

****Disease, Climate, and Abundance Impacts on Bighorn Sheep Lamb - Ewe Ratios in New Mexico**

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Understanding the impacts of *Mycoplasma ovipneumoniae* on bighorn sheep populations is paramount to ensuring population persistence. In New Mexico, most bighorn sheep (*Ovis canadensis*) populations were thought to be free of this pathogen prior to 2017; however, infections in multiple herds since that time have raised concerns surrounding impacts to population size and lamb survival. We evaluated the impacts of *M. ovipneumoniae* infection, abundance, climate, and predation on bighorn sheep lamb:ewe ratios across New Mexican populations. We characterized these relationships using lamb:ewe ratios from aerial and ground surveys from 2000 to 2022 and *M. ovipneumoniae* testing data from 2007 to 2022 (n = 466 individuals) for both Rocky Mountain (*O.c. canadensis*) and desert bighorn sheep (*O.c. mexicana*). From 2007 to 2022, we sampled n = 466 bighorn sheep across 19 populations in New Mexico for *M. ovipneumoniae* exposure. While timing of initial herd infections varied across populations, one population sustained active infections for over 15 years. We found reduced juvenile:female ratios post *M. ovipneumoniae* exposure for both desert and Rocky Mountain bighorn sheep populations. Evaluation of the effects of population size and environmental conditions on lamb:ewe ratios indicated varying impacts for each subspecies. Notably, population size was negatively related to lamb:ewe ratios for Rocky Mountain bighorn only after populations were exposed to *M. ovipneumoniae*. Additionally, climatic conditions in the previous lambing season and pre-parturition timeframe were associated with lamb:ewe ratios for Rocky Mountain populations while lamb:ewe ratios of desert bighorn appeared to only be affected by pre-parturition climatic conditions.