Student Pages: Nevada Bighorn Sheep: On the Edge?

Team 6   Your bighorn sheep herd name is MUDDY AND BLACK 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 1-6, and create your two graphs. 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. Finally, 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 the presentation.

BACKGROUND INFORMATION

The Muddy and Black Mountain Herd is located east of Las Vegas and occupies about 263,369 acres.
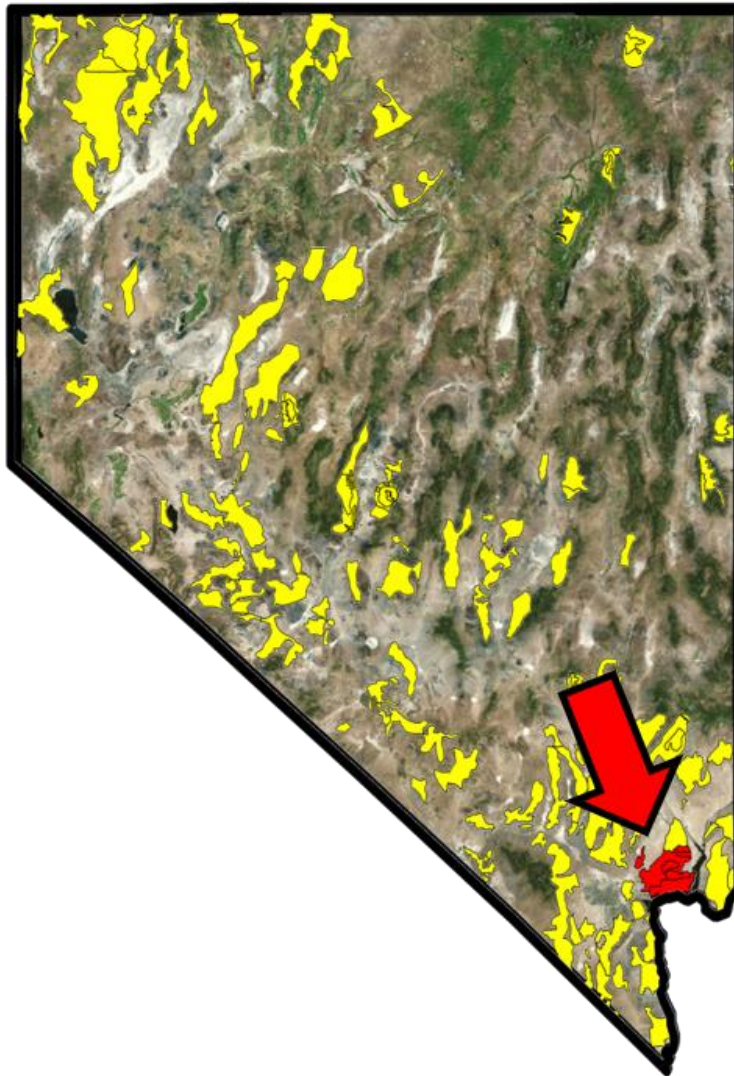
Bighorn Sheep Subspecies

The subspecies of bighorn sheep in the Muddy and Black Mountains Herd is the desert bighorn sheep.

History and Habitat

The Muddy and Black Mountains Herd is a native herd. The Muddy Mountains is adjacent to the Black Mountains. The habitat in the Muddy Mountains is primarily dominated by creosote bush, white bursage (*Ambrosia dumosa*), and black brush (*Coleogyne ramosissima*) with an understory of limited perennial fluff grass and desert needle grass. There are also a lot of flowers, with a peak bloom in late March/early April. There is a diversity of cactus species in this area, with barrel, beavertail, cholla, and others. The plant community in the Black Mountains is not as diverse as that in the Muddy Mountains. However, water is more available in the Black Mountains compared to water availability in the Muddy Mountains.

Before the Hoover Dam was built on the Colorado River near Boulder City, the Muddy Mountains served as winter range for bighorn sheep. Historically, there were about 700 bighorns that lived in the Muddy and Black Mountains area before the Hoover Dam was built.

Importantly, the Muddy Mountains area has a scattered distribution of two small shrubs called screwbean mesquite (*Prosopis pubescens*) and catclaw acacia (*Acacia greggii*) that stay green and bear their fruits longer during drought periods than any other shrub or plant. These two shrubs provide critical food sources for bighorn sheep when drought conditions exist. These two vitally important shrubs supplement the bighorn diet when all other plants are dried and desiccated, which allows desert bighorns here to survive better than most other desert bighorn sheep herds.

Wild Bighorn Sheep Translocation Program in Nevada

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

No bighorn sheep have been translocated INTO the Muddy and Black Mountains Herd.

However, since 1981 this bighorn sheep herd has served as a source stock, which means sometimes wild bighorn sheep have been trapped FROM the Muddy and Black Mountains Herd and translocated TO other wild bighorn sheep herds.

Factors Affecting the Conservation of the Muddy and Black Mountain Herd

Relative to most bighorn habitat in Nevada, the Muddy Mountain area is not well-watered. This area has less than 10 known natural spring sources. Bighorns are dependent on these springs from April-October each year. Bighorn sheep here also compete with a small number of feral horses and burros for water at the limited natural springs. To help conserve this herd, Nevada Department of Wildlife and many conservation organizations have built water guzzlers to help provide water.

Dispersed recreation is also a conservation issue. The Muddy and Black Mountains area is part of the Lake Mead National Recreation Area and Valley of Fire State Park, both of which receive high

amounts of dispersed recreation. The Muddy and Black Mountains Herd has acclimated to high rates of sightseeing helicopter flyovers from Las Vegas to the Grand Canyon.

Keeping the Muddy and Black Mountains Herd at or below carrying capacity is a management goal. This bighorn sheep herd is doing very well. In fact, this herd has done so well that hundreds of sheep have been trapped FROM the Muddy and Black Mountains Herd and translocated TO other bighorn sheep habitat throughout Nevada and even to other states to re-establish other bighorn sheep herds or to supplement small herds. Even today, the herd continued to grow despite the fact that many sheep had been translocated FROM this herd TO other herds.

It's important to keep this herd at or below carrying capacity to control the herd in relation to its availability of resources. To help keep the bighorn herd at or below carrying capacity, managers use at least two strategies: 1) regulated hunting (where the number of sheep allowed to be hunted is calculated based on scientific information), and, 2) trapping some individuals FROM the Muddy and Black Mountains Herd and transplanting them TO other wild bighorn sheep herds. Regulated hunting is an important conservation tool for wildlife managers.

Carrying capacity is the maximum size of a biological population that the environment can sustain indefinitely without degrading the environment for future generations. When a population is at carrying capacity, then the # of births = the # of deaths.

Graph It!
Now, it's time to do some graphing. There are two tables below, follow the instructions for each table.

Using Table 1-6 on the next 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 line 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 1-6. Annual Population Estimate of Bighorn Sheep in the Muddy and Black Mountains Herd, for Years 1985-2018

YEAR	Number of EWES Yearlings	Number of RAMS Yearlings	Number of EWES 2+ years old	Number of RAMS 2+ years old	Total Number of Bighorn Sheep Each Year
1985	77	76	377	294	824
1986	64	56	353	293	
1987	58	56	334	273	
1988	59	58	356	262	
1989	81	78	363	254	
1990	53	52	383	265	
1991	45	43	362	248	
1992	46	45	359	236	
1993	70	69	334	219	
1994	77	74	339	225	
1995	56	55	336	226	
1996	57	53	343	218	
1997	36	36	362	211	
1998	57	56	332	195	
1999	69	70	333	202	
2000	53	51	349	215	
2001	29	26	340	208	
2002	53	51	297	175	
2003	25	24	288	173	
2004	68	65	288	160	
2005	79	79	329	192	
2006	87	84	362	217	
2007	93	90	396	235	
2008	73	71	415	265	
2009	84	84	411	283	
2010	49	50	441	308	
2011	43	42	448	304	
2012	109	108	412	287	
2013	68	65	460	320	
2014	109	110	450	316	
2015	104	106	448	334	
2016	69	69	483	365	
2017	93	92	469	357	
2018	80	79	480	376	

Using Table 2-6 below (on this page), create a BAR graph showing the number of sheep translocated FROM the Muddy and Black Mountains Herd each year. Put **Year** on the x-axis and **Number of Sheep Trapped FROM the Muddy and Black Mountains Herd** on the y-axis.

Table 2-6. Number of Bighorn Sheep Trapped FROM the Muddy and Black Mountains Herd and translocated TO Other Bighorn Sheep Herds During 1981-2014.

Year	Number of bighorn sheep trapped FROM the Muddy and Black Mnts Herd
1981	20
1982	0
1983	57
1984	19
1985	50
1986	112
1987	74
1988	0
1989	26
1990	41
1991	38
1992	0
1993	55
1994	36
1995	58
1996	20
1997	0
1998	30
1999	20
2000	20
2001	26
2002	0
2003	10
2004	0
2005	0
2006	0
2007	25
2008	41
2009	20
2011	51
2012	25
2013	50
2014	71

Important information to remember about Table 2-6:

During 1990, of the 41 bighorn sheep trapped FROM the Muddy and Black Mountains herd, 12 of those trapped bighorns were then translocated TO the Gabbs/Gillis Range Herd.

During 1991, of the 38 bighorn sheep trapped FROM the Muddy and Black Mountains Herd, 20 of these bighorn sheep were then translocated TO the Bare Mountain Herd.

During 1993, of the 55 bighorns sheep trapped FROM the Muddy and Black Mountains Herd, 17 of these bighorn sheep were then translocated TO the Gabbs/Gillis Range Herd and 18 of these bighorn sheep were translocated TO the Bare Mountain Herd.

QUESTIONS (answer these as a team)

    1. How many sheep were trapped FROM the Muddy and Black Mountains Herd during 1993?

    2. In 1993, some of the bighorns that were trapped FROM the Muddy and Black Mountains Herd were translocated to two other bighorn sheep herds in Nevada. Name those two herds.

    2. What does carrying capacity mean?

    3. Why is it important to keep a wild bighorn herd at or below carrying capacity? How do managers keep the Muddy and Black Mountains Herd below or at carrying capacity?

    4. How does regulated hunting differ from unregulated hunting? (Hint: which one is <u>based on science</u>?)

    5. Why are screwbean mesquite and catclaw acacia so important to this herd?

    6. How many total bighorn sheep have been trapped FROM the Muddy and Black Mountains Herd and translocated TO other bighorn sheep herds? (Hint: add all the numbers in the orange column in Table 2-6).

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, include information about how many guzzlers have been built here and why screwbean mesquite and catclaw acacia are so important to this herd
4) the graphs you created
5) information about how many wild bighorn sheep have been trapped FROM the Muddy and Black Mountains Herd and translocated to other wild herds
6) information about how many bighorns have been trapped FROM the Muddy and Black Mountains Herd and translocated to the Gabbs/Gillis Range Herd and information about how many bighorns have been trapped FROM the Muddy and Black Mountains and translocated to the Bare Mountains Herd
6) a list of factors affecting the conservation of this herd
7) a definition of **carrying capacity**
8) photos of the Muddy and Black Mountains area and sheep, provided below

Photos of the Muddy and Black Mountains Herd and area provided by Mike Cox, Nevada Department of Wildlife: