



## **FOCUS SPECIES**

### **NORBECK WILDLIFE PRESERVE**

### **BLACK HILLS NATIONAL FOREST**

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## INTRODUCTION

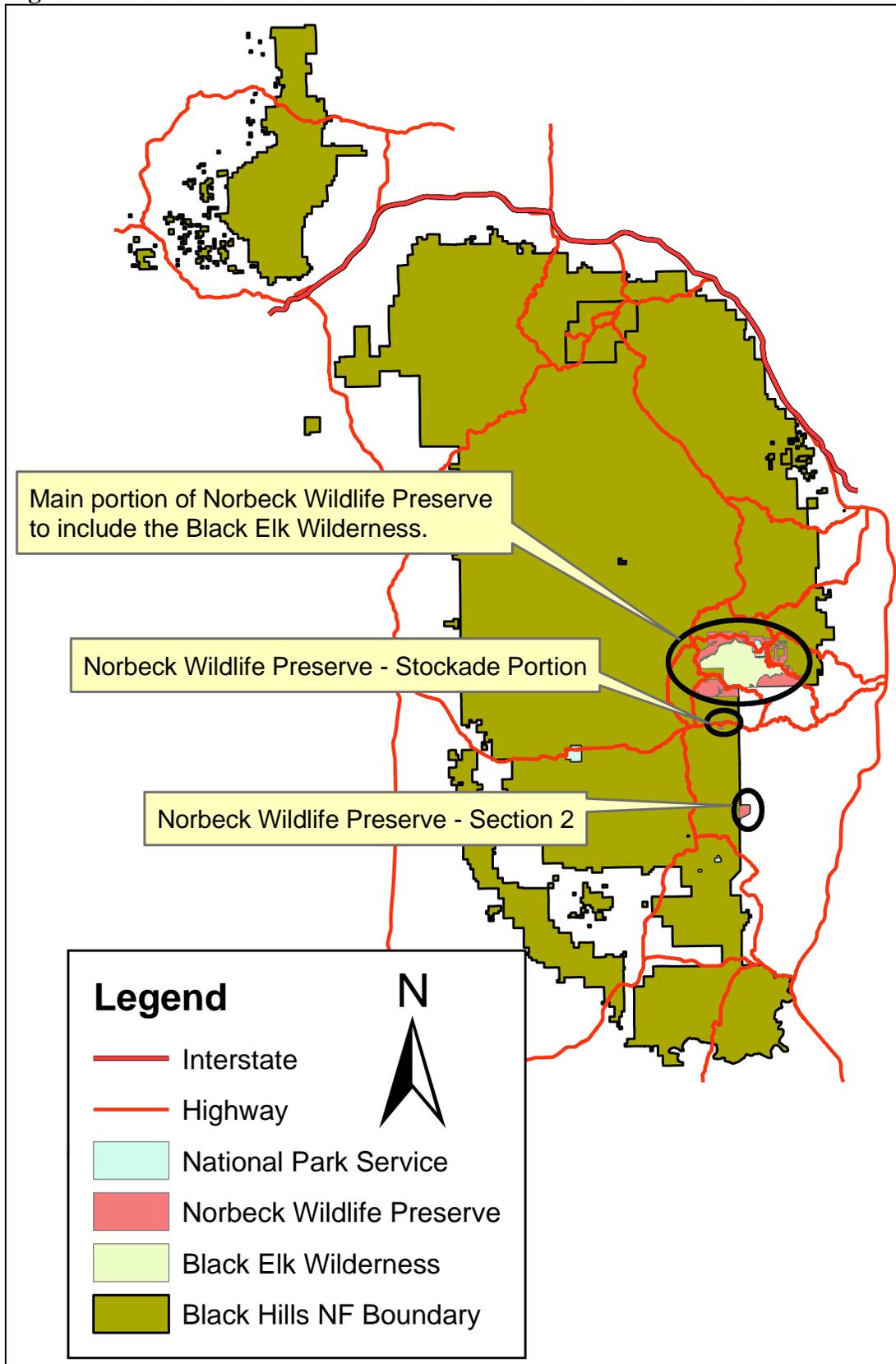
In 1905, a vision of the Nation's largest state park was born after Peter Norbeck paid a visit to the southern Black Hills. Peter Norbeck, a State Senator, Governor and eventually a US Senator, was obsessed with the idea of a park and worked for decades to manifest his ambitious goal to set aside beautiful landscapes as a game preserve (Fite 2005). First step was the establishment of Custer State Forest (now known as Custer State Park) in 1912. Norbeck was concerned about dwindling game species such as bison and antelope. He estimated that only 15-50 deer were in the general area but that the grasslands and mountain country could support at least 4000 deer, 1000 buffalo, 1000 elk, 500 antelope and 150 mountain goats (Fite 2005). In June of 1920, a Congressional act authorized the President to create the Custer State Park Game Sanctuary by setting aside 30,000 acres of Harney National Forest (now known as Black Hills National Forest) to adjoin the existing Custer State Forest "*for the protection of game animals and birds and to be recognized as a breeding place therefor.*" (Public Law 258. 1920). Throughout time, boundaries were adjusted and acreages were added and in 1949, Congress renamed the federal portion of the Sanctuary to the Norbeck Wildlife Preserve (NWP) after Peter Norbeck, who had passed away in 1936.

Although the Custer State Park Game Sanctuary legislation and the Norbeck Organic Act (NOA) did not prohibit other uses, the law left little doubt: Norbeck is to be managed for the benefit of certain wildlife. The Congressional Records do not lend much insight into the vague law, except that it was clear that in order to achieve protection for game animals and birds, cooperation between the federal government and South Dakota would occur. That cooperation continues today with this unified document and an interagency Memorandum of Understanding (MOU) described herein.

Today, the NWP is a testament to its success to rebound game populations and is home to a variety of wildlife, including elk (*Cervus elaphus*), white-tailed deer, (*Odocoileus virginianus*), mountain goat (*Oreamnos americanus*), small mammals and birds. It contains rugged granite formations and small streams. Ponderosa pine (*Pinus ponderosa*) is the predominant vegetation, but there are also stands of Black Hills spruce (*Picea glauca*) and hardwoods, and small open meadows. The NWP covers about 35,000 acres. Approximately 28,000 acres are within the Black Hills National Forest (BHNF). The remaining land is privately owned or under the jurisdiction of Custer State Park (CSP).

The Black Elk Wilderness and Peter Norbeck Scenic Byway are contained within NWP. The Scenic Byway is managed to emphasize visually appealing landscapes in roaded settings, while meeting the overall wildlife objectives for the NWP (USDA, Forest Service 2006). The enabling legislation for the Black Elk Wilderness states that provisions for the Norbeck also apply to the Wilderness, to the extent that they are not inconsistent with the Wilderness Act (Public Law 96-560. 1980). There are two small detached portions of the NWP. The Stockade portion is located east of Custer along Highway 16A at the entrance to CSP. Section 2 portion is located approximately 10 miles farther south and borders the northwest corner of Wind Cave National Park and the southwest corner of CSP (Figure 1).

Figure 1. Location of Norbeck Wildlife Preserve in the Black Hills National Forest.



### ***Continuing Education in Ecosystem Management (CEEM)***

The Hell Canyon Ranger District of the BHNF is in the early planning stages to conduct wildlife habitat improvement projects within NWP. The NWP is held in special regard by many parties within and outside the Black Hills. Opinions on how to manage the area vary from one end of the spectrum to the other in regards to vegetation treatments (i.e., logging, thinning, prescribed fire or “hands-off”), its current condition and a desired condition. In order to get an unbiased analysis of NWP, a group of resource specialists from various natural resource agencies and disciplines across the United States were invited through the CEEM Program to conduct a landscape level assessment of the NWP. BHNF is not obligated to follow the recommendations, but will seriously consider the recommendations throughout project planning.

The CEEM team concluded that the Norbeck is outside its reference condition in regards to vegetation structure (CEEM 2006). Forested areas have become denser with small diameter pine, while hardwoods (i.e., aspen, birch and oak) and meadows are disappearing due to pine encroachment and lack of wildfire. There is a concern that continued decline of these less common habitats could potentially lead to corresponding declines in some populations of game animals and birds. Species that prefer dense stands of ponderosa pine are most likely benefiting from current stand conditions. The CEEM team recommended that the NWP be actively managed for the creation of habitat for game animals and birds. Active management includes timber harvest (i.e., commercial and non-commercial) and prescribed fire (CEEM 2006).

The CEEM Team also recommended the following future desired conditions:

- The Norbeck will be a functioning wildlife preserve managed to fulfill a habitat need in the regional landscape for a defined list of “game animals and birds” in accordance with the mandate of the Norbeck Organic Act.
- The list of “game animals and birds” will consider what habitat the Norbeck has the potential to provide and what is needed in the regional landscape.
- Under the provisions of the 2004 Memorandum of Understanding (MOU) the responsible agencies (BHNF and South Dakota Game, Fish and Parks (SDGFP)) will determine which species should be protected in the NWP.
- Design and evaluate habitat enhancement treatments in an integrated manner, focus on the contribution of the treatments to habitat conditions across the entire NWP.
- Uses must be compatible with the objectives of the NWP as defined by the NOA and the final list of “game animals and birds.”

### **PURPOSE AND NEED OF THIS DOCUMENT**

The NWP was established by Congress for the “*protection of game animals and birds and to be recognized as a breeding place therefor.*” Throughout time, several

amendments to the NOA, other legislation (such as creation of Black Elk Wilderness) and the National Forest Management Act all lend some level of legal guidance to management of the NWP. However, in 2001, it was ruled that the Norbeck Organic Act is the primary legislative mandate for the management of the NWP but that the BHNF can continue to establish management plans under both the NOA and the National Forest Management Act (Sierra Club-Black Hills Group v. US FS. 2001). Pursuant to Public Law 107-206 (2002), a Memorandum of Understanding (MOU) was signed in 2004 between BHNF and SDGFP to further cooperation and consultation in the management of the NWP. However, no definition of “game animals and birds” was developed.

Because of the large number of game animal and bird species that occur in Norbeck today, it is not possible to individually focus on all game animals and all birds. Since every species has unique habitat needs, it would not be feasible to meet the needs of all wildlife with all management actions, including no action.

The purpose of this document is to two-fold. First, to explain the history and lend insight to the formation of NWP. Second, to define certain terminology from the NOA, specifically “protection”, and “game animals and birds”. To guide management, we need to define and select “focus species” in order for the BHNF to properly manage the NWP in accordance with its original spirit and intent. Both the BHNF and SDGFP retain the right to flexible resource management as new scientific information becomes available and when environmental conditions, legal precedents, policy guidelines and social requirements change. Therefore, the contents of this document are components of a living and dynamic process, open to modification when warranted.

## **HISTORY**

### ***Yesterday and Today***

In order for the BHNF and SDGFP to best understand what the authors of the Custer State Park Game Sanctuary legislation were thinking back in 1920, we need to have a better historic understanding of the juxtaposition between wildlife and humans in the late 1800’s and at the turn of the 20<sup>th</sup> Century. We do know that game in the Black Hills was slaughtered for settlers, miners and loggers. Hipschman (1959) provided insight into this era as described hereafter. In 1875, Lt. Col. Richard Irving Dodge recorded grizzly and black bears, a few cougars and “lynx”, wolves, fox, very few elk, a few mountain sheep, considerable “black-tailed” deer and the most abundant red deer. The first Dakota Territory law was passed in 1875 which set seasons for prairie upland birds but no considerations were given for bag limits or for Black Hills game other than grouse. In years with high snowfall, deer came into mining camps and were slaughtered to such a degree that the locals had a hard time giving away the carcasses before they spoiled. Hipschman (1959) stated that native “Virginia” turkey still existed in 1883 but was exterminated thereafter. (It is unclear where Hipschman derived information on Virginia turkeys. It may be anecdotal. See section on Merriam’s Turkey). Despite Territorial efforts to establish considerations for game populations, slaughtering and indifference continued. To summarize, Hipschman (1959) states that “*game and fish were at near dead zero when South Dakota achieved statehood*” in 1889.

Elsewhere in the Nation, learned citizens had taken the lead to raise awareness of dwindling game species. Aldo Leopold, a Yale graduate, was one of the first Forest Service employees and later became known as the father of game management. Leopold noted in 1909 that “*bison, elk, antelope and other game (in addition to grizzlies and cougars) had been driven from the lands around the Mississippi and were now growing scarce out West*” (Lorbiecki 1996). An intolerance for predatory mammals or birds that directly competed with human food sources, sport or subsistence hunting was tackled by determination to exterminate predators. While Leopold was stationed in the Southwest, he and the Forest Rangers kept up a steady war against wolves, mountain lions and grizzlies – the predators that killed the very game species the Foresters wanted to protect. One day, Leopold and others shot at a mother wolf and pups and Leopold watched the wounded female wolf die. The scene haunted Leopold and it took him a long time to understand the implications of what he had done. He stated, “*We reached the old wolf in time to watch a fierce green fire dying in her eyes. I realized then, and have known ever since, that there was something new to me in those eyes – something known only to her and to the mountain.*” (Lorbiecki 1996). However, an appreciation and respect for predators in the ecological web was a long time coming in Leopold’s writings.

Leopold and others were instrumental in sounding a huge wake-up call to alert state and federal governments that our bountiful wildlife species were not infinite in number. The conservation era took hold. President Theodore Roosevelt secured the federal government’s interest in conservation during his influences in the early 1900’s and established 51 game refuges before leaving office (Lorbiecki 1996). The conservation movement continued up through the 1920’s and this was the time frame of established national parks, monuments, forest reserves, the birth of some natural resource sciences and protection of bird species and mammals - particularly game species that had been hunted or slaughtered to near extinction. Drastic measures demanded Congressional action to literally save “ecological samples” from extermination. Such swift movements were extremely successful as seen through today’s populations of pronghorn antelope (*Antilocapra americana*), American robins (*Turdus migratorius*) and elk.

Law enforcement was essential. The Lacey Act was passed by Congress in 1900 which suppressed commercial market hunting by regulating interstate transportation of game. In South Dakota, the first game warden was appointed in 1909 and hunting seasons were closed for all game species by 1911 except for limited buck permits (Hipschman 1959). This restriction plus reintroductions and introductions were attempts to salvage and supplement what native big game remained in South Dakota. It was known that some game species wintered in the Custer State Forest and moved farther north for summer into the then named Harney National Forest. Governor Peter Norbeck felt that these northern areas should also be included in some sort of special wildlife reserve. Back in the Southwest, Leopold presented a plan in 1914 to turn some National Forest areas into game reserves, saving game animals from extinction while making money for the Forest Service through the sale of hunting permits (Lorbiecki 1996). It had already been established that States were responsible for protecting and managing game. By 1915, Leopold was inspired to write the first Forest Service publication, “*Game and Fish*

*Handbook*", which defined duties of Forest Officials and set out to enlighten Rangers of the economic and biological importance of forest wildlife – with the exception of predators. Game species had become so rare in places that hunters themselves were leading the conservation struggle (Lorbiecki 1996).

Closed hunting seasons in South Dakota were beginning to pay off. Hipschman (1959) reported that “...*deer in the Hills had a hard time coming back, probably the all time low was in 1923...Hard winters in 1917, 1918 and 1919 were followed by a four-foot snow fall in April of 1920...During the 1920’s, the game count showed 2,000 deer, a few antelope, no native elk, no buffalo and no sheep in the wild...Audubon’s sheep had become extinct when the last one was killed near the Badlands by a meat hunter. In the state game reserve [Custer State Park], things were looking up and by 1919, the herd of buffalo numbered 70, 10 antelope and 400 head of elk. However, unscrupulous individuals cut the fence to poach escaped elk..... and some local ranchers cut the fence to let their livestock feed in the lush park grasslands that had once been in public domain.*”

Restocking of native game was the norm but some attempts were rather odd such as introducing moose calves in the northern Hills of South Dakota, which were later reported to be “*in Wyoming and still going*” (Hipschman 1959).

In 1920, Governor Norbeck was the driving force behind the idea of a large state park and game reserve and rallied the support of US Senator Grandy of Rapid City to secure the legislation for the Custer State Park Game Sanctuary (Fite 2005). While Norbeck was not a sportsman (Fite 2005), he held an unweilding devotion to conservation during his entire political career. He kept informed and knew that many game species and bird populations had been severely decimated through unregulated harvests for food, fur, feather or millinery products and meat markets for East Coast restaurants. What the gluttons did not take, severe weather took.

The State was to erect a fence around the entire original Sanctuary (16 USC 6 Sec. 677) and Governor Norbeck himself supervised the work with prison labor. Erection and maintenance of the fence was later dropped because poachers were constantly cutting the fence around the Custer State Park unit to shoot escaped game (Hipschman 1959). And, it was later discussed that if the area was to truly be a sanctuary to increase game numbers, a fenced inclosure would not offer refuge to animals outside the fence, it would not allow for natural movements of animals and it would not allow for populations to expand to other areas of the Black Hills.

By the mid-20’s, hunting seasons were slowing coming back in parts of South Dakota, but hopes of ever again having abundance of wildlife seemed slim. The now US Senator Norbeck was instrumental in obtaining funds to reintroduce bighorn sheep, introduce mt. goats and establish an antelope preserve in Harding County. (Hipschman 1959). Elk numbers grew and the first antlerless tags were issued in 1947 to reduce damage to crops in the Southern Black Hills (Hipschman 1959). However, elk were so slow at re-establishing that up through 1956, it was stated that elk will “*rarely, if ever, [be] in*

*number great enough to provide more than a token harvest.*” (SDGFP 1957). That certainly is not the case today!

For decades now, game animals and game birds have been harvested in a manner to sustain their populations and management is under the jurisdiction of the South Dakota Department of Game, Fish and Parks. The NWP is managed under the jurisdiction of the US Forest Service, specifically Black Hills National Forest. It would be difficult to carry out the visionary wishes of Peter Norbeck if the two agencies did not collaborate on this document since one agency cannot manage its charge without cooperation with the other.

## DEFINITIONS

### *Protection*

The American Heritage Dictionary (1985) defines protect as “*to keep from harm, attack, or injury; to guard.*” Barron’s Law Dictionary (Gifis 1991) defines protection as “*to preserve in safety; to keep intact; to take care of and to keep safe....any measure which attempts to preserve that which already exists.*” The word “protect” is often associated with harboring ecological samples or archives of a certain condition or species and is a common word used in both preservation and conservation measures.

It is not practical to expect to keep, preserve or protect all individual animals and birds from harm, attack or injury. For example, many individuals will become prey for other individuals. Likewise, some game animal or bird habitat may be reduced by natural disturbance processes or during management actions designed to provide habitat for other game animals or birds. Many migratory birds encounter numerous situations outside the boundaries of NWP and the Black Hills.

In the realm of wilderness and endangered species management, the concept of protection is often similar to preservation. At the turn of the 20<sup>th</sup> century, settlement of the West demonstrated that our wilderness and wildlife did not offer infinite abundance. Forest reserves, wildlife refuges and preserves were established to keep some areas from irretrievable loss. The Black Elk Wilderness encompasses 13,543 acres or approximately 39% of NWP in its entirety and over 48% of NWP within the BHNF. Few human-caused alterations to improve game animal and bird habitats can be conducted in designated wilderness and in this case, the preservation side of “protection” is more applicable.

In wildlife and habitat management, the concept of protection is often compared to the concept of conservation. Conservation is the controlled use and systematic protection of natural resources. Conserve means to protect from loss or depletion. Aldo Leopold defined conservation as “*a positive exercise of skill and insight, not merely a negative exercise of abstinence or caution.*” Leopold also stated, “*Conservation is the attempt to understand the interactions of these components (soils, water systems, wild and tame plants and animals), and to guide their collective behavior under human conditions.*” (Callicott and Freyfogle 1999). The NWP is under human conditions whether we like it or not. Humans will always be a factor in managing NWP and the pressures to manage humans and our impacts increases exponentially. In 1949, the federal portion of the

Custer State Park Game Sanctuary was renamed the Norbeck Wildlife Preserve – 29 years *after* the original designation. By 1949, several game species had made significant gains in populations. Plus, conservation practices such as issuing restricted hunting permits had begun.

“Protect” and “protection” are part of conservation and conservation practices. We believe that a practical and applicable definition of “protection” for the purposes of game animal and bird population and habitat management today must incorporate concepts of conservation consistent with the NOA. The following definition of protection is used:

**Protection:** The controlled use, skill and systematic conservation and management of game animals and birds and their habitats; to protect game animals and birds and their habitats from depletion or the need to preserve individuals.

This definition focuses on the protection *and* conservation of game animals and birds and their habitats as influenced by humans. The definition encompasses a conservation land ethic and management system that supports populations of game animals and birds and strives to improve their habitats. The definition does not assume preservation of individual game animals and birds from predators, whether those predators are human or wild.

### ***Game Animals***

The legislative language “game animals and birds” is ambiguous. Does it mean all birds, non-game birds or game birds? What is a game animal? With such vague wording, we used our best judgment, professional expertise and surmised what it means. It could be assumed that back at the turn of the last Century when most people in the West depended upon wild animals for food, people just knew what a “game animal” was and therefore, common use of that phrase seemed logical and self-explanatory. For over 200 years, the word “game” has represented an animal that is hunted or shot for human consumption and derived from hunting activities that originated in Europe and Africa. In fact, as far back as the early 1800’s, volume 9 of the journals of Lewis and Clark stated that in what is known as eastern South Dakota today, “*There is every evidence that game was marvelously plenty in those days.....the river bottom and the stream itself were literally filled with game.*” (as cited in Hipschman 1959).

We scanned historical and references books and only found general use of the following words; predators, varmints, furbearers, game birds, small game, big game, upland game, game fish and game. We found no defined lists and no consistent use among the categories except that game was *not* the same as a varmint, furbearer or a predator. Game was assumed to be something for human consumption. In 1910, the first textbook on conservation in the United States included the heading “*Protection of Game*” and stated, “*We recognize that game preservation and the protection of bird life are intimately associated with the conservation of natural resources. We therefore favor game protection under regulation, the creation of extensive game preserves, and special*

*protection for such birds as are useful to agriculture.*” (Van Hise 1910 page 391). That is the entire section and there is no list of referenced game species.

Aldo Leopold forged the way to game management and amazingly enough, even in his 1933 “*Game Management*” book, Leopold never defines game. However, a table entitled “*Breeding habits and breeding potential of American Game Mammals in the wild*” lists; cottontail rabbit, snowshoe rabbit, fox squirrel, gray squirrel, white-tailed deer, mule deer, Columbian blacktail deer, elk (Wapitii), moose, woodland caribou, Rocky Mountain sheep, mountain goat, antelope, American buffalo, black bear and grizzly bear (Leopold 1933, page 32). Leopold, like others of his time, supported the bounties on predators and varmints. However, he did change his views about predators to some degree from the early 1900’s because by 1933, he listed bears as game mammals, rather than continuing their designation as strictly predators. Leopold did not list furbearers or cats as game mammals.

Leopold held strong that hunters were on the forefront of conservation and that regulated hunting was a crucial part of game management. Leopold was one of the first to emphasize in natural resource management that a certain habitat could only support a certain capacity; i.e.: carrying capacity. He felt that because predators had been removed, humans needed to fill that niche. “*Game management entails restriction of hunting, predator control, reservation of game lands (as parks, forest, refuges, etc), artificial replenishment and environmental controls of food, cover, etc.*” (Leopold 1933).

We believe it can easily be interpreted and correlated that the establishment and early management of the 1920 Custer State Park Game Sanctuary prophesied the advent of Leopold’s science of game management 13 years later. Throughout the 1920’s and 1930’s, conservation was supported by sportsmen, hunting was initially restricted, game species were stocked or reintroduced, fences were erected to enclose big game animals and habitats were altered by both the federal and state management agencies. We need to remember that in early game management, the war on predators was in full gear across the West and management within the NWP and the Black Hills was no exception. The BHNF issued orders to shoot predators (Connor et al. 1927), Black Hills deer hunters were given strychnine to poison the offal of deer carcasses to kill menacing coyotes (Hipschman 1959) and in 1929, the State placed a bounty on predators. We believe we have a more enlightened view on predators today and their entitled place in ecology but for purposes of taking a historic look at the early years in “game” management, clearly, predators were not considered “game”.

And lastly, based on the actions by Senator Norbeck to restock and introduce “game” into the Custer State Park Game Sanctuary, we have no reason to believe otherwise that eventual harvest of game animals would someday resume in NWP (Connor et al. 1927). In fact, game numbers rebounded and hunting was first permitted in the Sanctuary through the issuance of elk and deer permits as early as 1945 (“*Historical Background on Norbeck*,” author and date unknown). In a letter from Forest Supervisor Webber to SDGFP Director Peterson (USDA 1945), the BHNF no longer exercised the management of hunting permits in the Sanctuary and turned that over to the State. Supervisor Webber

stated, “it is no longer necessary that permits be issued by the FS for hunting in this area...For our records, it would be desirable to have information as to the number of licenses issued and the number of elk taken within the Sanctuary when this information is available.” If hunting of game animals in the Sanctuary was seen as completely contrary to the original 1920 legislation, we believe that when Congress renamed the Sanctuary 29 years later to the Norbeck Wildlife Preserve and 4 years after issuing the first hunting permits therein, that Congress would have made that distinction perfectly clear in 1949.

To begin to define “game animals” we looked in simple and logical places: a dictionary and State law. The American Heritage Dictionary (1985) defined game as “wild animals, birds or fish hunted for food or sport.” Game animals have also been defined as “wild animals that are deemed suitable for human consumption...game animals are categorized as large game and small game” (Herbst 1995). South Dakota Codified Law (SDCL) defines “game” as all wild *mammals* or birds (SDCL 41-1-1(12)).

Fish are not included in the definition of game animals because they are not specifically mentioned in the 1920 Custer State Park Game Sanctuary Act and fish are not defined as “game” according to SDCL. Also, to the best of our knowledge, fish species that were present in the Black Hills were not a huge food source to early settlers, miners and loggers. No doubt people consumed the white sucker (*Catostomus commersoni*) and if they were real desperate, the smaller mountain sucker (*Catostomus platyrhincus*), but no other native species were large enough to be harvested for food or commercial use. Because game mammals and birds were more abundant for food, people ignored the fish in Black Hills streams. However, fish in natural water bodies and streams outside of the Black Hills were quickly depleted (Hipschman 1959).

The U.S. Commissioner had waters in Eastern South Dakota stocked with non-native species such as carp and in 1886. Private individuals planted the first non-native brook trout fingerlings in Black Hills streams (Hipschman 1959, Barnes In Press). Numerous species of non-native trout were stocked in Black Hills streams for at least 34 years prior to the 1920 Game Sanctuary. Stocking a variety of trout and other fish species has been, and continues to be, a normal practice in the Black Hills since that time.

Similar legislation in the early 1920's specifically mentioned that several designated areas within other National Forests “be set aside for the protection of game animals, birds or fish” and further, even mentioned “the waters thereof” (16 U.S.C. § 682, 683, 694). We believe that if any fish species or bodies of water had been over harvested for whatever reason in the Black Hills, Congress in 1920 would have specifically listed “fish” and “waters” as needing protection. There were no known aquatic amphibians, reptiles, mollusks or other aquatic species that had been decimated in the Black Hills and current state laws regulate and protect aquatic species.

For the purposes of resource management in NWP, the definition of game animals is:

**Game animals:** Wild *mammals* or birds which breed in and/or occupy habitat (See Criteria below) within the Norbeck Wildlife Preserve that are legally hunted for food or sport.

### ***Birds***

We broadly interpret the phrase “game animal and birds” to mean “game animals and *all* birds” as opposed to “game animals and game birds.” This is consistent with past BHNF interpretation (USDA Forest Service 1989: Norbeck EIS and Norbeck EIS Supplement).

While game hunting was a major American activity in 1920, so were bird watching and bird conservation since many birds had been harvested to near extinction for feathers and meat markets. Because Senator Peter Norbeck proposed the first national migratory bird act, we assume Senator Norbeck had a reverence for all birds, not just game birds.

The American Heritage Dictionary (1985) defines a bird as “*a member of the class Aves, which includes warm-blooded, egg-laying, feathered vertebrates with forelimbs modified to form wings.*” South Dakota Codified Law only defines migratory waterfowl (SDCL 41-1-1(16)) and migratory birds (SDCL 41-1-1(17)). For the purposes of resource management in NWP, the definition for “birds” is:

**Birds:** Wild members of the class Aves which breed in and/or occupy habitats (See Criteria below) within the Norbeck Wildlife Preserve.

### ***Definition of and Criteria for Focus Species Selection***

The NOA requires that NWP be managed for the “*protection of game animals and birds and to be recognized as a breeding place therefor*” (Public Law 258. 1920). However, because of the large number of game animal and bird species that occur in Norbeck, it is not possible to individually focus on all game animals and all birds. By focusing on a limited number of species that use key habitat elements, management will provide for all game animals and birds in Norbeck by using a limited number of game animals and birds and their habitat elements to guide management. This does not mean that management will ignore all other wildlife species, nor does it mean we can manage for every focus species on every acre.

**Focus species:** Those game animals and birds that will guide management in Norbeck Wildlife Preserve.

Game mammal and bird species listed in the 2006 South Dakota Department of Game, Fish and Parks Hunting and Trapping Handbook and/or defined within South Dakota Codified Law 41-1-1 were evaluated for applicability to management in NWP and are found in Appendix A. Species listed in Appendix A which are currently legally hunted are part of the rationale for the list of “game animals.” From here on out, reference to “game animal” always means the definition given previously in this document.

The following criteria were used to select focus species that will guide management in NWP. There are two portions of the NWP and similarly, two lists of game animals and

birds. One list is for the main portion of the Norbeck *and includes* the Black Elk Wilderness and detached parcels around Stockade Lake (Figures 1 and 2). The other list is specific for Section 2 (Figure 1). Section 2 is located approximately 10 miles south of the southern-most boundary of the main Norbeck portion and is adjacent to the boundaries of CSP and Wind Cave National Park. Section 2 has different habitat structure, function, soils and climatic conditions compared to the main Norbeck portion. Criteria for NWP focus species includes:

A. A game animal or bird selected as a focus species must meet the following criteria:

1. Must be a game animal or a bird as defined above in this document.
2. Must spend a significant portion of its life requirements (breeding, wintering, or resident) within the Norbeck Wildlife Preserve (not just migrate through).
3. Has well known habitat relationships that can be used to guide management actions.

B. The following criteria were not required, but were used to prioritize focus species selection.

4. Occurrence is largely limited to areas in and around Norbeck Wildlife Preserve.
5. Preference is given to species whose habitat and/or populations can be monitored effectively and efficiently.
6. Habitat relationship requires one or more of the following habitat types:
  - a. Aspen and other hardwoods (Main portion only)
  - b. Spruce (Main portion only)
  - c. Late successional forest (Main portion only)
  - d. Large trees
  - e. Dense forest conditions
  - f. Open forest conditions
  - g. Snags
  - h. Burned areas
  - i. Shrubs, including understory shrubs
  - j. Riparian areas
  - k. Meadows
  - l. Grasslands (Section 2 only)

## **NORBECK MAIN PORTION**

The main portion of the NWP is dominated by ponderosa pine cover type (93 percent) and of this, 81 percent is considered dense (i.e. structural stage 3B, 3C, 4B, 4C and 5). Aspen, birch, oak, spruce, shrubs and meadows make-up the remaining vegetative cover types but are dwindling in abundance and distribution due to pine encroachment. Historically, dense ponderosa pine stands did occur within the Norbeck; however, the fire history almost certainly ensured that open pine stands as well as hardwoods and meadows were significantly greater in size and abundance than the current condition.

Most of NWP is outside the historical range of variability in regards to stand condition (i.e., density of trees). Research conducted in the Upper Pine Creek Research Natural Area showed a historical fire frequency of every 22-23 years (range: 11-74 years); a

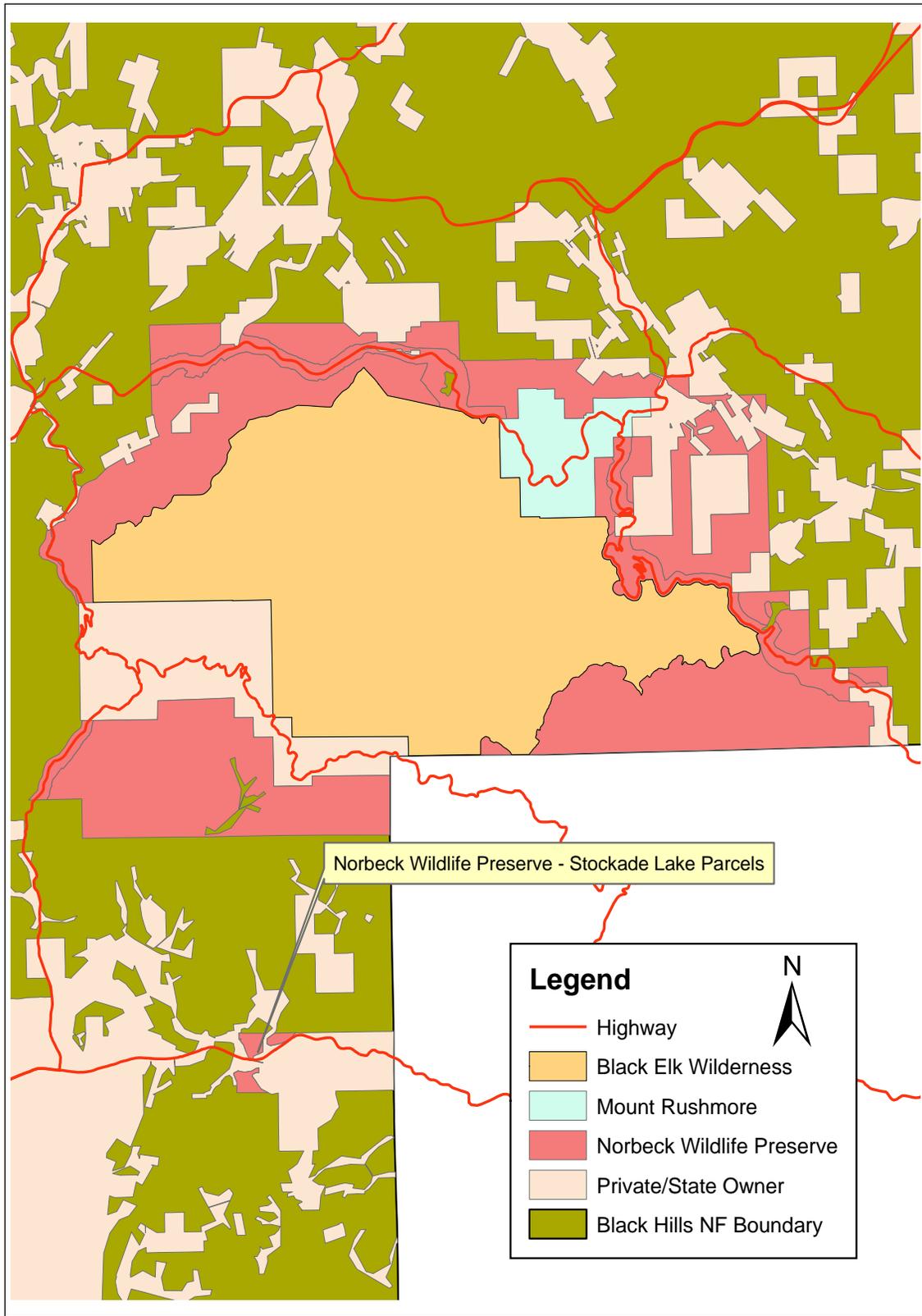
significant fire has not burned through that area since 1890 (Brown et al. 2000). This area is characterized by numerous rock outcrops and ridges that would have limited the fire spread between stands and is distinctive of the entire Black Elk Wilderness. Areas outside the Wilderness are typically less rocky and broken, and probably had a more frequent fire regime such as that found in the south-central Black Hills. Historical fire frequency for the south-central portion of the Black Hills is every 16 years (range: 1-45 years) (Brown and Sieg 1996). Recent research in Mount Rushmore National Memorial has shown a historical fire interval of every 15 years (range: 3-39 years) across the landscape with the last large-scale fire occurring in 1893 (P. Brown personal communication). Historically, surface fires would have consumed mainly the understory and killed most of the small trees. There would have been a limited number of mature trees killed also, but most would have survived because of the inability of the fire to climb and scorch the overstory.

The Black Hills was historically diverse and consisted of a mosaic of different stand dynamics which included: large openings devoid of any trees, open stands with a few large trees and areas consisting of many trees and a high density. As a whole, the Black Hills contains a similar basal area compared to historical conditions but that basal area is made-up of smaller, and more numerous trees (Brown and Cook 2006). Shinneman and Baker (1997) suggest that the moister, cooler, central and northern Black Hills were historically more dense compared to the southern Hills where frequent, low-intensity fires maintained an open, park-like appearance. Annual precipitation in the NWP averages 20.5 inches (measured at Mount Rushmore) compared to 29.1 inches in the northern Hills at Lead, South Dakota (Driscoll et al. 2000). Brown (2006) points-out that although fire frequency in the Black Hills was generally less than the southwestern US, there is evidence that surface fires were common prior to the late 1800's, which would have maintained open-canopy forests.

The consequences of maintaining such a high density ponderosa pine forest that is well outside the historical range of variability include: 1) decline in uncommon or unique habitats for game animals and birds, 2) decreased herbaceous productivity, 3) slower tree growth and increased mortality in older trees, 4) decreased stream flows, 5) less wildlife habitat available for species that prefer open conditions and a rich understory (Brown and Sieg 1996, Fule et al. 1997), 6) increased risk for large-scale insect and disease outbreaks and 7) increased risk for stand replacement fires which can significantly alter habitat components, including large trees.

Game animals and birds selected to guide management in this portion of Norbeck represent species that utilize late successional and open ponderosa pine stands and less common habitats such as aspen and other hardwoods, spruce, riparian and burned-over areas (Table 1). Additionally, a detailed species-specific habitat analysis and rationale for selection is provided. Appendix B lists species *not* selected and rationale.

**Figure 2.** Norbeck Wildlife Preserve Main Portion used for focus species selection.



**Table 1.** Focus species list to guide direction in the Main Portion of Norbeck Wildlife Preserve (includes the Black Elk Wilderness and Stockade Lake Parcels).

<b>SPECIES</b>	<b>HABITAT DESCRIPTION</b>
<b>Game Animals</b>	
Mountain Goat ( <i>Oreamnos americanus</i> )	Inhabits rugged terrain such as steep cliffs and rocky outcrops (Higgins et al. 2000). Primary range consists of the rugged terrain around Harney Peak, the Needles and Mount Rushmore (Richardson 1971).
Bighorn Sheep ( <i>Ovis canadensis</i> )	Inhabits semi-open terrain on steep cliffs and rocky slopes, usually in areas with limited human contact. Generally avoids dense forest stands (Higgins et al. 2000).
Rocky Mountain Elk ( <i>Cervus elaphus</i> )	Found in a variety of habitats such as coniferous forests, meadows, and forest edge (Higgins et al. 2000). Requires understory forage. Prefers limited human contacts and avoids motorized areas.
White-tailed Deer ( <i>Odocoileus virginianus</i> )	Very adaptable species that can live in almost any habitat including grasslands, wetlands and woodlands (Higgins et al. 2000). Requires rich understories of shrubs, forbs and grass for food, cover and fawn habitat.
Merriam's Turkey ( <i>Meleagris gallopavo merriami</i> )	Uses a variety of habitats. Winter habitat consists primarily of ponderosa pine with greater basal area composed of mature trees. Open pine stands and meadows with sufficient ground vegetation provide good summer habitat (Lehman 2005, Rumble and Anderson 1993). Primarily use large pine for roost trees.
<b>Birds</b>	
Mountain Bluebird ( <i>Sialia currucoides</i> )	Open ponderosa pine forest intermixed with grasslands, shrubs, burned areas and snags that serve as nesting cavities (Wiggins 2006a).
Golden-crowned Kinglet ( <i>Regulus satrapa</i> )	Found almost exclusively in white spruce habitat but occasionally present in habitats with a spruce component (Panjabi 2003).
Brown Creeper ( <i>Certhia americana</i> )	In the Black Hills, white spruce and late successional pine appears to be the most important habitat type for this species (Panjabi 2001, 2003).
Ruffed Grouse ( <i>Bonasa umbellus</i> )	Variable aged aspen stands, other hardwoods and pine forests provide habitat. Winter habitat is almost exclusively aspen (DeGraaf et al. 1991, Tallman et al. 2002).
Song Sparrow ( <i>Melospiza melodia</i> )	Streamside thickets, particularly shrubby willows, are required for habitat. Occasionally found in adjacent spruce habitat (Panjabi 2003).
Northern Goshawk ( <i>Accipiter gentilis</i> )	Forages in a variety of forested areas and small openings; nests primarily in dense mature conifer forests (Erickson 1987). Prey species habitat includes shrubs, dense understory, and diverse habitats.
Black-backed Woodpecker ( <i>Picoides arcticus</i> )	Occurs most frequently in recently burned habitat (Vierling 2005), to a lesser extent in mountain pine beetle infested pine stands (Bonnet 2006), and at lower densities in other forest types including late-successional pine forest and snag habitat. Year-round resident.

## ***Mountain Goat***

### **Habitat and Distribution**

The range of the mountain goat extends from the northern United States Rocky Mountains to Southeast Alaska (Clark and Stromberg 1987). Mountain goats are characteristically found in sub alpine and alpine tundra areas in the Northern Rockies and coastal mountain ranges of western North America (Higgins et al. 2000). Inhabits rugged terrain including cliffs, rock faces, ledges, and talus slopes, typically above timberline.

US Senator Peter Norbeck was instrumental in introducing six Canadian mountain goats into the Reserve and surrounding peaks in 1924. Today, primary range and habitat covers about 2,000 acres and is centered around Harney Peak and The Needles (Richardson 1971). The population, estimated in 1971 by Richardson, was approximately 300 to 400 animals. At that time, the population was considered static and occupying all suitable habitat in the Black Hills. The current population is estimated at 100 to 125 animals (Ted Benzon, Big Game Biologist, SDGFP, Div. of Wildlife, personal communication). The bulk of the mountain goat population occurs largely within the Black Elk Wilderness and NWP. Current mountain goat populations are smaller and more fragmented than estimates in 1971 (Richardson 1971). Reasons for the decline are uncertain but could be related to changes in habitat that are coinciding with increased canopy cover and decreased forage associated with ponderosa pine succession. Other possibilities include depredation from an increasing mountain lion population and the fact that the entire herd originated from six individuals and reproduction may finally be feeling the effects of genetic isolation. The SDGFP Div. of Wildlife will only issue two 2007 hunting licenses, which is down from the four licenses typically issued.

Mountain goats are found most abundantly on rock outcrops and high elevation meadows. Foraging habitat is alpine meadow, grassland, and montane shrubland (Benzon and Rice 1987). In the Black Hills, limits to persistence include a small population size and limited availability of preferred habitat, human recreation-activity disturbances, and loss of foraging habitat due to pine encroachment. Recommendations for improving habitat consist of thinning dense stands of ponderosa pine, maintaining meadows and placing clear-cuts next to or interspersed between granite outcroppings (Ted Benzon, Big Game Biologist, SDGFP, Div. of Wildlife, personal communication).

Mountain goats feed throughout the morning, rest at midday, and resume feeding in the late afternoon, continuing into the evening. A wide range of forage is utilized including chokecherry, russet buffaloberry, grasses and sedges, quaking aspen, serviceberry, wild rose, willow, and hazel (Richardson 1971). Usually the most available forage rather than the most palatable forage is consumed (Richardson 1971). Hunting, winter starvation, accidental deaths from rockslides and predation are some causes of mortality (Higgins et al. 2000).

### **Rationale for Selection**

In the Black Hills, the mountain goat is restricted almost entirely to the NWP, especially the Black Elk Wilderness. Some animals are found within Mt. Rushmore National Monument and CSP. The Black Hills high peaks area provides the rugged, granite outcroppings the species desires. The mountain goat is a big game animal and the SDGFP issues a limited number of annual hunting licenses. Peter Norbeck introduced the species and it is still a highly watchable wildlife species today. In order to maintain a population of this focus species on the Forest, the mountain goat and its habitat needs to be managed in the NWP.

## ***Bighorn Sheep***

### **Habitat and Distribution**

The range of Rocky Mountain bighorn sheep includes southern British Columbia and southwest Alberta south to southeast California, Arizona, and New Mexico (Whitaker 1980). Audubon's bighorn sheep (*Ovis canadensis auduboni*) were once native to the Black Hills but were extinct by 1916 due to uncontrolled market hunting (Benzon and Halseth 1999). To replace the extinct Audubon's, US Senator Peter Norbeck lead the efforts to stock Rocky Mountain bighorn sheep (*Ovis canadensis c.*) from Canada into CSP in 1922 (Hipschman 1959) and another restocking occurred with sheep from Whiskey Mountain, Wyoming, in 1965. The population increased to 150 animals by 1975. CSP supplemented the population again in 1999 with twenty animals from Canada.

For the CSP herd, there were historically a number of rams that ranged north through NWP and the Black Elk Wilderness (Layne 1987). About half-dozen ewes with lambs moved from CSP (North Fork of Bear Gulch) in mid-late June to the Mount Rushmore area. They typically moved along open, rocky areas through Woodpecker Ridge in NWP, north to Mount Rushmore and the rocky areas near the pigtail bridges along Iron Mountain Highway. They usually stayed there until around September when they returned to CSP. After CSP's die-off of bighorns in 2005, it is unknown whether or not that migration is still taking place. The Galena Burn area in the NWP is commonly used by rams and is just north of a lambing area in CSP (North Fork of Bear Gulch). The open, rocky habitat that developed as a result of the fire is now used by bighorns (Gary Brundige, Resource Program Manager, SDGFP, Div. of Parks and Recreation, CSP, personal communication).

Today, there are four groups of sheep in the entire Black Hills: (1) Rapid Creek in the Central Hills in and around Rapid City, (2) Spring Creek in the Central Hills in and around Rapid City and Hill City, (3) Southern Hills and Elk Mountain, and (4) Custer State Park. Movement occurs among the 4 groups but the exact extent of movements are unknown.

In 1991 and 1992, 31 Rocky Mountain bighorn sheep (*O. c. canadensis*) were transplanted into Spring Creek Canyon, outside the NWP (Benzon and Halseth 1999). In 2000, bighorn sheep were transplanted into the Southern Black Hills on state land. Today, there are approximately 200 individuals combined between the Rapid and Spring Creek herds and rams move freely between these two herds. There is a subherd near Hill City of approximately 60-70 individuals and of this subherd the ewes usually lamb northwest of Harney Peak (Ted Benzon, Big Game Biologist, SDGFP, Div. of Wildlife, personal communication).

Rocky Mountain bighorn sheep inhabit alpine meadows, foothills, cliffs, and rock outcrops (Luce et al. 1999, Clark and Stromberg 1987). Merwin (2000) noted that bighorn sheep often selected areas with good visibility (i.e., <40 percent canopy closure) within suitable distance of water and escape terrain. Historically, the Norbeck area

probably provided some of the best bighorn sheep habitat in the forest. Bighorn sheep prefer open areas so they can see and escape from predators. Rocky, talus slopes serve as escape cover and are ideal if located near foraging areas that contain either no trees or very few trees to reduce visual obstruction (Brundige 1985).

Limits to persistence include limited availability of habitat, vulnerability of habitat to residential development on adjacent private lands and disturbance from human recreation (Benzon and Halseth 1999). Bighorn sheep are often susceptible to diseases that could affect populations. The CSP herd experienced a major population decline in 2005. There were about 200 individuals using CSP prior to the decline but now estimates are less than 50. In 2005, a small number of rams and a few ewes moved south out of CSP to an area south of Battle Mountain near Hot Springs. It is hypothesized that the bighorns intermingled with domestic sheep, picked-up pneumonia, moved back to CSP and infected a large portion of the bighorn herd, resulting in a 75 percent population reduction. As a result, there will be no hunting season in CSP for some years to come. Three licenses will be offered outside CSP. (Ted Benzon, Big Game Biologist, SDGFP Div. of Wildlife, personal communication).

### **Rationale for Selection**

The Audubon's bighorn sheep originally inhabited the Black Hills and were one of the extirpated big game species that were cause for concern to conservation leaders when NWP was established. Rocky Mountain bighorns are classified as a big game animal and a limited number of annual hunting licenses are issued. Bighorn's prefer habitat similar to the mountain goat which NWP provides. However, encroaching ponderosa pine reduces habitat quantity and quality. The NWP serves as a key component to the survival of this restored species in the Black Hills and the NWP is used by this focus species as a migration corridor between CSP and other parts of the Black Hills. NWP contains lambing grounds. Population numbers have declined significantly in the last year from a pneumonia outbreak, indicating how fragile the species is. In order to maintain a population on the Forest and away from private lands, bighorn sheep and its habitat needs to be managed in the NWP.

### ***Rocky Mountain Elk***

#### **Habitat and Distribution**

Elk is a large North American cervid whose distribution and numbers were severely impacted by ranchers and hunters in the late 19th century (Zachow 1997). Prior to 1870, the Manitoban elk subspecies (*Cervus elaphus manitobensis*) occurred throughout South Dakota and on the Wyoming prairies but by 1900 had become regionally extirpated due to unregulated hunting (USDA, Forest Service 1996). During the first two decades of the 20<sup>th</sup> Century, the Rocky Mountain elk was successfully reintroduced to the Black Hills from herds originating out of Yellowstone National Park and Jackson Hole, Wyoming (O'Gara and Dundas 2002).

Elk use a wide variety of vegetation types on the Forest but show a preference for forested riparian areas, forested stringers in meadows, and deciduous stands of birch or

aspen (SAIC 2003). Elk find cover (thermal, hiding or both) on the Forest in dense conifer stands (summer and winter) and hardwoods (summer only). For forage; however, they rely on more open stands, meadows and prairies, all of which may provide an abundance of grasses, forbs, and/or shrubs. In the southern Black Hills, elk diet consists of 50 percent grass, 45 percent forbs, and 5 percent shrubs during the growing season. In the winter, shrub browsing somewhat increases as does aspen-and-lichen consumption. Competition with deer for forage is usually not an important management issue on BHNF and when competition does occur, elk dominate. In contrast, livestock grazing can have a negative impact on wintering elk through competition for forage and displacement (SAIC 2003). Elk in Wind Cave National Park selected open prairie habitat in the morning and evening hours during spring and summer and moved to pine dominated sites during midday in the summer. This may be in response to high summer temperatures and the need to thermo-regulate, as well as to avoid visitor disturbance. In the fall and winter, cow elk continued using open habitats all day whereas bull elk tended to move towards the timber at midday (Bauman 1998).

During the 20<sup>th</sup> Century, fire suppression and silvicultural treatments have affected elk forage. Ponderosa pine has encroached into montane meadows and grasslands and has become dense, with high canopy closure and little understory. Thus, recommendations for improving elk forage on BHNF consist of creating openings and reducing pine-stocking levels (SAIC 2003).

Security cover is important during the fall hunting season (SAIC 2003). Security cover is defined by stand attributes including coniferous tree height ranging from 6.5 to 20 feet, greater than 370 trees/acre (greater than 4 inches dbh), and 70 percent understory greater than 10-feet tall. Motorized use of roads negatively affects elk because roads degrade habitat and contribute to animal displacement and stress. Some important management considerations for elk include road density and locating dense stands (potential security cover) away from roads (SAIC 2003). Stubblefield et al. (2006) recommend maintaining landscapes >500 m from improved roads for elk centers of activity. Rice (1988) noted that elk selected forage areas and cover areas based on levels of human disturbance and Millsbaugh (1999) found that elk avoided hiking trails with unpredictable human foot traffic.

### **Rationale for Selection**

The Rocky Mountain elk is a charismatic big game animal and highly sought after by resident hunters in South Dakota. In 2005, there were a total of 14,687 first choice applications for the Black Hills Firearms Season, of which, 2,670 licenses were issued (i.e., only 18 percent of applicants actually received a license; Huxoll 2006). This focus species is sensitive to roads and motorized travel and compete with cattle for forage, especially during late summer (SAIC 2003). Depending on the type of road, amount of traffic and adjacent habitat, elk will normally maintain a distance of 0.25 to 1.8 miles away from the road (Lyon and Christensen 2002). Elk selected against grassland habitat and for dense (i.e., >70 percent canopy cover) conifer stands during the big game hunting season (i.e., 1 September to 30 November) in the Black Hills (Rumble et al. 2005). Additionally, Rumble et al. (2005) found that elk generally avoid areas within 1 km of

primary and secondary roads during this time period. The NWP is very limited to roads open for motorized travel compared to the rest of BHNF and there are few areas that have permitted livestock grazing. Elk are a prey item for mountain lions and NWP offers seclusion for lions. Thus, the majority of the NWP could become excellent elk habitat if vegetation treatments move the area towards a more open structure and diversity of vegetation compared to its current condition.

### ***White-tailed Deer***

#### **Habitat and Distribution**

White-tailed deer occur throughout most of the United States and southern Canada and occupy a wide range of habitats. They are mostly migratory in the Black Hills, using lower elevations in winter (USDA Forest Service 1996, Appendix H). White-tailed deer move to low-elevation winter range from October to January, depending on snow and forage conditions (Stefanich 1995, Griffin et al. 1999).

White-tailed deer in the Black Hills use diverse habitat types. Juxtaposition between cover and forage is crucial year-round. Hardwood stands, which provide abundant forage combined with screening cover, were best predictors of white-tailed deer diurnal, summer use (Stefanich 1995). Dense aspen habitats with dense, tall shrub cover are important fawning habitat in the northern and central Black Hills (DePerno et al. 2002). Summer nocturnal habitat use is significantly different with use of open habitat types of meadows, riparian areas, and/or open pine relative to proximity of dense cover (Stefanich 1995). Wet meadows, riparian areas, and open stands of ponderosa pine also provide quality forage.

In winter, white-tailed deer in the central Black Hills selected forested habitat with shrubs 1.5 to 4.7 times more frequently than shrub habitats occurred on the Forest (DePerno et al. 2002). Uresk and Severson (1998) found that open-canopy conditions are necessary to establish and maintain understory shrubs. Closed-canopy stands with minimal understory vegetation represent cover habitat but provide little forage. Therefore, management actions that increase habitat and structural diversity across BHNF will better meet necessary forage and cover requirements for deer.

Management activities such as timber harvest and thinning to increase ground cover and promote deciduous trees and shrubs will benefit deer. The decrease in early successional stage vegetation and increase in pine-dominated communities has been attributed to declines in white-tailed deer populations (DePerno 1998, Griffin et al. 1999). Recent increases in deer and elk populations have corresponded to increases in forage and ground cover from large scale fires. Ground cover is an important component for fawn survival. Research in the Black Hills has shown that white-tailed deer fawns prefer bed-down sites in relatively tall, dense grassy vegetation within open stands of ponderosa pine (Uresk et al. 1999).

## **Rationale for Selection**

The white-tailed deer is a big game animal and highly sought after by both resident and non-resident hunters. In 2005, there were 7,814 Black Hills Firearms Deer licenses issued and 4,257 deer were harvested for a success rate of 54 percent. The breakdown by species and sex is as follows: 2,219 white-tailed bucks, 1,324 white-tailed does, 696 mule deer bucks and 8 mule deer does (Huxoll 2006).

The primary limiting factor for white-tailed deer in the Black Hills is probably a lack of desirable shrubs for food and cover (DePerno et al. 2002) and nutritious forbs (Schneeweis et al 1972, Hill and Harris 1943). Historically, a diversity of shrubs and forbs were available in hardwood stands. However, fire suppression has allowed the encroachment of pine and spruce into hardwood stands, resulting in a loss of understory shrubs (Parrish et al. 1996). A similar change has occurred in riparian areas and wet meadows. Furthermore, pine stands have increased in density and canopy closure, which also results in decreased forage and cover in the understory (Stefanich 1995; Parrish et al. 1996).

Competition and impacts of livestock grazing to both white-tailed deer and mule-deer habitat have been documented in the Black Hills (Sieg and Severson 1996). Elk and livestock interests may have contributed to deer declines in the central Black Hills (DePerno et al. 2002). Telemetry studies conducted in the northern Black Hills showed that livestock grazing caused some localized displacement of summer resting sites for white-tailed deer (SAIC 2003).

The NWP is very limited in roads open for motorized travel compared to the rest of BHNF and there are few areas permitted for livestock grazing. Deer habitat in NWP is of marginal quality and getting worse from lack of fire and an increase in pine encroachment into meadow/grass sites, hardwoods and riparian areas. Additionally, the increased density of pine in forested sites (i.e. 3B, 3C, 4B, 4C and most of structural stage 5, see Appendix C) has eliminated most of the understory vegetation that serves as deer forage and fawn cover. The relatively remote nature of the NWP as well as limited competition from livestock grazing provides a unique opportunity for this big game species compared to the rest of BHNF. White-tailed deer is one of the primary prey species for mountain lions. Bobcats are also known to feed on deer of all ages. If management activities focus on meadow, riparian and hardwood restoration as well as opening-up pine sites in combination with providing cover, the NWP could provide excellent deer habitat.

## ***Merriam's Turkey***

### **Habitat and Distribution**

The literature is unclear but Hipschman (1959) reported that "Virginia" turkeys were native to the Black Hills but were exterminated by the turn of the 20<sup>th</sup> Century and that in approximately 1930, 80 pair of "Virginia" or Eastern turkeys were released in the Black Hills. We do not know where Hipschman (1959) derived this information on "Virginia" turkeys and it may be antidotal or perhaps the turkeys were stock released by early

pioneers. Peer-reviewed literature states that the native range of wild turkeys did not include the Black Hills (Ligon 1946, Schorger 1966). SDGFP introduced wild trapped Merriam's turkeys taken from Colorado and New Mexico into the southern Black Hills near the towns of Custer and Hot Springs in 1950 and 1951 (Peterson and Richardson 1975). Most likely, the origin of the Norbeck turkey population traces back to the southern Black Hills releases from the early 1950s.

Turkeys are common in and around the NWP. In the Black Hills, turkeys use a variety of habitats. Winter habitat consists primarily of ponderosa pine with >70 percent canopy cover, while open stands of ponderosa pine with sufficient ground vegetation provide good summer habitat in the central Black Hills (Rumble and Anderson 1993). However, in the southern Black Hills turkeys preferred open-mid canopy (0-70 percent canopy cover), mature (i.e., >9" dbh) ponderosa pine forested areas for winter feeding sites (Lehman 2005). Roost sites are typically on slope and ridge tops in trees  $\geq 9$ " dbh with layered horizontal branches (Rumble 1992). Winter diets consist mainly of ponderosa pine seeds and summer diets are grass seed and foliage (Rumble and Anderson 1996). There appears to be a preference for rock or rock outcrops for first-time nesting attempts. Subsequent attempts usually result in a shift to shrubs located in meadows (Rumble and Anderson 1989). In the southern Black Hills, successful nest sites were located in pine stands with 41-70 percent canopy cover on steep slopes, cliff faces and in areas with greater visual obstruction, vegetation height and shrub cover (Lehman 2005). Primary nest predators consist of coyotes (*Canis latrans*), magpies (*Pica pica*), and American crows (*Corvus brachyrhynchos*) (Rumble et al. 2003). Lehman (2005) reported that great horned owls (*Bubo virginianus*), coyotes, and bobcats (*Felis rufus*) are predators of young and adult birds. The mountain lion (*Felis concolor*) is also a predator based on limited stomach content analysis of dead lions (SDGFP biologists, personal communications).

Turkey populations in the Black Hills have been on a steady increase since 1998. The population has gone from approximately 9,000 birds in 1998 to 24,000 birds in 2005 (Huxoll 2006). However, population levels can fluctuate considerably due to adverse weather conditions during spring nesting and brood rearing season. SDGFP regulates hunting pressure to compensate for population declines due to adverse weather conditions. Spring weather is probably the single most significant factor in determining turkey populations. Hunting pressure can also affect population levels. Livestock grazing in conjunction with or independent of drought can reduce herbaceous vegetation, which is important to maintain high quality summer brood habitat (Rumble and Anderson 1996, Rumble et al. 2003).

Turkeys have expanded in population size quite significantly over the last six years while habitat capability at the BHNF level has remained relatively stable (USDA, Forest Service 2004). Thinning and meadow restoration treatments should increase herbaceous vegetation and invertebrate populations, which could lead to better poult survival in the area (Rumble et al. 2003). Lehman (2005) found that females with poults preferred meadow habitat next to the forest edge and that dense pine >9" dbh and >70 percent canopy cover was generally avoided. As a management practice, Lehman (2005)

suggests that habitat enhancement projects should be implemented that reduce the amount of small diameter pine invading open meadows.

### **Rationale for Selection**

The Merriam's turkey is considered a big game animal (SDCL 41-1-1 (4) and popular among hunters in the Black Hills. In 2005, there were a total of 9,971 (6,844 resident and 3,127 non-resident) licenses issued for the Black Hills Spring Firearms, Black Hills Spring Archery and Black Hills Fall Firearms seasons (Huxoll 2006). This focus species uses a combination of dense and open ponderosa pine stands as well as meadows for nesting and brood rearing. Turkeys serve as prey for mountain lions, bobcat, coyote and some avian predators. The NWP already lends itself to desirable terrain, rock outcrops and dense vegetation but generally lacks the openings and meadows typically desired as summer habitat. Vegetation treatments could produce some of the best habitat available on BHNH

### ***Mountain Bluebird***

#### **Habitat and Distribution**

The mountain bluebird breeds from Alaska to southern California, Nevada, Arizona and Southern New Mexico. It can be found as far east as northeastern North Dakota south to central Oklahoma (DeGraaf et al. 1991). It is considered a common migrant and summer Black Hills resident (Tallman et al. 2002). The species prefers open areas in ponderosa pine forests (DeGraaf et al. 1991, Tallman et al. 2002) and typically nests in woodlands intermixed with natural openings such as meadows, shrub sites, and burned areas as well as recently logged sites with snags nearby (Wiggins 2006a). Mountain bluebirds usually nest in old woodpecker cavities in both live and dead trees (Wiggins 2006a).

Monitoring in 2004 showed that highest densities were found in burned landscapes followed by shrublands and then mixed grass habitat (Panjabi 2005). Within the Jasper Burn Area, densities have risen from 2.9 birds/km<sup>2</sup> in 2001 to 23.9 birds/km<sup>2</sup> in 2004 (Panjabi 2005). Although they are found in significant densities in both mixed-grass and shrubland habitats in the Black Hills, these areas usually have some trees present. The species generally avoids expansive grasslands that lack any trees (Panjabi 2003). Along with burn areas, the highest densities typically occur at the pine forest – grassland ecotone (Panjabi 2003).

Breeding Bird Survey (BBS) data shows a slight increase of 0.8 percent per year in the U.S. for mountain bluebirds between 1966 and 2005. In South Dakota and the Black Hills, the species has actually decreased, and quite significantly at a level of 3.7 percent and 2.1 percent per year for the same 39-year period, respectively (Sauer et al. 2005). Possible reasons for declines include loss of open-ponderosa pine forests to dense, closed-canopy stands, loss of meadows and natural grassy openings to pine encroachment and lack of fire.

### **Rationale for Selection**

This species is selected to focus management activities towards meadow/grass restoration, open pine forests and prescribed fire yet maintain snags adjacent to or within these sites. The mountain bluebird prefers to nest in snags within open ponderosa pine forests in the Black Hills. Meadows, openings, shrubs and burned areas that once occurred in a mosaic within the ponderosa pine forest of the NWP have been replaced with dense stands of large and small diameter pine. Research conducted in the Upper Pine Creek Research Natural Area showed a historical fire frequency of every 22-23 years (range: 11-74 years, Brown et al. 2000) and every 15 years in Mount Rushmore (P. Brown personal communication).

Historical fire frequencies of every 15-23 years would have maintained meadows, created snags and reduced tree density in many of the forested sites within the NWP. About the only place mountain bluebirds are found in any significant numbers within the NWP is the Galena Burn Area. This focus species should benefit from management activities that open the pine forest, restore meadows and includes some form of fire. Treatments scattered throughout Norbeck will benefit the species and expand desirable habitat, which appears to be limited almost exclusively to the Galena Burn Area.

### ***Golden-crowned Kinglet***

#### **Habitat and Distribution**

The golden-crowned kinglet breeds from Alaska to California, southern Utah, south-central New Mexico, Mexico, Guatemala and east of the Rockies to New York, eastern Tennessee, western North Carolina and southern Maine (DeGraaf et al. 1991). The species is considered an uncommon permanent resident in the higher elevations of the Black Hills (Tallman et al. 2002). Recent monitoring shows that it is most abundant in the northern Black Hills (Panjabi 2003, Beason et al. 2006). The species is closely tied to white spruce (or Black Hills Spruce) and that is where the highest densities of golden-crowned kinglets are found. However, they have been observed in other habitat types but there is usually some spruce present (Panjabi 2003, Beason et al. 2006).

BBS data shows a significant decrease of 2.4 percent per year in the U.S. for golden-crowned kinglets between 1966 and 2005. In South Dakota and the Black Hills, the species has actually increased at a level of 8.2 percent and 7.7 percent per year for the same 39-year period, respectively (Sauer et al. 2005). Habitat trend for the golden-crowned kinglet appears to be increasing based on the short-and long-term increases in spruce forest (USDA, Forest Service 2005).

#### **Rationale for Selection**

The golden-crowned kinglet breeds almost exclusively in white spruce and is found almost entirely in that habitat type. The majority of white spruce found in the Black Hills is located north and west of the NWP. The NWP is near the southern extent of spruce site compatibility in the Black Hills. However, the NWP does have relatively large stands of white spruce along steep north-facing slopes, drainage bottoms and perennial streams. This species is affected by the loss of spruce habitat to encroaching ponderosa

pine. This focus species is selected to manage for white spruce habitat which will also benefit other wildlife species tied to spruce.

### ***Brown Creeper***

#### **Habitat and Distribution**

The brown creeper is found from Alaska and southern Canada south to Central America (DeGraaf et al. 1991). In the western states, the brown creeper is considered a year-round resident, retreating to lower elevations during the coldest months of winter (Kingery 1998). It is considered an uncommon permanent resident of the Black Hills (Tallman et al. 2002), largely tied to late successional pine and white spruce habitats (Panjabi 2003, 2005).

The brown creeper is found most abundantly in contiguous mature, old growth coniferous and mixed coniferous-deciduous forests. The preferred nesting habitat for this species is mature, old growth forest that is undisturbed and contains a closed canopy (Hejl et al. 2002, Wiggins 2005). This small forest bird occurs in low abundance throughout the Black Hills and is associated with mature and late succession forest conditions. Results from monitoring data identify white spruce and late successional pine as the most important habitat type for this species (Panjabi 2001, 2003, 2005). Other important habitat requirements are areas of large trees (i.e., >10" dbh), loose platey bark and/or areas infested with bark beetles and snags (DeGraaf et al. 1991, Peterson 1993, Kingery 1998, Wiggins 2005). Dead or decaying trees and snags provide substrate for nests and foraging. Nesting habitat generally contains trees that are >9" dbh (Hejl et al. 2002).

BBS data shows an average decline of 0.8 percent per year in the U.S. for brown creepers between 1966 and 2005. In South Dakota and the Black Hills, the species has actually increased at a level of 39.7 percent and 39.9 percent per year for the same 39-year period, respectively (Sauer et al. 2005). In the Black Hills, habitat specific density estimates for the species include only one habitat type - late successional forest. It is estimated that 14.1 birds/km<sup>2</sup> occupy this type of habitat component on BHNF (Panjabi 2005). Forest-level trend analysis suggests a stable to slightly decreasing habitat development for the species (USDA, Forest Service 2004). In 2004, Rocky Mt. Bird Observatory reported that of the 44 brown creepers observed near a count station, 52 percent were in areas classified as structural stage SS 5, 16 percent were in SS 4C, 18 percent were in SS 4B and 14 percent were in SS 4A (Panjabi 2005). Structural stages are listed in Appendix C.

#### **Rationale for Selection**

Brown creepers are closely associated with contiguous old growth and late successional forest that typically contain very large trees with loose platey bark. This type of habitat is lacking throughout much of BHN, however, the NWP has some of the largest trees available and contiguous stands of late-successional ponderosa pine. Approximately 86 percent of the NWP (including Black Elk Wilderness) is currently made-up of ponderosa pine cover type in structural stage 4 and 5 (i.e., large trees in the overstory), and of that, 84 percent is in structural stage 4B, 4C and 5 (Appendix C lists structural stages). This

focus species is selected to ensure management practices to recruit for and retain late-successional stands of ponderosa pine and spruce, even though vegetation treatments may be necessary to achieve this structural stage as well as provide habitat requirements for other game animal and bird species. Management for late successional and large trees does not prohibit understory thinning or reduction of some commercial trees.

## ***Ruffed Grouse***

### **Habitat and Distribution**

Ruffed grouse are a resident species where found and range from central Alaska to northwestern California, Idaho, Utah, Wyoming and Montana. They extend east through Minnesota, Ohio and the Appalachian Mountains from Virginia to northeastern Georgia (DeGraaf et al. 1991). In South Dakota, ruffed grouse are typically found in young-to-medium age aspen stands, other hardwood stands, and open pine forests (South Dakota Ornithologists' Union 1991). It is considered an uncommon permanent resident in the Black Hills (Tallman et al. 2002) with greatest abundance in the northern Hills (Panjabi 2003). In relation to historical data, ruffed grouse were formally more common in the Black Hill than what is found today (Wiggins 2006b). In fact, employees of SDGFP used to talk about the "good old days" when they could hunt for ruffed grouse in the Southern Black Hills in and around Norbeck. One would go hungry trying to fill a bag limit of grouse today, due to lack of aspen and poor understory recruitment.

High quality ruffed grouse habitat consists of large stands of aspen in the sapling, pole-sized and mature structural stage. Aspen buds are the primary, and in most cases, the only winter food source. These buds are packed with minerals, fats, proteins and carbohydrates necessary to keep ruffed grouse alive during the winter (Bolen and Robinson 2003). One of the main limiting factors for ruffed grouse is lack of young, dense aspen stands that serve as nesting and brood rearing habitat (Wiggins 2006b).

### **Rationale for Selection**

Historic fire suppression has resulted in reduced vigor of existing aspen stands and inhibited regeneration (Parrish et al. 1996). Also, expanding ponderosa pine stands have reduced the amount of aspen as an understory component on the Forest. The combination of heavy elk browsing and conifer encroachment have reduced aspen recruitment in the central Rocky Mountains (Kaye et al. 2005); it is estimated that aspen has declined by 60 percent in the western U.S. (range: 49 percent in Colorado to 96 percent in Arizona; Bartos 2000). Aspen has declined approximately 60 percent in the Black Hills compared to historic conditions (Dale Bartos, Forest Service, Rocky Mountain Research Station, Ogden, Utah, personal communication).

Main threats to ruffed grouse habitat (Wiggins 2006b) include: "1) fire suppression, which reduces the occurrence and establishment of young aspen stands; 2) livestock/ungulate grazing, which often leads to trampled and degraded forest understories, compacted soils and the loss of aspen recruitment; and 3) perturbations (e.g., induced by logging activity) to local hydrological patterns which alter or reduce stream flow, especially during the late summer brood-rearing period.

The ruffed grouse is selected as a focus species to ensure management for hardwood habitat, and in particular, aspen. The NWP is one of the few places in the central to southern Black Hills that has continuous flowing streams and stands of aspen and birch (although many are decadent and not successfully regenerating). Additionally, there is a smaller distribution of permitted livestock grazing, which can negatively impact shrub and hardwood communities. The NWP offers the opportunity to provide quality ruffed grouse habitat if hardwood and shrub restoration activities as well as prescribed fire are re-introduced. Currently, most hardwood stands are suffering from severe pine encroachment and lack diverse structural integrity desired by ruffed grouse. And, ruffed grouse is probably a prey item for Northern Goshawk, bobcat and mountain lion.

## *Song Sparrow*

### **Habitat and Distribution**

The song sparrow breeds from Alaska across Canada to Newfoundland and south across the northern part of the United States. It is considered common in the eastern United States and locally common in the West (DeGraaf et al. 1991). In South Dakota, it is considered an uncommon and local migrant in the western part of the state (Tallman et al. 2002). The song sparrow can be found throughout the Black Hills but is primarily dependent on riparian habitat with streamside thickets and willows. Highest densities were recorded in Black Hills montane riparian habitat and to a lesser extent foothill riparian and white spruce habitat types. The spruce habitat the species was observed in usually occurred adjacent to riparian areas (Panjabi 2003). The latest estimate of riparian habitat on BHNF is about 64,000 acres. This includes riparian areas with an overstory of hardwoods or conifers. Of this acreage, about 12,000 acres have a shrub (willow) component.

BBS data shows that the species has declined on average 0.3 percent per year throughout the U.S. from 1966 to 2005. In South Dakota and the Black Hills, the species has increased by 5.7 percent and 5.1 percent per year for the same 39-year time period, respectively (Sauer et al. 2005). Highest densities in the Black Hills were located in montane riparian habitat at 42.5 birds/km<sup>2</sup> followed by foothill riparian habitat with 8.4 birds/km<sup>2</sup> (Panjabi, 2003).

### **Rationale for Selection**

The song sparrow is selected as a focus species to guide management for riparian habitat in the NWP. Encroaching ponderosa pine, and lack of disturbance from beaver activity or fire, also threaten healthy shrub and hardwood communities typically associated with riparian areas. The NWP is one of the few places in the central and southern Black Hills that has continuous flowing streams and excellent opportunities to increase song sparrow habitat. Riparian corridor management needs to be a consideration.

## *Northern Goshawk*

### **Habitat and Distribution**

This species is an uncommon to rare resident in forests of Canada, and northern and western U.S. (DeGraaf et al. 1991). They are also found in Europe and Asia. This species is considered a rare permanent resident and has been found nesting in all counties located in the Black Hills (Tallman et al. 2002).

The goshawk is often referred to as a “habitat generalist” and will prey on a variety of small birds and mammals over a wide range of forest conditions. Critical to goshawk nesting success and long-term survival is the availability of suitable nesting habitat, which is limited to dense or moderately dense stands of large diameter trees, and the availability of prey and the condition of prey habitat. Flickers, tree squirrels, rabbits, ruffed grouse and jays are likely the most important prey species. Prey species available to goshawks in the Black Hills appear similar to those in the southwestern U.S. (USDA, Forest Service 2000).

Because no single prey species is likely to be abundant enough to support goshawk populations, habitats for multiple species are necessary (Reynolds et al. 1992). Important habitat attributes include snags, downed logs, woody debris, large trees, openings, herbaceous and shrubby understories, and an intermixture of various forest vegetative structural stages (Reynolds et al. 1992). Reynolds et al. (1992) recommends 2 snags per acre (>18” DBH) and 3 large, downed logs per acre ( $\geq 8$  ft long) in ponderosa pine habitats. However, Greenwald et al. (2005) analyzed all North American radio-telemetry studies involving goshawk home range and territory habitat selectivity and found that goshawks select late successional forest types (i.e., forest types with large trees, high canopy cover and large amounts of downed wood). However, selection of areas with edge and openings were inconclusive.

The BHNH hosted a Goshawk Management Workshop (September 12-14, 2006) with Richard Reynolds (Research Biologist) and Russ Graham (Research Silviculturalist) from the Rocky Mountain Research Station. SDGFP biologist attended. The workshop was conducted on-the-ground in actual goshawk nest areas/territories and resulted in management recommendations for goshawk habitat enhancement.

Recommendations include thinning small diameter (i.e., <9 inch dbh) pine trees within a 30 acre area around known goshawk nest sites. Although the species prefers late-successional pine to nest, it also prefers an open understory. Reynolds and Graham also recommended selecting alternate future nest sites in late successional pine where treatments may include both understory and overstory removal. The overstory removal should result in retaining the largest trees on the landscape in groups/clumps with interlocking crowns. Reducing the tree density in these future alternate nest stands will provide a place to nest if current nest stands are altered through fire and/or insect infestations. Goshawk nest stands and entire territories have been lost to mountain pine beetles and stand replacement wildfires in the Black Hills. Habitat outside nest areas should be treated to benefit an array of diverse prey species. Treatments should include

meadow, hardwood and riparian restoration as well as patch clearcuts, thinning, group selection, prescribed burning and individual tree removal. Additionally, old growth and some dense forest should also be available to support those prey species that prefer that habitat type.

### **Rationale for Selection**

The NWP has some of the largest diameter trees on BHNF and provides desirable nesting habitat for this focus species. There are relatively large stands of late successional ponderosa pine forest scattered throughout Norbeck and there are six known historical territories and possibly more unknown territories. Late successional ponderosa pine at a relative dense structural stage (i.e., 4B, 4C and 5, see Appendix C) provides nesting habitat. Currently, there are 19,363 acres (72 percent) of this habitat available in the NWP. Outside the nest site, goshawk habitat includes almost anything that benefits prey species. Thus, a diverse mosaic of different structural stages as well as openings, meadows, hardwoods, riparian corridors and snags are important habitat components.

The NWP offers an opportunity to provide high quality habitat for the northern goshawk. Large stands of “yellow bark” pine are common, although the increasing density of small diameter pine within these stands may threaten existing and future nest sites. Norbeck is vegetatively diverse and has the potential to provide habitat for a number of different prey species. However, through years of fire suppression and a “hands-off” approach to vegetative management, the vast majority of this area is considered dense ponderosa pine. Those prey species that rely on open pine forests, meadows, shrubs, hardwoods and riparian areas are at risk compared to prey species that rely on a dense forest structure. The best goshawk foraging habitat provides for a number of different prey guilds and species. Having abundant and diverse prey species to select from provides goshawks more reliable foraging opportunities, which is important when certain prey species are at the low-end of a population cycle.

### ***Black-Backed Woodpecker***

#### **Habitat and Distribution**

The black-backed woodpecker (*Picoides articus*) is a species of interest because of its low population numbers across its distribution and its association with recently burned habitats (Apfelbaum and Haney 1981, Hutto 1995, Dixon and Saab 2000, Bonnot 2006). Black-backed woodpeckers are commonly associated with recently burned forests, but the variability of wildfire occurrence suggests that other habitats may also provide suitable habitat. Mountain pine beetle (*Dendroctonus ponderosae*) (MPB) infestations might provide adequate resources for nesting and foraging (Bonnot 2006).

Black-backed woodpeckers are rare permanent residents of the Black Hills (Tallman et al. 2002). Currently, the BHNF Forest Plan lists the black-backed woodpecker as a “Sensitive Species” for the Rocky Mountain Region in order to reduce the potential for such species to trend towards federal listing (USDA, Forest Service 2005). Forest Service policy directs land management to conserve habitat for Sensitive Species.

Cavity-nesting birds such as black-backed woodpeckers rely upon increased snag densities for food and nest sites (Vierling 2005). Territory selection in MPB infested stands in the Black Hills was positively associated with densities of infested trees and wood borer (*Cerambycidae* and *Buprestidae*) abundance (Bonner 2006). Distances of 35 – 75 m from MPB infested patches were selected at the territory scale and higher densities of aspen trees and pine snags positively influenced territory selection (Bonner 2006).

Managing localized areas of mountain pine beetle infestations at endemic levels could employ strategies that benefit black-backed woodpeckers and control mountain pine beetle populations to prevent catastrophic outbreaks (Bonner 2006). Vierling (2005) researched the effects of salvage pine logging on black-backed woodpecker nesting activity in the Jasper Fire area of the Black Hills and found that pre-fire canopy cover, snag density surrounding the nest tree, nest tree DBH (diameter breast height) influenced the occurrence of occupied nest trees compared to random sites. Few nests occurred within salvage logged sites and those nests that did occur were in unlogged aspen snags. Vierling (2005) concluded that black-backed woodpeckers selected clumps of snags (pine or aspen) versus snags that are evenly distributed across the landscape. Bonner (2006) suggested that logging activities in MPB infested stands should try to mimic distribution of food and nest sites to include live and dead trees and young pine snags with minimal decay.

### **Rationale for Selection**

Black-backed woodpeckers were selected because of their affinity for forest burned habitats, and fire is important in a ponderosa pine ecosystem. Typically, black-backs occur in low densities throughout their range; however, populations can irrupt following forest fires (Apfelbaum and Haney 1981, Murphy and Lehnhausen 1998, Saab and Dudley 1998). Forest fires provide increased availability of food and nesting snags which allows for increased numbers of black-backed woodpeckers. For this reason black-backs are considered as early post-fire coniferous forest obligate, reliant upon recently burned areas (Hutto 1995). Black-backed woodpeckers are primary tree cavity nesters and they also provide nesting habitat for secondary cavity nesting birds and some mammal species once they have abandoned the nest tree. Therefore, providing suitable nest tree sites for this species will also eventually provide habitat for other wildlife such as chickadees, pygmy nuthatches, and Northern flying squirrel.

The NWP has patches of MPB infestations which provide important habitat for this focus species. Future wildfires are likely and would also create future optimal habitat for this woodpecker species. Pre-disturbance tree density and canopy cover will influence the post-disturbance quality of black-backed woodpecker habitat. Post-wildfire management can also influence burned habitat quality. Distribution of snags, snag diameter, canopy cover and snag densities within both burned and MPB-killed stands should be considered for black-backed woodpeckers. Prescribed fire is a potential management tools and its utility to create black-backed woodpecker habitat is an important consideration.

Providing suitable habitat for black-backed woodpeckers will also provide habitat for many other fire- and insect-dependant species.

## **NORBECK-SECTION 2**

Section 2 is 659 acres in size and is located next to both CSP and Wind Cave National Park at Township 5 South, Range 5 East (Figure 1). There are two main habitat types; pine dominated sites are best characterized as ponderosa pine (*Pinus ponderosa*)/little bluestem (*Schizachyrium scoparium*) woodland, while the meadow and grassland sites are northern Great Plains little bluestem prairie (with *Schizachyrium scoparium*, *Bouteloua curtipendula*, *B. gracilis*, and *Carex filifolia* providing the majority of herbaceous vegetation) (see Marriott and Faber-Langendoen 2000 for detailed descriptions of each habitat type).

Norbeck-Section 2 is located in the southeastern foothills of the Black Hills at the ponderosa pine-Northern Great Plains prairie ecotone. An ecotone is a boundary between vegetation groups where environmental conditions can change enough to provide certain species advantages over others (Brown and Sieg 1999). For example, the removal of natural fire through suppression efforts over the last 100+ years has resulted in ponderosa pine taking over grasslands. Brown and Sieg (1999) conducted research in this ecotone to determine the fire history. The mean fire interval between 1564 and 1896 was approximately 12 years (range: 3-32 years), which would have maintained meadows and grass sites as well as provide savannah and open pine forest habitats. The last large scale fire recorded in Section 2 and some portions of Wind Cave National Park was in 1881 (Brown and Sieg 1999). Neighboring CSP and adjoining BHNF outside Section 2 have either experienced fairly recent large-scale wildfires (Galena 1988, Cicero Peak 1990) or prescribed fires in Wind Cave National Park which have reduced or temporarily removed dense pine stands (stand replacement fires) adjacent to Section 2.

Game animals and birds focus species selected to guide management in Section 2 represent species that utilize extensive grasslands, open ponderosa pine stands and less common habitats such as shrubby draws, hardwoods, riparian and burned-over areas (Table 2). Additionally, a detailed species-specific habitat analysis and rationale for selection is provided. Refer to species analysis under previous section for elk, Merriam’s turkey, mountain bluebird, black-backed woodpecker and song sparrow. Appendix B lists species not selected and rationale.

**Table 2.** Focus species list to guide management direction in Section 2 of the Norbeck Wildlife Preserve.

<b>SPECIES</b>	<b>HABITAT DESCRIPTION</b>
<b>Game Animals</b>	
Mule Deer ( <i>Odocoileus hemionus</i> )	Occupy many habitat types to include grasslands, shrublands, riparian areas (Higgins et al. 2000). Escape cover includes rugged country, canyons, woody draws.
Rocky Mountain Elk ( <i>Cervus elaphus</i> )	Found in a variety of habitats such as coniferous forests, meadows, and forest edge (Higgins et al. 2000). Prefers limited human contacts and avoids motorized areas.

Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Short-grass and mixed-grass prairies. (Higgins et. al. 2000). Will clip vegetation to maintain low structure.
Merriam's Turkey ( <i>Meleagris gallopavo merriami</i> )	Uses a variety of habitats. Winter habitat consists primarily of ponderosa pine with greater basal area composed of mature trees. Open pine stands and meadows with sufficient ground vegetation provide good summer habitat (Lehman 2005, Rumble and Anderson 1993). Primarily use large pine for roost trees.
<b>Birds</b>	
Mountain Bluebird ( <i>Sialia currucoides</i> )	Open ponderosa pine forest intermixed with grasslands, shrubs, burned areas and snags that serve as nesting cavities (Wiggins 2006).
Grasshopper Sparrow ( <i>Ammodramus savannarum</i> )	Found almost exclusively in native mixed-grass prairies (Panjabi 2003), generally in grass structure higher than what is found on prairie dog town.
Song Sparrow ( <i>Melospiza melodia</i> )	Streamside thickets, particularly shrubby willows, are required for habitat. Occasionally found in adjacent spruce habitat (Panjabi 2003).
Black-backed Woodpecker ( <i>Picoides articus</i> )	Occurs most frequently in recently burned habitat (Vierling 2005), to a lesser extent in mountain pine beetle infested pine stands (Bonnet 2006), and at lower densities in other forest types including late-successional pine forest and snag habitat. Year-round resident.

## Mule Deer

### Habitat and Distribution

The Black Hills deer population is comprised of approximately 75 percent white-tailed deer and 25 percent mule deer (Parrish et al. 1996). Throughout much of the Black Hills, there is not a clear habitat distinction between the two species and their ranges overlap in many areas (Parrish et al. 1996). Mule deer tend to inhabit more open, rugged habitat and are more abundant in the southern Black Hills of South Dakota and Wyoming, where open, rocky habitat is more prevalent (Sieg and Severson 1996).

Black Hills mule deer populations have fluctuated with an estimated population of 13,000 in 1999 to 10,000 in 2001 to 14,000 in 2005 (Huxoll 2006). Habitat trend at the Forest-level suggests that summer habitat has increased while winter habitat has remained relatively stable to slightly decreasing (USDA, Forest Service 2004).

During the 20<sup>th</sup> Century, fire suppression, livestock grazing, urban development, migration barriers and silvicultural treatments affected mule deer forage (deVos et al. 2003). Within Norbeck-Section 2, ponderosa pine has encroached into meadows, shrublands and grasslands and has become dense with high canopy closure and little understory. Management recommendations for mule deer include (deVos et al. 2003):

- Re-introduce fire or controlled burns to restore ecosystem functions.
- Adjust cattle numbers to provide for stubble heights in meadows and riparian areas at 3.9-5.9 inches for those in excellent condition and 5.9-7.8 inches in areas considered good condition. Areas in poor condition should be rested.
- Mitigate roads and other developments.
- Manage for early successional habitats in forested areas as well as thinning pole-sized stands.
- Use prescribed fire to restore meadows and promote grasses, forbs and shrubs.

- Protect and restore hardwoods.
- Protect riparian areas from overuse by domestic and wild ungulates.
- Manage for and regenerate aspen stands.
- Manage for a diversity of key plants, including forbs.

### **Rationale for Selection**

Mule deer prefer more open, isolated habitats of the southern Black Hills but this habitat type is becoming rare after 100+ years of fire suppression and lack of pine removal in Section 2. Mule deer favor early successional stage habitat for foraging (deVos et al. 2003) and Section 2 corresponds to a historically open ponderosa pine forest with large meadows and grassy openings that were maintained through fire (Brown and Sieg 1999). The entire Section 2 is closed to motorized travel and grazing is kept to a minimum (usually only two-weeks per year). Thus, residual grasses and forbs after livestock have grazed are in relatively good condition. Encroaching ponderosa pine can quickly reduce the amount of available forage in meadows and natural openings within forested sites. As ponderosa pine increases, understory vegetation declines. This is especially important since grasses and forbs are the first to decline and in some cases, completely disappear from the landscape as pine takes-over an area (Uresk and Severson 1998). Mule deer are a prey item for mountain lions and probably for bobcats. Mule deer are an excellent focus species for this southern Black Hills habitat type.

### ***Black-tailed Prairie Dog***

#### **Habitat and Distribution**

Black-tailed prairie dogs are associated with short and mixed-grass prairies (Higgins et al. 2000). Suitable prairie dog habitat on the Black Hills National Forest is limited to non-rocky grassland soils on the Hell Canyon Ranger District, which constitute a fraction of the 110,000 acres of grasslands on the Forest. Based on 2006 monitoring data, the Forest currently has approximately 472 acres of occupied black-tailed prairie dog habitat consisting of 13 active colonies, the largest being 173 acres in size (Hell Canyon Ranger District, unpublished data). All of the prairie dog colonies on the Forest occur within grazing allotments; black-tailed prairie dogs were found to be more abundant in heavily grazed areas than in un-grazed areas in southwestern South Dakota (Uresk et al. 1982). Prairie dogs prefer short grass and denuded areas and will clip all vegetation to achieve visual observation.

Historically, black-tailed prairie dog colonies were common in the prairies from Canada to Mexico and from the eastern edge of the Rocky Mountains to the western edge of the tallgrass prairie (Hoogland 2006). However, prairie dogs have been subjected to major population control efforts by humans and as a result, have been extirpated from as much as 98 percent of their historic range (Biggens et al. 2006). The historic available habitat (i.e., total potential habitat within the range, not occupied habitat) estimate for this species based on the Bailey Eco-region model is 368,308,727 acres (Luce 2003), compared to the current habitat estimate of 1,558,337 acres (Luce 2004), a 99.6% decrease. Population and habitat reductions are mainly the result of control efforts by humans; livestock producers and land developers perceive prairie dogs as competitors for

resources. South Dakota has recently completed its aerial surveys and management plan for the black-tailed prairie dog. There is currently an estimated 411,425 acres of occupied habitat and of that, 216,750 acres are located on tribal lands while 194,673 acres are located on non-tribal lands. The acreage goal for the state's management plan is to maintain 166,958 acres on non-tribal lands (SDGFP 2005). There are approximately 300-500 acres of prairie dogs scattered in relatively small colonies within CSP and 2,200 acres of occupied habitat in 16 colonies throughout Wind Cave National Park (National Park Service 2006).

### **Rationale for Selection**

There is a 13-acre prairie dog colony located in the southeast corner of Section 2. This colony is actually part of a larger colony located on both CSP and Wind Cave National Park. The combination of livestock grazing, removal of pine encroaching into the meadow and future prescribed burning may facilitate colony expansion within the area (Milne-Laux and Sweitzer 2006). The prairie dog is selected as a focus species for Norbeck Section 2 because it can be hunted and is part of a larger colony that stretches onto Wind Cave and CSP. Wind Cave National Park may serve as a future black-footed ferret (*Mustela nigripes*) reintroduction site (US Fish and Wildlife Service 2006). Black-footed ferrets are totally dependent on prairie dogs for food and they use their burrows for shelter and raising young. Any additional prairie dog habitat on adjacent National Forest System land will help not only the black-footed ferret but also other rare species tied to the prairie dog ecosystem such as the burrowing owl (*Athene cunicularia*) and Ferruginous hawk (*Buteo regalis*).

### ***Grasshopper Sparrow***

#### **Habitat and Distribution**

Grasshopper sparrows breed from southern Canada to south-central Texas, and from California east to Maine and Georgia. They winter from central California and southern Arizona to Tennessee and North Carolina south to Central America (DeGraaf et al. 1991). It is considered a locally common migrant and summer resident for South Dakota (Tallman et al. 2002).

The grasshopper sparrow is found in a variety of open grassland types, but appears to be area sensitive, preferring grasslands >20 acres in size (Slater 2004). It may select larger patches to avoid predation associated with edge habitats (Slater 2004). In South Dakota, it is primarily found in mixed-grass prairies and avoids habitats with vegetation less than 4 inches (Slater 2004). It requires some areas of bare ground for foraging and some taller vegetation (tall grasses, forbs, or scattered shrubs) for singing perches (Slater 2004). Grasshopper sparrows can be locally abundant in some prairies, especially where there is a greater proportion of tall grass (Panjabi 2005). It typically avoids areas with  $\geq 35$  percent shrubs, but will tolerate some scattered trees. This species nests on the ground, usually at the base of a clump of vegetation. It eats primarily insects by gleaning from the ground, but is known to take spiders, seeds and snails (DeGraaf et al. 1991).

BBS data shows an average decline of 3.7 percent per year in the U.S. for grasshopper sparrows between 1966 and 2005. In South Dakota and the Black Hills, the declines are 4.7 percent and 4.8 percent per year for the same 39-year period, respectively (Sauer et al. 2005). Population declines have been attributed to habitat loss by urbanization, conversion of native grasslands to croplands and intensive livestock grazing (Slater 2004). Grasshopper sparrows have been monitored on BHNF since 2002 in cooperation with the RMBO (Panjabi 2003, 2005). It occurs widely in native mixed-grass prairies in the southern Black Hills and locally farther north in the central Black Hills (Panjabi 2005). Monitoring results from 2004 showed the species was found almost exclusively in mixed-grass prairie habitat with a density of 38.4 birds/km<sup>2</sup> - although three individuals were observed in the Jasper Burn Area.

### **Rationale for Selection**

The grasshopper sparrow is selected as a focus species for Norbeck-Section 2 in order to maintain the historically open structure of this parcel, especially the 315 acre mixed-grass meadow. Pine encroachment has the greatest potential to reduce habitat for this species. Grasshopper sparrows generally prefer large grassland patches (Johnson and Igl 2001). Although the general theme for grasshopper sparrow habitat is mixed grass prairie, this may conflict with another focus species for this part of Norbeck, the black-tailed prairie dog. Prairie dogs typically maintain the vegetative structure at a lower than desired level (i.e. <4 inches) for grasshopper sparrows. A comparison of avian species between prairie dog colonies and uncolonized sites in Oklahoma showed that grasshopper sparrows were found most often in open rangeland off nearby prairie dog colonies (Smith and Lomolino 2004). Since only 13 acres of prairie dog habitat currently exists in Section 2, it is unsure how that population will respond to future treatments, primarily the removal of encroaching pine. The colony could expand to occupy all open range in the area – if so, then habitat for the grasshopper sparrow will be limited. If expansion is minimal or even moderate, then grasshopper sparrows will more than likely still use adjacent uncolonized grassland.

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**APPENDIX A: South Dakota Game Mammals and Birds**  
**Game Mammal and Bird Species Listed in the 2006 South Dakota**  
**Department of Game, Fish and Parks Hunting and Trapping Handbook**  
**and/or Defined in South Dakota Codified Law 41-1-1.**

Status indicates federal and/or state threatened and endangered listing or if the species is legally hunted (H) or trapped (T). Final column indicates if the main portion of the Norbeck Wildlife Preserve (excluding Section 2 unless indicated otherwise) is highly likely to be a “breeding place therefor.” (See **Criteria 2**). Species range information from Higgins et al. (2000) and Turner (1974).

<b>SPECIES</b>	<b>STATUS</b>	<b>BREED IN NWP</b>
<b><u>Birds:</u></b>		
Ducks (Family Anatidae)	H	No
Geese (Family Anatidae)	H	No
Bald eagle <i>Haliaeetus leucocephalus</i>	LT ST	Possible Winter Resident
Osprey <i>Pandion haliaetus</i>	ST	No-closest Stockade Lake
Peregrine falcon <i>Falco peregrinus</i>	SE	No
Grouse		
Ruffed Grouse <i>Bonasa umbellus</i>	H	Yes
Sharp-tailed <i>Tympanuchus phasianellus</i>	H	Possible both portions
Gray Partridge <i>Perdix perdix</i>	H	No
Ring-necked Pheasant <i>Phasianus colchicus</i>	H	No
Coot <i>Fulica Americana</i>	H	No
Whooping crane <i>Grus americana</i>	LE SE	No
Sandhill Crane <i>G. canadensis</i>	H	No
Piping plover <i>Charadrius melodus</i>	LT ST	No
Eskimo curlew <i>Numenius borealis</i>	LE SE	No
Snipe <i>Gallinago gallinago</i>	H	No
Interior least tern <i>Sterna antillarum athalassos</i>	LE SE	No
Mourning Dove <i>Zenaida macroura</i>	H	Yes
Eurasian Collared Dove <i>Streptopelia decaocto</i>	H	Possible
Rock dove (pigeons) <i>Columba liva</i>	H	Possible
American Crow <i>Corvus brachyrhynchos</i>	H	Yes
American dipper <i>Cinclus mexicanus</i>	ST	No
European Starling <i>Sturnus vulgaris</i>	H	Possible
Blackbirds (only upon determination of depredation)		
Grackles (only upon determination of depredation)		
English house sparrow	H	Possible
<b><u>Mammals:</u></b>		
Opossum <i>Didelphis virginiana</i>	H, T	No
Cottontail Rabbit		
Desert <i>Sylvilagus audubonii</i>	H	No
Mountain <i>S. nuttallii</i>	H	Yes

*FOCUS SPECIES - NORBECK WILDLIFE PRESERVE*

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Eastern <i>S. floridanus</i>	H	Yes
Jackrabbit		
White-tailed <i>Lepus townsendii</i>	H, T	Yes
Black-tailed <i>L. californicus</i>	H, T	No
Yellow-bellied Marmot <i>Marmota flaviventris</i>	H, T	Yes
13- Lined Ground Squirrel	H, T	Yes
<i>Spermophilus tridecemlineatus</i>		
Black-tailed P. Dog <i>Cynomys ludovicianus</i>	H, T	No (Only Sec. 2)
Tree Squirrels		
Red <i>Tamiasciurus hudsonicus</i>	H	Yes
Eastern Fox <i>Sciurus niger</i>	H	Possible
Chipmunk <i>Tamias minimus</i>	H	Yes
Gopher		
No. Pocket <i>Thomomys talpoides</i>	H, T	Yes
Plains Pocket <i>Geomys bursarius</i>	H, T	Possible
Beaver <i>Castor canadensis</i>	H, T	Yes
Muskrat <i>Ondatra zibethicus</i>	H, T	Possible
Porcupine <i>Erethizon dorsatum</i>	H, T	Yes
Coyote <i>Canis latrans</i>	H, T	Yes
Gray wolf <i>Canis lupus</i>	LE	No
Fox		
Red <i>Vulpes vulpes</i>	H, T	Yes
Gray <i>Urocyon cinereoargenteus</i>	H, T	No
Swift <i>Vulpes velox</i>	ST	No
Black bear <i>Ursus americanus</i>	ST	No
Raccoon <i>Procyon lotor</i>	H, T	Yes
American Marten <i>Martes americana</i>	Protected	Yes
Weasel		
Short-tailed <i>Mustela erminea</i>	H, T	Yes
Long-tailed <i>Mustela frenata</i>	H, T	Yes
Least <i>Mustela nivalis</i>	H, T	Yes
Black-footed ferret <i>Mustela nigripes</i>	LE SE	No
Mink <i>Mustela vison</i>	H, T	Yes
Badger <i>Taxidea taxus</i>	H, T	No (possible Sec. 2)
Skunk		
Spotted <i>Spilogale putorius</i>	H, T	No
Striped <i>Mephitis mephitis</i>	H, T	Yes
Northern river otter <i>Lutra canadensis</i>	ST	No
Bobcat <i>Felis rufus</i>	H, T	Yes
 <b><u>Big Game:</u></b>		
Mt. Lion <i>Felis concolor</i>	H	Yes
Wild Turkey <i>Meleagris gallopavo</i>	H	Yes
Elk <i>Cervus elaphus</i>	H	Yes
White-tailed deer <i>Odocoileus virginianus</i>	H	Yes
Mule deer <i>O. hemionus</i>	H	Yes

Pronghorn antelope <i>Antilocapra Americana</i>	H	Possible
Bighorn sheep <i>Ovis Canadensis</i>	H	Yes
Mountain goat <i>Oreamnos americanus</i>	H	Yes

**KEY TO CODES:**

LE = Federal Endangered  
LT = Federal Threatened  
SE = State Endangered  
ST = State Threatened  
T = Trapped / furbearer  
H = Hunted

**DEFINITION OF TERMS, LICENSE REQUIREMENT:**

**Big Game (SDCL 41-1-1 (4))** All cloven-hoofed wild animals, mountain lion, and wild turkey.

Hunting and trapping handbooks states that a license is required to hunt elk, bighorn sheep, mountain lion, mountain goat, white-tailed deer, mule deer, wild turkey, pronghorn antelope. See SDCL 41 for several more laws regarding big game.

**Fur-Bearing Animals (SDCL 41-1-1 (11))** opossum, muskrat, beaver, mink, marten, black-footed ferret, skunks (all species), raccoon, badger, red, grey and swift fox, coyote, bobcat, lynx, weasel, and jackrabbit.

Hunting and trapping handbook states that a license is required to **trap** coyote, red fox, gray fox, raccoon, badger, bobcat, opossum, mink, weasel, beaver, skunk and muskrat; **and is required to hunt** bobcat, opossum, mink, weasel, beaver and muskrat.

**Hunt or Hunting (SDCL 41-1-1 (14))** shooting, shooting at, pursuing, taking, attempting to take, catching, or killing of any wild animal or animals. (Note: SDCL 41-8-31 makes it illegal to take most animals other than shooting.)

**Hunting methods restricted--Violation as C2 misdemeanor (SDCL 41-8-31)** No person may at any time hunt, catch, take, attempt to take, or kill any *small game or game animal in any other manner than by shooting* the same with a firearm, except:  
(1) Game birds and animals may be taken with birds trained in falconry or with bow and arrow; (2) A disabled person who is missing an upper limb, physically incapable of using an upper limb, or confined to a wheelchair and who has obtained a disabled hunter permit may use a crossbow to take game birds and animals; and (3) A legally blind person, who is legally licensed, possesses a disabled hunter permit, and is physically present and participates in the hunt but cannot safely discharge a firearm or bow and arrow, may claim game birds and animals taken by a designated hunter in accordance with the license possessed by the legally blind hunter.

**Predator/Varmint (SDCL 41-1-1(21))** coyote, gray fox, red fox, skunk, English house sparrow, European starling, gopher, ground squirrel, chipmunk, jackrabbit, marmot, unbanded undomesticated pigeon (rock dove), porcupine, crow, and prairie dog.

Hunting and trapping handbook states that a license is needed to hunt coyote, red fox, gray fox, skunk, raccoon, badger, prairie dog, gopher, crow, jackrabbit, ground squirrel, porcupine and marmot. (Note: SDCL also defines chipmunk, English house sparrow, European starling, rock dove (pigeon))

**Small Game (SDCL 41-1-1 (24))** Anatidae, commonly known as swans, geese, brants, merganser, and river and sea ducks; the rallidae, commonly known as rails, coots, and gallinule; the limicolae, referring specifically to shore birds, plover, snipe, and woodcock; the gruidae, commonly known as sandhill crane; the columbidae, commonly known as the mourning dove; the gallinae, commonly known as grouse, prairie chickens, pheasants, partridges, and quail but does not include wild turkeys; cottontail rabbit; and fox, grey and red squirrel.

Hunting and trapping handbook states that a license needed to hunt all except cannot shoot shore birds and plover. Small Game license also needed to shoot American crow, prairie dog, ground squirrels, gopher, porcupine, marmot, coyote.

**Trapping (SDCL 41-1-1 (25))** The taking or the attempting to take of any wild animals by means of setting or operating of any device, mechanism, or contraption that is designed, built, or made to close upon, hold fast, or otherwise capture a wild animal or animals. If the word, trap, is used as a verb, it has the same meaning as the word, trapping. *Trapping is only authorized for furbearing animals and those listed in 41-6-23 and predator/varmint, it is not legal to trap cottontails or other small game animals.*

**Trapping of fur-bearing animals prohibited except as authorized--Violation as misdemeanor (SDCL 41-8-19)** Except as authorized by chapter 41-6, no person may set or operate any trap, hunt, catch, take, trap, or kill any fur-bearing animal. A violation of this section is a Class 2 misdemeanor.

**Fur-bearing animal hunting and trapping license--Privileges--Activities for which license not required--Violation as misdemeanor (SDCL 41-6-23)** Except as provided in this section, it is a Class 2 misdemeanor for a resident to hunt, take, kill, or trap fur bearing animals without a license to take fur bearing animals or in violation of the conditions of the license or the rules of the Game, Fish and Parks Commission.

A license to take fur-bearing animals permits the resident licensee to set or operate a trap or traps, hunt, catch, take, trap, or kill fur-bearing animals, except the black-footed ferret, to the extent and in the manner provided in §§ 41-8-20 to 41-8-26, inclusive.

A license to take fur-bearing animals is not required for residents to hunt raccoon, skunk, badger, jackrabbit, fox, and coyote with firearms. A license to take fur-bearing animals is not required for residents to trap raccoon, skunk, badger, jackrabbit, fox, and coyote between April first and August thirty-first.

## APPENDIX B: Rationale for Species Not Selected

Rationale for why certain species were not selected as focus species for NWP. Not all species that could possibly occur in NWP were considered.

Species	Rationale for Non-Selection
<b>Federal / State Threatened and / or Endangered Species Considered</b>	
Bald Eagle <i>Haliaeetus leucoccephalus</i>	Federally and State Threatened. Black Hills winter resident. Possible winter use in Norbeck. Uses many habitats during winter, but mostly tied to carrion along roads and in other areas and/or open water for fishing. Will congregate near frozen lakes to scavenge fish parts left by fishermen. Winter roost sites typically consist of clusters of large trees associated with food sources such as waterfowl or fish. Tend to use same roosts each year and no known roost sites exist in or immediately adjacent to Norbeck. Not selected because habitat relationships (Criteria 3) not closely tied to the target habitats (Criteria 6).
Osprey	State Threatened. Summer resident. Center Lake in a roost tree, Stockade Lake in CSP has an artificial platform but birds have not successfully nested to our knowledge – these birds are now nesting in Bismarck Lake area.. Eat primarily fish and ducks. No confirmation but possible pair at Sylvan Lake in CSP but no nest was found. Not selected because habitat relationships (Criteria 3) associated with lakes and streams are not closely tied to the target habitats (Criteria 6). No roost trees adjacent to water would be removed.
Peregrine falcon	State Endangered. No known nests or confirmed sightings (Criteria 2,3).
<b>Forest-wide Management Indicator Species Considered</b>	
Beaver <i>Castor canadensis</i>	Can be legally hunted and trapped. Occurs in Norbeck at lower elevations in low gradient streams. Not selected because there are limited opportunities to increase beaver habitat due to the narrow, steep streams in Norbeck.
<b>Region 2 Sensitive Species Considered</b>	
American Marten <i>Martes americana</i>	Not currently trapped or hunted (Criteria 1). High quality marten habitat in the Black Hills consists of white spruce with >50% canopy cover, tree diameter >9 inches, within 100 m from a stream and >5,200 feet in elevation. Mature spruce requirements better represented by selection of Golden-crowned kinglet. If ever legally harvested, could be reconsidered if necessary. Forest Plan standards and guidelines for marten will be considered in all vegetation activities. No spruce stands will be removed. Considerable down material exists in NWP and provides winter / subnivean habitats. Fescke (2003) predicted marten habitat and the model demonstrated that the majority of primary habitat in the Southern Hills is located within the Black Elk Wilderness.
Flammulated Owl <i>Otus flammeolus</i>	Only one documented and one likely sighting recorded on BHNF. Not selected because occurrence is not confirmed (Criteria 2).
Burrowing Owl <i>Athene cunicularia</i>	Generally associated with prairie dog towns, which are limited to approximately 472 acres on the BHNF. Possible habitat in Norbeck-Section 2 (i.e., 13 acre prairie dog colony, which is actually part of a larger colony that spills-over onto Custer State Park and Wind Cave National Park). Not selected because no burrowing owls have been observed in Section 2 during monitoring surveys over the last two years (Criteria 2). If burrowing owls colonize Section 2 and become abundant, could be reconsidered if necessary.
Lewis' Woodpecker <i>Melanerpes lewis</i>	Prefers open canopy forest with well-developed understory. May colonize burned areas. This species may serve as an indicator for open, older burned habitat with larger snags. Not selected because it is not tied to as many habitat types (Criteria 6) as mountain bluebird.

*FOCUS SPECIES - NORBECK WILDLIFE PRESERVE*

<b>Species</b>	<b>Rationale for Non-Selection</b>
American Three-Toed Woodpecker <i>Picoides dorsalis</i>	Recent monitoring efforts have not shown a close tie to recently burned habitat, which is contrary to other Western reports, so this species was not selected as a focus species for burned habitat. Instead, it is closely tied to spruce habitat in the Black Hills. However, not selected as a focus for spruce habitat because the golden-crowned kinglet is more effectively monitored for spruce (Criteria 5, 6).
<b>Species of Local Concern Considered</b>	
Northern Flying Squirrel <i>Glaucomys sabrinus</i>	Cannot be legally hunted (Criteria 1) and primarily nocturnal. So far, preliminary research shows they are cavity nesters in aspen, birch and snags, not in live pine. Will forage in pine. Will travel through both open canopy and closed and shrubby habitats. Its habitat associations are currently being researched but data is not conclusive at this time to guide management (Criteria 3, 5). Not easily trapped and difficult to monitor (Criteria 5).
Sharp-Shinned Hawk <i>Accipiter striatus</i>	Forest habitat generalist. Inadequate habitat associations (Criteria 3).
Cooper's Hawk <i>Accipiter cooperii</i>	Forest habitat generalist. Inadequate habitat associations (Criteria 3).
Broad-Winged Hawk <i>Buteo platypterus</i>	Migratory. Inadequate habitat associations (Criteria 2,3) in the Norbeck area. While normally associated with Eastern hardwood forests, in its western-most range in the Northern Hills, closely tied to mixed conifer-hardwood sites at high elevations.
Northern Saw-Whet Owl <i>Aegolius acadicus</i>	Cavity nester, presumed resident but that has not been confirmed. They are found in a variety of forest types throughout their range. Roosting habitat tends to be denser than nesting habitat. Foraging also occurs in a variety of habitats. Generalized habitat needs may limit the utility to guide management activities (Criteria 3, 4). Goshawk better representative for small mammal prey.
American Dipper <i>Cinclus mexicanus</i>	Range is limited on BHNH to Northern Black Hills watersheds. Not known to breed/occupy Norbeck Wildlife Preserve (Criteria 2).
Pygmy Nuthatch <i>Sitta pygmaea</i>	Habitat relationships unclear (Criteria 3,6): may prefer open forests; but also undisturbed, late-successional forests, which tend to grow dense in the Black Hills in the absence of disturbance. Secretive (Criteria 5) and after 5 years of monitoring (RMBO 2001-2005), a total of 10 pygmy nuthatches were recorded in a variety of habitats across the entire forest: northern Hills ponderosa pine, southern Hills ponderosa pine, shrublands, late successional, white spruce and burned over areas. Brown Creeper better represents late-successional conifer forests.
Black and White Warbler <i>Mniotilta varia</i>	Inadequate information on presence in Norbeck and habitat associations unclear (Criteria 2, 3).
Loggerhead Shrike <i>Lanius ludovicianus</i>	Grassland edge species with poorly defined habitat limitations (Criteria 3,6).
<b>Other Species Considered</b>	
American Bison <i>Bos bison</i>	Does not occur in Norbeck Wildlife Preserve (Criteria 2). Forest Plan Standard 5.4A-3204 specifically directs the Forest not to introduce bison in Management Area 5,4A (Norbeck Wildlife Preserve). Not a game species outside of CSP (Criteria 1).
Mountain Cottontail Rabbit <i>Sylvilagus nuttallii</i>	Can be legally hunted. Habitat generalist and may use meadows, downed wood, and shrub habitat (Criteria 6), but habitat relationships (Criteria 4) are not documented or as well known as white-tailed deer, elk, mt. bluebird and song sparrow. A prey item for goshawk, which is a better representative to guide management for a wider range of habitat types (Criteria 6).
Eastern Cottontail Rabbit <i>S. floridanus</i>	Can be legally hunted. Habitat generalist and may use meadows, downed wood, and shrub habitat (Criteria 6), but habitat relationships (Criteria 4) are not documented or as well known as white-tailed deer, elk, mt. bluebird and song sparrow. A prey item for goshawk, which is a better representative to guide management for a wider range of habitat types (Criteria 6).

*FOCUS SPECIES - NORBECK WILDLIFE PRESERVE*

<b>Species</b>	<b>Rationale for Non-Selection</b>
White-tailed Jackrabbit <i>Lepus townsendii</i>	Can be legally hunted. Would not be a common resident in the Main Section and unclear how common it occurs in Section 2 (Criteria 3,6). Grasshopper sparrow and prairie dogs represent the high and low structure grasslands.
Yellow-bellied Marmot <i>Marmota flaviventris</i>	Can be legally hunted. Habitats tied to rock piles or tallus slopes with adjacent meadows or abundant understory vegetation. Not selected because specific habitat requirements unknown (Criteria 3) and rocky areas are not a target habitat (Criteria 6) that would be impacted by treatments.
Eastern Fox Squirrel <i>Sciurus niger</i>	Can be legally hunted. Habitats tied to mature stands of bur oak and other hardwoods but no specific studies have been conducted in the Black Hills. Oak in the Southern Hills mostly in smaller inclusions and being invaded by pine. Where pine occurs, will have red squirrels, which can outcompete fox squirrels when habitats overlap. Not selected because of unclear habitat relationships (Criteria 3) and where oak occurs in treatment areas, consideration will be given to remove pine and favor oak. Consideration will be given to squirrel caches and middens.
Red Squirrel <i>Tamiasciurus hudsonicus</i>	Can be legally hunted. Uses a variety of habitats including dense conifer forest and snags. A prey item for goshawk, which is a better representative to guide management for a wider range of habitat types (Criteria 6). Consideration will be given to squirrel caches and middens.
Red Fox <i>Vulpes vulpes</i>	Can be legally hunted and trapped. Not abundant in the dense conifer forest, especially where coyote are more common. No studies or data exists for the Southern Black Hills. Unclear relationships with target habitats (Criteria 3,6)
Mink <i>Mustela vison</i>	Can be legally hunted and trapped. While tied to riparian habitats, specific habitat relationships are not defined with target habitats (Criteria 4, 6).
Weasels Short-tailed <i>Mustela erminea</i> Long-tailed <i>M. frenata</i> Least <i>M. nivalis</i>	Can be legally hunted and trapped. No studies have been conducted in the Black Hills. Unclear relationships with target habitats (Criteria 3,5,6).
Badger <i>Taxidea taxus</i>	Can be legally hunted and trapped. Not found in Norbeck Main Section (Criteria 2) and possible occurrence in Norbeck Section 2. No badgers have been recorded for Section 2 (Criteria 2).
Coyote <i>Canis latrans</i>	Can be legally hunted and trapped. Ubiquitous. Found in almost every type of habitat. As a habitat generalist it does not lend guidance towards better habitat management in Norbeck (Criteria 1,6).
Mountain Lion <i>Felis concolor</i>	Can be legally hunted. Limiting factor may be prey presence rather than habitat. Has large territory and home ranges (Criteria 5) thus large portions of territories could be outside of Norbeck (Criteria 2,4). Norbeck already provides solitude from motorized vehicles and seclusion which will not change with management. It is more logical to use deer, elk, mountain goats and bighorn sheep to guide management because habitat relationships are better known.
Bobcat <i>Felis rufus</i>	Can be legally hunted and trapped. No studies have been conducted on bobcat habitats in the Black Hills. First study began in Wind Cave NP in 2006/07 but no data available at this time. Generalist and assume prey to be small mammals, turkey and deer. Therefore, it was not selected because of the unclear relationships with target habitats (Criteria 3,5,6).
Northern Flicker <i>Colaptes auratus</i>	A cavity nester that prefers large trees in open areas. Densities in the Black Hills appear to be greatest in burned areas but the species can also be found in every other habitat type within the forest. May be a good species for burned area (Criteria 6), but mountain bluebird is a better representative to guide management in a number of other habitat types (Criteria 6).
Red-naped Sapsucker <i>Sphyrapicus nuchalis</i>	Closely associated with aspen stands. Preferred nesting habitat is mature and late-successional aspen. Migratory. Red-naped sapsucker may not represent availability and vigor of young aspen as well as ruffed grouse (Criteria 6).

*FOCUS SPECIES - NORBECK WILDLIFE PRESERVE*

<b>Species</b>	<b>Rationale for Non-Selection</b>
Hairy Woodpecker <i>Picoides villosus</i>	Appears to be a generalist and not useful to guide management activities (Criteria 3,6).
Red-Breasted Nuthatch <i>Sitta canadensis</i>	Often associated with mature conifer habitat but can be found in a wide variety of habitats on the BHNF. Ambiguous habitat associations may limit the utility to guide management activities (Criteria 3,6).
White-breasted nuthatch <i>Sitta carolinensis</i>	Is a habitat generalist that uses mature deciduous forest as well as coniferous forest. Generality of habitat associations may limit the utility to guide management activities (Criteria 3).
Yellow-rumped Warbler <i>Dendroica coronata</i>	Has generalized habitat needs, which may limit the utility to guide management activities (Criteria 3). Practices designed for other coniferous forest species would likely benefit this species.
MacGillivray's Warbler <i>Oporornis tolmiei</i>	A riparian dependent species. Sensitive to disturbances in riparian areas, but habitat threats on the winter range are extensive compared to threats on its breeding range. Habitat needs not studied in the Black Hills (Criteria 3,6). Song sparrow a better representative for brushy riparian habitats.
Warbling Vireo <i>Vireo gilvus</i>	Although closely associated with aspen on the BHNF it is also common in a variety of pine structural stages. It is tolerant of ecological change and neutral to understory condition (Criteria 3,6). Migratory. Would likely only provide feedback on aspen quantity. Ruffed grouse is a better representative to guide management for aspen quality and quantity.
Ruby-Crowned Kinglet <i>Regulus calendula</i>	Closely associated with spruce throughout most of its range in the Rocky Mountains, and possibly the BHNF. Migratory and winter range conditions outside the Black Hills may be more limiting to breeding populations. Unclear habitat requirements (Criteria 3,6).
Vesper Sparrow <i>Pooecetes gramineus</i>	Primarily occupies mixed-grass prairie habitat in the central and southern Black Hills. Meadow/grass sites provide some limited habitat. Not selected because mountain bluebird uses more habitat types (meadow, snags, burned habitat, Criteria 3,6) and grasshopper sparrow has narrower habitat relationships for grassland habitat.
White-crowned sparrow <i>Zonotrichia leucophrys</i>	Prefers woodlands, thickets, groves and weedy fields. Habitat relationships are not well defined (Criteria 3,6).
Long-billed Curlew <i>Numenius americanus</i>	Would not be a common resident in the Main Section and unclear how common it occurs in Section 2 (Criteria 3,6). Grasshopper sparrow and prairie dogs already represent the high and low structure grasslands.

## APPENDIX C: Region 2 Habitat Structural Stages for Ponderosa Pine

Code	Structural Stage	Tree Size Class	Diameter Range	Crown Cover %
1	Grass-forb	Nonstocked		0-10
2	Shrub/seedling	Established	Less than 1 inch	11-100
3A	Sapling-pole	Small, medium	Mostly 1-9 inch	11-40
3B				41-70
3C				71-100
4A	Mature	Large, very large	Mostly 9 inches And larger	11-40
4B				41-70
4C				71-100
5	Old Growth	Large, very large	Varies	

For structural stage 5, standard attributes are displayed in Mehl (1992). For illustrations of the physical characteristics of old ponderosa pine trees reference Huckaby et al. (2003a and 2003b). General physical characteristics of Front Range old ponderosa pine can be considered similar to Black Hills old ponderosa pine. (Table taken from USDA, Forest Service. 2006).