

Developing a Non-Invasive Technique to Estimate Population Size of Bighorn Sheep in Rocky Mountain National Park Using Fecal-DNA

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Abstract: Developing non-invasive techniques to study large mammals is the goal of many wildlife managers and researchers. Handling ungulates causes stress to animals and risk to humans. In certain places, such as Rocky Mountain National Park (RMNP), Colorado, flying helicopters to radio tag or mark ungulates in wilderness is heavily scrutinized. The development of viable alternatives is needed. Based on research and modeling by McClintock (2006), the bighorn sheep population on the east side of RMNP (Mummy Range) is predicted to become extirpated by 2020 if the rates of decline observed during the study continue. It is unclear whether these declines have continued between McClintock's last field season in 2004 and the present time. Thus bighorn sheep population monitoring in RMNP is a high priority, and population and density estimates are essential for successful management and conservation of the species. In order to avoid capturing and marking bighorn sheep, we are conducting a study to develop a non-invasive population estimation technique using fecal DNA. Mark re-capture models will be used to estimate parameters such as population size and survival, where the "mark" will be an individual animal's DNA. If this technique is viable and less costly (and less risky) than traditional aerial helicopter monitoring, RMNP managers may be able to determine trends in bighorn sheep and other wildlife populations, which would inform a variety of management decisions. We are beginning the second year of this 2-year study. After first year analyses, it is clear that the method has validity, and preliminary analysis indicates that the herd has not declined further since the McClintock study.

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