

An Empirically Grounded Framework For Tuning a General Bighorn Sheep Space Use Model to Specific Environmental Contexts

KEZIA MANLOVE, Department of Wildland Resources and Ecology Center, Utah State University,
Logan, UT, 84321, USA, kezia.manlove@usu.edu

LAUREN RICCI, Department of Wildland Resources and Ecology Center, Utah State University,
Logan, UT, USA 84321

MIKE COX, Nevada Department of Wildlife, 6980 Sierra Center Pkwy. Suite 120, Reno, NV, USA 89511

ABSTRACT: Accurately predicting bighorn sheep movements is imperative for efficiently mitigating pathogen transmission risk, both within and between hosts. As habitat specialists, most bighorns share core attributes of space use, including affinity for cliffy terrain, aversion to dense forest, preferences for expansive viewsheds, and proximity to water. Yet the relative importance of these factors, at the both the individual and the herd level, varies with necessity and availability. For example, selection for slope shows strong seasonality in Rocky Mountain bighorn ewes, whose synchronous birth pulse leads to synchronous slope requirements, but this pattern does not emerge under the diffuse birth pulse of desert bighorn ewes. On the other hand, distance to water is a salient driver of space use in water-limited environments, but is much less important in environments where water is not scarce. Here, our objective is to outline a conceptual framework for understanding bighorn space use across latitudes, and then confront the framework with empirical data. We achieve this methodologically by fitting and comparing seasonal habitat selection coefficients associated with four key habitat attributes — slope, ruggedness, percent cover, and distance to water — for bighorns across a range of environmental contexts. Our findings illustrate that while these same core factors are good predictors of bighorn space use across a wide variety of environments, their relative importance may be recalibrated depending on the local context. Clear *a priori* expectations about which factors should be most important when may provide managers a means of tailoring bighorn space use predictions to better match particular landscapes, potentially improving pathogen transmission risk assessments for herds where local movement data are limited.

Biennial Symposium of the Northern Wild Sheep and Goat Council 23:1; 2022

KEY WORDS: bighorn sheep, pathogen transmission risk, seasonal habitat selection.