Disease and Predation: Sorting Out Causes of a Bighorn Sheep Decline

JOSHUA B. SMITH,[1] *Department of Natural Resource Management, South Dakota State University, Brookings, SD 57007, USA*
JONATHAN A. JENKS, *Department of Natural Resource Management, South Dakota State University, Brookings, SD 57007, USA*
TROY W. GROVENBURG, *Department of Natural Resource Management, South Dakota State University, Brookings, SD 57007, USA*
ROBERT W. KLAVER, *Iowa Cooperative Fish and Wildlife Research Unit and Department of Natural Resource Ecology and Management, Iowa State University, Ames, IA 50011, USA*

ABSTRACT From 2010 to 2012, we captured and radio-collared 74 neonate bighorn sheep (*Ovis canadensis)* in Black Hills, SD, to estimate 52-week survival and document cause-specific mortality. We estimated survival using known fate analysis in Program MARK. Model {S1wk, 2-8wks, >8wks} had the lowest Akaike's Information Criterion corrected for small sample size value, indicating that a 3-stage age interval (1 week, 2-8 weeks, and >8 weeks) best explained survival. Weekly survival estimates for 1 week, 2-8 weeks, and >8 weeks were 0.81 (95% Confidence Interval (CI) = 0.70-0.88), 0.86 (95% CI = 0.81-0.90), and 0.94 (95% CI = 0.91-0.96), respectively. Overall probability of surviving 52 weeks was 0.02 (95% CI = 0.01-0.07), with pneumonia (36%) as the leading cause of mortality followed by predation (30%). We found that pneumonia and predation were temporally heterogeneous; lambs were the most susceptible to predation during the first 2-3 weeks of life, but at the greatest risk of pneumonia during weeks 4-8. Mortality from predation may have been partly compensatory to pneumonia and its effects were less pronounced as alternative prey became available. Given the high rates of pneumonia-caused mortality observed, management activities should be geared toward eliminating contact between diseased and healthy populations.

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[1] *E-mail: joshua.smith@sdstate.edu*