# Bighorn Education Trunk

## Objectives:

Describe the anatomy of a rocky mountain bighorn sheep
Explain the differences between horns and antlers.
List the necessary resources for bighorn sheep as well as some predators of bighorn sheep.
Describe the habitat of bighorn sheep.
Inspire people to appreciate that bighorns are an important part of the ecosystem.
Educate the public about the habitat and conservation needs of the Rocky Mountain Bighorn Sheep.
Encourage the active stewardship of wildlife and wildlands.

## Key Vocabulary:

**Adaptation-** a physical, hereditary or behavioral feature that persists or adjusts to improve an individual's relationship with its environment

**Antler-** a hard, bony, branched growth projecting from the head of certain mammals, which falls off every year at a certain time

**Conservation-** the use of natural resources in a way that assures their continuing availability to future generations; the wise and intelligent use or protection of natural resources

**Ecology-** the study of the relationship between organisms or groups of organisms and their environment; the science of interrelations between living organisms and their environment

**Ecosystem-** a natural unit that includes living and non-living parts interacting to produce a stable system

**Endangered-** an "endangered" species is one which is in danger of extinction throughout all or a significant portion of its range.

**Environment-** the total of all circumstances and conditions – air, water, climate, location, vegetation, human-element, wildlife – that have an effect on the growth and development of an organism

**Ewe-** a female bighorn sheep

**Extinction-** the condition of having been removed from existence; gone forever. An animal or plant facing extinction is one in danger of vanishing from our world

**Habitat-** the arrangement of food, water, shelter or cover, and space suitable to an animal's needs

**Herbivore-** an animal that eats only plants

**Horn-** a permanent hard, keratin growth projecting from the head of certain animals

**Mammal-** a warm-blooded animal, with hair that more or less covers its body and that feeds its young, milk produced by mammary glands

**Predator-** an animal that kills and eats other animals

**Prey**- an animal that is killed and eaten by other animals
**Ram**- a male bighorn sheep
**Resource**- a portion of an environment upon which people have placed or assigned value, or see as being available for use
**Shelter-** cover from the elements: for natal activity, to travel in, for breeding, for bedding, etc. which varies from species to species
**Wildlife management**- the application of scientific knowledge and technical skills to conserve, protect, enhance, or extend the value of the wildlife resource and its habitat

## Background

An estimated 2 million or more wild sheep roamed many parts of the west in the 1800s. With European settlement and expansion, bighorn sheep numbers plummeted to an estimated 15,000 sheep, with many extirpated throughout their historic range. This decline was accelerated by unregulated hunting, habitat loss, predation, disease transfer from domestic sheep and goats, and competition for food resources with domestic sheep and other livestock.

Thanks to efforts by conservation organizations, including hunting groups and state wildlife agencies, the number of wild bighorn sheep has increased to about 70,000 sheep throughout the west. As part of this conservation effort, managers used transplant programs in which individual sheep from healthy herds are trapped and relocated to different suitable areas to re-establish former bighorn habitat or to supplement small existing herds.

In the US, the Rocky Mountain bighorn sheep is the most widely distributed species, consisting of these three subspecies: *Rocky Mountain Bighorn Sheep, Desert Bighorn Sheep,* and *Sierra Nevada Bighorn Sheep.* Of the three subspecies, Sierra Nevada bighorn sheep are most limited in population size and range. In fact, the Sierra Nevada Bighorn Sheep was federally listed as an endangered species under the Endangered Species Act in 1999. By 1995, there were only about 100 Sierra Nevada bighorn sheep anywhere in the world. Since it was listed as endangered and federally protected, this subspecies has grown to about 400 individuals today.

### SCIENTIFIC CLASSIFICATION OF NORTH AMERICAN WILD SHEEP

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| KINGDOM | *Animalia* |
| PHYLUM | *Chordata* |
| CLASS | *Mammalia* |
| ORDER | *Artiodactyla* |
| FAMILY | *Bovidae* |
| GENUS | *Ovis* |

## Rocky Mountain Bighorn —*Ovis canadensis canadensis*

The Rocky Mountain Bighorn Sheep is the largest of the wild sheep inhabiting North America. They are found in British Columbia and Alberta, Canada and in the western United States south to New Mexico. A large male, or *ram,* can weigh over 300 pounds and stand over 42 inches tall at the shoulder. They are generally a dark brown to gray-brown color with a white rump patch, muzzle and back of legs. Their coats may appear considerably lighter in spring before the winter coat is shed to reveal the darker summer coat beneath. Rams have horns that are massive and tightly curled close to the face. A female sheep, or *ewe*, has smaller, shorter horns that curve only slightly backwards. Ewes typically weigh 125-150 pounds.

The mountains that surround Dubois, Wyoming are home to North America's largest wintering herd of Rocky Mountain Bighorn Sheep. The National Bighorn Sheep Interpretive Center mission is to educate the public about the habitat and conservation needs of the Rocky Mountain Bighorn Sheep and to encourage stewardship of wildlife and wildlands. One way of advancing this mission is by making this educational trunk available to the public.

## Contents of NBSC Education Trunk

| Specimens | Suggested Topics to Review/Uses |
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| NOTE<br>All specimens are of the Rocky Mountain Bighorn Sheep species<br><br>1<br><br>Full Ewe Hide of female Rocky Mountain Bighorn Sheep | Anatomy of Rocky Mountain Bighorn Sheep<br><br>**Average adult female (ewe) size**<br>• Weight 110-150 pounds<br>• Length 4 ½ ft – 5 ¼ ft long<br>• Height at shoulder 2 ½ ft – 3 ft<br><br>**Average adult male (ram) size**<br>• Weight up to 300 pounds<br>• Length 5 ft – 6 ft long<br>• Height at shoulder 2 ½ ft -3 ½ ft<br><br>**Fur**  Outer layer made of brittle guard hair overlaying a thick underfur or fleece, bighorn sheep will shed their fur each summer<br><br>**Hoofs**  3 in – 3 ½ in long, sharp-edged with spongy padded sole interior allows for better balance and traction in steep terrain, halves of each hoof are separated, hind foot slightly smaller than fore foot<br><br>**Eyes**  Bighorn sheep have excellent eyesight to see predators far in the distance, position of eyes allows bighorn sheep to see in front and to the side (peripheral vision)<br><br>**Horns**  Female ewes and male rams have horns, but the male ram's horns are much larger (length and circumference, for use in dominance fights) |

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| **2**<br><br>Bighorn Ram Skull | #2 and #3 can be combined to demonstrate how the horns grow on the bighorn ram's skull. Discussion can include:<br><br>• Horns are not shed (as compared to antlers on deer or elk, which are shed annually). Also see #5.<br>• Rams have a thick, bony skull with cellular cushioning prevents injury during dominance mating fights during the run in the autumn/early winter.<br>• Teeth are specialized for chewing vegetation, not for biting/tearing like a carnivore's teeth. The space between bottom front and back teeth is for tongue to roll the cud around for further chewing. |
| **3**<br><br>Bighorn Ram and Ewe Horns | • Bighorn sheep ram horns can weigh as much as 30 pounds when their size reaches "full curl" at about 7-8 years of age<br>• Females have smaller horns<br>• "Brooming" is usually caused by fighting between rams, where the tips of the horns will be broken off or damaged, but it can also be caused by accidents or digging |
| **4**<br><br>Photo showing how to age a bighorn sheep by its horns | Specimens 2, 3 and 4 can be combined to show how to estimate the age of a bighorn by counting the rings on the horns.<br>• In the spring and summer when there is plenty of food, the horns grow relatively fast. In the fall and winter, when there is less food and a shift in hormones, the horns do not grow as fast, thus making the dark ring.<br>• Scientists look for the dark rings that typically go all the way around the horn. The distance between the dark rings represents one year of growth. Scientists count the number of rings to get a good idea of how many birthdays the animal has had. The rams are much easier to count than the ewes. |
| **5**<br><br>Deer antler | • Can be used to discuss the differences between horns and antlers as well as the types of animals that have each. Horns- cattle, bison, pronghorn, bighorn sheep, mountain goats. Antlers- deer, elk, moose. |
| **6**<br><br>Rocky Mountain Bighorn Sheep hoof, photo and track cast | • The outer part of the surface that touches the ground is very tough but the middle part near the split is softer like rocks climber's special shoes. This combination of surfaces allows bighorns to cling to narrow ledges and walk across rocks without falling. |

| 7 Photo of Rocky Mountain bighorn sheep eye | • Have students notice that the pupils are oblong instead of round like human pupils. This fact and the location of their eyes on the sides of their heads allows them to have peripheral vision of 320°-340° which helps them look out for predators. |
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| 8 Ovis-opoly game board, game cards and laminated hoof tracks | • Can be used to demonstrate the importance of certain resources for bighorn sheep as well as factors that are detrimental to bighorns <br> • Can use laminated hoof tracks to make a life size "game board" and have the students be the "game pieces" |
| 9 Sheep resources game instructions and game chips | • Can be used to demonstrate the importance of specific resources for bighorn sheep as well as factors that are detrimental to bighorns |
| 10 Laminated photos | • Show rams, ewes, lambs and predators of bighorns |

## Books & Other Reading Materials

- *Moho Wat: Sheepeater Boy Attempts a Rescue* by Kenneth Thomasma
- *Beyond Fair Chase* by Jim Posewitz
- *Above the Treeline* by Ann Cooper
- *Rocky Mountain Bighorn Sheep* by Dale Toweill
- *Mountain Meadow 1 2 3* by Caroline Stutson
- *Highlife: Animals of the Alpine World* by John Winnie, Jr.
- *Wild Sheep of North America North of the 49th*
- *Bufford the Little Bighorn* by Bill Peet
- *Bighorns Don't Honk* by Stephen Lester
- Greater Yellowstone Region National Geographic map
- National Bighorn Sheep Center Materials
    - Brochures
    - Bighorn Sheep Body Language Guide
- The Wind River Rendezvous-Petroglyph guide to Torrey Creek area
- Wyoming Big Game Mammals Guide (To compare 10 common wildlife species)
- Bighorn Sheep Species profile poster
- Wild Sheep of North America laminated poster
- Big Game Animals of North America interactive Wheel
- Zoobooks: The Deer Family
- Wyoming Wildlife magazine
- Wyoming Big Game Mammals magazine

- Wild Sheep Foundation: On The Mountain booklet
- Handouts which can be copied for students: crossword puzzle, matching game, word search, maze and bighorn sheep to color

## Review:
Key terms:

    Conservation, ecology, ecosystem, ewe, habitat, herbivore, horn, predator, prey, ram, resource

Describe the anatomy of a rocky mountain bighorn sheep.

Explain the differences between horns and antlers.

List the necessary resources for bighorn sheep.

## Assessment and evaluation:
Play Jeop-herdy game to assess student's learning. Email karen@bighorn.org for a PowerPoint format Jeop-herdy game.