



KEEPING **WILD SHEEP** HEALTHY

WHAT YOU NEED
TO KNOW AND
WHAT YOU CAN DO

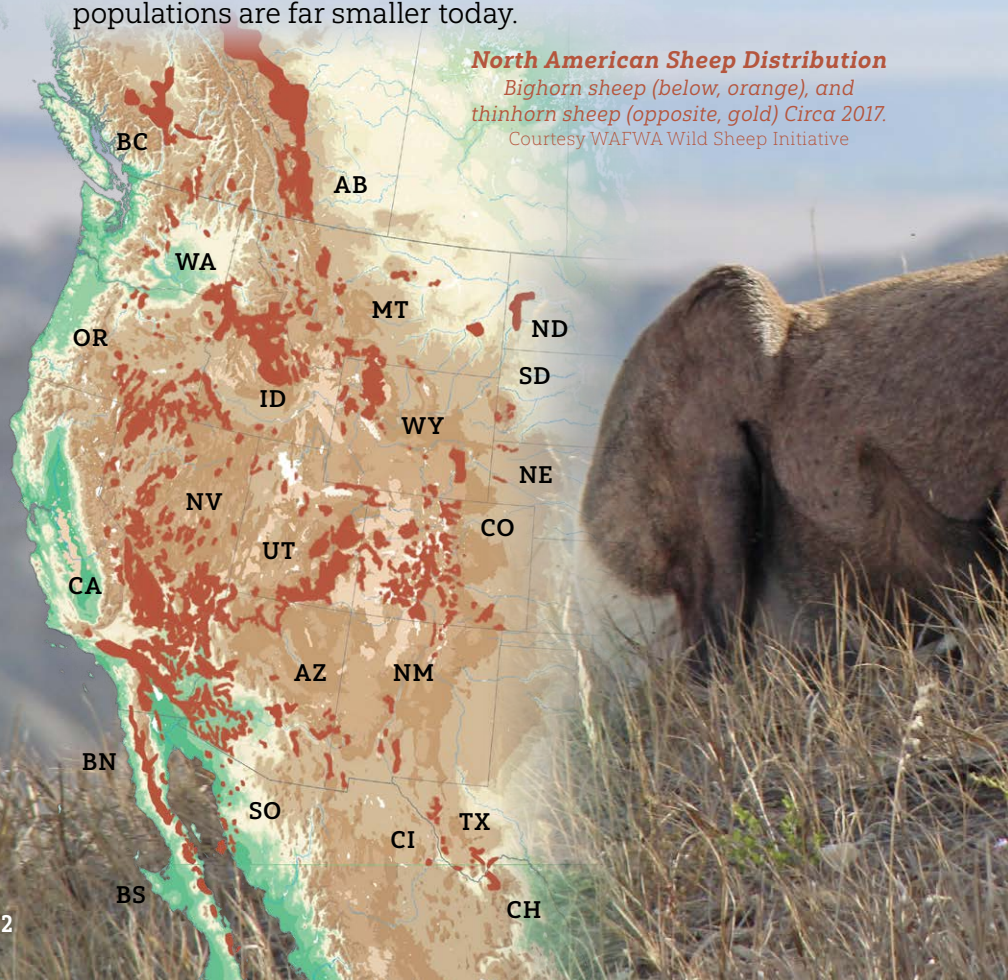
NORTH AMERICAN WILD SHEEP

Bighorn and thinhorn sheep (*Ovis canadensis* and *O. dalli*) are among nature's most awe-inspiring animals. Native to western North America, wild sheep usually live in remote and rugged habitats. These iconic animals are divided into Rocky Mountain, California, and desert bighorn sheep, and Dall's and Stone's thinhorn sheep. They have high ecological and economic values and are culturally and socially important. In short, they are a vital component of the natural heritage of North America. The historic and recent distribution of wild sheep in western North America has changed with time; while once widespread, their ranges and populations are far smaller today.

North American Sheep Distribution

Bighorn sheep (below, orange), and thinhorn sheep (opposite, gold) Circa 2017.

Courtesy WAFWA Wild Sheep Initiative





WHAT ARE THE THREATS TO WILD SHEEP?

Bighorn sheep populations declined significantly between the mid-1800s and the mid-1900s and have never fully recovered. Habitat disturbance and loss from human activities, effects of a changing climate, and predation all impact wild sheep. However, the most significant threat to bighorn sheep herds is respiratory disease (pneumonia) caused by bacteria transmitted from domestic sheep or goats or other infected wild sheep. Despite intensive efforts, including moving animals to re-establish populations,

bighorn sheep populations are a fraction of their historic numbers and currently occupy only a small proportion of their original range.



Researchers and volunteers test a bighorn as part of the Whiskey Mountain Bighorn Restoration Project in Wyoming.

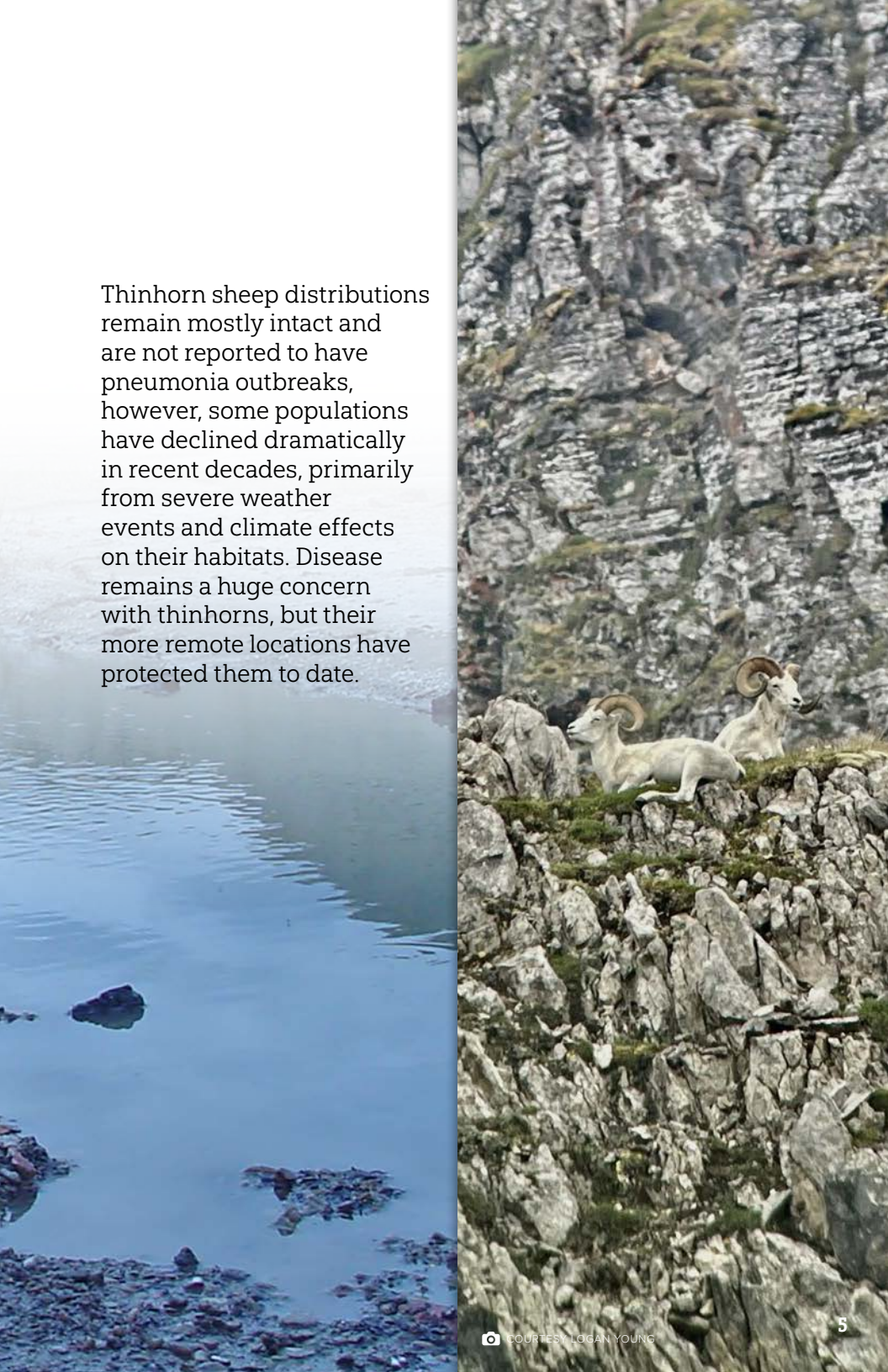
IMAGE COURTESY ZACH GREGORY, WGFD



Deceased collared bighorn ewe found in North Dakota.

IMAGE COURTESY BRETT WIEDMANN, NDGFD

Thinhorn sheep distributions remain mostly intact and are not reported to have pneumonia outbreaks, however, some populations have declined dramatically in recent decades, primarily from severe weather events and climate effects on their habitats. Disease remains a huge concern with thinhorns, but their more remote locations have protected them to date.



RESPIRATORY DISEASE IN BIGHORN SHEEP

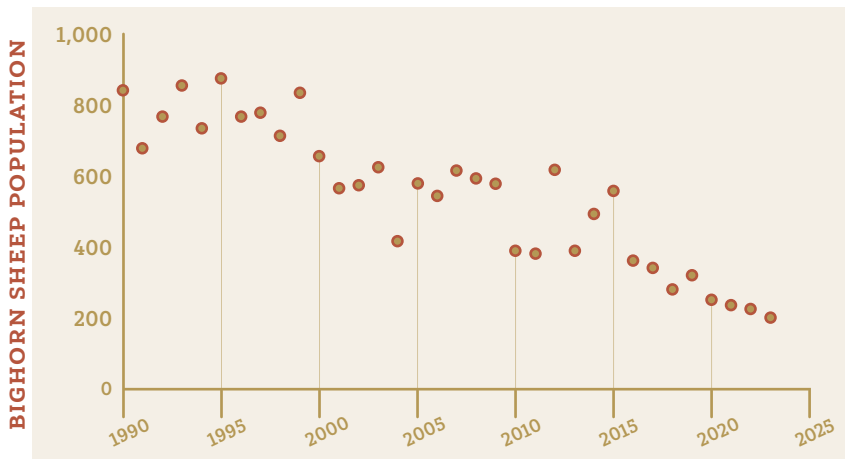
Outbreaks of pneumonia have occurred in bighorn sheep herds for decades throughout their range. These “die-offs” continue to cause catastrophic population declines and herd losses. Many organisms are associated with respiratory disease, including bacteria, lungworms, and viruses. In recent years, one bacterium, *Mycoplasma ovipneumoniae* (referred to as Movi), has been frequently identified in the early stages of outbreaks, acting as a trigger. Movi infection in wild sheep reduces their immune defenses and allows other, often more aggressive, bacteria into the lungs. The result is pneumonia and rapid death of the individual. The disease spreads to other animals quickly, and may kill the entire herd. After a die-off, survivors may carry and shed Movi and, if passed to lambs, it usually results in most lambs dying. This pattern may repeat year after year, with many infected herds never recovering.



DARRYN EPP

Examples of bighorn sheep showing signs of respiratory disease.





Whiskey Mountain bighorn sheep (Wyoming) population trend after a pneumonia die-off in the winter of 1990-1991.

WHERE DOES RESPIRATORY DISEASE COME FROM?

Domestic sheep and goats are the most common sources of Movi. The bacteria rarely cause serious disease in domestic flocks and herds but can reduce weight gains and cause mild respiratory issues in some animals. Isolated wild sheep populations, especially thinhorns, are usually free of Movi infection, but all are susceptible to disease after contact with Movi-infected domestic sheep and goats, or infected wild sheep. There is no effective treatment or vaccine for Movi in wild or domestic sheep and goats.



ARE THERE SOLUTIONS?

Despite significant investments into research and management efforts, to date, only complete separation of wild sheep from domestic sheep and goats has prevented disease spread. Without separation, the risk of contact and disease is much higher. The risk of contact is highest because or when:



- Wild and domestic sheep are closely related and socially attracted to each other. This attraction can be problematic when wild sheep undertaking natural movements called forays contact domestic sheep which can lead to pathogen transmission.
- Domestic sheep and goats held on private lands near, adjacent, or within wild sheep habitats are not fenced in a manner to stop escapes or entry of wild sheep into the area.
- Public lands near, adjacent or within wild sheep habitats are used for domestic sheep and goat grazing, weed and brush control, trailing, or recreational/commercial hiking and packing. They may stray and wander into contact with wild sheep.

No other management action has proven as effective for ensuring the health of wild sheep as complete separation of wild and domestic species.



WHAT RESEARCH IS BEING DONE?

Wildlife professionals are working together to understand more about wild sheep health and respiratory disease including developing improved testing methods for Movi and better understanding associations among Movi, wild sheep, and the environment in our changing world.

Separation of domestic sheep and goats from wild sheep is the most effective way to stop Movi transmission. Currently, the only management option available for an infected bighorn herd is 'Test and Remove'. With this method, bighorn sheep testing positive for Movi are removed from the herd for research or euthanized, reducing the risk of bacterial transmission, especially to newborn lambs. Test and Remove research in multiple herds is showing success in reducing the number of Movi infected animals and increasing lamb survival.

A bighorn ewe being released in Nevada after being tested and tagged as part of the multi-year ION Partnership Population Analysis, Test & Remove, Herd Health/ Disease Surveillance Project funded by the WSF Grant in Aid program.

IMAGE COURTESY SILVERLINE FILMS



HOW CAN I HELP?

Everyone can help by learning about wild sheep and participating in conservation efforts. Wild sheep managers, wildlife health professionals, livestock producers, researchers, and those who are simply interested, have joined conservation groups such as the Wild Sheep Foundation to work collaboratively, raise funds, learn more about wild and domestic sheep health, and ultimately keep wild sheep on the mountain.

YOU CAN ALSO HELP BY REPORTING:

- If you see domestic sheep or goats close to wild sheep, immediately contact the local state/provincial/territorial/tribal wildlife agency, the local land management agency, Wild Sheep Foundation, or the state/provincial WSF Chapter or Affiliate with the date and location of your observation.
- If you observe dead or sick wild sheep (e.g., excessive coughing, runny nose, thin), take photos or a video, and immediately contact the local state/provincial/territorial/tribal wildlife agency, the local land management agency, Wild Sheep Foundation, or the state/provincial WSF Chapter or Affiliate with the location of your observation.

Tagging 1 of 32 bighorns captured in February 2024 as part of Nebraska's Bighorn Restoration Project.

IMAGE COURTESY JUSTIN HAAG



WHERE CAN I LEARN MORE?

To learn more on wild sheep health and diseases, please explore these resources.

WSF Web Resources



SCAN FOR
MORE
INFORMATION
ABOUT DISEASE
AND SEPARATION



SCAN FOR
DETAILS ABOUT
JOINING A WSF
CHAPTER OR
AFFILIATE

Other Web Resources

WESTERN ASSOCIATION OF FISH
AND WILDLIFE AGENCIES
www.wafwa.org

MOVI-FREE
www.movifree.org



Fact Sheet

SCAN TO READ THE
WAFWA 2023 TEST AND
REMOVE FACT SHEET



FILMS

Wild & Wool — Disease is Killing Our Wild Sheep

Wild & Wool—from the Wild Sheep Foundation, in partnership with Sitka Gear, Implement Productions, and Foss Media—takes an in-depth



look at what we know about disease die-offs and what can be done to prevent these catastrophic events in the future. Scan the code to watch this 23-minute, award-winning video.



Transmission

The infectious bacteria, *Mycoplasma ovipneumoniae*, can be transmitted from domestic sheep to bighorn sheep with deadly results. A handful of scientists, volunteers and



sheep producers are working together to learn more about the disease and recover the bighorns. Scan the code to watch this 53-minute award-winning video.




WILD SHEEP
Foundation®

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 COURTESY RYAN BASKERVILLE