distribution

This paper presents information from a five-year study of birds at Storkersen Point. Eight classes of wetlands are defined on the basis of size, depth, vegetation, and water chemistry, and related to bird use. Invertebrate populations are examined in relation to peak hatch of shorebirds and ducks. Recommendations for preservation of wetlands during oil development activities are included. MRP

Arctic - Beaufort (Storkersen Pt.)
Shorebirds, seabirds, waterfowl, other
Habitat, food, management, reproduction, checklist, pollution, migration, abundance


Not reviewed.

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Specimen record


Birds collected in the Point Barrow region from 1933 through 1940 are listed. REG

Arctic - Chukchi (Pt. Barrow)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, distribution


Brief annotated accounts are presented for 60 species observed during summer 1915. Included among the birds are 13 water-associated forms. REG

Interior - Upper Yukon
Shorebirds, seabirds, waterfowl, other
Annotated list


This is a very interesting account of the birds recorded during an expedition to the Yukon Delta and coast of western Alaska in 1924. The narrative species accounts are preceded by several chapters which discuss the itinerary of the trip, the native peoples of the area, and the natural features of western Alaska. The book is replete with drawings, paintings, and photographs of the birds, people, and habitats encountered on the expedition. REG

Bering Sea - Yukon Delta
Shorebirds, seabirds, waterfowl, other
Distribution, behavior, breeding biology


The authors spent from May 14 to June 4, 1964, observing and collecting birds at Wales, Alaska. Fifty-seven species were observed, 25 collected, and 32 photographed. Arrival dates are given for 32 species. Over half of this note is devoted to a description of the passage of Sandhill Cranes westward across the Bering Strait. REG

Bering Sea - Norton Sound (Wales)
Shorebirds, seabirds, waterfowl
Sandhill Crane
Migration, specimen record


This series of papers presents an annotated list of some 60 species observed at Kodiak Island. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list

748

This paper reports on the birds observed and collected in Arctic Alaska and Siberia during an expedition from spring 1913 through summer 1914. NMH

Arctic
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This paper presents spring migration dates of Snowy Owls and 15 species of water-oriented birds along the coast past Point Barrow. Environmental factors influencing the timing of arrival of birds are discussed. MRP

Arctic - Chukchi (Barrow)
Seabirds, waterfowl, other
Migration


This report presents a description of the area and annotated accounts of selected species. Harvest information of game species and the potential for habitat improvement are discussed. MRP

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds, seabirds, waterfowl, other
Management, annotated list


This narrative account of the itinerary of the expedition includes many anecdotal references to birds encountered at various stops. CMH

Aleutians, Bering Sea, Gulf of Alaska
Shorebirds, seabirds, waterfowl, other
Public interest

This paper presents annotated accounts of 124 species, including some 90 water-associated forms. Data from several specimens are included. REG

Aleutians - (Adak Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, distribution


This paper discusses 35 species new to the Aleutians or on which significant new information is available. Five species and two subspecies new to North America are included. The majority of the species discussed are water-associated. MRP

Aleutians
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, specimen record


Pellets and remains of prey beneath an aerie of a Peregrine Falcon were collected and analyzed. A table presents the number of items and number of individuals represented for each bird species. The author briefly describes the relative abundance of each prey species, including six water-related forms, in the surrounding areas. CMH

Interior - Tanana (Fairbanks)
Shorebirds, seabirds, waterfowl, other
Red-necked Grebe, Green-winged Teal, Bufflehead, Lesser Yellowlegs, Herring Gull, Mew Gull
Food, predation

Notes on 35 species, including 25 marine forms, observed between June 7 and 15, 1950, are presented. Many of them are new records. REG

Bering Sea - Norton Sound (Sledge Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


The author has included all "primary" references to Alaska ornithology from 1785 through 1953. Citations number over 700 with nearly all being annotated, some having detailed summaries. REG

Alaska
Shorebirds, seabirds, waterfowl, other
Bibliography


This paper presents an annotated list of the 29 species observed in late fall 1940 in the Kodiak-Afognak Island area. Of these, 21 species are water birds. CMH

Gulf of Alaska - Kodiak (Kodiak-Afognak Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list


The author provides an annotated list of the birds observed during September 1940 in the Katmai region and summarizes earlier records for the area. Ninety-four species are discussed, including 59 species of water birds. A checklist of 118 species is appended. CMH

Gulf of Alaska - Kodiak (Katmai, Shelikof Strait)
Shorebirds, seabirds, waterfowl, other
Annotated list, checklist

The author presents annotated species accounts of birds observed in the monument in 1953 and 1954. Information on habitat use is included. NMH

Gulf of Alaska - Kodiak (Katmai National Monument)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


This paper presents an annotated species list of birds observed at Dutch Harbor over a 47-month period during World War II. Observations of 62 species are presented. MRP

Aleutians - (Dutch Harbor)
Shorebirds, seabirds, waterfowl, other
Annotated list


This paper "includes list of birds observed and a few that were collected." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Interior - Upper Yukon
Shorebirds, seabirds, waterfowl, other
Checklist, specimen record


This paper provides an annotated list of the 53 species of birds observed in a high valley of the Brooks Range during four summers. Thirty of the species are water-associated birds. CMH

Arctic - Beaufort (Brooks Range)
Shorebirds, seabirds, waterfowl, other
Annotated list

The author informally mentions the species which are common in the area in winter and some which he has collected. CMH

Gulf of Alaska - Southeastern (Long Is.)
Seabirds, waterfowl, other
Distribution


In this letter the author notes informally several species of birds which he has observed or collected near Juneau. Included are Red-legged Kittiwake, Western, Mew, and Glaucous-winged Gulls, and Marbled and Ancient Murrelets. CMH

Gulf of Alaska - Southeastern (Juneau)
Seabirds, other
Distribution


A list of 96 taxa of birds observed "along the Yukon River" between 1899 and 1901 is appended. REG

Bering Sea - Norton Sound (St. Michael)
Shorebirds, seabirds, waterfowl, other
Checklist


These notes, selected from a personal letter of a visitor to St. George Island, provide an anecdotal description of the island's seabird life. A few comments on seabird hunting by natives are included. NMH

Bering Sea - Pribilof Is. (St. George Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, subsistence

753

Not reviewed.


This paper "includes some specimens from Alaska and Bering Strait." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Specimen record

78. CHAPMAN, F. 1888. List of additions to the North American avifauna and of eliminations and changes in nomenclature proposed since the publication of the A.O.U. Check-list. Auk 5:393-402.

This update to the A.O.U. Checklist includes the addition of six species which were recorded from Alaska, including Larus barrovianus (= L. hyperboreus) and Tringa damacensis (= Calidris subminuta). CMH

Alaska
Shorebirds, seabirds, other
Glaucous Gull, Long-toed Stint
Distribution


The author lists the dates and locations of collections of the 302 specimens obtained by the Stone Expedition of 1901. Sixty-eight species and subspecies are treated, including 26 water-associated forms. REG

Alaska
Shorebirds, seabirds, waterfowl, other
Specimen record, annotated list

An annotated summary of 317 bird specimens and 35 egg sets collected in 1903 is presented. Sixty-two species are discussed, of which 20 are marine-associated. REG

Gulf of Alaska - Cook Inlet (Kenai Peninsula)
Bering Sea - Bristol Bay (Port Moller)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


Not reviewed.

Bering Sea - Yukon Delta (Anvik)


The author summarizes the summer and winter food habits of Arctic foxes near Teshekpuk Lake. Birds and eggs were found to form a large part of the summer diet; however, avian prey were not identified to species. CMH

Arctic - Beaufort (Teshekpuk L.)
Shorebirds, seabirds, waterfowl, other
Predation


The author presents annotated accounts for 90 species, including 59 water-associated forms. Species accounts are preceded by a discussion of the geology, climate, soils, and vegetation of the area. Data were collected between 1957 and 1960. REG

Arctic - Chukchi (Pitmegea R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat

755

This is a very extensive treatise providing annotated accounts of 176 species. Unfortunately, the accounts are not presented by geographic region, but instead include all observations from San Francisco, Alaska, and the Far East. Numerous specimen records are cited, usually accompanied by complete meristic data. REG

Bering Sea
Gulf of Alaska
Aleutians
North Pacific
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, anatomy


This paper updates the authors' earlier paper (Banks et al., Auk 90:136-170, 1973). This paper records more accurate counts, additions of specimens and collections, and the transfer of several collections. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Specimen record


"Mention is made of nine species of birds collected on St. Paul by Mr. Warneck. One described as new - *Larus warnecki* = *Rissa brevirostris.*" (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Pribilof Is. (St. Paul Is.)
Red-legged Kittiwake
Specimen record, taxonomy

756

Included in this paper is a checklist of all birds known to occur on the islands plus a brief account summarizing their relative abundance and distribution. Of the 131 species and subspecies listed, 97 are water-associated. Subsistence use is mentioned. CMH

Aleutians
Shorebirds, seabirds, waterfowl, other
Checklist, distribution, abundance, subsistence


This preliminary report provides annotated accounts for the 19 species of shorebirds using littoral habitats near Barrow, and for 11 other species of water birds commonly occurring there. Results of censuses taken regularly from July to September 1975 are graphically presented for most species. Qualitative food habits information is provided for 11 species. CMH

Arctic - Chukchi (Barrow, Wainwright), Beaufort
Shorebirds, seabirds, waterfowl
Habitat, abundance, food, annotated list


Included in this annual report are annotated accounts for the 19 species of shorebirds and 11 other species commonly using littoral habitats of the Barrow region. Census data are reported for the most common species. Habitat use and foraging ecology are discussed in detail for shorebirds. CMH

Arctic - Chukchi (Barrow, Icy Cape), Beaufort (Elson Lagoon)
Shorebirds, seabirds, waterfowl, other
Abundance, habitat, food

This report summarizes results of studies in summer 1977 on shorebird seasonal habitat use and trophic relationships in northwestern Alaska. Seasonal densities are also presented for a few other species. Susceptibility of shorebirds to impacts of oil development is addressed. Checklists present the status of bird species observed at Cape Krusenstern and Wales in 1977. CMH

Arctic - Beaufort, Chukchi, Kotzebue Sound
Bering Sea - Norton Sound
Shorebirds, seabirds, waterfowl, other
Abundance, checklist, pollution, habitat


This report summarizes information gathered at Prudhoe Bay and several other sites in summer 1978. Data are presented on seasonal habitat use of the littoral zone by shorebirds, on use of disturbed habitat by shorebirds and passerines, and on food habits of shorebirds. A checklist indicates the status of the 113 species of birds recorded at Cape Krusenstern in 1977 and 1978. Expansion of Aleutian Tern colonies is mentioned. CMH

Arctic
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, disturbance, food, habitat


This is an annotated list of the gamebirds observed in the Hooper Bay vicinity during spring and summer 1924. Included is information on chronology, relative abundance, breeding status, habitat, predation, behavior, plumage, migration, and meristics. Of the 46 species and subspecies discussed, 44 are water-related. The role of the Glaucous Gull as a predator is addressed. CMH

Bering Sea - Yukon Delta (Hooper Bay)
Shorebirds, seabirds, waterfowl
Annotated list, abundance, habitat, reproduction, predation, migration, behavior, plumage

758
93. COOK, J. 1784. A Voyage to the Pacific Ocean, Undertaken by the Command of His Majesty, for Making Discoveries in the Northern Hemisphere (etc.); Performed Under the Direction of Captains Cook, Clarke and Gore, in His Majesty's Ships the "Resolution" and the "Discovery" (etc.). 3 Vols., London.

Not reviewed.


Not reviewed.

Bering Sea - Pribilof Is.


Within the text appear numerous references to birds. A list of 209 species collected by the Scientific Corps during the expedition is appended. Most of the specimens came from Norton Sound, the Yukon Delta, and Yukon Valley. REG

Alaska
Shorebirds, seabirds, waterfowl, other
Checklist, subsistence, specimen record


This paper reports on specimens collected from October 1871 to August 1872 during a geographical reconnaissance from the Shumagin Islands to Unalaska Island. A total of 54 species was collected, of which 37 are water-oriented species. MRP

Aleutians
North Pacific
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record

Presented here is an annotated list of the 45 species of birds observed during a cruise in 1873 among the western Aleutian Islands. Included is information on habitat, relative abundance, seasonal occurrence, and breeding status. Thirty-two of the species addressed are water-associated. CMH

Aleutians
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, food, behavior


This paper reports on the species observed and collected from 1865 to 1867 by members of the Russo-American Telegraph Expedition. Annotated accounts of 212 species, including 116 water birds, are presented. MRP

Gulf of Alaska
Aleutians
Bering Sea
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This report presents an annotated species list of birds observed between May 8 and June 16, 1972, in the vicinity of Old Kashunuk Village. Included are arrival dates and general notes on each species. MRP

Bering Sea - Yukon Delta (Old Kashunuk Village)
Shorebirds, seabirds, waterfowl, other
Annotated list, migration

This monograph presents information on an ecological reconnaissance of the Baird and Schwatka Mountains. An annotated species list is included. MRP

Arctic - Kotzebue Sound
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


A total of 47 species of birds was observed at the Kitoi Bay Research Station during the summer of 1957. General notes on their status are provided. MRP

Gulf of Alaska - Kodiak (Kitoi Bay)
Shorebirds, seabirds, waterfowl, other
Checklist, predation


This report presents information on the abundance, distribution, and reproductive success of seabirds nesting on Forrester and Petrel Islands. An annotated list of 98 species of birds is included. MRP

Gulf of Alaska - Southeastern (Forrester Island NWR)
Shorebirds, seabirds, waterfowl, other
Annotated list

This field report presents information on the birds, foxes, marine mammals, and reindeer observed between June 26 and July 27, 1977, on the Bering Sea NWR. Census information is provided for the nesting seabirds, and habitat use by shorebirds and passerines is described. Arctic fox dens and foods are discussed. A list of plants, an annotated species list, and a discussion of logistics are appended. MRP

Shorebirds, seabirds, waterfowl, other
Abundance, distribution, food, predation, mortality, annotated list


This report presents information gathered during a survey of Chamisso Island from August 11-14, 1974. Breeding populations of seabirds are estimated, and annotated accounts of 37 species of birds are included. MRP

Arctic - Kotzebue Sound (Chamisso Island NWR)
Shorebirds, seabirds, waterfowl, other
Subsistence, abundance, annotated list

105. DENES, J. 1975. Some new data on faunistical exchanges through the Bering-Bridge. [In English with Hungarian summary.] Aquila 80-81:81-89.

Not reviewed.

Bering Sea
Zoogeography

A detailed study of avian use of wetland habitats on the Arctic Coastal Plain was conducted at five sites in 1977 and 1978. Wetland habitats are identified and mapped, and macroinvertebrate populations are described and quantified. Species accounts describe the abundance and seasonal variations of bird populations in relation to their use of different wetland habitats. Of the 54 species treated, 41 are water birds. Use of Teshekpuk Lake by molting geese is also described in detail. CMH

Arctic - Beaufort (National Petroleum Reserve - Alaska)
Shorebirds, seabirds, waterfowl, other
Habitat, annotated list, abundance, distribution, food, plumage


The authors present information on bird populations, their associations with ponded areas, and the effects of oil on macroinvertebrates within ponds. MRP

Arctic - Beaufort (Storkensen Point)
Shorebirds, seabirds, waterfowl
Abundance, distribution, habitat, migration, pollution


This report evaluates low-level 35mm aerial photo techniques for Arctic Slope vegetation mapping; reports on bird and plant species composition for ground-truthing; evaluates the feasibility of ground work at new study sites; and evaluates logistic support for aerial census and mapping operations. MRP

Arctic - Beaufort (National Petroleum Reserve - Alaska)
Shorebirds, seabirds, waterfowl, other
Techniques, abundance, checklist

This paper describes habitats and lists representative birds and mammals associated with each. MRP

Interior - Tanana
Bering Sea - Yukon Delta
Shorebirds, seabirds, waterfowl, other
Habitat


The author presents annotated accounts of 86 species, including 27 water-associated forms, observed in 1911 and 1912. REG

Bering Sea - Yukon Delta (Kuskokwim R.)
Interior - Tanana (Tanana, Fairbanks), Upper Kuskokwim (Kuskokwim R.)
Shorebirds, seabirds, waterfowl, other
Specimen record, annotated list


This identifies the locations of colonies and reports the number of "seabirds" breeding in the area. Notes on cormorants, shearwaters, eiders, oystercatchers, murres, puffins, guillemots, murrelets, auklets, gulls, and terns are included. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl
Abundance, distribution, breeding biology, annotated list

This report presents an annotated list of the 42 species of marine birds observed in Chiniak Bay during the winter of 1976-1977. Information on food habits is presented for a few species. Methods for ageing Marbled Murrelets in winter are suggested. CMH

Gulf of Alaska - Kodiak (Chiniak Bay)
Shorebirds, seabirds, waterfowl, other
Annotated list, abundance, food


This report provides data on weather, geology, habitat, flora, invertebrates, fish, birds, mammals, and archaeology of the Cape Peirce-Nanvak Bay region. MRP

Bering Sea - Bristol Bay (Cape Peirce, Nanvak Bay)
Shorebirds, seabirds, waterfowl, other
Annotated list, management, habitat


The authors present transect data from small boat censuses and discuss the advantages and disadvantages of censusing by this method. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl, other
Abundance, techniques

This thesis describes the distribution of birds and mammals observed from a vessel in the eastern Chukchi Sea between September 22 and October 27, 1970. Species accounts are presented; the relation of the ice edge to the distribution of birds and their foods is discussed. MRP

Arctic - Chukchi
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, food, migration


This report preliminarily results of a study of the distribution, abundance, and feeding ecology of birds associated with pack ice in the Bering, Chukchi, and Beaufort Seas. Information on distribution and abundance, obtained from shipboard cruises, is discussed. Potential impacts from oil spills are assessed. CMH

Arctic - Beaufort, Chukchi
Bering Sea
Shorebirds, seabirds, waterfowl
Distribution, abundance, pollution


This report maps the distribution and abundance of each species of bird observed during 11 cruises in 1977 in the Bering, Chukchi, and Beaufort Seas. Stomach contents of Black-legged Kittiwakes and Common and Thick-billed Murres are tabulated. An appended report summarizes information on seasonal habitat use, reproductive phenology and success, and foods of birds on Cooper Island from 1975-77. Effects of human disturbance are also discussed. CMH

Arctic - Chukchi, Beaufort
Bering Sea
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, food, habitat, disturbance

Part one of this report summarizes by species the numbers of nests found on each barrier island and spit between Cape Lisburne and Demarcation Point in 1977. Information on breeding phenology is included for seven species. In part two, stomach contents of 11 species of marine birds are tabulated. CMH

Arctic - Chukchi, Beaufort
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, reproduction, food


This paper discusses the relationship of sea ice to seabirds. The amount of surface area available for feeding and roosting, the reduction of prey abundance due to ice scour, the decrease in productivity of water covered by ice, and the spring plankton bloom are addressed. MRP

Arctic - Beaufort, Chukchi
Bering Sea
Shorebirds, seabirds, waterfowl
Distribution, habitat, food

This report presents data from two studies. First, pelagic distribution and abundance are mapped for each species observed during surveys of the Beaufort, Chukchi and Bering Seas. Densities are analyzed in relation to distance from land. In the second study, ground surveys were conducted at 12 coastal sites to determine seasonal use of habitats by birds. Tables indicate relative abundance in each habitat for all species recorded. Results of aerial surveys provide linear densities of birds along the coast. Age ratios of Glaucous Gulls are discussed. CMH

Arctic - Beaufort, Chukchi Bering Sea Shorebirds, seabirds, waterfowl, other Distribution, abundance, habitat


The author details his experiences collecting birds in southeastern Alaska during the period May 2 - July 8, 1907. References to species collected appear within daily narrative accounts. REG

Gulf of Alaska - Southeastern Shorebirds, seabirds, waterfowl, other Specimen record, public interest, distribution


These field notes from a member of the 1908 Alexander Alaska Expedition consist of several anecdotes about birds encountered in Prince William Sound. NMH

Gulf of Alaska - Prince William Sound Seabirds, other Horned Puffin, Tufted Puffin Annotated list

In the section on birds (pages 25-132), this paper includes a "checklist of 107 species and 5 hypothetical ones. Descriptive and distributional list follows." (From T.J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen). CMH

Interior - Tanana (Mt. McKinley National Park)
Shorebirds, seabirds, waterfowl, other
Checklist, annotated list, distribution

124. DIXON, J.S. 1943. Birds observed between Point Barrow and Herschel Island on the Arctic Coast of Alaska. Condor 45:49-57.

This narration of an Arctic expedition in 1913-1914 includes an annotated list of birds encountered and collected. NMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This report provides annotated accounts for the 58 species of water-associated birds observed on the south side of the Seward Peninsula during summer 1975. Included is information on occurrence and general habitat use. Management concerns are discussed. CMH

Bering Sea - Norton Sound (Seward Peninsula)
Shorebirds, seabirds, waterfowl
Annotated list, habitat, distribution, subsistence, management, pollution

This contains "short sections headed: migratory birds; duck, geese, other migrants; sea birds; native upland game birds; birds of prey; song birds." (From T.J. Cade, 1953, Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Shorebirds, seabirds, waterfowl, other


Data are presented on the species composition and abundance of marine birds in Prince William Sound. Shoreline and open water habitats were systematically censused from a fishing boat during the March-April and July-August periods of 1972 and 1973. Densities and population estimates are provided for the major species in the sound. Accuracy of the survey and potential impacts to avian populations from oil development are discussed. CMH

Gulf of Alaska - Prince William Sound
Seabirds, waterfowl, other
Abundance, techniques, pollution


This paper lists "some species noted May 28, 1922, at Ugashik, Alaska Peninsula." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Bristol Bay (Ugashik)
Distribution

A chapter is devoted to the birds observed during summers 1872-1876. An annotated list of 40 species, including 33 water birds, provides information on their status, relative abundance, behavior, habitat use, and use by natives for subsistence. CMH

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, subsistence, behavior, habitat


This is primarily a report on the pinnipeds of the Pribilof Islands, but an annotated list of avian species is included. NMH

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list

131. ELLIS, W.W. 1783. A Narrative of a Voyage Performed by Captains Cook and Clarke, of the Resolution and Discovery, in the Years 1776, 7, 8, 9, and 1780. 2 vols. London.

This narrative contains a "list of birds collected, including many type specimens." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Checklist, specimen record


This paper discusses the geographical areas to which the Amchitka avifauna are most closely allied. REG

Aleutians - (Amchitka Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, migration, distribution, zoogeography
133. EVERMANN, B.W. 1913. Eighteen species of birds new to the Pribilof Islands, including four new to North America. Auk 30:15-18.

The author records 18 species new to the Pribilof Islands, including 11 species of water birds. CMH

Bering Sea - Pribilof Is. 
Shorebirds, seabirds, waterfowl, other 
Distribution, annotated list

134. EYERDAM, W.J. 1936. Notes on birds collected or observed during the summer of 1932 in the eastern Aleutian Islands, Alaska. Murrelet 17:48-52.

The author provides dates, locales, and numbers of 43 species of birds collected or observed during the summer of 1932. Included are 30 species of water birds. REG

Aleutians - (Unimak Is., Unalaska Is., Umnak Is.) 
Shorebirds, seabirds, waterfowl, other 
Annotated list, distribution, abundance


This monograph includes sections on: the history of exploration of the island, physiography, climate, vegetation, vertebrate predator-prey relationships, numbers and biomass of birds, faunal associations, and annotated species accounts. Within the latter, 119 species are treated, of which some 80 are water-associated. Several photographs are appended. REG

Bering Sea - St. Lawrence Is. 
Shorebirds, seabirds, waterfowl, other 
Abundance, annotated list, distribution, habitat, predation


This paper "includes a list of 85 species." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Cook Inlet 
Shorebirds, seabirds, waterfowl, other 
Checklist

This paper evaluates the capability of radar stations in Alaska and Canada to monitor migration of birds and ultimately reduce the hazard of bird/aircraft collisions. Areas of high concentrations of migrating birds are discussed. CMH

Alaska
Shorebirds, waterfowl
Migration, management, techniques


This report summarizes radar and visual observations of spring migration in 1975. Techniques are discussed. A checklist gives the dates of first observation for 39 species. CMH

Bering Sea - Norton Sound (Cape Prince of Wales)
Shorebirds, seabirds, waterfowl, other
Migration, techniques, checklist


This report discusses visual and radar observations of birds during spring 1978 at Wales and Tin City, Alaska. Abundance, flock size and frequency, direction of movement, and radar techniques are addressed. An annotated list summarizes information for the 87 species observed. CMH

Bering Sea - Norton Sound (Cape Prince of Wales)
Shorebirds, seabirds, waterfowl, other
Annotated list, migration, techniques, abundance

This report presents results of aerial and shipboard surveys of coastal and offshore waters of the Kodiak Island archipelago. Annotated accounts are presented for the 58 species of birds observed during the study, which spanned from November 1979 through March 1980. Patterns of distribution are discussed. Data for each species are presented in detailed tables and maps. CMH

Gulf of Alaska - Kodiak
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance, habitat


This report describes the numbers and distribution of the ten species of birds sighted along a 1,340 statute mile cruise track between August 3 and 15, 1969. The distribution and abundance of each species are mapped and correlated with water depth, distance from land, and ice cover. REG

Arctic - Beaufort
Shorebirds, seabirds
Abundance, distribution, habitat


This paper documents the avian species encountered and collected during an expedition to St. Lawrence Island in 1930. Included is a description of the habitat and a history of previous expeditions to the island. NMH

Bering Sea - St. Lawrence Is.
Shorebirds, seabirds, waterfowl, other
Annotated list

This paper presents a list of 45 species of water-oriented birds found in Eskimo ruins on St. Lawrence Island. Ten species are new to the known avifauna of the island. MRP

Bering Sea - St. Lawrence Is.
Shorebirds, seabirds, waterfowl
Archaeology, distribution


This paper lists the species and the bone fragments found in four archeological sites along coastal Alaska. Twenty-one species of water birds were identified from Amaknak Island, 19 from Kodiak Island, 13 from Cape Denbeigh, and 3 from Kowieruk. MRP

Aleutians - (Amaknak Is.)
Gulf of Alaska - Kodiak (Kodiak Is.)
Bering Sea - Norton Sound (Cape Denbeigh, Imaruk Basin)
Seabirds, waterfowl, other
Archaeology


This reports "material collected by Hrdlicka in 1934, containing bones of 40 species." (From T.J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Archaeology


This paper remains the classic work on the birds of Kodiak. Some 140 species, over half of them water birds, are treated in annotated accounts. The species accounts are preceded by an extensive review of the history of ornithological work on Kodiak. REG

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record

This paper presents information from collections of bird bones from archaeological excavations on Kodiak, Little Kiska, Umnak, Atka, and Attu Islands. The species and bones found are listed for each island. MRP

Gulf of Alaska - Kodiak (Kodiak Is.)
Aleutians - (Little Kiska Is., Umnak Is., Atka Is., Attu Is.)
Seabirds, waterfowl, other
Checklist, archaeology


This paper reports on bird bones found in Eskimo ruins as old as 1,500 years. All but three of the 47 species identified were water birds. MRP

Bering Sea - Norton Sound (Cape Prince of Wales)
Seabirds, waterfowl, other
Archaeology


This article, presented in two installments, provides a narrative description of the breeding birds observed at seabird colonies on several National Wildlife Refuges in Alaska. Observations were conducted from the Brown Bear as it sailed along the coast from Juneau as far north as St. Matthew Island, throughout the Aleutians, and eastward to Nunivak Island. MRP

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Shorebirds, seabirds, waterfowl, other
Public interest, distribution


Alaska
Shorebirds, seabirds, waterfowl, other
Public interest


Information is presented in annotated format for 11 seabirds and 84 other species. MRP

Gulf of Alaska
Aleutians
North Pacific
Interior
Bering Sea
Seabirds, other
Annotated list


This book presents published and unpublished information on the distribution, migration, and habits of birds in Alaska. It is the classic reference book for the natural history of Alaska birds. MRP

Alaska
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, migration, annotated list, status, plumage, habitat, behavior, bibliography

Summarized in this report for public interest is very general information on composition of species observed during aerial water bird surveys, chronology, production, and habitat use. A briefly annotated list of the 54 species observed, including 40 water birds, is appended. CMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Public interest, abundance, reproduction, migration, annotated list


In this colorful brochure, the author summarizes general results of studies of waterfowl and other wildlife in relation to oil development on the North Slope. Tables show estimates of waterfowl populations and production. A briefly annotated list provides information on timing of migration, nesting, and abundance for the 67 species of birds recorded on surveys. CMH

Arctic - Beaufort (Prudhoe Bay)
Shorebirds, seabirds, waterfowl, other
Public interest, annotated list, abundance, reproduction, migration


This pamphlet includes a general summary of the breeding season at Prudhoe Bay in 1974, with estimates of waterfowl populations and production. CMH

Arctic - Beaufort (Prudhoe Bay)
Waterfowl
Public interest, abundance, disturbance

This brochure describes briefly the physical characteristics and avian use of each of the barrier islands of the Beaufort Sea. Tables show the number of nests of each species recorded per island from 1970-1975. General observations on Snow Geese nesting on Howe Island are summarized for the same period, and the overall production of ducks and geese near Prudhoe Bay in 1975 is briefly noted. CMH

Arctic - Beaufort (Barrier islands, Prudhoe Bay)
Shorebirds, seabirds, waterfowl, other
Public interest, abundance, reproduction, disturbance, habitat


This colorfully illustrated publication includes a broad summary of trends noted over a 10-year period in populations and production of birds in the vicinity of Prudhoe Bay oilfields. The effects of disturbance are discussed. CMH

Arctic - Beaufort (Prudhoe Bay)
Shorebirds, seabirds, waterfowl, other
Public interest, disturbance, abundance, reproduction


This paper discusses the occurrence of some 50 species of birds, 27 of them water-associated, seen in the Stepovak Bay area from May 25 to July 17, 1917. REG

North Pacific - (Stepovak Bay)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution

This note gives annotated accounts for 17 species of birds, 10 of them water-associated forms, recorded at Katmai National Monument in 1968. Many of these represent first records for the area. REG

Gulf of Alaska - Kodiak (Katmai)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


Not reviewed.

Gulf of Alaska - Southeastern (Alexander Archipelago)
Shorebirds, seabirds, waterfowl, other


This is a checklist of all birds that have been identified in Alaska. The list is updated at irregular intervals. Gibson and his colleague, B. Kessel, maintain close ties with ornithologists within the state and the checklist provides the most complete list of Alaska birds that is available. CJL

Alaska
Shorebirds, seabirds, waterfowl, other
Checklist


In tables and an annotated species list, the authors provide information on the occurrence, relative abundance, breeding status, and habitat use of the birds observed in the six major river drainages of southeastern Alaska. Of the 102 species recorded, 28 are water-associated. CMH

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, distribution, abundance

This report contains an annotated list of the birds and mammals observed during summer 1941, and includes information on their distribution, abundance, habitat, and breeding status. Most observations concentrated on waterfowl in the vicinity of Chevak and Hooper Bay, and subsistence and management considerations are discussed at length. Of the 64 species of birds noted, 47 are water birds. CMH

Bering Sea - Yukon Delta
Interior - Tanana
Shorebirds, seabirds, waterfowl, other
Annotated list, subsistence, management


The avian ecology of this estuarine system is examined. Included is an annotated list of the 107 species of birds observed, including 77 water-associated forms. REG

Bering Sea - Bristol Bay (Nelson Lagoon, Port Moller, Herendeen Bay)
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, habitat, annotated list


Included is a list of 57 species of birds observed in the Copper River Valley, 18 of which are water-associated forms. REG

Gulf of Alaska - Cook Inlet, Copper River
Shorebirds, seabirds, waterfowl, other
Checklist

This paper presents information on the location of breeding and molting areas along the Beaufort Sea coast and identifies specific habitat features characteristic of these areas. MRP

Arctic - Beaufort
Seabirds, waterfowl
Whistling Swan, Brant, Oldsquaw, Common Eider, Surf Scoter, Glaucous Gull, Arctic Tern
Abundance, distribution, habitat


Not reviewed.

Gulf of Alaska - Southeastern (Juneau)


This report presents a preliminary analysis of observations of birds during 43 shipboard cruises in Alaska waters in 1976 and 1977. Relative abundance is summarized for each species by region and month. Distribution and abundance are mapped by month for all species combined. Seasonal mean densities are compared for offshore regions. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Distribution, abundance


This paper provides brief annotated accounts for 66 species of birds observed in the region about Sitka between June 8 and August 24, 1896. Included are 32 species of water birds. REG

Gulf of Alaska - Southeastern (Sitka)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution

This paper reports observations and collections of birds and eggs from the Kotzebue Sound area during 1898 and 1899. MRP

Arctic - Kotzebue Sound
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, specimen record


This account lists the species observed in fall 1899 in the Nome vicinity, and provides general observations on relative abundance and habitat use. Fifteen of the 32 species are marine-associated. CMH

Bering Sea - Norton Sound (Cape Nome)
Shorebirds, seabirds, waterfowl, other
Annotated list


Avian specimens from Alaska in the collection of Stanford University are listed according to site of origin: Pribilof Islands, Amaknak Island, Belkovsky Bay, Unga Island, Kodiak Island, and Prince William Sound. NMH

Bering Sea - Pribilof Is.
North Pacific (Belkovsky Bay, Unga Is.)
Aleutians - (Amaknak Is.)
Gulf of Alaska - Kodiak, Prince William Sound
Shorebirds, seabirds, waterfowl, other
Specimen record

This report consists of an annotated list of birds encountered and collected in Prince William Sound, together with notes on species composition and origin. There is a short discussion on the selection for melanism in species endemic to this humid region. NMH

Gulf of Alaska - Prince William Sound
Shorebirds, seabirds, waterfowl, other
Annotated list, zoogeography, plumage


This note enumerates specimen records of 35 species of birds collected at various locations in Alaska between 1894 and 1901. Only three species, totaling 12 individuals, are marine-associated. REG

Alaska
Shorebirds, other
Hudsonian Godwit, Bar-tailed Godwit, Greater Yellowlegs
Distribution, specimen record


This report presents information on the habitats of the various localities visited by the expedition, and presents detailed annotated accounts of birds and mammals observed. Of the 104 taxa of birds recorded, 54 are water-oriented forms. MRP

Gulf of Alaska - Southeastern (Sitkan district)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, habitat


Not reviewed.

Alaska
Specimen record

This popular article provides very interesting reading, with much of the information supported by photographs. The author details his experience of camping and hunting in the vicinity of Port Moller, Nelson Lagoon, and Mt. Pavlof in 1927, and discusses many aspects of the avifauna of these areas. REG

Bering Sea - Bristol Bay (Nelson Lagoon, Port Moller, Mt. Pavlof)
Shorebirds, seabirds, waterfowl, other
Public interest, distribution


This report presents information on the number and distribution of birds using wetlands on the Arctic Slope, and discusses the relationships between birds and habitat. The use of aerial surveys to determine abundance of birds is discussed and recommendations are given for protecting bird populations. MRP

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, techniques, management, habitat


This brief narrative account describes the birds, mammals, and invertebrates seen by the author in the Aleutian Islands and Bering Sea. Observations of water birds include Canada Geese, Aleutian Terns, Fork-tailed Storm-Petrels, murres, and Tufted Puffins. MRP

Aleutians - (Unalaska Is.)
Bering Sea
Seabirds, waterfowl, other
Fork-tailed Storm-Petrel, Canada Goose, Aleutian Tern, Tufted Puffin
Public interest

The author provides an annotated list of birds observed on the Colville River Delta during summer 1971. REG
Arctic - Beaufort (Colville R.)
Shorebirds, seabirds, waterfowl, other
Annotated list


Annotated accounts of 13 species new to either North America or the Pribilof Islands are presented. Seven of these are water-associated forms. REG
Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This paper gives an annotated list of 36 species of birds observed on the refuge from July 8 to 14, 1916. Included are notes by A.K. Fisher recording his visit to the islands from July 14 to 15, 1899, as a member of the Harriman Expedition. MRP
Shorebirds, seabirds, waterfowl, other
Annotated list


This is a summary of a paper presented at the 590th meeting of the Biological Society of Washington. The author presented accounts of 21 species, including 13 water-associated forms, new to North America or the Pribilof Islands. REG
Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record

Hanna provides a checklist of the 129 species of birds recorded from the Pribilof Islands, and names the persons first recording each species there. He also indicates the species which breed regularly or are regular migrants. Eighty-seven of the species are water-related. CMH

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Checklist, specimen record


Presented are annotated accounts of 21 species new to either North America or the Pribilof Islands. REG

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Short-tailed Shearwater, Snow Goose, Falcated Teal, Canvasback, Common Goldeneye, Spectacled Eider, White-winged Scoter, Bristle-thighed Curlew, Polynesian Tattler, Marbled Murrelet
Specimen record, distribution


The author details accounts of three species new to the islands, including a European Jacksnipe and Long-billed Dowitcher. He also offers notes on six other species and presents a table of breeding species for each of the five main islands and rocks comprising the Pribilof group. REG

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list

Annotated accounts of 58 species are presented, including 44 marine forms. Observations were gathered during the summers of 1962 and 1963 and came mostly from areas of wet lowland tundra and coastal salt meadows. REG

Bering Sea - Yukon Delta (Kashunuk R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, abundance


This report analyzes results of aerial surveys over Alaska offshore waters between January and October 1976. Summaries of census data, by species, month, and oceanographic region, are presented in 34 tables. Monthly distribution and abundance data are mapped by species for the Beaufort, Chukchi, and Bering Seas in 171 figures. For the Gulf of Alaska, data are mapped by month for all species combined. Observations are briefly discussed. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Abundance, distribution


This report presents information from a reconnaissance of Unimak Island in 1975. Included are a description of seabird breeding areas and a checklist of 40 species, including 28 water-associated forms. MRP

Aleutians - (Unimak Is.)
Shorebirds, seabirds, waterfowl, other
Techniques, checklist, distribution

This is a list of specimens collected from 1848 to 1855 by several British naval officers in northern North America. Forty-eight species, including 5 species of shorebirds, 14 species of seabirds, and 7 species of waterfowl, are listed. MRP

Alaska
Shorebirds, seabirds, waterfowl, other
Specimen record


This paper records an account of a collection of birds from the Chilkat district in 1882, and includes notes on 83 species and on the general character of the region. (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Gulf of Alaska - Southeastern (Chilkat)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This short note records an abundance of owls during the harsh winter of 1917 and mentions predation by owls, eagles, and mammals on various birds. CMH

Gulf of Alaska - Southeastern (Admiralty Is.)
Seabirds, waterfowl, other
Abundance, predation

This paper provides a detailed account of the 36 species observed one summer in the Forrester group of islands. Information on breeding status, food habits, nesting chronology and habitat, and relative abundance is presented. Fourteen of the species recorded are water birds. CMH

Gulf of Alaska - Southeastern (Forrester Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, food, reproduction


This report provides information on the abundance and distribution of birds; aquatic macroinvertebrates on control and experimentally oiled ponds; vegetation types on plots used for aerial photo interpretation; and movements and activities of large mammals. MRP

Arctic - Beaufort (Storkersen Pt.)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat, migration, pollution


The author reports new records of occurrence or breeding for six species of birds, of which four are water birds. CMH

Gulf of Alaska - Cook Inlet
Shorebirds, waterfowl, other
European Wigeon, Canvasback, Hudsonian Godwit, Long-billed Dowitcher
Distribution, abundance

This paper presents an annotated list of birds observed during the summer of 1914 along the Alaska coast. Pelagic observations were conducted from the Revenue Cutter Bean from May 12 to June 5 and during July and August. Ground surveys in the vicinity of Kotlik were conducted in June. MRP

Alaska
Bering Sea - Yukon Delta (Kotlik)
Shorebirds, seabirds, waterfowl, other
Annotated list


This account summarizes the status of the avian populations in the vicinity of St. Michael in 1915. Information on relative seasonal abundance, reproductive chronology and success, and habitat use is reported. Forty-seven of the 67 species discussed are water birds. CMH

Bering Sea - Norton Sound (St. Michael)
Shorebirds, seabirds, waterfowl, other
Annotated list, reproduction, status, habitat


The author presents annotated accounts of 73 species, including 15 species of water birds. Preceding these is a section giving a narrative account of the birds, plants, and mammals of each region visited. REG

Bering Sea - Yukon Delta
Gulf of Alaska - Cook Inlet
Interior - Upper Kuskokwim
Shorebirds, seabirds, waterfowl, other
Annotated list

The author presents annotated accounts of avian species collected in the Katmai area. Included are 7 species of seabirds, 5 species of waterfowl, 9 species of shorebirds, and 16 species of landbirds. MRP

Gulf of Alaska - Kodiak (Katmai district)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This paper provides an annotated list of the species of birds recorded during the summers of 1960 and 1961, as well as those reported historically along the Kelly and Noatak Rivers. The major vegetation types and principal avian habitats are described. Of the 83 species addressed, 35 are water birds. CMH

Arctic - Kotzebue Sound (Noatak R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


This report presents data on the use of coastal and marine habitats by birds in Port Valdez and Valdez Arm in summer and winter. Results of systematic censuses conducted over various habitats are discussed. Information on reproductive phenology and success is presented for Glaucous-winged Gulls, Black-legged Kittiwakes, and Arctic Terns. Observations of waterfowl broods are tabulated and discussed. Recommendations are made for protecting critical habitats in the area from possible impacts of oil development. CMH

Gulf of Alaska - Prince William Sound (Port Valdez, Valdez Arm)
Shorebirds, seabirds, waterfowl, other
Checklist, habitat, abundance, pollution, reproduction

This paper presents an analysis of the occurrence and ecological distribution of 88 species of birds inhabiting a 75 km² study area on the Yukon-Kuskokwim Delta. REG

Bering Sea - Yukon Delta (Kolomak R.)
Shorebirds, seabirds, waterfowl, other
Distribution, annotated list, habitat


This paper "mentions small collection of birds from Sledge Island." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Norton Sound (Sledge Is.)
Specimen record


This paper reports observations of 47 species, including 21 marine forms, seen between April 22 and July 9, 1944. REG

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


This annotated list provides information on the relative abundance and habitat use of the 70 species observed during the summer of 1956 in the Kotzebue area. Forty of the species are water birds. CMH

Arctic - Kotzebue Sound
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


This is a five-part paper reporting bird observations from upper Bristol Bay between late May and late June 1930. Forty-six species are treated, including 34 marine forms. REG

Bering Sea - Bristol Bay
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, habitat


The author found that Eskimos had names for 89 of the 103 species of birds known from the Anaktuvuk Pass area. These names and their literal translations are provided. REG

Interior - Koyukuk (Anaktuvuk Pass)
Shorebirds, seabirds, waterfowl, other
Public interest


This is a short, general summary of the migration routes traversed by birds nesting in interior Arctic Alaska. CMH

Arctic
Shorebirds, seabirds, waterfowl, other
Migration

This comprehensive treatise of over 400 pages is based on field work from 1947-1959 at Kobuk and Anaktuvuk Pass, Alaska, and Old Crow, Yukon Territory, Canada. Extensive annotated species accounts are presented for each area with some 60, 125, and 100 species discussed for the respective areas. For most species, pertinent specimen data are included. In addition, major sections on status and distribution, migration, residence in the Arctic, and "Arctic metabolic economy" are included. REG

Interior - Koyukuk (Anaktuvuk)
Arctic - Kotzebue Sound (Kobuk)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, status, migration, reproduction, physiology, abundance, specimen record, anatomy


This book discusses the Arctic environment and how birds and mammals have adapted to its rigors. MRP

Arctic
Shorebirds, seabirds, waterfowl, other
Migration, distribution, physiology, habitat


Not reviewed.

Physiology


Annotated accounts are presented for 12 species; brief comments on their distribution and foraging in relation to the ice margin are included. REG

Bering Sea
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, habitat

795

The authors describe the area and present an annotated list of birds seen between 1943 and 1953. Forty-seven species are reported, of which 22 are water-associated. MRP

Arctic - Beaufort
Interior - Koyukuk
Shorebirds, seabirds, waterfowl, other
Annotated list


This checklist presents the status, relative abundance, and distribution of 214 species of birds within the Chugach National Forest and its contiguous coastal and offshore waters. REG

Gulf of Alaska - Prince William Sound (Chugach National Forest)
Shorebirds, seabirds, waterfowl, other
Checklist


This report presents census techniques and results from a cruise in the northeastern Gulf of Alaska. Primary groups of species observed include loons, gulls, alcids, fulmars, storm-petrels, cormorants, and scoters. MRP

Gulf of Alaska
Seabirds, waterfowl, other
Annotated list, abundance, distribution

The authors present detailed information on the region, its avian habitats, and habitat use by birds. In addition, they provide annotated accounts for over 200 species. REG

Gulf of Alaska - Prince William Sound, Copper River, Northern Gulf
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


This bibliography lists 375 selected entries judged to be the more important publications on the subject. Most relate to vertebrates of the Arctic. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Bibliography


Not reviewed.

Gulf of Alaska - Southeastern (Glacier Bay)
Shorebirds, seabirds, waterfowl, other
Checklist

This paper presents an annotated list of 76 species of birds observed during the Stoll-McCracken Expedition to the Arctic Ocean from May 4 to October 9, 1928. MRP

Gulf of Alaska
North Pacific
Arctic - Chukchi
Aleutians
Bering Sea - Bristol Bay, Norton Sound
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


The species of birds encountered and collected on a visit to southeastern Alaska from June 20 to July 25, 1941 are listed. Some 80 species are treated in an annotated format, including 37 water-associated forms. REG

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


Not reviewed.

Arctic


Not reviewed.

Alaska

This paper describes spring movements and numbers of birds seen near Northwest Cape, St. Lawrence Island from May 20 to June 7, 1973. Forty-nine species observed were water birds. MRP

Bering Sea - St. Lawrence Is.
Shorebirds, seabirds, waterfowl, other
Migration, distribution, annotated list


This report provides information from an intensive study of bird use of Simpson Lagoon and adjacent areas, and addresses migration, feeding, and molting for several groups of birds. MRP

Arctic - Beaufort (Simpson Lagoon)
Shorebirds, seabirds, waterfowl, other
Migration, reproduction, habitat, disturbance, abundance, distribution, food, plumage


This report addresses the migration, breeding, feeding, and staging/molting of birds at Simpson Lagoon in summer 1977. Tables summarize information on spring and fall migration for the 60 species of birds observed. Nesting densities and reproductive success are summarized for the 13 species breeding in the area. More detailed information on molt, staging, and feeding is presented for Oldsquaws, gulls, terns, and phalaropes. Possible effects of disturbance are briefly discussed. CMH

Arctic - Beaufort (Simpson Lagoon)
Shorebirds, seabirds, waterfowl, other
Migration, reproduction, abundance, anatomy, plumage, habitat, food, disturbance, checklist

This report compares information gathered in 1977 and 1978 to assess the importance to birds of barrier island/lagoon systems. Timing of migration is summarized for 63 species, and nesting densities are presented. The majority of the report addresses habitat use by molting Oldsquaws, and premigratory staging of shorebirds, gulls, and terns. Results of feeding studies are presented for Oldsquaws, phalaropes, and Glaucous Gulls. CMH

Arctic - Beaufort (Simpson Lagoon)
Shorebirds, seabirds, waterfowl, other
Migration, habitat, abundance, reproduction, food, plumage, physiology


Not reviewed.

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Bibliography, migration


This paper gives "a list of 8 species noted from Eagle City to a hundred miles north." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Interior - Upper Yukon (Eagle)
Distribution

The authors describe the fauna, physical characteristics, and vegetation of the Yukon Delta, and assess its value as avian habitat. Included are lists of birds and plants encountered during a reconnaissance in summer 1976. NMH

Bering Sea - Yukon Delta
Shorebirds, seabirds, waterfowl, other
Habitat, annotated list


Aspects of reproductive ecology are discussed for four species, particularly Black-legged Kittiwakes and Horned Puffins. Food, predation, disturbance, and ectoparasites are assessed as factors influencing production. An annotated list summarizes observations of the 119 species recorded on the islands in 1970, 1971, and 1978. CMH

Gulf of Alaska - Cook Inlet (Tuxedni Wilderness)
Shorebirds, seabirds, waterfowl, other
Annotated list


The author provides a general but interesting description of some of the birds encountered during the expedition. CMH

Aleutians
Bering Sea
Gulf of Alaska
Shorebirds, seabirds, waterfowl, other
Public interest

This paper presents an annotated list of 70 species, including 43 water-associated forms, observed at Amchitka Island from 1955 to 1959. A detailed description of the island and a brief history of recent human impacts are included. MRP

Aleutians - (Amchitka Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, disturbance


This paper gives a brief history of Simeonof Island, and provides an annotated list of species observed there in 1955 and 1960. MRP

North Pacific - (Simeonof Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list


This paper details observations collected in spring 1953 and 1958. Annotated accounts are presented for 40 species, including 26 marine forms. Arrival dates of several species and estimated sizes of breeding populations of seabirds and two passerine species are given. REG

Bering Sea - Little Diomede Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, migration, behavior, specimen record, habitat

Included in this report is an annotated list of the species of birds observed. A table lists, by island, the numbers of Bald Eagles, Common Eiders, and Emperor Geese seen, plus other significant sightings. CMH

Aleutians
Seabirds, waterfowl, other
Annotated list, distribution, abundance


This paper annotates observations of 34 species recorded between 1947 and 1954. Included are one new record for North America, 9 first records for the Pribilofs, and records of 12 other species rarely seen on the islands. More detailed information is presented on the status of populations of Glaucous-winged Gulls, Red-legged and Black-legged Kittiwakes, and Common Murres. Nesting chronology, abundance, and behavior are compared for the two kittiwakes. A few notes from the Aleutians are included. CMH

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, specimen record


The author has compiled a checklist of 152 species of birds of Mt. McKinley National Park, with seasonal status, relative abundance, and habitat distribution presented for each. REG

Interior - Tanana (Mt. McKinley National Park)
Shorebirds, seabirds, waterfowl, other
Checklist

Migration pathways and dispersal routes are discussed in general for birds and mammals in Alaska, and routes are postulated for species occurring seasonally in the Colville River area. NMH

Arctic - Beaufort (Colville R.)
Shorebirds, seabirds, waterfowl, other
Distribution, migration, zoogeography


This paper provides additional distribution records for 10 species, including five species of water birds. CMH

Gulf of Alaska - Copper River (Wrangell Mts.)
Interior - Tanana, Upper Yukon, Innoko
Shorebirds, waterfowl, other
Redhead, Ring-necked Duck, Killdeer, Hudsonian Godwit, Surfbird
Distribution, habitat, annotated list


This paper discusses the avifauna of northern Alaska in relation to the Bering Arc and the refugia hypothesized to exist during the past glacial periods. The 89 species which regularly occur in this region are grouped according to their east-west distribution and faunal affinities. The interchange with northeastern Siberia and eastern North America is examined. CMH

Arctic - Beaufort, Chukchi
Shorebirds, seabirds, waterfowl, other
Zoogeography


This is a checklist of 178 species known to occur within a 200-mile radius of Fairbanks. REG

Interior - Tanana (Fairbanks)
Shorebirds, seabirds, waterfowl, other
Checklist

The author has compiled a checklist of 167 species known from the Seward Peninsula. REG

Arctic - Chukchi, Kotzebue Sound
Shorebirds, seabirds, waterfowl, other
Checklist


This paper recognizes and describes 29 basic habitats in Alaska used by birds. For each terrestrial habitat the dominant vegetative forms are given as well as the characteristic birds. Descriptions of marine habitats are based primarily on distance from shore and on water depth. Several characteristic birds are also given for these habitats. REG

Alaska
Shorebirds, seabirds, waterfowl, other
Habitat


Avian-habitat associations along the Colville River are classified and discussed. NMH

Arctic - Beaufort (Colville R.)
Shorebirds, seabirds, waterfowl, other
Habitat


Annotated species accounts of birds observed and collected on the Colville River over several seasons in the 1950's are presented. Avian habitats throughout the region are described, and apparent avian affinities for specific habitats are tabulated. NMH

Arctic - Beaufort (Colville R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, distribution, specimen record

The authors provide a major and much needed update of the status and distribution of Alaska birds. Some 200 species, for which substantial new information is available since the publication of Gabrielson's and Lincoln's work in 1959 ("Birds of Alaska"), are treated in detailed annotated accounts. Included are 75 species new to Alaska, of which 30 are new to North America. REG

Alaska
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, checklist, status, taxonomy


This paper describes habitats and provides an annotated species list of birds in the upper Sheenjek Valley, Brooks Range. MRP

Interior - Upper Yukon (Sheenjek R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


This annotated list provides an update on the status of 36 of the less common species recorded in interior Alaska. Major factors considered in analyzing the distribution records are a severe drought in the Canadian prairie provinces and a very late spring in Alaska. Of the species addressed, 24 are associated with water habitats. CMH

Interior - Tanana, Upper Yukon, Koyukuk
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance, status

This paper presents annotated accounts for some 80 taxa of birds observed and/or collected between June 7 and 25, 1963. Among them are 43 species of water birds. Observations from previous studies are compared and contrasted. REG

Bering Sea - Yukon Delta (Hooper Bay, Kolomak R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


The authors present, by specific area and habitat, the birds most likely to be seen in each region. Addressed in an addendum are the birds likely to be seen in the Juneau, Barrow, Nome, and Kotzebue areas. JCG

Arctic - Chukchi (Barrow), Kotzebue Sound (Kotzebue)
Bering Sea - Norton Sound
Interior
Gulf of Alaska
Shorebirds, seabirds, waterfowl, other
Checklist, habitat, abundance


This report provides a general description of the Cape Newenham area. The physical, climatological, and geological characteristics and the use of the area by wildlife and humans are discussed. A list of the birds of the area is included. MRP

Bering Sea - Bristol Bay (Cape Newenham)
Shorebirds, seabirds, waterfowl, other
Annotated list, management, public interest

This paper gives the status of 61 common species and lists 45 less common species vulnerable to oil contamination in marine habitats of the area. MRP

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Abundance, status, pollution


This report quantifies the amount of habitats available for water birds along coastal western Alaska from Cape Prince of Wales to Cape Sarichef. From each USGS map (1:63,360 scale) the following were derived and are presented in appended tables: 1) area of ocean less than 10 fathoms; 2) length of beach; 3) number and area of lagoons; 4) number and area of large tidal river mouths; 5) areas of vegetated and unvegetated intertidal; and 6) the number of rivers and streams. REG

Bering Sea
Shorebirds, seabirds, waterfowl
Habitat


This paper presents information from a preliminary attempt to census water bird populations along the Bristol Bay coast in fall, and discusses sampling techniques. MRP

Bering Sea - Bristol Bay
Shorebirds, seabirds, waterfowl
Abundance, distribution, techniques

In this report the authors describe concentrations of birds, including colonies of nesting seabirds and rafts of waterfowl, observed along the coast from Cape Newenham to Cold Bay. MRP

Bering Sea - Bristol Bay
Seabirds, waterfowl
Distribution


This paper presents information from aerial surveys of migratory birds on the North Slope of Alaska. Population estimates, critical habitats, and densities and distributions of species are presented. Methods for comparing results of ground and aerial surveys are examined. MRP

Arctic - Beaufort (National Petroleum Reserve-Alaska)
Shorebirds, seabirds, waterfowl
Abundance, distribution, habitat, techniques


This paper provides "an account of observations of eggs and parent birds of a number of Alaskan species collected by Robert Kennicott." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Specimen record, distribution

809

This work "includes important notes on specimens taken and birds observed by the writer in the vicinity of Sitka, June 23 to July 31, 1827." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Gulf of Alaska - Southeastern (Sitka) Specimen record, distribution


A checklist is appended listing the numerical and breeding status of 28 species observed between July 15 and August 9, 1957. REG

Bering Sea - St. Matthew Is. Shorebirds, seabirds, waterfowl, other Checklist


The author discusses habitat preferences of species on the North Slope of Alaska and calculates an index of species density for each habitat. MRP

Arctic - Beaufort Shorebirds, seabirds, waterfowl, other Abundance, distribution, habitat


The author presents brief accounts of the 27 species observed on Amchitka Island in early summer 1952, and includes information on habitat use, breeding status, and relative abundance. Twenty-one water-associated species are addressed. A list of food items found at a Bald Eagle nest is given. CMH

Aleutians - (Amchitka Is.) Shorebirds, seabirds, waterfowl, other Distribution, abundance, annotated list, habitat, predation

This report contains survey and general information from a two day trip to Chisik and Duck Islands to locate and photograph the major seabird colonies. General information on all seabirds and landbirds seen is presented in narrative form, and information gained from conversations with people at Snug Harbor is included. MRP

Gulf of Alaska - Cook Inlet (Tuxedni NWR)
Shorebirds, seabirds, waterfowl, other
Abundance, annotated list


This paper presents an annotated list of the 44 species of birds observed during a summer cruise between Japan and the western Bering Sea and North Pacific. Population densities are estimated by the number of birds observed per hour, and bird distribution is correlated with air and water temperatures. Forty-one of the species observed are water-associated. CMH

North Pacific
Bering Sea
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, habitat, abundance


This paper analyzes the distribution of seabirds encountered on a cruise in summer 1954 between the western Bering Sea and Japan. Ocean currents, water and air temperatures, zoogeography, and food supplies are considered. Maps showing the distribution and abundance of each species observed are included. CMH

Aleutians
Bering Sea
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, habitat, food

811

This paper provides an annotated list of the 112 species or subspecies collected and observed on a cruise in the North Pacific. The ship travelled from Vancouver, B.C., to Japan via the Alaska coast and Aleutians in spring, and returned via a more offshore route through the Bering Sea and North Pacific in late summer. Sixty of those species recorded are water-related forms. CMH

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Shorebirds, seabirds, waterfowl, other
Annotated list


This paper reports on the birds and mammals observed during the Mount Logan Expedition from May 9 to August 21, 1925. Included are 84 species of birds, of which 18 are water-oriented. MRP

Gulf of Alaska - Copper River
Shorebirds, seabirds, waterfowl, other
Annotated list


This work "contains a few notes on the avifauna of Kodiak." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Kodiak (Kodiak Is.)

This work "contains references to many Alaskan species collected on Cook's voyages." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Distribution


This paper deals largely with geology, but does include a brief account of the region's avifauna. REG

Arctic - Beaufort (Canning R.)
Waterfowl, other
Habitat, distribution


This thesis investigates the nesting habitat relationships of four species of alcids to determine if competition exists for nest sites on Fish Island. The study examines in detail habitat characteristics, breeding chronology, seasonal and diurnal activity patterns, body size and flight capabilities, and interspecific behavioral interactions. A checklist giving the status of the 118 species of birds observed during summers 1976 and 1977 is appended. CMH

Gulf of Alaska - Prince William Sound (Fish Is.)
Shorebirds, seabirds, waterfowl, other
Checklist

This paper describes several types of censuses used to determine distribution, abundance, and productivity of birds nesting on the refuge. CMH

Bering Sea - Yukon Delta
Shorebirds, seabirds, waterfowl, other
Techniques


The author presents information on birds observed and collected in the Kvichak River area of Bristol Bay between May 17 and June 20, 1959. MRP

Bering Sea - Bristol Bay (Kvichak R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


The author presents information on birds observed in the region between September 4 and October 3, 1959, and May 15 to June 19, 1960. MRP

Bering Sea - Bristol Bay (Kvichak R.)
Shorebirds, seabirds, waterfowl, other
Checklist, annotated list

This report consists of three parts. First, reported recoveries of over 20,000 birds that were either banded or recovered in Alaska are summarized and briefly discussed. Observations on fall migration at Unimak Pass from August 11-25, 1975, are presented and discussed. Finally, in an appended paper (Flock 1976), radar and visual observations of spring migration at Cape Prince of Wales are discussed. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Migration


This report summarizes observations of marine birds in Alaska offshore waters during 21 cruises in 1975. Data are summarized by species, month, and oceanographic region in 165 tables. Monthly summaries of relative densities of all birds are depicted on 12 maps. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Abundance, distribution


This report summarizes census data obtained from 11 offshore surveys conducted in 1972, 1973, and 1975. Summaries are presented by species, 3-month interval, and oceanographic region in 23 tables. Quarterly summaries of total bird densities are presented in 4 maps. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Distribution, abundance

This paper consists primarily of two appended reports, which briefly describe the habitat and avifauna of the Yukon Delta. Observations were made from June 17 to July 23, 1976, and from January 26 to 31, 1977. Fifty-two species were recorded. CMH

Bering Sea - Yukon Delta
Shorebirds, seabirds, waterfowl, other
Habitat, checklist, abundance


This paper discusses observations on the populations, breeding biology, and foods of 19 species of marine birds during summer 1976. A checklist presents the breeding status of the 54 species of birds observed. CMH

Gulf of Alaska - Kodiak (Semidi Is.)
Shorebirds, seabirds, waterfowl, other
Checklist


This volume "contains banding and recovery records from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Distribution


This volume "contains banding and recovery records from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Distribution

816

This paper presents notes on birds and mammals seen in the areas of Cook Inlet and Knik Arm. Forty-seven species of birds are addressed, including 23 species of water birds. CMH

Gulf of Alaska - Cook Inlet
Shorebirds, seabirds, waterfowl, other
Annotated list


This checklist notes the breeding status and relative seasonal abundance of the 195 species and subspecies of birds found in the Kodiak Archipelago. MRP

Gulf of Alasks - Kodiak (Kodiak Is., Afognak Is.)
Shorebirds, seabirds, waterfowl, other
Checklist


This paper describes the nesting distribution and status of the birds observed during the summers of 1957 and 1958 on a sector along the upper Kaolak River. Major habitats are characterized, and additional information is provided on breeding biology, density, population trends, and foods for several species. Of the 34 species treated, 21 are water-associated. CMH

Arctic - Chukchi (Kaolak R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, reproduction, food

This paper provides additional notes on the occurrence of several species, including nine water birds, previously recorded on the Pribilof Islands. CMH

Bering Sea - Pribilof Is.
Shorebirds, seabirds, other
Greater Yellowlegs, Long-billed Dowitcher, Least Sandpiper, Baird's Sandpiper, Pectoral Sandpiper, Sharp-tailed Sandpiper, Rock Sandpiper, Sabine's Gull, Arctic Tern
Distribution, abundance


This paper includes a checklist of the 112 species observed during a study along the Noatak River in summer 1973. Information on relative abundance, breeding status, and habitat affinities is included. Results of breeding bird surveys in three habitat types at one site are presented, and species diversity is calculated for 11 different habitats. CMH

Arctic - Kotzebue Sound (Noatak R.)
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, habitat, checklist


The authors primarily treat landbirds in this paper but address habitat use and seasonal occurrence of 10 species of marine birds which use terrestrial habitats other than for nesting. CMH

Gulf of Alaska - Kodiak (Barren Is.)
Shorebirds, seabirds, waterfowl, other
Harlequin Duck, Black Oystercatcher, Semipalmated Plover, Black Turnstone, Common Snipe, Spotted Sandpiper, Least Sandpiper, Glaucous-winged Gull, Mew Gull, Black-legged Kittiwake
Habitat, abundance

Not reviewed.

Aleutians - (Amchitka Is.)


The authors present information on breeding bird populations at Storkersen Point. Habitat use and wetlands classifications are described. The effects on macroinvertebrates from experimental oiling of ponds are assessed. MRP

Arctic - Beaufort (Storkersen Pt.)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat, migration, pollution, checklist


Observations were made from June 27 to September 25, 1900. Annotated accounts are presented for 63 species, 24 of which are water-associated. REG

Bering Sea - Norton Sound (Egg Is., Besboro Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


The author presents annotated accounts of birds observed and collected in the Krenitzin Islands. NMH

Aleutians - (Krenitzin Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record

McLenegan provides brief, usually one sentence, descriptions of the status of 48 species of birds observed along the Noatak drainage in summer 1885. REG
Arctic - Kotzebue Sound (Noatak R.)
Shorebirds, seabirds, waterfowl, other
Annotated list


The authors present an annotated list of the 54 species of birds observed during two summers at Izembek Lagoon. Numbers and dates of observation are given along with notes on nests found. Thirty-five of the species are water-associated. CMH
Bering Sea - Bristol Bay (Izembek Lagoon)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance


This paper presents primarily the results of a quantitative survey of intertidal organisms. However, it does include a list of the numbers of each species of bird observed from August 10-16, 1969, in Port Valdez. CMH
Gulf of Alaska - Prince William Sound (Valdez)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance

This note presents a list of species observed in the vicinity of St. Matthew Island on February 6 and 7, 1970. MRP

Bering Sea - St. Matthew Is. Seabirds, waterfowl Checklist


On pages 329-332, the author describes the large numbers of murres nesting on this recently active volcano. He also mentions earlier observations of Horned Puffins, kittiwakes, gulls, Harlequin Ducks, and a dead albatross. CMH

Aleutians - (Bogoslof Is.) Seabirds, waterfowl Abundance, habitat, public interest


Not reviewed.

Gulf of Alaska - Copper River (Copper R. Delta) Shorebirds, seabirds, waterfowl, other


Not reviewed.

Gulf of Alaska - Copper River (Copper R. Delta) Shorebirds, seabirds, waterfowl, other

   Not reviewed.

   Gulf of Alaska - Copper River (Egg Is.)


   This report lists 204 species of birds found in Prince William Sound, and notes their general status in each of four management units in the sound. MRP

   Gulf of Alaska - Prince William Sound
   Shorebirds, seabirds, waterfowl, other
   Checklist, status


   This annotated bibliography contains a list of published and unpublished references concerned primarily with management of resources on the Copper River Delta. Most references addressing birds pertain to waterfowl; however, other references are included. MRP

   Gulf of Alaska - Copper River (Copper R. Delta)
   Shorebirds, seabirds, waterfowl, other
   Bibliography

822

During a study of nesting and migrating birds on the eastern Copper River Delta in 1978 and 1979, the authors determined habitat preferences, distribution, abundance, and phenology for the avifauna of the area. Critical habitats are identified and recommendations made for future surveillance and management of populations. Detailed information is presented for Dusky Canada Geese, Sandhill Cranes, and shorebirds. REG

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds, seabirds, waterfowl, other
Abundance, breeding biology, checklist, distribution, food, habitat, management, migration, predation, reproduction, status


Information gathered in summer 1977 on abundance, habitat use, and reproductive ecology is presented for 10 species of seabirds. Tables present the status of all species of birds observed in 1976 and 1977. Information on abundance and phenology is included for some species. The susceptibility of each species to oil pollution is assessed. CMH

Gulf of Alaska - Prince William Sound (Wooded Is.)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, reproduction, pollution, migration

This report presents information on the abundance and breeding biology of seabirds nesting on the Wooded Islands in 1976. Tables list the other species observed on the islands and their breeding status. The abundance of species occurring in littoral and marine areas is briefly noted. Potential effects of oil pollution and disturbance are discussed. CMH

Gulf of Alaska - Prince William Sound (Wooded Is.)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, pollution, disturbance


Not reviewed.

Bering Sea - Bristol Bay (Walrus Is.)


These papers present an "account of birds seen on Adak Island during the period April 9 to September 20, 1944." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Aleutians - (Adak Is.)
Shorebirds, seabirds, waterfowl, other
Distribution

This is a checklist of the 50 species of birds seen during two years of observation. Included are arrival and departure dates and an assessment of relative abundance. Thirty-nine of the species are water-associated. CMH

Arctic - Chukchi (Barrow)  
Shorebirds, seabirds, waterfowl, other  
Checklist, migration


Annotated accounts are presented for 54 species, including 42 water birds. A supplemental list of 18 species seen at Plover Bay, Siberia, in 1881 is included. REG

Arctic - Chukchi (Barrow)  
Shorebirds, seabirds, waterfowl, other  
Annotated list, distribution, habitat, abundance


The annotated accounts of nine water-associated species presented in this note are offered primarily as corrections to similar accounts presented by Nelson (Birds of the Bering Sea and Arctic Ocean, 1883). REG

Arctic - Chukchi (Barrow)  
Shorebirds, waterfowl, other  
Annotated list


An annotated list of 30 selected species, including 11 water-associated forms, is presented. CMH

Interior - Tanana (Mt. McKinley National Park)  
Shorebirds, seabirds, waterfowl, other  
Annotated list, behavior, distribution

825

This paper "is based on collections made by Geist during several years work on the island. (An) annotated list of birds (is presented), including several additions to Friedmann's list, bringing the total species recorded to more than 90." (From T.J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen). CMH

Bering Sea - St. Lawrence Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


This major work, based largely on observations gathered in 1936 and 1937, represents the first comprehensive treatment of the avifauna of this region. Included are sections on fishes and mammals as well as detailed physiographic and floristic descriptions of the area. REG

Aleutians
Bering Sea - Bristol Bay (Alaska Peninsula)
Gulf of Alaska - Kodiak (Alaska Peninsula)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, habitat, zoogeography


This preliminary report discusses primarily the distribution, abundance, and behavior of Short-tailed and Sooty Shearwaters as determined from shipboard surveys. The potential impact of oil development is briefly discussed. Included is tabular information on the distribution of the 22 other species of marine birds observed during the cruises. CMH

Gulf of Alaska
Bering Sea
Shorebirds, seabirds, waterfowl, other
Distribution

826

Observations of shearwaters in summer 1976 are mapped and briefly discussed. The relative abundance of other species of marine birds observed is noted in a table. NMH

Gulf of Alaska
North Pacific
Bering Sea
Shorebirds, seabirds, waterfowl
Abundance, checklist


From observations between 1960 and 1963, the author provides annotated accounts for seven species. The distribution and relative abundance of an additional 60 species, including 37 water-associated forms, are treated in a somewhat more abbreviated format. REG

Gulf of Alaska - Kodiak (Chignik R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance


In a narrative form, the author describes a collecting trip in the vicinity of St. Michael. Most of the account concerns seabirds; however, a few specimens of shorebirds, waterfowl, and landbirds were collected. MRP

Bering Sea - Norton Sound (St. Michael)
Shorebirds, seabirds, waterfowl, other
Specimen record

This represents probably the finest historical account of Alaska avifauna. Nelson provides detailed annotated accounts for some 190 species and subspecies of birds observed in western and northwestern Alaska in 1881. His accounts on birds of the Yukon Delta are further supported by observations he made at St. Michael in the late 1870's. Mention is also made of several species from northeastern Siberia. REG

Alaska
Aleutians
Arctic - Chukchi (Barrow), Kotzebue Sound
Bering Sea - Norton Sound, Yukon Delta
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


This is Nelson's rebuttal to Murdoch's (Auk 2:200-201, 1885) questioning of several of Nelson's observations from the Pt. Barrow region. Nelson stands by his original observations as reported in 1883. REG

Arctic - Chukchi (Barrow)
Shorebirds, waterfowl, other
Annotated list


This report contains annotated accounts for 258 species or subspecies of birds, of which 132 are water-associated. The information is drawn mainly from the Yukon Delta and Norton Sound areas where the author spent four years, but he also summarizes notes and specimen records from explorers of other areas of Alaska. Notes on migration dates, distribution, relative abundance, general habitat use, plumage, and behavior are included. A partial bibliography of Alaska ornithology is presented. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance, migration, bibliography, habitat, plumage, specimen record, behavior, food

828

The author summarizes information from aerial surveys of the Arctic Coast, Yukon-Kuskokwim Delta, and northwest Alaska. Results of nesting and migration studies on the Kaskunuk River and Innoko, Iditarod, and Pike Lake areas are also presented. General observations of many species are included. MRP

Arctic - Beaufort, Kotzebue Sound
Bering Sea - Yukon Delta
Interior - Innoko, Koyukuk
Shorebirds, seabirds, waterfowl, other
Annotated list


This compendium of reports includes checklists of the species of birds recorded during other studies throughout Alaska. MRP

Arctic - Kotzebue
Bering Sea - Yukon Delta
Interior - Innoko, Koyukuk, Tanana
Shorebirds, seabirds, waterfowl, other
Checklist


Not reviewed.

Specimen record


Not reviewed.

Specimen record.

This paper presents information on abundance, distribution, and reproductive success of birds at Prudhoe Bay, and discusses human-related impacts. MRP

Arctic - Beaufort (Prudhoe Bay)
Shorebirds, seabirds, waterfowl, other
Distribution, reproduction, abundance, pollution


Abundance, nesting habitat, breeding phenology, and productivity of 10 species are discussed, and data collected in 1978 are compared with those of 1975 and 1977. Chick growth and feeding rates are addressed for Black-legged Kittiwakes and Tufted Puffins. An annotated list of the 75 species observed in summer 1978 is appended. REG

Gulf of Alaska - Kodiak (Chiniak Bay)
Shorebirds, seabirds, waterfowl, other
Annotated list


The results of seabird colony censuses are reported and compared with 1972 censuses. Reproductive phenology and success are discussed for major breeding species, and results from "sea watch" and shoreline transects are reported. An annotated list of the 90 species observed in summer 1976 is appended. REG

Gulf of Alaska - Prince William Sound (Hinchinbrook Is.)
Shorebirds, seabirds, waterfowl, other
Abundance, reproduction, migration, annotated list
The first section of this report contains annotated species accounts of marine birds and mammals in the vicinity of Naked Island. The second section is a report on the reproductive ecology of Pigeon Guillemots. Appended is an annotated list of all species observed between May 8 and August 31, 1978. MRP

Gulf of Alaska - Prince William Sound (Naked Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list

This monograph reports field observations of birds and mammals during the summer and fall of 1902. MRP

Bering Sea - Bristol Bay
Gulf of Alaska - Kodiak, Cook Inlet
Shorebirds, seabirds, waterfowl, other
Annotated list


A collecting trip to Prince of Wales Island is recounted. Included are notes on some of the birds observed and collected. NMH

Gulf of Alaska - Southeastern (Prince of Wales Is.)
Seabirds, waterfowl, other
Distribution, specimen record


This treatise presents avifaunal accounts based on field investigations in 1903-1904 in eastcentral Alaska and the Yukon Territory. Each section is preceded by an introduction and general account of the region. Some 75 species are addressed of which 18 are water-associated forms. REG

Interior - Upper Yukon (Circle, Eagle)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


The title of this paper is somewhat misleading, as the text contains information collected in southeastern Alaska and the Bering Sea in transit to and from the Yukon. An itinerary, a discussion of faunal districts, and a section on previous works are presented, along with annotated accounts for over 100 species, including 70 water-associated forms. REG

Bering Sea - Yukon Delta, Pribilof Is.
Gulf of Alaska - Southeastern (Lynn Canal, White Pass)
Shorebirds, seabirds, waterfowl, other
Annotated list

On pages 121-124, the authors mention 10 species of birds. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Pribilof Is.
Distribution


This checklist includes 214 species of birds observed in Glacier Bay National Monument. The status, relative abundance, habitat preference, and seasonal occurrence are given for each species. JCG

Gulf of Alaska - Southeastern (Glacier Bay)
Shorebirds, seabirds, waterfowl, other
Checklist


This is "Steller's Journal of the Sea Voyage from Kamchatka to America and Return, as edited and published by Pallas." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH


Reference is made to species in Alaska, and the original descriptions of the Pelagic Cormorant and several other species are included. (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Pelagic Cormorant
Distribution, plumage, taxonomy

This treatise summarizes primarily observations obtained during the Vega Expedition on avifauna of the Arctic coasts of Siberia. However, it also discusses the distribution of bird species over the entire Arctic province, and addresses matters pertinent to Alaska avifauna. (From Stejneger, 1888, Auk 5:306-311. Original not seen.) CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Distribution


This work summarizes, in narrative format, extensive information gathered primarily between 1872 and 1895. Annotated accounts of 69 species, including 54 marine forms, are presented. Numerous specimen records, many with meristic data, are cited. REG

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


Not reviewed.

Alaska

341. PELZEN, A. VON. 1873. On the birds of the Imperial Collection at Vienna obtained from Leverian Museum. Ibis 1873:14-54; 105-124.

This paper "refers to specimens collected during Cook's voyages." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Specimen record

This work "contains a few matters pertinent to early records in Alaska, mostly Russian." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Distribution


This report presents information on the abundance, breeding biology, and predation of seabirds, and on spring migration, molt and foraging areas of loons and waterfowl. An appended table lists the 132 species of birds recorded from the area between 1963 and 1976; notes are included for those recorded only in 1976. CMH

Bering Sea - Bristol Bay (Cape Peirce)
Shorebirds, seabirds, waterfowl, other
Checklist


This paper reviews published and unpublished avifaunal records of the North Slope of Alaska from 1948 to 1973, with particular reference to the Barrow region. Distributional status is provided for all species. MRP

Arctic - Chukchi, Beaufort
Shorebirds, seabirds, waterfowl, other
Annotated list, checklist, distribution

Total numbers of individuals banded in 1951 are given. REG

Arctic - Chukchi (Barrow)
Shorebirds, seabirds, waterfowl, other
Oldsquaw, American Golden Plover, Semipalmated Plover, Ruddy Turnstone, Baird's Sandpiper, Dunlin, Red Phalarope, Arctic Tern

Techniques


Not reviewed.

Alaska


This is a rather extensive treatment of the avifauna of the Pribilof Islands, including often detailed accounts of the foods and feeding habits of some 130 species. REG

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, food, distribution, migration


The author summarizes observations of birds on the Pribilof Islands in the summer of 1895. Of the 24 species treated, 22 are water-associated. MRP

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list

This thesis presents results of a two-year study of the comparative breeding biology of Leach's and Fork-tailed Storm-Petrels. Taxonomy, predation, and chick growth are also treated in depth. An appendix notes the breeding status of the 118 species recorded during the two summers. CMH

Gulf of Alaska - Prince William Sound (Wooded Is.)
Shorebirds, seabirds, waterfowl, other
Checklist


The author conducted a survey of the birds of Middleton Island in June 1956, and recorded 45 species. He correlates the distribution of the 16 breeding species with major ecological formations. REG

Gulf of Alaska - Northern Gulf (Middleton Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, distribution


Provided is an annotated list of the 46 species of birds observed on a float trip down the Colville River during summer 1955. Information on relative abundance, habitat use, and breeding status is included, along with a checklist of the species seen at each confluence along the river. Twenty-six of the species are water-associated. CMH

Arctic - Beaufort (Colville R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance, habitat, checklist


Not reviewed.

Bering Sea

Specimen numbers and locations of collections are listed. MRP

- Gulf of Alaska
- North Pacific
- Shorebirds, seabirds, other
- Specimen record


Much of this paper deals with eastern Siberian birds, but will be of interest to anyone addressing avifauna of the northern Bering Sea and Gulf of Alaska. Included are reports of specimens of Short-tailed Shearwater collected in Alaska waters. REG

- Bering Sea - Bristol Bay
- Gulf of Alaska - Kodiak
- Seabirds, waterfowl, other
- Short-tailed Shearwater
- Specimen record, distribution


The author conducted surveys of breeding seabirds from July 1-29, 1978. Habitats and their use by seabirds are described, and estimates of breeding populations are presented. Daily checklists are appended. MRP

- Bering Sea - Nunivak Is.
- Shorebirds, seabirds, waterfowl, other
- Checklist

The author reports observations from June 26-28, 1979 of birds and habitats affected by the Atigun River crude oil spill of June 10, 1979. MRP

Interior - Upper Yukon (Atigun R.)
Shorebirds, seabirds, waterfowl, other
Pollution, habitat


The collections of birds and mammals in the Museum of the University of Alaska are briefly described; holdings of particular interest are noted. NMH

Alaska
Shorebirds, seabirds, waterfowl, other
Specimen record


This book presents a naturalist's description of the state and its wildlife. The author also discusses the problem of development in relation to conservation, and suggests means to preserve the wilderness. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Public interest, pollution, management


This paper addresses habitat use and compares the avifauna of the area with that of the Colville River Valley. Observations from summer and fall 1969 and 1970, plus June 1971, provide the basis for annotated accounts for 65 species. Included are 40 water-associated forms. REG

Arctic - Beaufort (Atigun R., Sagavanirktok R.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat

Not reviewed.

Bering Sea - Yukon Delta


Annotated accounts summarize observations of 22 species, including 8 water-associated forms, during summer 1973. REG

Gulf of Alaska - Copper River (Wrangell Mtns.)
Shorebirds, waterfowl, other
Annotated list, distribution


The authors conducted a series of ground censuses along the proposed gas pipeline route during summer 1972. Thirteen habitat types are described, and bird densities and species composition are analyzed for each. An annotated list presents information on abundance and habitat use for 152 species. Checklists indicate the species recorded at each census site. CMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Annotated list, checklist, habitat, abundance


The author has summarized bird observations collected aboard oceanographic vessels during 26 cruises between 1955 and 1967. Annotated accounts are presented for 36 species of birds, all typical marine forms except for Peregrine Falcon and Long-eared Owl. REG

Gulf of Alaska
Aleutians
North Pacific
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, abundance

This paper reports on the winter and summer distribution of marine birds in Port Valdez and assesses the extent of bird use in the area. MRP

Gulf of Alaska - Prince William Sound (Port Valdez)
Shorebirds, seabirds, waterfowl
Abundance, distribution


This report includes information on the abundance, breeding phenology, and productivity of seabirds using Constantine Harbor and Porpoise Rocks; general accounts of shorebirds, waterfowl, Bald Eagles, and marine mammals; information on breeding populations of Pigeon Guillemots and Parakeet Auklets on Smith and Little Smith Islands; and census information on seabirds of Naked and Storey Islands. MRP

Gulf of Alaska - Prince William Sound
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, annotated list, food


Not reviewed.

Bering Sea - St. Lawrence Is.

367. SAUER, M. 1802. An Account of a Geographical and Astronomical Expedition to the Northern Parts of Russia...the Whole Coast of the Tshutski...and of the Islands in the Eastern Ocean, Stretching to the American Coast Performed...by Commodore Joseph Billings in the Year 1785...to 1794.

Page 179 pertains to birds on Kodiak. (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Gulf of Alaska - Kodiak (Kodiak Is.)

Sightings of 19 species are summarized, including Ross' Gull, Steller's Eider, Black Brant, and Snow Goose (from summary in Auk 46:256, original not seen). REG

Arctic
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


This paper "includes a list of 128 species with many records from Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Annotated list


This final report provides results of a study of bird use of Egg Island and surrounding waters during summer 1972. Annotated accounts are presented for the major species, and graphs depict densities throughout the season in bay, sea, and island habitats. Patterns of habitat use are discussed in light of potential petroleum development. CMH

Arctic - Beaufort (Egg Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, abundance, pollution, management, migration

This paper documents changes in bird numbers over time and space near a barrier island in summer. Annotated accounts of eiders, Oldsquaw, loons, Red Phalaropes, Glaucous Gulls, and Arctic Terns are presented. REG

Arctic - Beaufort (Egg Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, migration, abundance


A study of avian occurrence and habitat use in the vicinity of Cape Espenberg was conducted during summers 1976 and 1977. Detailed information is presented on seasonal abundance, breeding biology, foods, habitat preferences, and predation. Daily checklists and an annotated species list are included for the 85 species of birds recorded. The probable impacts on birds from petroleum development are assessed. CMH

Arctic - Kotzebue Sound (Cape Espenberg)
Shorebirds, seabirds, waterfowl, other
Abundance, habitat, breeding biology, growth, annotated list, checklist, predation, subsistence, pollution, food


An ecological survey of Beaufort Lagoon and adjacent areas was conducted from June through September. The species and number of birds observed in each habitat are noted. Annotated species accounts are presented for loons, grebes, swans, geese, and ducks. MRP

Arctic - Beaufort (Beaufort Lagoon)
Shorebirds, seabirds, waterfowl, other
Checklist, habitat, abundance, distribution, annotated list

This paper presents information from weekly bird censuses and from personal field notes of other observers. Sixty-two species are listed, 19 of which are new to the island. MRP

Aleutians (Amchitka Is.)
Shorebirds, seabirds, waterfowl, other
Abundance, annotated list


This paper describes the bird populations along the proposed alternative gas pipeline routes between Prudhoe Bay and Arctic Red River and from Ft. MacPherson to the U.S. border. MRP

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Distribution, abundance, habitat


An intensive survey of the Innoko River region was conducted primarily to determine habitat use by waterfowl. Information on their abundance, distribution and life history is presented. A checklist of all birds observed in the region and notes on the most common species are included. MRP

Interior - Innoko
Shorebirds, seabirds, waterfowl, other
Checklist


Not reviewed.

Alaska

Spring arrival dates are given for 25 species. REG

Bering Sea - St. Lawrence Is.
Shorebirds, seabirds, waterfowl, other
Migration


This paper reports several additions to the known avifauna of St. Lawrence Island and discusses the zoogeographical significance of these and previous records. Approximately half of the 55 species discussed are coastal or marine-associated. REG

Bering Sea - St. Lawrence Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, zoogeography


These volumes describe in general the natural resources of and influences of man on each region of Alaska. The families of birds occurring in each major habitat are listed. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Public interest, management

This report presents results of a preliminary analysis of stomach contents, plus a discussion of live-trapping techniques. Included in an appendix are selected observations of spring and fall migration for 45 species of birds. CMH

Gulf of Alaska - Copper River (Copper R. Delta) Shorebirds, seabirds, waterfowl, other Migration, annotated list


Included in this annotated list of 60 species is information on spring arrival, breeding status, and relative abundance. Sixteen of the species are water-associated. CMH

Interior - Tanana (Toklat R.) Shorebirds, seabirds, waterfowl, other Annotated list, abundance, migration


This thesis presents detailed information on the breeding biology, distribution, abundance, and habitat requirements of Trumpeter Swans in Alaska. Recommendations for management and research are included. MRP

Gulf of Alaska - Copper River (Copper R. Delta) Shorebirds, seabirds, waterfowl, other Checklist

An annotated list and histograms document the seasonal abundance and breeding status of the 83 species of birds observed in summer 1976. Nesting densities, phenology, and success are summarized for the most common breeding species. CMH

Bering Sea - Norton Sound (Norton Bay)
Shorebirds, seabirds, waterfowl, other
Checklist, annotated list, abundance, reproduction


The avifauna of upper Norton Bay were investigated in summer 1976 and 1977. A checklist notes the relative abundance and nesting status of 103 species. Quantitative data on habitat use, timing of migration, nesting densities, productivity, and banding returns are presented for the most common species. Invertebrates sampled from pond edges and nearshore mudflats are identified. CMH

Bering Sea - Norton Sound (Norton Bay)
Shorebirds, seabirds, waterfowl, other
Habitat, migration, abundance, reproduction, subsistence, predation, food, checklist, pollution


The author presents annotated accounts of the birds observed and collected between May 13 and August 24, 1939. Of the 96 species addressed, 46 are water-associated. A general description of the area is included. MRP

Gulf of Alaska - Copper River (Yakutat)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record
387. SHUNTOV, V.P. 1962. Land birds and shorebirds in the Bering Sea. [In Russian.] Ornithologiya 4:373-375.

Not reviewed.

Bering Sea
Shorebirds, other


The species' assortment, seasonal distribution, migration, population density, numbers and geographic dispersal of seabirds are examined with respect to the existing biological structure of the World Ocean. Considerable attention is given to 17 species, 9 of them common to Alaska waters. The number of seabirds on the World Ocean is estimated and their role as consumers of other animals is discussed. REG

Gulf of Alaska
Aleutians
North Pacific
Bering Sea
Shorebirds, seabirds, waterfowl
Distribution, abundance


The author reports the addition of 22 species to the list of avifauna of the Pribilof Islands. Observations and collections were made in 1960, 1961, and 1962 and include those of 15 species of water-associated birds. REG

Bering Sea - Pribilof Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, specimen record

Bird populations were censused, habitat types were identified, and habitat use by birds was quantified at sites along the proposed gas pipeline route. MRP

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Abundance, annotated list, distribution, habitat


This volume primarily reports on the early geological investigation of northwestern Alaska. A brief anecdotal account of the region's avifauna is included. NMH

Arctic - Chukchi
Waterfowl, other
Distribution


This progress report presents a brief summary of results from a study on the nesting ecology of Black-legged Kittiwakes on Chisik Island. Included is an annotated list of 57 species of birds, 32 of them water-related, observed on or near the island. MRP

Gulf of Alaska - Cook Inlet (Tuxedni NWR)
Shorebirds, seabirds, waterfowl, other
Annotated list


This includes an "annotated list of 20 species and a hypothetical list of 17 others. References are made to some matters of Alaskan distribution." (From T.J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Distribution

This report presents information on the abundance and distribution of birds within the coastal zone of the Arctic National Wildlife Range. MRP

Arctic - Beaufort (Arctic NWR)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution


This report contains information on the timing of migration, habitat use, density, and species diversity of birds in the upper Tanana River, lower Nabesna River, Chisana River, and Scottie Creek drainages. MRP

Interior - Tanana (Tanana R.)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat, migration


This report includes an annotated list of the 87 species of birds, including 33 water birds, recorded in the Mancha Creek area. Habitat types are identified and described; the distribution and abundance of birds are analyzed for five major habitats. Intense field work in summer 1979 was supplemented by visits in other seasons. CMH

Arctic - Beaufort (Mancha Creek)
Shorebirds, seabirds, waterfowl, other
Annotated list, abundance, distribution, habitat

Annotated accounts of five species of birds seen near Hooper Bay between May 22 and 29, 1964, are presented. Included are Rufous-necked Sandpiper, Short-billed Dowitcher, Aleutian Tern, Black Guillemot, and Brambling. REG

Bering Sea - Yukon Delta (Hooper Bay)
Shorebirds, seabirds, other
Short-billed Dowitcher, Rufous-necked Sandpiper, Aleutian Tern, Black Guillemot
Annotated list, status, distribution


The author discusses 142 species collected or observed, plus other matters, some of which relate to Alaska. (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Distribution


In the course of this review, the author also discusses the identification, taxonomic status, and occurrence of seven species of Alaska water birds. CMH

Arctic
Bering Sea
Shorebirds, seabirds, waterfowl
White-fronted Goose, American Golden Plover, Rufous-necked Sandpiper, Dunlin, Herring Gull, Black-legged Kittiwake, Black Guillemot
Taxonomy, distribution, plumage

This paper summarizes specimen data and gives a brief description of molts and plumages of birds collected at several sites in Alaska between July 1897 and August 1898. The collection consists of over 1,400 specimens of 59 species. MRP

Arctic - Chukchi (Cape Lisburne, Wainwright, Pt. Hope, Barrow)
Bering Sea - Norton Sound (Port Clarence, King Is.)
North Pacific
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, plumage


Not reviewed.


This paper presents a brief itinerary of the voyage and lists all of the specimens collected at each stop. Several changes in nomenclature are suggested. MRP

Gulf of Alaska - Prince William Sound
Aleutians - (Unalaska Is.)
Bering Sea - Norton Sound, St. Matthew Is.
Shorebirds, seabirds, waterfowl, other
Taxonomy, specimen record


Annotated accounts, summarizing observations obtained between February 20 and March 18, 1945, are presented for 26 species, including 18 water-associated forms. REG

Aleutians - (Attu Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list

This very detailed report describes habitats of various localities visited by the expedition, and presents detailed annotated accounts of birds and mammals observed. Of the 137 species of birds recorded, 55 are water-oriented forms. MRP

Gulf of Alaska - Southeastern (Sitkan district)
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record, habitat


The author describes the habitats of the Stikine valley, and provides checklists and annotated accounts of birds and mammals of the area. Of the 127 species of birds treated, 24 are water-associated. MRP

Gulf of Alaska - Southeastern (Stikine R.)
Shorebirds, seabirds, waterfowl, other
Habitat, checklist, annotated list


This work remains the most extensive and complete account of the avifauna of this Bering Sea island. Observations were made between June 30 and November 6, 1927, and address some 150 forms. Morphometric data are reported for many of the 555 specimens collected. REG

Bering Sea - Nunivak Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, status, distribution, migration, habitat, specimen record

The author discusses the possible geographic origins of species of birds, mammals, and amphibians in southeastern Alaska. The distribution of 32 species and subspecies of birds in this region and adjacent areas is discussed. MRP

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Great Blue Heron, Canada Goose, Mallard, Spotted Sandpiper,
Greater Yellowlegs
Distribution, zoogeography


Annotated accounts summarize observations between November 18, 1945, and January 20, 1946. Of the 37 species of birds observed, 26 were water-associated forms. A brief comparison of the winter avifaunas of Adak and Attu Islands is presented. REG

Aleutians - (Adak Is., Attu Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list


This paper includes "several specimens taken in Alaska." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Arctic
Specimen record


This report provides detailed information on wetland habitats near Teshekpuk Lake and their seasonal use by birds. MRP

Arctic - Beaufort (Teshekpuk R.)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat, reproduction, food, disturbance, annotated list

854

This paper includes an "annotated list of 109 species, some of which have pertinence to Alaska." (From T. J. Cade, 1953, A Synoptic Bibliography of Alaskan Ornithology, Univ. Calif. Dept. Zool., Los Angeles. Original not seen.) CMH

Alaska
Annotated list


This paper presents annotated accounts of 44 species, including 38 water-associated forms, observed from April 25, 1964, to January 20, 1965. Avian habitats of the area are described. REG

Bering Sea - St. Lawrence Is., Punuk Is.
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat


This is a checklist of the 52 species of birds, including 21 water birds, observed during an exploration of the Kowak (= Kobuk) River in July and August 1885. Relative abundance and breeding status are noted. CMH

Arctic - Kotzebue Sound (Kobuk R.)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance

Brief annotated accounts are given for 58 species observed along the Kowak (= Kobuk) River in summer 1885. In addition, there is a short description of birds "obtained at various places between the Aleutian Islands and Kotzebue Sound." This consists of short annotated accounts for the 48 species collected, and concerns mostly birds encountered on the Pribilof Islands and Unalaska. REG

Arctic - Kotzebue Sound (Kobuk R.)
Bering Sea
Aleutians
Shorebirds, seabirds, waterfowl, other
Annotated list, specimen record


An aerial survey was conducted over coastal waters of Kodiak Island. Annotated accounts are presented for the species of birds observed, and distribution patterns are discussed. Numbers of birds, densities, and frequency of occurrence are summarized in tables for each species. Results are compared with those of previous surveys. CMH

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl
Abundance, annotated list, habitat, distribution

Transects radiating from a retreating glacier were censused repeatedly in June 1965 to determine abundance of the 110 species recorded in the area. Abundance was then analyzed, for the most common species, in relation to the amount of time habitats had been available since glaciation. Only general results are discussed, but tables present a daily list of the numbers of each species seen and summarize specific results. CMH

Gulf of Alaska - Southeastern (Muir Inlet)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, habitat


This report provides a brief overview and synthesis of information from studies on the oceanography, geology, and ecology of a barrier island/lagoon system. The information on birds is summarized from Johnson (1978, same volume). CMH

Arctic - Beaufort (Simpson Lagoon)
Shorebirds, seabirds, waterfowl, other
Abundance, habitat, migration, food, management, disturbance


Ground censuses of avian populations were conducted along the proposed gas pipeline route. Results and discussion are very general. A checklist of all species seen is appended. CMH

Arctic - Beaufort
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, habitat

The author provides a short description of the three westernmost Aleutian Islands and includes a briefly annotated checklist of the birds observed or collected there during a year-long visit in 1880-1881. Relative abundance and breeding status are noted for each of the 69 species recorded, 51 of which are water-associated. CMH

Aleutians - (Attu Is., Agattu Is., Semichi Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, subsistence


This major work is the result of extensive field work conducted between 1874 and 1881. Detailed annotated accounts are presented for 161 taxa, with specimen and meristic data listed for several. Most of the work was conducted over western Alaska and the eastern Aleutians. A checklist of all birds known from Alaska at that time is appended. REG

Alaska
Aleutians - (Unalaska Is.)
Bering Sea - Norton Sound (St. Michael)
Shorebirds, seabirds, waterfowl, other
Annotated list, subsistence, distribution, specimen record, checklist


These narrative reports present information on weather, habitat, wildlife, refuge development and maintenance, resource management, public relations, and field investigations on the refuge. The amount and type of information vary between years. However, numbers, arrival dates, and general observations of birds are included in some reports. MRP

Gulf of Alaska - Cook Inlet (Kenai National Moose Range)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques

These narrative reports present information on weather conditions, water conditions, fires, wildlife, refuge development and maintenance, resource management, field investigations, and public relations on refuges. Content of the reports varies between years. However, numbers, arrival dates, and general observations of birds are reported for most years. Information from the Eastern Aleutians NWR, Semidi NWR, Simeonof NWR, and Izembek NWR is included through 1971. Thereafter, only information from the Aleutian Island NWR and Bogoslof NWR is included. MRP

Aleutians - (Aleutian Island NWR, Eastern Aleutians NWR)
Bering Sea - Bristol Bay (Izembek NWR)
Gulf of Alaska - Kodiak (Semidi NWR)
North Pacific - (Simeonof NWR)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques


These narrative reports present information on weather, habitat, wildlife, refuge development and maintenance, resource management, public relations, and field investigations on the refuge. The amount and type of information vary between years. However, numbers, arrival dates, and general observations of birds are included in some reports. MRP

Gulf of Alaska - Kodiak (Kodiak NWR)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques

These narrative reports present information on weather, habitat, wildlife, refuge development and maintenance, resource management, public relations, and field investigations on the refuge. The amount and type of information vary between years. However, numbers, arrival dates, and general observations of birds are included in most reports. MRP

Bering Sea - Yukon Delta (Nunivak Is.)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques


These narrative reports present information on weather, habitat, wildlife, refuge development and maintenance, resource management, public relations, and field investigations on the refuge. The amount and type of information vary between years. However, numbers, arrival dates, and general observations of birds are included in most reports. Information from the Nunivak National Wildlife Refuge is included in some years. MRP

Bering Sea - Yukon Delta (Clarence Rhode NWR, Nunivak NWR)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques


These reports present information on human use and a brief description of studies on the refuge. Most reports include lists of the species of birds, fish, and mammals seen, and some provide additional notes. MRP

Bering Sea - Bristol Bay (Cape Newenham NWR)
Shorebirds, seabirds, waterfowl, other
Annotated list, checklist, subsistence, fishing, pollution

These narrative reports present information on weather, habitat, wildlife, refuge development and maintenance, resource management, public relations, and field investigations on the refuge. The amount and type of information vary between years. However, numbers, arrival dates, and general observations of birds are frequently included. MRP

Arctic - Beaufort (Arctic NWR)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques


This is a checklist of 139 species, 27 of which are treated as occurring hypothetically. REG

Arctic - Beaufort (Arctic NWR)
Shorebirds, seabirds, waterfowl, other
Checklist


Not reviewed.

Arctic - Chukchi, Beaufort


The status, relative abundance, and seasonal occurrence of 96 species are presented in this checklist. JCG

Bering Sea - Yukon Delta (Clarence Rhode NWR)
Shorebirds, seabirds, waterfowl, other
Checklist

These narrative reports present information on weather, habitat, wildlife, refuge development and maintenance, resource management, public relations, and field investigations on the refuge. The amount and type of information vary between years. However, numbers, arrival dates, and general observations of birds are frequently included. This series contains information from Izembek NWR, Simeonof NWR, Semidi NWR, and Eastern Aleutians NWR. MRP

Aleutians - (Eastern Aleutians NWR)
Bering Sea - Bristol Bay (Izembek NWR)
Gulf of Alaska - Kodiak (Semidi NWR)
North Pacific - (Simeonof NWR)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, distribution, behavior, disturbance, food, habitat, management, migration, mortality, population dynamics, predation, public interest, reproduction, research, status, techniques


The status, relative abundance, seasonal occurrence, and habitat preferences of 124 species are given. An additional 18 species are treated as occurring accidentally. JCG

Bering Sea - Bristol Bay (Izembek NWR)
Shorebirds, seabirds, waterfowl, other
Checklist


This checklist addresses 127 species. An additional 59 species are treated as occurring accidentally. Status, relative abundance, seasonal occurrence, and habitat affinities are given for each species in the eastern, central, and western Aleutians. JCG

Aleutians
Shorebirds, seabirds, waterfowl, other
Checklist

The status, relative abundance, seasonal occurrence, and habitat preferences of 116 species are given. JCG

Gulf of Alaska - Kodiak (Kodiak Is.)
Shorebirds, seabirds, waterfowl, other
Checklist


The status, relative abundance, seasonal occurrence, and habitat preferences of 108 species are given in this checklist. JCG

Bering Sea - Nunivak Is.
Shorebirds, seabirds, waterfowl, other
Checklist


This is a checklist of 38 species. Their status, relative abundance, and seasonal occurrence are given. JCG

Gulf of Alaska - Cook Inlet (Kenai Peninsula)
Shorebirds, seabirds, waterfowl, other
Checklist


This report includes a very general discussion of the water birds and raptors of Bristol Bay, summarizing available information on occurrence, habitat use, and food habits. CMH

Bering Sea - Bristol Bay
Shorebirds, seabirds, waterfowl, other
Habitat, distribution, food
438. VENIAMINOF, B.I. 1875. [Extract from] Zabieska ob Octrovah Oonahlashkenskah Otdayla. St. Petersburg, 1840. [Translation of "selections, most pertinent to subject" (Pribilof Islands) published by Elliott in his report on the condition of affairs in the Territory of Alaska, 1875, pp. 241-244.]

"A paragraph mentioning somewhat over a dozen species of birds which visit the Pribilof Islands seems to be the earliest note on the ornithology of the group." (From Gabrielson and Lincoln, Birds of Alaska, 1959. Original not seen.) CMH

Bering Sea - Pribilof Is.
Distribution


This paper primarily addresses the plants of the Kodiak Island area; however, some fish, mammals, and birds are mentioned. MRP

Gulf of Alaska - Kodiak (Kodiak Is. archipelago)
Seabirds, waterfowl, other
Zoogeography


The distribution and abundance of birds recorded on a cruise from Hakodate, Hokkaido, Japan, to Kodiak, Alaska, are reported. MRP

Aleutians
Bering Sea
Shorebirds, seabirds, waterfowl
Abundance, annotated list, distribution


This note presents a list of 29 species of birds observed at Chevak (= Old Chevak) on June 20 and 21, 1946. Clutch sizes are listed for all nests found. MRP

Bering Sea - Yukon Delta
Shorebirds, seabirds, waterfowl, other
Annotated list

The authors provide a checklist of 49 species observed between June 1 and 20, 1946. In addition, they present annotated accounts of the 20 species, including 11 water birds, found breeding in the area. An introduction describes the plants of the area and discusses the weather during the course of the investigation. REG

Bering Sea - Yukon Delta (Johnson R.)
Shorebirds, seabirds, waterfowl, other
Checklist, annotated list


The author presents results of shipboard censuses conducted in the Gulf of Alaska and provides information on food habits of birds collected during the cruise. MRP

Gulf of Alaska
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, food


Censuses were conducted during two shipboard cruises in the western Beaufort Sea in falls 1971 and 1972. In an annotated list, the authors summarize information on the distribution and food habits of the species of birds observed. MRP

Arctic - Beaufort
Shorebirds, seabirds, waterfowl
Annotated list, distribution, food

Annotated accounts are presented for 21 species, including 13 marine forms. Data were collected between February and September 1940 and update previous ornithological works from the area. REG

Gulf of Alaska - Southeastern (Sitka)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


This paper describes the major vegetation types and associated bird species of three altitudinal zones in southeastern Alaska. CMH

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Habitat


The author presents an annotated list of 51 of the species observed in the vicinity of Wrangell in spring and summer 1946. These records provide new information for the avifauna of southeastern Alaska as a whole, or for that of the upper Stikine River. Eighteen of the species treated are water-associated. CMH

Gulf of Alaska - Southeastern (Wrangell)
Shorebirds, seabirds, waterfowl, other
Annotated list

This report on the populations, breeding biology, food habits, and foraging areas of 21 species of marine birds in summer 1976. A daily checklist of the birds observed on the island, numbering 50 species, is appended. CMH

Gulf of Alaska - Kodiak (Ugaiushak Is.)
Shorebirds, seabirds, waterfowl, other
Checklist


Not reviewed.

Gulf of Alaska - Southeastern (Muir Inlet)


In this study, the authors estimated the total amount of energy required by a community of taiga birds in interior Alaska between late May and the end of August. Estimates are based on trail censuses of two areas and from direct measurement of the daytime resting metabolic rate of 11 of the 49 species recorded. Nine of the species censused are water-associated. CMH

Interior - Tanana (Fairbanks)
Shorebirds, seabirds, waterfowl, other
Abundance, physiology, food, habitat


Annotated accounts are given for 17 species, including 10 water-associated forms, observed and/or collected in spring and summer 1964 near Umiat, Alaska. REG

Arctic - Beaufort (Umiat)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, specimen record

Included in this report is a discussion of subsistence use of birds. A table lists the species observed in May and June 1980 and those previously recorded on the island. The numbers of each species seen during six visits to the nearby seabird cliffs are presented. CMH

Bering Sea - St. Lawrence Is. (Savoonga)
Shorebirds, seabirds, waterfowl, other
Checklist, abundance, subsistence


This report presents an annotated list of species observed in the Aleutians during the summer of 1911. MRP

Aleutians
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


This paper examines the ecological niches of the Peregrine Falcon, Gyrfalcon, Rough-legged Hawk, and Common Raven nesting on cliffs in Arctic Alaska. It discusses spatial and temporal habitat use, food habits, and possible benefits from other species. A wide variety of water birds are found to be important prey, especially for the Peregrine Falcon. CMH

Arctic
Shorebirds, seabirds, waterfowl, other
Predation

The authors provide annotated accounts for 92 species observed between June 10 and August 3, 1966, and during brief periods from May to July 1968. Some 40 of the species discussed are typically water-associated. The relative stability of several populations is discussed. REG

Interior - Upper Yukon (Circle)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, status


This chapter summarizes results of a study of the bird populations of Amchitka Island between 1967 and 1973. The status and seasonal abundance of each species are presented. Of the 131 species treated, 94 are water-related. The distribution of birds is analyzed in relation to 14 ecological formations. Information on population densities and food habits is presented for some species. CMH

Aleutians - (Amchitka)
Shorebirds, seabirds, waterfowl, other
Checklist, distribution, abundance, habitat, food, disturbance


This book contains a comprehensive list of all publications between 1724 and 1924, including those in English, Russian, and several other languages. Listings 690-773 pertain specifically to birds. CMH

Alaska
Shorebirds, seabirds, waterfowl, other
Bibliography

Not reviewed.

Gulf of Alaska - Southeastern (St. Lazaria Is.)


During the summers of 1912 and 1913 the author made detailed notes on the avifauna of the Sitka area, primarily that associated with the numerous island groups. This paper provides annotated accounts of some 150 taxa, of which 75 are water-associated. An extensive literature cited section is included. Numerous specimen records are listed. REG

Gulf of Alaska - Southeastern (Sitka, Baranof Is., Kruzof Is., Chichagof Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution, specimen record


This paper provides annotated accounts for 27 species of water birds and 21 species of landbirds observed on Forrester Island between May 23 and August 15, 1914. Included is a tabular summary of numbers of breeding water birds. REG

Gulf of Alaska - Southeastern (Forrester Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list, abundance


This annotated list reports observations made during two summers. The 26 species addressed had not previously been recorded for the island's avifauna. Included are 16 species of water-associated birds. CMH

Gulf of Alaska - Southeastern (Forrester Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list

This note presents records for 15 species not previously reported on Forrester Island. Eleven are water-associated species. CMH

Gulf of Alaska - Southeastern (Forrester Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list


The author presents, in narrative format, an account of the birds observed throughout the year 1920. Some species are discussed in detail, but most are only listed as having been seen at a given locality and time. REG

Gulf of Alaska - Southeastern (Craig, Forrester Is., Wrangell Is., Dall Is.)
Shorebirds, seabirds, waterfowl, other
Distribution, habitat


The author updates previously published information on the birds of southeastern Alaska by presenting annotated accounts of 36 species, including 18 water-related forms. Much of the information presented in this paper came from the notes and collections of F. H. Gray, of Wrangell. REG

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Annotated list


The author provides information which extends the known ranges of 21 species, and suggests new common names for a few. CMH

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Yellow-billed Loon, Red-necked Grebe, Horned Grebe, Whistling Swan, Canada Goose, Herring Gull, Mew Gull, Black Oystercatcher, Black Turnstone, Common Snipe
Distribution, taxonomy

871

This note details the occurrence of 10 species new to the vicinity of Craig; five water-related species are included. REG

Gulf of Alaska - Southeastern (Craig)
Shorebirds, seabirds, waterfowl, other
Western Grebe, White-fronted Goose, Hooded Merganser, California Gull, Red Knot
Annotated list, distribution


The author discusses the distribution of selected species common to southeastern Alaska and British Columbia. CMH

Gulf of Alaska - Southeastern
Shorebirds, seabirds, waterfowl, other
Annotated list, distribution


This note was written to update the information on the avifauna of this region and includes annotated accounts of 22 taxa. The White-crested Cormorant (= Double-crested), Baird's Cormorant (= Pelagic) and Lesser Scaup are the only water birds discussed. REG

Gulf of Alaska - Southeastern
Seabirds, waterfowl, other
Double-crested Cormorant, Pelagic Cormorant, Lesser Scaup
Annotated list, distribution

The climate, topography, and general ecological attributes of the Napaskiak area are briefly discussed. The distribution of birds observed during the summers of 1955 and 1956 is analyzed in relation to ten ecologic formations, characterized mainly by the life form of the vegetation. An annotated list presents information on 62 species, of which 34 are water birds. Specimen data are included. CMH

Bering Sea - Yukon Delta (Napaskiak)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, specimen record


This is a checklist of 119 species. The status, relative abundance, habitat association(s), and seasonal occurrence of each species are presented. REG

Gulf of Alaska - Cook Inlet (Anchorage)
Shorebirds, seabirds, waterfowl, other
Checklist


This paper describes 12 major ecologic formations in the vicinity of Iliamna Lake and analyzes the distribution of birds associated with each. Annotated accounts are presented for the 102 species of birds recorded from the area, including 39 water-associated forms. Relative abundance and habitat preferences are noted for each. Meristic data are provided for specimens. CMH

Bering Sea - Bristol Bay (Iliamna L.)
Shorebirds, seabirds, waterfowl, other
Annotated list, habitat, specimen record

This paper provides an annotated list of 26 species of birds for which there are new distributional or winter records for the region. Eight of the species are water-associated. CMH

Gulf of Alaska - Cook Inlet, Prince William Sound, Copper River
Shorebirds, seabirds, waterfowl, other
Fork-tailed Storm-Petrel, Great Blue Heron, Canvasback, Oldsquaw,
Ivory Gull, Killdeer, Hudsonian Godwit, Upland Sandpiper
Distribution, annotated list


This chapter presents information on bird populations in the Cape Thompson area during springs and summers of 1959 through 1961. Species composition, ecological distribution, density, productivity, and seasonal movements of birds were determined. MRP

Arctic - Chukchi (C. Thompson)
Shorebirds, seabirds, waterfowl, other
Distribution, checklist, migration, reproduction, habitat


The author provides annotated accounts of 24 species of birds, including 17 marine forms, observed on Attu during the summer of 1945. REG

Aleutians - (Attu Is.)
Shorebirds, seabirds, waterfowl, other
Annotated list

This thesis presents information on the preferential use of vegetation by nesting birds and reindeer. The vulnerability of nests to disturbance and destruction is assessed for various habitats. MRP

Arctic - Kotzebue Sound (Seward Peninsula)
Shorebirds, seabirds, waterfowl, other
Abundance, distribution, habitat, checklist, management, mortality


This paper relates prehistoric avifaunal remains from Chugachik Island to present bird use of Kachemak Bay. Approximately 75 percent of the remains were identifiable to family level, with waterfowl (Anatidae) comprising 57 percent of the remains. REG

Gulf of Alaska - Cook Inlet (Kachemak Bay)
Shorebirds, seabirds, waterfowl, other
Archaeology, abundance


The author presents annotated accounts for 66 species observed in the upper Tanana River Valley in July 1962. JCG

Interior - Tanana (Tok, Tetlin L.)
Shorebirds, seabirds, waterfowl, other
Annotated list, food, behavior


This paper presents annotated accounts of 40 species of birds observed in the Copper River - Cordova area in July 1962. The majority of species discussed are water-associated. REG

Gulf of Alaska - Copper River (Copper R. Delta)
Shorebirds, seabirds, waterfowl, other
Annotated list

This paper offers brief annotated accounts for some 60 species, including 27 water-associated forms. Observations were made from July 4-7 and from August 3 to September 3, 1962. REG

Interior - Upper Yukon (Yukon Flats, Ft. Yukon)
Shorebirds, seabirds, waterfowl, other
Annotated list
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