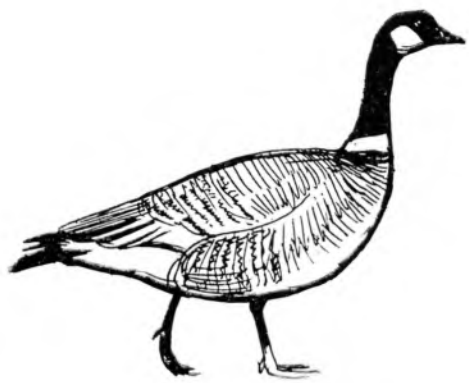
bodies responsible for the drainage of wetlands should consider the values of wetlands, both tangible and intangible, before carrying out such projects.

It is hoped that this conference will help initiate a number of projects which will cause governmental and other bodies who are responsible for wetlands, to realise that at least some of our wetlands must be preserved for posterity. Like so many things, our marshes and fens will not be missed until they are gone—and then it will be too late.



Buldir Island, site of a remnant breeding population of Aleutian Canada Geese

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Summary

RECENT observations of the once abundant Aleutian Canada Goose *Branta canadensis leucopareia* are reviewed. The introduction of Blue Foxes to the breeding grounds and increased hunting pressure are suggested as reasons for the decline of the race, with a note concerning the production potential of the Blue Fox. An expedition to Buldir Island, where no fox introduction had been made, is recounted along with a discussion of the island's topography, climate, avian and mammalian populations. Reestablishment of the Sea Otter at Buldir Island is noted. A breeding population of *B.c. leucopareia* was observed and the conditions of the habitat are discussed.

Ancestrally, a large population of a subspecies of small Canada Goose bred in the Aleutian Islands from about Yunaska Island at 52° 40′ N and 170° 40′ W to and including the islets off Attu, the westernmost of the Archipelago (Nelson, 1883; Turner, 1886; Murie, 1959). This sub-species has been designated by Delacour (1954) as the Aleutian Canada Goose *Branta canadensis leucopareia* (Brandt). Clark (1910) described the bird as abundant on Agattu, but Murie (1959, p. 67), in his account of observations made in 1936 and 1937, states that, "..., they had disappeared on most of the islands, and our total observations indicated that only a few pairs remained in the Aleutians." Recent observations support this gloomy view.

On 17th May, 1950 I observed a single goose alighting on Kirilof Point, Amchitka Island. Krog (1953) collected a specimen from a small flock on the islets in Constantine Harbor, Amchitka Island. Kenyon (1961) on 10th May, 1959 collected a specimen from a flock of seven on the same islets. On 27th June, 1961 five biologists working on Amchitka observed four Canada geese, all displaying the prominent white ring at the base of the stocking, in Constantine Harbor. Later, on 5th July, 1961, two of us observed two geese flying near Loran Island off Amchitka. At the same time two persons ashore on Loran Island photographed another goose resting with a group of common eider ducks. Though Amchitka was as carefully searched as possible through the summers of 1960, 1961 and 1962, these are the only recent reports from that area.

Murie (1959) noted the presence of these geese in 1936 and 1937 on Agattu, Buldir, and Chagulak Islands. Coats (1951, p. 3) writes of Buldir, " Numerous geese, probably the lesser Canada goose, breed on the island ". This observation was based on a four day visit in 1947.

Murie (1959) suggested that the decline of this race of geese was due to the introduction of Blue Foxes and to increased hunting pressure along the birds' migration route and on its wintering grounds. I can but agree. While the status of ancestral fox populations in the Aleutian Islands is obscure, we have records of Blue Fox introductions to almost every island in the Archipelago from Yunaska west, excluding Attu, which had an ancestral population of this dark phase of the Arctic Fox *Alopex lagopus* (Bancroft, 1886). These introductions occurred principally in the 1920's when fox furs commanded a high price. Some of these islands already had a population of Silver Foxes which in the central and western Aleutians were not very successful. They barely maintained, and in some cases still do, a minimal population. The Blue Foxes, however, rapidly produced and maintained large populations. For example, on Rat Island, to which Blue Foxes were introduced in 1922 and 1923, there is a population currently estimated at 250 individuals (Berns, 1962). This estimate is based on two years of tagging experiments. Rat Island, about 65 miles west of the 180th Meridian, is roughly 8 miles long with a greatest width of about two miles and includes 6.86 square miles. The central portion of the Island is mountainous and is not inhabited by foxes.

Observations during the last fourteen years have led us to conclude that there is little likelihood of finding a breeding population of Aleutian Canada Geese on any of the islands where Blue Foxes have been introduced and still persist. This being true, we devoted our efforts to reaching Buldir Island, one of the few islands in the Aleutians on which foxes were not introduced. Vernon D. Berns, Assistant Refuge Manager, Aleutian Islands National Wildlife Refuge, and I arrived off Buldir Island aboard the U.S. Coast Guard Cutter *Winona* on 25th June, 1962. Landing conditions were excellent and the necessary supplies and equipment were quickly set ashore.

Buldir Island, the most isolated in the Aleutian Archipelago, lies at approximately 52° 22′ N and 175° 55′ E, 53 nautical miles from Kiska and 66 from Shemya. It is dome-shaped, about 3.8 miles from east to west and 2.4 miles from north to south. It has an area of 6.64 square miles; and reaches an elevation slightly over 2,000 feet. The shores, except for the one sandy beach at the mouth of a small valley near Northwest Point, are cliffs either rising from the water's edge or backing narrow rock and sand beaches. Avalanches

are a principal characteristic of these cliffs and beaches. A chain of bold rocks and high, conspicuous islets extends 1.2 miles northwestward from the Island. The vegetation is luxuriant, remarkably so for the Aleutians.

The wind and sea were calm when we arrived at Buldir, and the ground swell from the North Pacific Ocean was as moderate as it is reasonable to expect. Advantage was taken of these conditions to make a passage in the dory around the Island. The boat was kept as close to the beach as conditions would permit, the chief limiting factor being a dense growth of kelp (*Alaria*). It was while struggling to remove a mass of kelp from the propeller that I observed a large male Sea Otter. It is to us a familiar animal, but it was so unexpected at Buldir that we approached closer for verification. It has been fifty years or more since Sea Otters have been reported at this point in the Aleutians. Despite the fact that we were searching the sky for geese we saw three more otters, all female and each carrying a pup. Later, on the beach, we saw Sea Otter droppings.

Buldir is inhabited, in summer at least, by immense numbers of pelagic birds. In the avalanches, sites are offered for the birds that nest in burrows and here one sees a steady arrival and departure of puffins and auklets. One large avalanche on the north side of the Island is inhabited by a small colony of Least Auklets (25,000-30,000). In this vicinity, flocks of the diminutive Alcids were constantly in flight, wheeling like so many sandpipers. At East Cape a large, mixed colony of Black-legged Kittiwakes and murres (some of which at least, are Thick-billed Marres) occupies the nearly vertical cliff that rises from the water's edge to form the Cape. Glaucous-winged Gulls in large numbers nest over the whole of the Island, from the beaches to the summit, superimposed over all the nesting areas. There are evidently vast numbers of nesting petrels which we did not see, but heard at night when the incessant calling of diurnal birds subsided. We saw one pair of Bald Eagles, apparently nesting, several pairs of Peale's Falcons, and 40-50 Parasitic Jaegers. There were also " dicky " birds present in large numbers, notably the Aleutian race of the Gray-crowned Rosy Finch, the Giant Song Sparrow, the Lapland Longspur, and the beach-dwelling Winter Wren.

This does not pretend to be a complete list of the birds of Buldir. It is rather an attempt to convey the impression of land, sea, and sky alive with birds in all of their activities. Such a concentration of birds produces an immense volume of sound. Add to this the grunting and roaring of about 10,000 Steller's Sea Lions *Eumetopias jubata* and one has the bedlam of Buldir.

It was amid these prospects that we set out around the Island on a search for Aleutian Canada Geese. The first four appeared almost at once and when the circuit was completed 56 had been counted. They flew from the comparatively level ground that surmounts the cliffs, or from the face of cliffs where the slope is suitable for vegetative cover to survive. They seemed curious about the sound of the engine, for they tended to fly near the boat, though high. Many of these geese, launching as they did from heights above 1,000 feet, flew at elevations I had seen Canada Geese use only when in migration. One flock, at what must have been about 2,200 feet elevation, flew over the summit of the Island.

We noted the locations of the geese and on the following morning set out afoot for the nearest of these. Difficulty was encountered in travelling because of the rank vegetative growth. There were two reasons: (1) the necessity of

physically opposing the vegetation, which was waist high in some areas; and (2) such a dense ground cover concealed the presence of holes. While crossing the interior portion of the island no geese were observed although we saw a moulting Mallard drake, Pintail drake, and two Common Teal drakes on a small pothole, As we approached the rim of the cliff, however, four geese rose at close range from the heavy vegetation. We were virtually upon these birds before they flew, and the cheeping of goslings became evident around us at once. Seven goslings (just tiny chicks at that time) were caught and released after making sure of their identity.

In this vicinity we saw fourteen flying geese where six had been seen from the dory the day before. Not all of these geese showed the conspicuous ring at the base of the stocking.

As far as we are aware, there are only two small ponds or potholes on Buldir, both somewhat removed from the areas in which geese were observed. That the geese have been able to adapt to this habitat is probably due in large measure to the polar maritime climate, characterized by high humidity, fog, rain, and small diurnal and annual range in temperature. At Adak, according to figures provided by the U.S. Navy Weather Service, the average temperature from 1943 through 1961 was 43.9°, 48.3°, and 51.2°F. for June, July, and August, respectively. The extreme minima were 36.0°, 39.3°, 41.5°, and the extreme maxima 56.2°, 62.8°, 64.9°. The soil on Buldir is quite friable and in the area where the geese were present we observed no standing water even in small depressions. Atmospheric conditions were dry, by Aleutian standards, at the time of our visit to the goose area. This is to say that the sky was partly clear, the overcast had lifted well above the Island's summit, and no precipitation occurred for several hours. The Aleutian climate is not properly described as one of heavy precipitation; rather, one in which precipitation on a small to moderate scale occurs a large percentage of the time. For example, the U.S. Navy Weather Service at Adak recorded precipitation on 78 days in June, July, and August, 1962. The amounts ranged from a trace on 27 days to a maximum of 0.78 inches on 9th August, for a total of 10.40 inches. In sum, this climate promotes a vegetation that is very succulent, and in walking through it where we found goslings on Buldir Island our clothes became wet from water produced on the plants by guttation.

We did not find geese in the valley near Northwest Point, nor did Murie (1959); we found them only near the summit of the sea cliff. Neither did we observe geese flying from or alighting in the Island's interior, though they did fly over it. This suggests that the goose habitat is peripheral, but as we have not yet examined a large part of the Island's interior this will require verification.

Murie (1959) reviewed reports of Northern Fur Seals *Callorhinus ursinus* on Buldir and concluded that they had once been there. We did not observe them, but the beaches were so littered with marine mammals, mostly Steller's Sea Lions and a few Harbor Seals *Phoca vitulina,* that determining the status of the Fur Seal on Buldir will require a special effort. Not only the beaches of Buldir but those of the adjacent islets and the rocks will require methodical examination.

Both Coats (1951) and Murie (1959) refer to Steller's Sea Lion rookeries on the offshore islets of Northwest Point. We found them not only on all the offshore islets but on all the beaches of Buldir as well. They were so prevalent

on the landing beach that we were obliged to haul the dory high above the beach lest she be wrecked by their activities. A large bull that had selected for his resting area the strip of beach across which we were hauling the dory, was so intent on returning that we felt it prudent to keep a loaded rifle within reach. All of which indicates a major change in the Sea Lion population on Buldir.

No evidence of terrestrial mammals was found.

Coats (1951, p. 2) states " It (Buldir) appears never to have been inhabited by Aleuts ". Murie (1959) presents evidence to the contrary, and we observed the bones and shells of an old village site, bared by the sea near the northwest end of the bight where landings are made. This is in the mouth of the single valley on the Island, and the alluvium of the valley-floor had covered the site. Most kitchen middens in the Aleutians are revealed by the luxurious vegetative cover that flourishes in the enriched soil of the site, but in this case alluvium had covered the organic mass and filled the holes left by decayed dwellings.

Mindful of the decisive influence of the sea upon our departure from Buldir, we did not tarry. The desired information had been secured and for the moment it was enough. When on the third day the *Winona* hove in view we launched the dory in light surf and re-embarked.

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Brent Goose population studies 1961-62

P. J. K. Burton

Summary

COUNTS of the proportion of young in wintering flocks of Brent Geese were made in the British Isles, Denmark, Holland and France and showed that a bad breeding season for Dark-bellied Brent had coincided with an even worse one for Greenland-bred Pale-bellied birds wintering in Ireland. The result must have been a reduction in the total population of Brent and limited evidence suggests that this might have been of the order of about 9% for a large part of the Dark-bellied population. Observations made on the island of Terschelling suggest a differential movement of birds with families and those without.

Introduction

Counts made during the winter of 1961-62 show clearly that the summer of 1961 was a poor one for both Dark-bellied Brent *Branta b. bernicla* breeding