

# The Canadian Field-Naturalist

## SUPPLEMENTARY MATERIAL:

### Monitoring Rock Ptarmigan (*Lagopus muta*) populations in the Western Aleutian Islands, Alaska Claire E. Braun, William P. Taylor, Steven M. Ebbert, and Lisa M. Spittler

**Appendix S1.** Historical review of information and previous studies and surveys for Rock Ptarmigan (*Lagopus muta*) on three islands (Adak, Amchitka, and Attu) in the Western Aleutian Islands in Alaska.

All islands studied had been disturbed by historical military activities. The military presence on Amchitka ended in 1951 (Kenyon 1961), the Naval Air Facility closed on Adak in 1997, and in 2010 the small Coast Guard station on Attu was closed. Hunting of Rock Ptarmigan on Adak continues but possibly at lower levels than when the military began downsizing in 1994. Despite the extensive military presence, the published literature on numbers of Rock Ptarmigan in the Aleutian Islands is limited and highly fragmented over time. Sutton, Taber, and Wilson were military officers stationed in the Aleutian Islands during World War II but were also trained biologists / ornithologists and published in ornithological journals. Standardized surveys conducted at intervals are limited for all three islands. The few references, outside of that on Amchitka, suggest that ptarmigan numbers were low with few exceptions.

#### Adak Island

Taber (1946) was stationed on Adak and reported on his bird observations during 18 November 1945 to 20 January 1946. He does not report any ptarmigan during this period even though his observation locales on the northern tip of the island included Andrew Lake (“Lagoon”) and Clam Lagoon. It is possible that activities of armed forces personnel could have influenced the abundance of ptarmigan in this area although Taber (1946: 273) speculated “the long-range effects [of military activities] upon the bird populations to have been small”. He also compared (pp. 276–277) the winter avifaunas of Adak and Attu based on Sutton and Wilson (1946) without mention of Rock Ptarmigan. Despite the military activity on Adak during the 1940s through the 1990s, little information is available on the presence of Rock Ptarmigan on this island other than the early (1907) description of the subspecies (*atkhensis*) by Clark (AOU 1957: 134). The only data found on population numbers (based on intensive field surveys by four observers) on Adak were those of Masteller (1981) who reported 3.0 males/km<sup>2</sup> on a 11.9 km<sup>2</sup> area during 13–15 May 1981 in the Mt. Adagdak re-

gion. Audubon Christmas Bird Count data (National Audubon Society 2015; <http://netapp.audubon.org/cbcobservation/>) reported for Adak for 1973 through 1994 revealed that numbers of observers, ptarmigan observed, and time afield fluctuated without apparent patterns.

#### Amchitka Island

Substantial information is available on Rock Ptarmigan on Amchitka, especially food habits and body mass (Elison 1980; Emison and White 1988), and plumage moult (Jacobsen *et al.* 1983). These studies were part of a wide-ranging environmental data collection program funded by the U.S. Atomic Energy Commission (AEC) and summarized by Amundsen and Clebsch (1971) and Armstrong (1971). The first listing of birds on Amchitka was by Kenyon (1961) from data collected in 1955–1959 following the departure of the military in 1951. His field investigations were after the initial intensive removal program for Arctic Fox (*Vulpes lagopus*) which began in 1950 (Jones 1960; Kenyon 1961; Emison *et al.* 1985). It appears most of the foxes had been removed from the eastern portion of Amchitka by about 1954, but some were still common on the western (less frequently visited) portion until at least 1955. Large drops of pesticide-treated baits in 1956 and 1957 probably reduced the fox population to only a few animals (and no active dens), which eventually died out sometime between 1962 and 1965 (Thomson and Byrd 2010). Thus, Kenyon’s field work overlapped several years of intensive predator removal. The only land mammal present after the eradication program were rats (*Rattus* spp.). Kenyon (1961: 318) indicates Rock Ptarmigan were “quite scarce” during 1955–1957 and “much more abundant in 1959, perhaps because of the reduction of foxes”. Only two to four ptarmigan were seen in a 22-km drive prior to 1959 whereas 15–20 birds were observed on this same route in 1959. White *et al.* (1977) initiated field work on Amchitka as part of the environmental data collection program funded through the AEC. Their field work continued from August 1967 through September 1973 and included

all months of the year. They surveyed a 1012-ha plot for the presence of Rock Ptarmigan and recorded 32 pairs in 1969 and 34 pairs in 1970. No surveys were conducted in 1971, but their observations indicated the size of the breeding population was similar to those recorded in 1969–1970. White *et al.* (1977: 242) estimated the spring and summer population size, based on extrapolation from their intensive study area, was 1400 Rock Ptarmigan whereas the autumn population was 2800, and the winter population was 2500 birds for the entire island. We do not believe the birds were moving on and off the island seasonally and the White *et al.* (1977) estimates from their intensive surveys on their study block were used by them to illustrate annual fluctuations and to estimate population sizes.

Zeillemaker and Schulmeister (1984: 5) made a roadside survey along Infantry Road between “mile post 1 and mile post 22” on Amchitka Island on 1 May 1984 and reported 34 Rock Ptarmigan. More recently, Scharf (1994) conducted surveys on Amchitka and indicated Rock Ptarmigan had increased over the levels reported in the late 1960s. This finding was based on surveys during 7 and 10 June 1994 using six observers “walking abreast” through four subplots (each 50 ha with nine pairs found in 1994 in 200 ha) within the 1012-ha plot described by White *et al.* (1977). Driving surveys were also established in 1994 along 8.3 km of Infantry Road and a route of similar length on Engineer Road starting at the east end of Baker Runway. A point-count survey with 12 survey points spaced at 400 m intervals was also established in 1979. The vehicle surveys recorded eight Rock Ptarmigan in 1994, 13 in 1988, six in 1980, and six in 1979 (Scharf 1994: Table 6). All of these surveys were conducted between 1 and 22 June.

#### Attu Island

The early reports (1910, 1925 cited in Bent 1932: 231) of Rock Ptarmigan on Attu suggested this species occurred at low densities in the higher mountains. Only three birds were reported in one day afield in 1910 and three in three days in 1925. Sutton and Wilson (1946) and Wilson (1948) were stationed on Attu for short periods (Sutton from 20 February to 18 March 1945, Wilson from September 1944 to October 1945). Sutton and Wilson (1946: 83) indicated they did not personally see ptarmigan despite making “a point of looking closely for them”. They report second-hand accounts of two birds in full winter plumage 3.2 km west of the head of Massacre Bay on 7 March. Both authors were on Attu when it was an active military base and spent most of their time afield from Casco Cove and Murder Point to Massacre Bay with short trips to Alexi Point, Temnac Bay, and

Chirikof Point. Wilson (1948: 127) suggested Rock Ptarmigan were restricted to the “rugged mountain slopes of the interior in summer” on Attu and that he never saw “it or its tracks anywhere along the coast, even in the dead of winter”. He reports a male on 10 June 1945 on Fishhook Ridge, a pair on 12 July on the west shoulder of Terrible Mountain, and a male and two females on 28 July high on the steep mountain southwest of Casco Cove. All of the observations in the mid-1940s were during the active military presence and prior to when Arctic Fox had been removed (1999–2000) from the island.

More recently, Hafflinger and Tobish (1977) conducted a population survey for Rock Ptarmigan along walking transects on Attu in the southeast portion of the island from Casco Cove to Massacre Bay and inland to the base of the mountains. They reported densities of 2.4 pairs/km<sup>2</sup> for breeding ptarmigan on Attu in 1977. Holder (1994) estimated there were 0.9 territories/km<sup>2</sup> for Rock Ptarmigan on her 10 km<sup>2</sup> study area on Attu in 1994. Her data indicated that territories were primarily on the higher slopes of the island. These densities are lower than those reported for 2003 (4 pairs/km<sup>2</sup>) by Braun *et al.* (2014) prior to a transplant of ptarmigan from Attu to Agattu (Kaler *et al.* 2010).

Introduced Arctic Fox were removed from Amchitka between 1950 and 1965 (Thomson and Byrd 2010), Attu between 1999 and 2000 (Ebbert and Byrd 2002), and from Adak between 2002 (Scharf *et al.* 2002) and 2004 (Alaska Maritime National Wildlife Refuge, Homer, Alaska, USA unpubl. data).

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