

THE BIGHORN SHEEP IN UTAH -- PAST AND PRESENT¹

by

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and

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There is archeological and historical evidence that bighorn sheep once were prevalent throughout most of what is now Utah. Skeletal remains of bighorns have been found in many parts of the state. Some of these date back to a late Pleistocene period, early to middle Wisconsin; however, most are more recent and are associated with caves inhabited by prehistoric man. This association and the petroglyphs and pictographs of bighorns, common in many parts of the state, indicate the bighorn must have been a very important source of food and clothing for prehistoric man.

The first white man to record bighorn sheep in Utah was Father Escalante. He stated that in 1776 bighorns were abundant along the Colorado River and the frequency of their tracks was comparable to large flocks of domestic sheep. Many trappers, explorers, and early pioneers in the state also reported the abundance of bighorns. However, with the advance of Western civilization, a steady decline in bighorn sheep numbers resulted. By the late 1800's, bighorns were sparse throughout most of the state, and by the mid-1920's bighorns had disappeared from most ranges in northern Utah.

Two subspecies of bighorn sheep, the Rocky Mountain bighorn (*Ovis canadensis canadensis*) and the desert bighorn (*Ovis canadensis nelsoni*), are found in Utah today. The presence of the former is primarily a result of re-introductions into Dinosaur National Monument and along the Wasatch Range near Brigham City. Utah's largest bighorn population consists of desert bighorns. This population inhabits the Colorado drainage from Dead Horse Point to the confluence of the Colorado and Green Rivers, through Cataract Canyon down to Red Canyon on the eastern side of the northern end of Lake Powell. As a result of studies conducted by the Utah Cooperative Wildlife Research Unit and the Utah

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Division of Fish and Game, limited bighorn trophy hunts have been held in the Red and White Canyon areas of southeastern Utah each year since 1967.

Although bighorn populations in Utah presently are not large, they attract considerable attention. Interest by Federal and State agencies in bighorns has grown steadily through the 1960's. Also, many of the mountains and deserts of Utah provide suitable bighorn habitat. With continued interest, foresight and effective management, the bighorn may again become plentiful in many parts of the state.

INTRODUCTION

Bighorn sheep are one of North America's most highly prized trophy animals. From the aesthetic point of view, they are one of the most challenging and exciting animals to find and to observe in its natural habitat.

A Eurasian bighorn (*Ovis ophion*) is considered to represent the ancestral stock of all bighorn sheep (Stokes and Condie 1961). Although authorities agree that the bighorn migrated across the Bering Land Bridge to North America from Eurasia (Cowan 1940, Clark 1967, and Hopkins 1967), there are a number of different opinions concerning the ancestry of the two species of North American bighorns--the Alaskan bighorn (*O. dalli*) and the Canadian bighorn (*O. canadensis*).

PREHISTORIC EVIDENCE OF BIGHORNS IN UTAH

Bighorn sheep were prevalent before the appearance of the white man throughout what is now Utah. Two subspecies of bighorn sheep, the desert bighorn (*O. c. nelsoni*) and the Rocky Mountain bighorn (*O. c. canadensis*), are found in Utah today (Wilson 1968).

Skeletal remains of bighorns have been found in many parts of the state (Figure 1). Some bighorn remains consisting of the posterior cranial elements with horn cores have been found at the Hardman gravel pit near Salt Lake City. According to Stock and Stokes (1969), these date back to a late Pleistocene period, early to middle Wisconsin in age. They considered these Pleistocene bighorns to be an evolutionary population which eventually developed into *O. canadensis*.

Bighorn dung, which archeologists reported to be about 11,000 years old, and sheep remains showing use by prehistoric man have been found in various layers during the excavation of Danger Cave near Wendover, Utah (Dibble et al. 1959). Dibble also postulated that bighorns could have existed in this area before then, but there is no evidence of this because the cave previously was filled with the waters of Lake Bonneville.

The bighorn must have been important to prehistoric men who inhabited what is now Utah, because bighorn remains often are found in caves which were inhabited by them (Jennings 1970). Hansen and Stokes

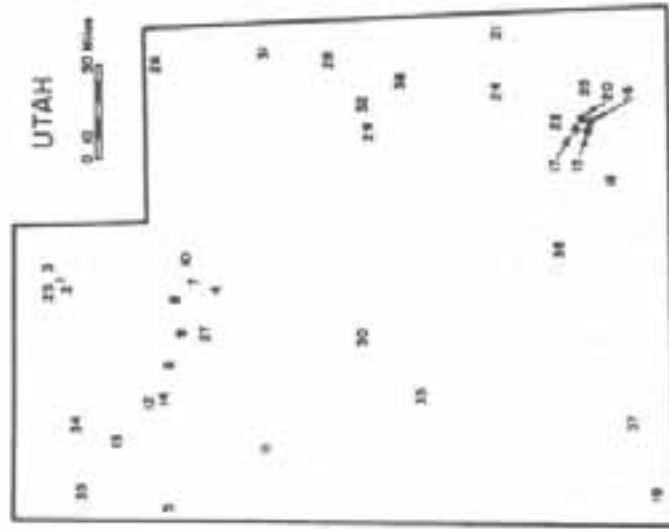


Figure 1. Locations of bighorn skeletal remains found in Utah (see Appendix for key to locations).

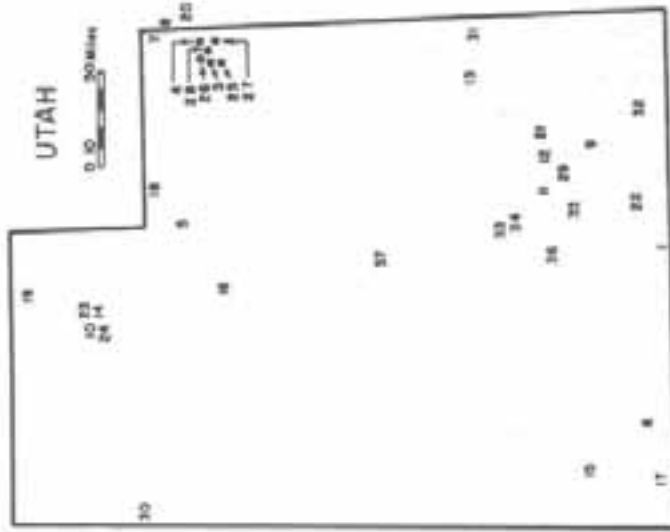


Figure 2. Locations of recorded bighorn sightings in Utah between 1776 and 1950 (see Appendix for key to locations).

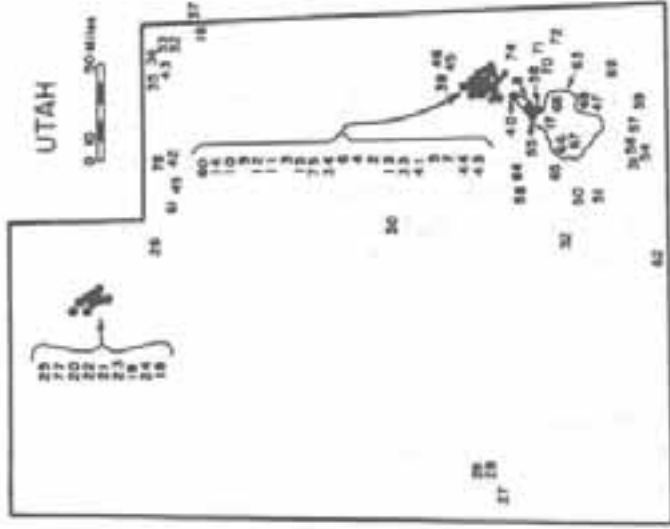


Figure 3. Locations of recorded bighorn sightings in Utah since 1950 (see Appendix for key to locations). Area 63, outlined by a heavy dark line, encompasses the study areas of Wilson (1968) and Irvine (1969).

See Appendix at end of article for key to locations.

(1941) found skulls and other bighorn skeletal bones in a cave inhabited by prehistoric man in American Fork Canyon. Stokes (1970) stated that this cave was important in illustrating the fact that prehistoric men heavily utilized the bighorn. The number of bighorn hides and bone awls found there is convincing evidence that these people used the bighorn as a source of both food and clothing. Stokes (1970) also has postulated that the bighorn was the most important source of protein to Indians in Utah before the white man's civilization caused a decrease in bighorn populations.

HISTORICAL REPORTS OF BIGHORNS IN UTAH

The earliest records of bighorns in Utah are the petroglyphs and pictographs left behind by early man. These early records have been found in many parts of the state (Hague 1970). Father Escalante was the first white man to record bighorn sheep in Utah. He stated that bighorns were very abundant along the Colorado River in 1776, and the frequency of their tracks was comparable to large flocks of domestic sheep (Wilson 1968). Most trappers and explorers who entered Utah also recorded something about bighorns in their journals. Locations of recorded bighorn sheep sightings in Utah between 1776 and 1950 are presented in Figure 2.

Osborne Russell, an early western trapper, visited Utah in late 1841 and 1842. While camped near the present town of Willard in December of 1841, he hiked into the rugged cliffs nearby to hunt for camp meat. When daylight came, Russell shot a number of bighorns in this area. He again returned to these mountains in February of 1842 and again was successful in killing bighorns (Haines 1955).

Bighorns were easy to kill when trappers were the only white men in the Rocky Mountains. Dodge, a western trapper, stated that if a hunter could approach a band of sheep, he could easily kill five or six. He claimed that with the first shot a band of sheep would bunch up to watch the smoke from the gun. Then four or five could easily be killed before they became frightened (Dodge 1959).

The flesh of bighorns was considered to be delicious, and Indians and trappers alike pursued the bighorn for its meat. The Indians considered it more sweet and delicate than any other kind of wild meat (Irving 1898). Western trappers also admired the bighorn for its beauty. Trappers occasionally wrote in their journals that the bighorn could elude predators and man by diving over the edge of a high precipice. It was their belief that the animal could survive the fall by landing on its enormous horns (Dodge 1959, and Hafen 1956).

Captain Fremont (1945) reported bighorns in the Uinta area during June of 1844. His party killed several bighorns at Browns Park, along the Green River. Browns Park, known to the trapper as Browns Hole, was a favorite wintering place for trappers. There was an abundance of game, including bighorn sheep, in the surrounding mountains. He also reported bighorns in the rocks along the river bottom in the area where Vermillion Creek enters the Green River.

Dellenbaugh (1908 and 1962), a member of the Powell expedition, was amazed at the abundance of deer, bear, and mountain sheep which he observed between Browns Park and Split Mountain in 1871.

Powell (1869) reported seeing mountain sheep around a small park at the confluence of the Yampa and Green Rivers. He explained that the Indians often used a steep trail to gain access into this park to kill bighorns. During July of 1875, Powell's party killed two bighorns in Cataract Canyon along the Colorado River.

George Hobbs, a Mormon pioneer in the late 1800's, was led to the bottom of some seemingly impassable slick rocks while following a bighorn sheep down to the edge of the Colorado River at a place now called Hole-in-the Rock. Hobbs reported bighorns to be curious, and told how one came within 15 feet of his campfire (Jones et al. 1957).

LAWS FOR PROTECTING BIGHORNS IN UTAH

Prior to 1876, the territory of Utah had no regulations regarding the taking of bighorn sheep. However, a season from July through December was set in 1876 for all big game animals. There were very liberal game laws between 1876 and 1899, but when Utah became a state in 1899 the state legislature passed a law prohibiting the hunting of bighorn sheep. This law remained in effect until 1967 when a limited number of permittees were allowed to hunt the desert bighorn (John 1968). However, there are not enough Rocky Mountain bighorns in Utah to provide a harvestable surplus, and both John (1970) and Huff (1970) agree that it will be far into the future before the Rocky Mountain bighorn will be hunted as a game animal in Utah.

DECLINE IN BIGHORN POPULATIONS

Bighorns inhabited almost every mountain range in Utah before the coming of the white man. The advance of Western civilization, however, caused a steady decline in bighorn sheep numbers. This decline was noted as early as 1870 (Buechner 1960). Civilization brought domestic animals and centers from which our natural resources could be exploited. This meant disaster for bighorns, as they are unable to tolerate the activities of mining and cattle and sheep raising (Irvine 1969).

Irvine (1969) found that the diet of the desert bighorn consisted of climax plants. Climax plants become less available to bighorns when overgrazing occurs, and, because of improper nutrition, they then are unable to combat parasites. Domestic livestock also exposed the bighorn to both scabies and lungworm and, due to poor range conditions caused by overgrazing, the bighorn has been reduced in numbers and forced to inhabit less desirable areas (Wilson 1968).

BIGHORN POPULATIONS IN UTAH

The advent of the white man in Utah resulted in the demise of bighorn sheep populations. Remnant populations persist, however, in various parts of the state, and the list of valid bighorn sightings since 1950 continues to grow (Figure 3). Information concerning bighorn populations within geographical areas of Utah will be discussed briefly.

NORTH CENTRAL UTAH

Rocky Mountain bighorns were known to exist on Mt. Nebo in the 1800's and still were found along the Wasatch Mountains between 1890 and 1927 (John 1970). A bighorn was killed in 1905 near Tony Grove in Logan Canyon (Barnes 1927). In 1917, Rulon White of Ogden saw 23 head of bighorn sheep behind Willard Peak. He also reported seeing about 15 animals in the same area in 1923. This was the last time native Rocky Mountain bighorns were reported in the Willard Peak area (Huff 1970).

Bighorns were reported on Mt. Timpanogos during 1926 and 1927 (Barnes, 1927). These were probably the last of the native bighorns reported on the Wasatch Mountains. Although these few reported sightings of Rocky Mountain bighorn sheep were along the Wasatch Front, there is evidence that bighorn sheep once inhabited the entire range. Skeletal remains have been found at various points throughout the Wasatch Mountains. Several skulls with horn cores have been found in the mountains east of Logan, and also along the Wasatch Front east of Salt Lake City.

NORTHWESTERN UTAH

Increasing evidence indicates that bighorn populations once inhabited the mountain ranges bordering the Great Salt Lake, as well as various ranges in the Great Salt Lake Desert. Skeletal remains have been found on many of these northwestern mountains and, in a few cases, there have been actual sightings of bighorns. Skulls with horn cores and an occasional horn have been found on Stansbury Island, Granite Mountain, and on the Oquirrh, Newfoundland, and Lakeside Mountains (see Figure 1). Bighorn sightings were reported for Granite Mountain in the early 1900's (Barnes 1927), and in 1910 a bighorn was killed 25 miles north of Wendover (Buechner 1960). One of the former ranges being considered for re-introduction of bighorns is the Newfoundland Mountains (Drobnick 1970).

NORTHEASTERN UTAH

There have been sporadic reports of sightings of Rocky Mountain bighorns in the Uinta Mountains and the Uinta Basin area in northeastern Utah since white men first entered the area. Bighorns were reported in the Red Canyon area, which is now part of Flaming Gorge Dam, as early as 1849 (Barnore 1962). Trappers and explorers persistently remarked about the abundance of bighorns along the Green River near Browns Park and Split Mountain Canyon, which is now part of Dinosaur National Monument on the Utah-Colorado border.

An estimated 150 bighorns inhabited Split Mountain Canyon around 1910, and at that time bands of 25 to 50 bighorns occasionally were seen. National Park Service employees verified the presence of bighorns on Split Mountain in 1943, but the last sighting of the herd was near the mouth of Split Mountain Canyon in 1944 (Barmore 1962).

The Colorado Fish and Game re-introduced Rocky Mountain bighorns into the Monument in 1952. Since then, bighorns have been seen occasionally along the rivers that flow through the Dinosaur National Monument (Barmore 1962). As recently as 1970 bighorns were seen at Jones Hole (Hannah 1970).

In addition to Dinosaur National Monument and the surrounding canyons and mountains, the high peaks of the Uinta Mountains and the canyons at Flaming Gorge also serve as Rocky Mountain bighorn range (Drobnick 1970). Outside of occasional sightings by people working in or visiting the Uinta Mountains, little is known about the remnant population in this area (see Figures 2 and 3).

A Rocky Mountain ram wandered into the Coalville area and bred a domestic ewe belonging to Herman Edgel during the fall of 1959. A hybrid ewe was born the following spring, and she has since given birth to a lamb (Dearden 1967).

A bighorn skull was found near Fruitland during the 1950's. It was wedged (about 6.5 feet off the ground) in a large Juniper tree. This section of the tree containing the bighorn skull can be seen at the Current Creek Cafe on Utah Highway 40 between Strawberry Reservoir and Fruitland (Chatwin 1970).

In 1964, two sightings of bighorns were made by Forest Service employees in Summit County (Dearden 1967). Bighorns were observed on the Uinta Mountains at Henry's Fork and also in the Dead Horse area. The two latest recorded sightings for the high Uintas were made in 1965 and 1970. Ralph Noble, a Utah Fish and Game employee, sighted a mature ram north of the Weber River in 1965 at Lofty Lake (Drobnick 1970). In 1970, Reddin (1971), a sheepman for G. R. Broadbent, photographed two bighorn rams near the confluence of the East Fork of Black Fork and the Little East Fork.

Rocky Mountain bighorns were reported several times by construction workers during construction of Flaming Gorge Dam (Barmore 1962). A mature ram was reported in 1966 near the Cart Creek bridge on Utah Highway 44. Since then tourists also have reported bighorns in this area (Drobnick 1970).

WEST-CENTRAL UTAH

West-central Utah, which consists of Juab, Millard, San Pete, and Sevier counties, apparently has no bighorn populations. Barnes (1927) however reported that horns from a bighorn sheep were found near Salina. Drobnick (1970) also found a bighorn skull in the Canyon Mountains east

of Oak City. Bighorns also are known to inhabit both the Needles and Wah Wah Mountain ranges, which extend from Beaver County into Millard County, but the only sightings on record for these two mountain ranges have been in Beaver County.

This section of Utah probably never will have significant numbers of bighorns.

EAST-CENTRAL UTAH

East-Central Utah, which consists of Carbon, Emery, Grand, and the lower one-third of Uinta County, supports populations of both Rocky Mountain and desert bighorns. A small bighorn population is believed to inhabit the San Rafael Swell. There have been occasional sightings in this area, but the only confirmed sighting was a young ram observed by a Fish and Game employee near the Feron City garbage dump in 1964 (Drobnick 1970). However, archeological records indicate that bighorns existed just north of Thompson (Wormington 1955).

Bighorns occasionally were sighted in Arches National Monument during the 1950's. Two sightings were made as late as 1958: one bighorn was seen watering in the Upper Courthouse area, and the other was seen in the Lower Fiery Furnace area (Follows 1969).

SOUTHWESTERN UTAH

Evidence indicates that bighorns were plentiful in southwestern Utah in the late 1800's and early 1900's, although few bighorn apparently exist there today. Barnes (1927) reported that the bighorn was once very numerous in the mountains north and west of Panguitch. He also mentioned bighorn sightings on the Frisco Mountains in Beaver County, and on the Pink Ledge of Little Zion in Washington County. Desert bighorns were reported on Little Pinto as early as 1899, and a bighorn was found floating in the Virgin River in 1919 (Barnes 1927).

Bighorns have been known to exist in the mountains west of St. George. Around 1958 a skull was removed from a dead bighorn on the Beaverdam Mountains about 15 miles west of St. George. The skull presently is in the University of Utah's Museum of Zoology in Salt Lake City.

References have been made to desert bighorns in the Wah Wah Mountains since the early 1900's. A bighorn ram bred domestic ewes in these mountains in 1966, and a bighorn ram and six ewes were seen in the Wah Wahs in 1968 (John 1970). Also, the Utah Division of Fish and Game range crew spotted bighorns on two different occasions in the Needles Mountain Range in 1968 (Drobnick 1970).

In the 1800's bighorns were common in the vicinity of what is now Zion National Park (Metherell 1970). In 1939 a band of 25 bighorns was observed at the junction of the North Fork and the Virgin River (Cowan 1940). Many authorities were convinced that bighorns at Zion were

increasing in numbers during the 1930's and 1940's (Buechner 1960). However, bighorn numbers dwindled in the Park, and in 1953 the last reported bighorn (a ewe) was observed on a promontory called the Watchman (Metherell 1970).

SOUTHEASTERN UTAH

The largest present day bighorn population in Utah is in the southeastern part of the state (see Figure 3). According to Drobnick (1970), the range of the desert bighorn in Utah

. . . is from Dead Horse Point along the Colorado River to the confluence of the Colorado and Green Rivers, through Cataract Canyon down to Red Canyon. The area from the confluence up to Dead Horse Point in Canyonlands is a non-huntable population, but the area in Cataract Canyon south of Gypsum Canyon to include lower Dark Canyon, Woodenshoe Canyon, White Canyon, and Red Canyon drainages is a relic hunting population.

Based on sightings gathered, it appears two distinct populations of desert bighorns exist within the boundaries of Canyonlands National Park. Frequent sightings come from the area around Junction Butte; and Follows (1969) stated that the major bighorn population in Canyonlands is in the "triangular shaped area north of the confluence."

A population of bighorns once existed just east of Canyonlands in Lockhart Basin, but it has vanished during the past few years. Drobnick (1970) postulated that these bighorns may have been exterminated by miners. Occasional bighorn sightings have been made from the visitors' center at Dead Horse State Park north of Canyonlands (John 1970).

Two Master of Science theses have been done on the desert bighorn populations in the White and Red Canyon areas. The first study of Utah's desert bighorns was initiated by Wilson in 1965, and the second was undertaken by Irvine in 1967. Both were associated with the Utah Cooperative Wildlife Research Unit at Utah State University, and supported by the Utah Division of Fish and Game. As a result of Wilson's study, limited hunting of trophy bighorn rams in this area was initiated in 1967. Hunts have been held each year since.

Sightings within the White and Red Canyon areas have been numerous, and their numbers continue to grow. Interest in Utah's desert bighorns began during the late 1940's and early 1950's when uranium was discovered in southeastern Utah. Much of this part of the state was virtually unexplored, but the discovery of uranium drew great numbers of people into the area. Miners and prospectors soon saturated the area and reports of desert bighorns began to increase. Miners living in the desert often utilized the bighorn for both sport and food. Although illegal to do so, they often hunted the bighorn; and, in a few cases, the bighorn apparently was a primary source of meat (Wilson 1968).

Navajo Indians also hunted desert bighorns. In 1942, residents in White Canyon reported seeing Indians leaving the canyon with 60 or 70 bighorn hides loaded on three pack horses (Wilson 1968).

A decrease in mining activities, the initiation of more conservative grazing programs, and increased interest by both State and Federal agencies in the welfare of desert bighorns have helped and will continue to help these sheep. Both Irvine's (1969) and Wilson's (1968) studies indicated increasing bighorn populations in the Red Canyon area.

In addition to Canyonlands and the Red Canyon area, desert bighorn populations also exist in other parts of southeastern Utah. Road crews have reported bighorns in the Henry Mountains (John 1970). A population of bighorns also is known to exist on the Little Rockies, at the southern end of the Henry Mountains (Follows 1970). Warburton (1970) similarly reported bighorn sightings at two locations in the Henry Mountains during 1969: on Mt. Hillers and east of Mt. Ellen at the north end of the range.

Charles Hunt reported seeing bighorns near the top of Mt. Peale in the La Sal Mountains in 1949 (Buechner 1960), and the skull of a ram which was illegally killed 1.5 miles north of La Sal in 1954 presently resides in the Museum of Zoology at the University of Utah.

Bighorns occasionally have been reported from areas south of Moab. Mel Stewart, a rancher, reported in 1923 that he often observed bighorns along the Colorado River bottoms about 20 miles below Moab (Barnes 1927). Another stockman, Lloyd Somerville, reported that in 1951 bighorns of both sexes had mixed with his domestic sheep on their winter range 15 miles south of Moab (Buechner 1960).

Warburton (1970) reported recent bighorn sightings in areas south of Moab. In 1968 he observed bighorns at the confluence of Indian Creek and the Colorado River, and near Hatch Point in the Needles overlook area.

Follows (1970) stated that a group of bighorns was observed on Iron Top Mesa at the southern end of the Waterpocket Fold. Fifteen bighorns were observed on Deer Point Mesa in 1968, which is also near the southern end of the Fold (Drobnick 1970). Bighorns historically inhabited the full length of the Fold. They existed in Capital Reef National Monument until 1948, when the last one apparently was shot by a sheepherder (Follows 1970).

Bighorns occasionally are sighted along the San Juan drainage. Five bighorns were observed at the mouth of John's Canyon in 1956, and 14 bighorns were reported along the San Juan River at the upper end of Lake Powell in 1967. Bighorns were observed in Mike's Canyon during 1968, and during a helicopter survey conducted by the Utah Division of Fish and Game in 1969, a ram was seen along the San Juan River near the mouth of Castle Creek (Drobnick 1970).

RE-INTRODUCTION OF BIGHORNS INTO UTAH

THE WASATCH MOUNTAINS

In 1960, the Utah Division of Fish and Game became interested in re-establishing the bighorn on its former ranges in Utah. Between 1961 and late 1965, the Division began looking for a parent stock of bighorn sheep, and made the necessary preparations to receive them. An 80-acre paddock was built to hold bighorns on Brigham Mountain near Brigham City, Utah. By April of 1966, 34 bighorns from Wyoming and Canada had been shipped to Utah. However, the 80-acre paddock was capable of supporting only about 20 animals. Therefore, an additional 1200-acre adjoining paddock was built.

A few bighorns have escaped from the paddocks each winter because of snow and wind damaging sections of the fence. As a result of these escapes, there have been occasional bighorn sightings in the Willard Peak area and along the Wellsville Mountain Range (Huff 1970) and Chronological Diary of Bighorn Project, 1966 to 1970). It appears these animals will result eventually in the establishment of a herd of Rocky Mountain bighorns on the Wasatch Range. The bighorns remaining in the paddocks will be held as parent stock from which releases will be made when suitable areas have been determined (Huff 1970).

Many problems are involved in the re-introduction of bighorns. A major problem is that the sheep must be handled frequently: during capture, transportation, veterinarian checks, and unloading. Bighorns are easily injured and readily contract pneumonia. Dr. Smart of the Veterinary Science Department at Utah State University has developed a cultured vaccine, which appears to be effective in combating pneumonia in bighorns (Huff 1970).

THE BOOK CLIFFS

A few skeletal remains have been found in the Book Cliffs, and the Hill Creek Indians have re-introduced Rocky Mountain bighorns into the Book Cliffs at Florence Creek Canyon. They received 10 bighorns (nine ewes and only one immature ram) from Wyoming in 1969. These animals were released, but nothing concerning them has been reported since their release. The Indian Tribe hopes to receive more bighorns from Wyoming during the winter of 1970-71 (Curry 1970).

ZION NATIONAL PARK

A program to re-introduce desert bighorn sheep into Zion National Park was initiated in 1967. An 80-acre holding paddock for parent stock was completed in January 1970. This paddock which includes year-round bighorn habitat is strategically located for ease of surveillance and care of the parent stock. It also is secluded from the view of tourists to minimize disturbances. Bighorns have not yet been located for this

project, but when they are, a detailed study will be made regarding the basic conditions under which desert bighorns may be restored into other areas (Metherell 1970).

FUTURE OF UTAH'S BIGHORN SHEEP

The future for the bighorn in Utah appears to be bright. Existing stocks are being protected and conservationists are working towards the re-introduction of Rocky Mountain and desert bighorns into suitable areas.

The Bureau of Land Management has made a special request to the mining industry to reduce explorations during the bighorn's lambing period (Call and Mahon 1970). Cooperation from such industries will greatly enhance the chances of lamb survival. John (1968) claimed lamb mortality is very high during the first year, but if a lamb survives its first year, it can be expected to live at least 10 years.

Water seems to be a limiting factor for desert bighorn populations. Twelve seeps or springs in southeastern Utah were developed or improved during 1968 and 1969 by the cooperative efforts of the Bureau of Land Management and the Utah Division of Fish and Game so that bighorns could use them all year (Call and Mahon 1970).

The Utah Division of Fish and Game, the Bureau of Land Management, and the Intermountain Forest and Range Experiment Station have initiated a cooperative study in 1966 to investigate possibilities of improving the forage on desert bighorn ranges. As a result, it was found that mesa tops could be improved as desert bighorn habitat (John 1969).

SUMMARY

Although Rocky Mountain and desert bighorn populations in Utah are not large, the bighorn is an important animal in the State. The bighorn already provides limited recreation. With time and effective management, the bighorn undoubtedly will provide many more hours of enjoyment, as well as economic benefits, to the state.

Interest in bighorns by both Federal and State agencies has grown steadily through the 1960's. However, governmental interest alone is not enough to guarantee the survival and restoration of bighorn populations. Public interest and conservation action must be stimulated.

Many of the mountains and deserts of Utah have suitable bighorn habitat. Re-establishment of the bighorn should be given priority in some of these areas to ensure that it will again become plentiful in Utah.

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DISCUSSION

QUESTION BY JOHN RUSSO, ARIZONA G & F: Did they ever decide what species or subspecies you have?

REPLY BY DALTON: Dr. Durant, the mammalogist at the University of Utah, doesn't commit himself.

QUESTION BY NORMAN SIMMONS, CANADIAN WILDLIFE SERVICE: In the northern sheep, which are in the scabies area, is there any evidence that sheep have been dying from this and also is this domestic sheep range?

REPLY BY DALTON: There are no domestic sheep there now but there is a history of grazing on the range. We don't know about die-offs but all the rams taken, which is a limited number, have had scabies.

KEY TO FIGURE 1 - SKELETAL REMAINS OF BIGHORNS FOUND IN UTAH

	<u>YEAR</u>	<u>LOCATION OF SHEEP SKELETONS</u>	<u>OBSERVER AND/OR SOURCE</u>
1.	1968	Skull found in Providence rock quarry (Figure 5).	(Anderson 1970).
2.	1968	Skull found in Providence rock quarry (Figure 5).	(Campbell 1970).
3.	1967	Skull found in Right Hand Fork of Logan Canyon (Figure 6).	(Holden 1970).
4.	1941	Skeletal remains of bighorns were found in a cave in American Fork Canyon about 3 miles above the Timpanogos Cave offices.	(Hansen and Stokes 1941).
5.		Danger Cave, near Wendover Utah. Skeletal remains and droppings were found here.	(Dibble <i>et al.</i> 1959).
6.	1970	Skull found on Stansbury Island.	(Wilson 1970).
7.	1907	Skull found at the head of Hughes Canyon near the twin peaks in Salt Lake City.	(Barnes 1927).
8.	1900's	Several bighorn skulls collected at the Hardman gravel pits northeast of Salt Lake City are in the Geology Department at the University of Utah.	(Stokes and Condie 1961).
9.	1968	Skull found in Black Rock Canyon in the Oquirrah Mountains by highway construction crews.	(Madsen 1970).
10.	1967	Skull found at Silver Creek by highway construction crews.	(Madsen 1970).
11.	1969	Skull found in Tooele County at the west base of Granite Mountain.	(University of Utah, Museum of Zoology).
12.	1958	Skull found in Tooele County on the west side of Lakeside Mountain.	(University of Utah, Museum of Zoology).
13.	1967	Skull found in Box Elder County on the northeast side of the Newfoundland Mountains.	(University of Utah, Museum of Zoology).
14.	1958	Skull and a single horn found in Tooele County on the west side of Lakeside Mountain.	(University of Utah, Museum of Zoology).
15.	1965	Skull found two miles west of Soldier Crossing and Utah Highway 95 on Plate Mesa.	Ruby Drobnick (University of Utah, Museum of Zoology).
16.	1965	Skull found in Slope Hollow on the southeast ridge of Fry Point Mesa, San Juan County.	Rodney John (University of Utah, Museum of Zoology).
17.	1950's	Skull from Jacob's Chair, White Canyon. Poached by uranium miners.	(University of Utah, Museum of Zoology).
18.	1954	Skull from bighorn killed at the junction of Hall's Crossing and the Colorado River. Donated by June King.	(University of Utah, Museum of Zoology).
19.	1958	Skull from bighorn found on Beaverdam Mountain, 15 miles west of St. George.	Arthur Bruhn (University of Utah, Museum of Zoology).
20.	1963	Skull found at Horse Flat, White Canyon, San Juan County.	Rodney John (University of Utah, Museum of Zoology).
21.	1954	Skull from the La Sal Mountains. Confiscated by Utah Fish & Game 1.5 miles north of La Sal.	(University of Utah, Museum of Zoology).
22.	1966	Ram skeleton found near Dark Canyon along the east side of the Colorado River Terrace.	(Follows 1969).
23.	1970	Ram's skull found in a draw northwest of Zanavoo Lodge in Logan Canyon. (Figure 6).	(Abee 1970).
24.	1957-1960	Two skulls found by Col. Mikesell in a cave on the south end of Squaw Flat in Canyon lands. Now at Pat Creek Ranch near Moab.	(Drobnick 1970).

KEY TO FIGURE 1 - (CONT.)

	<u>YEAR</u>	<u>LOCATION OF SHEEP SKELETONS</u>	<u>OBSERVER AND/OR SOURCE</u>
25.	1950	Skull from an illegally killed bighorn confiscated by Fish and Game at the Bears Ears.	(Drobnick 1970).
26.	1960	Skull found on east side of Hide Out Flat Ridge at Flaming Gorge by clearing crew foreman.	(Drobnick 1970).
27.	1953	Skull found on Coons Peak, in the Oquirrah Mountains.	Eldon Jenkins (Drobnick 1970).
28.	1970	Two ram skulls found in the Book Cliffs west of P.R. Springs in the Main Canyon drainage.	(Drobnick 1970).
29.	1969	Skull found along Range Creek in Desolation Canyon, now at the Highway Junk House in Wellington.	(Drobnick 1970).
30.	1957	Skull uncovered by storms in a 9-foot deep wash at forest boundary and Oak Creek Canyon in the Canyon Mountains east of Oak City.	(Drobnick 1970).
31.	1933	Skull found 20 miles east of Ouray.	J.K. Douth (Drobnick 1970).
32.	1936	Skull found at Florence Creek in Desolation Canyon.	J.K. Douth (Drobnick 1970).
33.	1970	Skull found in cave along Utah Highway 30 at southern end of Grouse Creek Mountains.	(Wagner 1970).
34.		Bighorn remains found in Hogup Cave.	(Jennings 1970).
35.	1955	Skull found ca. 8 miles east of Desert Range Experiment Station on the mountain slope.	(Butcher 1971).
36.	1955	Bighorn remains in the Turner Ranch site representing the Fremont Culture just north of Thompson.	(Wormington 1955).
37.	1955	Bighorn or deer bones identified in the archaeological investigations of Zion National Park.	(Schroeder 1955).
38.	1959- 1961	Bighorn bone fragments of prevalent archaeological investigations of the Coobs Site at Boulder.	(Lister 1959, 1960, and 1961).

KEY TO FIGURE 2 - RECORDED BIGHORN SIGHTINGS IN UTAH BEFORE 1950

	<u>YEAR</u>	<u>LOCATION OF SHEEP SIGHTINGS</u>	<u>OBSERVER AND/OR SOURCE</u>
1.	1776	Colorado River "Crossing of the Fathers."	Escalante (Wilson 1968).
2.	1776	Breaks of the Colorado River.	Escalante (John 1968).
3.	1871	Green River through Split Mountain.	(Dellenbaugh 1962).
4.	1871	Green River in Whirlpool Canyon.	(Dellenbaugh 1962).
5.	1939	Mt. Baldy in the Uinta Mountains.	N. B. Cook (Cowan 1940).
6.	1939	Junction of the Virgin River and the North Fork of the Virgin River in Zion National Park.	Cliff Presnall (Cowan 1940).
7.	1844	Green River and Browns Hole.	(Fremont 1845).
8.	1844	Junction of Green River and Vermillion Creek, inside Colorado.	(Fremont 1845).
9.	1942	White Canyon, San Juan County. Residents saw Indians remove 3 pack horses loaded with bighorn hides.	(Wilson 1968).
10.	1841	Wasatch Mountains near Willard. Russell killed mountain sheep here on two different days.	Osborne Russell (Haines 1955).
11.	1947	Henry Mountains.	(Durrant 1952).
12.	1946	Junction of Colorado River.	(Durrant 1952).

KEY TO FIGURE 2 - (CONT.)

	<u>YEAR</u>	<u>LOCATION OF SHEEP SIGHTINGS</u>	<u>OBSERVER AND/OR SOURCE</u>
13.	1923	Twenty miles below Moab on Colorado River bottoms. Rancher reported seeing bighorns every time he visited his cattle.	Mel Stewart (Barnes 1927).
14.	1896	Band of bighorns reported on Willard Peak.	(Barnes 1927).
15.	1899	Bighorns were known on Little Pinto in southwestern Utah.	(Barnes 1927).
16.	1926	Bighorns reported on Mt. Timpanogos.	(Barnes 1927).
17.	1919	Bighorn found floating dead in the Virgin River.	(Barnes 1927).
18.	1910	Bighorns reported around the mouth of Black's Fork on the north slope of the Uinta Mountains.	(Barnes 1927).
19.	1905- 1914	Bighorn killed in Logan Canyon near Tony Grove. Many bighorns also seen in Cottam Canyon.	Ted Seeholzer (Durrant 1952).
20.	1875	Junction of Yampa and Green Rivers.	(Powell 1869).
21.	1875	Cataract Canyon on the Colorado River.	(Powell 1869).
22.	1897	Hole in the Rock, along the Colorado river. Bighorn led a Mormon pioneer to the bottom of a seemingly impassable slick rock.	George Hobbs (Jones 1957).
23.	1917	Bighorns seen on Willard Peak.	Rulon White (Huff 1970).
24.	1923	Bighorns seen on Willard Peak. These were the last native Rocky Mountain bighorns reportedly seen in the Willard Peak area.	Rulon White (Huff 1970).
25.	1938	Ram observed near Dinosaur Quarry.	(Barmore 1962).
26.	1943	National Park Service verified the presence of bighorns on Split Mountain.	(Barmore 1962).
27.	1921	Robert C. Thorne believed bighorns to exist on Blue Mountain. Last animal shot there in 1921.	(Barmore 1962).
28.	1944	Last bighorns from original Dinosaur Nat'l Monument herd seen by Robert C. Thorne near the mouth of Split Mountain Canyon.	(Barmore 1962).
29.	1938	Golden Durfey estimated 100 to 300 bighorns in the Little Rockies.	Golden Durfey (Follows 1969).
30.	1910	Bighorn killed 25 miles north of Wendover.	(Buechner 1960).
31.	1949	Several bighorns reported near the top of Mt. Peale, San Juan River.	Charles Hunt (Buechner 1960).
32.	1878	Bighorns sighted at the goosenecks of the San Juan River.	Chris Christiansen (Buechner 1960).
33.	1933	Shepherd shot a ewe at Capitol Wash in Capitol Reef Nat'l Monument.	Golden Durfey (Follows 1969).
34.	1948	Last bighorn in Capitol Reef Nat'l Monument killed.	Charles Kelley (Follows 1969).
35.	1920's	Hunter killed a ram on Deer Point in Capitol Reef Nat'l Monument.	Charles Chestnut (Follows 1969).
36.	1938	Bighorn observed in fields below Boulder, Utah. Last reported bighorn in that area.	(Davis 1970).
37.	1940	Mature ram observed in Joe's Valley during the winter of 1940. The ram was curious and followed Edmonds' horses	(Edmonds 1970).

KEY TO FIGURE 3 - RECORDED SIGHTINGS OF BIGHORN IN UTAH SINCE 1950

<u>YEAR</u>	<u>LOCATION OF SHEEP SIGHTINGS</u>	<u>OBSERVER AND/OR SOURCE</u>
1. 1953	Ram seen on Watchman promontory in Zion National Park.	(Metherell 1970).
2. 1969	Ram seen on top of Lathrop Trail in Canyonlands National Park.	(Budge 1970).
3. 1969	One ram, two ewes, and one lamb seen on White Rim, one mile inside of Canyonlands National Park.	(Budge 1970).
4. 1969	One ram, three ewes, and two lambs seen in White Rim area in Canyonlands National Park.	(Budge 1970).
5. 1969	Ram seen at the southern base of Junction Butte in Canyonlands National Park.	(Budge 1970).
6. 1969	Bighorn seen 3 miles north of Monument Basin.	(Budge 1970).
7. 1969	Two bighorns seen at airstrip on the White Rim road.	(Budge 1970).
8. 1969	Sixteen bighorns seen 5 miles above Gypsum Canyon.	(Budge 1970).
9. 1969	Two rams, two ewes, and one lamb seen at Musselman Arch.	(Budge 1970).
10. 1969	One bighorn seen at the gate below Dead Horse Point.	(Budge 1970).
11. 1969	Four ewes seen on White Rim road below Sharps Trail.	(Budge 1970).
12. 1969	Four ewes and two lambs seen near the ranger trap on White Rim.	(Budge 1970).
13. 1969	One ram, three ewes, and two lambs seen at Murphay Range.	(Budge 1970).
14. 1969	One ram and one ewe seen below Dead Horse Point.	(Budge 1970).
15. 1969	Four ewes and four lambs seen at the Loop of the Colorado River.	(Budge 1970).
16. 1970	Bighorns observed in 1969 and 1970 at Jones Hole in Dinosaur National Monument.	(Hannah 1970).
17. 1967	Fresh bighorn tracks seen across the Colorado River from the mouth of Dark Canyon.	(Follows 1970).
18. 1967	One ram, one ewe, and one lamb seen on Francis Peak.	Fish and Game files, Ogden, Utah.
19. 1968	Five sheep seen on Ben Lomond Peak in the Wasatch Mountains.	Lynn Mikkelsen (Fish and Game files, Ogden, Utah).
20. 1968	Six bighorns seen above canal at Willard.	Fish and Game files, Ogden, Utah.
21. 1967	Six bighorns seen 0.5 miles north of Rulon White's residence in Ogden, Utah.	Seth Thorpe (Fish and Game files, Ogden, Utah).
22. 1967	Nine bighorns seen on Willard Peak by Fish and Game personnel.	Fish and Game files, Ogden, Utah.
23. 1967	Bighorn shot during deer season near Willard picnic area.	Fish and Game files, Ogden, Utah.
24. 1968	Seven bighorns seen at a salt lick on Willard Peak by Fish and Game personnel.	Fish and Game files, Ogden, Utah.
25. 1968	Ram seen along Highway 91 near Mantua.	Fish and Game files, Ogden, Utah.
26. 1969	Bighorn ram bred a domestic sheep in Coalville. Hybrid offspring still living.	Herman Edge1 (Fish and Game files, Ogden, Utah).

KEY TO FIGURE 3 - (CONT.)

<u>YEAR</u>	<u>LOCATION OF SHEEP SIGHTINGS</u>	<u>OBSERVER AND/OR SOURCE</u>
27.	1968 Four bighorns seen in the Needle Range by Utah Division of Fish and Game range survey team.	(John 1970).
28.	1966 Bighorn ram bred domestic sheep in the Wah Wah Mountains.	(John 1970).
29.	1968 One ram and six ewes reported in the Wah Wah Mountains.	(John 1970).
30.	1964 Ram observed at the Feron dump by a Fish and Game employee.	(John 1970).
31.	1969 Bighorns reported along the San Juan River at Nakai Dome.	(John 1970).
32.	Bighorns reported at Deer Point along the Breaks of the Escalante River.	(John 1970).
33.	1969 Bighorn seen at the southeast end of the neck inside Canyonlands National Park.	(Budge 1970).
34.	1966 Five bighorns, two ewes, two yearling rams and one lamb seen two miles south of the White Rim Slot.	(Budge 1970).
35.	1958 Four bighorns seen along the Green River in Red Canyon, upstream from Green Lakes.	Bruce Lean (Barmore 1962).
36.	1969 Three bighorns seen near Flaming Gorge dam site.	(Barmore 1962).
37.	1959 Two ewes reported at the mouth of Whirlpool Canyon.	(Barmore 1962).
38.	1966 Nine bighorns seen at the mouth of Gypsum Canyon during June.	(Follows 1969).
39.	1958 Ram seen watering in the Upper Courthouse at Arches National Monument.	Dan Winburn (Follows 1969).
40.	1954 48 bighorns seen above the Confluence in Canyonlands National Park. The sheep appeared sick and had sores on their ears.	(Follows 1969).
41.	1969 13 bighorns seen southwest of Junction Butte in the Sals Hole area.	Carl Madsworth (Follows 1969).
42.	1954 Five sheep seen on east side of Red Castle Peak in the Uinta Mountains.	Robert F. Hoag, Jr. (Buechner 1960).
43.	1955 Two rams, four ewes, and two lambs seen in Commissary Park, Ashley Nat'l Forest.	(Buechner 1960).
44.	1954 Old ram often seen on Deadman Point and around Spring Canyon in Canyonlands Nat'l Park.	LaVern Young (Follows 1969).
45.	1950's Two bighorns seen along the west boundary of Arches Nat'l Monument near Suicide Curve.	Bates E. Wilson (Follows 1969).
46.	1958 Ram seen in the lower Fiery Furnace area of Arches Nat'l Monument.	Bates E. Wilson (Follows 1969).
47.	1958 34 ewes and lambs seen just off the Moss Backs in White Canyon in Natural Bridges Nat'l Monument.	Chap Blake (Follows 1969).
48.	1968 Two ewes and a lamb seen going off the Moss Backs into White Canyon.	Carl Mahon (Follows 1969).
49.	1960 Mature ram observed in Uinta Mountains by Fish and Game pilot.	Ralph Noble (Drobnick 1970).
50.	1968 15 bighorns seen on Deer Point Mesa at the southern end of the Waterpocket Fold.	Keith McFall (Drobnick 1970).
51.	1970 Several bighorns observed by construction crews at Clay Hill Pass on the Halls Crossing road.	(Drobnick 1970).
52.	1956 Ram killed by a shepherd in lower Crouse Canyon in the Uinta Mountains. This ram previously observed alive and photographed by Fish and Game personnel.	Steve Radosevich (Drobnick 1970).

KEY TO FIGURE 3 - (CONT.)

	<u>YEAR</u>	<u>LOCATION OF SHEEP SIGHTINGS</u>	<u>OBSERVER AND/OR SOURCE</u>
53.	1963	Mature ewe seen with a band of domestic sheep in Crouse Canyon in the Uinta Mountains by Fish and Game personnel.	John Fannery (Drobnick 1970).
54.	1969	Ram seen by Fish and Game helicopter survey near mouth of Castle Creek on the north side of the San Juan River.	Rodney John (Drobnick 1970).
55.	1969	One ram and nine ewes seen by Fish and Game helicopter survey at the mouth of the first small canyon north of Gypsum Canyon on the east side of the Colorado River.	Rodney John (Drobnick 1970).
56.	1965	Tracks of six ewes and one ram found by Carl Mahon and Rudy Drobnick at Nakai Dome.	(Drobnick 1970).
57.	1968	Seven bighorns reported in Mikes Canyon along the San Juan River.	(Drobnick 1970).
58.	1967	24 bighorns seen above timberline on the north side of Mt. Ellen in the Henry Mountains.	(Drobnick 1970).
59.	1956	One ram and four unclassified bighorns seen by river floaters at the mouth of John's Canyon along the San Juan River.	Norm Nevilles and Frank Wright (Drobnick 1970).
60.	1959	13 bighorns seen by Fish and Game personnel at Dead Horse Point.	Lee Robertson (Drobnick 1970).
61.	1965	Mature ram seen in Uinta Mountains at Lefty Lake north of the head of Weber River.	Ralph Noble (Drobnick 1970).
62.	1968	One ram and two ewes spotted on Nipple Bench between Warm and Mah Weap Creeks, Kane County.	Ralph Noble (Drobnick 1970).
63.	1950 to present	Sightings in this area are very numerous (see Wilson, 1968, and Irvine, 1969). This area probably contains Utah's major desert bighorn population.	(Drobnick 1970).
64.	1969	Bighorns observed in the Poison Spring Canyon drainage.	(Warburton 1970).
65.	1969	Bighorns observed on Mt. Hillers.	(Warburton 1970).
66.	1966	Bighorns observed at Hites Crossing on the west side of the Colorado River.	(Warburton 1970).
67.	1968	Bighorns observed in White Canyon near the Colorado River.	(Warburton 1970).
68.	1968	Bighorns observed along Dark Canyon.	(Warburton 1970).
69.	1966	Bighorns observed along Fish Creek on Comb Ridge.	(Warburton 1970).
70.	1968	Bighorns observed along Cottonwood Creek.	(Warburton 1970).
71.	1966	Bighorns observed in Harts Draw upstream from Indian Creek.	(Warburton 1970).
72.	1966	Bighorns observed west of Monticello City limits.	(Warburton 1970).
73.	1969	Bighorns observed at the Mouth of Indian Creek.	(Warburton 1970).
74.	1968	Bighorns observed in Harts Draw near the Manti-La Sal Nat'l Forest boundary.	(Warburton 1970).
75.	1969	Bighorns observed in Lockhart Basin.	(Warburton 1970).
76.	1970	Two bighorn rams observed and photographed during July in the area near the confluence of the East Fork of Blacks Fork and the Little East Fork.	(Reddin 1971).
77.	1970	A mature ram and a ewe observed about 3 miles east of Brigham City on Highway 91 in early October.	(Mathews 1970).