Habitat Selection, Movement, Disease, and Population Structure of a Re-Introduced Bighorn Sheep Population in a Canyon Environment

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ABSTRACT: We comprehensively assessed multiple management concerns for a re-introduced sheep herd in Dinosaur National Monument, Colorado, USA. We captured 20 bighorn sheep in late 2006, collected genetic and disease samples and deployed GPS collars that recorded locations every 2.5 hours for 18 months. We evaluated habitat selection and movement at 2 spatial scales. Bighorns selected home ranges near the river, where canopy cover was low, and for grasslands, shrublands, and woodlands versus non-vegetated areas. Within the home range, in summer, assessed with an integrated step selection function, bighorns selected for areas near escape terrain, low solar radiation, more westerly slopes, moderate variation in local topography, and the canyon bottom or the rim, thus selecting against moderate elevations. Selection patterns in winter were similar, with additional selection for areas near permanent water and away from intermittent water. In terms of movement, bighorns strongly avoided crossing rivers, and selected areas with lower forest cover that were further from escape terrain. We detected movement across the rivers in one region, near the juncture of the Green and Yampa Rivers and found no genetic signal of population structure. Combined, these analyses suggest that the rivers and rugged canyons do not impede either demographic or genetic connectivity of bighorn sheep in the Monument and that they should be treated as a single herd. Results from the ELISA test suggest widespread exposure to *M. ovi*. These methods will help analysts working in other canyon systems and these findings will help local management of this re-introduced population.

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