



**Society for the Conservation of Bighorn Sheep
Sheep Sheet - Volume 1 – February 2014
www.desertbighorn.org**



Nevada Stone Sheep or a Very Large Rock Ram



Annual Meeting

The annual meeting of the Society for the Conservation of Bighorn Sheep was held Sunday February 9, 2014 at 11:00 am until 4:00 pm, in the fine gun room inside the Bass Pro Shop 7777 Victoria Gardens Lane, Rancho Cucamonga, CA 91730 45 Members and guest attended. Lunch was cold cut sandwiches, potato salad, ice tea and lemonade. All was provided by Bass Pro. We elected a full slate of officers for 2014. There were several power point presentations covering the 2013 work projects that were completed along with pictures from the projects.



The Board

Top Row Left: Jeff Crouse, Terry Anderson, Bob Burke, Christian Guntert, Gary Thomas, Neil Ringlee, Mark LeCompte. Bottom Row Left: Glenn Sudmeier, Steve Marschke, George Sutton, Norm Lopez, Dave Smith, Jennifer Hinojosa. Not Shown: John Hybarger



Newsletter by E-Mail

If you would like to have the Newsletter sent by e-mail let me know at cameracoordinator@sheepsociety.com. You can still get a paper copy via regular mail.



The SCBS Board of Directors meets at about 6:00 p.m. on the 2nd Tuesday of each month in the conference room at Bass Pro Shops, 7777 Victoria Gardens Lane, Rancho Cucamonga, CA 91730. You are invited to attend any and all board meetings, to bring a friend, to visit, and, hopefully, to participate.

SCBS 2014 Board of Directors

Director	Phone Number	Director	Phone Number
Robert Burke	760-957-7694	Jeff Crouse	760-680-9819
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Photo by Bob



By Carlos Gallinger
thewayofthings.org



**A PETROGLYPH IS WORTH 1000 WORDS
(Or 1145 words)**

This is one of the most famous petroglyphs in North America and rightfully so. It is unique in many ways. To start with, it's an action shot with two characters interacting with each other. This alone puts it in a rare and unique category of petroglyphs, and makes it worth trying to understand all that we can read from it.

We can start by cataloging all the various artistic attributes that we see in this picture then try to understand them in their totality.

We start with looking at the hunter. One of the first things we notice is that the artist chose to emphasize that this hunter is a man. This probably has more to do with a macho attitude rather than any necessity in communicating this, as traditionally women do not hunt big-game in hunter-gatherer societies.

Next we see that this hunter is wearing a hat. This may indicate that it was cold when this event happened or might be related to the status or position that this hunter had within the tribe. Then of course sometimes a hat is just a hat.

Now let's take a look at his bow. There is a lot of information here. To start with the way it's drawn may indicate that this hunter is right-handed. The fact that we have a bow being used on a Bighorn sheep is significant in itself. It tells us that, at the time this glyph was made, the bow was sufficiently developed to be used for Bighorn sheep as opposed to the Atlatl. Then we can relate this information to the level of patina on this glyph and

we can see that it's relatively old. That is to say, the patina has started to grow back over it. This tends to bracket the age of the glyph to a time when archery was relatively new. Furthermore we can see that this bow is not a "re-curve bow" and is relatively thick, indicating perhaps some of the possible attributes of the first bow used for big-game.

Now let's take an inventory of the desert Bighorn sheep.

To start with the horns on this animal are big enough that it is most likely a young ram. However, their size and shape can also be interpreted as those of an older ewe. How one sees or interprets the horns on this animal will influence the interpretation of what one sees in our next major component of this glyph. The body of this sheep was centered on an older glyph that has no recognizable symbolism of itself. Then the artist was careful to leave a partial outline of the original patina between the old and new glyph. This gives this Bighorn sheep glyph three separate times that are represented within one glyph. Perhaps this is representing the fact that this sheep is part of ongoing succession of its species. Or perhaps more to the point this could be a representation of a pregnant sheep. We have other glyphs that show this very clearly in the Coso mountains.

Now let's turn our attention to the arrow that is striking the sheep in the middle of its back. Here the artist has provided us with some incredible detail. The fact that the arrow is bent and fades out back toward the hunter is significant. The direction that it is bent indicates that it came from our hunter and had a arched trajectory. Then the artist was able to portray the last fraction of a second of flight before impact when the arrow was visually a blur.

Next, it seems like the artist tried to portray this animal with its mouth wide open at the moment it was hit, giving us the impression that this animal is screaming in pain. This gives us another indication that this petroglyph is a precise moment in time. However, it's been my experience that desert Bighorn sheep do not vocalize when mortally wounded as do other animals, such as the coyote does. Therefore, this detail may be an indication that the sheep has been running at full speed and breathing heavily rather than denoting the moment of the kill.

Now we want take a look at the legs on this sheep. To start with, the front legs are drawn in a very normal way for a Coso mountain Bighorn sheep glyph and the back legs are not. In this glyph the hind legs are held straight and stiff in a manner that's not conducive to running or standing. The most likely explanation for this is that this animal has just been hit in the spine with an arrow and the rear legs no longer work properly. This gives us another indication that this glyph is showing a precise moment in time

And finally we should contemplate the mysterious and nebulous cloud above the sheep's head.

By examining it closely we find that the patina is in the same condition as the sheep and the hunter, and so it was made at or near the same time as they were. This would seem to indicate that it is part of this overall scene and its message. Given the tremendous detail in which our sheep and hunter are shown, this third component, if part of this scene, is very different. It is abstract and mysterious. Perhaps it is trying to express something that is abstract or supernatural that is impossible to draw realistically.

Here we enter into speculation rather than just describing the anatomy of a drawing.

There are many possibilities one can think of. We can explore two to exercise our imagination.

One possibility is that both the sheep and the hunter were following a cloudburst that led to this moment. I myself have experienced desert Bighorn sheep leaving an area and walking 5 or 10 miles to where a thunderstorm has hit.

Then on a more spiritual plane this cloud might indicate the individual spirit of the sheep at the moment of the kill, going back to the supernatural world, back to the collective spirit of its species. This is a common belief system among many Native American tribes and hunter gatherers throughout the world.

So we're left with the question. Is this an artistic and beautiful rendition of a hunting scene in the physical world, or is this symbolically showing us something that they considered part of the eternal and mysterious way of things.

By Carlos Gallinger



Area Captain Coordinator

Thanks to all the area captains and others who helped out with the checking of some of the more remote drinker systems. Also, if you are out checking drinker systems PLEASE fill out the Area Captains Report and send it to jjrestorationservice@yahoo.com. Jeff is always looking for help covering all the SCBS water systems so give him a call at 760-680-9819 jjrestorationservice@yahoo.com if you can give a hand covering water systems.



Spring Captain Coordinator

Thanks to the efforts of Bill Tuck we have an effective Spring Captain Program too, so a big shout out to Bill and his team of Spring Captain's. Give Bill a call if you can lend a hand checking the Natural springs in the areas. Bill's phone numbers are Home: 760-8685837 and his cell is 760-964-8095.

“The Following is a Research Paper that was sent to me to see if we would consider putting it in our newsletter and provide some feedback to the author. It will be broken down in 2 parts”

Are Bighorn Sheep Experiencing an Evolutionary Change Regarding Horn Size in Response to Trophy Hunting?



Background Information on Bighorn Sheep

The bighorn sheep (*Ovis Canadensis*) are the most highly developed and extensively dispersed bovine. Originally it is believed that the bighorns crossed over to North America using the Bering land bridge from Siberia. At one time the population peaked in the millions in North America, but by 1900 was down in the several thousands (Hauke, 1998). Throughout the past few decades conservation efforts have helped to restore the population, however now there is the threat of trophy hunting where the biggest and strongest bighorns are being hunted and taken out of the breeding population (Coltman, 2003).

The horns on these sheep are some of the most impressive horns found on any mammal. Males known as rams have thick necks and curled horns which can measure up to 30 to 40 inches along the outside of the curl. Females called ewes also have horns, but they are much smaller measuring only 10 to 13 inches (Hauke, 1998). Ram horns have been recorded to exceed 51 inches in length, and 16 inches in circumference at the base. The horns are 8-12% of the bighorns body weight. Horns grow all the time in these sheep, but more so in the early years of life, and slow as they age (Geist, 1966).

Horns serve many functions for the bighorn sheep. One of the most important is that they act as weapons. Bighorn males will use their strength and horn size to their advantage when winning over females. Another advantage the horns serve is that's they will act as a shield during fights. The larger the horns, the bigger the shield and the harder the hit to

the other ram. Horns also serve as display organs to attract ewes. Bigger horn sheep will mate more frequently with ewes and be a larger threat to smaller horn rams. In one study by Valerius Geist, he concluded after his hypothesis was tested that horns of male mountain sheep evolved as display organs. He concluded that rams do have a distinct display behavior, and other rams can distinguish horn size. Larger horn rams are intimidated and dominated smaller horn rams, as well as had the reproductive advantage over small horn rams (Geist, 1966). Since his study in 1966, there has been much debate as to whether hunting is having a negative effect on the evolution of horn size.

Trophy Hunting and the Effects it can have on Bighorns.

Throughout the western United States and Canada, hunting for these bighorns has become a major source of revenue. In Arizona trophy hunters have been known to pay over \$300,000 for a single permit to hunt a desert big horn. Between the years 1984 and 2006 Arizona alone has raised over 5.7 million dollars from permits sold to hunt bighorn sheep (Hedrick, 2011). Many hunting areas in North American auction off special permits to hunt these bighorns. This is a type of fundraising strategy used by states in which the funds benefit conservation and habitat protection (Jorgenson, 2011). Without these permits, states would not have adequate funds to research conservation efforts.

Only a certain amount of permits are allowed each year. This is determined based on the level at which trophy hunting is not thought to result in a decline of population size or population growth and an ongoing sustainable population is maintained (Lee, 1990). The hunting season for legal rams goes from late August to the end of October. Legal hunting is based on horn size, and up until 1995 the legal horn size was 4/5 curl. However in 1996 this legal limit increased and only rams with a full curl could be hunted (Marco, 2004).

The number of rams hunted is very low, however, as Coleman states: Removing 1 or 2 prime rams per year from a population of 60-70 sheep is likely sustainable from a demographic viewpoint, especially if the population is genetically linked to a wider network through ram breeding migration (Hogg, 2000). However, if the ram with the biggest horns was removed every year from an isolated population, the cumulative selection effect on horn growth could be very strong (Hedrick, 2011).

So how is this effecting the bighorns, and are there other factors which contribute to smaller horn size, such as environmental decline, or inbreeding depression? This paper will attempt to address these problems and formulate a response to these issues.

Horn Size and how it relates to Bighorns

The life of the bighorn sheep is largely taken up by mating behaviors and reproduction. Approximately 21-25% of their annual energy output is dedicated to these functions (BOBEK, 1986). This statement proves that the importance to mating success is high. It should also be noted that about 1% of the energy is taken up by horn growth and 20-24% loss of body mass which occurs during mating, or rut. Mountain sheep in western North America (*Ovis dalli* and bighorn *Ovis Canadensis*) also expend a lot of their energy into the growth of their horns and during the rut (Allendorf, 2009). Rams typically older than 6 years of age have an average horn curl of $\frac{3}{4}$ of a full curl, in most areas there are size and age limits set for hunting which are based on the curl of the horns (Singer, 2002). As

stated previously as of 1996 the ram must have a full curl to be hunted legally.

During the 30 year study done by Marco Festa-Bianchet of the University of Sherbrooke in Quebec found approximately a 25% decline in horn size of bighorn sheep in both males and female populations (Huang, 2009). This study was done in Alberta, Canada at a place called none other than Ram Mountain. The bighorns on this mountain are the most sought after due to their thick curved horns that give them the typical Princess Leia appearance. It should be no surprise that males with larger horns tend to also be larger and produce larger offspring (Marco, 2004).

Throughout the fall breeding season, these larger rams mate more frequently than smaller males. They accomplish this by winning more fights, or by being more appealing to the ewes. Two months before the rut is the hunting season which means rams must survive this to make it to mating season. It should also be noted that around the age of 4 is typically the time when the rams horn size makes them legal to hunt, which is several years before their reproductive peak (Huang, 2009). Due to this fact it can be assumed that the smaller-horned male bighorns will have more opportunity to mate.

Bighorns and the Risk of Having the Largest Horns

Trophy hunting which is a million dollar activity in the United States, Canada and Alaska has put these bighorns at risk. Up to 2,000 rams are hunted each year, and the undesirable consequences are evident (see figure 1). The younger rams which are left because their horns have not reached peak growth have been known to be more socially disruptive and without the older rams the younger ones chase and are more aggressive to the ewes (Singer, 2002). Mountain sheep are social animals who like to live in groups, without the older males the dynamics of the groups can become imbalanced, thus forcing a shift in behaviors from all stages of life in bighorns (Singer, 2002).

There are many behavior changes which can be witnessed when there is removal of large horn rams due to trophy hunting. The following results are proven from Dall, Rocky Mountain and desert bighorns. In the Rocky Mountain bighorn sheep population herds performed 127% more harassment displays to the ewes (see figure 2). While rams from the hunted herds performed 35% less courtship displays to ewes (Singer, 2002). In the Dall population ewes were known to disperse 66% farther from the rams in the hunted populations versus the non-hunted. It is also interesting to note that the ewes moved farther from hunted small horned rams with less than 5/8 horn curl than in the not hunted. In all 3 taxa there were fewer mount attempts (see figure 1) in the hunted rams, and there was less ram to ram interaction times (Singer, 2002).

With this information it is safe to conclude that trophy hunting will have effects on survivorship of the bighorns. According to Singer and Zeigenfuss, "ratios of large-horned rams per 100 ewes were lower in all trophy hunted populations than in non-hunted populations." It is common for bighorns to stay with the nursery group until around the age of 2, which is when they will slowly move to males groups. Around the age of 4 rams have completed about 80% of horn growth, and are found exclusively in males groups (Jorgenson, 2011). This is also around the time they are legal to hunt.

One positive outcome of this study found that there was not a decrease in lamb

production related to hunting (Festa-Bianchet, 2004). These are the results of how horn size effects copulation: in 77% of the cases courtship was always performed by the largest horned ram (see figure 3). Successful mating and courtship was directly related to horn size in the Dall sheep and the Rocky Mountain bighorns, however not in the desert sheep. Therefore removal of the largest horn rams due to trophy hunting in the Dall sheep population made it possible for the $\frac{3}{4}$ curl rams to copulate many more times and be successful thus passing down the gene for smaller horn size (Singer, 2002).

Another key factor in this study proved that removal of rams caused less competition between rams for mating in rut groups. The size of the rut group was 24% less in hunted Dall sheep, and 58% less in Rocky Mountain sheep, and 23% in desert sheep compare to the non-hunted population. Amount in the rut groups with only 1 ram apparent increased 4% in the non-hunted versus 13% in the hunted Dall sheep, 7% to 25% in Rocky Mountain, and 12% to 20% in the desert sheep (Singer, 2002)

Population and area	Horn curl harvest restriction	Known or estimated harvest	Census (N)	Annual ram harvest (proportion of census N)	Annual harvest (proportion of legal rams)	Depressed survival of young rams reported
Examples of harvests ^a						
Northwest Territories, Canada	$\frac{3}{4}$ curl	200–300	7,000	0.040		
Alberta, Canada	$\frac{1}{2}$ curl	190	6,000	0.032		
	Ewe-lamb	225		0.038		
Yukon, Canada	$\frac{1}{4}$ curl			0.010		
Alaska	$\frac{1}{2}$ curl	1,100	74,000	0.015		
Utah	Any ram— $\frac{1}{4}$ curl encouraged	about 15	1,000	0.015		
Wyoming	$\frac{1}{4}$ curl	194	6,100	0.032		
Study populations reporting depressed survival of young rams						
Dry Creek, Alaska ^b	$\frac{1}{4}$ curl ^c	99	1,100–1,300	0.053 (0.090) ^d	about 1.00	Yes
Sheep River, Alberta ^e	$\frac{1}{2}$ curl	12 (20) ^f	99–153	0.085	0.30	Yes
Ram Mountain, Alberta ^e	$\frac{1}{2}$ curl	8–14	95–110	0.107	0.38	Yes
Usibelli, Alaska	Permit, adult ewes $\frac{1}{4}$ curl ^c	6–12 ewes		0.080 (0.130) ^d	0.12–0.24 of ewes about 1.00	Yes
Control study populations						
Denali National Park, Alaska ^b	Unhunted	0	215	0	0	No
Potash, Utah	Any ram	3	105–155	0.030	0.06	No
Curecanti National Recreation Area, Colorado	$\frac{1}{4}$ curl	4	90–125	0.030	0.14	No
Badlands National Park, South Dakota	Unhunted	0	123–140	0	0	No
Beaver Creek, Colorado	Closed	0	25–30	0	0	No
Waterton, Colorado	Closed	0	25	0	0	No

^a Heimer and Watson (1986); Wishart (1986); Emmerich (1986).
^b Heimer et al. (1984).
^c Restrictions now raised to 8/8-curl.
^d Potential ram harvest corrected for the situation if no depressed survival of young rams occurred.
^e Festa-Bianchet (1986).
^f Festa-Bianchet (1989).
^g Jorgenson et al. (1997).
^h This study.

THE SOCIETY FOR THE CONSERVATION OF BIGHORN SHEEP

A California Non-Profit Organization is looking for:

Sportsmen and Conservationists who are concerned about our California Desert Bighorn sheep and who are willing to get involved to make a difference. Be a part of history with our program to put bighorn sheep back in their historical ranges. The Society works with the California Department of Fish and Game and the Bureau of Land Management in programs such as: sheep transplanting and propagation; habitat improvement; wildlife census; research and development; and many more. If this sounds exciting and fulfilling to you, then fill out the following application and join the Society for the Conservation of Bighorn Sheep today! Check our website at: **www.desertbighorn.org**

APPLICATION FOR MEMBERSHIP SOCIETY FOR THE CONSERVATION OF BIGHORN SHEEP

Attn: SCBS Membership Chairman

**5801 Calico Cove Court
Bakersfield, CA 93306**

Name: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Phone: (H) _____ **(W)** _____

E-Mail Address (Optional): _____

Make checks payable to: SCBS

Annual\$35.00/Year New _____ Renewal _____

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Life\$300.00 New _____ option:3 Qtrly Pmt of (\$100.00)

Corporate\$1000.00/Year

Enclosed is my Tax Deductible check for \$_____ which includes my contribution of \$_____ to help you support desert wildlife.

Please send me information on the Society's desert water projects. Yes ___ No ___

Where did you hear about SCBS? _____

SCBS Sponsor: _____

Application Received: _____ Funding Received: _____

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Have you seen me? Send the editor pictures of your sightings.



Bob Burke - Editor
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