

Risk of Pathogen Spillover to Bighorn Sheep from Domestic Sheep and Goat Flocks on Private Land

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ABSTRACT Bighorn sheep (*Ovis canadensis*) across North America have suffered population losses due to polymicrobial pneumonia typically initiated by spillover events of bacteria from domestic sheep and goats. Because vaccination or treatment of individual animals remains an elusive goal and pneumonia often persists in bighorn herds for years or decades following infection, preventing contact between domestic and wild animals is widely accepted as the best prophylactic. For the past decade, most management efforts have focused on the risks associated with commercial sheep grazing on public lands; less attention has been paid to risks to bighorns from small flocks of domestic sheep and goats managed entirely on private land. We surveyed owners of 40 sheep or goat flocks located near bighorn sheep herds in central and southeastern Washington, USA during 2014 and 2015, to better understand their knowledge level, management practices, and willingness to reduce risks. Over one-third of sheep or goat owners had no knowledge of the potential for pathogen spillover to bighorns, but all were interested in reducing risk of interacting with bighorns, particularly by options that did not restrict their autonomy. We also sampled nasal mucosae of 137 animals in 24 flocks for presence of *Mycoplasma ovipneumoniae*, the bacterium most closely associated with bighorn pneumonia. *M. ovipneumoniae* was detected in 37.5% of sheep or goat flocks sampled, and animals had escaped their enclosures in 78% of these. Physical contact, and thus pathogen spillover from domestic sheep or goats living in small, private flocks in close proximity to bighorns is clearly a risk. We provide recommendations to agency staff on identifying, prioritizing and testing small herds, and then working with owners to reduce the risk of pathogen spillover.

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