

Using Distance Sampling to Estimate Dall's Sheep Abundance in Gates of the Arctic National Park and Preserve, Alaska

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Abstract: Historically, management of Dall's sheep populations in Alaska has depended on minimum count surveys for population assessment. Sheep movement and differences in survey coverage between years can result in highly variable counts, making trend analysis difficult. Additionally, these techniques can require an input of time and money that may be unrealistically high, especially when estimates for large areas, such as national parks, are necessary. Dall's sheep were selected by the National Park Service Arctic Network as an important species for long-term monitoring in Gates of the Arctic National Park and Preserve (GAAR), Noatak National Preserve and Kobuk Valley National Park. The sheer size of this region precludes minimum counts as an effective tool to monitor park-wide abundance. In 2009, we tested distance sampling as an alternative approach for estimating sheep abundance within GAAR. A set of 20km transects (n=316) was generated systematically throughout all potential sheep habitat in GAAR (27,934 km²). We fit Bayesian models to the survey data using WinBUGS, resulting in an abundance estimate of 8,564 (95% CI: 6,586 to 11,130) sheep in GAAR in 2009. This is the most viable park-wide estimate of Dall's sheep abundance for GAAR since the early 1980's, and we intend to refine methods in 2010 to improve survey efficiency and precision of estimates. Our preliminary findings suggest that distance sampling is a practical and efficient alternative to minimum counts for monitoring Dall's sheep populations and can provide precise estimates of abundance over large areas.

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