A Comparison of Habitat and Movement Metrics Between a Hunted and Unhunted Dall's Sheep Population

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ABSTRACT: In Alaska, Dall's sheep (*Ovis dalli*) are a coveted species and predominately managed under a full-curl harvest strategy, open to residents and non-residents. Recent population declines throughout the state have heightened the concern for the long-term conservation of the species. Among those concerns are: 1) the effectiveness of the full-curl strategy during population lows, and 2) the potential impact of climate change on population dynamics. In 2023, we initiated a novel, landscape-scale, comparative study on population dynamics and demographics in largely unhunted portion of Gates of the Arctic National Park (3,200 km^2) vs. adjacent hunted state managed lands (1,290 km^2). We deployed 50 GPS collars on rams, with 25 each in a treatment (hunted) and control (unhunted) study area. Sixty ewes (30 per study area) will be GPS collared in March 2024. We hypothesize that sub-legal, subordinate, rams should replace full-curl rams in the mating system, when the older, socially dominant full-curl rams are removed. Sheep in the treatment study area will have increased movement rates, specifically during the rut and during the hunting season. These behavioral changes could interact with weather events and/or climate change to increase mortality in unexpected ways. To test our hypotheses, data will be analyzed using a dynamic parameter movement model, integrated step-selection analysis, and energetic modelling to assess differences in movement behaviors, energy expenditure, and habitats used and selected in the treatment and control areas. Understanding how hunting potentially changes the mating system dynamic and habitat selection will lead to a more nuanced understanding of how hunting pressure interacts with climate events and resource disruptions to impact Alaskan Dall's sheep populations. Results from this study will provide managers with important information to conserve sheep and fulfill their respective mission and mandates.

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