

## EFFECT OF WEATHER AND PREDATORS ON NEST AND ADULT SURVIVAL OF ROCK PTARMIGAN IN ARCTIC CANADA

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**ABSTRACT.**—Predicting how arctic species will respond to a changing climate requires study on how environmental factors influence populations. Rock Ptarmigan (*Lagopus muta*) specialize in arctic and alpine tundra and may be an indicator for climate change effects in these habitats, but they have received relatively little study in western North America where the most rapid environmental change is expected to occur. We studied the population ecology of Rock Ptarmigan over a 5-year period (2004–2008) at an alpine study site in the Ruby Range Mountains of the southern Yukon Territory, Canada. During this time, we monitored 86 nests with a mean daily nest survival (DNS) rate of 0.961 and an expected nest success of 0.32. Nest failure was largely due to predation (89% of failed nests) from nest predators such as red fox and Arctic ground squirrels, as well as predators on adults. There was little evidence that nest survival varied by nest stage or year, but there was seasonal variation and DNS was higher during periods of warmer weather. Because few nest losses were directly attributable to weather, this finding suggests that weather indirectly affects nest success through an influence on predator and/or prey behavior. Although reproductive output was low in this population, adult survival was high for both females at 0.62 (0.51–0.73) and males at 0.73 (0.61–0.82). Avian predators, predominantly Golden Eagles (*Aquila chrysaetos*), were the dominant cause of adult mortality in the breeding period but we were unable to determine the causes during the non-breeding season. In comparison with studies on Willow (*Lagopus lagopus*) and White-tailed Ptarmigan (*L. leucura*) in the region, Rock Ptarmigan appear to show a shift to a slower life history strategy with lower reproductive output offset, at least partially, by higher adult survival. Thus, Rock Ptarmigan may be more sensitive to changes in the environment that influence adult survival. However, the low reproductive output may result in a slower recovery of populations if stochastic events lead to temporary population declines. *Received 11 January 2011, accepted 1 February 2011.*

WILSON, S., AND K. MARTIN. 2011. Effect of weather and predators on nest and adult survival of Rock Ptarmigan in arctic Canada. Abstract, page 337 in R. T. Watson, T. J. Cade, M. Fuller, G. Hunt, and E. Potapov (Eds.). Gyrfalcons and Ptarmigan in a Changing World, Volume I. The Peregrine Fund, Boise, Idaho, USA. <http://dx.doi.org/10.4080/gpcw.2011.0207>

