

## Student Pages: Nevada Bighorn Sheep: On the Edge?

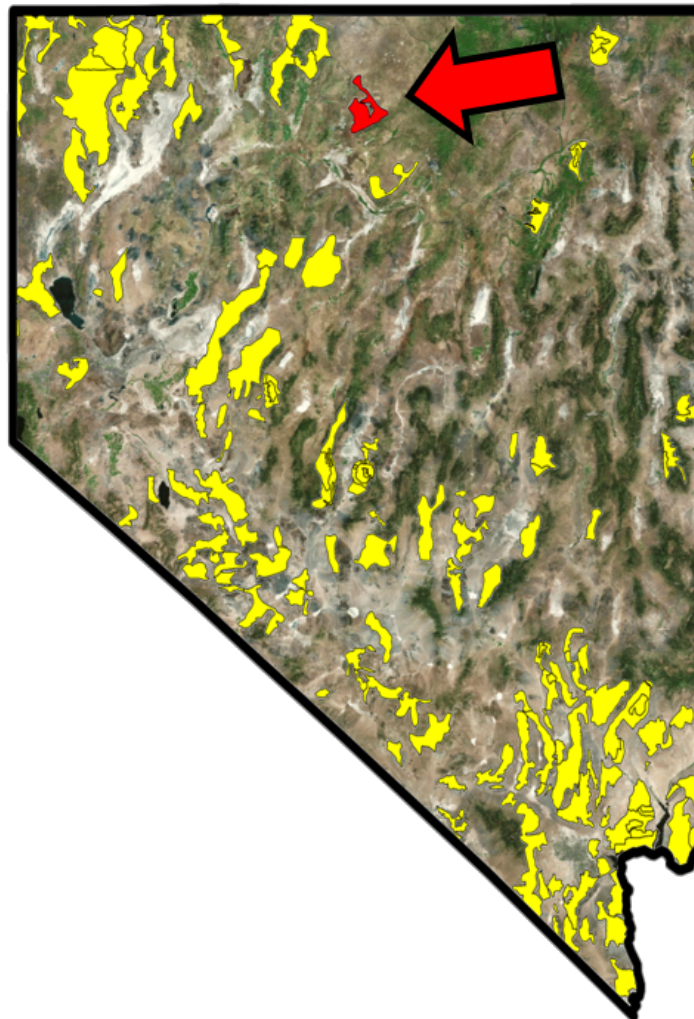
**Team 1** Your bighorn sheep herd name is SNOWSTORM MOUNTAINS HERD

### Instructions for this Activity

You should be in one of 6 teams. Individually, read through the Background Information thoroughly, calculate the missing data in the Table 1-1, and create your graph. Then, work as a team to answer the questions and create a list of factors (things) that affect the conservation of your bighorn sheep herd. Then, as a team create a presentation that you will give to the rest of the class. At the end of these Student Pages, you will find a list of things you should include in your presentation.

### BACKGROUND INFORMATION

The Snowstorm Mountains Herd is located north of Battle Mountain, Nevada and occupies about 125,000 acres.



## **Bighorn Sheep Subspecies**

The subspecies of bighorn sheep in the Snowstorm Mountains Herd is the California bighorn sheep.

## **History and Habitat**

Beginning in 1985, the Nevada Department of Wildlife began transplanting wild bighorn sheep INTO the Snowstorm Mountains area to help re-establish the herd. During 1985-1986, 15 bighorn sheep were translocated into the Snowstorm Mountains Herd from a wild bighorn sheep herd in Idaho. In 1988, 12 bighorn sheep were translocated into the Snowstorm Mountains Herd from a wild bighorn sheep herd in Idaho. In 1994, 13 bighorn sheep were translocated into the Snowstorm Mountains Herd from a wild bighorn sheep herd in British Columbia and 2 bighorn sheep were translocated into the Snowstorm Mountains Herd from a sheep herd in Nevada. In 1998, 14 bighorn sheep were translocated into the Snowstorm Mountains Herd from a wild bighorn sheep herd in northern Nevada. The herd grew steadily up until year 2011. During August 2011, bighorn sheep began dying from a bacteria pathogen called *Mycoplasma ovipneumoniae*, which causes pneumonia in wild bighorns.

The bacteria *Mycoplasma ovipneumoniae* can be present in domestic goats and domestic sheep. Interestingly, even when domestic goats and domestic sheep carry this bacteria, the domestic goats and domestic sheep typically do not get pneumonia. However, if a wild bighorn sheep comes into contact with a domestic goat or sheep that has this bacteria, then the wild bighorn sheep can be exposed to the bacteria and subsequently get infected with pneumonia. Moreover, the newly infected wild bighorn sheep can then bring the bacteria back to its herd and infect the entire herd with pneumonia.

Since 2011, recruitment in the Snowstorm Mountains Herd has been very low.

Nevada Department of Wildlife is collaborating with South Dakota State University, Washington State University, and Idaho Fish and Game on research to better understand disease transmission in wild bighorn sheep herds. Research efforts include trapping, collaring, and testing bighorns in the Snowstorm Mountains Herd. Each year, bighorn sheep in the Snowstorm Mountains Herd are tested to determine whether they have the bacteria called *Mycoplasma ovipneumoniae*.

The habitat in the Snowstorm Mountains is primarily dominated by sagebrush steppe shrublands with an understory of perennial, non-native annual grasses, and quite a lot of flowers. There are several buttes and ridge tops with dissecting drainages, with many aspen stringers large enough to provide habitat for Northern Goshawks. This area represents some of the most picturesque and typical Great Basin habitats in Nevada.

Water in the Snowstorm Mountains is relatively abundant with about 10 small creeks that flow year round, and several natural springs and meadows.

## Wild Bighorn Sheep Translocation Program in Nevada

As of February 2019, Nevada biologists have translocated 3,380 bighorn sheep in Nevada!

### **The following wild bighorn sheep were translocated INTO the Snowstorm Mountains Herd:**

1985 - 9 bighorns, came from a different bighorn herd in Idaho

1986 - 6 bighorns, came from a different bighorn herd in Idaho

1988 - 12 bighorns, came from a different bighorn herd in Idaho

1994 - 13 bighorns, came from a different bighorn herd in British Columbia

1994 - 2 bighorns, came from a different bighorn herd in Nevada

1998 - 14 bighorns, came from a different bighorn herd in Nevada

## Factors Affecting the Conservation of the Snowstorm Mountains Herd

Disease is the primary issue for the Snowstorm Mountains Herd. Because the 2011 die-off was caused by a bacterial pathogen that causes pneumonia, managers are working to minimize the possibility of domestic sheep and goat interactions with the Snowstorm Mountains Herd to reduce the threat of disease transmission.

Traffic and human disturbance are also issues for this herd because one of the largest open pit gold mines is located within 5 miles of the Snowstorm Mountains in the valley directly to the west. This means that the Snowstorm Mountains Herd is subjected to 24-hour traffic, noise, and lights. In addition, more than 500 feral horses occupy the area between the Dry Hills and Snowstorm Mountains, which means bighorn sheep compete for food and water resources with a large feral horse herd. Although cattle grazing operations are well managed at higher elevations, competition exists between cattle and bighorn at lower elevations where much of the native perennial grass component has been lost to wildfires. There is also competition between cattle and bighorns for water at degraded spring sources. In the Snowstorm Mountains, helicopters are used in spring to conduct golden eagle nest surveys, which has the potential to place newborn lambs at risk (they might fall or be abandoned) when the herd runs from the helicopters. Finally, there are some predators of bighorn sheep here, including mountain lions, bobcats, coyotes, and golden eagles.

## Graph It!

Using Table 1-1 on the following page, do the following:

1. Calculate the **Total Number of Bighorn Sheep Each Year** (HINT: add the Number of EWES yearlings, Number of RAMS yearlings, Number of EWES 2+ years old, and the Number of RAMS 2+ years old) for each year and put the answers in the column marked **Total Number of Bighorn Sheep Each Year** (the yellow shaded column).
2. After you have filled in all the missing data, create a graph showing the **Total Number of Bighorn Sheep Each Year**. Put **Year** on the x-axis and **Total Number of Bighorn Sheep Each Year** on the y-axis.

Table 1-1. Annual Population Estimate of Bighorn Sheep in the Snowstorm Mountains Herd, 1985-2018

| YEAR | Number of EWES<br>Yearlings | Number of RAMS<br>Yearlings | Number of EWES<br>2+ years old | Number of RAMS<br>2+ years old | Total Number of<br>Bighorn Sheep Each Year |
|------|-----------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------------------|
| 1985 | 2                           | 0                           | 3                              | 3                              | 8                                          |
| 1986 | 1                           | 1                           | 8                              | 2                              |                                            |
| 1987 | 1                           | 3                           | 8                              | 3                              |                                            |
| 1988 | 1                           | 1                           | 16                             | 7                              |                                            |
| 1989 | 5                           | 2                           | 15                             | 7                              |                                            |
| 1990 | 3                           | 3                           | 18                             | 8                              |                                            |
| 1991 | 3                           | 3                           | 20                             | 9                              |                                            |
| 1992 | 5                           | 5                           | 20                             | 10                             |                                            |
| 1993 | 2                           | 2                           | 22                             | 16                             |                                            |
| 1994 | 4                           | 4                           | 22                             | 13                             |                                            |
| 1995 | 6                           | 6                           | 38                             | 16                             |                                            |
| 1996 | 8                           | 7                           | 40                             | 19                             |                                            |
| 1997 | 6                           | 6                           | 42                             | 21                             |                                            |
| 1998 | 8                           | 8                           | 42                             | 23                             |                                            |
| 1999 | 12                          | 12                          | 53                             | 26                             |                                            |
| 2000 | 14                          | 12                          | 59                             | 28                             |                                            |
| 2001 | 18                          | 18                          | 65                             | 33                             |                                            |
| 2002 | 9                           | 9                           | 73                             | 42                             |                                            |
| 2003 | 12                          | 12                          | 73                             | 39                             |                                            |
| 2004 | 7                           | 7                           | 75                             | 45                             |                                            |
| 2005 | 11                          | 10                          | 72                             | 44                             |                                            |
| 2006 | 8                           | 8                           | 75                             | 43                             |                                            |
| 2007 | 17                          | 17                          | 75                             | 39                             |                                            |
| 2008 | 10                          | 10                          | 81                             | 44                             |                                            |
| 2009 | 13                          | 13                          | 82                             | 41                             |                                            |
| 2010 | 18                          | 18                          | 86                             | 43                             |                                            |
| 2011 | 9                           | 9                           | 50                             | 25                             |                                            |
| 2012 | 0                           | 0                           | 54                             | 15                             |                                            |
| 2013 | 1                           | 2                           | 48                             | 14                             |                                            |
| 2014 | 0                           | 0                           | 31                             | 14                             |                                            |
| 2015 | 4                           | 4                           | 26                             | 10                             |                                            |
| 2016 | 1                           | 1                           | 25                             | 11                             |                                            |
| 2017 | 2                           | 2                           | 15                             | 13                             |                                            |
| 2018 | 2                           | 2                           | 14                             | 9                              |                                            |

**QUESTIONS (answer these as a team)**

1. How many total bighorn sheep have been translocated INTO this herd between 1985-1998?  
Where did these translocated wild bighorn sheep come from?
  
2. What happened to this herd in 2011?
  
3. Do you think the bighorn sheep herd has recovered from whatever happened in 2011?
  
4. How is the pathogen that causes pneumonia in wild bighorn sheep often transmitted to bighorn sheep herds?
  
5. Why would traffic, noise, and lights affect bighorn sheep?
  
6. How do feral horses affect the habitat for wild bighorn sheep?

## **INSTRUCTIONS FOR CREATING YOUR PRESENTATION**

Work as a team to put together a presentation that you will give to the rest of the class. Your presentation should include at least the following:

- 1) the subspecies of bighorn sheep in your herd
- 2) where your bighorn sheep herd lives
- 3) brief background information about the history of this herd and the habitat it occupies, including information about the water availability in the Snowstorm Mountains
- 4) the graph you created
- 5) information about how many wild bighorn sheep have been translocated into the Snowstorm Mountains Herd during years between 1985-1998
- 6) information about what happened to this herd in 2011
- 7) a list of factors affecting the conservation of this herd
- 8) include photos of the Snowstorm Mountains, provided below

Photos of the Snowstorm Mountains area are provided by Mike Cox, Nevada Department of Wildlife:



