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## Evidence of Emperor Geese breeding in Russia and staging in Alaska

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Emperor Geese (*Chen canagica*) breed primarily on the Yukon-Kuskokwim Delta, Alaska (Eisenhauer and Kirkpatrick 1977), but a small, poorly quantified proportion of the world's population is known to breed in the Russia Far East (Kistchinski 1976, 1988, Portenko 1981). Eisenhauer and Kirkpatrick (1977) stated that 80 to 90% of all Emperor Geese breed on the Yukon-Kuskokwim Delta, Alaska, and current estimates for numbers of breeding pairs in this area are 20,000 to 25,000 (R. A. Stehn, National Biological Service, Anchorage, Alaska, unpubl. data). In Russia, Emperor Geese are distributed primarily along the north coast of the Chukotka Peninsula between Kolyuchin Bay and Cape Schmidt, and in the Anadyr Lowlands along the coast of Anadyr Bay (Fig. 1; Kistchinski 1988, Kondratyev 1992, 1993). Kistchinski (1976) noted that up to 80% of these geese are nonbreeding birds. Recent aerial surveys of Emperor Goose habitats along the eastern coast of Russia indicated a minimum of 3,000 to 5,000 geese, although very few were on nests or with young, and only 127 total broods were seen during these surveys (J. I. Hodges, Fish and Wildlife Service [FWS], Juneau, Alaska, unpubl. data). It is not known if these two continental distributions of breeding Emperor Geese commingle and use similar areas during migration and/or winter. Aerial surveys of the Alaska Peninsula during spring and fall indicate that lagoons on the northern coast are the primary staging areas for this species, and it is presumed that virtually all Emperor Geese use the Alaska Peninsula during migration (Petersen and Gill 1982). Emperor Geese winter throughout the Aleutian and Kommandorsky islands (Byrd et al. 1974). In the late fall, geese arrive in the western and eastern Aleutian Islands before arriving in the central Aleutians, thus suggesting that geese may be coming to this wintering area from both continents (G. V. Byrd pers. comm.). Speculations of previous investigators that Emperor Geese breeding in Russia use the Alaska Peninsula for staging (Eisenhauer and Kirkpatrick 1977, A. Krechmar pers. comm.) have not been confirmed. Here we report observations of two geese banded as juveniles in Russia and observed on the Alaska Peninsula during their first fall migration.

Emperor Geese were banded during the adult primary molt in the Anadyr Lowlands about 50 km south of Anadyr on the eastern coast of Russia. Two adults and 10 juveniles were banded with neck collars on 16 August 1992, and 2 adults and 1 juvenile were similarly banded on 8 August 1993. In March 1993, a local resident returned a neck collar from an Emperor

Goose he found during September 1992 near Ivanof Bay, a village along the southcentral coast of the Alaska Peninsula. This collar was used on 1V3, 1 of the 10 juveniles banded in Russia in 1992. On 28 September 1993, collar 2V3, belonging to the only juvenile banded in Russia in 1993, was observed by FWS personnel studying Black Brant (*Branta bernicla nigricans*) at Izembek Lagoon, an important staging area (Reed et al. 1989, Petersen and Gill 1982) located on the southwestern end of the Alaska Peninsula. It was seen again on 4, 6, 7, and 14 October.

Under an hypothesis of separate fall staging areas for Russian and Alaskan breeding Emperor Geese, these two observations were unlikely to have occurred. Very few leg bands or collars from neck-collared geese have been returned to the FWS since 1986, when the FWS closed all legal harvest of the species (FWS 1989). From 1982 through 1990, 4,286 Emperor Geese were neck-collared on the Yukon-Kuskokwim Delta. In 1993, an additional 275 geese were neck-collared in this area (J.A. Schmutz unpubl. data). Using survival rates given by Schmutz et al. (1994), we estimated that Emperor Geese banded in Russia constituted only 1.4 and 0.4% of all neck collared geese presumed to be alive in 1992 and 1993, respectively. Given that FWS personnel observed only 28 Emperor Geese at Izembek Lagoon in 1993 that were originally banded on the Yukon-Kuskokwim Delta, we would not have expected to see a Russian-banded bird there unless families of such birds have high rates of return to this part of the Alaska Peninsula.

A more tenable hypothesis, one that is supported by these two observations, is that Emperor Geese breeding in Russia use staging areas along the Alaska Peninsula. This migrational pathway could have important ramifications on population management. Presently, FWS personnel assess numbers of breeding Emperor Geese by aerial surveys of the Yukon-Kuskokwim Delta, whereas they ascertain productivity by estimating fall age ratios of Emperor Geese on the Alaska Peninsula in late September. It is presumed these surveys sample the same population; however, observations reported here suggest they may not. If reproductive rates vary between geese breeding on the two continents, the fall productivity surveys will be biased with respect to geese from the Yukon-Kuskokwim Delta, and interpretations about the status of the Yukon-Kuskokwim Delta populations could be in error. The extent of bias would depend on the size of the breeding and nonbreeding population of Emperor Geese in the Russian Far East. We know that at

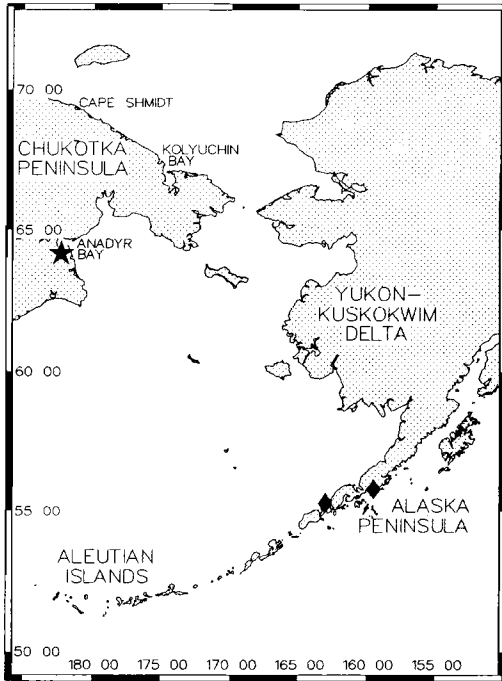


Fig. 1. Geographic areas used by Emperor Geese, and location where Emperor Geese were banded as young in Russia (indicated by star) in 1992–1993 and observed on the Alaska Peninsula (diamonds) during fall migration, 1992–1993. Each 5° of latitude (alternating bars on vertical-axis border) equals 300 nautical miles. Vertical axis also represents true north.

least small numbers of Emperor Geese breed along the Anadyr Bay coast (Kondratyev 1992, 1993). Large numbers (>3,000) of Emperor Geese without young were seen in Russia's Chukotka Peninsula during years of moderately good reproductive success on the Yukon-Kuskokwim Delta (J. I. Hodges, FWS, Juneau, Alaska, unpubl. data; C. R. Ely and J. A. Schmutz, National Biological Service, Anchorage, Alaska, unpubl. data). If these more than 3,000 geese represent failed breeders and nonbreeders derived from a Russian breeding population that stages in Alaska, then estimates of the fall age ratio for Emperor Geese from the Yukon-Kuskokwim Delta will be confounded by the presence of these Russian birds. Assuming that juvenile geese can constitute between 0 and 30% of the fall population, the estimated fall age ratio for geese from the Yukon-Kuskokwim Delta could be biased by up to 6.0 absolute percentage points (e.g. estimate of 24% instead of the actual 30%). Alternatively, if these more than 3,000 geese on the Chukotka Peninsula are simply failed breeders and nonbreeders from the Yukon-Kuskokwim Delta (i.e. molt migrants; Blurton Jones 1972), then the only Russian breeding birds that still might confound fall age ratios on the Alaska Peninsula are the small numbers of

breeders discussed by Kondratyev (1992, 1993). Under this scenario, potential bias in the fall age ratio for geese from the Yukon-Kuskokwim Delta is much smaller (<1.2%). The distinction between these two scenarios is important, since managers use fall age ratios to gauge the productivity of goose populations (FWS 1989).

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