

## COMPARING POPULATION SIZE ESTIMATORS FOR THE VULNERABLE TULE GREATER WHITE-FRONTED GOOSE SUBSPECIES FROM COUNTS, COLLAR OBSERVATIONS, AND RADIO LOCATIONS

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Tule greater white-fronted geese (*Anser albifrons gambeli*) comprise the smallest population of Arctic nesting geese in North America. Total count population indices have ranged from 6,860 in 1992 to 3,034 in 1994 and may be confounded by presence of other subspecies or visibility bias. Our concern about the accuracy of autumn counts led to a coordinated effort to determine the population size with other estimators. From 1995-1997, we captured tule geese in Alaska and California and attached neck collars and radio transmitters. Collar-marked geese (n = 100, 175, & 220) were resighted in September during 3 weekly observation periods of 2 days duration. Radio-marked geese (n=50, 45, & 40) were monitored during the same time periods on different days. The 1995 collar estimate of 5,450 was based on the Peterson estimate as modified to reduce bias using the hyper geometric model of Chapman in Seber. We used NOREMARK to determine the population estimate with radio-marked geese. The radio estimate of 6,286 individuals was higher than the collar estimate. We attempted a similar 3 technique survey in 1996 but due to early migration of other subspecies of white-fronted geese (*A. a. frontalis*) the collar observation and total counts surveys were incomplete. We discuss the accuracy, advantages and disadvantages of the 3 surveys. Production estimates varied between years and location. Summer Lake Wildlife Area in 1995 was 16.7% while Sacramento NWR was 30.0%, and Delevan NWR was 36.4%. Other white-fronted geese breeding in Alaska have increased over the last ten years, while the tule goose population has remained stable.

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