Draft

Environmental Assessment

For the Potential Reintroduction of Bighorn Sheep

Into the Bridger Mountains, Southwest Montana

Montana Fish, Wildlife & Parks

October 2012

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Chapter I

Purpose and Need

A. The Proposed Action and Project History

The Proposed Action is for Montana Fish, Wildlife & Parks (MFWP) to reintroduce Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) into the Bridger Mountains of southwest Montana. Like most mountain ranges in western Montana, the Bridgers once supported a native population of bighorn sheep through at least 1890's and perhaps into the early 1900's (Buechner 1960, Don Macdonald, pers. communication.). Bighorn sheep were extirpated throughout much of the west around the turn of the century due to a variety of reasons including disease, over hunting, and competition for forage from other grazers, often domestic livestock. The dramatic increase in bighorn sheep numbers and distribution in Montana since the 1940's is largely the result of a very purposeful and successful bighorn sheep transplant program (MFWP 2010). Between 1942 and 2009, MFWP captured and released 2,028 bighorn sheep in 55 different locations across Montana.

There has been continued MFWP and public interest in reintroducing bighorn sheep into the Bridgers for over 30 years (Alt 1994; Appendix A). The most recent effort to initiate a bighorn transplant into the Bridgers occurred in 1994. However, sportsmen groups and others continue to advocate for and support a transplant project if it has a reasonable chance of success.

Issues and concerns raised during previous transplant proposals in the Bridgers included potential grazing conflicts between bighorns and domestic livestock, disease factors (potential bighorn sheep die-offs), concerns about loss of public access or changes in motorized recreation, and potential for seasonal bighorn sheep use of and conflicts in rural subdivisions (Alt 1994, Lewis 1995; Appendix B). These concerns continue to be issues that are evaluated in most bighorn sheep transplant proposals in Montana and elsewhere.

Our understanding of bighorn sheep ecology and management has increased significantly in the last decade. Advances are the result of research projects in many states and provinces that take advantage of new GIS technologies in habitat mapping and modeling, GPS technologies in monitoring animal movements, and a new emphasis on monitoring for wildlife diseases and better understanding their epidemiology to include identifying the genetic background of disease organisms. Montana recently developed the Montana Bighorn Sheep Conservation Strategy, a comprehensive statewide planning document that was adopted by the MFWP Commission in January 2010 (MFWP 2010). The Conservation Strategy is a step forward in management intended to provide guidance for at least the next 10 years. As stated in the plan, "Ultimately, this document will assist biologists in making decisions regarding the management of particular populations, provide direction to other agencies relative to their management efforts that may affect bighorn sheep, and aide the FWP Commission in their decisions regarding bighorn sheep

in Montana." This EA relies heavily on new information and recommendations found in the Montana Bighorn Sheep Conservation Strategy.

If this EA is approved and bighorn sheep are transplanted, they will be humanely captured from other Montana herds using techniques and methods described in MFWP 2010; pg 30. Medications will be administered including an antibiotic to reduce the possibility of infection, ivermectine for parasite control, and a selenium supplement to reduce capture myopathy (Aune 1994). At the time of capture, animals from the source herd will be sampled to determine their health status to include fecal lungworm larval counts, serological (blood) profile, and nasal/throat bacterial swabs to ensure that sick bighorns are not translocated to new areas (MFWP 2010). Although a source herd has not been identified for this transplant, recent transplants have come from Wild Horse Island where detailed health profile data have already been collected.

Prior to release, a portion of the sheep will be marked with radio transmitters to determine movements and distribution. Additional capture and handling recommendations adapted from the 2nd Annual North American Wild Sheep Conference are listed in MFWP 2010; pg 31, including transplant sites should have the potential to support at least 100 sheep, potential transplant sites should be fully evaluated, including habitat, predator abundance, and the potential for livestock and other wildlife ungulate competition, initial transplants should include at least 30 animals, test source herds for diseases and do not transplant herds with recent histories of pneumonia, and monitor transplanted sheep for at least 1 year, using mortality sensing collars. The issue of connectivity between metapopulations is addressed in the Transplant Site Assessment Form (MFWP 2012; Appendix C). The proposed transplant may provide some improved chance of interconnectivity between the proposed Bridger population and the existing Gallatin Mountains bighorn sheep population 20-25 miles to the south. Interconnectivity between small bighorn populations is biologically desirable. Any translocation of bighorns ultimately depends on the availability of sheep from areas within Montana and adequate funding to accomplish the transplant.

If a bighorn population becomes established and increases in numbers, MFWP biologists will recommend if and when recreational hunting will begin. Establishing recreational hunting seasons is an action objective of most bighorn sheep transplant projects. One of the protocols for recently transplanted sheep is not to hunt them until they have reached 80% of a Minimum Viable Population (N=125) (i.e., 100 sheep) and there is sufficient annual recruitment to maintain herd growth while allowing for the anticipated harvest MFWP 2010; pg. 65. Sheep hunting seasons and harvest quotas are approved by the FWP Commission.

B. Purpose, Need and Benefits

As mentioned above, bighorn sheep were once native to the Bridger Mountains but were extirpated in the early 1900's. Restoring bighorn sheep to suitable habitats was the number one issue identified by the public during the scoping process for the Montana Bighorn Sheep Conservation Strategy (MFWP 2010; pg. 6). One of the statewide bighorn management

objectives is to “Establish five new viable and huntable populations over the course of the next 10 years and augment existing populations where appropriate.”

The purpose of the proposed action is to reintroduce bighorn sheep into the Bridger Mountains, with the goal of establishing a viable long-term population. A viable population would provide significant new recreational opportunities to include sport hunting and wildlife viewing. Bighorn sheep hunting in Montana generates a great deal of public interest within the state and around the world. Hunting and wildlife viewing are economic engines that contribute to Montana’s local and statewide economies. Montana’s diverse wildlife populations and wildlife related recreation helps define the public perception of Montana. Increasing recreational opportunities near Bozeman, a large outdoor oriented population center in southwest Montana, would be desirable to many people and businesses.

Biologically a new bighorn sheep population in the Bridgers would increase biodiversity and restore a native species to the ecosystem after an absence of 100 years. From a conservation perspective, increasing the number and distribution of viable populations has a long-term survival benefit for the species.

C. Location, Size, and Scope of the Proposed Action

This project encompasses the entire main stem of the Bridger Mountain range north of Bozeman, MT, in Gallatin County (Fig. 1). The habitat analysis area is about 150 square km (37,000 acres) in size with approximately 85% on public land and 15% in private land ownership. However, this does not mean that bighorn sheep will occur throughout the entire project area. Like other wildlife species, bighorns will occupy and use only a small portion of the area. Exactly where and when bighorn sheep will occur will be decided by them as they explore available seasonal habitats and get to know the area. Their distribution will be most restricted during the winter followed by potential longer distance movements and wider distribution in the summer and fall. It may take several years for the bighorns to adjust to their new habitat. Once the population becomes established, bighorn sheep, like most wild ungulates, show a remarkable degree of fidelity to specific seasonal habitats year after year.

Like most mountain ranges in southwest Montana, the Bridgers are a complex mix of habitat types depending on elevation, aspect, moisture, amount of exposed rock, and topography. A GIS analysis and description of the habitat area can be found in MFWP 2012; Appendix C.

If approved, bighorn sheep would be released on winter range habitat in Middle Cottonwood Creek on private land with landowner permission. This is the same release site selected in 1994 based on proximity to suitable winter range habitat, vehicle accessibility during the winter, and general location with respect to the entire mountain range.

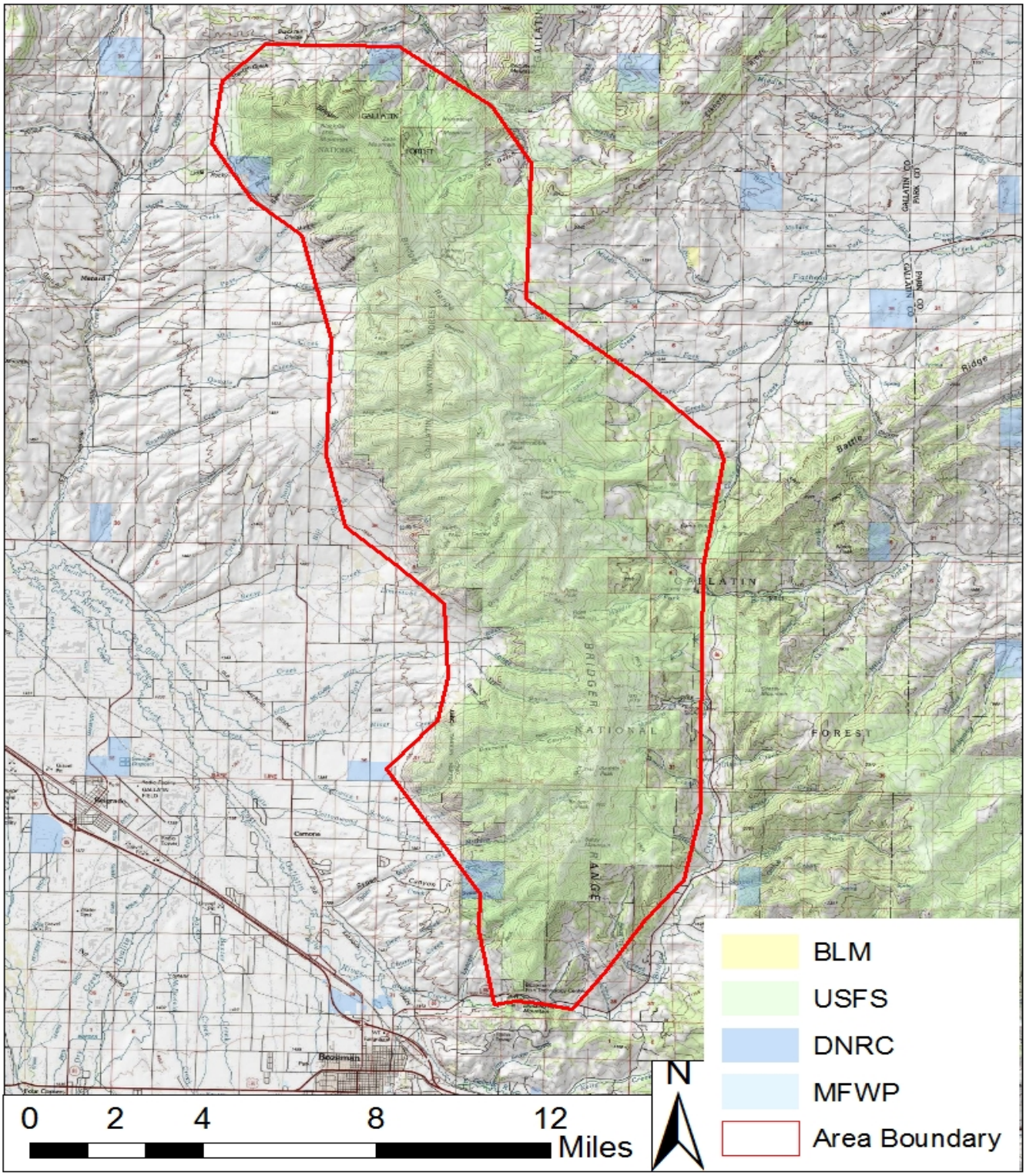

Figure 1. Map of proposed Bridger Mountains bighorn sheep transplant area in southwest Montana.

D. Agency Authority for Proposed Action

MFWP policies and guidelines are directed by state law (MCA 87-5-701-721) which provides for the importation, introduction, and transplantation of wildlife. This statute provides that transplantation or introduction of any wildlife is prohibited unless the MFWP Commission "determines, based upon scientific investigation and after a public hearing, that a species of wildlife poses no threat of harm to native wildlife and plants or to agricultural production and that the transplantation or introduction of a species has significant benefits."

In the statue, transplantation is defined as the "release or attempt to release, intentional or otherwise, wildlife from one place within the state into 'natural habitats' in another part of the state." Natural habitat means "any area in which the introduction of wildlife species may result in an uncontrolled, naturally reproducing population of that species becoming established." The requirements of this statue have been interpreted by MFWP legal counsel to apply to transplants to new areas where bighorn sheep do not currently exist but not to the augmentation of existing herds (MFWP 2010; pg. 29).

E. Anticipated Schedule

If the EA is approved and bighorn sheep are transplanted, the transplant date would depend on the availability of bighorn sheep, what priority this project would have relative to other transplants in the state, and availability of adequate funding to complete the project. The cost of transplanting bighorn sheep has increased significantly in the last 10 years. Recent transplants have cost an estimated $900-$1,000 per bighorn sheep relocated.

MFWP (MFWP 2010; pg. 66) has outlined a preferred time line protocol for the transplant process beginning in March with submission and evaluation of Habitat Evaluation Procedure (HEP) forms and landowner/agency contacts for each potential transplant site at the March MFWP Wildlife Managers meeting. New transplants are to be presented to the MFWP Commission at their May meeting for tentative approval to move forward. Final approval would occur by the Commission at their July meeting. The MEPA process (EA) is to be completed and all landowner agreements signed by August 1. MFWP Regions are to provide listings of the number of sheep available for transplant to MFWP's Wildlife Division by December 15. The Wildlife Division will then determine priorities for which previously approved transplants will occur during the following January to April period.

Bighorn transplants typically occur during the winter or early spring. Best results occur when source sheep are captured on their home winter range and released on suitable winter range habitat at the new transplant site as soon as possible. If this transplant EA is approved by the MFWP Commission in December 2012/January 2013 time frame, the earliest possible release would occur in winter/early spring of 2013, followed by a second window of opportunity in winter/early spring of 2014, depending on the factors mentioned above.

F. Public Outreach and Contacts

MFWP has made an effort to contact and inform potentially affected and interested agencies, groups, landowners and individuals about this project and will continue to do so throughout the EA process. The Gallatin National Forest (US Forest Service) manages virtually all of the public land within the project area. The project has been discussed with this agency on several occasions and levels. As in 1994 during the last transplant attempt, the Gallatin National Forest is supportive of any effort to protect or enhance bighorn sheep populations in Montana. The US Forest Service considers bighorn sheep to be a sensitive species and when possible pursues ways to protect or enhance bighorn sheep populations and habitat on public lands.

Anticipating another attempt to reintroduce sheep into the Bridgers, MFWP has identified and contacted private landowners in the area about the project. The main focus has been on contacting landowners within the potential sheep habitat that own 160 acres or more and all of the agricultural landowners within 14 miles of the release site that have domestic sheep, or have been associated with raising domestic sheep in the past and may be interested in future sheep operations. There are just over 30 landowners in the project area that own 160 acres or more; most of these landowners have been contacted once or more about the transplant project by personal visit, telephone, or mail and asked to complete a standard MFWP Cooperative Agreement for Trapping/Transplanting Bighorn Sheep form (MFWP 2010; Appendix D) . About 100 landowners with smaller ownerships occur within the mapped/predicted sheep habitat. Most of these will be contacted by postcard during the EA process to make sure they are aware of the project and are invited to a public meeting on the issue. There are no fewer than 10 flocks of domestic sheep located within 14 miles of the proposed bighorn sheep release site. All of these ownerships have been contacted, and the project has been discussed with them.

MFWP has created a PowerPoint presentation on the transplant project to be used at internal and public meetings to help explain the scope of this project. MFWP has also written a “Bighorn Sheep in the Bridger Mountains FAQ’s and Information” for distribution to interested parties (Appendix E). Following standard MFWP procedures, notice of this EA and dates of the public comment period will be published in various newspapers and appear online at the MFWP website (fwp.mt.gov). Copies of the EA will be sent to identified interested individuals, sportsman’s groups, conservation organizations, landowners, MFWP Commissioners, other state agencies, and state legislators or to anyone else upon request. The EA can also be accessed on MFWP’s website.

As required by statute (MCA 87-5-701-721) and as part of the EA process, MFWP will hold a public meeting on this transplant project from 6-8 PM on Thursday, November 15, 2012, at the MFWP Region 3 Headquarters in Bozeman, MT. There will be a 22-day public comment period from November 5-26, 2012. Public comments received during the comment period and during the public meeting will be reviewed and summarized in the Final EA document.

G. Purpose of the Draft EA

The purpose of this draft EA is to describe the proposed project, list and discuss in detail major issues and concerns that have been identified up to this point, stimulate further public input and discussion of the issues, and identify additional issues. The draft EA will be the focus of a public meeting and will be distributed to interested parties as well as being available upon request. At the end of a public comment period, any new public input will be summarized and incorporated into a Final EA. Both the Draft and Final EA are documents that will provide the Decision Maker with the best available information to assist him in evaluating the project and deciding whether to approve, not approve, or modify the proposed action in a Final Decision Notice. In this case, the decision making authority is the MFWP Region 3 Supervisor.

E. Environmental Impact Statement Determination

Based on the analysis completed in this EA, MFWP has determined an EA is the appropriate level of analysis because the proposed action is anticipated to have few to no impacts to the existing environment such as soil, water, vegetation, wildlife, and social resources. Anticipated impacts may be minor, manageable, or mitigable.

Chapter II

Issues and Alternatives and How They Were Identified

A. Introduction

Chapter II describes issues and alternatives that have surfaced and are being considered at this point in the Draft EA stage. This project is somewhat unique in that it was previously proposed and evaluated some years ago and has maintained a certain level of public interest since then. Also in preparation for a possible transplant, MFWP has solicited and received input from a number of individuals and groups within the last 12 months. Many of the issues and concerns regarding the introduction of bighorn sheep into the Bridgers expressed in 1994 remain the same. Advances in our understanding of bighorn biology and management will assist us in analyzing these issues today.

B. Issues and Concerns

Landowners, sportsmen groups, MFWP internal discussions, and past information from the 1994 Bridger transplant effort identified six issues relative to the success and impacts of a bighorn sheep transplant in the Bridgers. These issues appear below in no specific order along with an attempt to provide the best possible current information available on the issue.

Issue #1: Bighorn Sheep Habitat Suitability; Do the Bridger Mountains contain sufficient bighorn sheep habitat to produce and support a Minimum Viable Population of bighorn sheep (N=125 bighorns)?

To help answer this question, a Habitat Evaluation Procedure (HEP) was developed by MFWP to determine potential transplant sites by identifying suitable but unoccupied bighorn sheep habitats (MFWP 2010; pg. 60). The process uses GIS technology to develop a habitat suitability model that is reviewed by local biologists to ensure that adequate habitat exists. The habitat characteristics of the potential transplant site are compared to that of occupied sheep habitat elsewhere in Montana. To determine how many sheep an area can potentially support, specific habitat criteria are used to identify and measure the amount of winter, lambing, and summer habitat available. The location and amount of escape cover is also determined. Escape cover is a critical component because studies indicate that 95% of sheep activity occurs within 300 meters of escape cover (Smith et al. 1991). Typical sheep densities for different seasonal habitats along with the influence of escape cover are then applied to the site. This process results in an estimate of the number of sheep the area can support and what habitat types, if any, may be limiting.

This procedure was applied to the Bridgers (MFWP 2012; Appendix C), and based on habitat calculations MFWP expects the Bridgers to support 160-350 bighorn sheep depending on how they use the available habitat. The estimated population is based on all available habitats across the entire mountain range. It may take many years or decades for a transplanted population to

disperse throughout all potential habitats and reach their highest numbers. In the 1994 Bridger sheep transplant EA, MFWP estimated a potential population of 100-150 bighorns in the Bridgers. The estimate made 18 years ago was based largely on the personal field experience and judgment of biologists familiar with bighorn sheep biology and the Bridger Mountain range. Habitat and population modeling tools were not available at that time.

Issue #2: Disease Transmission; Is there a significant risk for disease transmission between domestic sheep and bighorn sheep in the Bridgers?

Historically and recently, bighorn sheep herds throughout the west and in Montana have experienced significant die-offs associated with disease transmission from domestic sheep (MFWP 2012; pg. 43). Domestic sheep (and to some extent domestic goats) are host to pathogens for which bighorn sheep have little or no immunity. From 1984 to 2010, there were significant die-offs in 14 bighorn populations in Montana, many related to respiratory disease or pneumonia. Although the transmission of disease from domestic animals to bighorn sheep is not entirely understood, it is widely recognized among wildlife health professionals and supported by numerous studies that when domestic sheep and bighorn sheep intermingle, bighorn sheep can die in significant numbers (Martin et al. 1996). There is no indication in the literature of disease transmission from bighorn sheep to domestic sheep (MFWP 2010).

In 2007, the Western Association of Fish and Wildlife Agencies (WAFWA), comprised of 23 state and provincial wildlife agencies (including MFWP), established a Wild Sheep Working Group (WSWG) to address the issue of contact between wild sheep and domestic sheep among other aspects of bighorn sheep management. Following an extensive review, the WSWG concluded the preponderance of evidence indicates significant risk exists for disease transmission when domestic sheep and goats comingle with bighorns and recommended that wild sheep managers take appropriate steps to minimize, mitigate, or eliminate the opportunities for disease transmission. The WSWG produced a report titled "Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat" which was endorsed by WAFWA directors (including MFWP) on July 12, 2007. The WAFWA encouraged state and federal agencies to use the recommendations as the basis for creating or revising policy level direction for bighorn sheep management (MFWP 2010; pg. 44). The United States Animal Health Association (USAHA) through a working group including the American Sheep Industry produced a similar report on best management practices for domestic sheep grazing on lands occupied by bighorns (MFWP 2010; pg. 50). MFWP has incorporated much of the content and recommendations from both of these documents into its Health Monitoring and Management policy (MFWP 2010; pg. 43-58).

With regard to potential bighorn transplants, the physical separation of domestic sheep from bighorns is the recommended way to avoid disease transmission. Zeigenfuss et al. (2000), when looking at a number of successful and unsuccessful bighorn sheep transplants, found that successful transplants were an average of 23 km (14.3 miles) from domestic sheep. Similarly Singer et al. (2000), when evaluating success of 100 bighorn sheep transplants, found that the

successful populations were an average of 20 km (12.4 miles) from domestic sheep. MFWP does not recommend placement of bighorn sheep within 23 km (14.3 miles) of domestic sheep herds without clear physical separations (i.e., major highways, rivers, double fencing, or other barriers) (MFWP 2010).

In the Bridgers, there are a minimum of 10 domestic sheep herds within 14 miles of the proposed sheep release site (Figure 2). Five are large herds (100 +/- 25 sheep), 3 are medium sized (20-50 sheep), and 2 are small herds (2-4 sheep) all located within 1.5 – 12 miles from the release site (Table 1). None of these herds currently have clear physical separations from the potential bighorn sheep population. All of these sheep owners have been contacted about the transplant, and the response has been mixed. All but one sheep owner agreed to contact MFWP and/or shoot and kill a wandering bighorn if seen near domestic sheep to prevent disease transmission. At this time, most producers were not interested in fencing their operations to ensure separation from bighorns. In addition, 2 of the 30+ landowners with 160+ acres were former sheep producers, and both oppose the transplant project due to concerns about their ability to run domestic sheep in the future.

MFWP's Wildlife Veterinarian has evaluated the Bridgers to be a high risk area for the transmission of disease from domestic sheep to bighorn sheep under the current circumstances (Appendix F). The evaluation expresses concerns that there are several domestic sheep herds within a short distance of the potential reintroduction site and that several accepted sheep management guidelines, including MFWP's Conservation Strategy, do not recommend introducing sheep under the circumstances that currently exist in the Bridgers.

The transmission of disease to bighorn sheep from domestic sheep has several consequences. Die-offs can be moderate or localized affecting only a small portion of the population, or they can develop into an "all-age" die-off where both sexes and all ages of bighorns die over time occasionally resulting in 90% mortality (MFWP 2010; pg. 54). Die-offs occur typically in fall or winter, and mortality is generally due to pneumonia. Die-off events are unique and may vary to some degree in the extent and stage of die-off when reported, the method of detecting or determining that or if a die-off is in progress, and access to the area where the die-off is occurring. Some die-offs occur rapidly with sheep dying within a few days, while other times a die-off may last a couple of months with animals deteriorating slowly before death. Another common consequence of a pneumonia epizootic in bighorns is reduced lamb production and recruitment, often for several years following an outbreak.

MFWP has developed a detailed protocol for actions and timeframes for responding to bighorn sheep die-offs (MFWP 2010; pg. 54-57). Reports of a possible die-off typically trigger a large scale aerial and ground monitoring effort to include sheep counts and collection of carcasses and removing (killing) any sheep that appear sick. Biological samples are collected and sent to wildlife labs that specialize in disease diagnosis. All potential contacts between bighorns and domestic sheep are investigated. Documenting exactly what takes place and clearly

communicating facts to the public are critical to dealing with a bighorn sheep die-off. The entire process may take several months, require additional personnel, incur significant survey and laboratory costs, and result in a disappointed and frustrated public. Post die-off impacts may include closing bighorn hunting seasons, eliminating the potential for using the area as a source of sheep or a possible transplant site for several years, and creating tension and poor relationships between the public and landowners.

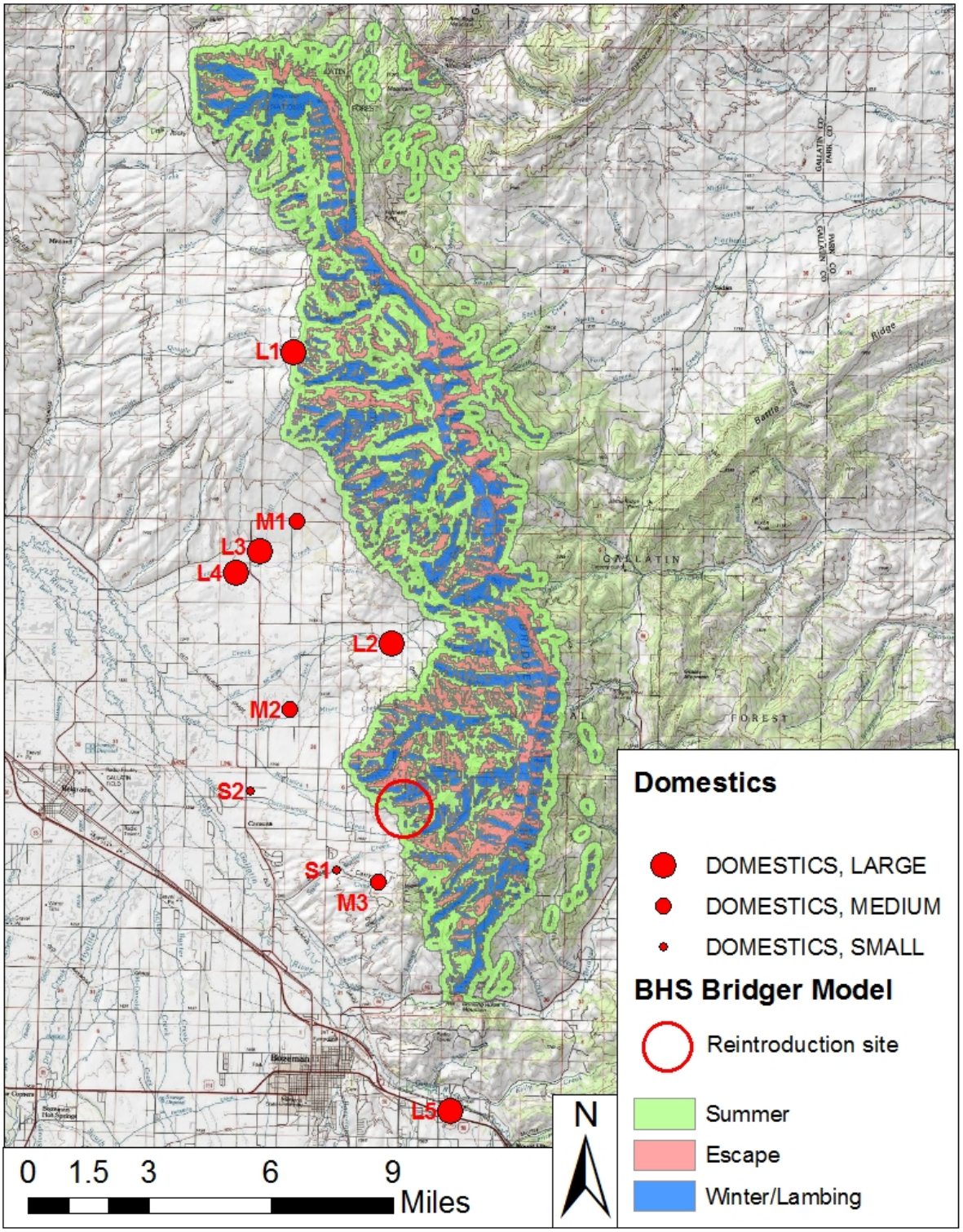

Figure 2. Map of domestic sheep herds relative to potential bighorn sheep habitat.

Table 1. List of landowners (sheep producers) with distances from potential reintroduction site, site description, and description of mitigations, if any.

Landowner ID	Dist. from Site	Description	Mitigations?
L1	12 miles	In potential habitat, multiple pastures	None
L2	4.5 miles	Rolling hills near riparian corridors, open space	Have 2 guard dogs per pasture, dogs may protect
L3	7.5 miles	Open space and agriculture	Visible pastures, sheep moved frequently. Have dogs.
L4	7.5 miles	Open space and agriculture, multiple pastures	None
L5	7.5 miles	Open space and agriculture, generally small pastures	None
M1	8 miles	Foothills 1 mile from projected habitat	Pseudo-double fencing: electric mesh pastures within perimeter fence
M2	4 miles	Farmland along creek bottom, open land	None known
M3	1.5 miles	Edge of subdivision ½ mile from timbered and open hills	None
S1	2 miles	Subdivision and foothills	None
S2	4 miles	Subdivision and open flat lands	None

Issue #3: Competition with Livestock; Could there be significant competition for forage between bighorn sheep and livestock?

Some level of mutual use or competition for forage between wild ungulates and domestic livestock occurs across Montana all the time. In Montana, wildlife populations such as deer, elk, antelope, and bighorns are free ranging and have access to suitable habitat on both public and private land. In many cases, domestic livestock (e.g., cattle, horses, sheep) and wild ungulates eat the same forage to survive. Where livestock and wildlife overlap, some level of mutual use or

competition occurs. In most cases, there is sufficient forage for both species However in some cases, conflicts with livestock occur. This natural relationship is recognized in Montana law (MCA 87-1-225) and MFWP wildlife management policy. Court cases (State of Montana vs. Rathbone March 5, 1940 and State of Montana vs. William and Edna Sackman March 18, 1968) have established that ranchers and farmers in Montana must expect a certain reasonable level of wildlife use and impact on their property based on the nature of our state and its wildlife populations. If landowners believe that wildlife impacts become unreasonable, they can contact MFWP and pursue a solution through established game damage rules (ARM Game Damage Rules 12-9-802) and programs.

The level of competition between bighorn sheep and livestock in the Bridgers will depend largely on the amount of spatial overlap between the species and the numbers of animals involved. In the majority of the project area, there will be no overlap between the species. About 85% of the area is located within the Gallatin National Forest. There are currently 15 public national forest cattle grazing allotments in the Bridgers that allow up to 3,128 cow/calf pairs (6,256 cows) for 3-4 months per year. There are no public domestic sheep or horse grazing allotments in the Bridgers. The Forest Service periodically monitors forage condition on allotments and works with the lessees to make adjustments as needed. At current cattle stocking rates, up to 6,256 cows occupy Gallatin Forest grazing allotments. At a predicted population of 160-350 bighorn sheep, cattle would outnumber bighorns 17-39 cows/bighorn sheep. At relatively low bighorn sheep numbers compared to cattle, it is unlikely that much smaller bighorns would have a significant impact on available forage for cattle.

Habitat overlap and competition could occur on private land that is grazed by cattle, horses, and sheep. Grazing currently occurs on a portion of the 15% of the project area in private ownership, most of which is located at the north end of the Bridgers. Most private grazing occurs on low elevation bench or foothill habitat outside the Gallatin National Forest. Grazing areas fall largely within bighorn summer habitat and do not contain large amounts of escape terrain or lambing/winter range. Throughout the year, bighorn distribution is closely tied to the proximity of escape terrain. Bighorn sheep, especially ewes, are generally found within 100 to 300 meters from escape terrain (Oldemeyer 1971; Erickson 1972; Smith et al. 1991; Douglas and Leslie 1999). Escape terrain is comprised of slopes 60% or greater with occasional rock outcroppings. Bighorns prefer rugged steep habitats, and their ability to feed in areas far from standing water separates them from areas normally grazed by livestock. The majority of sheep activity is expected to occur on public land within the Gallatin National Forest.

<u>Issue #4: Competition with Other Wildlife Species</u>; Is it likely there would be significant competition between reintroduced bighorn sheep and existing wildlife species in the Bridgers?

This issue is addressed in a biological evaluation of the Bridger sheep transplant (MFWP 2012; Appendix C). The two species where competition with bighorns is most likely are mule deer and

mountain goats. Competition can occur directly for resources such as forage or indirectly through spatial displacement. Literature on competition between bighorns and mule deer is scarce. One study in the Gallatin Canyon determined that spatial and dietary overlap was possible, especially in Douglas fir habitat types (Constan 1972). In a study of a guild of ungulate species in the northern Yellowstone, Singer and Norland (1994) estimated little dietary overlap between bighorn and mule deer.

Competition between mule deer and bighorns was also an issue in the 1994 sheep transplant EA. At that time, MFWP Deer Research Biologist Dave Pac did not anticipate significant competition between deer and bighorns at the stated bighorn population objective and existing mule deer numbers (MFWP 1994). Since 1994, the situation has changed. The average number of deer counted per year in the unit encompassing the release site has declined from 460 deer (1990-1994) to 194 deer (2006-2010). In addition, the estimated potential number of bighorns has increased from 100-150 bighorns to 160-350 bighorns. Mule deer management objectives in this unit has also changed since 1994, shifting from a general any buck mule deer season to a "special buck management area" in 1996 when regulations were implemented to increase the number of older age-class bucks in the population (MFWP 2001). Although MFWP does not know exactly how these changes in population numbers will effect competition, the starting population level of each species can be an important factor in whether two species competition results in competitive exclusion or coexistence (Begon et al. 1996). Likewise, MFWP is unsure of what effect if any the addition of bighorn sheep would have on the objective of providing older age class bucks in this hunting unit. Dave Pac (now retired) was asked to comment on the current bighorn transplant and the issue of competition with mule deer under the current conditions. Mr. Pac has concerns about releasing bighorns when deer numbers are low due to possible competition on winter range habitat. He did not recommend releasing bighorns at this time.

Mountain goats were introduced into the Bridgers in 1969. They are not native to this area. Although not surveyed frequently, the Bridgers appear to be support a relatively stable population of at least 50-100 mountain goats. Five mountain goat licenses are currently issued annually, and hunter success is generally high. The potential for resource competition between mountain goats and bighorn sheep has been an intriguing if somewhat elusive subject for decades. There have been several studies throughout the west, but there is no consistent or conclusive evidence for or against significant inter-species competition. There appears to be variation in studies and study areas. There is currently a mountain ungulate research initiative underway in the greater Yellowstone area (Garrott et al. 2010) that may eventually clarify the relationship between mountain goats and bighorn sheep. An initial literature review indicates that mountain goats and bighorns may overlap on summer or winter range, mountain goats may harbor parasites and pathogens that may infect bighorns, there is some dietary overlap but scale is important when considering resource similarities and differences, goats can be dominant over bighorns, and there is a lack of empirical data for sympatric populations where both species are doing well.

<u>Issue #5: Conflicts in Rural Subdivisions</u>; What is the potential for bighorn sheep to seasonally use and create management conflicts in low elevation subdivisions adjacent to the Bridgers?

Wild ungulates including bighorn sheep may use and create conflicts in rural subdivisions. A few conflicts with bighorns have occurred in western Montana where subdivisions border bighorn sheep winter range habitat in close proximity to escape terrain. Conflicts include grazing and browsing in yards, interactions with family dogs, minor property damage, and human safety/vehicle collision concerns. In general, the bighorn sheep habitat in the Bridgers occurs away from private land subdivisions except for the Middle Cottonwood Creek proposed reintroduction site and the Ross Peak area.

Approximately 15% of bighorn sheep habitat in the project area is in private ownership. However, only a small portion occurs within the boundaries of rural subdivisions. The rest of private ownership falls largely within family farms and ranches. The majority of all private land in the project area lies within bighorn sheep summer range that is the largest and least limiting habitat type. Very little escape terrain or lambing/winter habitat occurs on private land of any type including large farms and ranches (MFWP 2012; Appendix A). Throughout the year, bighorn sheep distribution is closely tied to the proximity of escape terrain. Bighorn sheep, especially ewes, are generally found within 100 to 300 meters from escape terrain (Oldemeyer 1971; Erickson 1972; Smith et al. 1991; Douglas and Leslie 1999). Escape terrain is comprised of slopes 60% or greater with occasional rock outcroppings. Private land subdivisions in the Middle Cottonwood and Ross Peak areas are not in close proximity to significant escape terrain. The majority of sheep activity is expected to occur on public land within the Gallatin National Forest.

Another factor in determining if wildlife conflicts occur is the number of animals involved. Often a small number of animals in or near a subdivision are tolerated, particularly if they are viewed as unique or unusual species for the area. Conflicts and complaints often develop when numbers increase beyond some level of tolerance and the novelty wears off. The total number of sheep expected to eventually occupy the entire Bridger Mountain range is 160-350. Based on sheep behavior and habitat modeling, they will spend the majority of their time on public land away from subdivisions.

<u>Issue #6: Public Land Access and Use Restrictions</u>; Will the reintroduction of bighorns result in changes in public land access or restrictions on existing recreational activities?

Approximately 85% of the project area is public land under the management of the Gallatin National Forest. The US Forest Service is responsible for regulating public access and recreational activities on the Gallatin National Forest. This is typically accomplished by

implementing a forest-wide Travel Plan and periodically revising or amending the plan through a public planning and comment process when issues or needs arise (USDA 2006).

With respect to the proposed bighorn sheep transplant MFWP is not making any recommendations for changes to public access or recreational activities on the Gallatin National Forest. MFWP concludes that current levels of activities occurring in the Bridgers including motorized and non-motorized recreation are compatible with a successful sheep transplant. The Gallatin National Forest is also not recommending any changes in public access or recreational activities as a result of the proposed bighorn sheep transplant. Any future management changes regarding access and recreation on the Gallatin National Forest would go through the established Forest Service public planning and comment process.

C. Alternatives

Many MFWP EA projects lend themselves to some degree of flexibility and the development of different alternatives to accomplish the same objectives. The unique character of a bighorn sheep reintroduction project offers few alternatives to accomplish its goal of establishing a sustainable sheep population. Typically, either sheep are released or they are not. However during the process of evaluating Issue #2: Disease Transmission, an important alternative surfaced and was developed for consideration. Achieving and implementing this new alternative would help reduce the high risk of disease transmission from domestic sheep to bighorn sheep in the Bridgers. This approach could avoid a bighorn sheep die-off and the failure of the proposed transplant. As described below, this alternative is not without its challenges and relies on cooperation from several different parties, but it may also lead to the project moving forward.

D. Alternative Descriptions

Alternative A (No Action)

Under the no action alternative, bighorn sheep would not be introduced at this time. Alternative A represents the current baseline condition against which the potential effects of the two other action alternatives can be compared. Alternative A also responds to those who oppose the bighorn sheep reintroduction including respondents wishing to postpone any release of bighorns at this time.

Alternative B (Proposed Action)

Alternative B represents the initial proposal for transplanting bighorn sheep in the Bridger Mountains with the objective of establishing a sustainable population as described in Chapter I. Under this alternative, 30-40 bighorn sheep would be released on winter range in Middle Cottonwood Creek and monitored following protocols outlined in the Montana Bighorn Sheep Conservation Strategy (MFWP 2010). The release schedule depends largely on availability of source animals and statewide transplant priorities. A follow-up augmentation release of 30-40 bighorns within 3-5 years is also possible.

Alternative C (Modified Proposed Action)

Alternative C would result in the release of bighorn sheep as described in Alternative B contingent upon entering into a voluntary domestic sheep management agreement with sheep producers in the area to achieve effective separation between domestic and wild sheep. The negotiated agreement would be specifically designed for each operation and include a combination of mutually agreed upon best management practices and mitigation strategies to include herders, dogs or other guarding animals trained to repel foreign animals, confinement of domestic sheep at night to reduce strays, adequate fencing configurations designed to achieve effective separation, and any other available measures or means determined appropriate.

The domestic sheep management agreements would be based on Wild Sheep Working Group (WSWG) guidelines found in "Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat"(http://www.wafwa.org/html/wswg.shtml), the United States Animal Health Association (USAHA) report "Recommendations on Best Management Practices for Domestic Sheep Grazing on Public Land Ranges Shared with Bighorn Sheep", and other recommendations found in MFWP's state management plan (MFWP; pg.49-54). Ideally, outside sources (state, federal, private, NGO's) would fund such projects so as not to burden the landowner with additional costs. The need and purpose of Alternative C is to address the high risk of disease transmission in the Bridgers and to reduce the risk of a bighorn sheep die-off. Mitigation efforts may not lead to complete species separation, but they could reduce the current disease transmission status from high risk to something lower.

E. Comparison of Alternatives with Respect to Effects

The alternatives differ in both if and when bighorn sheep would be released. Under Alternative A, no sheep would be released and everything would stay the same. Under Alternative B, sheep would be released as soon as source sheep became available under the current priority system. Under Alternative C, sheep would only be released after mutually acceptable domestic sheep separation agreements were completed with local sheep producers. This process would delay the release of bighorns for an unknown length of time. If separation agreements could not be completed, bighorn sheep would not be released.

Chapter III

The Affected Environment

A. Introduction

The purpose of Chapter III is to briefly describe components of the environment that could be affected by implementation of the proposed action. The chapter contains a general description of basic natural resources found in the project area. Resources related to project issues identified earlier are also described.

B. Affected Environment

The proposed reintroduction area encompasses the entire main stem of the Bridger Mountains north of Bozeman, MT, in Gallatin County (Fig. 1). The habitat analysis area is about 150 square km (37,000 acres) in size, approximately 85% on public land and 15% in private land ownership. Habitat and population modeling efforts (MFWP 2012; pg. 13) estimate that the Bridgers may eventually support 160-350 bighorn sheep, exceeding what is consider a Minimum Viable Population of 125 bighorns. A brief description of the existing natural resources within the analysis area appears under the following headings: Soil, Water, Vegetation, Other Wildlife, Social Issues, and Cultural Resources.

1. Soil

A detailed description of soils in the Gallatin National Forest and adjacent area is contained in Davis and Shovic (1996). Most of the area that bighorns are predicted to occupy in the winter are sagebrush grassland habitats dominated by shallow to moderately deep Mollisol soils. Mollisols typically have dark-colored surface horizon high in organic matter. The expansion or encroachment of woody vegetation (primarily Douglas fir and junipers) into grassland habitats has disrupted nutrient and soil moisture cycles in some of these areas. Surface soil erosion can occur in these areas if ground cover vegetation is not maintained.

Predicted bighorn sheep summer ranges are dominated by rock, rubble, and scree with shallow soil development occurring in some areas. Much of the summer range was influenced and created by montane glaciation. This is a cold rocky zone where soil nutrient recycling and decomposition rates are very slow.

2. Water

Hydrologically, the Bridger Mountains drain into the Gallatin River to the south and west, into the Sheilds River to the east, and into Sixteen Mile Creek to the north which flows into the Missouri River at Toston. Most water bodies in the analysis area are small perennial and ephemeral streams. The source of flowing water is primarily the snowpack that accumulates at high elevations during winter and spring months and slowly discharges to lower elevations

during the year. While surface water is not abundant in the analysis area, it is not believed to be a limiting factor in the proposed reintroduction of bighorn sheep into the Bridger Mountains.

3. Vegetation

Habitat Types/Plant Communities

The Bridger Mountains fall within the Mountain Foothills ecological region (MFWP 2010; pg. 69). Topography and elevation cause variation in local climate and weather conditions across this region determining which habitat types occur where. Elevations vary from about 5,000 to 9,600 feet. The Bridgers are oriented along a north-south trending axis, and local weather patterns typically move in from a west/southwesterly direction. More persistent snow pack and a more restricted distribution of winter range habitat generally characterize the westerly slopes or aspects. Easterly slopes or aspects occur in drier rain shadow zones and provide more extensive areas of winter habitat.

Vegetation in the Bridger foothills includes a variety of shrub species (big sage, bitterbrush, mountain mahogany, and juniper) interspersed among bunchgrass communities. The predicted bighorn sheep winter range is characterized by Idaho fescue/western wheatgrass and Idaho fescue/bluebunch wheatgrass grassland habitat types and big sagebrush/Idaho fescue, mountain mahogany/Idaho fescue, and bitterbrush/Idaho fecuse shrubland types. Some winter ranges have experienced conifer colonization reducing the productivity of some sites. Riparian areas contain cottonwood, aspen, willow, dogwood, and hawthorn. Higher elevation conifer forests contain Douglas fir, lodgepole pine, subalpine fir, limber pine, and whitebark pine. Subalpine and alpine vegetation is restricted to elevations above 8,500 feet. Much of the predicted summer range occurs in higher elevation thinly forested areas with numerous small meadows and grassy parks.

A major change occurring in forested habitats, particularly in the lodgepole pine zone, is the impact of the pine bark beetle resulting in significant tree mortality. In the long term, these beetle affected areas may become more open and could benefit bighorn sheep that prefer open habitats that offer good visibility.

Threatened and Sensitive Species

There is one threatened and five sensitive plant species (S1 and S2 rankings) (Table 2) reported from Gallatin County (from http://mtnhp.org/SpeciesOfConcern/). Ute Ladies Tresses *(Spiranthes diluvialis)* is listed as threatened by the U.S. Fish and Wildlife Service and is known from only a handful of locations in southwest and south central Montana. None of these threatened or sensitive plant species are known to occur in the analysis area. Their preferred habitats appear in Table 2.

Table 2. List of threatened and sensitive plant species (S1 and S2 rankings) reported from Gallatin County and potentially occurring in the project area. Occurrence and habitat information is from http://mttnhp.org/SpeciesOfConcern/.

Species	Habitat Characteristic
Annual Indian Paintbrush *(Castelleja exilis)* S2	Wetland/Riparian
Slender Indian Paintbrush *(Castelleja gracillima)* S2	Wetland/Riparian
Whipple's Beartongue *(Penstemon whippleanus)* S1	Open Areas (Subalpine and Alpine)
Slender Thelypod *(Thelypodium sagittatum)* S2	Alkaline Meadows (Valleys and Montane)
Slender Wedgegrass *(Sphenopholis intermedia)* S1S3	Mesic Sites (Low Elevation)
Ute Ladies Tresses Threatened *(Spiranthes diluvialis)* S1S2	Wetland/Riparian

4. Other Wildlife Species

Big Game Ungulate Species

The predicted bighorn sheep summer and winter ranges overlap with existing elk, mule deer, and mountain goat habitats. Mule deer and mountain goats are the two species where competition with bighorns is most likely to occur (see Chapter II; pg. 18). Elk occur in the Bridgers and overlap with some potential bighorn habitats but are less likely to compete directly with bighorns due to differences in seasonal distribution and feeding behavior with bighorns favoring more rugged terrain during much of the year. The Bridgers currently support healthy elk, mule deer, and mountain goat populations, all within expected population ranges and distribution.

Predators

The Bridgers support a full component of mid- to large-sized predators found in southwest Montana with the exception of grizzly bears *(Ursus arctos)* and Canada lynx *(Lynx canadensis)* which may occasionally move through the area but are not documented as resident populations at this time. Mid- to large-sized predators that occur in the project area include coyotes *(Canis latrans)*, gray wolves *(Canis lupus)*, bobcats *(Lynx rufus)*, mountain lions *(Puma concolor)*,

black bears *(Ursus americanus)*, and wolverines *(Gulo gulo)*. Gray wolves are the result of a reintroduction program initiated in 1995. Relatively few wolves and only a low level of wolf activity currently occur in the Bridgers. Mountain lions are perhaps the number one predator on bighorn sheep in Montana. Hunters and trappers can currently pursue and harvest all of these resident predators in the Bridger Mountains under established MFWP seasons and regulations.

Threatened and Sensitive Species

There are two threatened and three sensitive wildlife species (S1 and S2 rankings) (Table 3) reported from Gallatin County (from http://mtnhp.org/SpeciesOfConcern/). Grizzly bears and Canada lynx are listed as threatened by the U.S. Fish and Wildlife Service. Both species occur in southwest Montana and are found in appropriate habitats in nearby mountain ranges to include the Gallatin Range immediately south of the Bridgers. Both species may occasionally move through the area but are not documented as resident populations at this time. None of these threatened or sensitive species are known to occur in the analysis area. Their preferred habitats appear in Table 3.

Table 3. List of threatened and sensitive wildlife species (S1 and S2 rankings) reported from Gallatin County and potentially occurring in the project area. Occurrence and habitat information is from http://mtnhp.org/SpeciesOfConcern/.

Species	Habitat Characteristics
Western Spotted Skunk *(Spilogale gracilis)* S1S3	Riparian Shrub
Greater Sage Grouse *(Centrocercus urophasianus)* S1	Sagebrush
Western Toad *(Anaxyrus boreas)* S2	Wetlands and Flood Plain Pools
Canada Lynx Threatened *(Lynx canadensis)*	Subalpine Conifer Forest
Grizzly Bear Threatened *(Ursus arcdtos)*	Conifer Forest

5. Social Issues

Motorized Travel

Motorized travel on public lands in the project area is managed through travel planning efforts in the Gallatin National Forest (USDA 2006). The most recent travel plan was adopted in 2006. About 85% of the project area is located within the Gallatin National Forest. Motorized access and travel on other roads in the area is managed by Gallatin County and private landowners depending on landownership and existing road easements and right of ways.

Recreational Activities

Recreation in the project area includes hunting, fishing, camping, hiking, backpacking, bird watching, horse riding, wildlife viewing, mountain biking, trail running, back country downhill skiing, cross-country skiing, snowshoeing, snowmobiling, and off-road vehicle use. The Gallatin National Forest manages and regulates many of these activities on public land (USDA 2006). The project area is located immediately north of Bozeman, a large outdoor-oriented population center in southwest Montana. Bozeman and Gallatin County are known nationally for their diverse recreational opportunities.

Livestock Grazing

There are no domestic sheep or horse grazing allotments on public (Gallatin National Forest) land in the project area. The Forest Service manages 15 cattle grazing allotments in the Bridgers (see Chapter II; pg. 18). Livestock (i.e., cattle, horses, sheep) grazing also occurs on a portion of the private land that comprises 15% of the project area. Potential bighorn winter and summer ranges overlap with some existing public grazing allotments and private grazing lands in the project area. On public land in the Gallatin National Forest, bighorn summer range is generally at higher elevations, outside of grazing allotments, or in more rugged topography than is usually used by livestock. Bighorn sheep grazing within existing cattle allotments is likely to occur in areas that are not easily negotiated by domestic livestock. The same is likely true on private grazing lands where overlap may occur. Much of the private land grazing occurs on relatively flat pastures to rolling landscapes where slope is not a major factor. Domestic livestock prefer flat ground or gentle slopes and require frequent easy access to freestanding water often provided by ranchers. Bighorns prefer more rugged steep landscapes near effective escape terrain (60% slopes with rock outcroppings) and do not need frequent access to standing water. Bighorn sheep are often found within 300 meters of steep escape cover (Smith et al. 1991).

6. Cultural Resources

Both action alternatives do not involve any ground disturbing activities. This proposed project will have no effect on cultural resources. No further discussion of this topic will occur in Chapter IV.

Chapter IV

Environmental Consequences

A. Introduction

The purpose of Chapter IV is to describe and compare the potential consequences of implementing each of the alternatives under consideration. The emphasis is on resources connected with issues described in Chapter II. Resource discussions are presented in the same order as they appear in Chapter III. With any wildlife reintroduction, there are several unknowns. Until bighorn sheep become established and use seasonal habitats in a traditional manner, some of the environmental effects can only be anticipated based on expected bighorn sheep behavior and habitat preferences.

B. Action Alternatives B and C

In terms of possible environmental consequences, successfully implementing either Alternative B or C would have the same environmental effect. The difference is primarily in the timing of the transplant. If Alternative B were selected, bighorn sheep would be released as soon as they became available through an established priority system. If Alternative C were selected, the release of bighorns would require the completion of sheep separation management agreements with sheep producers in the area. This process will delay the release of bighorns for an unknown length of time. If agreements were not reached, bighorn sheep would not be released similar to Alternative A (No Action) and there would be no effects on the environment. For purposes of comparing possible effects of alternatives in Chapter IV, Alternatives B and C are grouped together and referred to below as “action Alternatives B and C”.

C. Soil

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, soils would remain unaffected.

Effects of implementing action Alternatives B and C:

Bighorn sheep at projected numbers of 160-350 animals are expected to have little impact on soils. Minor isolated natural erosion may occur in areas of repeated hoofed traffic. Any impact on soils by reintroduced bighorns would be less than impacts of much larger populations of elk, mule deer, and mountain goats which at their current numbers are not creating any significant known soil related problems.

D. Water

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, water resources would remain unaffected.

Effects of implementing action Alternatives B and C:

Water quality is not expected to be impacted by a population of 160-350 introduced bighorn sheep. In northern latitudes, bighorns obtain most of their water from feeding on vegetation and snow (Lawson and Johnson 1982). Bighorns do not spend a significant amount of time foraging in wet, densely vegetated riparian areas but instead feed primarily on upland grasses and forbs in open more dry habitats. If minor isolated erosion were caused by bighorn sheep, it would likely be of too small a magnitude to impact water quality.

E. Vegetation

1. Habitat Types

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, winter range habitat would remain unaffected.

Effects of implementing action Alternatives B and C:

At the predicted range of 160-350 bighorns, there are no expected significant impacts on plant communities or range conditions. This area currently supports large healthy big game and livestock populations without long-term negative impacts to vegetation. The addition of a small population of 160-350 bighorn sheep that were once native to the area and that specialize in grazing in rugged steep and dry habitat not used by many grazers should have little impact on plant communities or habitat types. The existing habitat types have evolved and prospered while being grazed by a number of native and introduced ungulate species.

2. Threatened and Sensitive Plant Species

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, sensitive plant species would remain unaffected.

Effects of implementing action Alternatives B and C:

The occurrence of 160-350 bighorn sheep in the Bridgers is expected to have little or no impact on the six threatened and sensitive plant species that could potentially occur in the project area

(Table 4). This determination is based on habitat separation, bighorn sheep dietary habits (Oldemeyer et al. 1971, Todd 1975, Keating et al. 1985), and the low probability of species occurring in the project area. Four of the six species are found in wetland/riparian or low elevation mesic (wet) sites (Table 2) which are seldom used by bighorn sheep and are not common habitats in the Bridgers. Slender thelypod (*Thelypodium sagittatum*) is a salt-loving plant found in poorly drained alkaline meadows that are usually not frequented by bighorn sheep to any extent. Whipple's beartongue *(Penstemon whippleanus)* is a plant that occurs in open subalpine and alpine habitats within bighorn sheep summer range. Bighorns are also known to feed on other *Penstemon spp.* However, this species is at the edge of its ecological range in Montana and is known from only two collections (locations) in the state, and only one specimen has been collected in the last 50 years. The likelihood of this species occurring in the Bridgers appears to be small. None of the six threatened or sensitive plant species are currently known to occur in the Bridger Mountains.

Table 4. Predicted effects of the alternatives on threatened and sensitive plants (S1 and S2 rankings) which could potentially occur in the project area.

Species	Effects
Annual Indian Paintbrush *(Castelleja exilis)* S2	No expected impact; outside the realm of bighorn food habits, little habitat overlap
Slender Indian Paintbrush *(Castelleja gracillima)* S2	No expected impact; outside the realm of bighorn food habits, little habitat overlap
Whipple's Beartongue *(Penstemon whippleanus)* S1	Low possibility of impact; within bighorn summer range and food habits, but extremely rare in Montana
Slender Thelypod *(Thelypodium sagittatum)* S2	No expected impact; outside the realm of bighorn food habits, little habitat overlap.
Slender wedgegrass *(Sphenopholis intermedia)* S1S3	No expected impact; outside the realm of bighorn food habits, little habitat overlap
Ute Ladies Tresses Threatened *(Spiranthes diluvialis)* S1S2	No expected impact; outside the realm of bighorn food habits, little habitat overlap

F. Other Wildlife Species

1. Big Game Species

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, big game resources would remain unaffected.

Effects of implementing action Alternatives B and C:

The occurrence of 160-350 bighorns in the Bridgers may result in some level of competition between introduced bighorn sheep and both mule deer and mountain goats (see Chapter II; pg. 20). The impact of these competitive relationships are poorly understood and difficult to predict. In some mountain ranges, these species occur sympatrically with no ill effects while in other areas competitive issues may occur. With regard to competition between bighorn sheep and mule deer, we know that historically both species coexisted in the Bridgers at presumably healthy population levels providing some predictive encouragement for a successful transplant. The addition of 160-350 bighorns into a mountain range that supports many more mule deer may not result in a significant level of competition between the species. We recognize that completion between these species may occur, but based on the best available information we can not at this time predict the impacts.

2. Predators

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, predators would remain unaffected.

Effects of implementing action Alternatives B and C:

The occurrence of 160-350 bighorn sheep in the Bridgers is not expected to have a major impact on the seven species of mid- to large-sized predators that occur or potentially occur in the Bridgers (see Chapter III; pg. 27). Under certain circumstances, all of these predators mentioned could potentially prey on young or adult bighorn sheep but mountain lions are the primary predator on bighorns in Montana and elsewhere. Bighorns would become a new prey source for mountain lions and some of the other mid- to large-sized predators. At predicted numbers, it seems unlikely that bighorns would become a major prey item for any single predator. The degree to which mountain lions shift to a new prey species (bighorns) may have a minor positive impact on the prey population that lions shifted from, in this case mule deer or elk.

3. Threatened and Sensitive Wildlife Species

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, sensitive wildlife species would remain unaffected.

Effects of implementing action Alternatives B and C:

The occurrence of 160-350 bighorn sheep in the Bridgers is expected to have little or no impact on the five threatened and sensitive wildlife species that could potentially occur in the project area (Table 5). The habitats of four of the five threatened or sensitive species (Table 3) do not typically overlap with bighorn sheep. The two threatened species are tied to conifer forests which are seldom used by bighorns. There is some overlap between sage grouse *(Centrocercus urophasianus)* and bighorns in sagebrush habitat, however it is unlikely that bighorns would have a negative effect on sagebrush habitat. In this area, sage grouse are not typically found close to the mountains but may be found further to the west in the Horseshoe Hills where bighorns are not expected to venture.

Table 5. Predicted effects of the alternatives on threatened and sensitive wildlife species (S1 and S2 rankings) which could potentially occur in the project area.

Species	Effects
Western Spotted Skunk *(Spilogale gracilis)* S1S3	No expected impact; riparian/shrub habitat does not overlap with predicted bighorn habitat
Greater Sage Grouse *(Centrocerecus urophasianus)* S1	Low possibility of impact; low elevation sagebrush habitat may overlap with predicted bighorn habitat
Western Toad *(Anaxyrus boreas)* S2	No expected impact; wetland and flood plain pool habitat does not overlap with predicted bighorn habitat
Canada Lynx Threatened *(Lynx canadensis)*	No expected impact; dense conifer forest habitat does not overlap with predicted bighorn habitat
Grizzly Bear Threatened *(Ursus arctos)*	No expected impact; dense conifer forest habitat does not overlap with predicted bighorn habitat

G. Social Issues

1. Motorized Access and Recreational Activity

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, existing access and activity restrictions would remain the same.

Effects of implementing action Alternatives B and C:

Implementing the proposed bighorn sheep transplant in the Bridgers is not expected to affect motorized access or recreational activities. MFWP has concluded that current levels of public access and recreation in the Bridgers, including motorized and non-motorized recreation, is compatible with a successful bighorn sheep transplant. MFWP is not making any requests for changes to public access or recreational activities on the Gallatin National Forest (USDA 2006). The Gallatin National Forest is not recommending any changes in public access or recreational activities as a result of the proposed bighorn sheep transplant. Any future changes regarding

access and recreation on the Gallatin National Forest would be subject to the established Forest Service public planning and comment process.

2. Competition with Livestock for Forage

Effects of implementing Alternative A:

Because bighorn sheep would not be released under the no action alternative, there would be no possible forage competition with livestock.

Effects of implementing action Alternatives B and C:

The occurrence of 160-350 bighorn sheep in the Bridgers is not expected to result in significant competition for livestock forage. Competition for forage between bighorns and domestic livestock is reduced due to differences in behavior, habitat preferences, seasonal movements, and the number of bighorns expected to occur. Bighorns are a native species that has evolved to graze rugged, steep rocky landscapes that few other species can negotiate. Bighorn winter and summer ranges overlap with some public grazing allotments. On the Gallatin National Forest, bighorn summer range is generally at higher elevation, outside of grazing allotments, or in more rugged portions of the allotment that are not easily accessible to cattle or horses. During the winter when bighorns are on public allotments livestock are typically removed to lower elevation private lands. Up to 6,256 cows occupy public grazing allotments on the Gallatin National Forest during summer months. At a predicted population of 160-350 bighorn sheep, cattle would outnumber bighorns 17-39 cows/bighorn sheep. At relatively low bighorn sheep numbers compared to cattle, it is unlikely that much smaller bighorns would have a significant impact on available forage for cattle.

Much of the private grazing land in the project area occurs at lower elevation on relatively flat pastures or rolling foot hills where slope is not a major factor. Domestic livestock prefer flat ground or gentle slopes and require frequent easy access to freestanding water often provided by ranchers. Bighorns prefer more rugged steep habitats near effective escape cover and do not need frequent access to standing water. Escape cover (60% or greater slope with rock outcroppings) is a critical component of bighorn sheep habitat. Studies indicate that 95% of sheep activity occurs within 300 meters of escape cover. Critical escape cover is lacking on much of the private grazing land. Having a relatively small population of 160-350 sheep dispersed over a large area will also reduce the likelihood of competition in the few areas where livestock and bighorns may occasionally overlap. Again bighorn sheep would be greatly outnumbered by livestock.

Under Alternative C, there could be some increased costs to interested NGO’s, public agencies (including MFWP), and/or individual sheep owners, should any of these parties choose to voluntarily participate in a domestic sheep management plan to prevent contact between the domestics and bighorns.

H. Cumulative Effects

Chapter III describes the existing conditions within the project area. Some activities expected to occur within the effected environment during the foreseeable future include: (1) potential vegetation treatments by the Forest Service to address conifer mortality associated with pine bark beetle die-offs, (2) potential vegetation treatments by the Forest Service to address conifer encroachment into grassland habitats and forest fuel reduction projects, (3) continued expansion of rural subdivisions along the base of the Bridgers.

The potential cumulative effects on the bighorn sheep reintroduction relative to the above predicted activities were considered. Both of the potential Forest Service land management activities may create additional bighorn sheep habitat and benefit the proposed bighorn sheep transplant effort. Continued expansion of private land subdivisions may increase occasional conflicts between bighorn sheep and homeowners (see Chapter II; pg. 21). However, bighorns are not expected to spend much time in subdivisions or use private land to a great extent, so some additional subdivision should not jeopardize the long-term success of bighorns in the Bridger Mountains.

The addition of another bighorn sheep herd could improve the overall condition of the species in Montana provided the criteria for separation from domestic sheep and goats are met. This new transplant could have a positive cumulative effect as a healthy metapopulation has high potential value for the species through genetic exchange with other herds (Appendix C, Site Assessment Form). Alternatively, should a disease outbreak occur due to lack of separation from domestic sheep and goats, the value of this reintroduction could have a negative cumulative effect (MFWP 2010, p. 41-42).

List of EA Preparers

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Howard Burt
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Montana, Fish, Wildlife & Parks

List of Individuals Consulted

Jody Canfield, Reggie Clark, Lisa Stoeffler, Bev Dixon; Gallatin National Forest

Jennifer Ramsey, Neil Anderson, Tom Carlsen, Dave Pac (retired); Montana Fish, Wildlife & Parks

MFWP has conducted informal scoping to obtain advanced comments and concerns from several NGO's to include: Wild Sheep Foundation (Jim Weatherly), Montana Woolgrowers Association (Jim Brown, Brent Roeder), and Gallatin Wildlife Association (Glenn Hockett, Jim Bailey).

MFWP has also contacted and discussed the bighorn sheep transplant proposal with numerous landowners within the project area.

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Appendix A

FINAL ENVIRONMENTAL ASSESSMENT

MIDDLE COTTONWOOD BIGHORN SHEEP TRANSPLANT

BRIDGER MOUNTAINS

PART I. DESCRIPTION OF PROPOSED ACTION

This is a proposal to introduce bighorn sheep into the Middle Cottonwood area of the Bridger Mountains.

A. Historic

The area was historic sheep range. Bighorn sheep were present up until the early 1900's (Don Macdonald, pers. communication). As recently as two years ago one of the landowners lying along the lower elevations found a sheep skull on the proposed transplant site. Based on recent archeological work, native bighorn sheep used the site, historically.

B. General Site Description

This area lies along the southwest flank of the Bridger Mountains and drainages flow into the Gallatin Valley. The site available to sheep ranges from around 5000 feet at the toe of the mountains to about 8400 feet near the crest of the Bridger Range. Topography can be characterized as very steep and rugged.

The area generally has a southwest exposure. Bunchgrass (bluebunch wheatgrass and Idaho fescue) dominates most of the south and southwesterly slopes and timber (Douglas and subalpine fir) is predominant along northerly exposures. During the fall of 1991, a wildfire burned about 1200 acres of mostly timbered lands in the Bostwick drainage.

All the components necessary for a successful reestablishment are present including: high quality winter range; secure rocky outcroppings for lambing; higher elevation summer and fall range; and adequate water (springs and creeks).

1

C. Initial Transplant Numbers and Population

The initial transplant would begin with about 40 sheep. The Department of Fish, Wildlife and Parks would initially manage to maintain at least a minimum of 100 sheep, however it is estimated the site could easily support a population of 150.

D. Map and Project Size

See Attachment A.

E. Benefits and Purpose of Proposed Action

The purpose of the proposed action is to establish a bighorn sheep population in the Middle Cottonwood area lying along the southwest slope of the Bridger Mountain range. This population would provide bighorn sheep hunting and non-hunting recreational opportunity for the general public.

PART II. ENVIRONMENTAL REVIEW

A. EVALUATION OF THE IMPACTS OF THE PROPOSED ACTION ON THE PHYSICAL ENVIRONMENT.

1. Land Resources

Impact of Proposed Action: Because bighorn sheep do not currently occupy this site, the introduction of sheep onto the site would add another class of wildlife to the area. Although there may be a minor increase rate of runoff, it is not expected to be significant due to the modest population objective. There will be no impact to any unique geological or physical features.

No Action Alternative: No impact.

2. Air Resources

Impact of Proposed Action: No impact.

No Action Alternative: No impact.

3. Water Resources

Impact of Proposed Action: There are no expected changes in surface water quality or quantity. In addition, the project will not effect a designated floodplain nor result in any discharge that will effect federal or state water quality regulations.

No Action Alternative: No impact.

4. Vegetation Resources

Impact of Proposed Action: The project will not effect wetlands, or prime or unique farmland. There are no significant changes expected in the plant community or in the diversity or abundance of plant species. There could be an increase in productivity of some of the grass/forb species because of the establishment of another class of wildlife on the site with modest population objectives. There could be some concern over the spread of noxious weeds. However, any spread would probably occur whether or not sheep were introduced because of the level of human activity and all the other species of wildlife and domestic stock present in the area.

No Action Alternative: No impact.

5. Fish/Wildlife Resources

Impact of Proposed Action: This proposal is a reintroduction of bighorn sheep onto historical range. A successful introduction will increase the diversity of wildlife on the site and in the Bridger Mountain Range. Elk, mule deer, mountain goats and to a lesser extent whitetailed deer are other wild herbivores present on the site. With the population objectives for sheep there are no substantial conflicts expected between other wild herbivores in the transplant area. In particular, Dave Pac (pers. communication) does not anticipate significant competition between deer and sheep at the stated population objectives. Predators such as lions will have an additional prey species available to them and in fact may divert some of their activities from deer to sheep. Because of the value of bighorn sheep in the illegal trade of wildlife parts, there could be an increase in illegal activity. However, this is expected to be small due to difficult terrain and existing access is highly visible to neighboring landowners.

No Action Alternative: No impact.

B. EVALUATION OF THE IMPACTS OF THE PROPOSED ACTION ON THE HUMAN ENVIRONMENT.

1. Noise/Electrical Effects

Impact of Proposed Action: No impact.

No Action Alternative: No impact.

2. Land Use

Impact of Proposed Action: Nearly all of the land which sheep are expected to use is Gallatin National Forest land. A fringe of land lying along the lower elevations of the site is private. These lands may provide some winter range value but are not expected to provide a significant area for use by sheep throughout most of the year. The landowners have shown support for and interest in this transplant. This proposed transplant would not interfere with existing productivity or profitability of existing land uses in the area, including public and private lands. There could be some conflict relating to game damage but it is expected to be small in relation to what occurs with other species already present in the area, i.e. deer and elk. There are no known domestic sheep within the area of projected use by wild sheep. There is a USFS cattle grazing allotment in the upper portion of the area. However, a letter dated January 3, 1994, from Gene Gibson, Bozeman District Ranger,USFS, stated, "... a crude estimate of additional AUMs by bighorn sheep on livestock grazing areas indicates that competition for forage will not be significant." Finally, there would be no anticipated restrictions on historical uses of the National Forest.

Another concern with the transplant proposal was the subdivision of farmlands adjacent to this area. However, the department has no jurisdiction in these matters. Because use patterns by wild sheep is expected to be at higher elevations, subdivision of the farmlands would not significantly effect the viability of the transplant.

No Action Alternative: No impact.

3. Risk/Health Hazards

Impact of Proposed Action: No impact.

No Action Alternative: No impact.

4. Community Impacts

Impact of Proposed Action: No impact.

No Action Alternative: No impact.

5. Public Services/Taxes/Utilities

Impact of Proposed Action: No impact.

No Action Alternative: No impact.

6. Aesthetics/Recreation

Impact of Proposed Action: There will be an increase in hunting and non-hunting recreational opportunity relating to bighorn sheep. The quality of the recreational experience will be enhanced in the Bridgers in that bighorn sheep will be added to the diverse species of wildlife currently found there.

As outlined on the Gallatin National Forest Visitor Map, the Bridger Range, with two exceptions, is open to motorized vehicles, yearlong. The trails in the immediate vicinity of the transplant site (#s 534, 535, 536) as well as the area in general is open to all motorized vehicles, yearlong. Because of the steepness of the terrain, motorized use on the west face is primarily restricted to established trails, i.e. those mentioned above. Snowmobile activity would in all likelihood occur either at the higher elevations of the area near the crest of the Bridgers or along established trails. The winter range for these sheep would lie well below the crest and no established trails traverse what is expected to be the winter range area. In addition, the elevations and steepness of their winter range would very seldom accumulate enough snow to make snowmobiling feasible. FWP, therefore feels that continued motorized use in the Bridger Mountains and specifically on the above mentioned trails/areas is compatible with a successful transplant.

The USFS is the primary public land management agency in the Bridger Mountains and as such controls land uses on these Federal Lands. The USFS must comply with NEPA in their decision making process and therefore OHV recreation as well as other user groups will be allowed opportunities to influence decisions in the future.

No Action Alternative: No impact.

7. Cultural/Historical Resources

Impact of Proposed Action: The proposed action would reestablish bighorn sheep in a portion of their historic range which is currently void of wild sheep.

No Action Alternative: No impact.

8. Summary Evaluation of Significance

The no action alternative would result in the status quo, i.e. no wild sheep in the Bridgers. Over the course of the last 20 years the Department has been looking for opportunities to reintroduce wild sheep into the Bridgers.

A second alternative is the introduction of bighorn sheep but without allowing hunting. The impacts of this alternative are the same as the proposed action except for the following:

There would be no additional opportunity for bighorn sheep hunting. This is a popular form of recreation in Montana and only about 3 percent of the applicants for sheep permits obtain permits.

Because the sheep population would be expected to grow and would probably result in too many sheep for the site, management would be required. Since hunting would not be allowed under this alternative, the department would have to bear the total cost of management. Live trapping could be done as long as locations for transplanting the sheep exist. The average cost per sheep varies depending on where the sheep are sent and conditions in the area of trapping but is estimated at $250 to $300 per animal. If no sites are available, the department would have to destroy excess animals to protect the habitat and private lands from game damage. This type of activity would also be costly.

If no management were undertaken, this alternative could result in too many sheep for the available habitat which would result in a weak population more susceptible to disease and predators and in possible game damage on private lands.

PART III. MITIGATION PROPOSED TO REDUCE POTENTIAL NEGATIVE IMPACT OF THE PROPOSED

The population would be managed to maintain at least a minimum of 100 sheep. As the population becomes established and with the

support of the USFS, affected landowners and the public, the population could foreseeably reach a level of around 150 sheep.

The population would be managed using permit only hunting. Once the population has become established and if it were deemed necessary to remove a relatively large number of ewes, live trapping would be the first tool of choice to provide transplant stock for other proposed introductions in other parts of the State.

PART IV. E.A.CONCLUSION SECTION

1. Based on the significance criteria evaluated in this E.A., is an EIS required? NO.

Due to the limited size and scope of the proposed project, an EIS is not required. The described population objectives are reasonable and adequately cover most foreseeable concerns.

2. Describe the level of public involvement for this project, if any, and given the complexity and the seriousness of the environmental issues associated with the proposed action, is the level of public involvement appropriate under the circumstances?

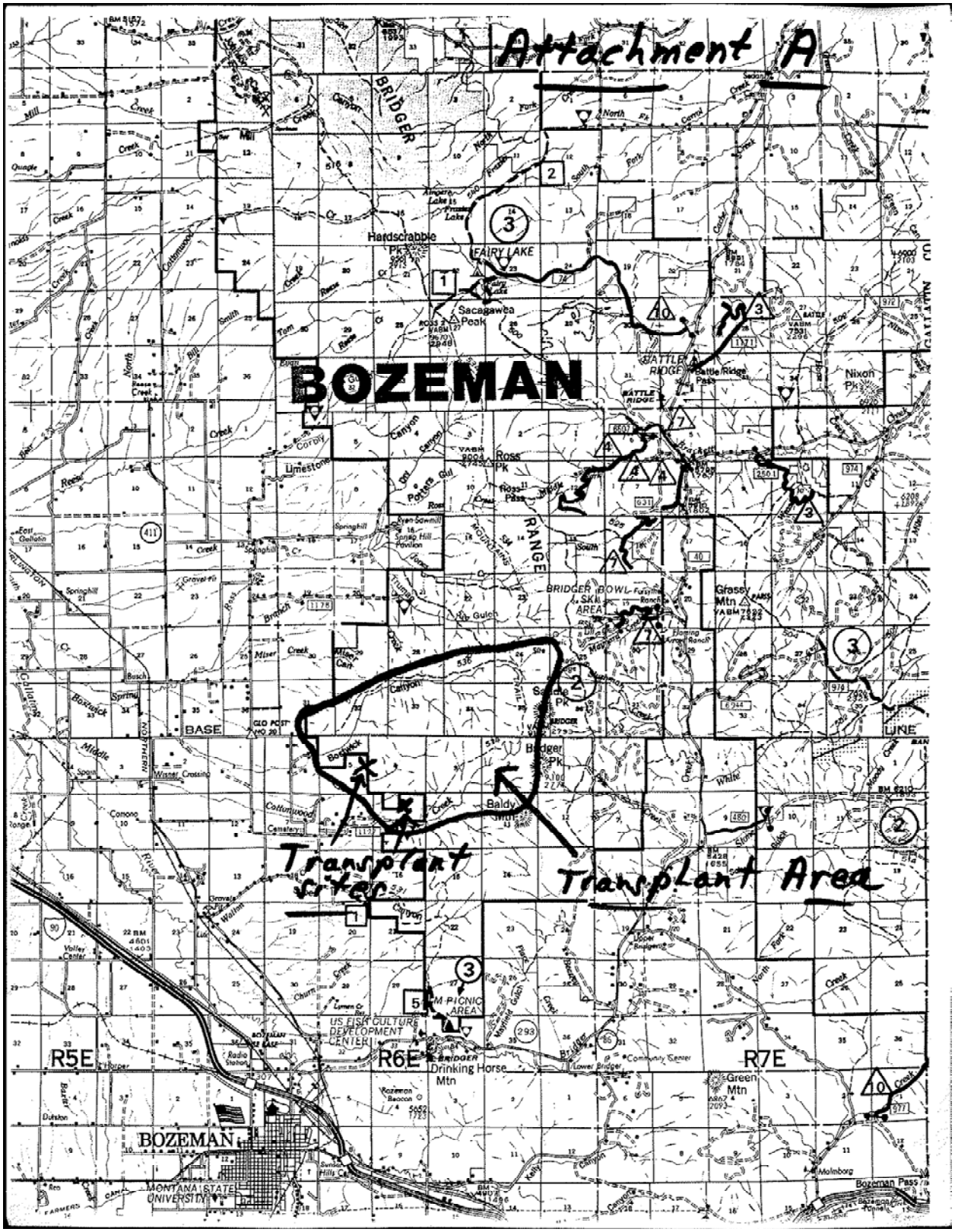
The USFS and the effected landowners were notified of the proposed action. A joint meeting was held with the landowners, USFS, and members of the Foundation for North American Wild Sheep during which the proposal was discussed. All parties supported the proposed action. In addition, the proposal was briefly presented during the Bozeman public hearing on season tentatives held in January. The proposal received strong support. Because the issues have already been discussed publicly, no additional public hearing was proposed. Copies of the E.A. are available through the Region Three Headquarters located at 1400 South 19th, Bozeman, Montana, 59715.

3. Duration of comment period for the Environmental Assessment.

The public had from February 25 through March 31, 1994, to comment on the draft EA.

4. Name, title, address and phone number of the person(s) responsible for preparing the E.A.

Kurt Alt, Wildlife Biologist, Montana Department of Fish, Wildlife and Parks, 1400 South 19th, Bozeman, MT 59715; phone number - 994-4042.


Attachment A
BOZEMAN
Transplant sites
Transplant Area
Hardscrabble Pk
FAIRY LAKE
Sacagawea Peak
BATTLE RIDGE
Nixon Pk
Ross Pk
Ross Pass
BRIDGER RANGE
BRIDGER BOWL SKI AREA
Grassy Mtn
Sacajawea Pk
Bridger Pk
Baldy Mtn
BASE
LINE
US FISH CULTURE DEVELOPMENT CENTER
BRIDGER PICNIC AREA
Drinking Horse Mtn
Green Mtn
R5E
R6E
R7E
MONTANA STATE UNIVERSITY
Bozeman Pass

Appendix B

DECISION NOTICE
MIDDLE COTTONWOOD BIGHORN SHEEP TRANSPLANT, BRIDGER MOUNTAINS
Prepared by Region 3, Montana Fish, Wildlife & Parks
January 3, 1995

PROPOSAL

The Montana Department of Fish, Wildlife and Parks (FWP) is proposing to transplant rocky mountain bighorn sheep into the Middle Cottonwood area along the west slope of the Bridger Mountains. Bighorn sheep were present in the area up until the early 1900's.

The initial transplant would begin with about 40 sheep. The FWP would manage the population to maintain a minimum of at least 100 sheep.

The purpose of the proposed action is to establish a bighorn sheep population in the Middle Cottonwood area lying along the southwest slope of the Bridger Mountain range. This population would provide bighorn sheep hunting and non-hunting recreational opportunity for the general public.

MONTANA ENVIRONMENTAL POLICY ACT (MEPA) PROCESS

The proposal has been outlined in an Environmental Assessment by the FWP to satisfy the Montana Environmental Policy Act (MEPA). The FWP is required to assess the impacts to the human and natural environment.

ISSUES RAISED IN THE ENVIRONMENTAL ASSESSMENT (EA)

The EA lists the issues in detail. In summary the population would be managed to maintain at least a minimum of 100 sheep. As the population becomes established and with the support of the USFS, affected landowners and the public, the population could foreseeable reach a level of around 150 sheep. The population would be managed using permit only hunting, once the population has become established and if it were deemed necessary to remove a relatively large number of ewes, live trapping would be the first tool of choice to provide transplant stock for other proposed introductions in other parts of the State. There would be no anticipated restrictions of historical uses (neither recreational nor commercial) of the National Forest as a result of this transplant.

GENERAL SUMMARY OF PUBLIC COMMENTS

The public comment period initially ran from February 23 through March 10, 1994. However, because of controversies arising from the

Tendoy sheep herd die-off, the comment period was extended through March 31, 1994. In addition, the proposal was presented during the Bozeman public hearing on season tentatives held in January of 1994 and received strong public support. During a joint meeting held with the adjacent landowners, USFS and members of the Foundation for North American Wild Sheep, all parties supported the action.

A total of 16 comments were received during the comment period, 15 written comments and 1 verbal. Only one comment was opposed to the transplant. Two comments were guardedly in favor of the transplant but with strong reservations centering around a concern for loss of motorized recreational opportunity. One comment was in favor of the transplant but did not want a strong population management program implemented. The other twelve comments were strongly in favor of the transplant.

1. An area sheep rancher is opposed primarily because he wants to avoid harassment from people concerned about disease from domestic sheep. In short, he is concerned about losing grazing opportunities on a public/private land allotment.

   Response: His allotment is on the east face of the Bangtails, known as the Canyon Creek Allotment, and is located about 3 air miles from the transplant site (see Attachment A). There is no conflict expected to arise between this transplant and his domestic sheep allotment. The distance is deceiving and the terrain features are not conducive for wild sheep movement to his allotment. In addition, the population objectives are conservative in relation to the available habitat and in and of itself will serve to minimize if not eliminate any potential future conflict with his domestic sheep allotment.

2. Why was the Bridger transplant stopped last winter?

   Response: Because a controversy arose late last winter over the Tendoy Bighorn Sheep Herd die-off and a BLM livestock grazing allotment, the Department felt the comment period needed to be extended. By the time the comment period ended it was too late in the year to trap and transplant sheep, therefore delaying a potential transplant until the following winter.

3. Why weren't conflicts between cattle and bighorns mentioned in the EA?

   Response: On page 4 of the EA it states, "... a letter dated January 3, 1994, from Gene Gibson, Bozeman District Ranger, USFS, stated, "... a crude estimate of additional AUMs by bighorn sheep on livestock grazing areas indicates that competition for forage will not be significant."

4. What about the effects of stress on Bighorns? Does the DFWP consider displacement by cattle and cow feces and urine saturated waters a stress on bighorns?

   Response: Stress is a factor with all wildlife species, in fact with all living things including people. Stress is

related to inter and intra species competition for food, water and space and environmental factors. Potential stress factors which can influence bighorn sheep include deer, elk, mountain lions, domestic livestock, people, dogs, annual moisture, winter snowfall, temperatures, soil and vegetative productivity, topographic features, etc., etc., etc. All of Montana's bighorn sheep populations are influenced by all or a combination of the above factors. In assessing the suitability of a potential transplant site many of the factors are evaluated in some manner. This site was evaluated as a potential transplant site because of its suitability in relation to many of the factors affecting bighorn sheep.

5. Does DFWP believe best bighorn management practices must include domestic livestock?

Response: Of course not. On the other hand agriculture surely does not believe that best agricultural practices must include wildlife. The reality is finding a balance, one which involves integrating management of the natural resources of the land in such a way as to accommodate the various uses.

6. Do livestock interests and politics prevent the DFWP and BLM from suggesting that domestic livestock can have adverse affects on wildlife and their habitat?

Response: We cannot speak for the BLM, but the answer from FWP is no. FWP tries to make decisions based on the best available information. FWP has and continues to promote sound range management practices. FWPs implementation of sound wildlife management programs involves a decision making process that is open to public review and input, and as such becomes accountable to a variety of social and economic values. That is the political system under which State government operates.

7. Is the DFWP waiting for the livestock industry and interests to okay future bighorn sheep introduction programs?

Response: No. We accept comments from any member of the public. These comments will be addressed and where pertinent incorporated into a specific project or program. Public comment can raise new issues or simply require a closer look at an already identified issue. In short, whether FWP decides to pursue an issue or not is rarely based on unanimous approval.

8. Is DFWP ordered by the State to do cows? Are domestic livestock on public lands in the best interest of the wildlife and their habitat?

Response: To the first question - NO.

To the second question - FWP believes that sound livestock grazing programs are compatible with most wildlife and their habitat.

9. It should be acknowledged up front that OHV recreation is one of the historical uses in the Bridgers, particularly in the Middle Cottonwood area where the introduction will take place. Trails 534, 536, 535 (Truman) and the spur south toward Sypes Canyon and the "M" from Middle Cottonwood intersection are of particular concern. Almost all of the Bridger drainages on both sides of the range, where public access has been established and motorized use is allowed, receive at least intermittent OHV activity throughout the summer riding season. I am not familiar with snowmobile use in the area, but know that at least some used to occur in the Cottonwood drainage.

Response: The USFS is the land management agency for most of the public lands in the Bridger Range and as such is the decision maker for land uses on these Federal Lands. However, as outlined on the Gallatin National Forest Visitor Map, all of the trails and areas mentioned above are open to all motorized vehicles, yearlong. In fact the entire Bridger Range, with two exceptions, are open to all motorized vehicles, yearlong. Because of steepness of the terrain, motorized use on the west face will primarily be restricted to established trails, those mentioned above. FWP, therefore feels that continued motorized use in the Bridger Mountains and specifically on the above mentioned trails/areas is compatible with a successful transplant. This statement will be reflected in the final EA.

10. The document should also reflect specifically that OHV recreation will be allowed an opportunity, with full NEPA involvement, to mitigate (with a tool other than closure) any conflicts that may arise before restrictions on OHV activities can be implemented.

Response: The USFS is the primary land management agency in the Bridger Mountains and as such controls land uses on these Federal Lands. The USFS must comply with NEPA in their decision making process and therefore OHV recreation will be allowed an opportunity to influence decisions in the future.

11. We would like to see potential lambing/nursery sites mapped with regard to the location of trail resources prior to the implementation of this project, and an indication of time periods when occupation of these sites would be critical for a comparison with anticipated time frames for motorized use and the timing of other potential intrusions resulting from other trail oriented recreation. We agree that the topography and habitat type generally offers adequate protection throughout the rest of the year.

Response: See attachment B. The lambing/nursery and winter range areas are expected to fall between Middle Cottonwood and Bostwick Canyon. This area provides numerous high security rocky outcrops with adjacent high quality forage. May and June will be important months for lambing and from mid-November through March are most important for wintering.

12. No long term management plan, other than possible herd reduction is spelled out in the EA. Historical "homeland" not withstanding, this is an "introduced" herd, who decides whether cows or sheep are of greater economic importance "down the road"?

Response: The USFS on public lands would be the decision maker under the NEPA process. However, as stated by Gene Gibson, District Ranger, in a January 3, 1994 letter, "After reviewing our livestock forage utilization data, we anticipate few areas of competition. Some of the high elevation basins may be utilized by both animals. However, a crude estimate of additional AUMs by bighorn sheep on livestock grazing areas indicates that competition for forage will not be significant."

13. Thinks the draft EA is incomplete because the "second alternative" - introduction without hunting was not covered in depth. In fact, given the possibility of disease transmission from cattle and the likelihood of "illegal activity", some alternatives for the hunting option should have been presented.

Response: FWP feels the second alternative was adequately addressed.

14. The only type of hunting alternative I could support is one that designates a core area large enough to sustain the population within which there is no hunting, with the stipulation that animals that stray outside thai area or cause excessive problems become eligible to be hunted. This type of hunting program would allow for a more naturally regulated wild population and reduce hunter/non-hunter conflicts and possibly reduce your management costs.

Response: With permit only hunting of this sheep population hunter numbers will be closely regulated, core areas are not needed. People are as much a product of the land as other living things and as such will continue to be an integral part of nature. People are part of the natural predator picture. Management costs associated with enforcing the no hunting core area could in fact go up.

15. Nature has been regulating wild populations since the beginning. To suggest that regulation by humans is now necessary does not make sense. Disease and predation are an integral part of the that process we call "survival of the fittest". And as you know that does not result in weak populations.

Response: Humans have and will continue to be either directly or indirectly part of the regulatory process. As disease and predation work through populations they tend to improve the overall health of the populations. However, when populations are out of balance with available habitat they do become more prone to catastrophic die offs.

16. Over the last four to five years I have noticed a marked increase in the mountain lion population in the transplant area. Could the Department increase the number of lion permits for that

end of the Bridgers.

Response: FWP is in the middle of the biennium of the biennial season setting process. FWP has been considering an increase in lion quotas but would like to wait until the Bridgers can be removed from the Crazy Mountains portion of the hunting district.

17. Does not want to see snowmobile activities in the Bridgers impacted by a transplant of bighorn sheep into the Middle Cottonwood drainage.

Response: Refer to questions 9, 10 ,11. The snowmobile activity would in all likelihood occur either at the higher elevations of the area near the crest of the Bridgers or along established trails. The winter range for these sheep would lie well below the crest and no established trails cross what is expected to be the winter range. In addition, the elevations and steepness of their winter range would very seldom accumulate enough snow to make snowmobiling feasible.

DECISION

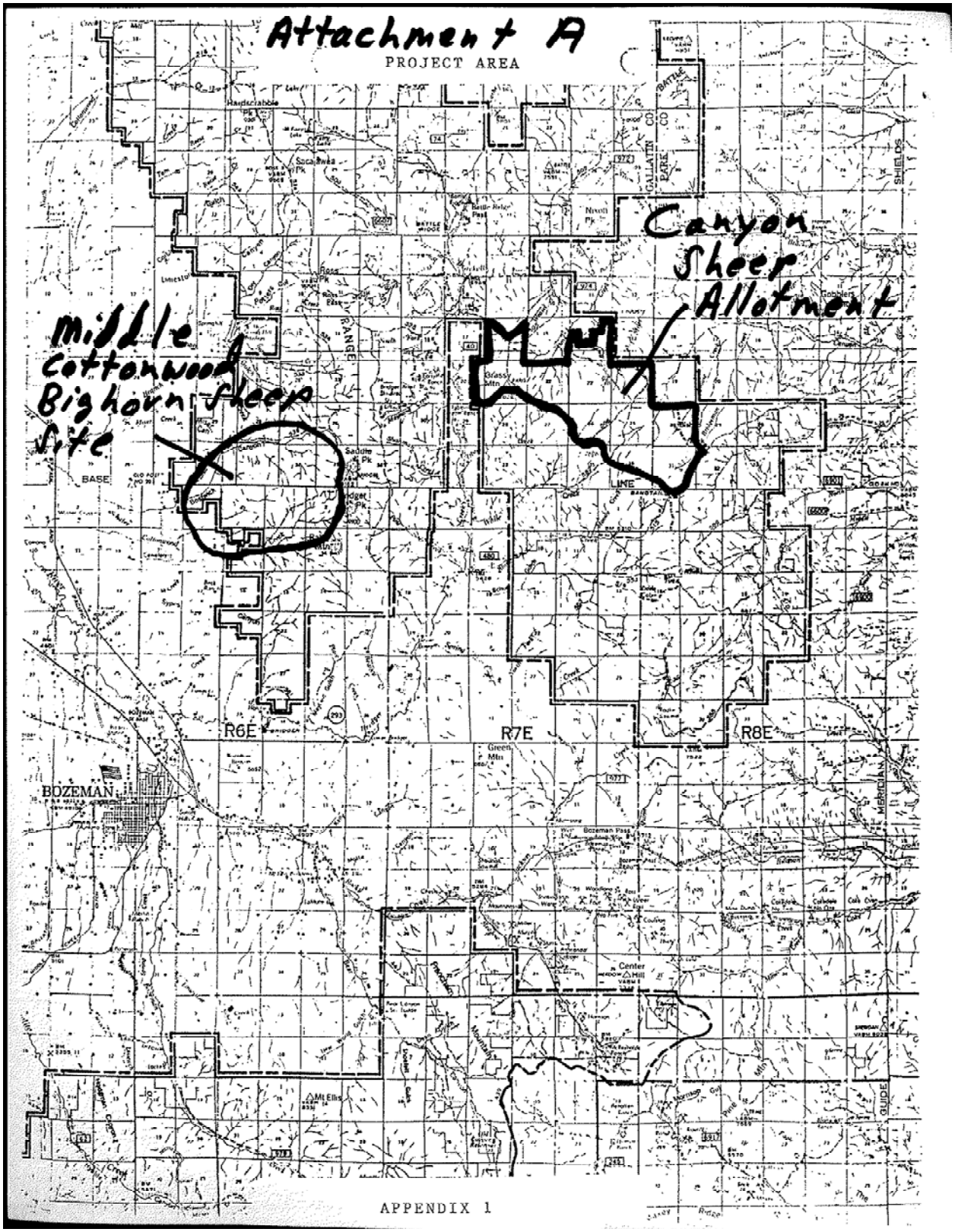
Utilizing the EA and public comment, a decision must be rendered by the FWP which addresses the concerns and issues identified for this proposed bighorn sheep introduction.

Many of the questions raised during the comment period were related to competing land uses. Although many of those raising questions were in favor of the transplant, their questions serve to highlight philosophical differences rather then real biological concerns with regard to the transplant. Many voiced concern that the sheep would be used by various interest groups to curtail or restrict their activities. Although these concerns are not without foundation our assessment has concluded that existing levels of activities occurring in the Bridgers including livestock grazing and motorized and non-motorized recreation are compatible with a successful sheep transplant.

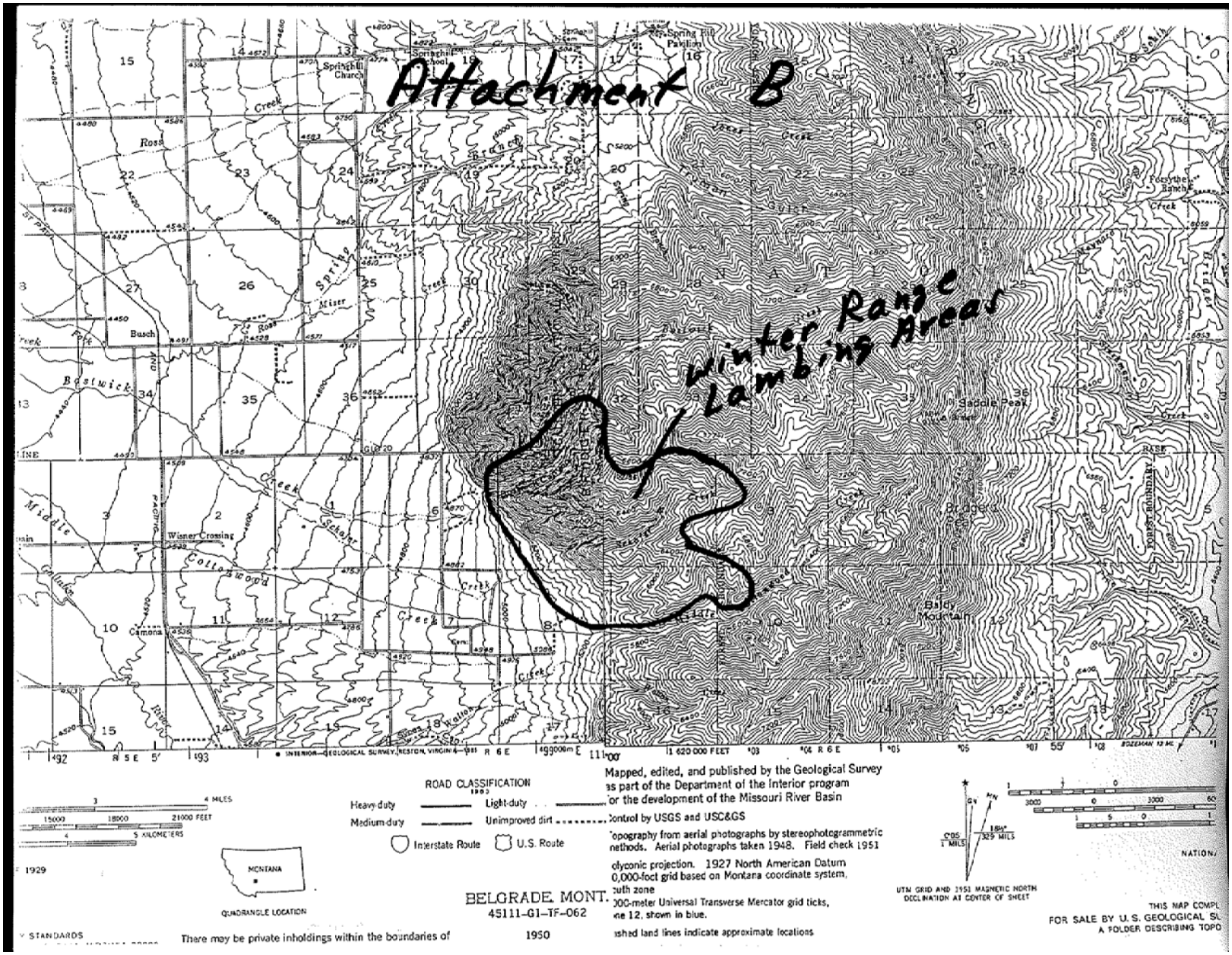
After review of this proposal and the corresponding public input, it is my recommendation to move forward with the proposed transplant subject to approval by the FWP Commission.

Stephen L. Lewis

Stephen L. Lewis
Regional Supervisor
Bozeman, MT
January 3, 1995


Attachment A
PROJECT AREA
Canyon Sheep Allotment
Middle Cottonwood Bighorn Sheep Site
R6E
R7E
R8E
BOZEMAN
BASE
LINE
Saddle Pk
Grassy Mtn
Green Mtn
Bozeman Pass
Center
Mt Ellis
GALLATIN CO
PARK CO
SHIELDS
GUIDE
MERIDIAN

APPENDIX 1


Attachment B
Winter Range Lambing Areas
Springhill Church
Springhill School
Spring Hill Pavilion
Ross Creek
Bostwick
Busch
Wisner Crossing
Camona
Middle Creek
Collowood Creek
Schaer Creek
Saddle Peak
Bridger Peak
Baldy Mountain
Forsythe Ranch
Mapped, edited, and published by the Geological Survey
as part of the Department of the Interior program
for the development of the Missouri River Basin
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
Interstate Route
U.S. Route
MONTANA
QUADRANGLE LOCATION
BELGRADE, MONT.
45111-G1-TF-062
1950
There may be private inholdings within the boundaries of
UTM GRID AND 1951 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
THIS MAP COMPL
FOR SALE BY U. S. GEOLOGICAL SU
A FOLDER DESCRIBING TOPO

Appendix C

Montana Fish, Wildlife & Parks

Bridger Mountains Bighorn Sheep Reintroduction

Preliminary Biological Investigation Memorandum
Julie Cunningham
Version 2.0 – 10/3/12

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APPENDIX A – Transplant Site Assessment Form ..... **Error! Bookmark not defined.**

INTRODUCTION

The Bridger Mountains are a suggested transplant site for bighorn sheep reintroduction as identified in the MFWP Bighorn Sheep Conservation Strategy (2010). This site received much attention in the mid 1990's, with public notices, public meetings, petitions, newspaper editorials, and a completed environmental assessment (Alt, 1994) all generally favorable towards the release of bighorn sheep in the Bridger mountains. The wide-spread public support at the time remains well-documented: our files contain dozens of pages of supportive letters and petitions with hundreds of signatures. However, the reintroduction never occurred, and although a decision notice had been drafted addressing the 16 official responses to the EA's comment period, it was never publicly released. The reintroduction was tabled, apparently due to concerns over possible bighorn interactions with cattle and/or sheep.

The sportsmen's groups so heavily involved with this effort (Gallatin Wildlife Association and Headwaters Sportsmen's Association) have not forgotten. Gallatin Wildlife Association, in particular, has petitioned MFWP (2011-2012) to re-open the Bridger Mountains for consideration as a future reintroduction site.

Biologically, there are four wildlife-based major issues that should be seriously examined prior to reintroduction. First, what would the reintroduction of bighorn sheep mean to mule deer populations in the Bridger Mountains? Second, would the introduced mountain goat population have any competitive effects on bighorn sheep? Third, what would the carrying capacity for sheep be in the Bridger Mountains? Finally, what is the domestic sheep situation, and how would that be relevant for long-term viability of bighorn in the Bridgers? In this document, I explore each scenario based on the data at-hand.

MULE DEER

Bighorn sheep competition with mule deer was briefly addressed and summarily dismissed in the original 1994 EA as a factor of little concern *given a population of 100 bighorn sheep.* However, there are two major changes regarding mule deer that have occurred between 1994 and today. First, it was not until later (1996) that the Bridger Mountains were designated as a special buck management area. Second, the average mule deer count was more than two times higher during 1990-1994 than they are today. (1990-1994 average post-season count = 460; 2006-2010 average post-season count = 194). MFWP mule deer research biologist Dave Pac (retired) wrote that it would be "ecologically irresponsible" to introduce a potential competitor when mule deer numbers are at the current low levels (1/21/11). The starting population level of each species can be an important factor in whether a 2-species competition results in competitive exclusion or coexistence (Begon et al. 1996).

Competition can occur directly for shared resources (i.e., forage) or indirectly through spatial displacement. Literature discussing competition between bighorn sheep and mule deer for forage is scarce. One study occurring in the Gallatin Canyon (deer and elk hunting district 311) determined that spatial and dietary overlap was possible, especially in Douglas fir habitat types (Constan 1972). In a study of a guild of ungulate species in the northern Yellowstone, Singer and Norland (1994) estimated little dietary overlap between bighorn and mule deer.

We can speculate on the causal factors regarding the mule deer decline and how it may relate to bighorn reintroduction. Over-harvest of female mule deer could be a reason, and as of 2010, MFWP reduced female mule deer licenses (see the 2010 season justification). We are emerging from a 10-year drought, which may have influenced deer production and survival. Finally, predation by mountain lion could be a factor. Should bighorn sheep be reintroduced, it is possible that mountain lions may focus attention to the more numerous species (McKinney et al. 2006).

To determine potential spatial overlap between known mule deer locations and projected bighorn sheep locations, I overlaid GIS layers produced by Messer et al. as described in the Montana Bighorn Sheep Conservation Strategy (2009, pages 58-61) with 2,393 telemetry-based mule deer locations collected during winter months (December through April) 1975-1996 from the 3 subpopulations most likely to be affected by bighorn reintroduction. Notably, bighorn sheep layers were created using habitat types, slopes, and aspects in order to identify blocks of land with potentially suitable bighorn sheep habitat. The layers were not designed to determine how bighorn would use the land within those blocks. For example, lambing habitat cannot be separated from wintering habitat, due to lack of information about snowpack. Thus, the resulting model in the Bridger Mountains demonstrates potential lambing/winter habitat at high and low elevations, but there is currently no way to postulate how the bighorn sheep would use these habitats.

I performed a rudimentary use versus availability analysis by dividing the percent of each habitat type available (summer, escape/other, winter/lambing, and unclassified) versus percent used by mule deer. In such a ratio, numeric values higher than 1 indicate positive selection whereas values lower than 1 indicate negative selection. I found positive selection for summer (1.56) and winter/lambing habitats (1.70). Next, I examined whether potential selection would differ by mule deer population segment. I saw the same results, except perhaps for a higher selection by mule deer for winter/lambing habitat (1.99) in the Ross Peak area (Northwest slope) and a slightly lower positive selection (1.23) for this habitat in the north end of the Bridgers, with the proposed reintroduction site, the Middle Cottonwood area (Southwest slope) falling intermediately with mule deer still positively selecting for winter and lambing habitat (1.50).

Summary

Such analysis leaves much to be desired. We do not know how bighorn are projected to use the space defined, nor do we have a large base in the literature to gauge whether spatial competition will be a major or minor factor between the species. We have high-quality mule deer use models, but need bighorn sheep models calibrated to use patterns. At this point my recommendations are:

1) Engage the Mule Deer Foundation proactively and discuss whether a sheep reintroduction at Middle Cottonwood (just 1 of 7 mule deer wintering areas in the Bridger Mountains) is a concern to mule deer trophy management?
2) If the possibility of negative impacts to our mule deer herds concerns our sporting public, wait 3-5 years until Dr. Bob Garrott (MSU) and his graduate students complete a specific habitat modeling effort on mountain ungulates in the Greater Yellowstone, and apply this calibrated model to the Bridgers. Then, perform a more detailed habitat analysis to bring more information to light on this question.

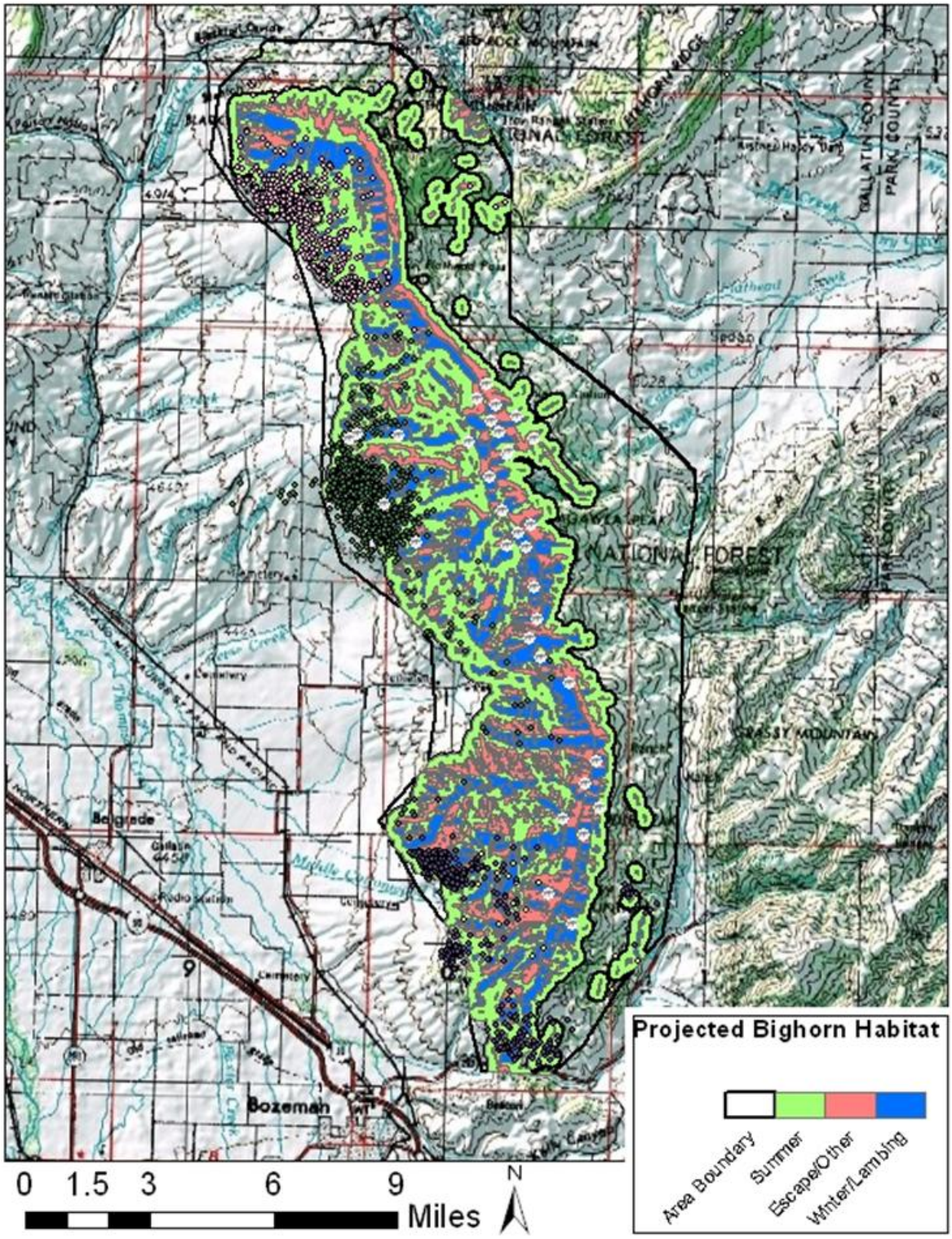

Figure 1: Potential bighorn sheep habitat in the Bridger Mountains. Overlays include mountain goat sighting locations (white) and 3 subpopulations of mule deer wintering areas from telemetry taken December – April (Pac, MFWP data).

MOUNTAIN GOATS

Mountain goats are non-native to the Bridger Mountains, but are apparently thriving after their reintroduction. The Bridger mountain goat herd produces trophy-quality goats, with horn lengths often exceeding 10 inches. Currently, 5 mountain goat licenses are issued annually. Mountain goat counts have enumerated as many as 74 goats, but it is important to note that fixed-wing counts run every 4-5 years in this environment are prone to substantial error. Mountain goat surveys in the Bridgers occur during summer only, but on the northwest slope, mountain goats are frequently observed during wintertime mule deer locations (Figure 2). There, mountain goats appear to move lower in elevation during winter.

An extensive literature review of field studies and modeling efforts regarding bighorn sheep and mountain goat resource and interference competition is summarized in Garrott et al. 2010. Salient results from this work include:

- Mountain goats and bighorn sheep may spatially overlap on summer or winter range.
- There is a real potential for dietary overlap between the species, but scale is important when measuring and considering resource use similarities/differences.
- Mountain goats may be dominant over bighorn sheep, resulting in competitive displacement.
- Mountain goats may also be hosts for parasites and pathogens that may infect bighorn sheep.
- Variation in studies and study areas is common: competitive trends are not the same in all places, and there can be seasonal differences in fine-scale resource use.
- There is a lack of empirical data for sympatric populations, obfuscating interpretation from studies.

Summary

Interactions between these two mountain ungulate species are difficult to interpret, and often confounded by scale, location of study, seasonality, and other variables. The literature is relatively sparse compared to with other species, and the question is intriguing enough to merit a tri-state, multi-agency, major research effort (Garrott et al. 2010).

My conclusion from examination of the literature is that caution is warranted. We would be introducing bighorn into an area where mountain goats have established, and it is possible that bighorn populations could be suppressed by presence of mountain goats. As mountain ungulate research continues, we will learn more, but currently it is difficult to predict the extent to which this competition would occur. If bighorn sheep were reintroduced, and if their populations failed to thrive, determining whether mountain goats were at fault would be nearly impossible without a devoted research effort.

We could take the precautionary measure of introducing additional mountain goat licenses to moderate their populations, but mountain goats are known to be exceptionally prone to over-harvest. With flights occurring only every 4-5 years, we do not receive the population information to effectively monitor trend and protect the mountain goat population from over-harvest. The argument could be made that they are an exotic ungulate and should not be managed at the expense of a native ungulate (although the native ungulate does not currently exist on the landscape).

My recommendation is to wait to reintroduce bighorn sheep into the Bridger Mountain Range until the Greater Yellowstone Area Mountain Ungulate Research Initiative is completed. This project is designed to quantify bighorn and mountain goat relationships across their range, and predictive models will be developed that would be readily applicable to the Bridger Mountains.

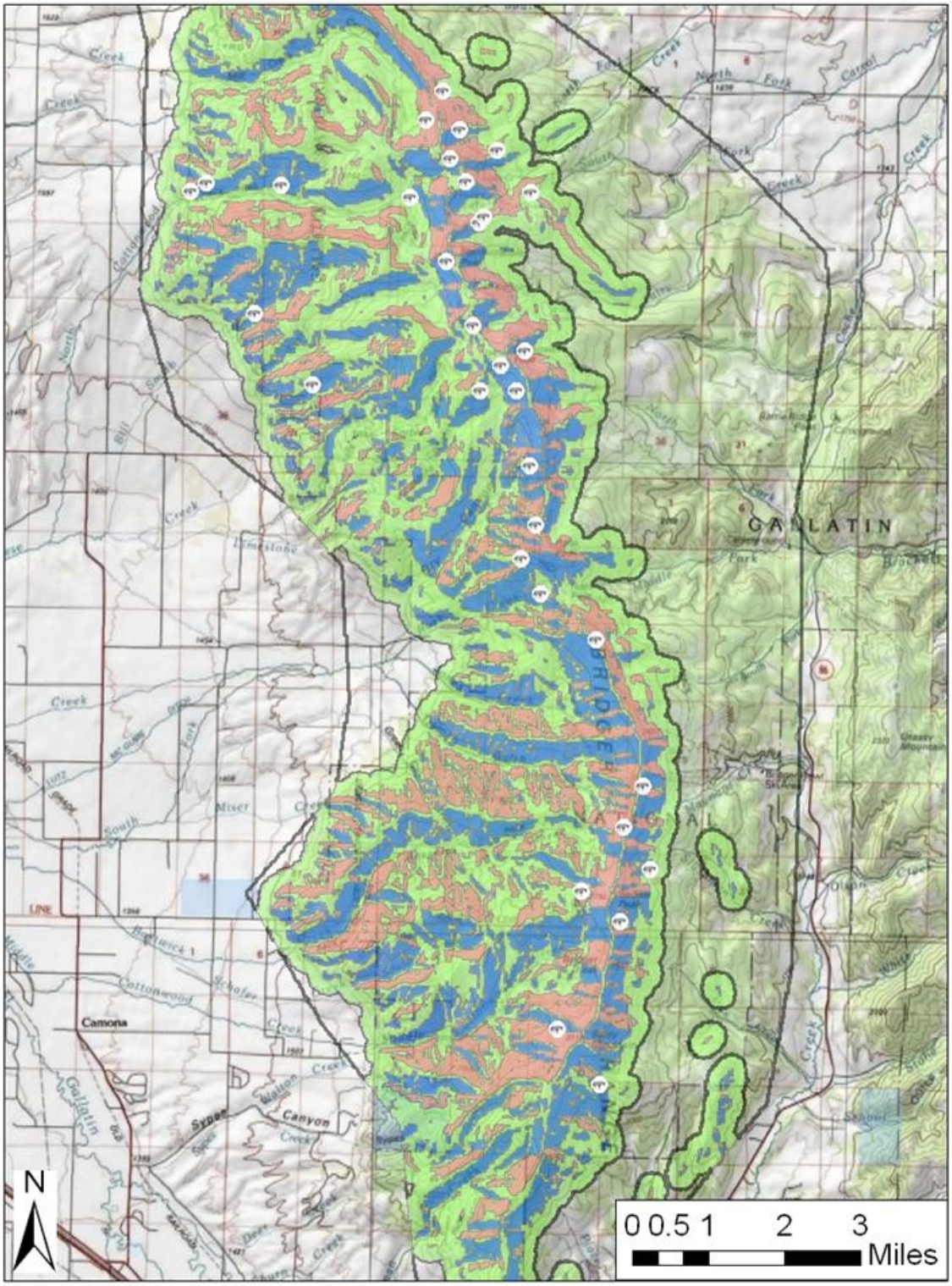

Figure 2: Summer locations of mountain goats along the Bridger Ridge (2005 and 2009) and note the lower-elevation mountain goat locations in North Cottonwood, Bill Smith, and Reese Creeks as taken during winter mule deer flights.

SUBDIVISION

The Bridger Mountain bighorn sheep study area is largely held by the US Forest Service as public lands, although the southern end of the Bridger Mountains does experience an encroachment of high-density subdivision, which may be a larger factor than in the 1990's when bighorn reintroduction was first proposed. In general, the bighorn sheep habitat boundaries fall away from private land subdivisions, except for the Middle Cottonwood proposed reintroduction site and possibly the Ross Peak area.

Private lands overlay on 37 km^2 of the total 239 km^2 of bighorn sheep habitat in the study area. This amounts to 15% of the total landscape. Furthermore, the majority of private lands coincide with summer range (29 km^2 out of 137 km^2, or 21% of the summer range available). Private land was not a strong influence on escape terrain (3 km^2 out of 46 km^2 or 7%) and lambing/winter habitat (5 km^2 out of 56 km^2 or 9%).

I did not examine classification of private lands. In the northern Bridger mountain range, there are large family farms and ranches, whereas the southern Bridger Mountains are more subdivided into small acreages with residential developments.

Regardless of classification, rural dwellings will occur at the fringes of the bighorn sheep habitat as mapped. Based on my calculations, there should be little concern to sheep viability, as summer range is plentiful and the most limiting factor (lambing/winter habitat) is not highly affected by subdivision. Biologically, the land development around the Bridger Mountains does not currently appear to be an obstacle to reintroduction.

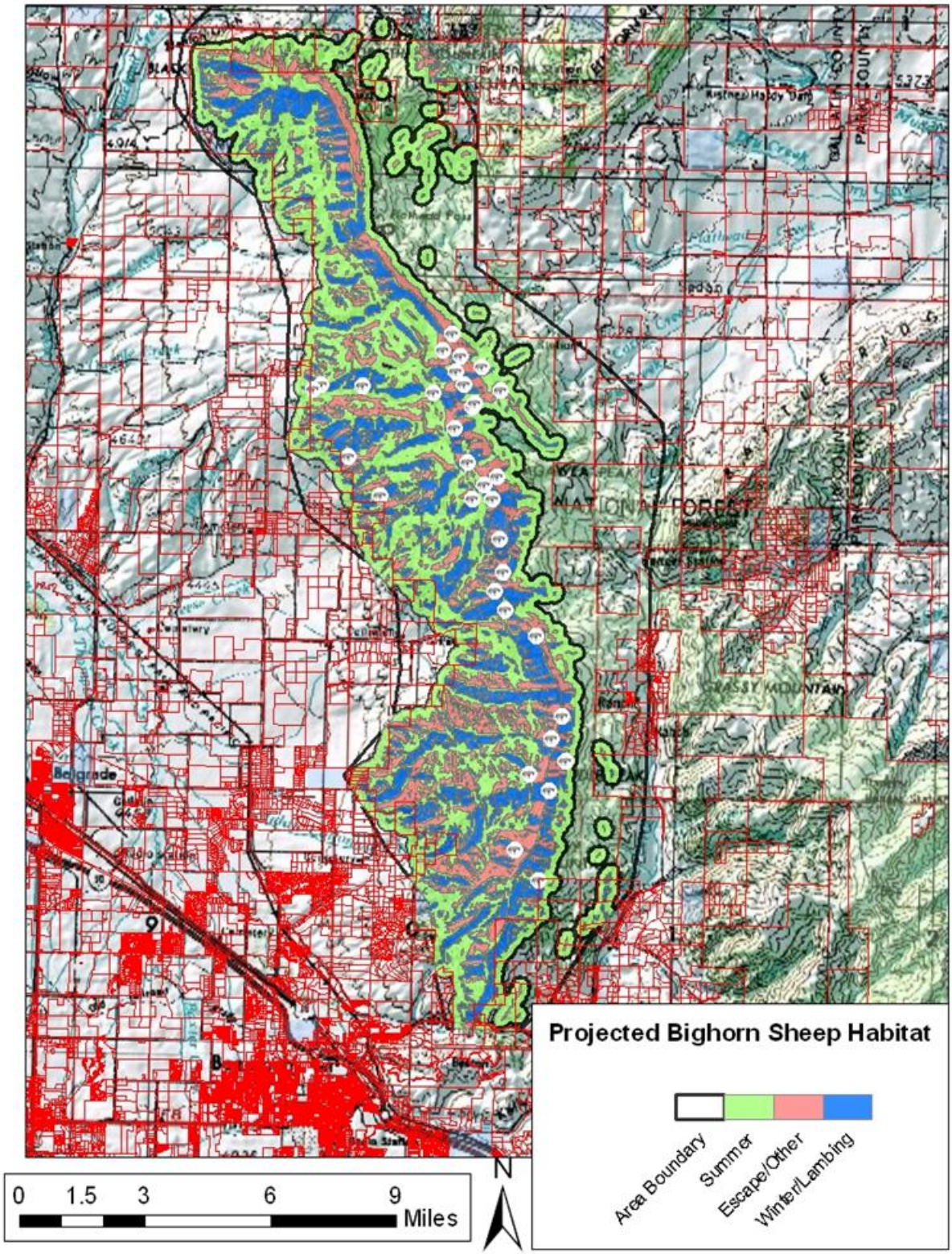

Figure 3: Land ownership overlay on the area surrounding the projected bighorn sheep habitat in the Bridger Mountains. Red outlining indicates parcel boundaries – the smaller the squares, the higher the level of subdivision.

DOMESTIC SHEEP AND DISEASE

The Montana Bighorn Sheep Conservation Strategy does not recommend placement of wild bighorn within 23km (14 miles) of domestic bighorn sheep herds without clear physical separations to keep domestic and wild sheep separate (i.e., major highways, rivers, double-fencing, or other barriers) due to disease transmission risk. In the Bridger Mountains, there are no fewer than 9 domestic herds (Figure 4). There are 4 large herds (about 100 +/- 25), 3 medium-sized herds (about 20-50 sheep), and 2 small herds (2-4 sheep). I have contacted all sheep owners. For their privacy, I refer to large sheep owners as L1, L2, L3, and L4; the medium-sized sheep flock owners as M1, M2, and M3, and the small landowners as S1 and S2. Through contact with individual landowners we have learned the following:

Table 1: List of landowners with distances from potential reintroduction site, site description and description of mitigations, if any.

Landowner ID	Dist. from Site	Description	Mitigations?
L1	12 miles	In potential habitat, multiple pastures	None
L2	4.5 miles	Rolling hills near riparian corridors, open space	Have 2 guard dogs per pasture, dogs may protect
L3	7.5 miles	Open space and agriculture	Visible pastures, sheep moved frequently. Have dogs.
L4	7.5 miles	Open space and agriculture, multiple pastures	None
L5	7.5 miles	Open space and agriculture, generally small pastures	None
M1	8 miles	Foothills 1 mile from projected habitat	Pseudo-double fencing: electric mesh pastures within perimeter fence
M2	4 miles	Farmland along creek bottom, open land	None known
M3	1.5 miles	Edge of subdivision ½ mile from timbered and open hills	None
S1	2 miles	Subdivision and foothills	None
S2	4 miles	Subdivision and open flat	None

All landowners except L4 agreed to contact us and/or shoot and kill a wandering bighorn, if seen, to prevent disease transmission from the domestics back to the herd. None (except perhaps S1 and L5) were willing to entertain double-fencing, even if MFWP gathered the money to pay for it. With most larger operations, double-fencing multiple pastures would be exceedingly expensive.

Discussions with the wildlife laboratory and other wildlife biologists with first-hand experience related to die-offs suggest that this reintroduction would be a **high-risk** effort given this number of domestic sheep operations within the minimum radius from the habitat and relocation site. It is likely that reintroduced sheep will face a die-off risk, be it in one year or ten years.

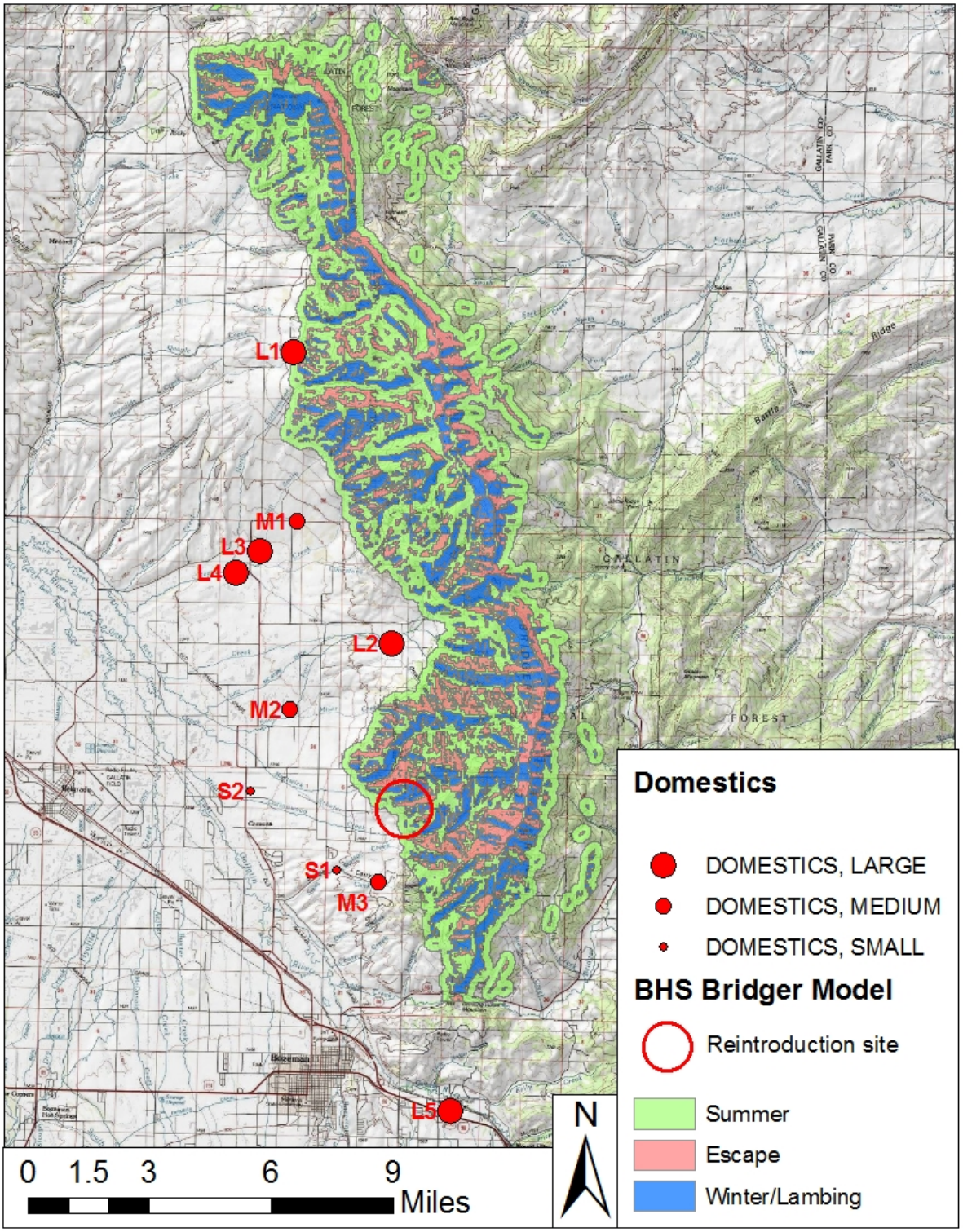

Figure 4: Map of domestic bighorn sheep herds relative to potential bighorn habitat.

BIGHORN SHEEP POPULATION SUMMARY

Based on habitat calculations (Table 2) we could expect to support 160-350 bighorn sheep across the entire Bridger Mountain Range depending on how they use the habitat (Table 3, Appendix A). In the 1994 EA, Kurt Alt estimated the expected population would be between 100 and 150 sheep in the immediate reintroduction area.

Note that transplanted animals are not likely to immediately disperse throughout all available habitats. Transplanted animals often show high fidelity to release sites, as they lack the knowledge about how to use the landscape as native animals have learned and passed down through millennia. It is likely that if we released sheep only at the Middle Cottonwood area, they would take many years, or even decades, to expand to the north Bridgers. Therefore, it is possible that realized population size may be on the lower end of what could be expected without additional augmentation to elsewhere in the Bridgers as well.

RECOMMENDATIONS

I originally recognized 4 potential outcomes to immediate population reintroduction (2011 draft):

1) All proceeds as planned: mule deer are unaffected, mountain goats unaffected, and either
    a. Bighorn sheep reach sustainable levels (125 sheep or more)
    b. Bighorn sheep do not reach sustainable levels (below 125 sheep) due to lack of lambing/winter habitat.
2) Mule deer numbers and trophy quality suffers in the area surrounding reintroduction; bighorn are successful
3) Mountain goats compete with bighorn sheep and bighorn never reach sustainable numbers
4) I pro-actively increase mountain goats licenses in the Bridgers, reducing their population size, and potentially reducing their trophy quality.

Today, I recognize a 5th outcome, perhaps superseding these prior four. With the occurrence of domestic sheep throughout the Bridgers, with no reintroduction site further than 14 miles from a domestic herd, and with no mitigations to prevent contact and disease transmission, there is high likelihood that this reintroduced population will fail. Failure would be at great expense to MFWP (costs of transplant plus costs of disease remediation through field time and testing) and to the welfare of the animals we would be transplanting.

My recommendation is still to postpone reintroduction, to maintain contact with landowners and sheep owners, and sportsmen, and prepare for future opportunities. At least 1 sheep owner is planning on leaving the business, perhaps opening more opportunities for focused mitigation or even a more feasible reintroduction site. Postponing the reintroduction would still allow us to

learn from and apply the knowledge gained by the GYA Cooperative Mountain Ungulate study, currently in progress. We will continue mule deer survey and inventory with a goal of increasing the mule deer populations. We should re-evaluate the habitat in the Bridgers to determine if any habitat improvement projects could occur to increase the amount of winter/lambing habitat.

The Bridgers remain a viable area for bighorn sheep reintroduction in the future.

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Singer, F. J. and J. E. Norland. 1994. Niche relationships within a guild of ungulate species in Yellowstone National Park, Wyoming, following release from artificial controls. Canadian Journal of Zoology. 72: 1383-1394.

Table 2: Habitat calculations and classifications for bighorn sheep in the Bridger Mountain Range.

Habitat and Landcover Summary

Land Cover	Analysis Area not in other habitats	Summer Foraging Habitat (W/in 300m of escape cover, but not including escape cover)	Summer Escape Cover (North Aspects)	Lambing / Winter Escape Cover (South Aspects)	Total Escape Cover (All Aspects)
Agricultural Vegetation	4.2	0.1	0	0	0
Barren	0	0	0	0	0
Developed	0.3	0	0	0	0
Forest and Woodland	80.6	93.1	37	28.9	65.9
Introduced Vegetation	0	0	0	0	0
Polar and High Montane	0.5	2.9	3.8	5.5	9.3
Semi-Desert	17.6	12.5	2.8	11.6	14.4
Shrubland and Grassland	37.4	23.3	1.1	9.9	11
Sparse Rock Vegetation	0	0.2	0.3	0.4	0.7
Transitional Vegetation	9.3	4.4	0.7	0.1	0.8
Water	0	0	0	0	0
Total SqKm Habitat	**149.9**	**136.5**	**45.7**	**56.4**	**102.1**

Table 3: Habitat-supported population summary models based on p. 62 of Montana Sheep Conservation Strategy. Habitat based on all landcover (top) and on non-forested landcover (bottom).

	Summer Foraging Habitat (W/in 300m of escape cover, but not including escape cover)	Total Escape Cover (All Aspects)	Lambing / Winter Escape Cover (South Aspects)	Summer Foraging Habitat and Total Escape Cover (All Aspects)	
Total Sq Km Habitat (**ALL** Landcover)	137	102	56	239	Sq Km
Population that can be Supported:					
3.85 / sq km (Prairie Badlands: Zeifenfuss et. al 2000)	525.5	393.1		918.6	Sheep
1.47 / sq km (Rocky Mountain)	200.7	150.1		350.7	Sheep
16.6 / sq km Lambing Habitat (per below)			936.2		
20 / sq km Winter Habitat (per below)			1128.0		

	Summer Foraging Habitat (W/in 300m of escape cover, but not including escape cover)	Total Escape Cover (All Aspects)	Lambing / Winter Escape Cover (South Aspects)	Summer Foraging Habitat and Total Escape Cover (All Aspects)	
Total Sq Km Habitat (**NON-FORESTED** Landcover)	43	65	28	109	Sq Km
Population that can be Supported:					
3.85 / sq km (Prairie Badlands: Zeifenfuss et. al 2000)	167.1	250.6		417.7	Sheep
1.47 / sq km (Rocky Mountain)	63.8	95.7		159.5	Sheep
16.6 / sq km Lambing Habitat (per below)			456.5		
20 / sq km Winter Habitat (per below)			550		

Appendix A – Transplant Site Assessment Form

Fill out the following list of items as the various aspects of the potential transplant site are quantified according to the Habitat Evaluation Procedure (HEP) in the Translocation Section. Attach a map showing the potential site, including the overall area, potential lambing habitat, summer range and winter range.

Site Name: Bridger Mountains
Date: 10/3/12

1. Is this potential transplant site to your knowledge historical bighorn sheep habitat? Yes

2. Are there any existing bighorn sheep populations in the vicinity? If yes, what is the name of the population, distance to it, and the likelihood for interchange assuming the establishment of a new population?

a. Name of nearest bighorn sheep population: i) Spanish Peaks Herd ii) Elkhorn herd iii) Gallatin Crest
b. Distance from core habitat: i) 30-40 miles, ii) 40-50 miles, iii) 20-30 miles
c. Likelihood of interchange: i) Low, ii) Low, iii) Low-medium

3. Are there any significant barriers to movement that need to be considered and if there are provide details and suggested mitigations if any? For example: prescribed burn to open up migration corridors where conifers are establishing on former grasslands. No barriers within proposed habitat – Bridgers are continuous. Between Bridgers and other areas, there are roads/highways, rivers, open ground, and human developments that could be challenging to sheep dispersing to other areas.

4. Based on your assessment of escape terrain in the entire potential area as described in the HEP (item 1 page 62 of Conservation Strategy) is there enough suitable habitat to support a MVP of 125 animals? What is the total estimated size of potential habitat from this analysis? If the area can support more animals what would be the estimate of total number of bighorn sheep the area could support at the appropriate density (see Translocation Section for densities in relation to habitat type)?

a. Is there suitable habitat for MVP – Likely. At Rocky Mountain densities of 1.47/km^2, if sheep do use forested escape terrain, there will be enough for MVP (150 sheep). If sheep do not use the forested area, escape terrain could be a limiting factor (estimated 96 sheep).
b. Size of potential habitat: Total escape terrain (all aspects) approximated at: 65-102 km^2 (non-forested habitat use only to all-landcover habitat use)
c. Total number of bighorns the area can support: Total at 1.47/km^2 = 96-150 (non-forested habitat use only to all-landcover habitat use)

5. Based on your assessment of potential winter range as described in the HEP (item 2) is there enough suitable habitat to support a MVP of 125 animals? What is the total estimated size of potential winter range habitat from this analysis? If the area can support more animals because of the size of potential winter range habitat what would be the estimate of total number of bighorn sheep the area could support at the suggested maximum density of 20 bighorn sheep /km2?

a. Is there suitable winter habitat for MVP – Likely, provided sheep can exist at higher densities on the winter range (20/km^2) at lower densities, there would be insufficient habitat for MVP.
b. Size of potential winter habitat: 28 – 56 km^2
c. Total number of bighorns the area can support: Total at 1.47/km^2 = 41 – 83. Total at 20/km^2 = 550-1128 (non-forested habitat use only to all-landcover habitat use)

6. Based on your assessment of potential lambing habitat range as described above in the HEP (item 3) is there enough suitable habitat to support a MVP of 125 animals? What is the total estimated size of potential lambing habitat from this analysis? If the area can support more animals because of the size of potential lambing habitat what would be the estimate of total number of bighorn sheep the area could support at the suggested amount of habitat (6 ha) required for each lambing ewe?

a. Is there suitable lambing habitat for MVP – Likely, provided sheep can exist at higher densities (6 ha per lambing yew = 16.6 ewes / km^2).

b. Size of potential lambing habitat: 28 – 56 km^2

c. Total number of bighorns the area can support: Total at 1.47/km^2 = 41 – 83, total at 16.6 ewes / km^2 = 457-936 (non-forested habitat use only to all-landcover habitat use)

7. Based on your assessment of potential summer range as described in the HEP (item 4) is there enough suitable habitat to support a MVP of 125 animals? What is the total estimated size of potential summer range habitat from this analysis? If the area can support more animals because of the size of potential summer range habitat what would be the estimate of total number of bighorn sheep the area could support?

a. Is there suitable summer habitat for MVP – Likely, depending on how bighorn sheep use forested and non-forested habitat, and their ability to forage on escape cover.

b. Size of potential summer habitat 137 km^2 of summer foraging habitat within 300m of escape cover but not including escape cover, 239 km^2 of summer foraging habitat including escape terrain of all aspects. Using non-forested landcover only, there would be 43km^2 of summer foraging habitat within 300m of escape cover but not including escape cover, and 109km^2 of summer foraging habitat including escape terrain of all aspects.

c. Total number of bighorns the area can support Total at 1.47/km^2

Forested, not-including escape = 201
Forested, including escape = 351
Non-forested, not including escape = 64
Non-forested, including escape = 160

8. Are there domestic sheep or goats near this site? If so approximately how many and what would be their distance from the habitat to be potentially occupied by bighorn sheep? Are the domestic animals located on private or public lands? Is there opportunity for spatial/temporal separation based on minimum suggested distance of 23 km, effective physical barriers or other mitigating factors?

a. Number of domestic sheep and goats and distance to potential bighorn habitat:
There are no fewer than 9 domestic sheep herds within 23km of the reintroduction site. There are 4 large (about 100) sheep operations 4.5, 7.5, 7.5, and 12 miles from the site. There are 3 medium-sized (about 20-50 sheep) operations 1.5, 4, and 8 miles from the site. There are 2 small (2-4 sheep) domestic sheep owners 4 and 2 miles from the site.

b. Located on Private or Public lands (describe): Private

c. Opportunity for separation: All except for the large operation 12 miles from the release site are outside of projected habitat. This does NOT infer that sheep will not travel there on exploratory movements. Many of these domestic operations have NO viable mitigations. Such mitigations that do exist include only:

- One medium-sized producer 8 miles from the site does have an approximate double-fence strategy with a regular perimeter fence and electric wire mesh fences inside this perimeter enclosing the domestics.
- One large producer 4.5 miles from the site has herding dogs they believe would indeed guard against wildlife intrusion, even a wild sheep.

- One medium and 2 small producers (1.5, 2, and 4 miles from the site) have very visible sheep flocks right outside their houses
- All (except for perhaps 1 large producer 7.5 miles from the site) agree to shooting, killing, and reporting a wandering bighorn sheep should they see one.

Most producers would not be willing to entertain a double-fencing strategy, even if MFWP and other groups partnered to pay for this fence. The medium-sized producer 1.5 miles from the site does not wish to add any structure to their sheep operation, as they are waiting for the sheep to "get old and die on their own", at which time, they will have no more sheep.

9. Assuming there is adequate habitat to support an MVP of bighorn sheep what is your qualitative assessment on the juxtaposition of seasonal ranges. If the area is not large enough based on the assessment of the various seasonal ranges, how many bighorn sheep would it support?

Qualitatively, I suggest this release site may support 50-75 bighorn sheep, but as they expand to use other areas in the Bridgers, the population could easily reach 150+, as the habitat assessment (Table 2, Table 3) suggests.

Appendix D

Montana Fish, Wildlife & Parks

Cooperative Agreement for Trapping/Transplanting of Bighorn Sheep or Augmentation of Existing Populations

1. Introduction

Montana Fish, Wildlife and Parks (FWP) recently completed a Conservation Strategy for bighorn sheep and that plan, detailing the future management of bighorns was approved by the FWP Commission in January 2010. In the Translocation section of the strategy, criteria for selecting new sites for bighorn releases as well as criteria for augmenting existing populations are presented. Most habitats that bighorn sheep utilize in Montana are of mixed ownership consisting of public and private lands. The private lands are essential to the long-term maintenance of bighorns. The purpose of this agreement between FWP and cooperators is to specify what is expected of both parties to insure the successful establishment of bighorns to the area being considered. Further, the agreement specifies commitments by FWP designed to address concerns that may be expressed by cooperators regarding their private lands and agricultural operations.

2. Proposal

Montana Fish, Wildlife and Parks (FWP) is considering bighorn sheep transplants in the Bridger Mountains in Region 3. This transplant could potentially occur as early as the winter of 2012-13 providing landowner agreements are procured and other criteria regarding new transplants are satisfied. Bighorns would be captured in existing populations in Montana and released in Middle Cottonwood/Bostwick area. It is estimated that there's suitable habitat in The Bridger Mountains to support 100-220 sheep.

3. Roles and Responsibilities

FWP's responsibilities in relation to this bighorn transplant/augmentation consists of the following:

1. Develop a population objective for bighorns that is consistent with available habitat, landowner tolerance and other land uses that occur in the area.
2. Address proactively any negative impacts to agricultural production by bighorn sheep.
3. Manage the population through the use of hunting and/or trapping and transplanting sheep to other areas to stay within objectives for this population.
4. Assume the risk of transplant failure holding no landowner responsible.

The Cooperator's responsibilities in relation to this bighorn transplant/augmentation consists of the following:

1. Agrees to tolerate on their private lands a reasonable number of bighorn sheep with that number being jointly determined with FWP personnel.
2. Agrees to allow reasonable hunter access to help manage bighorn numbers as well as permission to trap and move bighorns should it be necessary for population management.

4. Modification

Modification within the scope of this agreement shall be made by the issuance of an executed modification agreed to by all parties prior to any changes being performed.

5. Approval of the Agreement

The undersigned below agree to the above roles and responsibilities.

_____
Date

_____
Pat Flowers
Region 3 Supervisor
Montana Fish, Wildlife and Parks

Landowner and Date signed

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Appendix E

Montana Fish, Wildlife & Parks

BIGHORN SHEEP IN THE BRIDGER MOUNTAINS – FAQ'S AND INFORMATION

Bighorn Conservation

- Bighorn sheep conservation is widespread concern. The U.S. Forest Service has declared bighorn a sensitive species. Within Montana, sheep are absent from many historically-occupied ranges, and periodic die-offs continue to affect total herd numbers.
- Bighorn are "watchable wildlife", and are a highly prized species for sportsmen.
- Reintroducing sheep to areas where they had been extirpated will help recover Montana's bighorn sheep populations.

Bighorn, Domestic Sheep, and Disease

- Bighorn do not carry pathogens (diseases) that will affect domestic sheep.
- Domestic sheep can carry pathogens for which bighorn have little to no immunity. Intermingling can result in wild sheep dying in significant numbers. Such die-offs may impact entire herds.
- Domestic sheep owners will be encouraged to maintain complete separation between their herd and wandering bighorn. In the event a producer sees a bighorn sheep near their flock, we would ask them to call MFWP immediately. We may even ask them to shoot and kill the bighorn to prevent it from returning to the herd with any contagious diseases.

Bighorn in the Bridgers

- The Bridger Mountains were a historic range for bighorn sheep. Bighorn were seen up until the early 1900's, but have not existed here in a sustainable population since.
- The Bridger Mountains have no domestic sheep allotments on the Federal lands.
- A prospective release site to return bighorn sheep to the Bridger Mountains is Middle Cottonwood Canyon. This is the same release site as proposed in 1994.
- With local landowner support, we may be able to restore this species to their past native range.

Public Process

- MFWP is in the process of contacting all landowners with >160 acres inside prospective bighorn range, and nearby landowners with domestic sheep.
- MFWP will write an Environmental Assessment (EA) with a public comment period.
- All area landowners will receive mailings telling them when this comment period will occur.

For More Information:

Bighorn sheep information and Montana's Bighorn Sheep Conservation Plan:
http://fwp.mt.gov/fishAndWildlife/management/bighorn/

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Appendix F

An Evaluation of Disease Transmission Risk from Domestic Sheep to Bighorn Sheep in the Proposed Bighorn Mountain Reintroduction Site

October 11, 2012

The risk of disease transmission from domestic sheep to wild bighorn sheep is widely recognized. Because of its potentially severe and long lasting effects on bighorn populations, pneumonia is generally considered the most important disease that may be transmitted from domestic sheep to bighorn sheep. Numerous experiments have supported the idea that comingling of bighorn sheep with domestic sheep leads to an increased risk of pneumonia transmission to bighorn sheep. In the natural setting, domestic sheep or goats have been known to occupy areas within bighorn ranges prior to several bighorn pneumonia die-offs.

Pneumonia epizootics in bighorn sheep have the potential to severely reduce or even lead to near loss of entire bighorn sheep populations. Another common consequence of these epizootics is reduced lamb production and recruitment, often for several years following the outbreak. Agency response to a large scale die-off can be expensive and in some cases may require a significant time commitment from personnel.

Because of the importance of this particular issue to conservation of healthy bighorn sheep populations, great effort has been focused on development of science based protocols and guidelines that provide recommendations for minimizing contact between domestic and bighorn sheep in order to reduce risk of disease transmission. We are fortunate that we can take advantage of these resources that have been developed by experts and based on the most current knowledge of the disease to help guide our decisions in regard to bighorn sheep management.

One example of such an effort is the “Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat”, which was developed by the Wild Sheep Working Group (WSWG), established in 2007 by the Western Association of Fish and Wildlife Agencies (WAFWA). This document, endorsed by the WAFWA directors in 2007, focuses on the risk of disease transmission between domestic sheep and goats to bighorn sheep, and provides recommendations for minimizing or eliminating opportunities for domestics and wild sheep to comingle, and also suggestions for mitigation in areas where domestics are present within bighorn range. Under “Recommendations to WAFWA Agencies”, this document recommends avoiding translocations of wild sheep into areas with no reasonable likelihood of effective separation from domestic sheep or goats.

Montana Fish, Wildlife & Parks is fortunate enough to have developed the “Montana Bighorn Sheep Conservation Strategy” in 2010. An entire section of this document is focused on health

monitoring and management. The risk of disease transmission from domestic to wild bighorn sheep is addressed in detail, which demonstrates the importance of this issue to the agency.

The Bridger Mountains have been proposed as a reintroduction site for bighorn sheep. Much work has been done to evaluate the suitability of this range for such an effort. It is concerning that there are several domestic sheep herds located a very short distance from the potential reintroduction site, one being as close as 2 miles away. Information provided from the area wildlife biologist indicates that while some landowners may be willing to cooperate and comply with mitigation measures, there are landowners who are not interested in participating in suggested mitigation measures at this time. Some of these non-participant landowners own flocks that are very near the potential reintroduction site.

The Montana Bighorn Sheep Conservation Strategy states that bighorn sheep populations in close proximity or with high likelihood of contact with domestic sheep and/or goats will be considered to be at high risk of experiencing a major disease event. The Conservation Strategy also refers to studies that found that successful bighorn sheep transplant populations were an average of 14.3 miles (Zeigenfuss et al. 2000) from domestic sheep in one study and 12.4 miles (Singer et al. 2000) from domestic sheep in another study. With the nearest domestic herds being only 2-4 miles away from the reintroduction site, domestic sheep in the Bridger Mountains are much closer than these studies suggest would be conducive to a successful transplant.

Based on this information, it is clear to me that bighorn sheep reintroduced into the Bridger Mountains under current circumstances would be at high risk of disease transmission from domestic sheep in the area. Disease transmission and disease outbreak could happen soon after reintroduction, or the bighorn could be unaffected for a number of years. However, the fact that the risk is high does not change unless circumstances in the area change. It is my opinion that introduction of bighorn sheep into a high risk area would warrant long term monitoring, and funding should be available for that effort.

Based upon the biologist's evaluation of the potential reintroduction site, and the current science of bighorn sheep pneumonia as summarized and presented in resources such as WAFWA's "Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat" and Montana Fish, Wildlife & Parks Bighorn Sheep Conservation Strategy, I view a reintroduction of bighorn sheep into the Bridger Mountains to clearly be a high risk reintroduction under current circumstances, and hope that decision makers will consider the potential consequences of carrying out a reintroduction that is so clearly identified as a high risk reintroduction.

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