SUMMER DISTRIBUTION OF PELAGIC BIRDS IN BRISTOL BAY, ALASKA

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Bristol Bay and its islands, the embayments, lagoons, and other estuaries along the north side of the Alaska Peninsula, and the nesting cliffs on the north shore, are seasonally important to vast numbers of seabirds, waterfowl, and shorebirds that either breed, summer, winter, or stopover there during migration. This productive southeast corner of the Bering Sea is also used by sea otters and several species of pinnipeds and cetaceans, and it is the site of the world's largest salmon fishery.

Petroleum development is planned for this area and, judging from the past history of numerous oil spills in nearby Cook Inlet, could have deleterious effects on this rich fauna. This possibility prompted investigations of the migratory birds, including the pelagic species, that could provide the year-round information on distribution and numbers necessary to protect birds from the possible hazards of petroleum development and shipping. A part of that information is provided by the observations on distribution and relative numbers of pelagic birds made in a section of Bristol Bay during July and August 1969, and reported on in this paper.

Data on pelagic birds from the Bering Sea region is limited, and even less is published about birds within Bristol Bay and adjacent lands. Jaques (1930) provided annotations on the birds he observed in and between Unalaska and Port Moller during the early summer of 1928. Shuntov (1961) surveyed populations of birds summering in the shallow portion of the eastern Bering Sea but west of Bristol Bay. King and McKnight (1969) made aerial surveys of the pelagic birds within 12 miles of the Bristol Bay coastline in October. Arnold (1948) reported on the distribution of birds in the North Pacific from Kodiak Island to Unalaska Island and in the Bering Sea from Unalaska Island to Attu Island between 18 June and 16 September 1944. Kuroda (1955) reported on the birds seen at sea in the vicinity of the Kuril Islands and near the western end of the Aleutian Islands. Shuntov (1966) and Irving et al. (1970) reported on the wintering birds of the Bering Sea. Unanalyzed data on birds observed in the Bering Sea are published with the oceanographic and fisheries records of the RV *Osharo Maru* (Hokkaido University 1957–68).

Osgood (1904), Murie (1959), and Gabrielson and Lincoln (1959) summarized the information on birds of the lands bordering Bristol Bay. Dall (1873) and Cahn (1947) described the birds on and about Unalaska Island, the westernmost point included within our area of study. Except for Turner's (1886) brief account of the birds of Cape Newenham and recent unpublished administrative reports of the Bureau of Sport Fisheries and Wildlife, the immense bird colonies along the western half of the north shore of Bristol Bay, including Cape Newenham and nearby islands, and the Walrus Islands (not to be confused with the Walrus Island of the Pribilofs) have been neglected by ornithologists and are not yet described. Gabrielson and Lincoln (1959) referenced only Turner's cursory account of Cape Newenham and were aware of small colonies on Hagemiester Island, but neither they, Murie (1959), nor Osgood (1904) were apparently aware of the other colonies.

METHODS

Observations were made between 13 July and 20 August 1969 aboard the research vessel, MV *Commander*, which was being operated by the Bureau of Commercial Fisheries to collect oceanographic and fisheries information. A virtually unobstructed view was obtained from atop the wheelhouse, approximately 17 ft above the water. An attempt was made to count all birds within ⅜ of a mile of the ship, but variations in the width of the transect due to fog, strong winds, and rough sea precluded the use of the data to estimate bird densities. The data were used to indicate relative abundance and distribution and are, therefore, comparable in kind to most shipboard observations of birds. Figure 1 shows those transects along which observations were made during the periods of 13 to 31 July and 1 to 20 August.

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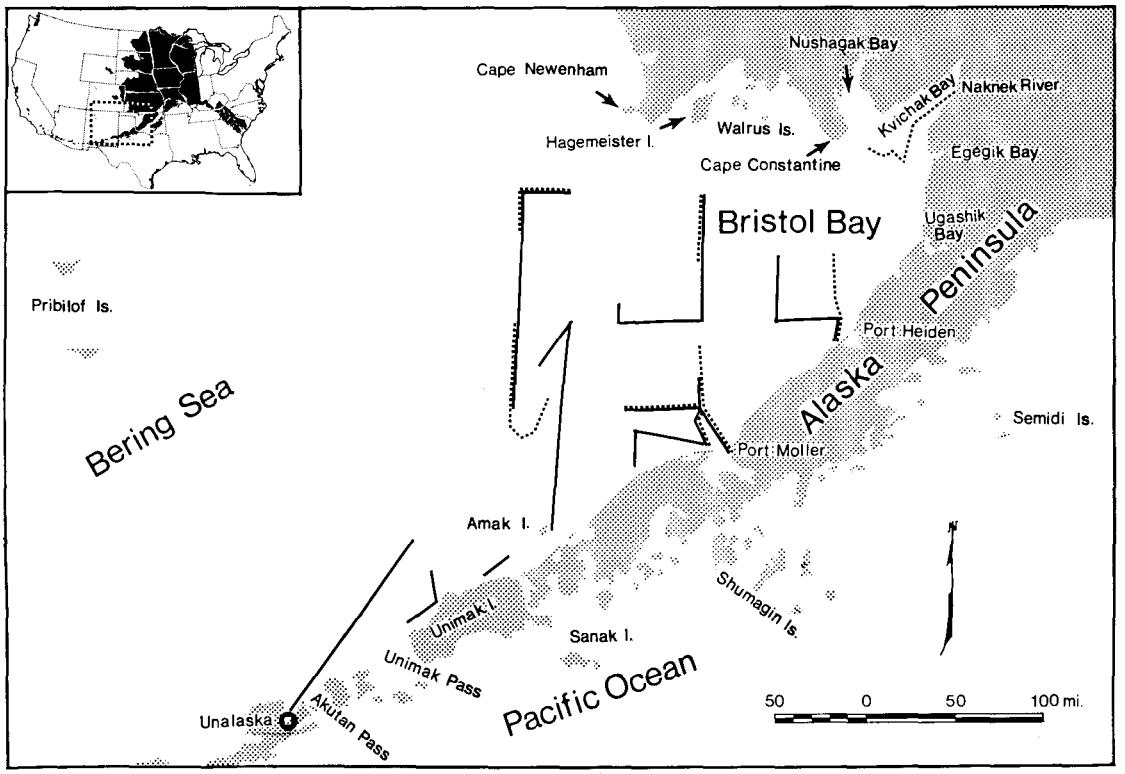

FIGURE 1. Transects along which observations of pelagic birds were made in Bristol Bay for the periods 13 to 31 July (solid line) and 1 to 20 August (broken line) 1969. Gaps between transects represent areas for which observations were not made. Inset shows map coverage within Alaska which is superimposed over the conterminous United States for size comparison.

Gaps between transects represent periods when no observations were made because of either darkness, weather, or other duties. Distributional maps showing the relative numbers of birds along 20-mile segments were prepared for each species observed at sea. In those segments where birds were counted during replicate runs, the highest counts were used in the distributional maps but total counts were used in the narrative. Land birds and sea birds observed while ashore at Port Moller, along the shore from Cape Constantine to nearby Protection Point, Amak Island, Naknek, Dutch Harbor, and Unalaska are not included in the distributional maps unless they were also seen at sea; but records of these observations are filed at the institution of the authors.

OBSERVATIONS

The distribution and relative numbers of 32 species of pelagic birds observed in Bristol Bay are presented in figure 2.

Loons. Eight Arctic Loons (*Gavia arctica*) and three unidentified loons were recorded at sea. At Cape Constantine on 17 and 19 August, many Arctic Loons were seen flying to and from tundra ponds and Nushagak Bay. According to Murie (1959), Arctic Loons and lesser numbers of Red-throated Loons (*Gavia stellata*) and Common Loons (*G. immer*) nest on the coastal tundra bordering Bristol Bay; and Yellow-billed Loons (*G. adamsii*) are transients.

Fulmar and Shearwaters. Fulmars (*Fulmarus glacialis*) were widespread, and 485 of them were recorded at sea west of 160° W. On few occasions were more than a half dozen seen at once. Dark, light, and intermediate color phases were found in the ratio of 100:55:44 ($n = 355$). Fulmars are common in the North Pacific and Bering Sea region (Murie 1959), and they nest nearby in the Pribilof and Semidi islands (Gabrielson and Lincoln 1959).

More than 108,000 Slender-billed Shearwaters (*Puffinus tenuirostris*) were counted at sea and all west of 158°30′ W. Although Sooty Shearwaters (*Puffinus griseus*) were not identified, they were probably present in small numbers among the Slender-billed Shearwaters. Large scattered flocks on the water, stretching to the horizon in every direction, were seen on many occasions. Shearwaters were found in the largest numbers in Akutan Pass and in outer Unalaska Bay on 20 July, where they were conservatively estimated to be in the tens of thousands. Distribution and numbers of shearwaters during the periods of 13 to 21 July and 1 to 20 August suggest that many birds moved from the central portion of Bristol Bay (fig. 3). The movement may be partly attributed to a change in weather which was generally sunny and calm during July and the first days of August but became rough and windy or foggy during the remainder of August. These shearwaters breed from the tip of South America to southern New Zealand, Australia, and Tasmania and spend their nonbreeding season from May through October in the North Pacific Ocean and the Bering Sea (Gabrielson and Lincoln 1959). Enormous numbers of Shearwaters have been reported in Unimak Pass on

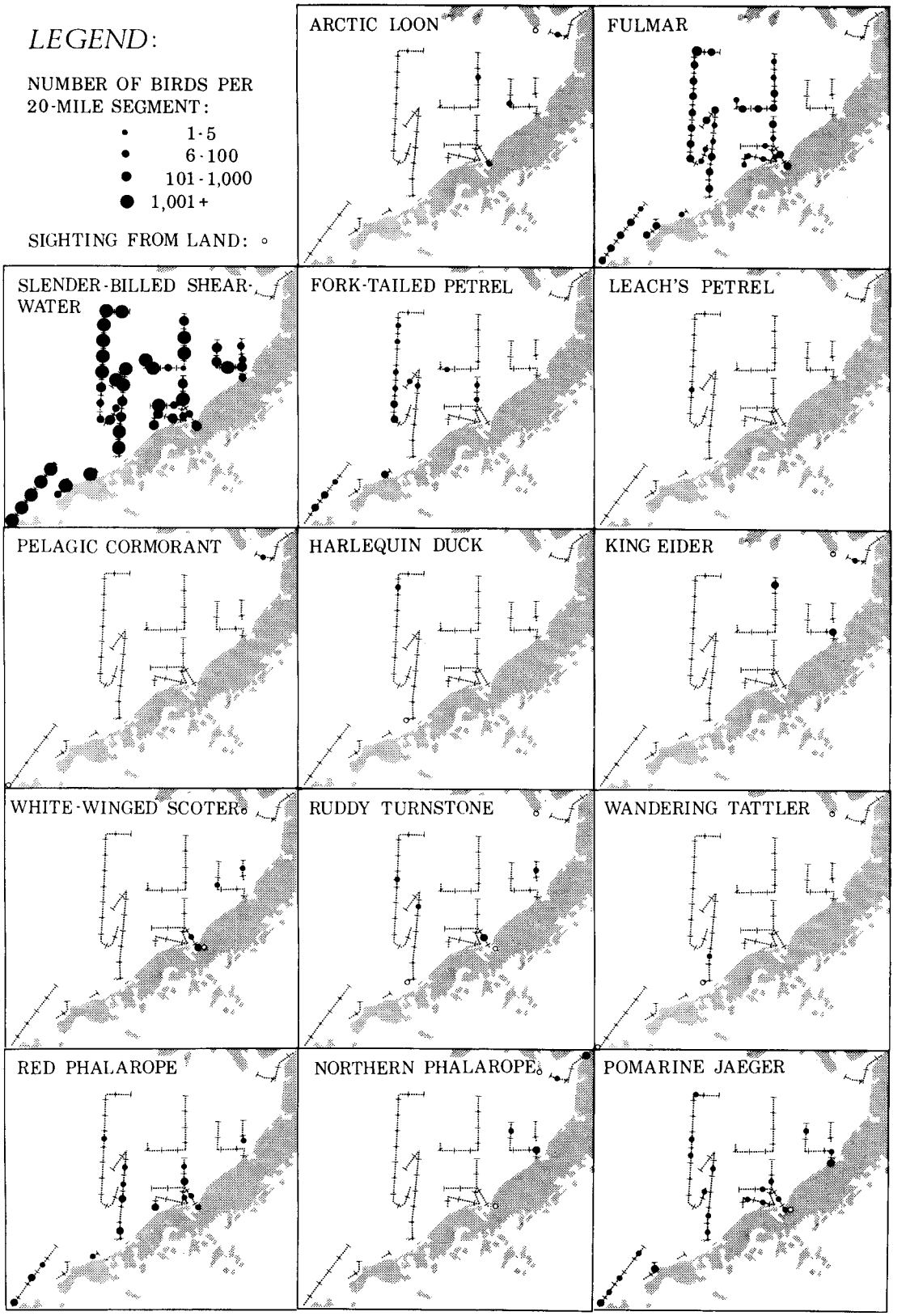

FIGURE 2. Distribution and numbers of birds observed in Bristol Bay along 20-mile segments and sightings of birds from land, 13 July to 20 August 1969.

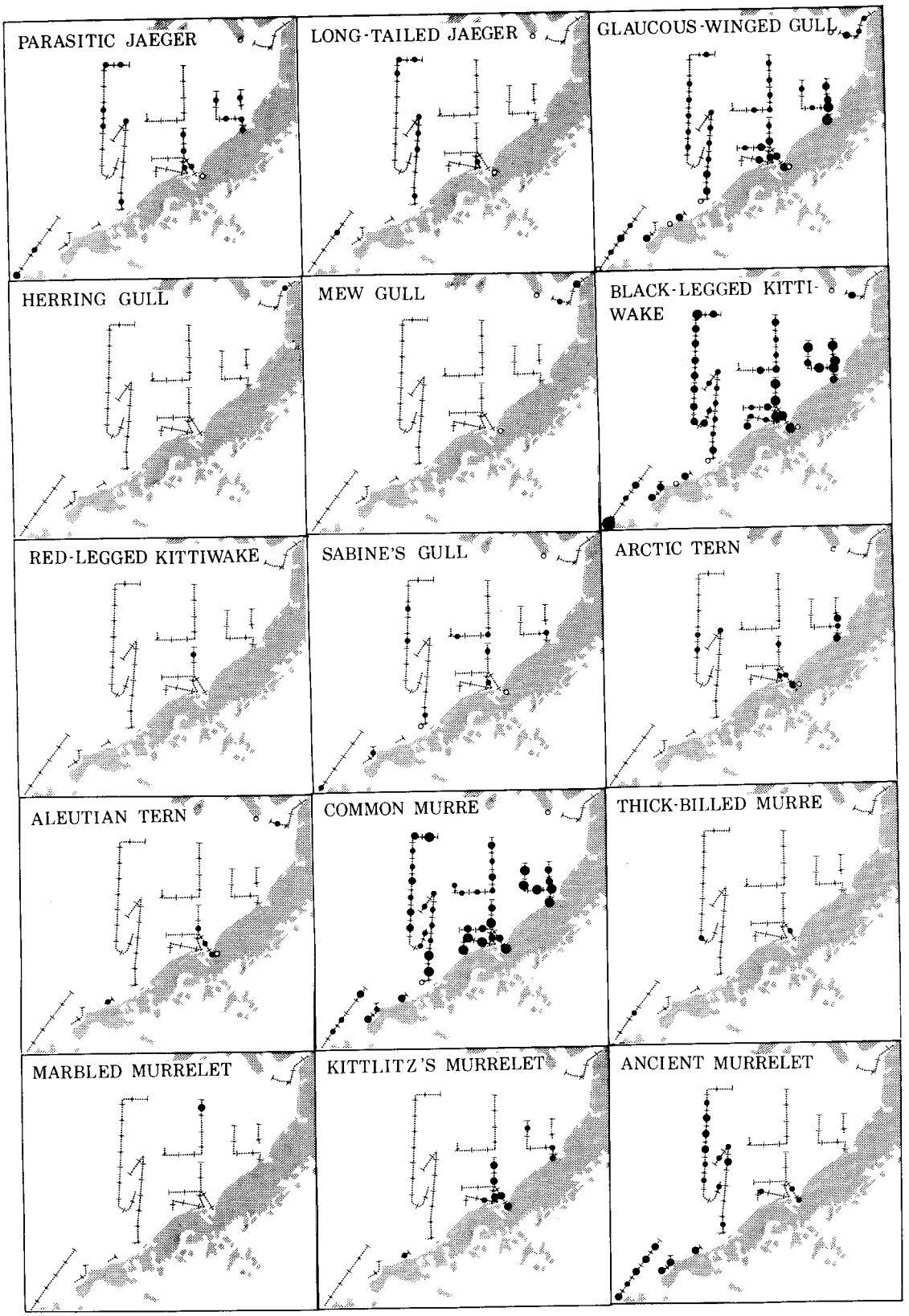

FIGURE 2. *Continued.*

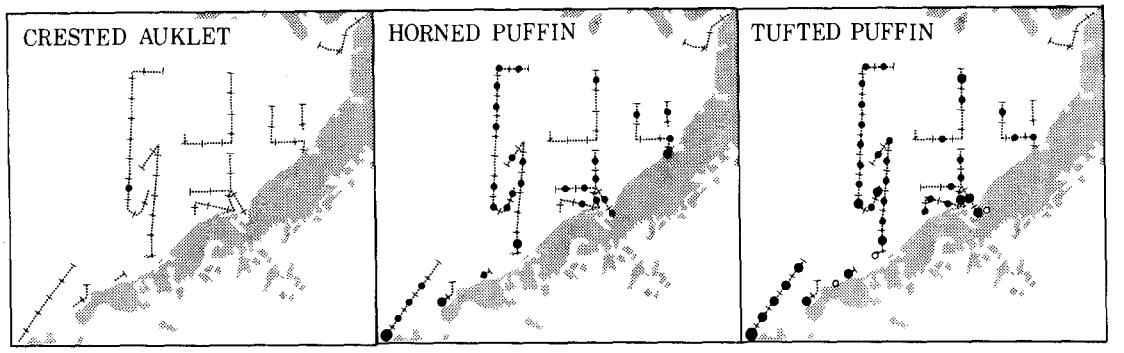

FIGURE 2. *Continued.*

9 June 1944 (Arnold 1948) and in Umnak Pass on 3 September 1938 (Victor B. Scheffer *in* Murie 1959).

Storm Petrels. Ninety-eight Fork-tailed Petrels (*Oceanodroma furcata*) were recorded at sea. They were far more common just north of Unimak Pass and between Unimak Island and Amak Island than elsewhere, but singles were seen with regularity. A single Leach's Petrel (*Oceanodroma leucorhoa*) was seen on 15 July flying in the characteristic leaping manner. According to Murie (1959), the Fork-tailed Petrel breeds throughout the Aleutians, on Sanak Island, and in the Shumagin Islands while the Leach's Petrel tends to breed and range further south.

Cormorants. Only two Pelagic Cormorants (*Phalacrocorax pelagicus*) were observed while at sea; and they landed near the ship while hove to SE of Cape Constantine on 20 August. Red-faced Cormorants (*Phalacrocorax urile*) were the most numerous cormorant in Unalaska Bay on 21 July, but scattered individual Pelagic Cormorants and a pair of Double-crested Cormorants (*P. auritus*) were also present. All three species are common breeders in the Bristol Bay area.

Ducks. An unidentified Goldeneye (*Bucephala* sp.) was seen approximately 65 miles NW of Port Heiden on 13 July. Murie regarded the Barrow's Goldeneye (*Bucephala islandica*) to be confined generally to the basal part of the Alaska Peninsula, the adjacent islands, and mainland as a breeding bird and the Common Goldeneye (*B. clangula*) to be generally encountered as a migrant to the westward in the Aleutians.

A drake Harlequin Duck (*Histrionicus histrionicus*), seen 70 miles SW of Cape Newenham on 15 July, was the only record at sea, but at least 50 molting birds were seen at Amak Island on 24 July. Murie (1959) found the Harlequin to be the most numerous duck in the Aleutians and common on both sides of the Alaska Peninsula.

Groups of 15, 6, and 5 King Eiders (*Somateria spectabilis*) were observed at sea between 10 and 20 August. Sixty or more additional birds were seen along the beach near Cape Constantine on 17 August. Murie (1959) questioned the validity of reports that King Eiders nested within the Aleutian chain but described them as wintering in greatest numbers among the eastern Aleutians, along the Alaskan Peninsula, and near Kodiak. The southernmost breeding record for this eider is Nome (Gabrielson and Lincoln 1959).

Thirteen of 19 White-winged Scoters (*Melanitta deglandi*) observed at sea were in the vicinity of Port Moller, and four additional birds were seen at Cape Constantine on 17 August. Murie (1959) reported this species to be common in the Bristol Bay area.

Turnstones. Thirty-seven Ruddy Turnstones (*Arenaria interpres*), in groups of 2, 30, 4, and 1, were recorded at sea. This species was numerous at Port Moller, on Amak Island, and at Cape Constantine. The Yukon Delta is the southernmost area in Alaska where this species is known to breed (Gabrielson and Lincoln 1959).

Sandpipers. A single Wandering Tattler (*Heteroscelus incanum*) circled the masthead for several minutes on 18 July when we were 30 miles N of Amak Island. Two were seen at Unalaska on 21 July, eight at Amak Island on 24 July, and two at Protection Point on 17 August. Murie (1959) found this species to be fairly common among the Aleutian Islands and believed it to nest along the Alaska Peninsula.

Phalaropes. Red Phalaropes (*Phalaropus fulicarius*) molting into winter plumage were encountered at sea at irregular intervals, with 120 being counted in unusually small flocks of up to a dozen birds. Northern Phalaropes (*Lobipes lobatus*) were identified only four times at sea, and none of these 20 birds was seen west of 160°W. Thirty-two more Northern Phalaropes were present in a tide rip in the mouth of the Naknek River on 20 August. An additional 12 unidentified phalaropes were seen at sea. Although both phalaropes migrate through the Bristol Bay area in large numbers, only the Northern Phalarope breeds in the vicinity (Murie 1959).

Jaegers. Fifty Pomarine Jaegers (*Stercorarius pomarinus*) and 42 Parasitic Jaegers (*S. parasiticus*) were identified at sea. An additional 39 birds belonging to either of these species were seen at sea. Thirty-eight Pomarines were light-phase individuals

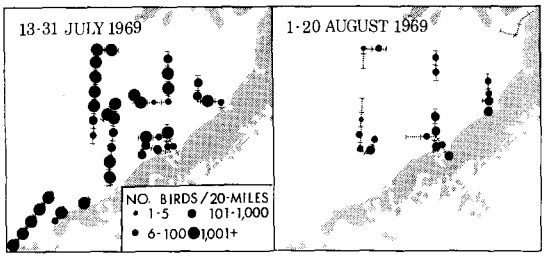

FIGURE 3. Distribution and numbers of Slender-billed Shearwaters observed in Bristol Bay along 20-mile segments during the periods of 13 to 31 July and 1 to 20 August 1969.

and six were dark phase; no notes on color were recorded for the remaining six. Pomarines were widely observed; and although none was seen from shore, they were more numerous within 30 miles of shore than farther at sea. Parasitics were observed from the beach at Port Moller and rather commonly over the tundra at Cape Constantine. Thirty-nine Parasitics identified at sea were light-phase birds. Fourteen Long-tailed Jaegers (*Stercorarius longicaudus*) were observed at sea, three being the maximum group size. Three additional Long-tails were seen from shore, one each at Port Moller on 6 August and Cape Constantine on 17 and 19 August. According to Murie's (1959) account of the three species, only Parasitics nested in the Bristol Bay area; Pomarines were only found either at sea or well offshore; and Long-tails were rare in the Aleutian district.

Gulls. Glaucous-winged Gulls (*Larus glaucescens*) were common at all landfalls, with 723 being recorded at sea. Two third-year Herring Gulls (*Larus argentatus*) were observed near the mouth of the Naknek River on 20 August. Only one Mew Gull (*Larus canus*) was observed at sea; however, others were recorded about Port Moller, Cape Constantine, Egegik Bay, and the mouth of the Naknek River.

A male Black-headed Gull (*Larus ridibundus*) molting into second winter plumage was collected at Entrance Point, Port Moller, on 13 August, the fifth day in 6 consecutive days of 25- to 45-knot westerly winds. When first noted, the bird was feeding somewhat apart from a group of ten Glaucous-winged Gulls, eight Bonaparte's Gulls (*L. philadelphia*), and six Black-legged Kittiwakes (*Rissa tridactyla*). This specimen (U.S. Nat. Mus. 532697) is the fifth for Alaska and western North America and the first for the Alaska mainland. Of the four previous specimens of Black-headed Gulls, one was taken on Kiska Island (Murie 1945), one taken on St. Paul Island (Kenyon and Phillips 1965), and two taken on Amchitka Island in May 1969 (Clayton M. White, pers. comm.). Our record is not included in figure 2 because the specimen was observed only from land and not at sea.

Black-legged Kittiwakes (*Rissa tridactyla*) were very common and widespread at sea, with more than 4200 birds being counted. Large colonies are found at several locations along the northwestern shore of Bristol Bay, in the Walrus Islands, and on Amak and Unimak Islands. An adult and two immature Red-legged Kittiwakes (*Rissa brevirostris*) were observed feeding on young whiting at the surface of the water in company with 23 Black-legged Kittiwakes and an adult Sabine's Gull (*Xema sabini*) on 3 August. The Pribilof Islands are the nearest known breeding place for the Red-legged Kittiwake (Gabrielson and Lincoln 1959).

Of 21 Sabine's Gulls counted at sea, 18 were high-plumaged adults and 3 were immatures. Two were seen together on only two occasions, and five seen during the morning of 25 July off Amak Island was the maximum count on any one day.

Terns. Thirty-eight widely scattered Arctic Terns (*Sterna paradisaea*) were recorded at sea. The species was commonly observed within 12 miles of Port Moller, where several hundred pairs nested at Entrance Point. Twelve adult and one immature Aleutian Terns (*Sterna aleutica*) were observed at sea. Additionally, a pair of Aleutian Terns with an immature were seen at Port Moller on 13 and 14 August; and three adults and three immatures were observed together at Protection Point on 17 August. Seven terns observed at sea were not identified to species. Jaques (1930) reported Arctic Terns to be common breeders in the Port Moller area and observed several hundred Aleutian Terns there from 22 to 30 May 1928.

Alcids. The Common Murre (*Uria aalge*) greatly outnumbered the Thick-billed Murre (*U. lomvia*), with 2769 and 3, respectively, being recorded at sea. Hundreds of Common Murres were encountered in widely scattered groups off Port Heiden, Port Moller, and in the vicinity of Amak Island. Many pairs with large downy young were seen on 9 August when we were more than 40 miles south of Cape Newenham, which is one of several breeding places for alcids along the north side of Bristol Bay. In addition to the three Thick-billed Murres observed at sea, single adults were found dead and washed ashore both near Dutch Harbor and near Port Moller.

Thirteen Marbled Murrelets (*Brachyramphus marmoratum*) were seen as scattered individuals about 40 miles south of Hagemeister Island on 10 August and identified by their very dark plumage and peeping call note. Kittlitz's Murrelets (*Brachyramphus brevirostre*) were fairly common in pairs off Port Moller, from within ½ mile of shore to 65 miles out; and 149 individuals were recorded at sea. *Brachyramphus* murrelets, carrying food from the surface of Unalaska Bay at 23:00 on 20 July, were seen in light too poor for identification to species, but we believe they were Kittlitz's Murrelets. An additional 15 *Brachyramphus* murrelets that were counted at sea were not identified to species. Both species have been frequently reported in the Bristol Bay area (Gabrielson and Lincoln 1959).

Two hundred and five Ancient Murrelets (*Synthliboramphus antiquum*) were recorded in widely separated groups of up to 12 individuals. All were seen between 10 and 110 miles from land, and none was noted east of 160°30′ W. Four pairs of adults with two downy young each were recorded on two occasions: on 20 July two families were seen 30 miles at sea NW of Cape Mordvinof, Unimak Island, and on 26 July two families were observed between 12 and 20 miles at sea over 40 miles WNW of Port Moller. Although Murie (1959) reported Ancient Murrelets were common in the Shumagins and bred throughout the Aleutian chain, he believed that they would rarely, if ever, be encountered on the north side of the Alaska Peninsula.

One adult Crested Auklet (*Aethia cristatella*) was observed on the water at 56°24′ N, 163°25′ W on 8 August. According to Murie (1959), the species nests throughout the Aleutian chain; and it occurs along the north side of the Alaska Peninsula but not as a nesting bird.

Horned Puffins (*Fratercula corniculata*) were widespread in small numbers with 245 counted at sea. They were seen in abundance only in Unalaska Bay, where 150 or more were recorded late on 20 July. None was seen east of 159°W. Turner (1886) reported them to be abundant at Cape Newenham and at Amak Island.

Tufted Puffins (*Lunda cirrhata*), like Horned Puffins, were widespread and in small numbers, with 434 recorded at sea. More than 500 Tufted Puffins were estimated to have been in Unalaska Bay on 20 July. The species was virtually the only alcid observed between there and Akun Island. Murie (1959) regarded the Tufted Puffin to be more numerous than

the Horned Puffin although they generally nested in the same area but in different habitat. He reported both puffins to be abundant in the Aleutian, Shumagins, and Sanak groups; and Gabrielson and Lincoln (1959) reported them from the Semidi Islands.

SUMMARY

Observations on distribution and abundance of pelagic birds in a portion of Bristol Bay were made during July and August 1969. Slender-billed Shearwaters were by far the most numerous of the 32 species encountered at sea. Black-legged Kittiwakes and Common Murres were common. The first record of a Black-headed Gull on the mainland of Alaska was obtained at Port Moller.

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