

## **Interaction Between Domestic & Wild Sheep and Goats**

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Bighorn sheep currently occupy western North America from Canada to Arizona. Their numbers have drastically declined since their estimated historical abundance and had only started to be reintroduced in the 20<sup>th</sup> century. Hunting, habitat loss, disturbance and other factors have played a role in the decline of bighorn sheep. It is now thought that epizootic pneumonia is the main cause of mortality. Epizootic pneumonia is also what is keeping bighorn sheep populations from recovering and increasing. For years, it has been known that most pneumonia cases have come from domestic sheep and goats. However, there is now clear evidence that polymicrobial pneumonia is from the spillover of *Mycoplasma ovipneumoniae* also known as Movi. Movi is a bacterial disease most commonly found in domestic sheep and goats, whether they are healthy or not. Domestic sheep and goats then become carriers of the bacteria, meaning they can pass it on, but it does not affect them. When a domestic carrier comes in contact with a wild sheep, the bacteria is transferred and it can kill 80% of a herd within months (Cassirer and Sinclair 2007, Cassirer et al. 2013).

To have a domestic sheep or goat come in contact with a bighorn sheep sounds unlikely because of their two different worlds, but it is very easy. Most management efforts have focused on the risks of commercial sheep that graze on public land (Schommer and Woolever 2008, TWS 2010). However, there are also risks, and maybe even higher, coming from the smaller flocks and herds that live on private land. Human settlement has spread everywhere, including areas in closer proximity to the habitats of bighorn sheep. This creates a more likelihood of contact between domestic and wild sheep (Winkler et al. 2007, Abrams and Bliss 2013). When a bighorn touches noses with a domestic sheep or goat with Movi, the disease will transfer. Whether it is a big flock, small herd, public land or private land, if a domestic goat or sheep that has

*Mycoplasma ovipneumoniae* comes in contact with a wild sheep, there is not only a slim chance of survival for that one, but for all the other wild sheep in that herd as well.

Bighorn sheep were historically present in the state of Washington; however they were eradicated during the 19<sup>th</sup> century and early 20<sup>th</sup> century. Beginning in the 1920s, there was a start to reintroduce bighorn sheep in 18 areas within Washington, mostly these sheep came from British Columbia, Canada and Montana, USA. By 2014, there was an estimate of 1,280 bighorns living in 17 herds throughout eastern Washington (Washington Department of Fish and Wildlife 2014a). In 2014 and 2015 there were 76 small-scale domestic sheep and goat flocks living near bighorn sheep herds (Heinse M. Laura).

In 2016 my sister and my goats were a part of the 76 flocks documented. I have been raising meat goats for 5 years and have raised them for 4-H and now FFA or Future Farmers of America. I raise them throughout the summer preparing to take them to our county fairs in the fall. We live in the hills where there is always wildlife around us, from bears, hawks, coyotes, cougars, and deer to bighorn sheep. We have never had any issues with disease before since we keep our goats isolated in a secure, clean pen so they cannot interact with any animals that may carry something harmful. I was not aware my goats could transfer a destructive bacteria like *M. ovipneumoniae* to the 150 bighorn sheep that reside on the wildlife area bordering our property. However, I am very thankful to live in Chelan County, which has not had any respiratory disease outbreaks among its 3 bighorn sheep herds.

Yakima County and Asotin have not been as lucky. Out of the 4 bighorn sheep herds in Yakima County, 2 herds have experienced pneumonia-related die-offs. In 2009-2012 the Yakima Canyon herd and the Tieton herd in 2013 both had to be removed entirely to prevent the further spread of infection to neighboring herds. In Asotin, 3 of 4 herds have suffered die-offs beginning

in 1995 (Cassierer et al. 2016). These die-offs have raised a lot of concern around Washington State not only for the well being and health of domestic and wild sheep and goats, but also for hunters who buy bighorn sheep tags. Hunters spend hundreds of thousands of dollars on tags annually, but if there are not plenty of bighorn to choose from, then why would they spend the money? Bighorn sheep are considered trophies and the more sheep that are killed from Movi, the less amount of money the state will collect from hunting tags.

There was a study conducted by Washington State University that surveyed small-scale sheep and goat owners about their knowledge on *Mycoplasma ovipneumoniae*, their willingness to prevent contact with bighorns, and the risk of interaction between domestic and wild sheep. They took the 76 small-scale sheep and goat flocks and ranked them high, moderate or low risk to bighorns. This is based off how close each flock is in proximity to bighorn sheep herds. Out of the 76 flocks, 63 of them were moderate to high risk. These 63 were also going to be the subjects that would take the survey from WSU (Heinse M. Laura).

The experiment conductors then tested 24 sheep and goat flocks for active infection of *M. ovipneumoniae*. Nine of the 24 flocks sampled came back positive for Movi. They also tested for differences in owners' level of knowledge between counties with outbreaks and without, they tested the flock size vs. testing positive for Movi, and if closed flocks were less likely to test positive than non-closed flocks (Heinse M. Laura).

Out of the 63 flocks that were high to moderate risk, 40 took the survey, 19 were unavailable and 4 declined. Ninety-four percent of owners kept their animals contained within fences, 10 out of 34 owners allowed their animals to have free-range of the property when they were home, 25 out of 34 owners have had individual sheep or goats escape at least once and 10 out of 34 owners had also seen bighorn sheep around their own flocks. About 32% of owners had

"no knowledge" of bighorn pneumonia, 53% were "somewhat knowledgeable" and 15% were "very knowledgeable". No difference was found between an owner's level of knowledge about transmitting pneumonia in counties with and without outbreaks. However, the likelihood of a flock testing positive for Movi increased with flock size. The estimated probability of a goat being taken at random from all goat flocks and being *M. Ovipneumoniae* positive was 28% while if a sheep was taken at random, the probability of being positive was 2% (Heinse M. Laura).

After learning about the new information and danger of *M. Ovipneumoniae*, all owners wanted to prevent bighorn contact with their domestic sheep and goats. The owners came up with many ways to take precautions. To limit association, you can get dogs who would scare bighorn sheep away, fence in your livestock, contact a biologist to allow them to remove bighorns from your property or work with a veterinarian to clear *M. Ovipneumoniae* from your flock (Heinse M. Laura). Through education and knowledge it benefits all owners of domestic flocks to take precautions to limit contact with these majestic animals we call the bighorns.

### Works Cited

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