



Is Habitat Constraining Bighorn Sheep (*Ovis canadensis*) Distribution and Restoration? A Case Study in the Greater Yellowstone Ecosystem

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ABSTRACT: Rocky Mountain Bighorn Sheep (*Ovis canadensis*) are believed to have historically existed within geographically distinct areas (e.g., mountain ranges) as naturally structured metapopulations, and efforts focused on restoring metapopulations may provide currently unrealized restoration opportunities. By rebuilding metapopulations, managers may not only increase bighorn sheep abundance and distribution, but may also promote natural recolonization, improve genetic heterozygosity and improve population resiliency to stochastic disease events. The Madison Mountain Range, located on the western edge of the Greater Yellowstone Ecosystem (GYE), is a good example of a mountain complex with apparent unrealized potential for restoration. We hypothesized that the range is capable of supporting a metapopulation of bighorn sheep, and that current distributions are not primarily limited by habitat availability. We instrumented 27 adult female bighorn sheep in the Taylor-Hilgard population, located on the southern end of the Madison Range, with GPS radio collars programmed to record spatial data for approximately 18 months. Based on these data, we generated resource selection function (RSF) models to describe the seasonal movement of this population and evaluated their ability to predict current distributions of bighorn sheep within the Madison Range. Next, we extrapolated predictive models to identify areas of unoccupied habitat that could be considered for future translocation efforts aimed at establishing a continuous bighorn sheep metapopulation. Here, we discuss our models' performance, and utility for informing future bighorn sheep management within the Madison Range.

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KEYWORDS Bighorn sheep; *Ovis canadensis*; resource selection function; predictive habitat models; translocation potential; Madison Range; Montana.