Unraveling The Complex Biogeographic and Anthropogenic History of Alaska's Mountain Goats

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ABSTRACT: Both natural and anthropogenic forces can play a substantial role in the demographic history and current structure of a wildlife population. Species with strict habitat requirements are especially susceptible to these impacts. Mountain goats (*Oreamnos americanus*) in Alaska are of particular interest in this regard due to their influence on alpine ecosystems, importance to human cultures, and their enigmatic history in some areas. Here, we used genetic tools to examine the population structure and demographic history of mountain goats in Alaska. We genotyped 816 mountain goats at 18 microsatellites, identified the number of genetically distinct subpopulations, and assessed their genetic diversity. We used Bayesian methods to investigate the demographic history relative to the known geologic and human history of Alaska, and we simulated human-mediated translocation events onto islands to address the hypothesis that Baranof Island harbored an extant population prior to an early-20th century introduction. We showed that Alaska has 4 genetically distinct subpopulations of mountain goats. The main demographic split between Southcentral and Southeast Alaska occurred following the retreat of ice after the Last Glacial Maximum. Simulations of translocation events largely aligned with the expected genetic diversity patterns of current subpopulations except for Baranof Island which showed greater diversity than the simulation, consistent with the hypothesis of an endemic population prior to the translocation. This study highlights the value of considering both natural and anthropogenic forces when assessing the biogeographic history of a species and provides new insights about the complex demographic history and biogeography of mountain goats in Alaska.

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