Bighorn Sheep Nutrition and Disease Project Winter 2020 Update

Rachel Smiley, Britany Wagler, and Kevin Monteith

Winter took its toll on the final lambs collared as part of the Bighorn Sheep Nutrition and Disease Project led by the Monteith Shop at the University of Wyoming in collaboration with Wyoming Game and Fish Department, Bureau of Land Management, and the Wyoming State Vet Lab. All 18 lambs collared this past summer died from various causes. Many fell victim to the causes of mortality we expect from neonate ungulates such as predation, accidents, and malnutrition in the first few weeks of life. After the remaining lambs overcame the first hurdle of surviving these typical causes of mortality, they faced a seemingly bigger hurdle: pneumonia. Beginning in early July, pneumonia was the only observed cause of mortality for the rest of the summer, claiming more half of the lambs. Once September hit, there were only three lambs left alive, two in the Whiskey herd and one in the Jackson herd. Bill Sincavage, a local photographer and board member of the National Bighorn Sheep Center, photographed the two remaining lambs in the Whiskey herd with snotty noses—a clear sign of pneumonia. One succumbed to the disease in late October and, in late November, the last lamb in the Jackson herd died of unknown causes. In mid-February the last lamb of the Whiskey herd died, likely killed by a predator.

Before this project began, we knew the Whiskey Basin herd had exceptionally low rates of lamb survival. We didn't know exactly what was killing them, but suspected pneumonia was a contributing factor. The results of this past summer suggest that pneumonia is the leading issue of poor recruitment in the Whiskey herd. It appears that even if the lambs can survive through the trials faced in the first few weeks of life, which generally is the riskiest time for a newborn ungulate, they are still vulnerable to pneumonia. Although one goal of this project is to determine what is killing the lambs, we hope the value of this work will lie in determining *why* the lambs in the Whiskey herd are particularly susceptible. Herds throughout the west have pneumonia, but not all are suffering the long-term population declines that the Whiskey herd is experiencing. We know that pneumonia is a culprit for the Whiskey herd's decline, and we want to be able to identify the various factors that influence their apparent susceptibility to pneumonia.

The data we collect about how and when the lambs die is important, but perhaps more illuminating will be the rest of the data that will be coupled with evidence of survival or death. Our work before initiating the lamb survival portion of the project suggested that summer nutrition in the Whiskey herd may play an important role in their lack of success in recruiting lambs. Therefore, half of our field season is spent studying the habitats these sheep live in during the summer. We're on our hands and knees identifying plant species, collecting bags of plant clippings, and searching for poop. While finding enough alpine avens to fill a paper bag may feel less rewarding than collaring a newborn lamb, these are the data that will help us identify the driving factors behind the population decline. With intensive habitat surveying, we will be able to determine the quality of each sheep's diet, from micronutrients to protein content. With this information, we will be able to draw comparisons of summer nutrition between the Whiskey and Jackson herds. We suspect that understanding the link between nutrition and disease is key to understanding differences in bighorn sheep population performance.

One season of collecting data on lamb survival and summer nutrition gave us a glimpse into the overall patterns that the bighorn sheep in the Wind River and Gros Ventre ranges are experiencing. Additional seasons of data collection will allow us to draw much stronger conclusions and provide a broader picture of the factors influencing sheep populations. With that in mind, we are preparing for our

second of three field seasons. Again this summer we will cover countless miles in the Wind River and Gros Ventre ranges collaring lambs, picking up poop, and collecting plants on summer range. Beyond summers of data collection, the rest of the year is filled with lab analyses of the samples collected, data analysis, and conversations with our many collaborators and experts in the field of bighorn sheep pneumonia. The Bighorn Sheep Nutrition and Disease Project is a marathon, not a sprint, and it will take time to collect and piece together the data to reveal the root of differences in population performance. The dismal lamb survival observed this year is discouraging, but the information we can draw from it should be a source of progress towards understanding pneumonia in bighorn sheep. With critical support from the Wyoming Game and Fish Department, Wyoming Wildlife and Natural Resource Trust, Wyoming Governor's Big Game License Coalition, Bureau of Land Management, Wyoming Wild Sheep Foundation, Wild Sheep Foundation, Bowhunters of Wyoming, Wyoming Wildlife/Livestock Disease Research Partnership, and the Teton Conservation District the team will continue to work towards identifying the link between nutrition and disease in bighorn sheep to seek possible solutions to aid in keeping sheep on the mountain.