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## **THE EXISTING ENVIRONMENT**

### **Soil Resources**

The Sand Hills makes up the northeastern extension of the Kill Pecker Dunes. This massive dune complex originates from the Big Sandy and Little Sandy creeks located at the southern end of the Wind River Mountains. Here in central Wyoming the dunes have stabilized, becoming the foundation for this unique ecosystem (Knight 1984). The majority of soils are classified as Orpha loamy sands and Highland loamy sands. Both of which are highly susceptible to wind and water erosion (NRCS 1985). Cut banks are not stable and are subject to slumping. Disturbed areas and those with minimal vegetation are at high risk due to shifting sands. Blow-outs are common in disturbed areas. The terrain is gentle to sloping.

These deep and well-drained soils provide low to moderate water availability, effecting plants with root systems up to 60 inches. This availability varies based on annual precipitation, depth of sand, and types of substrate.

### **Vegetation Resources**

Plant communities on stabilized sites include needle-and-thread grass, prairie sand reed, sand bluestem, and Indian ricegrass. Silver sagebrush, rabbitbrush, and Wyoming big sagebrush are typical of shrubs located here. Forbs are numerous and include annuals and perennials. As the range conditions deteriorates unpalatable forbs and annuals increase in abundance.

Heavy grazing, recreational activities, wildland fire suppression efforts, and motorized travel impact sand dune environments by loss of ground cover and the high potential for blow-outs. Under harsh conditions, plant vigor deteriorates quickly in this ecosystem. As the range further deteriorates, non-native plant species (cheatgrass brome and other invasive annuals) replace the more productive vegetative communities. Once ground cover is lost, the Orpha loamy sands are subjected to high winds and water erosion increasing the initial area of disturbance. Reestablishment of native plant communities is difficult at best and often unsuccessful.

Current range conditions vary based on grazing allotment, location, and season of use. In general, the northeastern portion of the Sand Hills MA has better range conditions. The potential plant community produces between 1,700 pounds of air-dry matter in a favorable year to approximately 900 pounds in unfavorable conditions. Due to seepage, livestock watering ponds are not well-suited for much of the area. Annual precipitation for the area is approximately 10 to 14 inches.

### **Water Resources**

Sand Creek flows south and to the west of the analysis area and is entirely on private and state land. Lone Tree Gulch is located to the east of the analysis area. Both streams are intermittent. The majority of the surface water is located on private lands. Available water is a vital part of wildlife habitat as well as part of any livestock grazing operations. Therefore, water wells and reservoirs are

common range improvement projects. There are currently five water wells on public lands within the Sand Hills MA. There are no water wells located on public lands within the proposed extended boundary of the MA. Several reservoirs have been developed east of the analysis area.

## **Wildlife Resources**

The Sand Hills MA is within two big game herd units: the North Converse mule deer herd unit (755) and the North Converse antelope herd unit (748). According to the Wyoming Game and Fish Department (WGFD), the mule deer herd unit is approximately 8% above the population objective of 9,100 animals (WGFD 2005). Management issues identified for this herd unit include:

- Hunter access to private and land-locked public lands;
- Increasing mineral development and the associated impacts of habitat fragmentation;
- Lack of information regarding seasonal distribution and the lack of delineated crucial winter range;
- The impacts of chronic wasting disease on the mule deer herd; and,
- The impacts of extended drought on range conditions.

According to the WGFD, the antelope herd unit is approximately 15% above the population objective of 28,000 animals (WGFD 2005). However, the WGFD believes the model may actually be overestimating the population. Apart from the questionable population estimation, management issues identified for this herd unit are similar to those identified for the North Converse mule deer herd unit.

Sage grouse in Wyoming are considered a BLM state director-listed sensitive species. In accordance with the BLM 6840 manual, sensitive species are afforded the same level of protection as candidate species under the Endangered Species Act (ESA). Three sage grouse leks occur within the vicinity of the Sand Hills: BLM No. 117, Blue Hill No. 1, and Sand Spring Creek No. 1. All the leks occur in WGFD upland game management unit 35. Lek activity data for all of these leks and the management unit overall is very limited due to the inaccessibility of the area. Additionally, much of the Sand Hills may provide sage grouse seasonal habitat, including nesting, brood rearing, and winter habitat.

The analysis area also provides habitat for numerous raptor species. Some of the species that have been observed through anecdotal observations in the area include: ferruginous hawk, bald eagle, golden eagle, red-tailed hawk, Swainson's hawk, American kestrel, burrowing owl, and prairie falcon. Presently, there is only one documented raptor nest, a ferruginous hawk, within the management area. The management area lies between two bald eagle winter communal roosts. The North Fork of the Cheyenne River roost is located approximately 4 miles northeast of the MA and the Cole Creek bald eagle roost is located approximately 9 miles to the south. The analysis area may provide some foraging opportunities for eagles using these roost locations.

Black-tailed prairie dog colonies are present in areas along the periphery of the Sand Hills where suitable soils allow colonization. The majority of the area contains sandy soils which naturally limits colonization into the area.

In addition to the wildlife discussed above, a variety of non-game wildlife including several species of songbirds, small mammals, and predators occur throughout the area.

### **Threatened and Endangered Species**

The Sand Hills MA was evaluated for the presence of all federally threatened, endangered, candidate, and proposed species as identified on the United States Fish and Wildlife Service (FWS 2007). Based on field visits to the area and a review of historical data, no threatened or endangered species occur within the project area. Suitable habitat does not exist for the endangered black-footed ferret, threatened Ute ladies-tresses, or the threatened Colorado butterfly plant. Suitable habitat is present for the endangered blowout penstemon; however, surveys conducted throughout the area had negative findings (WYNDD 2004).

### **Cultural Resources**

Cultural resource inventories have been conducted in the Sand Hills for over thirty years. Most of the projects are linear surveys related to oil and gas exploration. Block surveys for well pads and other developments account for additional inventory coverage. The majority of the cultural resources recorded to date are of prehistoric origin (lithic workshop areas, camp sites, stone circles, etc.) with a smattering of historic materials related to the homesteading period. Livestock management (sheepherder's camps, for example) and a long history of oil and gas development have left a thin overlay of historic debris in most places.

Altogether, 24 inventories have been carried out in the study area. Of these 15 were linear inventories for which acreage is not reported (geophysical exploration and oil/gas access roads—these projects may have resulted in recording sites beyond the scope of this review) and nine were 10 to 40 acre blocks amounting to 260 acres of coverage. This is a very small percentage of the management area and cannot be definitive in terms of explaining cultural processes in the area. Nine sites have been reported; of which one is the Bozeman Trail (recorded in two counties), two stone circles, four cairn sites thought to be prehistoric in origin, and one locality identified as a hunting blind. For the most part, these sites were recorded off-survey and no evaluation was made. Additionally, those sites reported during inventories for geophysical exploration were avoided and left unevaluated. The Bozemen Trail, of course is a significant cultural resource, but it remains to be seen whether any segment contained in the study area would contribute to that significance.

The Sand Hills dune complex in other areas have produced numerous prehistoric activity sites. The low number of sites in the study area is more likely due to limited survey coverage than a low site density. Inventories in surrounding areas within the analysis area have resulted in recording many prehistoric sites. It may also be that the lack of reliable water would have been a factor in directing prehistoric activities elsewhere in the area. An extensive inventory in the Sand Dunes Unit, an oil and gas unit just to the east of the study area produced a significantly high site density. Dunal areas generally contain a variety of resources exploitable by prehistoric people, so the absence of procurement or camp sites in the study area is at odds with the general trend. High site densities are found to the east of the study area on the western slope and crest of Pine Ridge. Sites of all types (stone circles, workshop areas, domestic/camp areas, etc) are present. The full chronological range is represented in the general area, if not within the management area.

Prehistoric sites in the vicinity have been shown to contain cultural materials ranging from the Paleoindian to Historic periods. In the 19<sup>th</sup> Century early trappers (e.g. Jim Bridger) were supplanted by survey groups such as the Sawyer and Reynolds expeditions who were mapping terrain, resources, and possible road routes. Accompanied by Jim Bridger, the Reynolds Expedition worked their way south from the Yellowstone River to the North Platte River along the eastern flank of the Bighorn Mountains, a route that later became the Bozeman Trail. Bozeman's initial 1864 route began at Guinard's Bridge (at Fort Caspar) and ran northeast, crossing a portion of the sand dunes in the study area. The next year Bozemen departed from Deer Creek (Glenrock) and travelled north through the eastern edge of the study area. Both of these trips would have left very little traces. However, the routes were later used for local access by ranchers and others. By the early 1880s, conflicts with the Native Americans had subsided, and the area was surveyed by the General Land Office. Section corner and other markers from this period are not uncommon. Shortly after the beginning of the 20<sup>th</sup> Century, oil was discovered in the area, and oilfield debris such as dry hole markers, drilling rig parts and other assorted debris can be found throughout the project area

### **Paleontological Resources**

To date, no paleontological localities have been recorded in the current project area (personal communication Dale Hanson, BLM Regional Paleontologist, BLM-WSO).

Review of BLM Potential Fossil Yield Classification System (PFYCS) maps indicates that the project area falls within Fossil Yield Class 4b. PFYCS Class 4b ('Low Potential') includes lands with surfaces with little (but not zero) potential to contain paleontological materials. Further, the 'b' designation indicates that the potentially fossil-bearing bedrock is buried beneath a mantle of soil and earth. The Sand Hills lies almost completely on Quaternary sand dunes and loess ('Qs' in Love and Christianson 1985). This recent unconsolidated material overlies the Upper Cretaceous Lance Formation which has proven to be a rich source of invertebrate and vertebrate fossils. Significant finds include the first *Tyrannosaurus rex*, early mammalian fossils, and numerous marine reptiles. The largely limestone formation takes its name from the type site at Lance Creek, Niobrara County, Wyoming. This area is known to be fossil-rich. No named localities are known for the Lance Creek exposures adjacent to the Sand Hills study area. The terminus of the Lance Formation coincides with the great Cretaceous-Tertiary extinction some 65 million years ago.

BLM management prescriptions for this Class involve awareness-level concern rather than field reconnaissance or survey by a qualified paleontologist. The probability of impact is a composite of fossil potential, undertaking type, and land cover considerations. The proposed Sand Hills Management Plan is intended to regulate Off Highway Vehicle (OHV) use and in order to minimize surface disturbance and subsequent erosion in the study area. Since virtually all of the study area is covered with non-sensitive post-Pleistocene sands and aeolian deposits, the probability of any disturbance is nearly zero.

### **Socioeconomics**

*The Wyoming Economic Outlook 2007* published by the Wyoming State Government and the *2006 Impact Report* published by the Wyoming Board of Tourism show a continued growth and dependence on extractive industries such as oil and gas production and mining. Energy production

is a key component of the Wyoming economy and paralleled by employment increases in other industries such as construction, trade, and transportation. However, low diversification often results in a cyclic economy. Wyoming tourism is becoming increasingly important. In 2006, tourism accounted for 8.3% of Wyoming's total sales tax revenue. In addition, 29,950 full- and part-time jobs were directly related to this industry. According to state economists, travel and tourism are vital to long-term economic stability for the state.

The Wyoming Business Council reports a population of 69,799 for Natrona County for 2005. The average household income was \$49,566 per year and is projected to reach \$55,672 per year by 2010. The service industry employs the highest percentage of wage earners for the county at 35.28%, followed by retail trade with 21.88%. Agriculture, forestry, and fishing have a combined percentage of .88% of the total employment for the Natrona County.

The economic value of BLM-administered surface and split estate properties within the Sand Hills project area are related to non-renewable and renewable energy development, livestock grazing, and tourism. There are 15 oil/gas leases, 5 ranch allotments, and 4 permitted big game outfitters operating in the area. Map 2 displays grazing allotment boundaries.

The Sand Hills MA is administratively unavailable for new oil and gas leasing. However, all valid and existing rights would be maintained. The additional BLM surface that has been included in the MA under some alternatives is currently available for lease. Within the analysis area, there is approximately 7,491 acres of public surface leased for oil and gas production, of which 2,847 acres are held by production. These leases are part a larger units, which extend beyond the boundary of the MA. Leases not held by production are set to expire between 2011 and 2017. Map 3 shows current oil and gas leases and the corresponding expiration dates. The area is considered to have a moderate potential for oil and gas production. Other energy-related activities that may occur in the vicinity on private or public lands outside the MA include wind and solar power.

Discussions with the private landowners reveal that the significance of these public lands is related more to the intrinsic values than to the economic returns. Large private in-holdings have preserved a rural social structure. The open space, a relatively undisturbed landscape, and wildlife provide the backdrop to a highly valued way of life. The recent subdivision has had a negative impact on the quality of life for long-term residents and has the potential to effect monetary gains related to ecotourism in the Sand Hills.

## **Recreation**

The Sand Hills are approximately 12 miles northeast of Casper and near a major county road. Rural developments on private lands such as ranch homes and newly constructed roads diminish the feelings of remoteness normally associated with large blocks of public land. Inside the MA, the natural landscape dominates the view. The sights and sounds of the natural environment are common, while management presence is low. This normally takes the form of rangeland improvement projects, pasture fences, and informational signs. Other man-made structures are isolated and rarely seen from the commonly used travel routes. There is always some on-site presence of other people, and motorized use on the main corridor changes from low to moderate during the hunting season. Opportunities for solitude, self-reliance, and personal challenge are

generally over-stated, and interactions with other groups are common. The existing transportation network, along with the large blocks of open space, provides a roaded natural recreational experience.

The most popular activity in the Sand Hills MA is deer hunting. The large local deer population and restricted access creates a prime opportunity for hunters that do not want to compete with the public. Big game outfitters in the area provide all necessary amenities. Some private landowners do allow access for a fee. Other recreational opportunities for the public within the Sand Hills MA are significantly restricted by the lack of legal motorized or reasonable public access.

## **Off-Highway Vehicles**

In accordance with Instruction Memorandum No. 2006-173, Implementation of Roads and Trails Terminology Report, consistent terminology will be used in all transportation plans in order to better categorize the existing environment. Throughout this document the following terminology will be used.

Transportation System: Transportation system represents the sum of the BLM recognized inventory of linear features (roads, primitive roads and trails) formally recognized, designated, and approved as part of the BLM transportation system.

Routes: Routes represent a group or set of roads, trails and primitive roads that represent less than 100% of the BLM transportation system. Generically, components of the transportation system are described as routes.

Roads: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Primitive Roads: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Primitive roads do not normally meet any BLM road design standards.

Ways: Roadlike feature used by vehicles having four or more wheels but not declared a road by the owner and which receives no maintenance to guarantee regular and continuous use

Trails: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

All existing routes were inventoried using standards developed for the Casper Field Office. The inventory begins with the use of digital-ortho photo quads. All linear disturbances are digitized using Arc map technology. This ensures that all potential routes are verified and improves the accuracy of fence line data. Volunteers use GPS technology to ground-truth travel routes within the planning area, a 1-mile buffer, and blocks of public lands located immediately to the southwest. This inventory assessed the condition and included anecdotal information on levels of motorized use. Map 4 shows baseline information for existing transportation routes within the Sand Hills MA. Inventory protocols are located in appendix B.

Until the subdivision of the BB Brooks Ranch, there were only two built and maintained roads in the vicinity of the Sand Hills, neither of which provided motorized public access into the management area. The road network constructed for the subdivision was not included in the road inventory as these routes are entirely on private lands. The majority of the existing transportation network within the analysis area consists of primitive roads. These roads are linear routes that do not meet BLM road standards and do not receive any annual maintenance. Most primitive roads have been user created and adopted into the transportation system over time. Less intrusive transportation routes are defined as "ways." All ways have been user created and are normally used to maintain rangeland improvement projects. These types of routes receive little to no use on an annual basis and normally have a moderate to high degree of vegetative cover. There is no guarantee that a specific way would be available from year to year. Ways represent less than 10% of the travel routes located within the management area. For simplification purposes, primitive routes and ways would be grouped and referred to as primitive roads or as travel routes.

Most of the ½ mile analysis area on the southern boundary was not inventoried because of time limitations related to the high number of newly constructed roads. Additionally, the BLM did not acquire permission to inventory these routes from the land owner. There are numerous crowned and ditched roads in the area, and it is difficult to estimate how many more would be built. A total of 209 miles of linear travel routes within the analysis area located on BLM, State lands, and private properties.

Comments from long time land owners indicate that the subdivision of the BB Brooks ranch has reduced the ability to manage unauthorized use of OHV on both private and public lands and many of the existing roads have increased in length due to OHV driving beyond the end point of the existing primitive road. Increasing off-route motorized use is having negative impacts on vegetation and soil resources.

## **Visual Resources**

The Sand Hills are characterized by open space and panoramic views. The rounded forms created by the dunes are repeated throughout this environment and are mirrored by minor changes in vegetative communities. The entire area is considered a visual resource class IV which allows for large-scale visual intrusions that not only draw the viewer's attention but also dominate the view. Currently, visual intrusions are limited to small rural developments, rangeland improvement projects, and the existing transportation system. The basic elements of the natural environment include line, form, color, and texture and are reflected in the existing structure. Travel routes on public lands within the area follow the slope, creating a low to moderate contrast with the surrounding environment.