

ROCKY MOUNTAIN BIGHORN SHEEP

MANAGEMENT PLAN

SOUTH DAKOTA

2007

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INTRODUCTION

PAST

Audubon's bighorn sheep were common in the Black Hills, White River Breaks, and badlands of South Dakota during the early 1800's. In 1833, Maximillian reported that the Manitari Indians went to the Black Hills and surrounding mountainous areas to hunt mountain sheep, killing as many as one hundred or more in one season. In July 1875, members of the Newton-Jenny U.S. Geological Survey shot a sheep along a tributary of Boxelder Creek in the Black Hills. Bighorn sheep were not found very far from the Black Hills, but were reported to be abundant in the badlands near the White River, fifty miles east of the hills.

Due to uncontrolled hunting, the numbers of Audubon's began to decline during the late 1800's. It was reported that by 1887, mountain sheep were virtually gone from the Black Hills. However, a few still remained in the Harney Peak area within the very core of the hills. It was reported that the band was still present in 1895, but no sheep were found when Thompson Seton visited the area in the summer of 1902. Seton did learn of bands of about 200 Audubon's bighorns that still existed in the White River badlands near Pine Ridge at this time, however, it was reported that the last of the Audubon's bighorns in South Dakota were gone even in the rugged badlands by 1910.

With the last of the Audubon's bighorns gone from South Dakota, no mountain sheep existed in the state until a decade later when U.S. Senator Peter Norbeck obtained eight Rocky Mountain bighorns from Alberta, Canada in 1922. These sheep were placed into Custer State Park within the Black Hills (see Appendix I for history of bighorn sheep transplants in South Dakota). This herd grew and sustained itself until a unknown cause reduced the herd to one animal by 1959. Again, South Dakota was without bighorn sheep.

In 1964, Rocky Mountain bighorns from Pikes Peak in Colorado were introduced into Badlands National Park, located in the White River badlands where the last of Audubon's bighorns had existed prior to the turn of the century. This was a result of a cooperative effort between the South Dakota Department of Game, Fish and Parks and the National Park Service. The goal of this effort was to establish a viable herd in suitable habitat within the park, a herd that could serve as a source of transplant stock for transplanting elsewhere in South Dakota. The original 22 bighorns were placed into a 370-acre enclosure within park boundaries to establish a captive herd. However, reduction of animals due to an unknown disease caused the agencies to release the remaining 16 sheep into the park in 1967. A 3-year study conducted by the Department to determine

population status of this herd resulted in an estimated herd size of 133-200 animals during the winter of 1989-1990. The main range of this herd, lies within the Sage Creek Wilderness Area which is devoid of roads and has few recreational hiking trails.

The Badlands National Park herd declined in numbers. Census surveys conducted by the Park Service denoted a drop in herd size between 1994 and 1996 of the main herd in the Sage Creek wilderness area. During 1996, 16 bighorns were relocated from the Sage Creek area to the east side of the park, approximately 13 miles, in an attempt to expand the bighorn range. This group declined in numbers due to an apparent EHD outbreak. In order to rebuild the herd, park officials working with the SD Department of Game, Fish and Parks transplanted 23 bighorns from Wheeler Peak, New Mexico into the park.

Again, a transplant of Rocky Mountain bighorns was attempted in the French Creek area within Custer State Park. This herd was established in 1965 from 22 bighorns obtained from Whiskey Mountain, Wyoming. The herd grew to a population of approximately 150 by 1975 then became static, with no further growth apparent. Research completed in 1992 on the genetic makeup of these animals has indicated limited genetic variability within the herd, and other research has shown low lamb recruitment due to several factors. With that in mind, in 1999 a transplant of 20 bighorns from Alberta, Canada were placed into Bear Gulch within the park to fill that unoccupied range and provide genetic diversity. Past wildfires within the park disturbed about 21,000 acres with over 2,400 acres of bighorn habitat being released, effectively increasing ewe/lamb habitat by 180%. However, pioneering movements by bighorns into the new area has been slow and limited. Once again an all age die-off occurred in the park during the winter of 2004 – 2005. This die-off was due to suspected pasteurilla-related pneumonia and left only 45-50 bighorns alive from an estimated herd of 170-180.

And additional herd in South Dakota is located in the central Black Hills in Spring Creek and Dark Canyons. This herd was established in 1991 with 26 Rocky Mountain bighorns obtained from Georgetown, Colorado. An additional five sheep from the Badlands herd were placed in Spring Creek Canyon in 1992 to supplement the original transplant and provide genetic diversity. Prior to transplanting, extensive habitat work was completed within Spring Creek Canyon. Through a cooperative agreement between the Department and the Black Hills National Forest, approximately 150 acres of dense pine was clear-cut on the canyon rim, and this was followed by a prescribed burn. An additional 200 acres of pine was clear-cut and burned after the original transplant had occurred. This herd divided into three lamb/ewe groups spaced approximately six miles apart, with ram movement between groups.

The Spring Creek Canyon transplant was considered a success. Excellent lamb production and survival had allowed the herd to reach sustainable numbers. Ram movement between the three separate lamb/ewe groups should insure that one group does not get genetically isolated from the whole herd. Management surveys conducted during the winter months will monitor herd status. The environmental assessment of 1987 for the initial habitat improvement plan for the Spring Creek Canyon area indicated a carrying

capacity of 50 bighorns. Additional habitat improvements increased the carrying capacity by 50% to approximately 75 animals. Management surveys conducted in 1999 estimated the number of sheep residing in the canyon at 85 animals. A limited hunting season for two sheep was initiated in 2000.

With the Spring Creek Canyon herd reaching carrying capacity, 20 bighorns were removed in 2001 and transplanted into the Hells Canyon country in the southern Black Hills. That herd established itself on Elk Mountain. An additional 7 ewes from Wheeler Peak, New Mexico were transplanted on Elk Mountain in 2004 for genetic diversity.

PRESENT

The Custer State Park herd continues to have low lamb recruitment due to the suspected pasteurella die-off. No attempts to supplement the herd have occurred to date.

The Badlands National Park herd has increased in numbers due to the 2004 transplant. When herd numbers reach the mid-100's, bighorns will be removed to supplement other herds within South Dakota, or start new herds.

The Spring Creek Canyon herd complex has become stable. Recent suspected predation by mountain lions has reduced lamb survival for the last several years.

The Elk Mountain herd continues to grow and thrive. Recent surveys have indicated this herd has grown to approximately 100 animals.

FUTURE

The future for bighorn sheep within South Dakota depends on many factors. Negative factors that can affect bighorn numbers include habitat changes, urbanization, diseases, predation, and competition for space and forage to name a few. Management options range from preservation of the existing herds, expansion of present herd numbers, to transplants to establish new herds. As expected, budgetary costs, manpower needs, and consumptive and nonconsumptive benefits will dictate management direction. Management of present herds requires the smallest budgetary and manpower expenditure, but also provides the least amount of hunter opportunity and bighorn viewing by the public. Long term management and expansion of existing herds and additional herds would provide expanded consumptive and nonconsumptive benefits. However, budgetary and manpower constraints, plus habitat availability may limit the extent as to the number of additional herds that could be established in South Dakota. Numerous rugged canyons exist within the Black Hills, however extensive habitat work may be required to create the "open" habitat required by bighorns.

Management responsibilities for bighorn sheep within Custer State Park, lies with Custer State Park personnel. Management for bighorn sheep outside of the park lies with Wildlife Division personnel. Both divisions will work together to manage bighorn sheep as a state resource.

The Wildlife Division's Systematic Approach to Management Plan of April, 1994 discussed the objectives and strategies for bighorn sheep within South Dakota. The listed objectives are: 1) To establish a statistically viable herd in Spring Creek Canyon by the year 2000, 2) To evaluate potential sites for at least two additional herds within western South Dakota totaling 100+ animals per site, 3) To develop a census technique for determining herd status in Spring Creek Canyon, 4) To define the future management goals for bighorn sheep in South Dakota, and 5) To incorporate public input into guidelines and management goals.

Custer State Parks Resource Management Plan 1995-2010 addressed the need for investigations of limited recruitment, genetic supplementation through transplant, and habitat improvement in primary bighorn ranges in the park. Habitat modification has been limited. Timber harvest prescriptions bordering occupied bighorn habitats have included bighorn habitat enhancement (clear cut and thinning). However, acreage impacted is limited. A prescribed fire is in the prescription phase for a portion of west French Creek Canyon, primary range of one CSP sub-herd.

OBJECTIVES

Manage existing herds to maintain short-term population viability

Minimum viable population

Historic evidence shows that all bighorn herds declining to less than 50 became extinct within 50 years, whereas herds which exceed 100 have persisted for over 80 years. Herds of less than 50 bighorn sheep exhibit extremely high extinction rates over the relatively short-term. Maintain individual herd in excess of this number. Herds dropping below this minimum will be supplemented.

Habitat carrying capacity

Habitat evaluations will be accomplished every 5 years to assess range carrying capacity. Evaluations will be conducted to indicate AUM production. Grazing pressure on the range must include all large herbivores sharing the range with the bighorns. On ranges where populations exceed carrying capacity, grazing pressure will be reduced. Bighorn herds exceeding the above numbers could be considered for reduction through transplant. However, maintenance of a larger population should be considered. Habitat modification/maintenance projects will be scheduled where appropriate to enhance

carrying capacity. Projects will include timber manipulations, prescribed burning, and native vegetation release. Water development will proceed on sites otherwise suitable.

Manage meta-population for long-term viability

Establish herds on suitable habitat

Evaluate potential transplant sites via topography and water availability. Vegetation analysis (ie. satellite or aerial photography) of sites found suitable based on topography and water criteria will indicate what, if any, habitat modifications are required. Sites will be acceptable and considered for transplant if they are capable of supporting >100 bighorns. Sites should be prioritized based on the maximum population sustainable, habitat quality rating, the habitat modification/maintenance required, and competitors present. The presence of domestic sheep or goats within 30 miles of contiguous habitat of the transplant range will exclude that site from consideration. Appendix II is a map depicting possible bighorn sheep habitat within western South Dakota based on isolated slopes between 27-85 degrees with a 300m buffer around those slopes using a 10m digital elevation model data. This map does not include vegetation data, land ownership or proximity to domestic sheep or goats.

Genetic enhancement

Initial transplants should be sought from sources of stock unrelated to founder herds existing within the state. This will maximize outcrossing potential in the future. Bighorn populations originating from 4 separate bloodlines currently exist in SD; Badlands National Park, Custer State Park, Spring Creek Canyon, and Elk Mountain. Custer State Park has introduced additional genetic material from an Alberta transplant. The Spring Creek Canyon herd has some integration of genetics from the Badlands herd, and Elk Mountain from New Mexico. An additional outsource herd should be located for future transplants.

Genetic maintenance-

To maintain inbreeding coefficients below 1% per year, necessary for long-term population health, effective population size should exceed 50. Effective population size is reduced from total population size by such factors as unequal sex ratios, unequal fecundity, differential breeding, overlapping generations, and small founder populations. These factors all occur in bighorn sheep in South Dakota.

When bighorns are established on at least five sites capable of supporting >100 animals, genetic maintenance transplants will be conducted from other SD herds. This will create genetic flow between herds, and increase genetic variability, and genetic maintenance. Population exchange between herds will occur with each herd donating/ receiving stock once every 10 years. Optimally, transplant composition should include 1/3 rams. Badlands National Park should be integrated into the overall SD sheep management plan and participate in transplants. This will increase effective meta-population size and

benefit all South Dakota herds. Travel corridors will be investigated to create migration/travel corridors.

Population Control-

When individual herd numbers approach habitat carrying capacity, transplants as outlined above should be conducted. When equilibrium levels are reached among herds, surplus animals (primarily ewes and lambs) should be offered to agencies requesting bighorn sheep, or harvested as a last resort. These sheep should be offered to any state or provincial agency that has a comprehensive management plan. Surplus rams should be offered for harvest. Harvest should be designed to provide a median age of harvested ram of 9 years. This will ensure that the rams are of trophy quality and individual herd breeding dynamics are not compromised. Regulations should be structured so those genetic enhancement transplant animals are not subject to harvest. This will ensure maximal benefit from transplant.

Benefits-

Establishment of a long-term viable meta-population of bighorn sheep in SD will decrease threats to individual populations. Bighorn herd quality will be increased. Disease or other mortality factors will be isolated and herds can be restocked. Surplus animals will be made available to enhance other bighorn populations, benefits could include introduction and supplementation of native species from other states to SD in transplant trades. Bighorn sheep will be in much greater number and much more widely distributed through western SD providing vastly increased opportunity for wildlife viewing. A harvest of approximately 2-3 rams/100 population can be expected. This should allow for a minimal annual harvest of 12-18 rams.

Appendix I

History of Rocky Mt. Bighorn Sheep In South Dakota

1922 – 8 bighorns from Alberta, Canada into Custer State Park

1961 – 12 bighorns from Alberta, Canada into the Slim Buttes, transplant failed

1964 – 22 sheep from Pikes Peak Colorado into Badlands Natl Park, transplant succeeded
approx. 160 in late 90's, has since crashed

1965 – 22 bighorns from Whiskey Mountain, Wyoming into Custer State Park

1974 – 26 bighorns from Custer State Park shipped to Colorado

1980 – 6 bighorns from Custer State Park shipped to Nebraska

1981 – 6 bighorns from Custer State Park shipped to Nebraska

1982 – 4 bighorns from Custer State Park shipped to Nebraska

January, 1991 – 26 bighorns from Georgetown Colorado into Spring Creek Canyon, after
5 years of working with the USFS and habitat improvements.

February, 1992 – 5 bighorns from Badlands into Spring Creek
Three sub-herds now exist, Spring Creek, Rapid Creek, Hill City – approx. 230
bighorns in the 3 sub-herds.

1999 – 20 bighorns from Alberta, Canada into Custer State Park

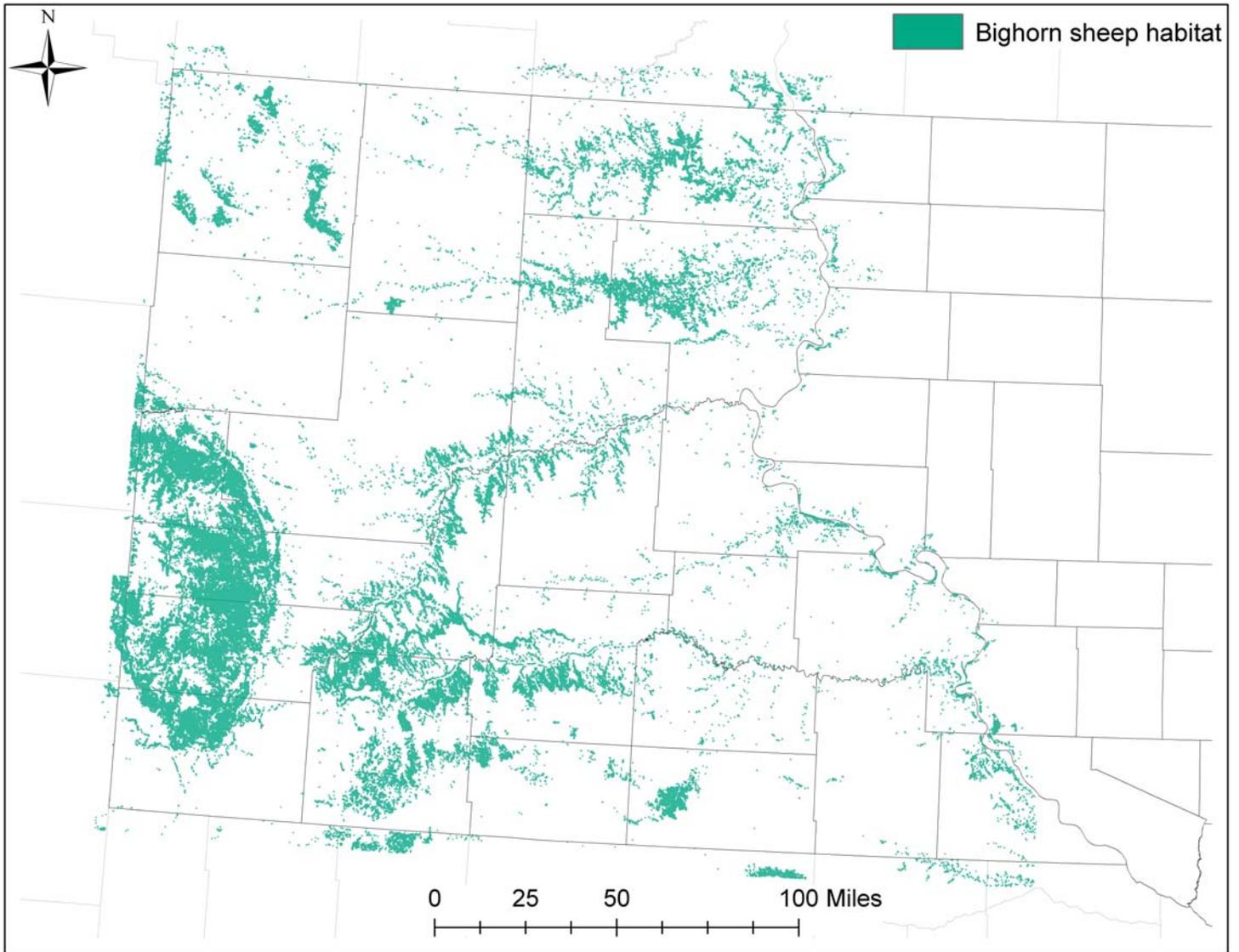
October, 2000 – First established hunting season outside Custer State Park in the Black
Hills, 2 any sheep permits.

January, 2001 – 20 bighorns from Spring Creek into Hell Canyon, herd has established
itself on Elk Mountain.

September, 2004 – 7 bighorns from New Mexico released on Elk Mountain for genetic
diversity. Present herd size is 100 animals.

September, 2004 – 23 Bighorns from Wheeler Peak, New Mexico transplanted into
Badlands National Park

Appendix II



Appendix III

LETHAL TAKE OF BIGHORN SHEEP WHEN ASSOCIATED WITH DOMESTIC SHEEP OR GOATS

Department of Game, Fish and Parks Policy

Effective: 09-28-07

Replaces: New

PURPOSE STATEMENT

To provide direction to Department staff in dealing with bighorn sheep that have come in direct contact with domestic sheep or goats. To prevent the spread of diseases from domestic sheep and goats back to wild bighorn sheep herds.

BACKGROUND

Scientific research has established that when bighorn sheep have even brief contact with domestic sheep or domestic goats, large numbers of bighorn sheep may die when the contacting bighorn returns to other bighorn sheep. Typically, the cause of death in the bighorn sheep is due to bacterial pneumonia, and the die-offs affect all age and sex classes.

POLICY REQUIREMENTS

It is the policy of the South Dakota Department of Game, Fish and Parks that bighorn sheep observed in close proximity to domestic sheep or goats are to be captured or killed as soon as feasible. Research and management work often dictates collection immediately upon notification or discovery of the encounter. Because time is of the essence and prior approval is impractical, collection may be completed by an employee without prior approval as long as circumstances meet the criteria described above and permission to access private property is acquired as necessary. It is recommended that live capture be attempted first and the animal used for disease research purposes. If live collection is not practical, then lethal means should be used. If lethal removal is accomplished via gunshot, the shot should be to the head to swiftly dispatch the animal and prevent damage to respiratory organs to facilitate collections for research.

Whenever possible, proper collection will be made of samples to include, but not be limited to, blood (both serum and anticoagulant), organs (spleen, liver, lymph nodes, tonsils and if possible the entire thoracic contents to include trachea, lungs, and heart), teeth, and fecals for parasites as required to supplement ongoing research and management projects.

Collected samples will be promptly forwarded to South Dakota State University veterinary diagnostic laboratory or other appropriate laboratory for analysis. Findings shall be relayed to the Department senior game staff, CSP wildlife biologist and the Regional Game Program manager.