

A Home on The Prairie? Restoration Potential of Bighorn Sheep in Montana's Prairie Region

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Efforts to recover Montana's bighorn sheep (*Ovis canadensis*) have focused primarily in the mountainous western region; however, rugged areas in the eastern prairie region were historically occupied by bighorn sheep. Currently, only 4 populations exist in this region and are some of the state's most abundant and stable populations. We predicted that potential habitat and restoration opportunity likely exists in the prairie. We used GPS collar data collected during 2014 - 2018 from 2 bighorn sheep populations located along the Missouri River in Montana to estimate a resource selection model. We first extrapolated model predictions across Montana's prairie region to understand the spatial distribution of predicted habitat and restoration potential of bighorn sheep. Second, within an estimate of bighorn sheep historic range, we estimated the abundance of bighorn sheep that the predicted habitat could potentially support. Resource selection was most strongly associated with terrain slope and ruggedness, canopy cover, and an NDVI metric. Within currently unoccupied areas of the historic range, the model predicted 7,211 km² of habitat, with about half (55%) managed by public land agencies. We estimated that these unoccupied areas of habitat could support 1,327 - 3,457 bighorn sheep, an increase in the abundance of Montana's prairie bighorn sheep of 1.9 - 3.2 times. Our results demonstrate substantial potential for restoration opportunities of bighorn sheep in eastern Montana. Broad restoration of bighorn sheep across the prairie region would likely require strong collaboration among and between public resource managers and private landowners given the heterogeneous landownership patterns.