Recreation and Travel Management

Introduction

The Northern Great Plains offers a variety of recreational experiences and unique grassland and forest settings. Use and interest in recreating and travelling on public lands are increasing. Mixing recreational use with other public desires, such as livestock grazing, coal, oil and gas production and the needs of wildlife, is a continuing challenge for Forest Service managers. Direction for recreation, public access and travel would be provided in the three revised management plans.

In addition, a new method for describing scenic quality, called the Scenery Management System (SMS), has been applied to these public lands as a way of developing landscape character goals and scenic integrity objectives. Recreation Opportunity Spectrum (ROS) designations have been determined for units where they are not currently available.

Travel is associated with nearly every activity on National Forest System (NFS) lands. Travel management is a tool that facilitates the movement of people and products. As use of NFS lands increases, travel management will become more complex and important as a tool to mitigate impacts on various resources and to coordinate uses. The Forest Service works closely with all user groups to maintain multiple travel and recreation opportunities and to identify where these activities can continue.

Laws, Policy and Direction

Forest Planning Regulation 36 CFR 219.21 requires evaluation of the recreation resource including ROS, supply of developed recreational facilities, off-highway vehicle-use opportunities and scenic integrity objectives (SIO). Scenic integrity objectives are a part of the new SMS and similar to Visual Quality Objectives (VQOs), which were formerly used.

Key Indicators

- Acres by Recreation Opportunity Spectrum
- Acres by scenic integrity objective
- Capacity levels at developed recreation sites
- Change in opportunity for dispersed recreation activities
- Acres available by permitted travel type.

Recreation Affected Environment

In the current management plans, ROS is addressed in general terms in the goal statements of management area prescriptions. Little to no specific analysis exists concerning what the best mix of ROS classification should be to serve the public need. Except for some management areas on the Dakota Prairie Grasslands, there are no specific decisions concerning what the ROS class should be in each management area.

The current management plans generally address scenic integrity objectives in each management area prescription as an objective that can not be exceeded. Except in a few cases, no specific SIO is assigned to areas.

The Custer and Nebraska National Forest Land and Resource Management Plans provide for additional trail construction. The Medicine Bow Land and Resource Management Plan also provides for additional trail construction, although no trails are planned for construction on the Thunder Basin National Grassland. No additional developed recreation sites are identified in the three management plans. The Nebraska National Forest Land and Resource Management Plan was amended in February 1988 to include management of the Congressionally designated Soldier Creek Wilderness and Pine Ridge National Recreation Area. In August 1988, the Nebraska National Forest Land and Resource Management Plan was again amended to provide additional emphasis on the recreation program. This amendment identified a priority on developing a grassland interpretive center at Wall, South Dakota, construction of developments near unique areas, increasing the number and quality of day-use and camping facilities, and a need for barrier-free facilities.

Although the Medicine Bow Land and Resource Management Plan did not do so, the other two management plans did identify areas where motorized vehicle use is restricted. See the Travel Management section for further information on current travel restrictions.

Developed and Dispersed Recreation Opportunities

(Information in this section comes from A Summary of the Northern Great Plains Recreation Market Assessment, 1997, (1-8). This document is on file in at the Forest Supervisor's Office in Chadron, Nebraska.)

Introduction and Overview

None of the units under review are nationally significant recreational destinations. However, many do receive significant visitation, often from people in nearby states or Canadian provinces. Some units attract many visitors travelling to other primary destinations. Often these units lie near or within major highway corridors. For instance, the Buffalo Gap National Grassland, with Interstate 90 near its northern boundary, lies adjacent to both Badlands National Park and the Black Hills of South Dakota. Travellers often visit the Buffalo Gap National Grassland on their way to South Dakota's badlands or Black Hills, or major attractions, such as Yellowstone National Park, farther west. The same can be said about the Little Missouri National Grassland. Interstate 94 crosses that unit near Medora, North Dakota. Other major highways traversing the planning area units include Highway 83 going through the Fort Pierre National Grassland, Highway 85 through the Little Missouri National Grassland and Highway 2 through the Nebraska National Forest. Also used is a generalized north-south travel corridor, referred to as a Heritage Corridor, from Interstate 80 in Nebraska to Interstate 90 in South Dakota.

Facilities, such as trails and trailheads, campgrounds and picnic grounds, continue to be built or improved on the units under review. These facilities will likely increase recreational use, especially from people living within short driving distances of the facilities.

Presently there is little outfitter guide activity on any of the planning units, although in recent years several inquiries have been received requesting information about outfitter guiding on the grasslands.

Dakota Prairie Grasslands

Grand River and Cedar River National Grasslands

The Grand River and Cedar River National Grasslands comprise about 162,000 acres in northwestern South Dakota and southwestern North Dakota. Although these units contain no developed campgrounds, camping and picnicking do occur. Autumn finds a fair number of hunters in search of wild game, including pronghorn antelope, sharp-tailed grouse and deer. Prairie dog viewing and shooting are also popular. Some warm-water fishing is available on small reservoirs on the units, and limited river floating is available during high-water seasons. Shadehill Reservoir, managed by the U.S. Bureau of Reclamation, lies adjacent to Grand River National Grassland, and offers camping, picnicking and fishing opportunities. On average, about 14,700 Recreation Visitor Days occurred on these two grassland units each year between 1992-96, with hunting at the top of the list of activities.

Little Missouri National Grassland

The Little Missouri National Grassland is the largest national grassland in the country. It contains rugged badlands topography, which attracts tourists. Tourists especially visit Theodore Roosevelt National Park. The three units of this national park lie within the boundaries of the Little Missouri National Grassland. Nearby Medora, North Dakota, an historic, recreated cowboy town, is a major regional tourist attraction. The large Missouri River dam, Lake Sakakawea, a major recreational resource, lies nearby to the north and east.

The unit is named after the Little Missouri River, one of the longest undammed rivers in the United States. It provides scenic canoeing opportunities in the spring when water flows are up. In the winter, snowmobiling is popular on and along the river. The Little Missouri River is a state designated scenic river. Mixed-grass prairie dominates the region, although other interesting plant communities thrive in isolated locations, including ponderosa and limber pine, cottonwood draws and riparian forests, and upland woodlands. Fossils and geologic formations are common. Wildlife, which attracts hunters and others, abounds, including prairie dogs, falcons, eagles, deer and bighorn sheep. The Little Missouri National Grassland offers the only elk and bighorn sheep hunting in the state. Camping is spread across the unit. Three developed campgrounds and three picnic grounds are maintained. By 1998, the Maah Daah Hey Trail stretched more than 120 miles. Other shorter trails include the Summit (4.5 miles long), the Long X (8.5 miles long) and the Little Missouri Snowmobile (22 miles long). Large, remote, unroaded tracts can still be found on the Little Missouri National Grassland, although oil and gas exploration has resulted in many roads advancing into previously unroaded areas over the past 25 years.

Motorized Travel / Viewing Scenery is the single most popular recreation category on the unit, including travel on I-90 and Highway 85 through the grassland. Hunting categories (Big Game, Upland Game, Small Game and Waterfowl), added together, are more popular than Motorized Travel / Viewing Scenery. Camping and Hiking / Horseback Riding are also quite popular. This grassland experienced on average about 95,900 Recreation Visitor Days each year between 1992-1996.

Sheyenne National Grassland

The Sheyenne National Grassland comprises about 70,000 acres in southeastern North Dakota. It is a remarkable unit if only because it represents a remnant area of tallgrass prairie. The Fargo-Moorhead metropolitan area lies about 50 miles from this unit and a fair number of these urban residents recreate on the Sheyenne National Grassland, as well as nearby Fort Ransom State Park and Little Yellowstone, a county park. The Sheyenne National Grassland is home to one of the last strongholds of the greater prairie chicken in North Dakota. Rare plants, including the western prairie fringed orchid--a nationally recognized threatened species--make this unit their home. Dozens of sensitive plant species survive on this remnant tallgrass prairie, which attract photographers, horseback riders and others interested in rare plant communities. Moose hunting occurs and elk sometimes wander into the area. The North Country Trail, part of a national system of trails, crosses through about 25 miles of the Sheyenne National Grassland. Canoeing is popular on the Sheyenne River, which flows through portions of the grassland.

Hunting and Motorized Travel/Viewing Scenery are the most popular activities on this unit. Recreation use accounted for an average of 21,300 recreation visitor days annually between 1992-1996.

Medicine Bow-Routt National Forest Unit

Thunder Basin National Grassland

Overall, the Thunder Basin National Grassland comprises about 572,000 acres in eastern Wyoming. This unit is characterized by high rolling plains, rolling plateaus, steep rocky escarpments and gentle plains. The unit contains some of the largest coal deposits in the nation. Many people drive to these mines to view the mining process. One of the largest concentrations of golden eagles in the nation is found in the Thunder Basin region. Most recreation on the unit occurs in semi-primitive motorized areas. No inventoried trail systems or developed campgrounds exist on the unit, but opportunities for hiking and camping exist. Mountain biking and warm-water fishing opportunities are available. Prairie dog viewing and shooting are popular. Elk viewing and hunting are also popular.

Motorized Travel/Viewing Scenery is the most popular recreation use category. Hunting categories and camping are also quite popular. Recreation use accounted for an average of 64,100 Recreation Visitor Days annually between 1992-1996.

Nebraska National Forest Units

Bessey Unit and Samuel R. McKelvie National Forest

The Bessey Ranger District of the Nebraska National Forest and Samuel R. McKelvie National Forest together comprise about 206,000 acres in northcentral Nebraska. They lie in the Nebraska Sandhills and contain the largest hand-planted forest in the Western Hemisphere, as well as the largest publicly owned tract of Sandhills prairie.

The Bessey unit lies along a major east-west travel corridor in Nebraska (Nebraska Highway 2) and is the first national forest that travelers encounter coming west from Iowa. The Bessey Recreation Complex, near Halsey, Nebraska, is the most comprehensively developed recreational facility on any of the units under review. With 35 campsites, a large group campground

and shelter, tennis courts, a swimming pool and fish pond, the complex is a recreational oasis. The complex is connected to Scott Tower, the only active fire lookout in Nebraska, by a three-mile-long National Recreation Trail. Other developed camping facilities include Nattick and White Tail Campgrounds on the Bessey Unit and Steer Creek Campground on the Samuel R. McKelvie Unit. Both Nattick and White Tail have facilities for horses. The Nebraska State 4-H Camp is located on the Bessey Unit and receives use by many groups, including 4-Hers. Recreation use associated with the adjacent Merritt Reservoir also occurs on the Samuel R. McKelvie unit.

A variety of wildlife occurs on these two units, attracting many hunters and nature lovers each year. In the spring, many people come to use grouse viewing blinds to watch grouse courtship displays. The plantation forests of ponderosa pine and cedar attract visitors looking for a forested experience in an otherwise grassland region. Camping, Motorized Travel / Viewing Scenery, and Hiking / Horseback Riding are the three most important recreation categories. The viewing and hunting of prairie grouse on these public lands are also highly valued. Deer hunting on both units is a very popular fall activity. Recreation use accounted for an average of 85,000 Recreation Visitor Days annually between 1992-1996.

Buffalo Gap National Grassland

The Buffalo Gap National Grassland comprises about 595,000 acres in southwestern South Dakota. Primarily a mixed-grass prairie, this unit's landscape includes badlands formations, woody draws, wetlands, juniper breaks, and flat to hilly grasslands.

A great variety of plant and animal species can be found on the Buffalo Gap National Grassland, including the recently reintroduced black-footed ferret, which is, next to the Florida panther, possibly the most endangered mammal in North America. The ferret is being reintroduced into Conata Basin, and this effort could potentially increase visitation due to trends in ecotourism.

Geological and paleontological resources abound, as well. Agate beds and fossil sites are common. The much sought-after Fairburn agate, the state gem of South Dakota, keeps rockhounds searching diligently. Pierre Shale fossil beds are recognizable to the trained eye, and provide opportunities for outdoor education.

Developed recreation sites include French Creek Campground and the Pioneer Picnic Ground on the Fall River District. There are no developed recreation sites on the Wall Ranger District.

The National Grasslands Visitor Center in Wall, the only center in the nation devoted solely to the interpretation of America's national grasslands, draws more than 60,000 visitors per year. Railroad Buttes, near Rapid City, is a popular off-highway vehicle site. The Indian Creek and Red Shirt areas are remote destinations for those who seek solitude. The grassland is also a destination point for prairie dog shooters from several states. Antelope hunting is a popular activity in the western portion of the grassland.

The Black Hills and the Badlands National Park are within driving distances of the national grassland. As such, highways that cross the Buffalo Gap National Grassland carry tens of thousands of visitors into the area every year. State Highways 240 and 44 provide a scenic loop through the Buffalo Gap National Grassland and Badlands National Park. Not surprisingly, Motorized Travel / Viewing Scenery is the most prevalent recreation category. Recreation use accounted for an average of 165,700 Recreation Visitor Days annually between 1992-1996.

Fort Pierre National Grassland

The Fort Pierre National Grassland comprises about 116,000 acres in central South Dakota. This unit is characterized by hilly, mixed-grass prairie terrain. One of its most popular features is a population of greater prairie chickens. In mid-April, many people come to the unit to view the prairie chickens and sharp-tailed grouse courtship displays. Visitors are invited to use blinds to view these displays. Hunting and viewing sharp-tailed grouse and greater prairie chickens are some of the more important and popular recreational activities on the Fort Pierre National Grassland.

Autumn attracts hunters, ready to bag their limit of the prairie chicken, or to stalk other game, such as whitetail and mule deer. Dispersed recreation, including hiking, warm-water fishing and birdwatching, is the rule on this unit, which lies just minutes from an urban setting--Pierre and Fort Pierre, South Dakota. The Missouri River courses just beyond the unit's northeastern boundary.

Motorized Travel/Viewing Scenery is the most popular recreation category, mainly because U.S. Highway 83 splits the unit in two. Recreation use accounted for an average of 60,700 Recreation Visitor Days annually between 1992-1996.

Pine Ridge Unit and Oglala National Grassland

The Pine Ridge Ranger District and the Oglala National Grassland comprise about 146,000 acres in northwestern Nebraska. Ponderosa pine forests drape across the rugged Pine Ridge, a landscape of steep swelling slopes and frequently flat hilltops. The Pine Ridge of Nebraska offers the largest block of ponderosa pine forests in the state, and many people consider this region to be the state's most scenic. The Pine Ridge Ranger District includes the Soldier Creek Wilderness and the Pine Ridge National Recreation Area.

The largest and longest mountain biking trail system in the state is also found on the Pine Ridge Ranger District. The annual "Ride the Ridge" horse ride attracts more than 300 riders annually from surrounding states to traverse segments of the Pine Ridge Trail. Organized, competitive, off-highway motorized events occur annually. The Pine Ridge is an important destination for deer hunting, and provides the most popular turkey hunting area in Nebraska.

Fort Robinson State Park lies adjacent to the ranger district, the largest state park in Nebraska. Chadron State Park also lies adjacent to the ranger district, and is the oldest state park in Nebraska.

The Oglala National Grassland contains badlands topography and mixed-grass prairie. This grassland unit provides the primary block of public land for pronghorn hunting in the state. The northwestern panhandle of Nebraska is known for its geologic resources and formations, including agate beds and various fossil sites. Toadstool Geologic Park and the Hudson-Meng Bison Bonebed lie within the Oglala National Grassland (see Special Interest Area and Fossil Resource sections later in this chapter for more information on Toadstool Park). The Hudson-Meng Bonebed enclosure opened in 1998, and visitation is expected to rise to about 20,000 visitors annually. Northwestern Nebraska, including the various state parks, the Pine Ridge Ranger District and the Oglala National Grassland, is increasingly becoming a regional tourist destination.

Horseback riding and mountain biking are becoming increasingly popular. The 29-mile-long Pine Ridge Trail is planned to eventually extend 52 miles and connect Chadron and Crawford,

Nebraska. Camping and Motorized Travel / Viewing Scenery are the two most popular recreation categories on the Pine Ridge Ranger District and the Oglala National Grassland. Recreation use accounted for an average of 60,200 Recreation Visitor Days annually between 1992-1996.

Developed Recreation Sites

The existing recreation facilities by unit are listed in the Tables RTM-1 to RTM-3. They also represent the existing benchmark capacity for the planning units.

Table RTM-1: Developed Recreation Sites on the Dakota Prairie Grassland Units

Planning Unit	Site Name	Site Kind	Persons At One Time Capacity
Little Missouri National Grassland / McKenzie	Summit	Picnic Ground	20
	Sather	Picnic Ground	40
Little Missouri National Grassland / Medora	Burning Coal Vein	Campground	25
	Buffalo Gap	Campground	100

Table RTM-2: Developed Recreation Sites on the Medicine Bow-Routt National Forest Units

Planning Unit	Site Name	Site Kind	Persons At One Time Capacity
Thunder Basin National Grassland	Soda Well	Picnic Ground	5

Table RTM-3: Developed Recreation Sites on the Nebraska National Forest Units

Planning Unit	Site Name	Site Kind	Persons At One Time Capacity
Bessey District	Cedars	Campground	140
	Hardwoods	Campground	50
	Bessey Group	Campground	150
	Whitetail	Campground / Trailhead	50
	Bessey Family	Picnic Ground	145
	Bessey Pool	Swimming Pool	125
	Scott Lookout	Fire Lookout	130
	Nattick	Trailhead / Camping	30
	Bessey Fishing Pond	Fishing Site	20
	Middle Loup Canoe Launch	Boating	10
	Dismal River Canoe Launch	Boating	20
Samuel R. McKelvie National Forest	Steer Creek	Campground	115
	Niobrara Canoe Launch	Boating	100

Planning Unit	Site Name	Site Kind	Persons At One Time Capacity
Buffalo Gap National Grassland / Fall River	Pioneer	Picnic Ground	15
	French Creek	Campground	15
Buffalo Gap National Grassland / Wall	National Grasslands Visitor Center	Interpretive Site	200
Oglala National Grassland	Hudson-Meng Bison	Interpretive Site	150
Pine Ridge District	Red Cloud	Campground	70
	Roberts Tract	Campground / Trailhead	90
	Soldier Creek	Campground / Trailhead	140
	West Ash	Trailhead	15
	Spotted Tail	Trailhead	15
	Outrider	Trailhead	20
	Cliffs	Picnic Ground	55

Maintenance needs for developed recreation facilities generally outstrip the dollars available for maintenance. For example, several loops of the Buffalo Gap Campground on the Medora District of the Little Missouri National Grassland have been closed due to the lack of funds to fix a water line leak. Usually though, backlog maintenance needs do not result in closing the developed recreation facility. The limited maintenance funds often result in repairing damaged or outdated recreation structures when replacement of the structure might be the better option.

Fishing Opportunities

Currently, the Nebraska National Forest provides five miles of recreational stream fisheries, 11 miles of recreational riverine fisheries, 75 fishing ponds of about 600 surface acres and 530 surface acres at Merritt Reservoir on the Samuel R. McKelvie National Forest.

Currently, the Thunder Basin National Grassland provides seven miles of recreational riverine fisheries and five fishing ponds of 76 surface acres.

Currently, the Dakota Prairie Grasslands provides, by district, the following fishing opportunities: Sheyenne National Grassland: five miles of recreational stream fisheries (Sheyenne River) and 5 fishing ponds of 10 surface acres; Grand River / Cedar River National Grasslands: four miles of recreational stream fisheries (Grand River and Deer Creek) and six fishing ponds of 125 surface acres; Little Missouri National Grassland--Medora District: eight miles of recreational stream fisheries (Little Missouri River) and two fishing ponds of 20 surface acres, and McKenzie District: 12 miles of recreational stream fisheries and two fishing ponds of 47 surface acres.

Trails

Sixty miles of trails exist on the Little Missouri and Sheyenne National Grasslands. The Little Missouri Snowmobile Trail makes up 22 miles of the total. The 120-mile Maah Daah Hey Trail on the Little Missouri National Grassland connects the North and South Units of Theodore

Roosevelt National Park. A 25-mile portion of the North Country National Scenic Trail was constructed on the Sheyenne National Grassland. There are no developed trails on the Grand River and Cedar River National Grasslands.

There are no developed trails on the Thunder Basin National Grassland.

One hundred three miles of trail exist on the Nebraska National Forest units. Two of these trails, Scott Lookout at three miles and four and one-half miles of the Trooper Trail, are designated as National Recreation Trails. The Nebraska National Forest is currently constructing the Pine Ridge Trail. About 29 miles of the approximate 50-mile trail have been completed. When finished, the trail will connect the cities of Chadron and Crawford. Forty-one miles of mountain bike trails were recently identified on the Nebraska National Forest as suitable to meet the increased demand for this type of opportunity.

Generally trail conditions are good on the units. Most trail maintenance needs are created by environmental factors rather than by overuse. For example, trail maintenance within the Soldier Creek Wilderness on the Pine Ridge District of the Nebraska National Forest is primarily removing fire-killed timber from the trail tread. Trails traversing grassland units generally are not very evident because low use allows grass growth to cover trail tread.

Recreation Opportunity Spectrum (ROS)

Recreation on National Forest System (NFS) lands is more than an activity. A sense of relaxation and personal experience is generated through recreational activities in preferred settings. Many people form a strong personal attachment to places in the landscape. The key to providing most recreational experiences and opportunities is the setting and how the setting is managed. Recreation management provides desired visitor experiences. The ROS offers a framework for defining classes of recreational settings, opportunities and experiences. There are seven classes of ROS settings:

- Urban
- Rural
- Roaded Modified
- Roaded Natural
- Roaded Non-Motorized
- Semi-Primitive Motorized
- Semi-Primitive Non-Motorized Primitive

For a more complete discussion on ROS classes refer to Chapter 4 of the 1986 Forest Service ROS Book. The following tables display the acres by ROS classification for each forest and grassland:

Table RTM-4: Recreation Opportunity Spectrum Classes on the Dakota Prairie Grassland Units

	ACRES				
Planning Unit	**Urban**	**Rural**	**Roaded Natural**	**Roaded Modified**	**Semi-Primitive Motorized**
Cedar River National Grassland	0	1,770	4,980	0	0
Grand River National Grassland	0	23,360	129,110	1,710	0

Planning Unit	Urban	Rural	ACRES Roaded Natural	Roaded Modified	Semi-Primitive Motorized
Little Missouri National Grassland	750	249,830	447,900	116,400	205,630
Sheyenne National Grassland	10	21,260	28,040	0	20,978

Table RTM-5: Recreation Opportunity Spectrum Classes on the Medicine Bow-Routt National Forest Unit (Thunder Basin National Grassland)

Planning Unit	Urban	Rural	ACRES Roaded Natural	Semi-Primitive Motorized	Semi-Primitive Nonmotorized
Thunder Basin National Grassland	14,050	70,690	444,620	27,070	0

Table RTM-6: Recreation Opportunity Spectrum Classes on the Nebraska National Forest Units

Planning Unit	Urban	Rural	ACRES Roaded Natural	Semi-Primitive Motorized	Semi-Primitive Nonmotorized
Bessey District	0	2,760	30,730	56,680	0
Samuel R. McKelvie National Forest	0	0	13,340	56,680	0
Buffalo Gap National Grassland	0	40,220	405,310	124,860	18,720
Fort Pierre National Grassland	0	9,780	98,810	7,480	0
Pine Ridge District / Oglala National Grassland	240	6,610	78,640	44,960	14,340

* Acreages on all tables rounded to the nearest 10 acres.

Scenery Integrity Objectives

Grassland scenery is often characterized by grand vistas, "big skies" and a sea of grass on a large scale. On a smaller scale, wildflower displays in the spring and summer captivate many visitors. Scenery on the grasslands is affected by structures, such as oil and gas wells, utility lines, railroads and roads, fence densities and water structures. Interspersed farming practices also affect the scenic qualities of grasslands.

In previous management plans, only the Thunder Basin National Grassland had an existing visual quality objectives (VQO) inventory completed.

Trends and Projections

Public lands management and planning depends upon accurate information from a variety of sources. "Snap-shot" information isn't as useful as trend information, which charts changes over time and is comparable in methodology, context and content. The following trend information offers highlights from several sources closely associated with the Northern Great Plains units.

General Trends

Though opinions are divided, most seem to agree that available leisure time is shrinking. The number one reason for not participating in leisure activities is reported as "lack of time." In order to compensate, people are more discriminating about leisure time choices and are increasingly seeking ways to easily and precisely locate information. Adventure travel businesses, including outfitters and guiding businesses, rely increasingly upon electronic marketing and business transactions. Many national forests and national grasslands have developed Internet homepages available on national websites, but some have not.

The two most significant broadscale changes likely to influence how people recreate over the next 50 years relate to anticipated increases both in the population and real income. U.S. Census projections are for population increases ranging from 30 percent in the northern states to 60 percent in the Pacific region coupled with an 88 percent increase in average real income.

Demographic changes are expected to play an important role in outdoor recreation trends in the coming years. The number of people over 16 has grown by 65 percent since 1960, the percentage of Caucasians, who currently make up over 80 percent of outdoor recreationists, is falling, and the country is becoming more urban. Since recreation participation differs among demographic groups, there will likely be shifts that reflect the country's changing make-up. With increasing age, activities generally switch from active to passive activities. Also, people with rural backgrounds tend to prefer dispersed recreation activities.

Most activities for which survey information has been collected are projected to continue long-term moderate growth, while more rapid growth is expected for new, risky, technology-driven activities, such as mountain biking and jetskiing. Interestingly, the current fastest growing activities include birdwatching, hiking, backpacking, primitive area camping and off-highway driving.

Fishing participation is expected to increase nationally by 36 percent over the next 55 years with the Rocky Mountain / Great Plains Region seeing as much as a 55 percent increase. Fishing currently accounts for twice as many "primary purpose trips" as non-consumptive wildlife activities and nearly three times as many as all forms of hunting combined. Nationally, hunting is projected to continue to decline over time. However, the 12 Rocky Mountain / Great Plains states from Nevada east to Kansas are projected to see a 20 percent increase in hunting participation.

Participation in non-consumptive wildlife activities is expected to increase 64 percent over the next 55 years, while days spent participating are projected to double. The most prominent factor contributing to this increase appears to be the increasing age of the population.

The following tables illustrate the changes in wildlife-related recreation participation in Northern Great Plain states from 1980 to 1990. This information was taken from the National Survey of Fishing, Hunting and Wildlife Associated Recreation, sponsored by the U.S. Fish and Wildlife Service.

Table RTM-7: Recreation Related to Fish and Wildlife by State (1980-1985)

State	Hunting 1980-1990	Fishing 1980-1990	Non-consumptive, non-residential wildlife 1980-1990
North Dakota	+10%	+5%	+53%
Nebraska	-13%	+30%	+127%
South Dakota	-10%	+17%	+71%

State	Hunting 1980-1990	Fishing 1980-1990	Non-consumptive, non-residential wildlife 1980-1990
Wyoming	-16%	+1%	+29%

However, the same information for the 1985 to 1990 period gives a somewhat different impression in some cases.

Table RTM-8: Recreation Related to Fish and Wildlife by State (1985-1990)

State	Hunting 1985-1990	Fishing 1985-1990	Non-consumptive, non-residential wildlife 1985-1990
North Dakota	-6%	-8%	-12%
Nebraska	-1%	+10%	+20%
South Dakota	-1%	+9%	-26%
Wyoming	-16%	-6%	-27%

Two noticeable changes in the 1985 to 1990 timeframe were the resurgence of hunting in Nebraska and South Dakota accompanied by a precipitous decline in non-residential (over a 15-minute drive from home), non-consumptive wildlife activities. Hunting is gradually, but steadily, declining as a part of the outdoor recreation menu overall. Several reasons have been suggested:

Hunting is a space-intensive activity requiring large area settings compared to most other activities. In addition, changing attitudes of private landowners have resulted in fewer private lands open to hunting. Many comments received during initial scoping for the plan revision alluded to the increase in fee hunting that reduces the private land available. Another possibility is the continued shift to an urban life-style. Fewer young people are exposed to hunting. Finally, hunting participation is higher among Caucasians and American Indians than other groups (Asians, Hispanics, and African-Americans). Caucasians are becoming a smaller percentage of the population.

The following table indicates changes in both the numbers of hunters using public lands in the Northern Great Plains states and the percentage of time spent hunting on public lands. It may be important to note that while the figures indicate a general decline both in the number and percent of hunters using public lands (except Wyoming), the figures may not accurately reflect the use on a specific Northern Great Plains unit. Anecdotal evidence indicates that, for some units, hunting pressure has intensified significantly during this time period. In addition, as private lands become less available to public hunting, and as more private landowners convert to fee hunting only, increased use of public lands for hunting can be expected in the future.

Table RTM-9: Hunters' Use of Public Lands

State	1985 Hunters Using Public Lands	% of Total Hunters Using Public Lands	1991 Hunters Using Public Lands	% of Total Hunters Using Public Lands
North Dakota	56,900	55%	46,900	48%
Nebraska	61,500	32%	44,300	48%
South Dakota	99,900	60%	73,000	50%
Wyoming	121,000	68%	99,700	74%

Only Wyoming saw an increase in the percentage of hunting days on public lands, while all experienced declines in the numbers of hunters using public lands.

Selected Activity Trends

The 1994-95 National Survey of Recreation and Environment noted a 155 percent increase in bird watching since the 1982-83 survey, the largest increase of any activity, representing 32 million additional participants. National figures indicate approximately 123,500 dedicated birders spend an average of $2,000 a year, half on travel. "Avitourism" is beginning to be appreciated as a source of found money in some areas that have, or have promoted, birding attractions. Grand Island, Nebraska, for instance, draws 80,000 birders who spend $15 million annually to watch migrating cranes.

Hiking, backpacking, primitive area camping, and off-highway driving are also increasing as measured by the percentage growth rate.

Backpacking participation is expected to increase by about 23 percent over the next 50 years while hiking, which currently accounts for nearly 50 million participants and more than 800 million days annually, is expected to grow by between 30 and 80 percent.

Horseback riding accounts for about the same number of participants as backpacking--15 million--but falls behind only hiking and off-highway driving in the number of primary purpose trips and days spent participating. Horseback riding is expected to increase primarily based upon projected growth in real income. However, at least in Nebraska, this activity has received a legislative boost. The 1997 state legislature passed a law designed to limit liability and offer some measure of protection for those engaged in horse-related businesses.

Off-highway driving is expected to grow by 37 percent in the Rocky Mountain / Great Plains region, more than twice the national average.

Primitive camping, which seems to generally decrease as income increases and which draws its loyalists from rural white males, is projected to decline by about 6 percent nationally, while growing by about 20 percent in the Rocky Mountain / Great Plains region.

Days spent biking are expected to increase by 50 percent in the region over the next 50 years compared to developed camping, which will likely double. A recent study of 280 mountain bikers by the University of Wisconsin Center for Community Economic Development revealed that 94 percent felt "natural surroundings were very or extremely important." The overwhelming majority agreed upon the importance of quiet settings, limiting motorized vehicles, a variety in trail types, and single-track trails. More than 90 percent had household incomes above $30,000 and 31 percent had advanced degrees.

Trends on Specific Units

Dakota Prairie Grasslands - The *Fiscal Year 1995 Monitoring and Evaluation Report* for the grassland units of the Custer National Forest stated developed recreation use has decreased on the Little Missouri National Grassland from budget constraints. Several loops in the Buffalo Gap Campground have been closed because of insufficient funding to complete needed repairs. The Little Missouri National Grassland has seen an increase in horseback and mountain bike use.

The Sheyenne National Grassland has experienced a steady rise in use of the North Country Trail, resulting in increased conflicts between horse back riders and hikers.

The report contained no recreation trend information for the Grand River and Cedar River National Grasslands.

Medicine Bow-Routt National Forest (TBNG) - The *Thunder Basin National Grassland Fiscal Year 1995 Monitoring Evaluation Report and Ten-year Review* does not indicate any recreation demand exceeding available supply, although plans have been developed for at least one small, minimal-service campground. This national grassland is experiencing some localized damage from off highway vehicles.

Nebraska National Forest Units - According to the *Fiscal Year 1995 Monitoring and Evaluation Report*, developed recreation use has exceeded the anticipated management plan accomplishment. Dispersed recreation use as well as off-highway vehicle use is less than the anticipated accomplishment, although dispersed recreation use has been increasing.

Table RTM-10: Recreation and Management Plan Accomplishment Percentages

Activity Monitored	% Anticipated Management Plan Accomplishment 1992-95
Developed Recreation Use RVDs	155
Dispersed Recreation Use RVDs	86
Off-Highway Vehicle Use RVDs	12

There appears to be a need for additional developed facilities, particularly on the Wall Ranger District of the Buffalo Gap National Grassland, which offers no developed recreation facilities, and the Bessey Ranger District, where demand exceeds available facilities.

Environmental Consequences

Direct and Indirect Effects

Effects Common to All Alternatives

Recreation opportunities are directly affected by limitations on use, by competing uses and by the availability of facilities. Management activities indirectly influence the quality of the recreation experience. As natural settings are altered through management activities, such as livestock grazing or oil development, the capacity of the grassland or forest to provide some types of dispersed recreation settings and experiences is diminished. As greater emphasis is placed on commodity production, opportunities for recreation activities in natural-appearing landscapes are reduced. In the grassland ecosystem, the composition and structure of the vegetation have a strong influence on the recreation setting and opportunities. Over time, some characteristics of developed recreation sites are lost as a consequence of constant use and maintenance.

Developed Recreation Activities and the Alternatives

Developed recreation includes camping in developed campsites, developed interpretive facilities, canoe and boat launches, trailheads, and picnicking in developed picnic areas. The following table displays the persons at one time (PAOT) capacity by alternative.

Table RTM-11: Developed Recreation Capacity in PAOTs by Alternative

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS					
Cedar River/Grand River National Grasslands	0	0	50	0	50
Little Missouri National Grassland	185	185	205 to 225	185	355 to 450
Sheyenne National Grassland	0	0	75	0	75 to 150
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT					
Thunder Basin National Grassland	5	5	80	5	200
NEBRASKA NATIONAL FOREST UNITS					
Bessey District	870	870	870	870	870
Samuel R. McKelvie National Forest	215	215	215	215	215
Buffalo Gap National Grassland	230	230	305	230	305
Oglala National Grassland[1]	560	560	560	560	560
Pine Ridge District	405	405	405	405	405

1 It is assumed that the Prehistoric Prairies Discovery Center would be constructed in all alternatives

Use levels are expected to increase at most existing recreation facilities. Some facilities are already exceeding their capacity. Without additional facilities at those locations, associated recreational experiences would decrease. Recreation goals for Alternatives 3 and 5 include increased developed recreation facilities. In Alternative 3 the following facilities would be constructed on the Dakota Prairie Grasslands: one new campground on the Sheyenne National Grassland, 1 new picnic ground on the Grand River Grassland, and 1 to 2 boat launch and take out sites on the Little Missouri River. One or more dispersed or developed recreation sites would be constructed on the Thunder Basin National Grassland, and at least one campground would be constructed on the Buffalo Gap National Grassland. In addition to the facilities listed under Alternative 3, an additional 2 to 3 new campgrounds on the Little Missouri National Grassland and another campground could be constructed on the Dakota Prairie Grasslands in Alternative 5. In Alternative 5, at least one new campground would be constructed on the Thunder Basin National Grassland.

Based on budget allocations and the priorities and themes stressed by alternative, Alternative 5, with its high recreation emphasis, would most positively influence developed recreation, followed by Alternatives 3, 4, 2 and 1. Increased recreation budgets in Alternatives 5 and 3 would provide more money to address backlog maintenance needs.

Dispersed Recreation Activities and the Alternatives

Dispersed recreation requires few structural improvements and may occur over a wide area. This type of recreation often takes place on or adjacent to roads, trails and undeveloped water-ways. Activities may include primitive camping, picnicking, hunting, fishing, off-road vehicle use, hiking, horseback riding, mountain biking and sightseeing, among others.

Primitive Camping

Diverse vegetation and landscapes would enhance experiences associated with primitive camping. In addition, special area allocations, including Wild and Scenic Rivers, Wilderness recommendations, Special Interest Area and Research Natural Area prescriptions, would enhance diverse vegetation and, therefore, primitive camping experiences. Alternative 4, with

its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Additional trails probably would enhance primitive camping opportunities. Alternative 5 would provide the most new trail construction over the next decade (0 miles DPG, 50 miles NNF, 100 miles TBNG). Alternative 3 would provide the next largest amount of new trails over the decade with 40 miles on the Dakota Prairie Grasslands, 30 to 40 miles on the units of the Nebraska National Forest and an undetermined amount on the Thunder Basin National Grassland.

The 120-mile Maah Daah Hey Trail on the Little Missouri National Grassland and the 52-mile Pine Ridge Trail on the Nebraska National Forest, Pine Ridge District, would be completed under all alternatives. No other new trail construction is planned under Alternatives 1, 2 and 4. Both the Maah Daah Hey and Pine Ridge Trails are developed for non-motorized uses including hiking, bicycling and horseback riding.

Picnicking

Diverse vegetation and landscapes would enhance experiences associated with picnicking. In addition, special area allocations, including Wild and Scenic Rivers, Wilderness recommendations, Special Interest Area and Research Natural Area prescriptions, would enhance diverse vegetation and, therefore, picnicking opportunities. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Wildflower Viewing

Diverse vegetation and landscapes would enhance experiences associated with wildflower viewing, since diverse vegetation would provide a diversity of habitat for wildflowers. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation. Many wildflower species flourish well on highly disturbed sites, as well. Therefore, Alternative 2, which emphasizes commodity production, including livestock grazing, may provide the next highest degree of wildflower habitat. Habitat for wildflowers and opportunities to view them might be most available next in Alternative 3, followed by Alternatives 1 and 5.

Bird Watching, Photography and Nature Study

Diverse vegetation and landscapes would enhance experiences associated with bird watching, photography and nature study. In addition, special area allocations, including Wild and Scenic Rivers, Wilderness recommendations, Special Interest Area and Research Natural Area prescriptions, would enhance diverse vegetation and, therefore, bird watching, photography and nature study opportunities. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Rock Collecting

Recreational opportunities for rock collecting may be slightly enhanced by a low vegetative structure, although most rock collecting sites are agate beds that do not require grazing or other disturbances to expose them. Ultimately, how the alternatives affect motorized access may present the greatest effects on recreational rock collecting. Since Alternatives 1 and 2 allow off-designated motorized travel, they probably offer the greatest opportunities to pursue rock collecting, providing the greatest access to even remote agate sites. Alternatives 3, 4 and 5

restrict motorized travel to designated routes only. As such, only those routes that bisect agate beds would provide motorized access for rockhounds. Remote agate beds could still be accessed via non-motorized methods.

Driving for Pleasure

Diverse vegetation and landscapes would enhance experiences associated with driving for pleasure. Alternative 4, with its heavy emphasis on ecological restoration, may provide the most diverse vegetation.

Beyond diverse vegetation, motorized public access also affects driving for pleasure. Special area allocations, including Wild and Scenic Rivers, Wilderness recommendations, Special Interest Area and Research Natural Area prescriptions, may reduce motorized access in some areas, especially if any become Congressionally designated Wilderness areas or Wild and Scenic River corridors classified as "wild." Alternative 4 provides the most acres of special area allocations, followed by Alternatives 5, 3, 2 and 1.

In addition, whereas Alternatives 1 and 2 generally do not restrict motorized use, Alternatives 3, 4 and 5 do carry some new and significant restrictions. Essentially, Alternatives 3, 4 and 5 restrict motorized traffic to designated routes. As such, driving for pleasure would be affected and would be more limited under Alternatives 3, 4 and 5 than in Alternatives 1 and 2. In Alternative 5 the amount of designated routes is the greatest, followed by Alternative 3, then Alternative 4.

Off-highway Motorized Recreation

Alternatives 1 and 2 generally do not restrict motorized use; however, Alternatives 3, 4 and 5 do carry some new and significant restrictions. Essentially, Alternatives 3, 4 and 5 restrict motorized traffic to designated routes; so too does Alternative 3a, which applies only to the Fall River Ranger District of the Buffalo Gap National Grassland. As such, off-highway motorized recreation would be affected and would be more limited under Alternatives 3, 4 and 5 than in Alternatives 1 and 2.

Generally, where off-highway use has land degradation in the past, closure orders that eliminate motorized use have been initiated and enforced. These restrictions have allowed damaged areas to recover. Closure orders for resource protection are administrative decisions not influenced by the choice of a management plan alternative.

On the Dakota Prairie Grasslands and the Thunder Basin National Grassland (Medicine Bow-Routt National Grassland), the greatest off-highway motorized recreation opportunities would be provided by Alternative 1 and 2, followed equally by Alternatives 3, 4 and 5.

On Nebraska National Forest units (excluding the Fall River Ranger District of the Buffalo Gap National Grassland), the greatest off-highway motorized recreation opportunities would be provided by Alternatives 1 and 2, followed by Alternatives 5, 3 and 4.

On the Fall River Ranger District of the Buffalo Gap National Grassland (Nebraska National Forest), the greatest off-highway motorized recreation opportunities would be provided by Alternatives 1 and 2, followed by Alternatives 3a, 5, 3 and 4.

For a comparison of these alternatives and their relationship to off-highway motorized recreation, see the comparison tables by alternatives under "major revision topics" found in Chapter 2 of this document.

Fishing

Fishing opportunities generally improve with the availability of more water impoundments stocked with game fish. Alternative 5 would provide more fishing opportunities because it emphasizes the creation of more water impoundments and recreational developments.

Table RTM-12: Change in Fishable Ponds by Alternative

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS					
Grand River and Cedar River National Grasslands	no change	no change	no change	no change	add 1 pond
Little Missouri National Grassland	no change	no change	add 1 pond	no change	add up to 2 ponds
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT					
Thunder Basin National Grassland	no change	no change	no change	no change	no change
NEBRASKA NATIONAL FOREST UNITS					
All units combined	no change	no change	no change	no change	add 1 pond

On the Dakota Prairie Grasslands, Alternative 5 projects the addition of one to two boat launches and take-out sites on the Little Missouri River of the Little Missouri National Grassland. In addition, an objective of creating 2 to 3 new ponds at least 50 acres in size on the Little Missouri and Grand River National Grasslands would occur under Alternative 5.

On the Nebraska National Forest, an objective for Alternative 5 is the addition of at least 1 new pond at least 50 acres in size.

On the Thunder Basin National Grassland, an objective for Alternative 5 is the addition at least 2 water-oriented recreation-opportunity sites.

Motorized access to fishable waters generally is important to recreational fishing. Alternatives 1 and 2 generally do not restrict motorized access. Alternatives 3, 4 and 5 do restrict motorized access to designated routes only. It is assumed in Alternatives 3, 4 and 5 that routes to fishing opportunities would be designated for motorized use.

Quality Big Game Hunting

Big game hunting opportunities may or may not be enhanced where motorized travel is not restricted, depending upon the type of hunting experience desired. Alternatives 1 and 2 would not generally restrict motorized travel, while Alternatives 3, 4 and 5 restrict motorized travel to designated routes only. While hunters who use motorized vehicles to hunt game would be restricted under Alternatives 3, 4 and 5, hunters looking for walk-in hunting opportunities would fare better under Alternatives 3, 4 and 5. Walk-in hunters would experience a less enjoyable hunt under Alternatives 1 and 2.

Bighorn Sheep - The Little Missouri National Grassland has the only sizeable population of bighorn sheep within the planning area. The State of North Dakota issues only two bighorn sheep hunting permits annually, so hunting is not a major activity. Alternatives 2 through 5 have more acres assigned to management area (MA) 3.51 than Alternative 1, and so these alternatives may provide more opportunities for increased bighorn sheep populations for viewing and hunting.

Deer - Hunting opportunities for deer are best on the flat to rolling prairie land when brushy and herbaceous hiding cover along stream and woody draws is available. Alternatives 2 through 5 call for 80 percent of the woody draws and riparian areas to be regenerating, whereas Alternative 1 calls for 27 percent woody draw and riparian area regeneration on the Thunder Basin, 40 percent on Nebraska National Forest Units and 55 percent on Dakota Prairie Grasslands. Areas that are regenerating usually provide good hiding cover along streams and within wooded draws.

Elk - The only unit with a management area designed specifically for elk habitat management (Management Area 3.68) is on the Thunder Basin National Grassland. It is likely that hunting opportunities would increase as acres managed in MA 3.68 is increased. Therefore, the greatest opportunity for elk hunting would be in Alternative 3 with 33,890 acres in MA 3.68, followed by Alternative 1 with 4,270 acres. The rest of the alternatives have no acres assigned to MA 3.68.

On the other planning units, management activities in the alternatives would not significantly affect the opportunities for elk hunting.

Pronghorn - None of the alternatives would change expected opportunities to hunt or view pronghorn from what currently exists.

Wild Turkey - None of the alternatives would change expected opportunities to hunt or view wild turkey from what currently exists.

Upland Bird Hunting

Alternatives 1 and 2 would not generally restrict motorized travel, while Alternatives 3, 4 and 5 restrict motorized travel to designated routes only. While hunters who use motorized vehicles to hunt game would be restricted under Alternatives 3, 4 and 5, hunters looking for walk-in hunting opportunities would fare better under Alternatives 3, 4 and 5. Walk-in hunters would experience a less enjoyable hunt under Alternatives 1 and 2.

Upland birds are generally attracted to habitat with high percentages of high vegetative structure. Where hiding and holding cover is available, hunters usually have good recreational hunting experiences. Percentages of low / moderate / high vegetative structures by alternative are shown below in parentheses.

On the Dakota Prairie Grasslands, Alternative 4 would provide the best vegetative structure for upland bird hunting (15 / 39 / 46%), followed by Alternative 3 (15 / 49 / 36%), Alternative 5 (15 / 52 / 33%), Alternative 2 (14 / 66 / 20%) and Alternative 1 (15 / 66 / 19%).

On the Nebraska National Forest, Alternative 4 would provide the best vegetative structure for upland bird hunting (16 / 37 / 47%), followed by Alternative 5 (19 / 39 / 42%), Alternative 3 (23 / 42 / 35%), Alternative 1 (18 / 64 / 18%) and Alternative 2 (27 / 56 / 17%).

On the Thunder Basin National Grassland, Alternative 4 would provide the best vegetative structure for upland bird hunting (25 / 37 / 38%), followed by Alternative 3 (22 / 49 / 29%), Alternative 5 (21 / 57 / 22%), Alternative 1 (25 / 57 / 18%) and Alternative 2 (29 / 55 / 16%).

Waterfowl Hunting

None of the alternatives would change expected opportunities to hunt or view waterfowl from what currently exists.

Wildlife Viewing (other than prairie dog viewing)

Diverse vegetation and landscapes would enhance experiences associated with wildlife viewing. Alternative 4, with its heavy emphasis on ecological restoration, may provide the most diverse vegetation, followed by Alternatives 3, 5, 2 and 1. In addition, Alternative 4 prohibits the poisoning of prairie dogs, which would enhance a number of species dependent upon or associated with prairie dog towns, thereby enhancing wildlife viewing. Alternatives 3 and 5 also decrease prairie dog control poisoning. Prairie dog shooting restrictions associated with black-footed ferret reintroduction sites also would enhance wildlife viewing. Alternative 4 would provide the most acres of black-footed ferret reintroduction sites (238,662 acres), followed by Alternative 3 (154,610 acres), Alternative 3/3a (129,340 acres), Alternative 5 (114,630 acres), Alternative 2 (102,740 acres) and Alternative 1 (41,800 acres).

Prairie Dog Viewing

The viewing of prairie dogs is greatly influenced by available prairie dog habitat. Prairie dog habitat is best provided with low vegetative structure. Alternative 4 would have the most acres of active prairie dog colonies in 10 years, followed by Alternatives 3 and 5. Alternatives 1 and 2 would provide no additional acres of active prairie dog colonies, and thus would not provide additional opportunities for prairie dog viewing.

Motorized access to prairie dog towns is considered important for prairie dog viewing. Alternatives 1 and 2 do not generally restrict motorized access. Alternatives 3/3a, 4 and 5 do require that motorized vehicles remain on designated routes and, therefore, reduce the viewing experience.

Prairie dog shooting restrictions generally would increase prairie dog viewing opportunities. Shooting within Management Area 3.63 (Black-footed Ferret Reintroduction Habitat) would be prohibited by state regulations or Forest Service closure orders. The alternatives allocate different acres to M.A. 3.63.

Prairie Dog Shooting

The shooting of prairie dogs is influenced by the number and size colonies and type of shooting restriction in place. While Alternative 4 would have the greatest number of active prairie dog colonies, all colonies would have a yearlong prairie dog shooting restriction. Alternatives 3 and 5 would have the next highest amount of prairie dog colonies. Alternative 5 would provide more shooting opportunities as the only restriction to shooting would be in MA 3.63 Black-Footed Ferret Reintroduction Habitat. Alternative 3 would have a seasonal shooting restriction from 3/1 through 7/31 in all colonies, in addition to yearlong restrictions in MA 3.63. The only shooting restriction in Alternatives 1 and 2 would be in MA 3.63.

Motorized access to prairie dog towns is generally considered important to prairie dog shooters. Alternatives 1 and 2 do not generally restrict motorized access. Alternatives 3, 4 and 5 do require that motorized vehicles remain on designated routes and therefore reduce the shooting experience.

Hiking and Backpacking, Bicycling (Mountain Biking), and Horseback Riding

Diverse vegetation and landscapes would enhance experiences associated with hiking and backpacking, bicycling (mountain biking), and horseback riding. In addition, special area allocations, including Wild and Scenic Rivers, Wilderness recommendations, Special Interest Area and Research Natural Area prescriptions, would enhance diverse vegetation and recreation and, therefore, hiking and backpacking, bicycling (mountain biking), and horseback riding

opportunities. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Hiking, backpacking and horseback riding opportunities are generally enhanced where motorized travel is restricted. Alternatives 1 and 2 generally would not restrict motorized travel, while Alternatives 3, 4 and 5 restrict motorized travel to designated routes only.

Bicycles, including mountain bikes, are considered mechanized vehicles, which are prohibited in Congressionally designated Wilderness areas. Elsewhere, bicycles are not restricted. Restrictions on motorized travel would not have an effect on the use of bicycles.

Trails designed for hiking and backpacking, bicycles (including mountain bikes), and horseback riding probably would increase these types of recreational opportunities. Alternative 5 would provide the most new trail construction over the next decade (0 miles DPG, 50 miles NNF, 100 miles TBNG), followed by Alternative 3 (40 miles DPG, 30 to 40 miles NNF, some trails TBNG).

The 120-mile Maah Daah Hey Trail on the Little Missouri National Grassland and the 52-mile Pine Ridge Trail on the Nebraska National Forest, Pine Ridge District, would be completed under all alternatives. Both the Maah Daah Hey and Pine Ridge Trails are developed for non-motorized uses including hiking, bicycling and horseback riding.

Alternatives 4 and 5 provide the most acres of non-motorized use, which would accentuate the quality of experience for hikers, backpackers, horseback riders, and mountain bikers searching for solitude and more primitive opportunities. (Mountain bikes are prohibited, however, from designated Wilderness areas.)

All the alternatives require the installation of easier-opening fence gates and more fence openings, which would provide a higher quality recreation experience.

For most planning units, Alternatives 3, 4 and 5 would increase the size of fenced pastures, which could reduce the number of fencelines recreationists would otherwise have to cross. The size of livestock grazing pastures is largest in Alternative 4. Overall, large pastures promote a sense of a vast, open space landscape. Alternative 4 also allows the least number of water developments, such as dug-out stock ponds, which would promote a more natural-appearing landscape.

Effects by Major Resource Programs

Effects from Fire and Fuels Management

Wildfires in grassland settings are generally high-intensity short-duration events that can temporarily alter recreational settings, displace wildlife, threaten structures and generate smoke. Wildfires in forest environments are also high-intensity events, but with a longer duration. Recreational settings take longer to recover, smoke may take longer to clear, and the remaining timber may be stressed and more susceptible to insects and diseases. The effects from wildfire would be similar for all alternatives, since the amount of wildfire cannot be predicted by alternative.

Prescribed fire occurs under more controlled situations and the results are more predictable. Prescribed burning can be scheduled to lessen impacts to recreation-use seasons and wildlife habitat and activity periods. Prescribed fire can increase grassland vegetation vigor and yields. Structures can be protected. Prescribed burn plans can include measures to assure that burning is compatible with the recreational setting and activities. Still there would be short term effects

on scenic quality. Alternative 4 with the greatest acreage of prescribed burning would affect scenic quality the most, followed by Alternative 5.

Fuels management can include fire and other methods, such as mowing, to lessen the occurrence and intensity of catastrophic fire. Such management can result in more diverse vegetation and wildlife habitat.

Effects from Fish and Wildlife Management

Fish and wildlife habitat improvements could result in increased populations and improved opportunities for recreation activities associated with fish and wildlife. Restrictions imposed to protect wildlife may reduce opportunities associated with those wildlife species or their habitats. Management Areas 3.51 Bighorn Sheep, 3.63 Black-footed Ferret Reintroduction Habitat and 3.68 Big Game Range would restrict recreational activities that could disrupt these species. Alternative 4, followed by Alternative 3, has the greatest acres allocated to these management areas.

Effects from Insect and Disease Management

Few effects associated with insect and disease management would be expected with any alternative. There could be temporary disruptions in recreation opportunities in areas undergoing treatment. Insects and diseases can kill trees, which become safety hazards, especially in campgrounds or other developed areas where they can topple, injuring people or property.

Effects from Oil, Gas and Minerals Management

Oil, gas and minerals development could displace wildlife, impact scenic resources, reduce areas offering semi-primitive experiences, cause temporary access closures, and increase dust, noise and traffic hazards. Dispersed recreation opportunities temporarily lost to development could displace recreationists and force displaced recreationists into fewer undeveloped areas.

In addition, oil developments do reduce the scenic quality of an area. All of the alternatives allow for oil and gas leasing, however, some with no-surface occupancy. Despite no-surface occupancy stipulations, none of the alternatives really reduce the visual impacts of oil and gas development from current conditions. The scenery in certain areas may be retained, however, where no-surface occupancy or withdrawals from leasing occur. Alternatives 4 and 5 provide the greatest number of acres of likely no-surface occupancy and withdrawals from leasing stipulations, followed by Alternatives 3, 2 and 1.

Effects from Plant and Animal Damage Control

Generally, the effects from plant and animal damage control activities would be minimal to recreation except for activities associated with prairie dogs. Alternatives 1 and 2 would have higher levels of prairie dog control than the other alternatives, so those activities associated with prairie dog colonies would be negatively affected. Conversely, Alternatives 3, 4 and 5 allow for increases in prairie dog colonies. Predator control activities conducted by the Animal and Plant Health Inspection Service would have negligible risk to recreationists and their pets (EA for Predator Damage Management in Eastern Wyoming, 4-18 to 4-20).

Effects from Range Management and Livestock Grazing

Issues associated with range management and livestock grazing include: trampling of streambanks and trails, stream and lake contamination, compacted soils, manure on trails, altered landscapes from range management facilities, such as fences, gates and watering developments, vegetation reductions and changes from natural conditions.

Livestock developments also affect scenic quality. For most planning units, Alternatives 3, 4 and 5 would increase the size of fenced pastures, which would reduce the number of fencelines and improve the scenic integrity of the area. The size of livestock grazing pastures is largest in Alternative 4. Overall, large pastures promote a sense of open space natural landscape. Alternative 4 also allows the least number of water developments, such as dug-out stock ponds, which would promote a more natural-appearing landscape.

Effects from Special Area Designations

The effects of special area designations on recreation opportunities and experiences vary depending on the type of designation and type of recreation activity. Additional Wilderness areas would enhance the experiences for people seeking primitive recreation opportunities. It would reduce opportunities for people desiring motorized or mechanized-related activities. Alternative 4 would recommend the most areas for Wilderness designation followed by Alternative 5. Alternatives 1 and 2 would not recommend any areas for Wilderness designation. Some recreationists could find some limitation on their activity with Wild and Scenic River designations, depending on the river classification; whereas designation of rivers into the Wild and Scenic River System would attract other recreationists. Alternatives 4 and 5 are the only alternatives where streams, flowing through National Forest System lands, are recommended for inclusion into the National Wild and Scenic River System. Research Natural Area (RNA) designation would affect recreation use if the use is restricted because it threatens or interferes with the objectives or purposes of the Research Natural Area. Alternative 4 would allocate the most acreage to RNAs , followed by Alternative 3 on the Thunder Basin National Grassland. Alternative 3 would allocate the most acreage to RNAs on the Dakota Prairie Grassland units and units of the Nebraska National Forest, followed by Alternative 4. Special Interest Area (SIA) designation would affect recreation use if the use does not contribute to the protection or enhancement of the characteristics for which the area was designated In many instances though, recreation use would be encouraged within a designated SIA. On the units of the Dakota Prairie Grasslands and Thunder Basin National Grassland Alternative 3 would designate the most acreage to SIAs, followed by Alternative 4. For the units of the Nebraska National Forest, Alternative 3a would designate the most SIA acreage, followed by Alternative 5.

Effects from Timber Management

Timber management activities could affect recreation opportunities and experiences in the following ways: increased noise and traffic hazards and changes to the landscape's appearance from timber harvest and logging slash. Initially, logging operations are a short-term effect that disrupt the normal activity level in the area. However, noticeable landscape changes may persist for many years. Wildlife and recreationists may be temporarily displaced. Roads built to remove timber may increase public access, which can benefit some recreationists and diminish the experience of others. In most cases though, roads constructed for timber removal would temporary and would be obliterated after the timber is harvested. Potential timber harvest would occur on least than 8% of the planning area. Alternative 2 would have the greatest amount of timber harvest, followed by Alternatives 4, 5, 3 and 1.

Effects from Travel Management and Motorized Use

Restrictions on motorized travel would indirectly benefit people who prefer non-motorized recreation, and could ultimately provide better hunting opportunities as wildlife security is improved. On the other hand, motorized travel restrictions make it more difficult to gather

grassland and forest products, retrieve game and sightsee. In addition, elderly or disabled people may be less able to access public lands.

Alternatives 1 and 2 generally do not restrict motorized use; however, Alternatives 3, 4 and 5 do carry some new and significant restrictions. Essentially, Alternatives 3, 4 and 5 restrict motorized traffic to designated routes; so too does Alternative 3a, which applies only to the Fall River Ranger District of the Buffalo Gap National Grassland. As such, off-highway motorized recreation would be affected and would be more limited under Alternatives 3, 4 and 5 than in Alternatives 1 and 2. In Alternatives 3-5 the projected amount of designated routes varies by alternative also. For the units of Dakota Prairie Grasslands and Thunder Basin National Grassland Alternative 5 would provide the most miles of designated roads, followed by Alternatives 3 and 4. Alternative 3, followed by Alternatives 5, 3a, and 4, would provide the greatest miles of designated roads for the Nebraska National Forest units. For further information, see the Travel Management section in this chapter.

Recreation Opportunity Spectrum (ROS) by Alternative

Recreation opportunities are affected by management restrictions, competing uses for a finite resource and the type and availability of recreation facilities. The ROS offers a framework for defining classes of recreational settings, opportunities and experiences. The following table displays the acres by ROS classification by alternative.

Table RTM-13: Recreation Opportunity Spectrum Classification by Alternative

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS					
Grand River and Cedar River National Grasslands					
rural acres	25,130	25,130	25,130	25,130	25,130
roaded natural acres	134,090	134,090	134,090	134,090	134,090
semi-primitive motorized acres	1,710	1,710	1,710	1,710	1,710
Little Missouri National Grassland McKenzie					
rural acres	158,900	165,610	156,020	156,020	154,700
roaded modified acres	46,180	46,180	45,930	45,930	46,180
roaded natural acres	195,450	199,510	193,200	189,370	198,970
roaded natural non-motorized acres	0	0	6,430	2,840	0
semi-primitive motorized acres	65,150	89,530	49,560	44,910	65,870
semi-primitive non-motorized acres	35,150	0	49,690	61,760	35,120
Little Missouri National Grassland Medora					
urban acres	750	750	430	750	430
rural acres	89,570	89,570	89,230	88,920	89,560
roaded modified acres	70,110	70,110	64,740	67,830	67,850
roaded natural acres	247,530	247,510	213,530	207,130	233,110
roaded natural non-motorized acres	860	780	4,630	2,410	780
semi-primitive motorized acres	108,450	116,100	43,080	26,160	60,900
semi-primitive non-motorized acres	7,840	290	109,480	131,910	72,470

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Sheyenne National Grassland					
rural acres	21,240	21,240	19,120	19,990	10,230
roaded natural acres	27,990	27,990	27,990	28,910	12,160
roaded natural non-motorized acres	60	60	740	740	290
semi-primitive motorized acres	20,980	20,980	18,280	20,640	1,030
semi-primitive non-motorized acres	0	0	4,140	0	46,570
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT					
Thunder Basin National Grassland	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
urban acres	13,250	49,780	48,130	44,680	49,790
rural acres	69,530	51,180	41,190	51,260	51,850
roaded natural acres	442,620	424,430	418,270	387,420	391,000
roaded natural non-motorized acres	0	0	1,210	3,520	0
semi-primitive motorized acres	27,090	27,090	22,280	2,130	21,870
semi-primitive non-motorized acres	0	0	21,390	63,480	37,970
NEBRASKA NATIONAL FOREST UNITS					
Bessey Ranger District					
rural acres	2,760	2,760	2,760	2,760	2,760
roaded natural acres	30,380	30,380	30,380	30,380	30,380
roaded natural non-motorized acres	500	500	500	500	500
semi-primitive motorized acres	56,570	56,570	56,570	56,570	56,570
Samuel R. McKelvie National Forest					
roaded natural acres	14,400	14,400	14,280	7,170	7,380
roaded natural non-motorized acres	0	0	2,620	120	0
semi-primitive motorized acres	101,540	101,540	99,050	24,170	26,680
semi-primitive non-motorized acres	0	0	0	84,480	81,880
Buffalo Gap National Grassland					
Fall River					
rural acres	9,470	9,470	9,470 9,4703a	9,470	9,470
roaded natural acres	251,740	249,290	245,920 232,4903a	231,380	239,630
roaded natural non-motorized acres	0	1,560	1,560 1,5603a	1,010	1,560
semi-primitive motorized acres	61,510	52,700	49,790 43,0403a	44,630	44,520
semi-primitive non-motorized acres	0	9,700	15,970 36,1603a	36,220	27,540
Buffalo Gap National Grassland					
Wall					
rural acres	30,740	30,740	30,740	30,740	30,740
roaded natural acres	153,700	153,340	152,240	142,330	152,240
roaded natural non-motorized acres	0	1,030	1,030	1,030	1,030
semi-primitive motorized acres	63,320	62,650	51,580	51,580	51,580

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
semi-primitive non-motorized acres	18,720	18,720	30,880	40,790	30,880
Fort Pierre National Grassland					
rural acres	9,780	9,780	9,780	9,780	9,780
roaded natural acres	98,820	98,820	98,770	98,770	98,770
roaded natural non-motorized acres	0	0	1,030	1,030	1,030
semi-primitive motorized acres	7,480	7,480	6,490	6,490	6,490
Pine Ridge Ranger District/Oglala National Grassland					
urban acres	240	580	240	240	240
rural acres	6,610	6,610	6,610	5,730	5,550
roaded natural acres	78,840	78,610	77,120	69,450	70,990
roaded natural non-motorized acres	0	0	0	1,580	0
semi-primitive motorized acres	44,520	44,520	44,520	37,870	38,770
semi-primitive non-motorized acres	14,490	14,370	16,210	29,840	29,160

All of the alternatives offer a mix of ROS settings, but to differing degrees. Generally, for the Dakota Prairie Grasslands, Thunder Basin National Grassland and units of the Nebraska National Forest, Alternative 4 provides the greatest acres of primitive-type recreational settings, followed by Alternatives 5 and 3, while Alternative 2, followed by Alternative 1, provides the greatest acres of the more-developed rural-type recreational settings.

Scenery Integrity Levels (SILs) by Alternative

All the planning units have been inventoried under the new Scenery Management System. Mapping under the new system incorporates viewing distance zones, concern level (public importance), scenic attractiveness (indicator of intrinsic scenic beauty of a landscape), scenic class (determined by combining the scenic attractiveness with distance zone and concern levels), and existing scenic integrity (state of naturalness) (Landscape Aesthetics 6-8).

In the revised management plans, a landscape character description is developed along with associated scenic integrity levels. Scenic integrity levels were assigned to each management area based on the intent of the management area direction (see Appendix B for further discussion on this). With the adoption of the plans, the landscape character description (included in the geographic and management area desired condition goals) becomes a goal and the scenic integrity levels become scenic integrity objectives (SIO). Scenic integrity levels are a set of measurable goals for management of grassland and forest scenic resources. The levels include:

- Very High: A scenic integrity level that generally provides for ecological change only.
- High: A scenic integrity level that means human activities are not scenically evident.
- Moderate: A scenic integrity level that refers to landscapes where the valued landscape character "appears slightly altered."
- Low: A scenic integrity level that refers to landscapes where the valued landscape character "appears moderately altered."
- Very Low: A scenic integrity level that refers to landscapes where the valued landscape character "appears heavily altered."

Specific activities and projects will require a detailed analysis of the impacts to the scenic resource to determine which types, location, and size of management activities are permitted.

Mitigation would occur in all alternatives and during project implementation. Grasslandwide and forestwide standards and guidelines would direct rehabilitation, enhancement of scenic integrity, integration of aesthetics in resource planning and efforts to achieve vegetative diversity. Examples of mitigation efforts commonly used include revegetation of disturbed sites, choice of materials and colors for structures that reduce their visibility, placement of utilities underground, etc.

The following tables shows the scenery integrity levels associated with the alternatives:

Table RTM-14: Scenery Integrity Levels by Alternative

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS					
Grand River and Cedar River National Grasslands					
low acres	158,810	159,680	156,720	159,680	84,850
moderate acres	2,120	1,010	3,980	1,010	75,850
high acres	0	230	230	230	240
Little Missouri National Grassland McKenzie					
low acres	457,020	481,440	405,450	397,360	318,360
moderate	2,410	13,120	32,980	32,590	141,070
high acres	41,410	6,280	62,400	70,880	41,400
Little Missouri National Grassland Medora					
low acres	508,590	502,930	323,750	302,200	295,650
moderate	7,830	19,870	92,020	82,900	151,820
high acres	8,700	2,320	109,340	140,020	77,650
Sheyenne National Grassland					
low acres	69,620	70,220	5,460	5,860	1,810
moderate acres	600	0	59,950	63,680	21,610
high acres	60	60	4,880	740	46,860
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT					
Thunder Basin National Grassland					
low acres	550,960	490,670	430,050	450,370	412,660
moderate acres	1,530	55,230	87,260	28,530	95,260
high acres	0	6,590	35,170	73,590	44,560
NEBRASKA NATIONAL FOREST UNITS					
Bessey Ranger District					
low acres	89,670	69,660	69,700	69,580	220
moderate acres	0	19,990	400	20,090	69,890
high acres	530	550	20,100	530	20,100
Samuel R. McKelvie National Forest					
low acres	114,830	110,190	104,880	26,090	20
moderate acres	1,110	5,750	5,580	5,250	31,190
high acres	0	0	5470	84,600	84,730
Buffalo Gap National Grassland Fall River	**Alt 1**	**Alt 2**	**Alt 3** **Alt 3a**	**Alt 4**	**Alt 5**

Planning Unit	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
low acres	322,720	299,100	196,490 264,300	269,600	196,830
moderate acres	0	12,360	105,600 5,050	13,640	94,510
high acres	0	11,250	20,620 53,180	39,510	31,370
Buffalo Gap National Grassland Wall	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
low acres	213,020	264,290	224,260	223,300	84,290
moderate	53,460	1,160	1,160	1,160	139,610
high acres		1,030	41,060	42,020	42,590
Fort Pierre National Grassland					
low acres	115,200	115,190	114,160	114,160	43,910
moderate acres	880	890	890	890	71,150
high acres	0	0	1,030	1,030	1,030
Pine Ridge Ranger District					
low acres	136,840	102,560	99,050	85,390	55,260
moderate acres		33,310	34,930	34,290	65,770
high acres	50	1,020	2,910	17,210	15,860
very high acres	7,810	7,810	7,810	7,810	7,810

Note: when an alternative is selected and adopted in the plan, the scenic integrity levels become scenic integrity objectives.

Each of the alternatives, if implemented, would maintain, alter or enhance the scenic character of the landscapes to varying degrees. The most obvious and significant effects on the scenic resource are from vegetation and landform alterations, typically associated with resource management activities, such as roads, vegetation management, recreation facility development, and oil, gas, and minerals development. Grassland units have relatively flat topography and few trees. Due to this, structures such as windmills, fences and oil and gas wells are more evident than they would be in a forested landscape. These existing structures create a grassland landscape that appears moderately altered (Low scenic integrity level). Therefore, management areas that place little to no limits on the amount of structures would receive a scenic integrity level of Low.

The SILs are lower in Alternatives 1 and 2 because those alternatives utilize management areas that would emphasize commodity production, including livestock grazing, and oil, gas and minerals development. Alternative 3 utilizes management areas that would place less emphasis on commodity production and more emphasis on recreation opportunities and wildlife habitat; therefore, the SILs are higher to complement those non-commodity activities. Alternative 4 utilizes management areas that would emphasize ecosystem restoration, which would result in higher SILs. Scenic integrity levels are an important component of Alternative 5, which emphasizes recreation opportunities and activities.

Cumulative Effects

Based on land allocations, prairie dog restrictions, miles of designated routes and number of new recreation developments, Alternative 5 may provide the most diverse recreation

opportunities, followed by Alternatives 3 and 4, and 2 and 1. Alternative 4 probably provides the most diverse landscapes and vegetation for recreationists, followed by Alternatives 3 and 5, and 2 and 1.

Each of the five alternatives, would meet the recreational needs of people in various mixes of management area designations. Such designations as Special Interest Areas, backcountry non-motorized recreation, dispersed recreation areas, developed sites, and scenic corridors can fill the varying recreation demands of people.

Perceptions of recreational benefits are based upon personal and societal values, and evidence exists that public values may be shifting. Newspaper coverage of national forests and national grasslands indicate more interest in ecological, aesthetic, and spiritual values relative to economic values. One study revealed that recreational benefits and values were discussed more frequently than any other categories of benefits and values in an analysis of more than 30,000 on-line media news stories between 1992 and 1996 (Fan, Bengston, 1997). Evidence indicates that, while the recreational customer metaphor does encourage managers to identify recreationists' preferences and to provide them activities and facilities to meet those preferences, some shortcomings remain. For instance, some members of the public see themselves not as "customers," but as "owners" of the public lands because tax dollars collected from all citizens support public lands.

More importantly, the customer metaphor may imply that recreational settings are viewed similarly to mass-produced consumer products. It ignores the fact that many people form strong personal attachments to specific places that hold unique values to them. Values associated with the experience of being in an environment rather than the value of products or services taken from an environment are known as "experiential values," and contain elements of three broad categories:

- Emotional Values - place-based experiences that elicit strong feelings such as for a traditional family camping spot or hunting area.
- Symbolic Values - places that carry meanings beyond their immediate physical presence such as locations of important events; for instance, General George Custer's travel route across the Little Missouri National Grassland or the Warbonnet Memorial on the Oglala National Grassland.
- Spiritual Values - people's experiences that link them to deeper meanings and connections with a greater reality, which can be--but may not be--associated with a specific place.

Based on survey data, the "typical" public lands recreator may be a white male, 25 to 40 years old, living in a city of 50,000 or less, who has children in a home with multiple careers, and who is likely to load the family into a sport utility vehicle and travel less than a hundred miles to a wildland setting to recreate for an average of three to four hours.

Public Comments

Public scoping comments provide further information on recreation and travel management demand. Some have requested more recreation facilities, such as campground, picnic sites, trails, interpretive stations, whereas others discouraged additional facilities. Results of the full CUSTOMER survey on the Nebraska National Forest indicate that visitors found the recreation sites and their recreation experiences met or exceeded their expectations.

Public scoping comments related to hunting included concern over wildlife habitat requirements, access for hunters, concerns that the number of hunters is reducing the quality of the hunting experience, and requests for walk-in hunting areas. In addition, results from "Customer Report Card" surveys conducted in the autumns of 1994 through 1996 show that hunters across all units rated feeling uncrowded as one of the most important attributes of their outdoor experience. In all cases, the number of hunters completely satisfied with having an uncrowded recreation experience was lower than the number who considered it important. This was especially true on the Grand River Ranger District, Sheyenne National Grassland, Pine Ridge Ranger District, and Fall River Ranger District.

A Summary of Cumulative Effects

In general, recreation on public lands, including planning units on the Northern Great Plains, is increasing. Perhaps the recreational activity that is increasing the most rapid is birdwatching. "Avitourism" is beginning to be appreciated as a source of revenue in some areas, and the Northern Great Plains offers substantial opportunities to birdwatch, with many opportunities provided by the planning units associated with the Northern Great Plains Plans Revision. Diverse vegetation and landscapes would enhance experiences associated with birdwatching. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Other recreational activities showing substantial increases include hiking and backpacking, primitive camping, off-highway-vehicle recreation and fishing.

Diverse vegetation and landscapes would enhance experiences associated with hiking, backpacking and primitive camping. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Off-highway-vehicle recreation is also a high-growth recreation activity. Off-highway-vehicle recreationists may prefer Alternatives 1 and 2 most, because these alternatives do not generally restrict motorized use. Alternatives 3, 4 and 5 do carry some new and significant restrictions. As such, off-highway motorized recreation would be affected and would be more limited under Alternatives 3, 4 and 5 than in Alternatives 1 and 2.

Fishing, too, appears to be increasing substantially as a preferred recreational activity. Fishing opportunities generally improve with the availability of more water impoundments stocked with game fish. Alternative 5 would provide more fishing opportunities because it emphasizes the creation of more water impoundments and recreational developments. Motorized access to fishable waters generally is important to recreational fishing. Alternatives 1 and 2 generally do not restrict motorized access. Alternatives 3, 4 and 5 do restrict motorized access to designated routes only. It is assumed in Alternatives 3, 4 and 5 that routes to fishing opportunities would be designated for motorized use.

Horseback riding is becoming more and more popular. Diverse vegetation and landscapes would enhance experiences associated with horseback riding. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives 3 and 5, 2 and 1.

Finally, hunting may or may not be increasing as a recreational activity. State wildlife agencies report that hunting in general is increasing in North Dakota, but decreasing in Nebraska, South

Dakota and Wyoming. However, as private lands become less available to public hunting, and as more and more private landowners resort to fee hunting only, increased use of public lands, including on planning units for the Northern Great Plains Plans Revision, can be expected in the future. Anecdotal evidence indicates that, for some units, hunting pressure has intensified significantly over the past decade or so. All of the alternatives would provide diverse hunting opportunities. Alternatives 3, 4 and 5 would provide more non-motorized walk-in hunting opportunities than Alternatives 1 and 2. However, Alternatives 1 and 2 generally do not restrict motorized access, while Alternatives 3, 4 and 5 do carry restrictions to designated routes only. For those seeking a motorized hunt, Alternatives 1 and 2 may offer the best opportunities.

Travel Management

Affected Environment

In the last few years, motorized use on the Northern Great Plains units has increased. The popularity of off-highway vehicles (OHV), motorcycles and four-wheel-drive vehicles have contributed to the increase. Historically, ranchers used horses to move stock, fix fence and do other chores. The development of dependable OHVs has significantly replaced horses as the rancher's choice for transportation.

Currently there are few restrictions to motorized travel on the planning units with approximately 18,480 acres having year around motorized travel restrictions. The largest areas with travel restrictions are the Congressionally designated Soldier Creek Wilderness and Pine Ridge National Recreation Area, both located on the Pine Ridge District of the Nebraska National Forest. In addition to year around travel restrictions, the Bessey Ranger District and Fort Pierre National Grassland, both located on the Nebraska National Forest, have seasonal motorized travel restrictions during hunting season. Motorized travel on the entire Fort Pierre National Grassland is restricted to roads during hunting season.

Roads

The following tables show the miles of classified and unclassified road by jurisdiction on the planning units:

Table RTM-15: Miles of Classified Road by Jurisdiction on the Dakota Prairie Grassland Units

			MILES				
Planning Unit	**Forest Service**	**County**	**Other Federal**	**State**	**Local**	**Private**	**Total**
Cedar River / Grand River National Grasslands	263	53	1	2	4	37	360
Little Missouri National Grassland / McKenzie	432	273	0	46	0	111	862
Little Missouri National Grassland / Medora	393	476	1	50	1	61	982
Sheyenne National Grassland	112	75	0	13	19	0	219

Table RTM-16: Miles of Unclassified Road by Jurisdiction on the Dakota Prairie Grassland Units

	MILES

Planning Unit	Forest Service	County	Other Federal	State	Local	Private	Total
Cedar River / Grand River National Grasslands	120	0	3	1	0	15	139
Little Missouri National Grassland / McKenzie	359	0	0	0	0	67	426
Little Missouri National Grassland / Medora	516	0	0	0	0	206	722
Sheyenne National Grassland	48	0	0	0	0	3	51

Table RTM-17: Miles of Classified Road by Jurisdiction on the Thunder Basin National Grassland

	MILES							
Planning Unit	Forest Service	County	Other Federal	State	Local	Private	Unknown	Total
Thunder Basin National Grassland	1,585	705	0	61	3	499	1	2,854

There are no unclassified roads on the Thunder Basin National Grassland

Table RTM-18: Miles of Road by Jurisdiction on the Nebraska National Forest Units

	MILES						
Planning Unit	Forest Service	County	Other Federal	State	Local	Private	Total
Bessey District	123	0	0	4	0	0	127
Samuel R. McKelvie National Forest	65	0	0	27	0	0	92
Buffalo Gap National Grassland / Fall River	271	197	0	0	0	1	469
Buffalo Gap National Grassland / Wall	121	191	0	0	11	0	323
Fort Pierre National Grassland	60	147	0	16	0	0	223
Pine Ridge District / Oglala National Grassland	140	173	0	8	0	1	322

In addition to roads listed in the above table, about 2,500 miles of uninventoried unclassified roads exist on units of the Nebraska National Forest.

Trails

Sixty miles of trails exist on the Little Missouri and Sheyenne National Grasslands. The Little Missouri Snowmobile Trail makes up 22 miles of the total. The 120-mile Maah Daah Hey Trail is currently being constructed on the Little Missouri National Grassland. This trail, when complete, will connect the North and South Units of Theodore Roosevelt National Park. A 25-

mile portion of the North Country National Scenic Trail is located on the Sheyenne National Grassland. No developed trails exist on the Grand River and Cedar River National Grasslands.

Nebraska National Forest units contain 103 miles of trail. Two of these trails, Scott Lookout at 3 miles and 4.5 miles of the Trooper Trail, are designated as National Recreation Trails. The Nebraska National Forest is currently constructing the Pine Ridge Trail. About 29 miles of the total 50-mile trail have been completed. When finished, the Pine Ridge Trail will connect the cities of Chadron and Crawford. Forty-one miles of mountain bike trails were recently identified on the Nebraska National Forest as suitable to meet the increased demand for mountain biking.

No developed trails exist on the Thunder Basin National Grassland.

In addition to classified roads and trails, unclassified roads and trails are formed by visitors moving cross-country. These unclassified roads, in fact, may be many years old, having never been identified and obliterated. These routes often provide more challenging experiences, especially for horseback riders, hikers and mountain-bike enthusiasts. These routes are not maintained. They are usually inventoried and evaluated for possible designation or obliteration during site-specific analyses.

Environmental Consequences

Resource Protection Measures

The location, design, operation and maintenance of roads and trails are specified in forestwide and grasslandwide standards and guidelines, Forest Service Manual direction and Forest Service specification references developed by the Washington Office. This direction assures that intended uses will be accommodated over time.

General Effects

Alternatives 1 and 2 would provide unlimited motorized access, except in the following areas where motorized use would not be allowed (except authorized administrative use):

- 14,400 acres of designated Wilderness area (Soldier Creek Wilderness on the Nebraska National Forest) and National Recreation Area (the Pine Ridge National Recreation Area on the Nebraska National Forest),
- 600 acres on Little Missouri National Grassland / Medora District,
- 500 acres on Nebraska National Forest / Bessey District,
- 500 acres on Buffalo Gap National Grassland / Fall River District,
- 1,900 acres in Alternative 1 and 2,900 acres in Alternative 2 on Buffalo Gap National Grassland / Wall District.

In addition, Fort Pierre National Grassland would have about 115,000 acres with seasonal closures affecting motorized use.

Alternative 5, for the Dakota Prairie Grasslands, initially designates all existing roads and trails for motorized use, except roads in non-motorized areas and the Maah Daah Hey and North Country Trails. Alternatives 3, 3a, 4 and 5 would eventually restrict motorized traffic to designated roads or trails. The specific designated routes would be identified using a second

level of planning that could consider more site-specific needs and conditions. This process (draft Roads Analysis Procedure, www.fs.fed.us/news/roads) would provide managers opportunities to work with user groups interested in travel management issues. Alternative 5, for the Dakota Prairie Grasslands, designates all existing roads and trails for motorized use, except roads in non-motorized areas and the Maah Daah Hey and North Country Trails.

Direct and Indirect Effects

Effects from Management Area Prescriptions

Travel management schemes were developed based on the emphases and desired conditions of the alternatives. The alternatives are interpreted into land allocations and management prescriptions that result in different philosophies toward travel. Allocations of acres to specific management areas, such as Management Area 1.2 (areas recommended to Congress for Wilderness) or Management Area 1.32 (Backcountry Non-motorized Recreation), carry motorized restrictions on large acreages.

Alternative emphases and management area prescriptions would result in the following travel management acres and miles. The tables show the anticipated effects after site specific road designations are made to implement the travel management direction for Alternatives 3-5. Managers will have up to 5 years to work with interested parties to make site-specific decisions on designated routes. The effects analyses that follow were done as if the travel restrictions were in place for Alternatives 3-5.

Table RTM-19: Travel Management Acres and Miles by Alternative Dakota Prairie Grasslands

Cedar River and Grand River National Grasslands		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	161,800	161,800	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	0	0	0	0	0
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	0	0	0
Areas with designated routes for motorized travel	acres	0	0	161,800	161,800	161,800
Cedar River and Grand River National Grasslands		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	250 to 500	250 to 375	375 to 500
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.0 to 2.0	1.0 to 1.5	1.5 to 2.0
Little Missouri National Grassland: McKenzie Ranger District		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	500,840	500,840	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	0	0	57,220	79,500	15,730

Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	61,890	49,830	55,120
Areas with designated routes for motorized travel	acres	0	0	381,730	371,510	429,990
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	600 to 950	580 to 930	670 to 1070
Expected road density for designated routes[1]	miles/-sq.mile	NA	NA	1.0 to 1.6	1.0 to 1.6	1.0 to 1.6
Little Missouri National Grassland: Medora Ranger District		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	524,520	524,520	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	600	600	113,650	150,260	73,800
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	56,120	24,510	4,650
Areas with designated routes for motorized travel	acres	0	0	355,340	350,350	446,670
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	830 to 1,110	680 to 820	1,050 to 1,400
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.5 to 2.02	1.25 to 1.52	1.5 to 2.0
Sheyenne National Grassland		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	70,200	70,200	0	0	2,800[2]
Areas where no motorized use is allowed (except administrative use)	acres	60	60	4,900	700	46,900

[1]Since the McKenzie Ranger District's existing road density is 1.6 miles and no new road construction is planned, the high range of road density will be the same as the existing density.

[2]Hankinson Hills.

Sheyenne National Grassland		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	0	0	0
Areas with designated routes for motorized travel	acres	NA	NA	65,400	69,600	20,500
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	150 to 250	160 to 220	90 to 140
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.5 to 2.5[3]	1.5 to 2.0	2.75 to 4.25[4]

Table RTM-20: Travel Management Acres and Miles by Alternative Thunder Basin National Grassland

Thunder Basin National Grassland		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Areas allowing off-road motorized travel	acres	557,500	557,500	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	0	0	22,600	65,500	38,000
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	39,800	0	0
Areas with designated routes for motorized travel	acres	0	0	495,100	492,000	519,500
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	970 to 1,550	960 to 1,150	1,220 to 1,620
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.0 to 2.0	1.0 to 1.5	1.5 to 2.0

Table RTM-21: Travel Management Acres and Miles by Alternative Nebraska National Forest

Bessey Ranger District		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Areas allowing off-road motorized travel	acres	65,500	65,500	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	500	500	500	500	500
Areas with seasonal motorized travel restrictions (except administrative use)	acres	24,500	24,500	0	0	0
Areas with designated routes for motorized travel	acres	0	0	90,000	90,000	90,000

[3]Because of the large amount of non-Forest Service jurisdiction roads, the road density percent is higher than other units, assuming that private roads are not designated routes for public use.

[4]Includes 110 miles of non-Forest Service jurisdiction roads and additional 40 percent of Forest Service roads designated to match 40 percent of area that is not Management Area 1.2 under Alternative 5.

Bessey Ranger District		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	110 to 280	110 to 160	160 to 280
Expected road density for designated routes	miles/-sq.mile	NA	NA	.75 to 2.0	.75 to 1.5	1.5 to 2.0
Samuel R. McKelvie National Forest		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	116,000	116,000	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	0	0	2,400	85,000	77,700
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	0	0	0
Areas with designated routes for motorized travel	acres	0	0	113,600	31,000	38,300
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	90 to 360	24 to 72	90 to 120
Expected road density for designated routes[5]	miles/-sq.mile	NA	NA	.5 to 2.0	.5 to 1.5	1.5 to 2.0
Buffalo Gap National Grassland Fall River		**Alt 1**	**Alt 2**	**Alt 3** **Alt 3a**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	322,200	322,200	5,200 284,700	0	10,400
Areas where no motorized use is allowed (except administrative use)	acres	500	500	17,400 38,500	49,000	29,100
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	0 0	0	0
Areas with designated routes for motorized travel	acres	0	0	300,100 0	273,700	283,200
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	470 to 940 NA	430 to 645	660 to 890
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.0 to 2.0 NA	1.0 to 1.5	1.5 to 2.0
Buffalo Gap National Grassland Wall		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	233,700	260,600	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	1,900	2,900	43,070	46,400	42,970

[5]Lower that usual road density due to existing densities are already quite low.

Buffalo Gap National Grassland Wall		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	0	0	0
Areas with designated routes for motorized travel	acres	30,900	3,000	223,430	220,100	223,530
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	350 to 700	300 to 520	520 to 700
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.0 to 2.0	1.0 to 1.5	1.5 to 2.0
Fort Pierre National Grassland		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	0	0	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	520	520	1,520	1,520	1,520
Areas with seasonal motorized travel restrictions (except administrative use)[6]	acres	115,480	115,480	0	0	0
Areas with designated routes for motorized travel	acres	0	0	114,480	114,480	114,480
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	180 to 360	180 to 270	270 to 360
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.0 to 2.0	1.0 to 1.5	1.5 to 2.0
Pine Ridge and Oglala National Grassland		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Areas allowing off-road motorized travel	acres	131,160	131,160	0	0	0
Areas where no motorized use is allowed (except administrative use)	acres	14,400	14,400	16,170	31,600	29,120
Areas with seasonal motorized travel restrictions (except administrative use)	acres	0	0	0	0	0
Areas with designated routes for motorized travel	acres	0	0	129,390	113,960	116,440
Expected designated routes (does not restrict snowmobile use)	miles	NA	NA	250 to 400	220 to 310	270 to 360
Expected road density for designated routes	miles/-sq.mile	NA	NA	1.25 to 2.0	1.25 to 1.75[7]	1.5 to 2.0

[6]Seasonal motorized travel restriction on Fort Pierre National Grassland is motorized travel restricted to designated routes 9/1-11/30.

[7]Because of large amount of non-Forest Service jurisdiction roads, the road density percent is higher than other units, assuming that private roads are not designated routes for public use.

Effects Common to All Alternatives

Travel for Forest Service administration, fire and emergency, treatment of noxious weeds, and the maintenance of permitted livestock operations would be allowed in most areas under all alternatives. Exceptions may or may not include special area designations, such as Wilderness and "wild" river segments within the National Wild and Scenic River System. Although motorized use in Wilderness areas for livestock grazing administration can be allowed under the enabling legislation, motorized use for Forest Service administration and fire and emergency does require approval by Forest Service regional foresters.

In Alternatives 3, 4, and 5, which would restrict travel to designated routes, administrative travel by Forest Service personnel off designated routes would be allowed in most cases to effectively manage NFS lands entrusted to the agency. Examples include implementing projects designed to enhance management, including wildlife habitat, water resources, wildfire suppression, and law enforcement.

In addition, livestock permittees would be allowed to travel off of designated routes, with the approval of the appropriate district ranger, to fulfill the obligations of the livestock permit. Such activities as mending fencelines, repairing water developments and rotating livestock would be allowed.

Finally, reasonable access to private property would occur under all alternatives.

Effects from Fire and Fuels Management

Motorized travel typically would be allowed under all alternatives to suppress wildfires or escaped fires or to conduct needed fuels management Effects from fire and fuel management on travel management are expected to be negligible in all alternatives.

Effects from Fish and Wildlife Management

Motorized travel typically would be allowed for fish and wildlife administrative management under all alternatives. Wildlife related concerns may restrict travel in key habitat areas and during critical times of the year. For example, travel may be restricted in MA 1.31 Bighorn Sheep during lambing, breeding and winter use. Alternative 4 would have the greatest likelihood of affecting travel management as this alternative would have the most acres allocated to wildlife management areas. Alternatives 3 and 5 would have the next greatest affects. Alternative 1 would have the least affects to travel from wildlife management.

No effects to travel are anticipated under any alternative from fish management.

Effects from Insect and Disease Management

Motorized travel typically would be allowed for insect and disease management under all alternatives. No effects to travel are anticipated from insect and disease management under any alternative.

Effects from Oil, Gas and Minerals Management

In areas available for leasing that allow surface use, special-use permits to construct roads for oil and gas development can be expected in all alternatives. Roads built to support oil and gas construction are usually obliterated after cessation of oil and gas activities. However, some roads are retained for such purposes as emergency access. Oil and gas road construction and obliteration would be most prevalent on the Little Missouri and Thunder Basin National Grasslands, with limited occurrence possible on the Buffalo Gap and Oglala National Grasslands.

Effects from Plant and Animal Damage Control

Motorized travel typically would be allowed for plant and animal control under all alternatives. No effects to travel are anticipated from plant and animal damage control in any alternative.

Effects from Range Management and Livestock Grazing

Motorized travel would be allowed under all alternatives as necessary to implement needed range management activities and livestock grazing except in special areas, such as Special Interest Areas, if restrictions are considered necessary to protect the characteristics for which the area is designated.

Effects from Recreation Management and Use

Final construction of both the Pine Ridge Trail (Nebraska National Forest) and the Maah Daah Hey Trail (Little Missouri National Grassland) would be completed under Alternatives 1 through 5. No other new trail construction or construction of new, developed recreation sites would be expected under Alternatives 1, 2 and 4. Additional recreation trail construction and construction of new, developed recreation sites would be expected under Alternatives 3 and 5.

Present motorized recreation use would not be changed under Alternatives 1 and 2. Motorized recreation acres would be significantly reduced under Alternatives 3, 4 and 5, because these alternatives limit motorized use to designated routes only. While motorized recreation would be reduced under Alternatives 3, 4 and 5, non-motorized recreation opportunities would be greatly increased.

Effects from Special Area Designations

Special area designations under Alternative 1 and 2 would result in little change to motorized access because of the few number of areas recommended or proposed for special area designations (including Wilderness areas, Wild and Scenic Rivers, Special Interest Areas and Research Natural Areas). In Alternatives 1 and 2, obliteration of unclassified roads would likely occur in designated Research Natural Areas. The miles of road to be obliterated is expected to be very minor. Alternatives 3, 4 and 5, which would limit motorized travel to designated routes, could result in less motorized access to some special areas and within designated special interest areas. It is anticipated that routes needed to access designated SIAs would be designated for motorized travel.

Effects from Timber Management

Motorized travel typically would be allowed under all alternatives to conduct timber management practices. Roads constructed to remove timber would normally be temporary and would be obliterated upon the completion of the timber harvest. Therefore, minimal effects to travel from timber management are anticipated in all alternatives.

Cumulative Effects

Alternatives 1 and 2 would provide the most opportunity for motorized travel. Of those alternatives that limit motorized use to designated routes, Alternative 5 would provide the most miles of designated routes and the highest density of designated routes, followed by Alternatives 3 and 4.

In all alternatives, it is anticipated that most new road construction would be of a temporary nature to provide access for timber harvest or for oil and gas activities. Temporary roads would probably not be designated for motorized travel in Alternatives 3, 4 and 5. Alternative 2

would have the most temporary road construction. In Alternatives 3, 4 and 5 the amount of unclassified roads would be expected to decrease as many of these would not be designated motorized travelways. Evidence of these roads would disappear over time as grass revegetates the tracks.

Road maintenance would be the greatest in Alternative 5. It is anticipated in this alternative, that roads would be maintained to a higher standard to provide better access for passenger cars. Alternative 3 would have the next greatest amount of road maintenance. Alternative 4 with its emphasis on restoration would have the least amount of road maintenance.

It is not anticipated that the total amount traffic would change much between alternatives. Although increased road traffic might be more noticeable under Alternative 4 as this alternative would have the least amount of designated roads.

Public comments received during the scoping period regarding travel management have two themes. Many people stated that the negative effects of uncontrolled off-road travel outweighs the rights of people to pursue those activities. Many of the same people promote more control and enforcement of restrictions. Another theme emphasized that national forests and national grasslands are among the few, if not only places, for off-highway-vehicle enthusiasts to ride. Some suggested segregating off-highway activities to specific trails and areas to reduce conflicts with other recreation users.

Comments received about roads during the scoping period include: support for new roads to provide reasonable access to all parcels of public lands; desire for better road maintenance; no more federal dollars used to build roads for commercial interests and a desire to have some of the roads closed and obliterated.

Notes

Special Area Designations

Introduction

The planning area includes many unique and outstanding combinations of physical and biological resources and areas of special social interest. These are collectively referred to as "special areas." The public, other agencies, and Forest Service employees have shown interest in protecting special areas.

Four types of special area designations exist: Wilderness areas, Wild and Scenic River designations, Research Natural Areas and Special Interest Areas.

Special area designations may include: cultural and historic sites, geologic and paleontologic sites, rare habitats, botanical areas, zoological areas, wetland conservation areas, unique ecological communities, and areas of biodiversity richness.

Research Natural Areas (RNAs) are selected to provide a spectrum of relatively undisturbed areas representing a wide range of natural variability within important natural ecosystems and environments or areas with special or unique characteristics or scientific importance.

Maintaining grassland roadless areas and designating grassland Wilderness areas are important to some people. Thirty-nine areas were analyzed for recommendation to Congress as Wilderness as part of the Northern Great Plains Plans Revision process.

Special Interest Areas (SIAs) are managed to protect or enhance areas with unusual characteristics, such as scenic, historical, geological, botanical, zoological, paleontological or others. Management emphasis is on protecting or enhancing and, where appropriate, developing and interpreting for public education and recreation, areas with unusual characteristics.

Wild and Scenic River studies have shown that many stretches of several rivers appear to meet eligibility requirements. Five streams were analyzed as part of this analysis process.

Key Indicators

- Number and acres of Research Natural Areas
- Number and acres recommended for Wilderness
- Number and acres of Special Interest Areas
- Acres and miles of Wild and Scenic Rivers recommended.

Notes

Research Natural Areas

Introduction

Research Natural Areas (RNAs) are selected to provide a spectrum of relatively undisturbed areas representing a wide range of natural variability within important natural ecosystems and environments (for example: forest, shrubland, grassland, alpine, aquatic, and geological environments) and areas with special or unique characteristics or scientific importance. RNAs are also selected to:

- Serve as reference areas for evaluating the range of natural variability and the impacts of management in similar environments.
- Maintain representative and key elements of biological diversity at the genetic, species, population, community, and / or landscape levels.
- Serve as areas for the study of ecosystems and ecological processes including succession.
- Provide on-site and extension educational activities.
- Serve as baseline areas for measuring ecological change.

Many designations attempt to maintain natural ecosystem components and processes. In addition to RNAs, the Forest Service recommends or designates botanical, ecological, geological, zoological, and scenic special areas, as well as National Recreation Areas, Wilderness areas, and Wild and Scenic Rivers. Similar designations exist for both private and state lands and in countries all over the world. Although the designations differ in their degree of disturbance, isolation, and management emphasis, they all contribute to the protection of biological diversity across the landscape.

Laws, Policy and Direction

The general provisions of the Organic Administration Act of 1897 (16 USC 551) authorize the Secretary of Agriculture to designate Research Natural Areas (RNAs). Under regulations at 7 CFR 2.42, the Secretary delegates RNA-designation authority to the Chief of the Forest Service who, pursuant to 36 CFR 251.23, selects and establishes RNAs as part of the continuing land and resource management planning process for National Forest System (NFS) lands (36 CFR 219.25 and FSM 1922). The revised FSM 4063 delegates the responsibility to the Regional Forester, with concurrence of Station Directors, to approve new RNAs and to sign the implementing designation order. Prior to May 4, 1994, only RNA recommendations could be made in land management plans as the final decision was to be made by the Chief.

RNAs are part of the national network of ecological areas designated in perpetuity for research and education and / or to maintain biological diversity on NFS lands. Research is conducted by recognized organizations and must be done in accordance with goals and objectives outlined in the Research Natural Area Management Plan. RNAs are for non-manipulative research, observation and study. RNAs also may contribute to the implementation of provisions of special acts, such as the Endangered Species Act of 1972 and the monitoring provisions of the National Forest Management Act of 1976.

Affected Environment

Research Natural Areas (RNAs) are lands that are permanently protected for the purposes of maintaining biological diversity, conducting non-manipulative research, monitoring to determine the effects of management on similar ecosystems, and fostering education.

Objectives

The objectives of RNAs are to:

- Preserve a wide spectrum of pristine representative areas that typify important forest, shrubland, grassland, alpine, aquatic, geological, and similar natural situations that have special or unique characteristics of scientific interest and importance that, in combination, form a network of ecological areas for research, education and maintenance of biological diversity.
- Preserve and maintain genetic diversity.
- Protect against serious environmental disruptions.
- Serve as reference areas for the study of succession.
- Provide on-site and extensive educational activities.
- Serve as baseline areas for measuring long-term ecological changes.
- Serve as control areas for comparing results from manipulative research.
- Monitor effects of resource management techniques and practices.

Definitions

Research Natural Areas - A physical or biological unit in which natural conditions are maintained insofar as possible. These conditions are ordinarily achieved by allowing natural physical and biological processes to prevail without human intervention. However, under unusual circumstances, deliberate manipulation may be utilized to maintain unique features that the RNA was established to protect. Management practices to manipulate the vegetation should only be applied where the vegetative type would be lost without management. These manipulative management practices, in concurrence of the Forest Supervisor and Station Director, may include management practices necessary for noxious weed control, grazing, control of excessive animal populations and prescribed burning.

Criteria

The following criteria were used in selecting potential RNAs in the alternatives:

1. Quality: How well a site represents the targeted ecosystem type or protected biodiversity elements.
2. Condition: How much the site has been degraded or altered from natural or optimal conditions.
3. Viability: The likelihood of long-term survival for the ecosystem and its protected biodiversity.
4. Defensibility: Extent to which the ecosystem and biodiversity elements can be protected from extrinsic human factors.

Identifiers

Identifiers help define criteria to a finer scale. They are used as tools for evaluating sites which:

- Are under-represented ecosystem types, plant series and plant association levels in the planning area,
- Have had little impact from human disturbance since settlement,
- Are roadless areas and have closure of primitive roads,
- Contain grazing allotments that are vacant or closed, or have a low degree of use,
- Have small recreation use.

The Custer National Forest in Management Plan Amendment Number 19 established the Two Top-Big Top and Limber Pine RNAs. The Two Top-Big Top Research Natural Area is 100 acres, representing a perched relic prairie in North Dakota with the following habitat types: Western wheatgrass, needle-and-thread and a localized big sage type, in addition to badlands slope communities. The Limber Pine RNA is 680 acres, representing unique limber pine habitat type in North Dakota. Sheyenne Springs RNA, on the Sheyenne National Grassland, is 57 acres in size.

The *Nebraska National Forest Land and Resource Management Plan* lists Signal Hill as an established RNA. It is 504 acres and represents the Sandhills vegetation type, consisting of Sandhill lovegrass, Sandhill bluestem, sand reedgrass, blowout grass, Indian grass, switchgrass, sandhill muhly, needle-and-thread and sedge. In Nebraska, the Sandhills make up approximately one-fourth of the state's land area.

No RNAs currently exist on the Thunder Basin National Grassland.

A total of 21 areas were evaluated and met the criteria to be considered and nominated for RNAs (totalling about 34,470 acres). In addition, field evaluations have not been completed for one other area, Tree Farm, (totalling about 120 acres) which is being proposed as an RNA. Additional information on all nominated RNAs is provided in Appendix E. The following tables summarizes the nominated and proposed RNAs.

Table SAD-1: Nominated Research Natural Areas

Planning Unit	RNA Name	Type	Acres
DAKOTA PRAIRIE GRASSLANDS			
Little Missouri National Grassland McKenzie	Cottonwood Creek-Badlands	botanical / zoological	6,460
	Bear Den-Bur Oak	botanical	2,840
Little Missouri National Grassland Medora	Bullion Butte	botanical / geological	3,160
	Ponderosa Pines	botanical / zoological	3,530
	Mike's Creek	botanical / zoological	4,490
	Little Missouri River	botanical / geological	1,260
Sheyenne National Grassland	Oak Hills	botanical	390

Planning Unit	RNA Name	Type	Acres
	Fritillary Prairie	botanical / zoological	240
	Bluestem Meadow	botanical	80
	Platanthera Prairie	botanical	400
		Totals	**22,850**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT			
Thunder Basin National Grassland	Rock Creek	botanical	590
	Prairie Creek	botanical	560
	Antelope Creek	botanical	1,090
	Wildlife Draw	botanical	640
		Totals	**2,880**
NEBRASKA NATIONAL FOREST UNITS			
Samuel R. McKelvie National Forest	Steer Creek	botanical	2,500
Buffalo Gap National Grassland Fall River	South Pasture, 777 Allotment	botanical	1,560
	Hay Canyon, Bochert Allotment	botanical	1,010
Buffalo Gap National Grassland Wall	West Wall	botanical	1,040
Fort Pierre National Grassland	Mallard	botanical	1,050
Oglala National Grassland	Prairie Dog, Pasture 45	botanical / zoological	940
Pine Ridge Ranger District	West Ash, Pastures 6, 7, 11	botanical	640
		Totals	**8,740**

Table SAD-2: Proposed Research Natural Areas

Planning Unit	RNA Name	Type	Acres
Samuel R. McKelvie National Forest	Tree Farm	botanical	120

Environmental Consequences

Direct and Indirect Effects

General Effects

Where possible, boundaries of each nominated and proposed RNA are aligned with watershed and fence line boundaries. Areas were reviewed to determine if grazing allotments were active or vacant along with the nature of the current management system. Vacant allotments were favored for consideration of RNA designation along with allotments containing the vegetation composition desirable for representation. The size of each nominated and proposed RNA was designed to maintain ecosystem processes and landscape-scale natural disturbance patterns, when feasible. The local impacts of recreation are much less significant in large areas because

larger areas are more resilient and can absorb the impacts from people which would have a smaller overall effect on ecosystem composition, structure, and processes. The following table shows which RNAs were nominated by alternative and their acreage.

Table SAD-3: Nominated Research Natural Areas by Alternative

Planning Unit	RNA Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Little Missouri National Grassland/McKenzie	Cottonwood Creek-Badlands	0	0	6,460	6,460	0
	Bear Den-Bur Oak	0	0	2,840	2,840	0
Little Missouri National Grassland/Medora	Bullion Butte	0	0	0	3,160	0
	Ponderosa Pines	0	0	3,530	3,530	0
	Mike's Creek	0	0	4,490	4,490	0
	Little Missouri River	0	0	1,260	1,260	0
Sheyenne National Grassland	Oak Hills	0	0	390	390	390
	Fritillary Prairie	0	0	240	240	240
	Bluestem Meadow	0	0	80	80	80
	Platanthera Prairie	0	0	400	400	400
	No. Areas	**0**	**0**	**9**	**10**	**4**
	Acres			**19,690**	**22,850**	**1,110**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT						
Thunder Basin National Grassland	Rock Creek	0	0	590	590	0
	Prairie Creek	0	0	0	560	0
	Antelope Creek	0	0	0	1,090	0
	Wildlife Draw	0	0	640	640	0
	No. Areas	**0**	**0**	**2**	**4**	**0**
	Acres			**1,230**	**2,880**	
NEBRASKA NATIONAL FOREST UNITS						
Samuel R. McKelvie National Forest	Steer Creek	0	0	2,500	2,500	0
Buffalo Gap National Grassland Fall River	South Pasture, 777 Allotment	0	1,560	1,560	1,560	1,560
	Hay Canyon, Bochert Allotment	0	0	0	1,010	0
Buffalo Gap National Grassland Wall	West Wall	0	1,040	1,040	1,040	1,040
Fort Pierre National Grassland	Mallard	0	0	1,050	1,050	1,050

Planning Unit	RNA Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Oglala National Grassland	Prairie Dog, Pasture 45	0	0	0	940	0
Pine Ridge Ranger District	West Ash, Pastures 6, 7, 11	0	0	0	640	0
	No. Areas	**0**	**2**	**4**	**7**	**3**
	Acres		**2,600**	**6,150**	**8,740**	**3,650**

Table SAD-4: Proposed Research Natural Areas by Alternative

Planning Unit	RNA Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Samuel R. McKelvie National Forest	Tree Farm	0	0	120	120	0

Table SAD-5: Existing Research Natural Areas by Alternative

Planning Unit	RNA Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Little Missouri National Grassland/Medora	Limber Pine	680	680	680	680	680
	Two Top/Big Top	100	100	100	100	100
Sheyenne National Grassland	Sheyenne Springs	60	60	60	60	60
	No. Areas	**3**	**3**	**3**	**3**	**3**
	Acres	**840**	**840**	**840**	**840**	**840**
NEBRASKA NATIONAL FOREST UNITS						
Bessey unit	Signal Hill	500	500	500	500	500

Alternative 1 maintains only the acreage of the existing RNAs. Alternative 4 would allow for the most RNAs to be nominated followed by Alternatives 3, 5 and 2 allowing for the least number of RNAs to be nominated.

RNAs are managed to maintain natural and relatively pristine pre-settlement conditions by allowing ecological processes to prevail with minimal human intervention. However, under some circumstances, deliberate manipulation may be utilized to maintain the ecosystem or unique features for which the RNA was established or to re-establish natural ecological processes. Vegetation, habitat, soil productivity, water quality, and ecological processes are to be in a natural condition or in as close a natural condition as practicable. Heritage resources are protected by RNA designation since ground-disturbing activities are limited.

A variety of uses are allowed in RNAs as long as the activity or uses do not become a threat to the values for which the RNA was proposed and so long as direction is followed as outlined in each RNA management plan.

Effects from Facilities Management

Buildings and developed recreation sites are prohibited, unless there are exceptional circumstances that do not threaten the values for which the RNA was proposed. No known adverse effects are expected in any of the alternatives from facilities.

Effects from Fire and Fuels Management

Human-caused wildfires would be controlled in all alternatives. Where excessive fuel build-up from past wildfire suppression threatens the RNA, fires would be controlled.

The use of scheduled prescribed fire may be permitted to restore a natural fire regime or to reduce unnatural fuel loads in all alternatives dependent on the objectives for each of the nominated or proposed RNAs. Fire control techniques would be used that minimize ground disturbance. Natural barriers would be used to confine or contain fire where possible.

Effects from Fish and Wildlife Management

Habitat manipulation for wildlife is prohibited unless it is specifically needed to restore natural ecosystem conditions. Habitat manipulation is allowed if specifically designed for the protection of Federally threatened, endangered or sensitive species. No known adverse effects are expected from fish and wildlife management for any alternative.

Effects from Heritage Resource Management

The Bullion Butte RNA is known as a "traditional cultural practice area." Grasslandwide standards and guidelines would be used to protect these areas. There are no known inventoried archaeological or other heritage resources in any of the other nominated RNAs. However, any such resources located in the future would be given additional protection as a result of an RNA designation. There are no known eligible or listed heritage resources or other buildings or structures within any of the nominated RNAs.

Effects from Insect and Disease Management

Natural outbreaks of native insects and diseases are allowed to proceed without intervention, unless they are a substantial threat to important resources inside or outside the RNA boundary. Control methods will minimize disturbance. No known adverse effects are expected from insect and disease management in any alternative.

Effects from Oil, Gas and Minerals Management

The Bullion Butte, Little Missouri River, Bear Den - Bur Oak, and Cottonwood Creek - Badlands, Mike's Creek and Ponderosa Pine on the Little Missouri National Grassland; Antelope Creek, Prairie Creek, Rock Creek and Wildlife Draw on the Thunder Basin National Grassland; and Prairie Dog (Pasture 45) on the Oglala National Grassland have potential for oil and gas development. However, even though oil and gas leasing is allowed, no ground-disturbing activities are allowed within the boundaries of the RNA. A no surface occupancy stipulation would not cause a reduction in potential oil and gas productivity and would also protect the integrity of the RNA.

When withdrawal from locatable mineral entry is necessary to protect the values for which the area was designated, a request for withdrawal from mineral entry will be in conformance with Section 204 of the Federal Land Policy and Management Act of 1976 (PL 94-576).

Extraction of salable minerals (sand, gravel, hard rock for crushing, and landscape materials) would not be allowed in RNAs.

Effects from Plant and Animal Damage Control

Exotic (non-native and invasive) and noxious plant species would be controlled where feasible and biologically and socially desirable. The control method selected would minimize threats to native species.

Exotic (non-native) animal species would be controlled when feasible and biologically and socially desirable. The control method selected would minimize threats to native species and protect the values for which the RNA was established.

Effects from Livestock Grazing

There are active grazing allotments within all the nominated RNAs. The following table lists the capable rangeland acres that are contained in each RNA. There would be no increase in animal unit months or developments unless the increased grazing or developments are determined necessary as outlined in the RNA management plan to achieve the objectives of that plan. Large ungulate grazing is an important ecological process on the Northern Great Plains. However, site-specific changes regarding season and use by livestock grazing may be proposed during the future development of RNA management and monitoring plans.

Table SAD-6: Nominated Research Natural Areas and Capable Rangeland

Planning Unit	RNA Name	Total Acres	Capable Acres
DAKOTA PRAIRIE GRASSLANDS			
Little Missouri National Grassland McKenzie	Cottonwood Creek-Badlands	6,460	3,130
	Bear Den-Bur Oak	2,840	1,520
Little Missouri National Grassland Medora	Bullion Butte	3,160	2,490
	Ponderosa Pines	3,530	2,685
	Mike's Creek	4,490	1,330
	Little Missouri River	1,260	910
Sheyenne National Grassland	Oak Hills	390	385
	Fritillary Prairie	240	240
	Bluestem Meadow	80	80
	Platanthera Prairie	400	370
	Totals	**22,850**	**13,140**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT			
Thunder Basin National Grassland	Rock Creek	590	590
	Prairie Creek	560	560
	Antelope Creek	1,090	1,080
	Wildlife Draw	640	630
	Totals	**2,880**	**2,860**
NEBRASKA NATIONAL FOREST UNITS			
Samuel R. McKelvie National Forest	Steer Creek	2,500	2,440
Buffalo Gap National Grassland Fall River	South Pasture, 777 Allotment	1,560	1,540

Planning Unit	RNA Name	Total Acres	Capable Acres
	Hay Canyon, Bochert Allotment	1,010	990
Buffalo Gap National Grassland Wall	West Wall	1,040	1,000
Fort Pierre National Grassland	Mallard	1,050	1,020
Oglala National Grassland	Prairie Dog, Pasture 45	940	940
Pine Ridge Ranger District	West Ash, Pastures 6, 7, 11	640	480
	Totals	**8,740**	**8,410**

Table SAD-7: Proposed Research Natural Areas and Capable Rangeland

Planning Unit	RNA Name	Total Acres	Capable Acres
Samuel R. McKelvie National Forest	Tree Farm	120	120

Table SAD-8: Existing Research Natural Areas and Capable Rangeland

Planning Unit	RNA Name	Total Acres	Capable Acres
DAKOTA PRAIRIE GRASSLANDS			
Little Missouri National Grassland Medora	Limber Pine	680	370
	Two Top / Big Top	100	40
Sheyenne National Grassland	Sheyenne Springs	60	60
	Totals	**840**	**470**
NEBRASKA NATIONAL FOREST UNITS			
Bessey unit	Signal Hill	500	500

Range capability to determine allowable livestock production has been examined for all nominated, proposed and existing RNAs. All areas determined capable are considered suitable with the exception of Two Top / Big Top RNA and Signal Hill RNA, both of which have previously been determined as not suitable; however, no net gain in estimated AUMs and no further developments will be allowed until site specific management plans are written for RNAs. Permitted livestock use will only occur as outlined in the RNA management plan. Development of this management plan would be accomplished with the assistance of research personnel, users, and other groups interested in the management of the area through a separate public involvement process in accordance with National Environmental Policy Act. Management Plans would be developed within five years of RNA establishment.

Effects from Recreation Management and Use

The Forest Service would not actively advertise RNAs as destinations for recreation use. However, existing non-vehicular recreation use would be allowed as long as the use does not become a threat to the values for which the RNA was proposed. Current levels of horseback

riding, hunting, hiking, fishing, camping, and related low-impact uses by the public would be allowed to continue. If resource degradation develops from increased use, the public would be encouraged to shift use to other, less impacted areas or administrative closures might be imposed.

Trails that exist prior to RNA designation will be allowed to provide recreation, scientific, or educational access except when they are a threat to the values for which the RNA was proposed. The Maah Daah Hey Trail in the Cottonwood Creek - Badlands RNA and the North Country Trail in the Oak Hills RNA are non-motorized trails and would not have an adverse effect on the RNAs. The construction of new trails is prohibited except when necessary to correct resource damage occurring from existing trails.

Motorized use is not allowed in RNAs, unless necessary for research or authorized administrative access.

Effects from Special-Use Management

Proposals for non-manipulative research would require approval of the Rocky Mountain Research Station Director and the applicable Forest Service authorized officer. Special-use permits are required for the collection of all products as well as for many other types of commercial uses.

Effects from Threatened, Endangered, and Sensitive Species Management

Populations of federally listed threatened or endangered species located within any of the nominated RNAs would be protected according to provisions under the Endangered Species Act and applicable grasslandwide standards and guidelines. Sensitive species located within any of the RNAs would be protected by applicable grasslandwide standards and guidelines. The overall effect of RNA designation would provide additional protection for these species.

Effects from Timber Management

Nominated RNAs are not available for timber harvest. The following table lists the approximate amount of tentatively suitable acres in each of the RNAs which contain timber. Although these lands are tentatively suitable, they would not be available for timber harvest if the RNA is established.

Table SAD-9: Tentatively Suitable Timber Acres by RNA by Alternative

Planning Unit	RNA Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Little Missouri National Grassland Medora	Ponderosa Pines	0	0	810	810	0
Sheyenne National Grassland	Oak Hills	0	0	390	390	0
	Totals	**0**	**0**	**1,200**	**1,200**	**0**

Table SAD-10: Proposed Research Natural Areas by Alternative

Planning Unit	RNA Name	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
NEBRASKA NATIONAL FOREST UNITS						
Pine Ridge Ranger District	West Ash, Pastures 6, 7, 11	0	0	0	630	0

In the determination of timber suitability, based on the suitability criteria, none of the areas listed above are suitable. So even if the RNA is not established there would be no impacts from timber harvest. Vegetation removal for other purposes is not allowed unless it is prescribed in the Research Natural Area Management Plan.

Effects from Travel Management and Motorized Use

New road construction in RNAs would be prohibited. Existing roads would be obliterated, except as documented below, and motorized use would be restricted except when needed for necessary scientific, educational or administrative purposes. The following nominated RNAs have developed roads contained within their boundaries:

Bullion Butte - An access road to a 40-acre parcel of private land exists within the nominated RNA. This parcel of land contains a recreation cabin used from late spring to early fall. The Forest Service is obligated to provide reasonable access to this private land and therefore cannot close the road. This road would not have an impact on the values for which the RNA would be established.

Antelope Creek - This area contains one-quarter mile of Forest Development Road (FDR) 942. This road would not have an impact on the values for which the RNA would be established and it provides access to the RNA.

Hay Canyon, Bochert Allotment - FDR 7045 runs through the RNA. Even though this road provides access to the RNA, the road would have to be closed as it would have an adverse effect on the values for which the RNA was established. This would limit access through the RNA. Alternative routes would have to be used.

All of the nominated RNAs contain, to some degree, two-track trails used to access range developments and for other public use. Use of these two tracks would still be authorized to maintain range developments in accordance to terms listed in a permit but would be closed to the general public. Other two-track roads within nominated RNAs would be obliterated.

Effects from Wilderness Management

Acreages of RNAs within existing or Recommended for Wilderness areas would be managed to standards and guidelines for Wilderness Areas. The following table shows the acres of RNAs within existing or Recommended for Wilderness areas. Effects on Wilderness areas would be insignificant as management actions would adhere to the standards and guidelines for Wilderness.

Table SAD-11: Nominated Research Natural Areas within Existing or Recommended Wilderness by Alternative

Planning Unit	RNA Name	Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS							
Little Missouri National Grassland/Medora	Bullion Butte	3,160	0	0	0	3,160	0
	Ponderosa Pines	3,530	0	0	0	3,530	0
	Little Missouri River	1,260	0	0	0	1,260	0
Sheyenne National Grassland	Oak Hills	390	0	0	0	390	390
	Fritillary Prairie	240	0	0	0	0	240
	Bluestem Meadow	80	0	0	0	0	80
	Platanthera Prairie	400	0	0	0	0	400
		No Areas	**0**	**0**	**0**	**4**	**4**
		Acres				**8,340**	**1,110**
NEBRASKA NATIONAL FOREST UNITS							
Samuel R. McKelvie National Forest	Steer Creek	2,500	0	0	0	2,500	0
Buffalo Gap National Grassland - Fall River	South Pasture, 777 Allotment	1,560	0	0	0	1,560	1,560
Buffalo Gap National Grassland - Wall	West Wall	1,040	0	0	0	0	1,040
		No Areas	**0**	**0**	**0**	**2**	**2**
		Acres				**4,060**	**2,600**

Cumulative Effects

The purpose for establishing Research Natural Areas is to provide areas of representative ecosystems which maintain some elements of biological diversity, to conduct non-manipulative research, for monitoring to determine the effects of management on similar ecosystems, and to foster education. There is currently a Nationwide network of Research Natural Areas that represents certain ecosystem and vegetation types. There are currently only 4 Research Natural Areas established within the planning area. Alternative 4 would nominate 21 new RNAs to be established which would provide representation of ecosystem and vegetation types not currently represented in the RNA system. Alternative 3 would nominate 15 new RNAs and Alternative 5 would nominate 7 new RNAs to be established. Alternative 2 would nominate 2 new RNAs for establishment. Also under Alternatives 3 and 4 one proposed RNA, Tree Farm, would be considered but not nominated as field evaluations have not been conducted to see if it meets the criteria for possible establishment.

Designation of RNAs will add to the acreage on forest and grassland units where ecological processes are largely unaffected by human influences.

Due to the nature of RNAs and the establishment of a Research Natural Area Management Plan, activities can not detract from the values for which the RNA is established. There would be no cumulative effects.

Notes

Roadless Areas

Introduction

Maintaining grassland roadless areas and designating grassland Wilderness areas are important to some people. Thirty-nine areas were analyzed for recommendation to Congress as Wilderness as part of the Northern Great Plains Plans Revision process. Information on four additional areas is provided in Appendix C. (See note beginning on page two of this section.)

The inventory process to identify roadless areas and the results of the inventories are discussed below.

Laws, Policy and Direction

The Forest Service is required to inventory, evaluate and consider all roadless areas for possible inclusion in the National Wilderness Preservation System. 36 CFR 219.17 states:

> Unless otherwise provided by law, roadless areas within the National Forest System (NFS) shall be evaluated and considered for recommendation as potential Wilderness areas during the forest planning process.

Two Wilderness laws pertain to the planning area. The Wilderness Act of 1964 applies to land west of the 100th Meridian and includes all of the planning units, except the Sheyenne National Grassland. The Eastern Wilderness Act of 1975 applies to land east of the 100th Meridian, which includes the Sheyenne National Grassland.

Historical Summary

In 1970, the Forest Service studied all administratively designated primitive areas and inventoried and reviewed all roadless areas greater than 5,000 acres on the national forests and grasslands. This study was known as the Roadless Area Review and Evaluation (RARE). RARE was halted in 1972 due to legal challenges.

In 1977, the Forest Service began another nationwide Roadless Area Review and Evaluation (RARE II) to identify roadless and undeveloped areas within the NFS that were suitable for inclusion in the National Wilderness Preservation System. As a result of RARE II, the following areas were recommended for Wilderness: the 9,000-acre Twin Buttes area on the Little Missouri National Grassland (*Custer National Forest LRMP, Final EIS 119*) and the 6,388-acre Pine Ridge roadless area on the Nebraska National Forest (*Nebraska National Forest LRMP II-35*). RARE II was also challenged in court, and the court determined that RARE II did not fully comply with National Environmental Policy Act (NEPA) requirements.

In 1985, the Nebraska Wilderness Act established the 7,794-acre Soldier Creek Wilderness on the Nebraska National Forest and the 6,599-acre Pine Ridge National Recreation Area, the latter of which is not a Wilderness area.

The stage was set for the RARE II analysis to be re-evaluated and completed during the development of each current land and resource management plan. On the Custer National Forest, RARE II areas became the inventoried roadless areas and were re-evaluated. The 1987

management plan made the following determinations for the roadless areas now on the Dakota Prairie Grasslands:

- Twin Buttes, Bennett-Cottonwood, and Lone Butte (total of about 74,700 acres) - Allocated to a Low Development Management Area.
- The remaining inventoried roadless areas, Ash Coulee, Bell Lake, Bullion Butte, Kinley Plateau, Magpie, Strom Hanson, and Wannagan (about 53,300 acres), were allocated to a mix of multiple-use emphases that ranged from a Range / Wildlife / Minerals prescription to a Wildlife prescription.

No roadless areas were identified on the Thunder Basin National Grassland during RARE II or the 1980's planning effort.

The Nebraska National Forest was authorized by the Chief of the Forest Service to defer the re-evaluation because the Nebraska National Forest was in the final stages of completing the *1984 Land and Resource Management Plan* (*Nebraska National Forest LRMP II-35*). In addition, no activities were planned for any Nebraska National Forest RARE II areas that would preclude future consideration as Wilderness. Three areas, all in South Dakota, remain to be re-evaluated: Indian Creek, 24,670 acres on the Wall Ranger District of the Buffalo Gap National Grassland; and Red Shirt, 9,700 acres and Cheyenne River 7,750 acres on the Fall River District of the Buffalo Gap National Grassland. The special designations of the two RARE II areas in Nebraska was accomplished through the Nebraska Wilderness Act of 1985.

Affected Environment

Within the 250 million acres of the Northern Great Plains planning area, 9 federally designated Wilderness areas (none of which are located on a proclaimed national grassland) exist for a total of 158,234 acres. The following table shows the existing Wilderness acreages by administering agency.

Table SAD-12: Existing Wilderness

Existing Wilderness	Administering Agency	Acres
Chase Lake, ND	US Fish and Wildlife Service	4,155
Lostwood, ND	US Fish and Wildlife Service	5,577
Medicine Lake, MT	US Fish and Wildlife Service	11,366
UL Bend, MT	US Fish and Wildlife Service	20,819
Fort Niobrara, NE	US Fish and Wildlife Service	4,635
Theodore Roosevelt, ND	National Park Service	29,920
Sage Creek, SD	National Park Service	64,144
Black Elk, SD	US Forest Service	9,824
Soldier Creek, NE	US Forest Service	7,794
TOTAL		**158,234**

(Information for table from "The National Wilderness Preservation System Map 1964-1989.")

An inventory of areas essentially roadless in character was completed for each planning unit. All inventories started with an identification of all public highways and Forest Service Development roads maintained for the administration of units. Once the roads were identified, areas more than 5,000 acres in size (exclusive of the Sheyenne National Grassland, which was analyzed based on the Eastern Wilderness Act) without those road types within them were

identified. User-developed unclassified roads are included within the areas inventoried. The process then varied by unit based on the information contained in each unit's GIS. On the Dakota Prairie Grasslands, maps identifying potential roadless areas were sent to district employees for review of improvements within the areas. Direction found in *Forest Service Handbook 1909.12,7* was followed to determine whether existing developments would disqualify the area from the roadless inventory. To assess undeveloped character, the amount of other developments, such as fences, water tanks and other structures, was evaluated. Areas identified with essentially undeveloped character became part of the roadless inventory for evaluation as potential Wilderness.

The following table lists the areas meeting the Forest Service roadless area inventory criteria.

Table SAD-13: Inventoried Roadless Areas

Planning Unit	Inventoried Roadless Area	Acres*
DAKOTA PRAIRIE GRASSLANDS		
Little Missouri National Grassland		
McKenzie	Collar / Bennett-Cottonwood	19,700
	John Town / Horse Creek	24,450
	Lone Butte	11,470
	Long X Divide	10,100
	Magpie	6,700
	Scairt Woman	640
Little Missouri National Grassland		
Medora	Bell Lake	11,270
	Blacktail	8,620
	Bullion Butte	19,880
	Dawson's Waterhole	6,090
	Easy Hill	7,340
	Kinley Plateau	16,900
	Magpie	14,580
	Ponderosa Pine	7,470
	Scairt Woman	5,460
	Strom Hanson	18,810
	Tracy Mountain	9,760
	Twin Buttes	13,390
	Wannagan	6,020
Sheyenne National Grassland	Delamere	5,090
	Durler	12,460
	McLeod	9,120
	Sheyenne	14,540
	Venlo	5,320
TOTAL		**265,180**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT		
Thunder Basin National Grassland	H A Divide	5,060
	Red Hills	6,840
	Cow Creek	8,470
TOTAL		**20,370**

Planning Unit	Inventoried Roadless Area	Acres*
NEBRASKA NATIONAL FOREST UNITS		
Buffalo Gap National Grassland		
Fall River	Red Shirt	8,620
	Red Shirt RARE II	9,700
	Cheyenne River	7,570
	Jim Wilson Canyon	6,020
	First Black Canyon	4,960
Buffalo Gap National Grassland		
Wall	Indian Creek	24,670
TOTAL		**61,540**

*Acreages are computer generated and rounded to the nearest 10 acres.

In addition, during public scoping, the Sierra Club requested the Forest Service evaluate several other areas for Wilderness potential. Although these areas have a fence density greater than that allowed within official Forest Service inventoried roadless areas (FSH 1909.12,7.11a,5b), they have been evaluated for their potential as Wilderness. The table below lists those areas by administrative unit.[8]

Table SAD-14: Public Proposed Wilderness

Planning Unit	Inventoried Roadless Area	Acres*
DAKOTA PRAIRIE GRASSLANDS		
Grand River National Grassland	Grand River Badlands	6,060#
	South Fork	12,830#
	Twin Butte Creek	6,540#
TOTAL		**25,430**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT		
Thunder Basin National Grassland	Cow Creek Buttes	9,710**
	Miller Hills	10,370
	Duck Creek	12,330
	Downs	6,510
TOTAL		**38,920**
NEBRASKA NATIONAL FOREST UNITS		
Buffalo Gap National Grassland		
Fall River	Indian Creek	3,760+
Buffalo Gap National Grassland		
Wall	Rake Creek Badlands	12,230

[8]Note: Forty-three roadless areas have been identified as a part of this revision process. Four of the 43 areas (three located on the Grand River National Grassland - Grand River Badlands, South Fork, and Twin Butte Creek: Dakota Prairie Grasslands, and one on the Fort Pierre National Grassland - Cedar Creek: Nebraska National Forest) do not appear in the alternatives or alternative maps developed for the DEIS. They are not included because of the late date in which the areas were identified. However, these areas are described in Appendix C and will be fully analyzed in the final environmental impact statement.

Planning Unit	Inventoried Roadless Area	Acres*
	Indian Creek	3,890+
Fort Pierre National Grassland	Cedar Creek	8,730#
Pine Ridge Ranger District/Oglala National Grassland	Sugarloaf	9,090
	Toadstool	5,270
Samuel R. McKelvie National Forest	Steer Creek East	60,810
	Steer Creek West	26,220
TOTAL		**130,000**

*Acreages are computer generated and rounded to nearest 10 acres.

**Acreage outside of Forest Service inventoried roadless area.

+Acreage outside of the RARE II area.

Not analyzed in the Draft Environmental Impact Statement. (see footnote 1 for further information)

Environmental Consequences

General Effects

The following tables show roadless areas recommended for Wilderness by alternative and their approximate acreages.

Table SAD-15: Inventoried Roadless Areas Recommended for Wilderness by Alternative

Planning Unit	Roadless Area Name	Alt 1	Alt 2	Alt 3 *Alt 3a*	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Little Missouri National Grassland/McKenzie	Collar/Bennett-Cottonwood	0	0	0	15,590	0
	John Town/Horse Creek	0	0	0	5,460	5,460
	Lone Butte	0	0	0	11,470	0
	Long X Divide	0	0	10,100	10,100	10,100
	Magpie	0	0	0	0	0
	Scairt Woman	0	0	0	0	0
	Total Acres	**0**	**0**	**10,100**	**42,620**	**15,560**
Little Missouri National Grassland/Medora						
	Bell Lake	0	0	0	0	0
	Blacktail	0	0	0	0	0
	Bullion Butte	0	0	0	8,410	0
	Dawson's Waterhole	0	0	0	0	0
	Easy Hill	0	0	0	0	0
	Kinley Plateau	0	0	0	16,900	0
	Magpie	0	0	0	0	0
	Ponderosa Pine	0	0	0	7,470	0

Planning Unit	Roadless Area Name	Alt 1	Alt 2	Alt 3 *Alt 3a*	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
	Scairt Woman	0	0	0	0	0
	Strom Hanson	0	0	0	0	0
	Tracy Mountain	0	0	0	0	0
	Twin Buttes	0	0	7,950	8,940	8,940
	Wannagan	0	0	0	1,600	1,600
	Total Acres	**0**	**0**	**7,950**	**43,320**	**10,540**
Sheyenne National Grassland	Delamere	0	0	0	0	5,090
	Durler	0	0	0	0	12,460
	McLeod	0	0	0	0	9,120
	Sheyenne	0	0	4,090	0	14,540
	Venlo	0	0	0	0	5,320
	Total Acres	**0**	**0**	**4,090**	**0**	**46,530**
Total Acres for Dakota Prairie Grasslands		**0**	**0**	**22,140**	**85,940**	**72,630**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT						
Thunder Basin National Grassland	H A Divide	0	0	0	5,060	0
	Red Hills	0	0	0	6,840	0
	Cow Creek Buttes	0	0	8,460	10,450	8,460
Total Acres for Thunder Basin National Grassland		**0**	**0**	**8,460**	**22,350**	**8,460**
NEBRASKA NATIONAL FOREST UNITS						
Buffalo Gap National Grassland Fall River	Red Shirt RARE II	0	0	8,970 *0*	9,700	9,700
	Red Shirt Inventoried	0	0	7,000 *0*	5,880	0
	Cheyenne River	0	0	0	7,570	0
	Jim Wilson Canyon	0	0	0	6,020	0
	First Black Canyon	0	0	0	4,960	0
	Total Acres	**0**	**0**	**15,970** ***0***	**34,130**	**9,700**
Buffalo Gap National Grassland Wall	Indian Creek	0	0	0	24,520	0
Total Acres for Nebraska National Forest Units		**0**	**0**	**15,970** ***0***	**58,650**	**9,700**

Table SAD-16: Public Proposed Wilderness Recommended for Wilderness by Alternative

Planning Unit	Roadless Area	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Grand River National Grasslands	Grand River Badlands: 6,060 acres**					
	South Fork: 12,830 acres**					

Planning Unit	Roadless Area	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Twin Buttes Creek: 6,540 acres**					
Total Acres for Grand River National Grasslands: 25,430**						
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT						
Thunder Basin National Grassland	Cow Creek	0	0	6,380	7,730	6,800
	Miller Hills	0	0	0	10,370	0
	Duck Creek	0	0	0	12,330	0
	Downs	0	0	0	6,510	0
Total Acres for Thunder Basin National Grassland		**0**	**0**	**6,380**	**36,940**	**6,800**
NEBRASKA NATIONAL FOREST UNITS						
Buffalo Gap National Grassland Fall River	Indian Creek	0	0	0	2,090	0
	Total Acres	**0**	**0**	**0**	**2,090**	**0**
Buffalo Gap National Grassland Wall	Rake Creek Badlands	0	0	0	12,160	0
	Indian Creek	0	0	0	3,870	0
	Total Acres	**0**	**0**	**0**	**16,030**	**0**
Fort Pierre National Grassland	Cedar Creek: 8,730**					
	Total Acres: 8,730**					
Pine Ridge Ranger District/Oglala National Grassland	Sugarloaf	0	0	0	8,360	0
	Toadstool	0	0	0	5,270	0
	Total Acres	**0**	**0**	**0**	**13,630**	**0**
Samuel R. McKelvie National Forest	Steer Creek East	0	0	0	58,290	0
	Steer Creek West	0	0	0	26,120	0
	Total Acres	**0**	**0**	**0**	**84,410**	**0**
Total Acres for Nebraska National Forest Units		**0**	**0**	**0**	**116,160**	**0**

*Acreages are computer generated and rounded to nearest 10 acres.

** These areas are not analyzed in the Draft Environmental Impact Statement (see footnote 1 for further information)

Ratings for Northern Great Plains Roadless Areas

Roadless areas were evaluated for their capability, availability and need for Wilderness recommendations (FSH 1909.12,7.21, 7.22 and 7.23). The following table provides ratings of high, moderate or low for each of the 39 roadless area analyzed in this section. To review the entire Roadless Area Evaluation for Northern Great Plains Planning Units, see Appendix C.

Table SAD-17: Summary Ratings for Northern Great Plains Roadless Areas

Roadless Area	Capability	Availability	Need for Wilderness
DAKOTA PRAIRIE GRASSLANDS			
Little Missouri Grassland/Medora			
Bell Lake	Moderate	Low	Low
Blacktail	Moderate	Low	Low
Bullion Butte	Moderate	High	Moderate
Dawson's Waterhole	Moderate	Low	Low
Easy Hill	Moderate	Low	Low
Kinley Plateau	Moderate	High	Low
Magpie	Moderate	Low	Moderate
Ponderosa Pine	Moderate	High	Moderate
Scairt Woman	Moderate	Low	Low
Strom Hanson	Moderate	Moderate	Low
Tracy Mountain	Moderate	Low	Low
Twin Buttes	Moderate	High	Moderate
Wannagan	Moderate	High	Moderate
Little Missouri Grassland/McKenzie			
Collar / Bennett-Cottonwood	Moderate	Moderate	Moderate
Johns Town / Horse Creek	Moderate	Moderate	Low
Lone Butte	Moderate	Moderate	Low
Long X Divide	Moderate	High	Moderate
Sheyenne National Grassland			
Delamere	High	High	High
Durler	High	High	High
McLeod	High	High	High
Sheyenne	High	High	High
Venlo	Moderate	High	High
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT			
Thunder Basin National Grassland			
Cow Creek Buttes	High	High	High
Downs	High	High	Moderate
Duck Creek	High	Moderate	High
H A Divide	Moderate	Moderate	Moderate
Miller Hills	Moderate	Moderate	Moderate
Red Hills	High	Moderate	High

Roadless Area	Capability	Availability	Need for Wilderness
NEBRASKA NATIONAL FOREST UNITS			
Samuel R. McKelvie National Forest			
Steer Creek East	High	High	Moderate
Steer Creek West	High	High	Moderate
Buffalo Gap National Grassland/Fall River			
Cheyenne Creek	Moderate	Moderate	Moderate
First Black Canyon	Moderate	Moderate	Low
Jim Wilson Canyon	Moderate	Moderate	Low
Red Shirt	High	Moderate	Moderate
Buffalo Gap National Grassland Wall			
Indian Creek (RARE II)	High	Moderate	Low
Indian Creek (Public Proposed)	High	Moderate	Low
Rake Creek	High	Moderate	Low
Oglala National Grassland/Pine Ridge			
Sugarloaf	Moderate	High	Low
Toadstool	Moderate	Moderate	Low

Inventoried roadless areas on the Little Missouri National Grassland that received a "low" availability rating were not considered for Wilderness because of existing oil and gas leases within those areas' boundaries. Each roadless area was analyzed to determine whether or not oil and gas leases existed, whether or not those leases carry no surface occupancy (NSO) stipulations, and whether or not the non-NSO lease distribution would degrade the areas for Wilderness consideration. Those areas that carry a "low" availability rating either have the majority of their acreage leased without NSO stipulations or have non-NSO leases scattered across the roadless area. In some roadless areas, private mineral ownership exists under federal land surface. The Forest Service cannot deny the mineral owner reasonable access for mineral development.

Alternatives 1, 2 and 3a would make no Wilderness recommendations. Alternatives 3, 4 and 5 recommend to Congress different combinations of roadless areas. Areas are recommended as Wilderness based on their capability, availability and evidence of need for Wilderness ratings.

Alternative 3 includes acres from the Long X Divide, Twin Buttes, Sheyenne, Cow Creek and Red Shirt Roadless Areas for a total of 46,570 acres. Roadless areas assigned to MA 1.2 in this alternative were selected due to higher capability, availability and need ratings than most other areas.

All roadless areas, Forest Service inventoried and public proposed, were given a MA 1.2 Recommended for Wilderness allocation in Alternative 4, except the roadless areas on the Sheyenne National Grassland and some on the Little Missouri National Grassland. The Sheyenne roadless areas were not allocated to Management Area 1.2 as the management area direction would be too restrictive for the Alternative 4 restoration emphasis. Little Missouri National Grassland roadless areas not allocated to MA 1.2 have existing oil and gas leases which allow surface occupancy and the leasing pattern is such that there are no contiguous 5,000 acre blocks without existing leases. Alternative 4 includes acres from Collar / Bennett-Cottonwood, Johns Town / Horse Creek, Lone Butte, Long X Divide, Bullion Butte, Kinley

Plateau, Ponderosa Pine, Twin Buttes, Wannagan, HA Divide, Red Hills, Red Shirt, Cheyenne River, Jim Wilson Canyon, First Black Canyon, Indian Creek (RARE II), Rake Creek, Cow Creek, Miller Hills, Duck Creek, Downs, Sugarloaf, Toadstool, Steer Creek East and Steer Creek West Roadless Areas for a total of 309,080 acres.

Roadless areas allocated to MA 1.2 in Alternative 5 was based on outstanding contributions to the recreation emphasis of the alternative. Alternative 5 includes acres from Lone Butte, Long X Divide, Twin Buttes, Wannagan, Delamere, Durler, McLeod, Sheyenne, Venlo, Cow Creek / Cow Creek Buttes and Red Shirt Roadless Areas for a total 96,960 acres.

Table SAD-18: Acres of Wilderness Recommendations by Alternative (All Units)

Alternative	1	2	3	4	5
			3a		
Acres	0	0	46,570	320,040	96,960
			0		

Table SAD-19: Acres of Wilderness Recommendations on the Dakota Prairie Grasslands

Alternative	1	2	3	4	5
Acres	0	0	22,140	85,940	72,630

Table SAD-20: Acres of Wilderness Recommendations on the Nebraska National Forest

Alternative	1	2	3	4	5
			3a		
Acres	0	0	15,970	174,810	9,700
			0		

Table SAD-21: Acres of Wilderness Recommendations on the Thunder Basin National Grassland

Alternative	1	2	3	4	5
Acres	0	0	14,840	59,290	15,260

Allocations of Roadless Areas by Alternative

Roadless areas are allocated to various management areas by alternative. Areas assigned a Recommended for Wilderness Management Area prescription do not create Wilderness areas. Ultimately, Congressional representatives must write and pass legislation creating designated Wilderness areas. The tables below show the roadless acreages assigned to each management area by alternative. To review a specific roadless area for its management area allocation by alternative, see Appendix C.

Table SAD 22: Roadless Area Acreage[9] Allocations to Management Areas--Dakota Prairie Grasslands

Management Area Prescription	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
1.2			22,190	85,940	72,670
1.31	42,480		120,180	98,930	78,650

[9]Total roadless acreage is 265,180. Acres may be off due to rounding

Management Area Prescription	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
2.1		780	780	310	70
2.2	60	60	11,700	700	60
3.4				3,800	3,980
3.51	12,990	42,440	180		9,380
3.63				10,830	
3.64	3				
3.65			37,910	12,980	
3.66			36,240	38,300	
4.22			3,830		
4.32			120	120	
4.4				1,100	1,090
5.12			5,620	7,650	
6.1	209,480	221,740	26,320	4,340	99,160

Table SAD 23: Roadless Area Acreage[10] Allocations to Management Areas--Thunder Basin National Grassland

Management Area Prescription	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
1.2			14,850	59,280	15,260
1.31			6,500		6,500
3.65			37,930		
5.12		59,280			
6.1	59,280				37,510

Table SAD 24: Roadless Area Acreage[11] Allocations to Management Areas--Nebraska National Forest

Management Area Prescription	Alternative 1	Alternative 2	Alternative 3 *Alternative 3a*	Alternative 4	Alternative 5
1.1	7,810	7,810	7,810	7,810	7,810
1.2			15,970 *0*	174,810	9,700
1.31		9,700	12,160		120,270
1.31a	6,540	6,540	6,540	6,540	6,540
2.1		910	30,860 *58,950*		30,860
2.2		1,560	4,060		1,560
3.4				1,440	
3.63			11,740 *760*	120	10,990
3.64		790	3,480	60	5,980
3.66				2,160	

[10]Total roadless acreage is 59,280. Acres may be off due to rounding

[11]Total roadless acreage is 197,130. Acres may be off due to rounding

Management Area Prescription	Alternative 1	Alternative 2	Alternative 3 *Alternative 3a*	Alternative 4	Alternative 5
4.4					1,440
5.12		2,160			
6.1	182,780	167,660	104,500 *103,370*	4,170	1,980

For roadless areas not designated by Congress as Wilderness, management area allocations as outlined in the alternatives may or may not retain general undeveloped natural characteristics. By in large, these management area allocations divide along the prescription categories as described above. For the most part, management area categories 1 and 2 do retain those general undeveloped natural characteristics, while prescription categories 3, 4, 5 and 6 may not.

Category 3 management areas may retain relatively high undeveloped natural characteristics; however, certain activities associated with such allocations may reduce undeveloped natural characteristics to such a degree that their potential for Wilderness consideration would be lost. For instance, in Management Area 3.63 (Black-footed Ferret Reintroduction), road and facility construction may occur if needed to support reintroduction efforts. Another example is Management Area 3.64 [Ecosystem Restoration (Tallgrass Prairie)], the intensity with which prescribed fire could be used may limit the extent to which managers allow natural-disturbance processes to evolve, exclusive of human intervention.

The table below shows by alternative acres within roadless areas that generally do or do not retain undeveloped natural characteristics, as determined by management area allocations.[12]

Acres shown below in the table for each alternative may be off by no more than 200 acres from the base acreage (507,280 acres). These minor differences result from unavoidable mapping techniques that cannot reflect exact acreages at the scale with which the roadless area maps were developed.

Table SAD-25: Management Area Acres (and Percentages) By Alternative that Generally Do or Do Not Retain Undeveloped Natural Characteristics

	Alt 1	Alt 2	Alt 3	Alt 3a***	Alt 4	Alt 5
***Acres (and Percentages) Retaining Wilderness Character**	0 (0%)	13,010 (3%)	239,220 (47%)	29,650 (73%)	419,980 (83%)	335,560 (66%)
****Acres (and Percentages) Not Retaining Wilderness Characteristics**	507,280 (100%)	494,090 (97%)	267,880 (53%)	10,980 (27%)	87,110 (17%)	171,540 (34%)

* Acres represent Management Areas 1.2, 1.31, 2.1 and 2.2.

** Acres represent Management Areas 3.4, 3.51, 3.63, 3.64, 3.65, 3.66, 4.22, 4.32, 4.4, 5.12 and 6.1.

*** Acres apply to the Fall River Ranger District of the Buffalo Gap National Grassland only.

[12] Please note that the acres shown do not include the three roadless areas on the Grand River National Grassland and the one roadless area on the Fort Pierre National Grassland. These areas were not mapped for the DEIS, but will be mapped and displayed in the final environmental impact statement. These four public proposed roadless areas total 40,085 acres.

Direct and Indirect Effects

Effects Common to All Alternatives

None of the alternatives would alter the management for the one existing Wilderness, Soldier Creek, or for the Pine Ridge National Recreation Area on the Nebraska National Forest.

It is the intent of the Forest Service that, under all alternatives, motorized use within recommended Wilderness or Backcountry Recreation Non-motorized areas be allowed for: 1) emergency purposes, such as rescue operations, 2) the suppression of wildfire when the need to suppress exceeds the estimated risks, 3) authorized administrative functions, 4) authorized maintenance of livestock developments by permittees, and 5) the recovery of threatened and endangered species when and where the needs of recovery efforts require motorized support.

Wildfire suppression and prescribed burning for specific purposes would be allowed in recommended Wilderness and Backcountry Recreation Non-motorized areas under all alternatives.

Livestock grazing would be allowed under all alternatives within roadless areas. Adjustments in the provisions of the livestock permit would be determined on a site specific basis. If an area is designated Wilderness by Congress, adjustments to livestock grazing would be made in to meet Wilderness bill legislation and to protect the resources located within the Wilderness area.

Designation of an area as Wilderness by Congress normally withdraws the area from availability for mineral leasing. Areas recommended for Wilderness are available for leasing with no surface occupancy stipulations.

Private subsurface mineral ownership under a federal surface ownership (including Wilderness areas or areas proposed for Wilderness designation) can occur on the public lands. The owner of these subsurface mineral rights must be allowed reasonable access to those areas by the agency responsible for managing the surface (typically, the Forest Service). If the agency denies a lessee the opportunity to develop a lease, regardless of the mineral ownership (federal or private), such denial would constitute a taking and the agency must compensate the lessee for potential lost revenue that may have resulted from that lease's development.

Before development activities would occur that could affect the potential Wilderness characteristics within any inventoried Forest Service roadless area, additional environmental analysis would be completed.

Effects from Fire and Fuels Management

Wildfire suppression would be allowed within areas assigned to Management Areas 1.2 (Recommended for Wilderness) and no surface occupancy Recreation Non-motorized); however, the suppression strategy would be perimeter control versus direct control that would be allowed in other management areas. Perimeter control would likely result in more acres being burned from wildfire. The use of heavy ground-disturbing equipment within these management areas requires permission from the appropriate line officer. This requirement could also result in more acres being burned by wildfire. Alternative 4 would allocate the most

roadless acres to Management Areas 1.2 and 1.31, followed by Alternatives 5, 3, 2 and 1. Wildfire suppression activities in other than these management areas could affect the wilderness characteristics if heavy equipment was used to build firelines. The actual effects of wildfires cannot be accurately predicted because wildfires themselves are unpredictable.

Prescribed burning would be allowed under all alternatives in all management areas as long as the prescribed fire supports the direction within the management area. Effects from prescribed burning is anticipated to be low within roadless areas, except in Alternatives 4 and 5 on the Sheyenne National Grassland where effects may be moderate in order to restore tallgrass prairie ecosystems.

Effects from Fish and Wildlife Management

Structures for fish or wildlife habitat improvement would be allowed in all management areas; however, in Management Areas 1.2 and 1.31, structures would be subordinate and in keeping with the semi-primitive / primitive character of the area. Roadless areas allocated to other than those management areas, especially Management Area 3.63, could have habitat improvement structures constructed that would affect the characteristics of the area.

Effects from Insect and Disease Management

In roadless areas allocated to Management Area 1.2, insect and disease control actions would only be taken when outbreaks threatened resource values outside of the area. Therefore, the effects from insects and disease could be more evident in Alternative 4 with the most amount of roadless areas allocated to Management Area 1.2, followed by Alternatives 5, 3, 2 and 1. Roadless areas assigned to other management areas would not have restrictions on insect and disease control. While the effects from outbreaks might be less noticeable, in timbered areas especially, management activities could involve practices that would change the vegetative structure.

Effects from Oil, Gas and Minerals Management

Oil and gas development, including wells, pumping stations and roads, affects potential Wilderness characteristics. Oil and gas development is restricted to non-ground-disturbing activities in Management Areas 1.2, 1.31, 2.2 (Research Natural Areas), 3.51(Big Horn Sheep) and some 2.1 (Special Interest Areas). Alternative 4 has the most roadless acres allocated to management areas with no ground-disturbing restrictions in place, followed by Alternatives 5, 3, 2 and 1. Even if roadless areas are allocated to the above management areas there may be effects from oil and gas development that could change the potential Wilderness characteristics. Where existing leases are in force, exploration for and the development of oil and gas minerals would not be restricted beyond the requirements of the existing lease. Also, several of the roadless areas have private mineral ownership within them. The Forest Service cannot prohibit development of private oil and gas minerals. The Forest Service could purchase private subsurface rights or existing leases in order to better protect the characteristics within areas recommended for Wilderness. The cost of such purchases, however, may be prohibitive.

Coal occurrence potential in any of the roadless areas, except Ponderosa Pine on the Little Missouri National Grassland, is low. Although there are coal resources under the Ponderosa

Pine roadless area, the potential for development is low. Therefore, effects from coal development in the roadless areas in all alternatives are anticipated to be negligible.

Unless an area is withdrawn from mineral entry, prospecting and removal of locatable minerals could occur in all alternatives. A portion of the Toadstool roadless area has been withdrawn from mineral entry. The potential for occurrence of locatable minerals is low in all roadless areas. Therefore, the likelihood of effects from locatable mineral development is low for all alternatives.

The removal of mineral materials would not be allowed in Management Areas 1.2, 1.31 and 2.2. Even though the other management area prescriptions do not restrict the removal of mineral material, the occurrence and potential for development of such minerals is low in all of the roadless areas in all alternatives.

Effects from Plant and Animal Damage Control

The use of ground-based motorized and mechanical equipment to support the application of pesticides and other chemicals would be allowed in all alternatives, although restrictions could be placed on the method of control used in the non-motorized management areas. It is anticipated that effects would vary little by alternative, and the effects from plant and animal damage control would be low.

Effects from Range Management and Livestock Grazing

The presence of livestock may detract from a primitive recreational experience; however, on grassland ecosystems, livestock may also add to the cultural and historic nature of settlement. Livestock can adversely affect natural resources such as soil damage from soil compaction and erosion caused by trailing. Livestock sometimes contribute to the spread of exotic and noxious weeds. Undesirable plant seeds can be carried and deposited by hooves, hide and the fecal droppings of livestock.

Development of additional fences and water developments to support livestock management could change the potential Wilderness character of a roadless area. The amount of fence and developments was taken into account in the initial roadless inventory process. For grassland units, any more than an average of one mile of interior fence per section precluded an area from the roadless inventory. Likewise, numerous structural range improvements dropped an area from the roadless inventory if the amount was enough to detract from the semi-primitive / primitive setting.

Management Areas 1.2, 1.31, 2.1, 2.2, and 3.65 (Rangelands with Diverse Natural-Appearing Landscapes) prohibit a net gain in the amount of fences and water developments. This restriction would tend to maintain roadless characteristics. In addition, the vegetative matrices applied to these management areas and Management Area 3.64 on the whole tend to have higher percentages of high vegetative structure. The high vegetative structure would reduce noticeable effects from livestock grazing and would result in a natural-appearing landscape. The alternative with the highest roadless acreage in management areas emphasizing high vegetative structure and maintenance of current fence and water developments is Alternative 4. On the Dakota Prairie Grasslands and Thunder Basin National Grassland following Alternative 4, the alternatives anticipated to have the next fewest effects from range management and livestock grazing are Alternatives 3 and 5. For the Nebraska National Forest units after

Alternative 4, the alternative with the next fewest effects would be Alternative 5, followed by Alternative 3.

Alternatives 1 and 2, with no restrictions on the amount of fencing or number of range improvement structures, could adversely affect the potential Wilderness characteristics of the roadless areas.

Effects from Recreation Management and Use

Developed recreation facilities would adversely affect potential Wilderness characteristics of roadless areas. Construction of developed recreation facilities would be restricted in Management Areas 1.2, 1.31, 2.2, and 3.51. Alternative 4 has the most roadless acreage allocated to these management areas, followed by Alternatives 3 and 5 on the Dakota Prairie Grasslands and Thunder Basin National Grassland. For the Nebraska National Forest units, Alternative 4 also has the most roadless acreage allocated to management areas with restrictions on constructing developed recreation facilities, followed by Alternatives 5 and 3. Although there are no restrictions in Alternatives 1 or 2 on construction of developed recreation facilities, it is unlikely that any would be constructed. The effect to existing roadless areas from developed recreation facilities would be low in all alternatives.

People interested in backcountry non-motorized experiences in pristine settings where solitude and serenity are highly prized would likely increasingly visit management areas with non-motorized opportunities. Such user groups as hikers, backpackers, canoeists, photographers and nature seekers may best represent those who would visit. Any effects such use might create would likely be more than compensated for by the elimination of motorized recreation.

See the Effects from Travel Management section for effects from motorized recreationists. Adverse effects to roadless areas from mechanized recreation such as mountain biking is anticipated to be low in all alternatives. Although mountain biking can cause soil erosion and rutting, the majority of the activity occurs on existing trail or roads.

Effects from Timber Management

Because so few acres of timber are located within any of the roadless areas and no suitable timber is found within any roadless area, effects resulting from commercial timber harvests would be low in all the alternatives.

Effects from Travel Management and Motorized Use

Alternatives 1 and 2 have the fewest restrictions on travel management and have the least amount of roadless area acres allocated to non-motorized management areas. Within these alternatives, the continued use of unclassified roads within the roadless areas would be anticipated. The likelihood of resource damage from rutting and soil erosion would be the greatest in these alternatives. Alternatives 1 and 2 also have the fewest amount of restrictions on the construction of new roads. There is a likelihood that new roads, especially for oil and gas development, could be constructed.

Effects from motorized use would be the least in Alternative 4, followed by Alternatives 5 and 3 as these alternatives have the most roadless acreage in management areas restricting motorized use. Also Alternatives 3, 4 and 5 restrict motorized use to designated routes, which would help

limit off-road soil erosion and rutting. In general, in areas allocated to non-motorized management areas, unclassified roads would be allowed to revegetate over time and return to a natural state. No road maintenance would be conducted on unclassified roads. Some unclassified roads might be retained and maintained as part of a recreational trail system. Some effects resulting from increases in non-motorized use can be expected. In general, effects from non-motorized uses are anticipated to be less adverse than the effects from motorized uses.

New trails (and trailheads) might be designed, constructed and maintained in all the roadless areas. This would not adversely affect the potential Wilderness characteristics.

Effects from Special Area Designations

Most special area designations would retain potential Wilderness characteristics. Therefore, adverse effects to roadless areas from special area designations would be low.

Cumulative Effects

Presently, there are no designated Wilderness areas on any national grassland. Alternative 4 would recommend the most roadless areas for designation, followed by Alternative 5 on the Dakota Prairie Grasslands and Thunder Basin National Grassland. On the Nebraska National Forest units, Alternative 4 recommends the most Wilderness designations, followed by Alternatives 3 and 5.

Changes to roadless area characteristics from road, facility and range improvement construction, and oil and gas development would be least in Alternative 4, followed by Alternatives 5 and 3 on the Dakota Prairie Grasslands and Thunder Basin National Grassland. On the Nebraska National Forest units, Alternative 4, followed by Alternatives 3 and 5 would result in the least amount of potential adverse impacts to roadless characteristics.

Alternatives 1 and 2 could result in changes in several of the roadless areas because range improvement structures and oil and gas development would be allowed.

Presently, Mike Dombeck, Chief of the Forest Service has established an interim road policy that suspends new road construction projects, including temporary road construction and road reconstruction projects, within unroaded areas. Existing oil and gas leases would be exceptions to this road construction rule. The rule will remain in effect for 18 months from its effective date (3/1/1999). Therefore, under all alternatives, there would be no road construction or reconstruction within the roadless areas unless already permitted under an existing lease or right.

Notes

Special Interest Areas

Introduction

Special Interest Areas (SIAs) are managed to protect or enhance areas with unusual characteristics, such as scenic, historical, geological, botanical, zoological, paleontological or others. Management emphasis is on protecting or enhancing and, where appropriate, developing and interpreting for public education and recreation, areas with unusual characteristics.

Laws, Policy and Direction

The National Environmental Policy Act of 1969 (NEPA) describes the responsibility of federal agencies to preserve important historic, cultural and natural aspects of our national heritage. Also, 36 CFR 294.1 allows for the classification of Special Interest Areas (SIAs): "Suitable areas of National Forest System land, other than Wilderness or wild areas, which should be managed principally for recreation use, may be given special classification."

Affected Environment

In 1993, the Custer National Forest Management Plan was amended to include candidate SIAs. (This plan is currently in force on the Dakota Prairie National Grasslands.) Amendments 18 and 31 identified the following candidate SIAs:

- Botanical - Black Cottonwood, Bullion Butte Escarpment, Pretty Butte, Black Butte, and Round Top Butte.
- Geological - Burning Coal Vein, and Ice Caves
- Biological - Denbigh Experimental Forest

The 1984 *Nebraska National Forest Management Plan* designated two SIAs:

- Hudson-Meng Bison Bonebed
- Charles E. Bessey Nursery.

There are no SIAs designated on the Thunder Basin National Grassland.

A summary of potential SIAs, by administrative unit, follows: (Please note: Between completion of the Analysis of the Management Situation and alternative development, it was determined that some potential SIAs were improperly identified and fit other designations better. The following table has been updated to reflect the most current inventory.) For location maps of the potential SIAs, refer to Appendix F.

Table SAD-26: Potential Special Interest Areas

Planning Unit	SIA Name	Type	Approximate Acres (#s over 10 rounded to nearest 10)
DAKOTA PRAIRIE GRASSLAND UNITS			
Grand River and Cedar River National Grasslands	Aspen Stand	botancial zoological	10
	Grand River Sanddunes	botancial geological	70
	Bog Hole	botancial geological	30
	White Butte	botancial geological historical prehistoric recreational scenic	130
Little Missouri National Grassland/Medora	Square Butte	botanical geological historical paleontological zoological	1,600
	Battle of the Badlands	geological historical paleontological zoological	1,220
	Black Butte	botancial geological historical prehistoric scenic zoological	730
	Black Cottonwood	botanical historical zoological	290
	Bullion Creek Formation Type Section	geological, paleontological	550
	Burning Coal Vein / Columnar Junipers	botanical geological historical paleontological zoological	210
	Cannonball / Slope Contact	geologic, paleontological	60

Planning Unit	SIA Name	Type	Approximate Acres (#s over 10 rounded to nearest 10)
	Ice Caves	botancial geological historical recreational scenic zoological	240
	Pretty Butte	botanical geological historical paleontological prehistoric scenic zoological	320
	Riparian Pools	botancial historical zoological	50
	Roundtop Butte	botanical	10
	Slope Type Formation	geologic	190
	Custer Trail-Davis Creek	botanical historical scenic zoological	700
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT			
Thunder Basin National Grassland	Cheyenne River Zoological (formerly East Pasture)	botanical, zoological	5,980
	Paleontological (formely Thunder Basin)	paleontological	5,140
	Walker Teepee Ring Site	historical	490
	Cellars Teepee	prehistoric historcial	960
NEBRASKA NATIONAL FOREST UNITS			
Bessey Ranger District	Tree Plantations	botanical historical scenic	19,000
Samuel R. McKelvie National Forest	Tree Plantations	botanical historical scenic	2,160
	Mallard Exclosure	botanical	1,030
Buffalo Gap National Grassland - Fall River	Edgemont Shark Locality	paleontological	960

Planning Unit	SIA Name	Type	Approximate Acres (#s over 10 rounded to nearest 10)
	Wallace Ranch Localities	paleontological	420
	One-Mile Hill	paleontological	640
	Marietta South	paleontological	270
	Swift Fox	zoological	11,580
	Indian Creek	geological paleontological scenic	830
Buffalo Gap National Grassland - Wall	Red Shirt	scenic	36,940
	Indian Creek	geological paleontological scenic	24,660
	Kadoka Lake	botanical, zoological	1,050
	Scenic Type Section	geologic, paleontolo-gical	360
	Weta Dam	botanical, zoological	570
Oglala National Grassland	Quaking Aspen Stand	botanical	3
	Toadstool Park	geological paleontological recreational scenic	910
	Warbonnet / Yellow-hand	historical	30
Pine Ridge Ranger District	Bur Oak Enclosure	botanical	3
	Mountain Mahogany Stand	botanical	90

Environmental Consequences

Resource Protection Measures

Special Interest Area allocations offer management opportunities to protect or enhance and, where appropriate, develop and interpret for public education and recreation, areas with unusual characteristics. Many uses are allowed in Special Interest Areas, including recreation, livestock grazing, mineral leasing and road construction, but only if such uses do not degrade the characteristics for which these areas are designated.

Designation of SIAs by Alternative

The two existing SIAs on the Nebraska National Forest, Charles E. Bessey Nursery and Hudson Meng Bison Bonebed, will continue as SIAs in all alternatives.

The following table shows potential SIAs by alternatives and approximate acreages (numbers over 10 acres are rounded to nearest 10):

Table SAD-27: Special Interest Areas by Alternative

Planning Unit	SIA Name	Alt 1	Alt 2	Alt 3 *Alt 3a*	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Grand River and Cedar River National Grasslands	Aspen Stand	0	0	0	0	10
	Bog Hole	0	30	30	30	30
	Grand River Sanddunes	0	70	70	70	70
	White Butte	0	130	130	130	130
Little Missouri National Grassland/Medora	Square Butte	0	0	1,600	1,600	1,600
	Battle of the Badlands	0	0	1,220	1,220	1,220
	Black Butte	0	0	720	720	0
	Black Cottonwood	0	290	290	0	0
	Bullion Creek Type Formation	0	550	550	550	550
	Burning Coal Vein / Columnar Junipers	0	210	210	210	210
	Cannonball / Slope Contact	0	60	60	10	10
	Ice Caves	0	240	240	0	0
	Pretty Butte	0	0	320	320	0
	Riparian Pools	0	0	50	50	50
	Roundtop Butte	0	0	10	10	10
	Slope Type Formation	0	190	190	60	60
	Custer Trail-Davis Creek	0	0	700	700	700
	Total Acres	**0**	**1,770**	**6,390**	**5,680**	**4,650**
MEDICINE BOW-ROUTT NATIONAL FOREST UNIT						
Thunder Basin National Grassland	Cheyenne River Zoological	0	0	5,980	0	0
	Paleontological (formerly Thunder Basin)	0	5,140	5,140	5,140	5,140

Planning Unit	SIA Name	Alt 1	Alt 2	Alt 3 *Alt 3a*	Alt 4	Alt 5
	Walker Teepee Ring Site	0	490	490	490	490
	Cellars Teepee	0	960	960	960	960
	Total Acres	**0**	**6,590**	**12,570**	**6,590**	**6,590**
NEBRASKA NATIONAL FOREST UNITS						
Bessey Ranger District	Tree Plantations	0	10	19,540	10	19,540
	Charles E Bessey Nursery	30	30	30	30	30
Samuel R. McKelvie National Forest	Tree Plantations	0	0	2,170	0	2,170
	Mallard Exclosure	0	0	680	0	680
Buffalo Gap National Grassland - Fall River	Edgemont Shark Locality	0	0	940 *940*	940	940
	Wallace Ranch Localities	0	0	420 *420*	420	420
	One-Mile Hill	0	0	630 *630*	640	640
	Marietta South	0	0	260 *260*	270	270
	Swift Fox	0	0	*11,580*	0	0
	Indian Creek	0	0	830 *830*	0	0
	Red Shirt	0	0	*36,160*	0	0
Buffalo Gap National Grassland - Wall	Scenic Type Section	0	0	0	350	360
	Indian Creek	0	0	27,870	0	27,870
	Kadoka Lake	0	0	0	0	1,030
	Weta Dam	0	0	0	0	120
Oglala National Grassland	Quaking Aspen Stand	0	3	3	3	3
	Toadstool Park	0	910	910	0	910
	Hudson Meng	40	40	40	40	40
	Warbonnet/Yellow-hand	0	20	20	20	20
Pine Ridge Ranger District	Bur Oak Enclosure	0	3	3	3	3
	Mountain Mahogany Stand	0	30	90	90	90
	Total Acres	**70**	**1,046**	**54,436** ***105,256*[3a]**	**2,816**	**55,136**

On the Dakota Prairie Grasslands, Alternatives 2 through 5 would provide the greatest acreage of SIA designation. Alternative 1, the no-action alternative, would provide no SIA designations.

On the Thunder Basin National Grassland (Medicine Bow-Routt National Forest), Alternative 3 would provide the greatest acreage of SIA designation. Alternatives 2, 4 and 5 each would provide fewer acres, while Alternative 1, the no-action alternative, would provide no SIA designations.

On the Nebraska National Forest, the Alternative 3a / Alternative 3 combination would provide the greatest acreage of SIA designations (Alternative 3a addresses only the Fall River Ranger District of the Buffalo Gap National Grassland). Alternative 5 would provide fewer acres. Alternative 3, which addresses SIA allocations differently than Alternative 3a on the Fall River Ranger District, would provide yet fewer acres. Finally, Alternative 4 would provide even less acres, while Alternative 2 would provide yet less acres. Alternative 1, the no-action alternative, would provide no new SIA designations.

Effects Common to All Alternatives

Management direction for SIAs allows uses and activities, such as recreation, livestock grazing, mineral leasing and road construction, only if such activities do not degrade the characteristics for which the area was designated. Designation of SIAs may place some limits on management activities.

Effects from Fire and Fuels Management

The location and timing of wildfire ignitions are largely unpredictable. When such ignitions occur, fire suppression would be conducted as quickly as possible under the guidance of fire-response plans. Response techniques are dictated by the resources and developments at or near the wildfire ignition. Protecting the resources for which specific SIAs have been designated would be weighed against the value of resources lost should wildfires spread beyond the boundaries of SIAs. Although wildfires may produce both positive and negative effects to grassland vegetation and resources, it is impossible to predict the extent to which such effects may occur within SIAs. Wildfire response would seek to minimize the adverse effects associated with fire.

Prescribed burning is conducted in order to achieve certain beneficial results, such as fuel-load reductions and wildlife habitat improvements. Such activities are conducted only after prescribed burning plans have been written and the effects of prescribed burning activities are analyzed. The implementation of prescribed burns would be conducted only when such activities do not significantly reduce the resource values for which an SIA has been designated. In some cases, depending on the resource, prescribed burns within SIAs could enhance the values for which the SIA has been designated.

Generally, adverse effects associated with fire and fuels treatment within SIAs are anticipated to be low to insignificant.

Effects from Fish and Wildlife Management

Activities in response to fish and wildlife management would be conducted in SIAs only if such activities would not degrade the characteristics for which the SIA was designated or if they are required for threatened or endangered species recovery. Fish and wildlife management activities within SIAs would normally be implemented to enhance the values for which the SIA has

been designated. Therefore, adverse effects associated with fish and wildlife management are anticipated to be insignificant for all alternatives.

Effects from Insect and Disease Management

Insect and disease management can have significant adverse effects upon vegetation, wildlife and other resources. Using insecticides to control grasshopper outbreaks, for instance, has been shown to adversely impact certain grassland bird species. In any case, prior to treating an area to address insect or disease concerns, the Forest Service evaluates the effects of implementation in an environmental document . No such treatments would be conducted within an SIA if such treatments adversely affected the unique attributes for which the SIA was designated. Therefore, adverse effects associated with insect and disease management are anticipated to be low to insignificant for all alternatives.

Effects from Land Adjustments

It is unlikely that the Forest Service would conduct land adjustments, such as land exchanges or the disposal of land designated as an SIA. Land adjustments are routinely evaluated and reviewed based on the merit of the land adjustment proposal. Effects from land adjustments to SIAs are anticipated to be insignificant.

Effects from Oil, Gas, Minerals Management

Oil, gas and minerals exploration and development can cause significant adverse effects, including major ground disturbances. Management guidance for SIAs, however, require that activities do not adversely affect the characteristics and features for which an SIA was designated. Environmental documents must be prepared in advance of any disturbances within an SIA resulting from oil, gas and minerals management. If anticipated disturbances are considered significant, oil, gas and minerals activities would have to be redesigned so as not to create adverse effects upon the characteristics for which an SIA was designated. Because the effects of oil, gas and minerals exploration and development will be evaluated prior to the implementation of associated activities within an SIA, and because adverse effects will be addressed prior to exploration and development, effects from oil, gas and minerals management is anticipated to be low, in all alternatives, where the mineral resources are under federal ownership.

The following potential SIAs have subsurface non-federal mineral ownership: Edgemont Shark Locality (390 acres) and Swift Fox (5,793 acres) on the Fall River District of the Buffalo Gap National Grassland and Battle of the Badlands (300 acres) on the Medora District of the Little Missouri National Grassland. The potential for oil and gas occurrence in these areas ranges from high to moderate. For both Edgemont Shark Locality and Battle of the Badlands the private subsurface ownership occurs mostly in the high potential for oil and gas occurrence. These two areas would be designated SIAs in Alternatives 3, 3a, 4 and 5. Except for about 100 acres, the private mineral ownership in the Swift Fox area occurs in a moderate potential oil and gas area. This area would be designated a SIA in Alternative 3a. There is a possibility that the subsurface owners would develop the mineral resource. This could have a detrimental effect, in those alternatives where the areas would be designated as SIAs, on the characteristics of the areas depending on type of mineral development planned. Since the mineral ownership is the

dominant estate, the Forest Service would be limited in applying restrictions on mineral development where the mineral ownership is non-federal.

Effects from Plant and Animal Damage Control

Activities in response to plant and animal control would be conducted in SIAs only if such activities do not degrade the characteristics for which the SIA was designated. For instance, treatment of undesirable exotic plants or noxious weeds would normally benefit the native botanical characteristics for which some SIAs might be designated. Such treatment programs can, however, have adverse effects if treatment techniques are done incorrectly. Procedures to control specific plant and animals are conducted only by trained professionals and only after the proper environmental documentation is completed. Therefore, adverse effects associated with plant and animal control within SIAs are anticipated to be low for all alternatives.

Effects from Range Management and Livestock Grazing

Range management and livestock grazing could pose potential adverse effects within some SIAs, including ground disturbances, impairment of riparian areas, streams and bottom areas, impacts to botanical resources, and damages to fossil resources found on or near the surface. Management guidance for SIAs, however, requires that activities do not adversely affect the characteristics and features for which an SIA was designated. Environmental documents must be prepared periodically for grazing management. If anticipated disturbances are considered substantial, range management activities and livestock grazing would have to be redesigned so as not to create adverse effects on the characteristics for which an SIA was designated. Therefore, adverse effects associated with range management and livestock grazing are anticipated to be low to insignificant for all alternatives.

Effects from Recreation Management and Use

Recreation could disturb the characteristics for which some SIAs may be designated. Unauthorized and unpermitted collection of unique or rare plants, historical artifacts, or vertebrate fossils, for instance, even if considered recreational in nature by the public, could substantially and adversely impact some potential SIAs. Another concern is vandalism as it relates to recreation or any other activity within an SIA. Signing notifying the public about the significance and value of the unique features within an SIA may reduce illegal collecting and vandalism. A proactive and on-going public education program might also reduce the incidence of illegal collecting and vandalism, as might the frequent presence and visibility of law enforcement. Alternative 5 would provide the greatest opportunity for public education, followed by Alternative 3.

Hiking, camping, hunting, canoeing, picnicking, horseback riding, nature study and other associated recreational activities should not unduly affect the characteristics for which an SIA may be designated.

In general, adverse effects resulting from recreation management and use within SIAs are anticipated to be low to insignificant in all alternatives. Alternatives 5 and 3 with the greatest acres of designated SIAs would also have larger budgets to provide resource protection for the areas.

Effects from Timber Management

None of the potential SIAs contain commercially viable quantities of timber. Within a few SIAs, some timber management might be conducted for purposes other than commercial production, including the improvement of wildlife habitat. Such projects would be implemented only after the proper environmental documentation analyzing the effects of the timber activities is completed. In any case, no timber management projects would be conducted if they adversely affected the characteristics for which an SIA was designated. Effects resulting from timber management within SIAs are anticipated to be insignificant for all alternatives.

Effects from Travel Management and Motorized Use

Travel management and motorized use pose significant challenges in the management of many of the potential SIAs. Travel management does differ by alternative, too, which substantially alters the anticipated effects of motorized use.

Under Alternatives 1 and 2, motorized travel would not be restricted. Motorized traffic, including the use of recreational vehicles such as ATVs, would be allowed to access any site, except those designated to non-motorized use only. Since none of the potential SIAs would be designated as non-motorized sites, effects from travel management and motorized use could be significant. Such sites that contain fossils, rare and sensitive plants, and easily disturbed soils may be particularly vulnerable to unrestricted motorized use.

Other travel, including horseback riding and hiking, could affect those characteristics for which SIAs are designated. Horses, like other hooved animals, can cause substantial damage to vegetation and soils if use is concentrated.

Under Alternatives 3 through 5, motorized travel is restricted to designated routes. Where designated routes enter SIAs, some resource damage along the designated routes might be expected. Since most SIAs are not located along Forest development roads, it is anticipated that few routes within SIAs would become designated routes under Alternatives 3 through 5.

In general, adverse effects from motorized use within SIAs under Alternatives 3 through 5 are anticipated to be moderate to low.

Wild and Scenic Rivers

Introduction

Wild and Scenic River studies have shown that many stretches of several rivers appear to meet eligibility requirements. In the case of the Little Missouri River in North Dakota, segments of the river flowing through the Little Missouri National Grassland and Theodore Roosevelt National Park were analyzed as part of this analysis process. The National Park Service, therefore, is a cooperating agency. The USDA-Forest Service is the lead agency.

Laws, Policy, and Direction

The Wild and Scenic Rivers Act of 1968 establishes a national policy to "preserve selected rivers or sections thereof in their free-flowing condition, to protect water quality of such rivers and to fulfill other vital national conservation measures." The Act in Section 5(d) directs all federal agencies to give consideration to potential national wild, scenic and recreational river areas in all planning for use and development of water and related land resources. For a river to be included in the Wild and Scenic Rivers System, it must first meet the tests of eligibility and suitability. To be found eligible, a river must be free flowing and possess river features judged to be "outstandingly remarkable." The act, as well as USDI and USDA guidelines, require that, to be found suitable, the benefits of designation should outweigh the disadvantages. This evaluation includes looking at the landownership in the area, the land uses that would be affected, public, state and local government interests in the river's designation, estimated costs, and any other issues raised during the planning process.

Despite Congressional legislation that creates a mechanism to establish Wild and Scenic Rivers, a recommendation by the USDA-Forest Service or National Park Service for any particular river or river segment does not guarantee that Congress will proceed with the recommendation. The agencies can only recommend the inclusion of a river within the National Wild and Scenic River System. Congress must act upon the recommendation.

Historical Summary

The Custer National Forest identified the Little Missouri River as meeting the eligibility criteria for possible inclusion into the National Wild and Scenic Rivers System during development of the first management plan in 1987. No suitability study was completed.

The Medicine Bow National Forest did not identify any rivers as being eligible on the Thunder Basin National Grassland during their first planning effort completed in 1985.

The *1984 Nebraska National Forest Land and Resource Management Plan* did not identify any rivers as being eligible for inclusion into the National Wild and Scenic River System. The review of river eligibility focused primarily on the lack of scenic quality and shortness of river length flowing through the lands administered by the Nebraska National Forest. The rivers reviewed were:

- Niobrara (NE) - approximately 1/2 mile,

- Snake (NE) - approximately 1 mile,
- Dismal (NE) - approximately 3 miles,
- Middle Loup (NE) - approximately 2 miles,
- Cheyenne (SD) - approximately 14 miles, and
- White (SD) - approximately 4 miles.

In 1990, the Director of the National Park Service asked that national park units determine whether rivers within the park boundaries were eligible for nomination under the Wild and Scenic Rivers Act. The directive required that if a river or segment of a river were found eligible for nomination, at the next appropriate planning process involving river resources, a suitability study would determine whether or not to recommend to the U.S. Congress that the river or segment be designated under the Wild and Scenic Rivers Act. The directive also recommended that where a river flowed through another agency's jurisdiction, a joint suitability study be conducted.

In 1992, Theodore Roosevelt National Park (TRNP) determined that the entire segment of the Little Missouri River (27.2 miles) within the boundaries of the three TRNP units was eligible for designation. The identified outstanding remarkable values of the Little Missouri River within the park include scenic, recreational, geological, fisheries, historic, cultural and ecological.

- South Unit: 11.5 total river miles,
- Elkhorn Unit: 1.0 total river miles, and
- North Unit: 14.7 total river miles.

Affected Environment

The Little Missouri River is currently the only river in the planning area specifically being managed to preserve its characteristics as a potential Wild and Scenic River. There are no designated Wild and Scenic Rivers within the administrative boundaries of any of the units involved in the Northern Great Plains Plans Revision. Within the Northern Great Plains, segments of two rivers have been included in the Wild and Scenic River System: the Missouri and the Niobrara. Several segments of the Missouri River have been designated, including a segment in Montana, and other segments in Nebraska and South Dakota. A segment of the Niobrara River southeast of Valentine, Nebraska, has also been designated.

The Nebraska National Forest and Thunder Basin National Grassland conducted a systematic review of all sixth-level watersheds using Geographic Information Systems (GIS). The GIS computer program mapped all the sixth-level watersheds for these units on a scale of 1:126,720. An interdisciplinary team on each district then reviewed the major stream within each sixth-level watershed for free-flowing characteristics and evaluated the free-flowing segments using Forest Service Region 2 criteria to determine if segments had any outstandingly remarkable characteristics. Eligibility-determination criteria indicating an outstanding rating could include: scenic, recreation, geology, fisheries, wildlife, prehistoric, historic and ecological / vegetative.

The Dakota Prairie Grasslands (formerly a part of the Custer National Forest) reviewed all intermittent and perennial streams. The evaluation of these streams then followed the same process as the other units. The process for assessing outstandingly remarkable values for every criteria for each stream evaluated is on file at the Forest Supervisor's Office in Chadron, Nebraska.

Values were judged "outstandingly remarkable" when compared to other streams on a regional level. For streams found eligible, an estimate of possible future designation as "wild," "scenic," or "recreational" was made.

The table below displays the results of the Forest Service's eligibility inventory.

Table SAD-28: Wild and Scenic River Inventory

Planning Unit	River	Classification	Miles	Outstandingly Remarkable Features
DAKOTA PRAIRIE GRASSLAND UNITS				
Little Missouri National Grassland	Little Missouri	wild, scenic, and recreational	3.3 wild 88.9 scenic 13.7 recreation	scenery, fisheries, wildlife
Sheyenne National Grassland	Sheyenne	recreational	10.2	plant species, fisheries, ecologic, archeologic, hydrology
NEBRASKA NATIONAL FOREST UNITS				
Bessey Ranger District	Middle Loup	recreational	0.5	Bessey Nursery, Bessey recreation complex
Buffalo Gap National Grassland - Fall River	Cheyenne	scenic	8.6	fisheries, wildlife, scenic, recreation
	Rapid Creek	scenic	1.7	fisheries, wildlife

The table below displays results of the National Park Service's eligibility inventory along the Little Missouri River in Theodore Roosevelt National Park.

Table SAD-29: Theodore Roosevelt National Park Classifications for the Little Missouri River

Planning Unit	River	Classification	Miles	Outstandingly Remarkable Features
South Unit	Little Missouri	recreational wild and scenic	1.5 recreational 5.8 scenic 4.2 wild	scenic, recreational, geological, fisheries, historic, cultural, ecological
Elkhorn Unit	Little Missouri	scenic	1.0 scenic	scenic, recreational, geological, fisheries, historic, cultural, ecological
North Unit	Little Missouri	Wild and Scenic	4.0 Scenic 10.7 Wild	scenic, recreational, geological, fisheries, historic, cultural, ecological

Environmental Consequences

Recommendations by Alternative for National Forest System River Segments

The table below shows Wild and Scenic River recommendations by alternative, classification and miles.

Table SAD-30: Recommendations by Alternative (miles)

Planning Unit	River	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
DAKOTA PRAIRIE GRASSLANDS						
Little Missouri National Grassland	Little Missouri	0	0	0	3.3 wild 88.9 scenic 13.7 recreation	92.2 scenic 13.7 recreation
Sheyenne National Grassland	Sheyenne	0	0	0	0	10.2 recreation
NEBRASKA NATIONAL FOREST UNITS						
Bessey Ranger District	Middle Loup	0	0	0	0.5 recreation	0
Buffalo Gap National Grassland / Fall River	Cheyenne	0	0	0	8.6 scenic	8.6 recreation
	Rapid Creek	0	0	0	1.7 scenic	1.7 recreation

On the Dakota Prairie Grasslands, Alternative 5 provides the greatest combined miles of wild, scenic and recreational designations (116.1 miles), followed by Alternative 4 at 105.9 miles. Alternatives 1, 2 and 3 provide no miles.

On the Nebraska National Forest, Alternative 4 provides the greatest combined miles of wild, scenic and recreational designations (10.8 miles), followed by Alternative 5 at 10.3 miles. Alternatives 1, 2 and 3 provide no miles.

No river segments were found eligible for Wild and Scenic River designation on Thunder Basin National Grassland.

Direct and Indirect Effects

The effects from major programs and activities on potential Wild and Scenic River segments are described below. Unless otherwise noted, the effects apply to "wild, scenic, or recreational" Wild and Scenic River designations:

Effects from Fire and Fuels Management

In general, adverse effects from fire and fuels management is anticipated to be low to insignificant. Any anticipated adverse effects from intentional fire and fuels treatment (prescribed burning) would be addressed in the fuels management plan developed prior to project implementation. If necessary, anticipated adverse effects would be mitigated as outlined in the fuels management plan.

Effects from Fish and Wildlife Management

In general, effects from fish and wildlife management is anticipated to be low to insignificant. Projects may be developed to address or otherwise enhance fish and wildlife habitat conditions within river segments. Effects of projects proposed within the river corridor, however, would be addressed in project-level plans written prior to implementation. Construction and maintenance of minor structures for the protection, conservation, rehabilitation or enhancement of fish and wildlife habitat would be allowed provided they would not have a direct and adverse effect on the values of the river, including its free-flowing nature.

Effects from Insect and Disease Management

In general, anticipated effects from insect and disease management is considered low to insignificant. Any anticipated adverse effects resulting from implementation of insect or disease projects, such as the release of biological agents, chemical toxins or the use of mechanized equipment, would be mitigated in project-level plans.

Effects from Land Exchange, Acquisition or Condemnation

Section 6 (a)(1) of the Wild and Scenic Rivers Act addresses land acquisition. Under this act, the Secretary of the Interior and the Secretary of Agriculture are each authorized to:

> "acquire lands and interests in land within the authorized boundaries of any component of the national wild and scenic rivers system designated in section 3of this Act, or hereafter designated for inclusion in the system by Act of Congress ..."

Although Section 6 (a)(1) also authorizes land exchanges between affected state-administered and tribal-administered lands, no such lands or eligible river segment corridors exists under the authority of affected states and tribal governments. As such, no land exchange is necessary under designation.

Section 6 (a)(2) authorizes either the Secretary of Interior or the Secretary of Agriculture to purchase lands outside of eligible corridors: "When a tract of land lies partially within and partially outside the boundaries of a component of the National Wild and Scenic Rivers System, the appropriate Secretary may, with the consent of the landowners for the portion outside the boundaries, acquire the entire tract."

The key to this authority is "with the consent of the landowners." In other words, the federal government would only negotiate with willing sellers. Private acres considered eligible for inclusion in the National Wild and Scenic River System exist along the Little Missouri and Sheyenne River corridors in North Dakota.

Section 6(a)(1) further limits the amount of land the federal government can purchase to not more than an average of 100 acres per river mile within the corridor--that is, approximately 50 acres (a 400-foot strip) on either side of the river's bank. Easement purchases--which allow the acquisition of partial rights to lands, but not the actual title to the land--carry no limitations.

Section 6 (c) addresses land condemnation:

> "Neither the Secretary of the Interior nor the Secretary of Agriculture may acquire lands by condemnation, for the purpose of including such lands in any national wild, scenic or recreational river area, if such lands are located within

any incorporated city, village or borough which has in force and applicable to such lands a duly adopted, valid zoning ordinance that conforms with the purposes of this Act."

Furthermore, land condemnations are considered a "last resort," and can be employed only after all other means are exhausted and only when:

- The land is clearly needed to protect resource values or to provide necessary access for public recreational use and a selling price cannot be agreed upon,
- Clearing title to a property is a legal procedure that has nothing to do with government/landowner differences, and
- Those affected would not be given less than fair-market value for their land.

Section 6 places additional limitations on land condemnation. The "50-percent rule" allows for no condemnation for fee title of private land when more than 50 percent of the lands within the river boundary are in federal, state or local government (public) ownership. The 50-percent rule does not apply when used to clear title or to acquire conservation or use easements reasonably necessary to provide public access or resource protection.

In general, designation would reduce impacts on land within the river corridors and would protect and enhance visual resources more fully than non-designation. In addition, designation is likely to create marketing opportunities, since public interest usually follows Congressionally designated areas. Such designation is often used by businesses, industries and government entities to capture a larger segment of visitors and to stimulate tourism. At the same time, increased visitation also may result in increased conflicts between specific groups of users, such as recreationists and livestock permittees.

Management guidance for the development of project-level implementation within designated corridors would be found in Comprehensive River Management Plans, which must be written within three years of designation. A notice of availability and completion of these plans must be published in the Federal Register.

Effects from Oil, Gas and Minerals Management

It is anticipated that effects from mineral management, other than oil and gas, would be low in all alternatives. Although there are locatable and leasable mineral resources located within stream segments recommended for Wild and Scenic River designation in Alternatives 4 and 5, the likelihood of mineral development is low. There would be no anticipated adverse effects from mineral material removal as mitigation measures would be included project-level plans.

The Little Missouri River is the only stream with the potential be affected from oil and gas management. The oil and gas development potential is high along approximately one-half of its length. For segments recommended for wild designation, there would be no adverse effects from new oil and gas leases as no ground disturbing activities would be allowed. Adverse effects from new leasing on segments recommended for scenic or recreational designation would be low as any effects would be mitigated by leasing stipulations. Existing leases would remain in effect and could have an adverse effect on recommended wild, scenic or recreational river segments. Since the restrictions on oil and gas development within the river segments vary in the existing leases, it is difficult to determine precise adverse effects. Therefore, the adverse effects from oil and gas management are anticipated to be moderate.

Effects from Plant and Animal Damage Control

Even though biological, chemical or mechanical means may be used to control such species, no significant adverse effects are anticipated under any alternative.

Effects from Range Management and Livestock Grazing

Effects from range management and livestock grazing are anticipated to be to moderate under any recommended river designations.

Guidelines issued by the Secretary of Agriculture and the Secretary of Interior indicate that livestock grazing and agricultural practices should be similar in nature and intensity to those present in the area at the time of designation. Grazing is permitted under the "wild," "scenic" and "recreational" classifications but are managed to maintain the values for which the river is designated.

Livestock can, however, cause adverse effects on water quality, fisheries, soils and vegetation within and outside of riparian and aquatic zones, through compaction, alterations to streams, stream beds and stream banks, and the creation of cattle trails. These concerns would be addressed within the Comprehensive River Management Plan developed for designated river segments. In addition, livestock grazing and its management would be addressed within the appropriate allotment management plans for designated river segments.

Effects from Recreation Management and Use

Overall, the effects of recreational use and management within designated river segments are anticipated to be low. Although recreationists may use designated river segments for camping, canoeing and hiking, their anticipated impact is expected to be minimal.

Recreation users expect to experience primitive conditions within "wild" river segments, and so recreation developments would not be allowed.

Recreation users expect to experience semi-primitive conditions within "scenic" river segments and, so, should recreational developments be built within "scenic" river corridors, their construction would be accomplished in such a way as to blend with the surrounding area and in such a manner as to not adversely affect the reasons for "scenic" river designation.

Recreation users might expect some recreational developments within designated "recreational" river segments. Designation might, in fact, accelerate the construction of developed recreational facilities, such as canoe launches or picnic areas.

Minimal impacts may be anticipated, including some additional trash not disposed of properly by recreationists. A greater concern might be escaped fires resulting from recreation use. Fire suppression would be initiated wherever and whenever necessary. Even so, the chances of such effects are anticipated to be low.

Fishing and hunting would not be prohibited under a "wild," "scenic" or "recreational" classification. Fishing and hunting are regulated under state laws. Agencies, such as the U.S. Forest Service and the National Park Service, in consultations with state fish and wildlife agencies, may, however, establish no-hunting zones for the purposes of public safety.

Effects from Timber Management

No timber harvests or other timber management projects are likely to occur in any of the eligible river segments should they be designated. There are, in fact, no commercially viable or suitable timber stands along any eligible segments. As such, anticipated effects from timber management do not apply within designated river segments.

Effects from Travel Management and Motorized Use

In general, the effects from travel management and motorized use are anticipated to be low within designated "wild" river segments. Effects from non-motorized use and permitted motorized use are anticipated to be low in "scenic" or "recreational" river segments.

Within "scenic" and "recreational" segments, road building or river crossing developments to accommodate motorized traffic would be allowed. However, construction of such developments might be additionally costly as design specifications seek to reduce visual impacts and the number of river crossings. If motorized use, such as recreational vehicle use, were shown to be causing adverse environmental effects, travel-closure orders may be applied at the discretion of the district ranger. If motorized travel routes are designated within "scenic" or "recreational" river corridors, there would be potential for moderate levels of environmental effects.

Even though some eligible river segments, especially those classified as "wild," are very remote and quite inaccessible, the Wild and Scenic Rivers Act does not prohibit motorized use within designated segments. Because of the remote nature of "wild" river corridors, versus either "scenic or recreational," the volume of motorized traffic by land vehicles would be extremely low.

However, effects from travel management and motorized use do vary by alternative. Alternatives 1 and 2 allow for motorized access without restrictions. Despite this fact, neither Alternative 1 nor 2 recommend any river segments for designations. Therefore, motorized use by land vehicles, including recreational vehicle use, within Alternatives 1 and 2, is a moot point.

Alternatives 3, 4 and 5 restrict motorized use to designated routes only; however, these alternatives would allow motorized use for administrative purposes. Since none of the eligible "wild" river corridors have any developed travel routes within them, including roads or trails, no motorized use over land, including recreational use, would be allowed. The Wild and Scenic Rivers Act does prohibit road building or developments for purposes of motorized river crossings in "wild" segments.

Non-motorized access within designated river segments would not be restricted. Canoeing the river corridor or hiking in on foot or horseback would likely be the primary ways to access "wild" or "scenic" river segments, as well as many "recreational" segments.

In addition, motorized boats, jet skis, hovercraft and other types of water-bound motorcraft are allowed in "wild," "scenic" and "recreational" river segments, consistent with Congressional intent and the river management objectives as outlined in the enacting legislation and the Comprehensive River Management Plan.

Effects to Water-Resource Projects and Water Rights

Section 7 (a) of the Wild and Scenic Rivers Act addresses water-resources projects:

> "The Federal Power Commission shall not license the construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the Federal Power Act (41 Stat. 1063), as amended (16 U.S.C. 791a et seq.), on or directly affecting any river which is designated in section 3 of this Act as a component of the national wild and scenic rivers system or which is hereafter designated for inclusion in that system, and no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration."

In addition, this section also addresses water developments above and below designated river segments:

> "Nothing contained in the foregoing sentence, however, shall preclude licensing of, or assistance to, developments below or above a wild, scenic or recreational river area or on any stream tributary thereto which will not invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area on the date of designation of a river as a component of the National Wild and Scenic Rivers System."

This section clearly prohibits major projects requiring federal licensing, including dams and hydroelectric projects, that would significantly and adversely impact the characteristics for which a river segment is designated. In addition, no such projects would be allowed in corridors outside of designated segments if such projects significantly impeded the characteristics for which river segments were designated.

Minor water projects using federal government funds, grants or licenses may be allowed within corridors, depending upon the anticipated effects of such projects. For instance, irrigation projects might be allowable if their impacts were considered insignificant. Irrigation projects outside designated corridors would be objectionable only if such projects were so large as to adversely affect the qualities for which a river segment was designated.

Alterations to existing irrigation or water withdrawal facilities may be approved under Section 7 of the act as long as there is no direct or adverse effect to the values for which the river was designated. The valid and existing rights of present landowners to use water and shorelines are not affected by designation.

The Wild and Scenic River Act's (Section 1(b)) stated policy is to preserve certain rivers in their "free-flowing condition" and to "protect the water quality" of such rivers. The act addresses, both expressly and by implication, protection of water flows and quality of designated rivers. Section 13(c) states:

> "Designation of any stream or portion thereof as a national wild, scenic or recreational river area shall not be construed as a reservation of the water of

such streams for purposes other than those specified in this Act, or in quantities greater than necessary to accomplish these purposes."

Section 13(b) states that jurisdiction over waters is determined by established principles of law. As a general rule existing, valid water rights are not affected by designation. Few cases for water rights established under the act have been determined. It is a general policy of federal land management agencies to operate under the umbrella of state law in dealing with water rights.

State water rights, such as contracts or interstate compacts, are protected and not affected by designation.

Furthermore, Section 13 does provide the authority for a reserved federal water right; however, the intent of the act is to reserve water only in the amounts necessary to accomplish the purposes of the act--that is, to preserve the free-flowing condition of the river and to preserve the values for which the river was designated. The Supreme Court has held that the federal government may, at the least, reserve unappropriated water (water not subject to a right vested under state law) for federal purposes from federal "public domain" lands [United States v. New Mexico, 438 U.S. 696 (1978)].

Recommendations by Alternative for National Park System

In addition to river segments flowing through National Forest System lands, 27.2 miles of the Little Missouri River in North Dakota that flow through Theodore Roosevelt National Park were analyzed as part of this process. National Park Service recommendations by alternative, classification and miles are shown in the table below. Note: The National Park developed four alternatives, while the U.S. Forest Service developed five alternatives. For purposes of clarity and ease in mapping, however, the National Park Service's four alternatives have been merged into the five alternatives developed by the U.S. Forest Service.

Table SAD-31: National Park Service Recommendations by Alternative (miles)

Planning Unit	River	Alt 1 and 2	Alt 3	Alt 4	Alt 5
Theodore Roosevelt National Park	Little Missouri	0	6.8 Scenic 14.9 Wild	1.5 Recreational 10.8 Scenic 14.9 Wild	21.7 Scenic

Within Theodore Roosevelt National Park, Alternative 4 provides for the greatest combined miles (27.2) of river that would be recommended for designation, followed by Alternatives 3 and 5. Alternatives 1 and 2 do not provide for any miles of river designation.

Wild designation, in Alternatives 3 and 4 would involve 14.9 miles on the Little Missouri River within Theodore Roosevelt National Park. This includes 4.2 miles in the South Unit from the confluence with Beef Corral Wash to the north boundary and 10.7 miles in the North Unit from the point the river enters the park at the southwestern corner to where the river leaves the park at Section 33, T148N, R99W.

Except for three short segments, the river corridor within the three park units is within the park's "natural zone." The natural zone was designated by the park's *1987 General Management Plan* and is managed to maintain the primitive character and natural processes of the park.

Miles of eligible "scenic" river segments for the Little Missouri within Theodore Roosevelt National Park are found in Alternatives 3, 4 and 5. Eligible "scenic" river segments include 5.8 miles in the South Unit from Section 16, T140N, R102W to the confluence with Beef Corral Wash; 1 mile in the Elkhorn Unit and 4 miles in the North Unit from Section 33, T148N, R99W to the eastern park boundary.

"Recreational" designation would involve only one segment of the Little Missouri River within Theodore Roosevelt National Park. This segment includes 1.5 miles in the South Unit from the northern boundary of Chimney Park State Historic Site in Section 22, T140N, R102W to Section 16, T140N, R102W, just north of Interstate 94. An error does exist, however, on the Wild and Scenic Rivers map prepared for Theodore Roosevelt National Park. The map should show 1.5 miles of "recreational" river within the national park from Medora north to Interstate 94. Currently, the map shows this segment as a "scenic" segment. The error will be corrected in the final printing of the map. The proposed "recreational" segment is within the park's "natural zone."

Direct and Indirect Effects on National Park System River Segments and Programs

The effects on major programs and activities from potential Wild and Scenic River designation are described below. Unless otherwise noted, the effects apply to "wild, scenic, or recreational" Wild and Scenic River designations:

Effects on Fire and Fuels Management

Fire and fuels management would not be affected by the designation of any river segments. If required and flow conditions permit, motorized suppression efforts using the river would still be permitted. Prescribed fire burn plans or other fuels management needs in the backcountry would address and eliminate or mitigate any anticipated adverse effects from these actions on the river.

Effects on Fish and Wildlife Management

In general, effects of Wild and Scenic River designation on park fish and wildlife management activities would be low to insignificant. Construction and maintenance of minor structures for the protection, conservation, rehabilitation or enhancement of fish or wildlife habitat may be permitted within designated river segments, provided they do not have a direct and adverse effect on the values of the river, including its free-flowing nature. If fish or wildlife projects are proposed, the effects would be addressed and impacts to river values would either be eliminated or mitigated in project plans or environmental documents prior to implementation. Because of the nature of the park, there are no current or future anticipated wildlife management activities involving structures within recommended segments. The only current wildlife management activity within the quarter-mile corridor is the North Unit bison-handling facility. It is well screened by vegetation from the river.

Effects on Habitat Management and Livestock Grazing

Habitat management activities within the river corridor in the park are employed only to restore native conditions. Livestock grazing is not allowed within the three park units. As a result, no

effects of river designations on habitat management and livestock grazing programs can be expected.

Effects on Insect and Disease Management

A very limited number of projects may be developed to address insects and diseases associated with vegetation or other resources within designated river corridors. If these projects are necessary, any anticipated adverse effects resulting from implementation, such as the release of biological agents, chemical toxins, or the use of mechanized equipment, would be identified, studied and either eliminated or mitigated as outlined in specific project plans. In general, effects of river designation on insect and disease management would be low to insignificant.

Effects on Oil, Gas and Other Minerals Management

Mining and oil and gas extraction are prohibited within the park's boundaries unless subject to a valid, existing use. There are no inholdings of surface or mineral rights along the river classified as "wild" or "scenic" in either the North or South Units. In the Elkhorn Unit, all minerals are federal except for a 44.72-acre parcel of private minerals. About one-quarter mile of this acreage borders the Little Missouri River. Surface occupancy within the national park or within the river corridor designated as "scenic" would be prohibited. In addition, the drilling company would need to submit a plan of operations to the park for approval to go after oil and gas in this one tract. The above two requirements are in place under existing park regulations. Therefore, the proposed "scenic" sections of the river would have no impact on mineral management activities within the park. There are no inholdings of surface or mineral rights along the river classified as "recreational" in the South Unit. Therefore, the proposed "recreational" section of the river would have no impact on mineral management activities within the park.

Effects on Plant and Animal Damage Control

Projects designed to control noxious and/or exotic plants and animal species would occur within designated river segments. Biological, chemical and/or mechanical means may be used to control such species. The park is extremely conservative with the use of chemical control within the river corridor. The use of chemicals requires regional and Washington, D.C., office approval. Consequently, no significant adverse effects on the park's Integrated Pest Control Management Program are anticipated from river designations.

Effects on Visitor Management and Use

Park visitors currently use the proposed "wild" river segments for camping, canoeing, hiking and horseback riding. These recreational users expect to experience primitive conditions within the proposed "wild" river segments. Because these segments are within the park's natural zone, recreational developments are already prohibited.

"Wild" designation may generate an increase in canoe use and maybe there would be sufficient interest to warrant canoe-outfitter services. Increased use may result in additional visitor impacts including additional trash not disposed of properly, associated impacts to the riparian plant communities due to improper backcountry camping techniques along the river and loss of a "quality" visitor experience should the levels of use increase dramatically. Increased use may also cause increased trespass onto private lands outside the park's boundaries by recreationists.

These potential impacts are minimized because usually there are only sufficient water flows for canoeing in the spring and early summer.

Overall, the effects of "wild" designation on visitor use within the proposed segments are anticipated to be low. Potential impacts can be addressed in the river management plan and monitored by park staff. If monitoring shows the necessity, better signing, education, regulations or camping restrictions could be implemented to mitigate or control visitor behavioral activities.

"Scenic" designation may generate sufficient interest to warrant canoe outfitting services. However, these recreational users expect to experience semi-primitive conditions within the "scenic" river segments. Consequently, the only recreational developments that would be constructed would be those necessary to protect the riparian environment or provide essential visitor services.

"Scenic" designation, particularly if the "wild" designation also occurs, may generate an increase in canoe use and maybe there would be sufficient interest to warrant canoe-outfitter services. Increased use may result in additional visitor impacts including additional trash not disposed of properly, associated impacts to the riparian plant communities due to improper backcountry camping techniques along the river and loss of a "quality" visitor experience should the levels of use increase dramatically. Increased use may also cause increased trespass onto private lands outside the park's boundaries by recreationists. These potential impacts are minimized because usually there are only sufficient water flows for canoeing in the spring and early summer.

Overall, the effects of "scenic" designation on visitor use within the proposed segments are anticipated to be low. Potential impacts can be addressed in the river management plan and monitored by park staff. If monitoring shows the necessity, better signing, education, regulations or camping restrictions could be implemented to mitigate or control visitor behavioral activities.

Park visitors currently use the proposed "recreational" river segment for canoeing and to access segments of the river north of Interstate 94. Consequently, there are no recreational developments within this segment and such developments would only be constructed if absolutely necessary to protect river resources. Increased use may result in additional visitor impacts including additional trash not disposed of properly, associated impacts to riparian plant communities due to improper backcountry camping techniques along the river and loss of a "quality" visitor experience should the levels of use increase dramatically. These potential impacts are minimized because usually there is only sufficient water flows for canoeing in the spring and early summer.

Overall, the effects of the "recreational" designation on visitor use within the designated "recreational" river segment are anticipated to be low. Potential impacts can be addressed in the river management plan and monitored by park staff. If monitoring shows the necessity, better signing, education, regulations or restrictions can be implemented to mitigate or control visitor behavioral activities.

Effects on Timber Management

Neither timber harvest nor collection of firewood is permitted in the park. Any hazard fuel reductions would be completed by an approved plan that would address impacts these actions

might have on river values. Consequently, anticipated effects of designation on these activities do not apply.

Effects on Travel Management and Motorized Use

Within the three park units, motorized vehicle use is restricted to developed roads. Visitors would access the "wild," "scenic" or "recreational" units by canoeing, hiking or horseback riding. The park's *General Management Plan* does not recommend any additional road construction.

Parking lots occur within the corridor of the "scenic" segments, but visitors must use short trails to actually access the river.

While the Wild and Scenic Rivers Act does allow the use of motorized boats, the flow of the river precludes the use of motorized boats except during spring flows or during floods. It is the park's intent to continue to prohibit motorized boat use at all times, except for emergency vehicles. Snowmobile use on the frozen river surface would be managed according to park regulations and state law.

Cumulative Effects

No streams or rivers in North Dakota, western South Dakota, eastern Wyoming or western Nebraska are currently part of the Wild and Scenic Rivers System. A portion of the Missouri River in southeastern South Dakota and northeastern Nebraska, and a portion of the Niobrara River in northcentral Nebraska are part of the national system.

Additional designated river segments in North and South Dakota, Wyoming and Nebraska may create new regional attractions for visitors. Some increased recreational use, tourism and infusions of outside money into local communities could be expected. Special Congressional designations tend to draw people to those areas. For example, designation of the Niobrara River in Nebraska has increased recreational use and resulted in an increase in service businesses related to tourism.

Designation of wild and scenic rivers does not open private land to public access. Landowners can continue to post their property as closed to public access. Newly developed access points and recreational facilities would likely reduce trespass and impacts on both private and public lands.

On-going uses of private land, particularly those existing at the time of river designations, are not directly affected. Most private land uses within the vicinity of eligible river segments, such as ranching, farming, recreation and tourism, are compatible with wild and scenic river management.

Since wild and scenic river designations establish a measure of protection from future incompatible land uses and development, designations can have a positive impact on property values and private property marketability. In addition, designations often serve to reinforce traditional land uses in rural areas by restricting large-scale developments, such as dam construction, which create significant adverse environmental and social effects.

Although the effects of non-designation may not significantly increase recreation or tourism in or near the designated river segments, non-designation may represent a lost opportunity to

protect stream characteristics that are unusual to the region. In addition, non-designation may represent a lost opportunity to reinforce traditional land uses in rural areas.

Other Topics and Disclosures

Planning Coordination and Outreach

The Forest Service continually coordinates with scores of state and local governments, associations, tribes, partners, groups and other entities. This ongoing process is an effort to better identify common goals and visions for the National Forest System lands and adjacent lands on the Northern Great Plains. As part of this effort, the Forest Service tries to keep abreast of the many plans, like county land-use plans, developed by other counties or other entities. Such entities include: county and tribal governments, state wildlife agencies, recreation and tourism agencies, regional economic development groups, state and local transportation departments, and research colleges and universities, to name just a few.

In the fall and winter of 1996-97, Forest Service district rangers and legislative coordinators contacted county, state, regional agencies that were in the vicinity of Forest Service units on the Northern Great Plains. The outreach had two goals:

- To assess whether existing local economic development, growth, or other trends or plans can be facilitated by national forest and national grassland management, and
- To assess the current and future impact of national forest and national grassland management on local infrastructure, such as police, fire, water, sewer, schools, and roads.

Most agencies expressed a desire to be kept informed of the agency's planning and management activities. Some presented land-use plans that would require close coordination with Forest Service management. A few expressed a desire that the Forest Service be involved in local land-use plans. Many cases of existing coordination and cooperation in joint ventures were cited. A few opportunities were brought forward for future coordination and cooperation, such as South Dakota's desire to facilitate the permit process on public lands for the motion picture industry. Such a process could facilitate movie productions such as *Dances With Wolves*, which brought millions of dollars into South Dakota. (See *Planning Coordination and Outreach with State and Local Entities*. This paper can be reviewed at the Supervisor's Office in Chadron, Nebraska.)

Potential Conflicts with Other Agencies' Goals or Objectives

The USDA-Forest Service has coordinated with various agencies and groups in the formulation of alternatives, the development of goals, objectives, standards and guidelines, and in completion of other important aspects of the Northern Great Plains Management Plans Revision process. Consultations have been and continue to be conducted with American Indian tribes, the Bureau of Land Management, the Environmental Protection Agency, the National Park Service, the U.S. Fish and Wildlife Service, the Natural Resources Conservation Service, state game and fish agencies in North and South Dakota, Wyoming and Nebraska, various state and county governments, and other governmental agencies.

In addition, the USDA-Forest Service has consulted with various non-profit and private entities, including local livestock associations, the Sierra Club, the Nature Conservancy and local chambers of commerce, among others.

The alternatives, associated effects, forestwide and grasslandwide standards and guidelines, and management area prescriptions are generally compatible with and compliment the goals and objectives of land management agencies adjacent to or near the planning units associated with this revision process.

Resource Commitments

Energy is consumed in the administration and use of natural resources on the Northern Great Plains planning units. For the purpose of the revised plans, energy sources include gasoline, diesel fuel, liquefied petroleum, natural gas, electricity and wood. Although many activities consume energy, the following are considered significant in the implementation of any alternative:

- Energy consumed in utilizing range vegetation required for hauling livestock to and from the range and for livestock permittee range-development activities, such as fencing, watering, salting and herding livestock.
- Energy consumption related to recreation, including estimated number of dispersed and developed recreation visitor days, estimated trip lengths and facility construction.
- Energy consumed by Forest Service administrative activities including vehicle use, the lighting, heating and cooling of buildings, and fuel or petroleum products used in small engines, burners or other machinery.
- Energy consumed in timber harvesting activities, such as felling, bucking, skidding, loading and hauling.
- Energy consumed in construction, reconstruction or obliteration of roads or oil and gas facilities by contractors or Forest Service crews.

Unavoidable Adverse Effects

The application of forestwide and grasslandwide standards and guidelines and resource protection measures limits the extent and duration of adverse environmental effects. Nevertheless, some adverse effects are unavoidable. For a detailed disclosure of all effects, including unavoidable adverse effects, please reference the "Environmental Consequences" narratives for each revision topic.

Hazardous Materials

The use of motor vehicles and the transport of hazardous materials, such as gasoline, anhydrous ammonia, various other petroleum products, fertilizers, pesticides, insecticides, rodenticides, and building materials on roads and highways carry the potential for accidental spills.

Short-term Uses of the Environment in Relation to Long-term Productivity

Short-term uses are those expected to occur on the planning units over the next 10 years. These uses include, but are not limited to, recreation use, livestock grazing, minerals development, timber harvests and prescribed burning. Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the next 10 years.

The minimum management requirement established by regulation (36 CFR 219.27) provides for the maintenance of long-term productivity of the land. Minimum management requirements prescribed by the forestwide and grasslandwide standards and guidelines will be met under all alternatives. Minimum requirements assure that long-term productivity of the land will not be impaired by short-term uses.

Monitoring, as described in the revised plans, applies to all alternatives. One purpose of monitoring is to assure that the long-term productivity of the land is maintained or improved. If monitoring and subsequent evaluation indicates that forestwide and grasslandwide standards and guidelines are insufficient to protect long-term productivity, the revised plans will be amended.

Although all alternatives are designed to maintain long-term productivity, differences remain among the alternatives in the long-term availability or condition of resources. Differences also may exist among the alternatives in long-term expenditures necessary to maintain desired conditions. These types of differences are described in Chapters 2 and 3.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources are defined in the Forest Service Handbook (1909.15):

> The irreversible commitment of resources means that nonrenewable resources are consumed or destroyed. Examples include mineral extraction, which consumes nonrenewable minerals, and potential destruction of such things as heritage resources by other management activities. These consumptions or destructions are only renewable over extremely long periods of time.
>
> The irretrievable commitment of resources are opportunities foregone. They represent trade-offs in the use and management of forest [and grassland] resources. Irretrievable commitment of resources can include the expenditure of funds, loss of production, or restrictions on resource use.

Decisions made in these revised management plans do not represent actual irreversible or irretrievable commitments of resources. These revised management plans determine what kinds and levels of activities are appropriate on the planning units. These revised management plans do not make site-specific or project decisions. The decision to irreversibly or irretrievably commit resources occurs:

- When the USDA-Forest Service makes a project or site-specific decision, or
- At the time Congress acts on a recommendation to establish a new Wilderness area or to include a river or river segments within the National Wild and Scenic River System.

Previous to the release of these draft revised management plans, several oil and gas decisions, supported by the NEPA process, including the release of environmental impact statements, came into effect. These oil and gas decisions determined that certain lands within the planning units were available for oil and gas leasing. Analyses associated with these oil and gas decisions are on file and can be requested. Essentially, these decisions allow the Bureau of Land Management to conditionally authorize certain National Forest System lands for oil and gas exploration and production (36 CFR 228.102 (e)). Although surface disturbances cannot occur on

leased land without further analyses and decision-making, issuance of a lease confers certain rights on the lessee and, therefore, represents a commitment of resources.

Examples of irretrievable resource commitments associated with these revised management plans include:

- Those commodity outputs and uses (such as most motorized activities) curtailed or eliminated in areas recommended for and subsequently designated as Wilderness areas, Wild and Scenic Rivers, Research Natural Areas and Special Interest Areas.
- Opportunities for non-motorized recreation, solitude and primitive or Wilderness experiences foregone if such areas are not recommended and subsequently designated for such purposes.
- Timber volume output foregone on lands determined as not suitable for timber harvests.
- Commodity outputs reduced or foregone in areas allocated to specific uses or purposes, such as developed recreation sites.
- Non-commodity values, including scenic resources, reduced or foregone in areas allocated to commodity uses.

Environmental Justice

Environmental justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the beliefs of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment.

None of the alternatives examined as a part of the Northern Great Plains Management Plans Revision would lead to disproportionately high and adverse effects on any populations or groups. All of the alternatives would maintain continued consultation efforts, would provide careful inventory procedures, and would uphold the principles of environmental justice.

By far, the largest minority group on the Northern Great Plains is American Indians. In the past, federal projects have had significant effects on American Indians on the Northern Great Plains, including the flooding of tribal lands in order to complete large reservoir projects, especially on the Missouri River. Environmental justice as it relates to American Indian populations, therefore, are examined briefly below.

American Indians of the Northern Great Plains have distinct cultures and traditional values unique to them. They have a special legal and political relationship with the United States government based on history, treaties, the U.S. Constitution, statutes and court decisions.

Area tribes, like other groups and communities, continue to strive for economic and self-sufficiency. They have brought outside businesses and resources to their reservations, while maintaining their traditional values. American Indians on the Northern Great Plains are known for producing some of the finest American Indian art in the nation, which they market both nationally and internationally. Agriculture remains one of the predominate industries on Northern Great Plains reservations. Some tribes have constructed casinos to attract outside income from tourism and gambling. In addition, some television and movie industry films have been produced on Northern Great Plains reservations, utilizing the talents of American Indian actors and film specialists. Some tribes have been raising bison for both traditional and

commercial purposes. Finally, the USDA-Forest Service utilizes the expertise of many experienced wildland firefighters who reside on reservations on the Northern Great Plains. Despite these developments, poverty remains desperately high on many reservations on the Northern Great Plains.

Land and natural resources are spiritually significant to many American Indians on the Northern Great Plains. National Forest System (NFS) lands contain numerous areas of traditional, historic and contemporary importance. Cultural practices, such as gathering sacred and medicinal plants, and conducting spiritual ceremonies, including vision quests and fasts, occur on NFS lands.

American Indian issues related to the management of NFS lands on the Northern Great Plains include: 1) protection of sacred areas, 2) recognition of traditional American Indian values, 3) access to NFS lands in order to practice traditional ceremonies, 4) appropriate reburial of disturbed human remains, 5) greater involvement in land management decisions on NFS lands, and 6) employment and training opportunities.

Today, and into the future, economic issues and companion concerns, like health care, education and child care, will continue to be the primary concerns for American Indians, along with preservation of their traditional religions, cultures and practices.

Most adverse effects resulting from planned activities, including road building, oil and gas development, recreation development, and livestock grazing, can be avoided with proper and continued consultation with American Indians and their tribal representatives. Careful inventory efforts prior to activities that disturb natural resources also avoid adverse effects.

Air

Introduction

The planning area occurs in five identified airsheds): North Plains, South Plains, Little Missouri, Thunder Basin, and Wheatland (Blett, 1993 and Blett, 1999, personal communication). Criteria to determine the airshed boundaries included topography, upper-level air flows, and political/civil boundaries where physical boundaries were not apparent. Airsheds are not fixed boundaries as watersheds are, but can be a useful mechanism for grouping management areas likely to have similar air quality. All airsheds have the potential to be affected by off-site pollution sources, as well as management-induced sources on National Forest System lands. The Forest Service sources include prescribed and wildland fires, oil and gas development, grazing, mining, developed recreation, and use of travelways.

Laws, Policy and Direction

- **The Clean Air Act** - The Federal Clean Air Act, as amended in 1977 and 1990, designates wilderness in existence as of August 7, 1977 (including later expansions) and over 5,000 acres in size as Class I areas. Section 169 (A) of the act requires "the prevention of any future and the remedying of any existing impairment of visibility in mandatory Class I areas ...." Within Class I areas, the act protects air-quality-related values (AQRVs) from adverse impacts resulting from air pollution. AQRVs are features or properties that have the potential to be changed by human-caused air pollution (i.e., flora; fauna; soil; water; visibility; odor; and cultural, archaeological, and paleontological resources). The Clean Air Act requires the Forest Service to comply with all federal, state, and local air quality regulations and to ensure that all management actions conform to the State Implementation Plan (SIP). To comply with recently developed regulations under the Clean Air Act, the Forest Service must evaluate all management activities to ensure that they will not:
    - Cause or contribute to any violations of ambient air quality standards.
    - Increase the frequency of any existing violations.
    - Impede a state's progress in meeting their air quality goals.
- **The Wilderness Act** - The Wilderness Act of 1964, and the Code of Federal Regulations developed to implement it, gives the Forest Service the responsibility and direction to manage designated wilderness areas to preserve, protect, and restore, as necessary, natural wilderness condition.
- **The Forest and Range Renewable Resource Planning Act** - The Forest and Range Renewable Resource Planning Act, as amended by the National Forest Management Act of 1976, directs the Forest Service to " ... recognize the fundamental need to protect and, where appropriate, improve the quality of soil, water and air resources ..."

Other federal acts that provide management direction include the Organic Administrative Act of 1976, the Multiple Use Sustained Yield Act of 1960, and the National Environmental Policy Act. These acts require the Forest Service to develop plans that provide for multiple use of

national forests and grasslands in a manner that maximizes long-term net public benefit in an environmentally sound manner.

The Forest Service is also responsible for complying with the individual State Clean Air Acts and State Implementation Plans (SIP). These documents outline how the state will comply with the National Ambient Air Quality Standards (NAAQS). NAAQS are legal limits of atmospheric pollution established by the Environmental Protection Agency (EPA) for the protection of the public's health and welfare from adverse effects from air pollution.

In addition to determining allowable limits of air pollution, the EPA is also responsible for developing regulations to ensure reasonable progress toward meeting national visibility goals for Class I areas where determinations of impairment to visibility have been established.

Affected Environment

There are no nonattainment areas within or immediately adjacent to the planning units, although there is one nonattainment area within the Thunder Basin airshed. The airsheds covering the planning area, and their existing condition are discussed in more detail below. The Sheyenne National Grassland does not fall within a defined airshed. Current air quality in and near this unit is unknown. The State of North Dakota does not have any pollutant monitoring equipment located near the grassland. It is expected that occasional wind-blown dust is the most prevalent air quality impact on the Sheyenne Grassland.

North Plains Airshed

This airshed includes the Fort Pierre National Grassland, Grand River National Grassland, Cedar River National Grassland and the eastern half of the Buffalo Gap National Grassland. It encompasses most of South Dakota, except for a small portion of the state which is in the Thunder Basin airshed. The National Park Service has a visibility (IMPROVE aerosol) monitor in Badlands national park. This site has been monitoring visibility since 1988, and shows that the hazy days have been getting dirtier in the area over the period of record. The cause of this decline in visibility is unknown, but the monitor indicates that nitrate values increased in 1993 and have remained high since that time. The aerosol monitors are assumed to represent air quality over approximately 100 km. The State of South Dakota does not have any air quality monitoring equipment near any of the Forest Service units in this airshed.

South Plains Airshed

This airshed includes the Samuel R. McKelvie National Forest and the Bessey Ranger District of the Nebraska National Forest. It encompasses most of Nebraska, except for the westernmost portion of the state which is in the Wheatland and Front Range airsheds. Current air quality in and near the units in this airshed is unknown. The State of Nebraska does not have pollutant monitoring equipment in these areas. It is expected that occasional wind-blown dust is the most prevalent air quality impact in these units.

Little Missouri Airshed

This airshed includes the Little Missouri Grassland in North Dakota. The State of North Dakota does not have any air pollution monitoring equipment near the Little Missouri National

Grassland, so the current air quality in and near the grassland is unknown. Oil and gas leasing on the grassland, and windblown dust are the two most likely sources of air pollutants in this area.

Thunder Basin Airshed

This airshed includes the Thunder Basin National Grassland, Oglala National Grassland, and western half of the Buffalo Gap National Grassland. The airshed is affected by oil and gas development in the Bighorn Basin and Powder River Basin in Wyoming and Billings, Montana areas; pollutants from the area are carried into the airshed by northwesterly winds. It is also affected by Powder River Basin coal field developments. There is no knowledge of any proposed emission sources in the South Dakota or Nebraska portions of this airshed other than projected oil and gas development discussed in this document. In Wyoming, oil and gas development is a current emissions source, as well as the Dave Johnston Power plant in Converse County. Projected future emissions sources include a major coal bed methane field development project within the Powder River Basin, along with increases in gas processing and power generating facilities in northeastern Wyoming and in the Casper area. The State of Wyoming maintains particulate matter monitoring sites in Sheridan and Gillette. One nonattainment area occurs within this airshed: Sheridan with an exceedance in the National Ambient Air Quality Standards for PM-10 (particulate matter smaller than 10 micrometers in diameter) (USA Air Quality Nonattainment Areas).

A ranking system developed by the Forest Service Region 2 Air Group identified visibility and aquatics, terrestrial, and depositional information as the highest concerns and priorities for monitoring in this airshed. Presently, some particulate monitoring information is available within the Thunder Basin National Grassland, and limited particulate (PM-10, PM-2.5), sulfur dioxide (SO_2), ozone, and nitrogen oxide (NO_X) data may be available from nearby monitoring stations operated by the oil, gas and coal mining companies.

Wheatland Airshed

This airshed includes the Pine Ridge portion of the Nebraska National Forest. It also includes the Soldier Creek Wilderness. The airshed is affected by the Basin Electric Wheatland power plant, a large source of SO_2 (25,000 tons per year) and NO_X (15,000 tons per year). Airborne dust, regional haze and agriculture- or forestry-related burning may occasionally impair visibility within the airshed. The State of Wyoming maintains a particulate monitoring site in Converse County and particulate matter (PM-10) levels monitored have remained relatively low. There is little information available about pollutant effects on grasslands or lower elevation pine forests, and no monitoring of air-quality-related values has been conducted in the airshed.

Environmental Consequences

Resource Protection Measures

Federal land managers are responsible for protecting the Air Quality Related Values (AQRV) from impacts caused by human-induced air pollution in Class I areas. Although the Forest Service administers no Class I areas in the planning area, there are several Class I areas adjacent to the planning units. Air resource management occurs mainly through two activities: 1)

involvement in the Prevention of Significant Deterioration (PSD) permitting process and 2) complying with EPA's conformity regulations. The PSD permitting process gives federal land managers the opportunity to identify and monitor potential impactors outside National Forest System lands and to request that these potential impactors make changes in their operations. Compliance with the conformity regulations gives land managers the opportunity to identify potential impacts from Forest Service activities at the project level, including those authorized by the Forest Service. The proposed Land and Resource Management Plan would require compliance with all applicable federal, state, and local air quality standards and regulations.

Five grassland and forest activities could potentially impact air quality: use of travelways (paved or unpaved roads and trails), oil and gas exploration and development, prescribed fire and wildfires, mining, and developed recreation (campfires). Activities outside the boundaries and jurisdiction of the planning units can potentially impact air quality as well. These include, but are not limited to:

- Regional haze
- Power plants and other fossil-fuel users
- Mining
- Agriculture (grazing, farming and stock yards)
- Paved and unpaved travelways
- Wildfires
- Agricultural burning
- Oil and gas development

Of the five activities managed by the planning units, fire, use of travelways, oil and gas, and mining could impact the AQRVs most. The one activity within and outside the planning unit boundaries and Forest Service jurisdiction with the greatest potential to impact AQRVs is oil and gas exploration and development.

Effects from mining, oil and gas exploration and development, dispersed recreation, and grazing are considered short term. Over the next five decades, oil and gas exploration and mining are expected to stabilize or to decrease slightly as reserves dry up.

Direct and Indirect Effects

Effects from Fire and Fuels Management

Smoke and particulate matter (PM 10 and PM 2.5) produced by fires can impact visibility, water, flora, and soil. Any prescribed burning would not exceed state or national air quality standards. This will be monitored by using models (i.e., Simple Approach Smoke Estimation Model) to predict the specific effects of smoke on air quality for every proposed prescribed fire. Although prescribed burning may increase emissions in the short term, these burns could help to decrease the emissions from catastrophic wildfires by reducing fuel loading, especially in the timbered areas.

Alternatives 1 and 2 would have the least potential for impacts from prescribed burning. Alternative 4 would have the greatest potential for impact. Alternatives 3 and 5 are in the mid range of the alternatives for effects.

Effects from Oil, Gas, and Minerals Management

Air quality would be affected by future oil, gas, and mineral exploration and development. Effects would be short term and would include engine emissions from drilling activities, possible emissions from flaring gas during testing, and release of gasses during drilling. Long term air quality effects would only be anticipated if additional gas processing or compression facilities were required as part of gas production and development.

Little Missouri and Cedar River

Oil and Gas Leasing Analysis Environmental Impact Statements were completed in 1991 for the Northern Little Missouri National Grassland and in 1996 for the Southern Little Missouri and Cedar River National Grasslands. A revised Reasonably Foreseeable Development Scenario, completed in July 1997, indicates that the predicted number of wells to be drilled disclosed in the environmental impact statements (EISs) is still valid. Because the predicted well drilling activity is the same as used in the EISs to determine air quality effects, those effects are incorporated by reference and summarized below (see the EISs for the full analysis).

Pollutant emissions from the projected energy development include: 1) emissions of particulates (dust) during construction and from vehicle traffic on unpaved roads, 2) emissions of carbon monoxide and oxides of nitrogen from gasoline and diesel engines (including vehicle engines and stationary engines, such as electric generators), and 3) hydrogen sulfide (H_2S) and sulfur dioxide (SO_2) emissions from flaring and/or treater flaring.

Northern Little Missouri

Only the hydrogen sulfide and sulfur dioxide emissions may cause adverse effects; the particulate and gaseous emissions from engines and vehicle traffic probably would be transient and of limited magnitude. Modeling in the Williston Basin Regional Air Quality Study predicted widespread occurrences of exceeding the PSD Class I increments in three of the four PSD Class I areas in the region, as well exceeding PSD Class II increments in two additional fields. North Dakota State Department of Health developed an Oil Field Mitigation Plan to eliminate predicted air quality problems. Mitigation was to be completed by March 1994 (see Appendix D of Oil and Gas Leasing Northern Little Missouri National Grassland, D-8-9, 9/1991). However, North Dakota State Department of Health (White, per com 1999) indicates that mitigation has only occurred for two of the seven fields. The main reason that mitigation has not occurred as planned is that overall production, especially on the older fields with high H_2S pools, has been steadily decreasing over the last decade. As a result, emissions from most fields have steadily decreased, improving air quality. In addition, taller stacks have been required in newer fields, more gas has been recovered and processed rather than being flared, and storage tank emissions are now being flared. Also, most of the new development in the last five years has produced pools with zero H_2S emissions. Of the original 12 study fields, only four have any potential for causing SO_2 problems, and of those four, only three are in the vicinity of the Little Missouri National Grassland. One of the three, Little Knife Field, has the potential to cause SO_2 impacts, but would not likely violate the SO_2 Ambient Air Quality Standards (AAQS).

Southern Little Missouri and Cedar River

Particulate emissions were estimated to average 8,856 pounds annually per producing oil and gas well. Engine emissions indicate one oil and gas well drilled with a medium drill rig (1500

horsepower) and completed in 30 days could produce 17.5 tons of emissions. Service vehicle engine emissions for light duty service vehicles produce about one-half ton of vehicle emissions annually. Support vehicles needed to complete an oil and gas well produce about 0.23 tons of engine emissions. The effect on air quality is minimal. The Reasonably Foreseeable Development Scenario, in combination with existing oil and gas development, do not compromise the Federal Clean Air Act or the air pollution standards for North Dakota.

The Reasonably Foreseeable Development Scenario for the Little Missouri National Grassland projects that 17 wells could be eliminated due to application of the No Surface Occupancy stipulation in Alternatives 4 and 5. Alternative 3 could eliminate 15 wells, while Alternative 2 could eliminate 11 wells. The possible reduction in wells in Alternatives 2-5 would further reduce any air quality impacts.

Thunder Basin, Western Buffalo Gap and Oglala National Grasslands

A draft EIS called WYODAK is being completed for a coal bed methane development project in the Powder River Basin. Because the air quality analysis for WYODAK covers effects for an area encompassing these grasslands, the analysis will be used, when it becomes available, to determine gas well development effects on air quality for these grasslands. Until then, existing oil and gas leasing environmental documents will be used to determine the effects. According to the revised Reasonably Foreseeable Development Scenario (completed in 1997), the predicted number of wells to be drilled described in the environmental impact statements (EISs) and environmental assessments (EAs) is still valid. Because the predicted well drilling activity is the same as used in the environmental analyses to determine air quality effects, those effects analyses are incorporated by reference. A summary of the analysis is stated below. For the full analysis, see the environmental documents.

Thunder Basin National Grassland

The Oil and Gas Leasing EIS for the Thunder Basin National Grassland was completed in 1994. The EIS stated that Total Suspended Particulates (TSP) from oil and gas operations were not predicted to exceed Wyoming Department of Environmental Quality regulations. Concentrations of hydrogen sulfide from oil and gas wells were expected to be of minor consequence due to windy conditions in the Thunder Basin National Grassland. Sources of hydrogen sulfide are not thought to exist in significant quantities within the area, and hydrogen sulfide emissions are regulated by the Wyoming Air Quality Standards and Regulations.

Western Buffalo Gap and Oglala National Grasslands

There are two oil and gas environmental analyses. The extreme western portion of the Buffalo Gap was covered in an analyses completed 1995 and another western portion of the Buffalo Gap and the entire Oglala will be covered in an analysis not yet released. Road dust particulate emissions were estimated to average 2 tons / year. This is well below the PM10 significant emission rate standard of 15 tons / year per site. Engine emissions per well drilled for all alternatives are:

- Carbon dioxide (CO_2) = .44 tons / year:
- SO_2 = .13 tons / year; hydrocarbons (HC) = .0006 tons / year;
- NO_2 - 2 tons / year; and

- Particulates =.21 tons / year.

A worst-case, well testing, SO_2 emissions scenario for the area would be that gases are flared for one month prior to production, that 1,822 thousand cubic feet (mcf) of gas are produced, and that they contain 3.5 percent H_2S. Total SO_2 emissions would be 2.6 tons / year per well site drilled. Total engine and flaring emissions for each well site is estimated to be 8.1 tons / year on the area covered by the 1995 environmental analysis and 5.5 tons / year for the area covered by the yet to be released analysis. This is well below the emission rate standard of 100 tons / year / site. Production emissions in the planning units for current wells range from 3.9 to 20.5 tons / year / site of sulfur dioxide. These figures would be the same for any new wells under all the alternatives. These are well below the 100 tons / year / site Prevention of Significant Deterioration (PSD) standard for major sources.

Effects from Recreation Management and Use

Air quality is temporarily lowered at developed recreation sites by vehicle emissions, dust, and smoke from campfires. These effects would be similar and minor under all alternatives.

Effects from Travel Management and Motorized Use

Most impacts from the use of travelways on the planning units are associated with dust from unpaved surfaces. Most of these effects are localized and temporary. Differences among alternatives would be slight. Alternatives 1 and 2, with the most unrestricted travelways, would have the greatest potential for impact. Alternative 4, with the most restricted travel, would have the least potential for impact. Emissions from snowmobiles will not vary greatly by alternative and are not expected to produce a measurable effect on air quality.

Effects from Coal Mining

Present monitoring of ambient air quality in Wyoming around the existing coal mines has shown no occurrence of exceeding of state or federal air quality standards (Schick, per. comm). This is expected to stay the same through all alternatives.

Cumulative Effects

Currently, there is a proposed coal bed methane development project, called WYODAK, that could affect air quality on Thunder Basin, Buffalo Gap, and Oglala National Grasslands. The proposed development is located in central Campbell and northern Converse Counties in Wyoming, on private land and BLM- and Forest Service-administered lands. The development involves about 5,000 new wells with an increase in gas compression of 177,000 hp. for an estimated project emissions increase of 2800 tons per year NOx. This area has 890 currently existing (or analyzed) wells and 40 currently existing (or permitted) compressor stations. The pollution emissions from these operations and the impacts that they may have on Wyoming and South Dakota wilderness areas, as well as on National Parks, are currently being addressed in the WYODAK EIS. The primary pollutant of concern with the proposed development is nitrogen oxides (NO_x).

While the total acres of prescribed fire in Alternatives 4 and 5 may seem large, the burning will occur on individual units that are quite distant from each other. Even if several of the units conducted prescribed burns on the same day, there would be no cumulative effect from the fires

because of the large distance separating the units. Total acreages scheduled for annual burning accounts for about one percent of the planning area in Alternative 4.

Activities (such as mining, agriculture, and agricultural burning) that occur outside of the boundaries and jurisdiction of the planning units do not vary by alternative and are not expected to cumulatively adversely impact air quality.

Fire and Fuels Management

Introduction

Wildfire has been and will continue to be an important influence on grassland vegetation. Prior to Anglo-American settlement, fires on the Northern Great Plains were of high frequency and low intensity. Fire suppression to protect property altered this fire regime.

Fires generally fall into one of two categories: prescribed burns or wildland fires. A prescribed fire is any fire ignited by management actions to meet specific objectives. A wildland fire is a fire resulting from an unplanned ignition; it requires an appropriate management response to control its spread.

Before a prescribed burn is initiated, a fire plan must be written and approved and National Environmental Policy Act (NEPA) requirements must be met. Prescribed fire is currently used for habitat and vegetation improvement on a very limited scale. Location and timing of the prescribed fire is decided on a site-specific basis after an adequate analysis, including the assessment of fire hazards, risks, and resource values.

In the past, the strategy for wildfire management has generally been suppression. Today wildland fires are controlled by one of three strategies: direct control, perimeter control, or prescription control. Direct control is the immediate and complete extinguishment of a wildfire. Usually this control is restricted to new fire starts, to steady-state fires that have not reached large sizes, and to selected portions of large fires. Direct control also includes exposure protection in which critical resources, such as houses, are shielded from the fire.

Perimeter control is a strategy that seeks to confine the active zone of fire spread. Actual fire line location is selected to minimize the cost of suppression and the values that could be lost to fire. Fire's beneficial ecological effects may also be used to determine fire line location. Under prescription control, fire is considered to be controlled as long as it burns within specified geographic boundaries and predetermined burning properties. Prescription control will not be used as a strategy for wildfire suppression within the Northern Great Plains planning area because of intermingled ownership and the difficulty in coordinating this type of strategy with local volunteer fire departments. Prescription control is also known as prescribed natural fire.

Each level in the USDA Forest Service organization is trained and equipped to deal with fires of certain size, number, or severity. Fire strategies call for maintaining a national organization capable of coming to the assistance of any one or more USDA Forest Service regions as needs develop. The control center for management of the national and international fire organization is in Boise, Idaho.

Laws, Policy, and Direction

- **The Organic Administration Act of 1897** authorizes the Secretary of Agriculture to make provisions for the protection of national forests and national grasslands against destruction by fire.

- **The Bankhead-Jones Farm Tenant Act of 1937** authorizes and directs the Secretary of Agriculture to develop a program of land conservation and land utilization to protect the public lands.
- **The Wilderness Act of 1964** authorizes the Secretary of Agriculture to take such measures as may be necessary to control fire within designated Wilderness areas.
- **The National Forest Management Act of 1976** directs the Secretary of Agriculture to specify guidelines for land management plans to ensure protection of forest resources.
- **The Clean Air Act of 1977** provides for the protection and enhancement of the nation's air resources.

Affected Environment

The northern great plains region includes North Dakota, South Dakota, Nebraska, and the eastern portions of Montana and Wyoming; it extends northward into Manitoba, Saskatchewan, and Alberta. Moving from west to east across the region, precipitation and humidity increase, and periodic droughts decrease. The climate range influences not only the potential native vegetation, but also fire regime and effects.

The shortgrass prairie on the western and southern portions of the region is the most arid. The mixed-grass prairie in the mid-section of the region has a more moderate precipitation regime. The tallgrass prairie on the eastern edge receives the most precipitation. The variation in precipitation across the region greatly influences the growth and expansion of woody plants. In the most western portions of the region, big sagebrush occupies uplands; in the absence of fire, big sagebrush persists or expands. In the arid portions of the region, woody vegetation is restricted to draws, or similar sites, with greater soil moisture. In contrast to more arid portions of the region, mesic prairies in the northern, eastern and southeastern portions of the region are characterized by precipitation amounts high enough to support the expansion of woody plants onto uplands. In addition to climatic factors, herbivores also influence the region's vegetation and fire regimes.

Data from adjoining ponderosa pine forests indicate that fire frequency historically varied from 2 to 25 years. On topography more dissected with breaks and rivers, data indicate a historic fire frequency of 20 to 30 years. In the more mesic portions of the Northern Great Plains, the average historic fire return interval was shorter. The historic fire frequency in the tallgrass prairie is estimated to be 1 to 5 years.

Dakota Prairie Grasslands

Current direction for national grassland units of the Dakota Prairie Grasslands emphasizes the following:

- Prevention, detection, and suppression.
- Interagency coordination.
- Interstate coordination.

Fuels management direction consists of the following two elements:

- A combination of treatments that most efficiently meet the fuels management direction for each management area, including fire use.

- Treatment levels that, after analysis of hazards, adjust management actions to meet desired results.

Fire suppression activities on Dakota Prairie Grasslands are managed by the local grazing associations, which use Conservation Practice (CP) funds to contract with the local volunteer fire departments for initial attack of wildfires. If the size of the fire is beyond the scope of control for the volunteer fire department, then the USDA Forest Service is contacted for suppression action.

Thunder Basin National Grassland

On the Thunder Basin National Grassland, current direction emphasizes:

- The protection of life, property, and resource values from wildfire in a cost-effective manner that maximizes the benefits of shared resources and developing technologies.
- Using prescribed fire as a vegetative and fuels management technique where it is the most cost-effective and acceptable alternative to achieve management objectives.

The Thunder Basin National Grassland has agreements with local volunteer fire departments, which take initial attack action and are then reimbursed for their services. If the fire is beyond the scope of control of the volunteer fire department, the USDA Forest Service is contacted for support.

Nebraska National Forest Units

On the Nebraska National Forest units, emphasis is placed on providing a level of protection from wildfire that is cost-effective and meets management objectives for the area. To accomplish this, various factors are considered. Suppression action is taken on all escaped fires, after considering various factors.

In South Dakota, the Buffalo Gap and Fort Pierre National Grasslands have agreements with local volunteer fire departments for initial-attack fire suppression. This is coordinated with the State of South Dakota in accordance with a statewide agreement. On the Nebraska National Forest, the Bessey unit is a member of the Sandhills Mutual Aid and coordinates fire suppression activities with the local volunteer fire departments. Due to the Samuel R. McKelvie National Forest's isolation, the USDA Forest Service responds to initial attack, but then relies on volunteer fire departments for additional response until other USDA Forest Service units can respond. The Pine Ridge Ranger District has a mutual aid agreement with the volunteer fire departments of Chadron and Crawford, Nebraska and takes initial-attack suppression action on both the Pine Ridge area and the Oglala National Grassland.

Wildfire Fire Occurrences

The following table shows the occurrence of wildfires on the planning units:

Table FM-1: Wildfire Occurrences on the Planning Units

Planning Unit	Fires per Year	Acres per Year
Little Missouri, Cedar River, Grand River National Grasslands	7	1,130
Sheyenne National Grassland	2	20

Thunder Basin National Grassland	9	3,500
Nebraska National Forest Units	21	8,470

Prescribed Fire Occurrences

Dakota Prairie Grasslands

Sheyenne National Grassland personnel have conducted prescribed burns on about 2,000 acres per year for the past 5 years.

Thunder Basin National Grassland

Personnel on the Thunder Basin National Grassland conduct prescribed burning on about 100 acres per year.

Nebraska National Forest Units

Between 1981 and 1985, personnel on the Pine Ridge Ranger District conducted 400 acres of prescribed burning; 270 acres were in the Soldier Creek management unit. Between 1988 and 1990, prescribed burns were conducted on about 900 acres in the Bordeaux Creek area.

Environmental Consequences

Resource Protection Measures

Grassland and forestwide goals and objectives and standards and guidelines and management area standards and guidelines identify the types of control that can be used for each management area. As fire management plans are developed for specific areas of the national forests and grasslands, control types will be refined. Management area direction calls for direct or perimeter control for all fires. There is no direction calling for prescription control.

The National Fire Management Analysis System (NFMAS) will be used to allocate funding for suppression and presuppression levels. This system is also one methodology used to characterize future fire events.

Direct and Indirect Effects

General Effects

Prescribed Fire

The use of prescribed fire is determined by the goals and objectives of the alternatives. Alternative 2 emphasizes commodity production and would have less prescribed burn acres than existing direction on the Dakota Prairie Grasslands and the Nebraska National Forest units. Alternatives 4 and 5 would restore naturally functioning processes and would allow the most prescribed burning.

The following table lists the prescribed burn acres by alternative per year:

Table FM-2: Acres of Prescribed Burning per Year by Alternative

Planning Unit	Total Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Dakota Prairie Grasslands						
Grand River/Cedar River National Grassland	161,800	500	500	500	16,000	10,000
Little Missouri National Grassland/McKenzie	500,800	300	200	2,000	15,000	5,000
Little Missouri National Grassland/Medora	525,390	300	200	2,000	15,000	5,000
Sheyenne National Grassland	70,270	2,500	2,000	4,000	10,000	6,000
Totals	**1,258,260**	**3,600**	**2,900**	**8,500**	**56,000**	**26,000**
Thunder Basin National Grassland	552,900	400	1,000	500	4,500	8,000
Nebraska National Forest Units						
Bessey District	90,470	0	0	150	1,500	0
Samuel R. McKelvie National Forest	115,960	0	0	150	1,000	0
Buffalo Gap National Grassland/Fall River	322,720	0	0	450	6,000	600
Buffalo Gap National Grassland/Wall	266,510	0	0	100	2,000	500
Ft. Pierre National Grassland	116,000	0	0	500	6,000	0
Pine Ridge Ranger District	50,570	0	0	200	850	200
Oglala National Grassland	94,170	0	0	250	1,100	800
Totals	**1,056,400**	**0**	**0**	**1,800**	**17,950**	**2,100**

The budget to achieve the prescribed burn levels in Alternatives 4 and 5 would likely require a budget more than 50 percent over the experienced budget (See budget discussion in Chapter 2). Because the likelihood of receiving budget increases over 50 percent of the experienced budget is doubtful, the prescribed burn levels were adjusted to bring them within 150 percent of the experienced budget level. The following table shows the adjustments made to Alternatives 4 and 5:

Table FM-3: Constrained Prescribed Burn Levels for Alternative 4 and 5.

Planning Unit	Alt 4	Alt 5
Dakota Prairie Grasslands		
Grand River/Cedar River National Grassland	3,000	3,000
Little Missouri National Grassland/McKenzie	5,000	4,000
Little Missouri National Grassland/Medora	5,000	4,000
Sheyenne National Grassland	8,000	6,000
Totals	**21,000**	**17,000**
Thunder Basin National Grassland	4,500	2,000
Nebraska National Forest Units		
Bessey District	800	200
Samuel R. McKelvie National Forest	500	200
Buffalo Gap National Grassland/Fall River	2,700	950
Buffalo Gap National Grassland/Wall	1,200	850
Ft. Pierre National Grassland	2,700	200
Pine Ridge Ranger District	600	600
Oglala National Grassland	500	500
Totals	**9,000**	**3,500**

Alternative 4 would treat the most acres, followed by Alternatives 5, 3, 1 and 2, respectively.

Acres Burned by Wildfire

On the Northern Great Plains, fire hazard can be related to historical processes, climatic patterns, fuel flammability, and fuel loads. In addition to fire hazard, the risk of ignition must be considered. Over a long period of time, lightning-caused fires are scattered over the entire general planning area. Lightning risk is constant in all alternatives. However, the risk of human-caused fire does vary among the alternatives. As the level of human activity increases, so does the risk of a human-caused fire.

Values besides hazard and risk are also key in the description of the grassland and forest wildland fire situation. Rural residences, urban interface zones, regenerated timber stands, unique habitats, domestic watersheds, and highway (visual) corridors are a few examples of high or moderate values. Other areas would have low or moderate resource values.

It is not possible to predict the actual acres burned by wildfire by alternative. Weather and fuel variables, combined with organization and budget constraints, would make any prediction very generic, with no data or research to support such a prediction.

Effects from Management Activities

Effects from Range Management and Livestock Grazing

Grazing levels affect the amount of herbaceous forage remaining during fire activity seasons. This relates to the amount of estimated forage production available for livestock use. The risk of fire ignitions would be the same for all alternatives; however, the size and intensity of the fires would vary by alternative. Alternative 4 would have the highest potential for larger fires because less herbaceous forage would be consumed by livestock, while Alternative 2 would have the least potential for larger fires.

Effects from Recreation Management and Use

Recreation use of the national grasslands and forests is expected to increase under all alternatives, with the highest increase expected in Alternative 5. The increase in recreation use is accompanied by an increased probability of human-caused ignition. This is true for both developed and dispersed recreation. While wildfires would be suppressed within Management Areas 1.2 (Recommended for Wilderness) and 1.31 (Backcountry Recreation Non-motorized), the suppression strategy is perimeter control rather than direct control allowed in other management areas. Perimeter control would likely result in more burned acres. The use of heavy ground-disturbing equipment within these management areas requires permission from the appropriate line officer. Alternative 4 has the most acres allocated to Management Areas 1.2 and 1.31, followed by Alternatives 5, 3, 2, and 1.

Effects from Timber Management

About 8 percent of the planning units are a forested and are a major part of recreational settings and scenic integrity. Less than 2 percent would be actively managed for timber production in the action alternatives. Timber harvest activities generally reduce natural fuel loadings; however, on the Northern Great Plains, where fire suppression has increased the amount of forested type, removing timber encourages grass and shrub species to expand. Under Alternative 4, timber harvest does not move a forest into an earlier seral stage, but instead creates a late successional forest with large mature trees spaced about 45 feet apart. Timber harvest in all

alternatives would reduce canopy cover and would reduce the potential for fires that move through the crowns of trees, independent of surface fuels.

Slash or activity fuels are created from timber harvest. However, this increase in fuels and associated increased risk of ignition are mitigated in timber sale contracts. Specifically, risks are reduced by contract provisions requiring fire preparedness and hazard recognition related to timber purchaser operations. Timber harvest contract provisions require timber purchasers to conduct their operations using precautionary fire measures.

The increase in activity fuels is also mitigated by timber sale contract provisions for slash reduction or removal. The timber purchaser is required to lop and scatter logging slash to certain depths or pile the slash for later burning. This greatly reduces the buildup of slash and the risk of fire.

Fuel levels in stands receiving timber harvest treatment versus fuel levels in untreated stands depend on the type of timber harvest treatment and the amount of slash disposal prescribed for the harvest area. For example, clearcutting, in combination with slash treatment, leaves less available fuel than either harvested or natural stands without slash treatment. Commercial thinning in sawtimber stands may initially create more fuel than is present in untreated stands. However, the overall hazard is reduced by slash disposal treatments of lopping and scattering and the compaction of the scattered slash by yearly snow cover.

Pre-commercial thinning of seedling / sapling stands creates additional slash. However, the slash is usually lopped and scattered to a depth of 18 to 24 inches. Again, snow cover in succeeding years compacts the slash and reduces the overall hazard.

Even though the timber harvest levels is greatest in Alternative 2, timber is being managed to provide a mosaic of timber stands. On a decade-by-decade basis, the amount of acres being managed is higher in Alternative 2 compared to the other alternatives. This would affect the fire control program by allowing dense regeneration in a greater percentage of the stands. The probability of a stand-replacing fire increases as dead fuels and ladder fuels build up.

Alternatives 3, 4, and 5 have the opposite effect. Timber harvest would be used to create a late successional forest type of lower canopy cover and more space between trees. This would also reduce the amount of large-diameter fuels. Once the desired conditions of an open parklike stand are met, late successional forests would be maintained through the use of fire.

Effects from Travel Management and Motorized Use

Under Alternatives 1 and 2, unrestricted motorized travel can increase the risk of ignitions, while at the same time facilitating fire control efforts. Alternatives 1 and 2 would have more road building for oil and gas activities and timber production. The access provided by these roads would improve fire crew response time and increase the effectiveness of control efforts. Alternatives 3, 4, and 5 would restrict travel to designated routes except for fire suppression activities.

Cumulative Effects

Fuel loads would vary by alternative. Fine fuel loads would increase under Alternatives 3, 4 and 5. Under these alternatives, less forage would be consumed by livestock, higher grass structure levels are desired for wildlife habitat, and more open parklike timber stands would be created. Alternative 2 would have the least amount of fine fuel loads because more available

forage would be consumed by livestock and more moderate to lower grass structure levels are desired.

Alternatives 4 and 5 manage for later successional forest which decreases large-diameter fuel loads and increases fine fuel loads. Even though Alternative 2 has the most acres being managed for timber production, the risk of fire would be the greatest as regeneration creates ladder fuel conditions allowing fire to spread into the crowns of forested stands.

Alternatives 3, 4, and 5 increase the amount of management areas in backcountry non-motorized and recommended for Wilderness areas. In these management areas, the fire control strategy would be primarily perimeter control. This could increase the risk of more burned acres.

Rural development is occurring in areas bordering the national grasslands and forests. This development places emphasis on reducing adjacent hazard fuels.

Fossil Resources

Introduction

The need to develop management guidelines that address fossil resources has become apparent, particularly as interest in and collection of fossils for scientific, recreational and commercial purposes have increased.

Laws, Policy and Direction

The Antiquities Act of 1906 established protection of any object of antiquity situated on lands owned or controlled by the United States Government. Secretarial Order 3104 of 1984 delegates the authority to manage paleontological resources to individual agencies rather than Departments as specified in the Antiquities Act (draft Fossil Resources Center of Excellence, 1995). The Federal Land Policy and Management Act of 1976 states that public lands be managed in a manner to protect the quality of scientific values. Two Code of Federal Regulations (CFR) are specific to fossil resources. The first, 36 CFR 228.62(e), gives direction on free use distribution of petrified wood. The second regulation, 36 CFR 261.9(j), requires a special use authorization for removing any vertebrate fossil or for removing any paleontological resource for commercial purposes.

Affected Environment

Existing Direction and Conditions

The planning area is rich with fossil resource and has fossil bearing formations on approximately 90% of the area. The existing management plans contain little or no direction for fossil management. Varying public views exist as to the type of collection that should be allowed and who should be able to collect fossils. There are also varying views as to how the fossil program should be managed if fossil collection is allowed. Several fossil-bearing formations outcrop

within the planning area. Some of the formations and types of fossils found within them are listed in the following table (Information from Northern Great Plains Ecosystem Assessment Broadscale Paleontology Report):

Table FOS-1: Fossils by Formation

Formation	Fossil Types	Recommended Class*
Skull Creek Shale	Invertebrates and microfossils.	3
Newcastle Sandstone	Few marine vertebrates.	3
Mowry Shale	Fish scales, teeth, bones and occasional marine vertebrates.	3
Belle Fourche Shale	Invertebrates, microfossils and vertebrates - fish and plesiosaurs.	3
Greenhorn Formation	Invertebrates, microfossils and vertebrates - fish.	3
Carlile Shale	Invertebrates such as Inoceramus, ammonites, and gastropods. Vertebrates such as fish and marine reptiles.	3
Niobrara Formation	Invertebrates and microfossils. Marine vertebrates such as fish, birds, pterosaurs, amphibians, and reptiles-mosasaurs and plesiosaurs.	5
Pierre Shale	Invertebrates of ammonites, snails, clams and crabs. Marine vertebrates such as mosasaurs, plesiosaurs, fish, turtles, pterosaurs and birds.	3,5
Fox Hills Sandstone	Invertebrates such as ammonites, plant fossils and relatively rare vertebrates.	3
Hell Creek / Lance Formation	Well known for dinosaur faunas-Triceratops, Anatosaurus, Tyrannosaurus rex, Pachycephalosaurus, Stygimoloch, Ankylosaurus, and Ornithomimus. Also fish, turtles, champsosaurs, and crocodiles.	5
Fort Union Formation	Many excellent fossil plants, invertebrates, and vertebrates are found in this group.	3, 5
Ludlow Formation	Vertebrate fossils may be locally abundant.	3, 5
Cannonball Formation	Only Tertiary unit in which sharks, rays and other marine vertebrates and invertebrate fossils are preserved in situ.	5
Slope Formation	Vertebrate fossils may be locally abundant.	3, 5
Bullion Creek Formation	Significant leaf and pollen floras, many invertebrates, and a wide variety of vertebrates such as fish, salamanders, frogs, turtles, crocodiles, champsosaurs, lizards and dozens of mammals.	3, 5
Sentinel Butte Formation	Plants, invertebrates, and vertebrates including amphibians, reptiles - crocodiles, champsosaurs and turtles, and mammals.	3
Golden Valley Formation	Vertebrates and plant fossils in some areas.	3, 5
Slim Butte Formation	Fauna from this formation is the only Duchesnean age mammalian fauna from the Northern Great Plains area.	5

Formation	Fossil Types	Recommended Class*
White River Group	Vertebrates range from fish, frogs, lizards and turtles, tiny rodents, rabbits, and insectivores, to saber-tooth cats, dogs, horses, camels, oreodonts, rhinoceroses, birds, and titanotheres. Invertebrates primarily snails.	5
Chadron Formation	Vertebrates range from fish, frogs, lizards and turtles, tiny rodents rabbits, and insectivores, to saber-tooth cats, dogs, horses, camels, oreodonts, rhinoceroses, birds, and titanotheres. Invertebrates primarily snails.	5
Brule Formation	Vertebrates range from fish, frogs, lizards and turtles, tiny rodents rabbits, and insectivores, to saber-tooth cats, dogs, horses, camels, oreodonts, birds, and rhinoceroses . Invertebrates primarily snails.	5
Sharps Formation	Many kinds of vertebrates including diminutive saber-tooth cat, hedgehogs, true moles, and mountain beavers.	5
Arikaree Group		
Gering Formation	Fauna includes rodents, dogs, and other carnivores, oreodonts, a hedgehog, and a mole.	5
Monroe Creek Formation	Vertebrate fossils only locally abundant, including fish, frogs, lizards, snakes, birds, a marsupial, hedgehogs, shrews, moles, rabbits, rodents, carnivores, horses, camels, and oreodonts.	5
Harrison Formation	Much of same as Monroe, plus large and small carnivores, chalicotheres, other articodactyls join a group of horses, rhinos, giant pigs, and camels. Invertebrates such as snails, and some aquatic plants.	5
Ogallala Group	Fossils include true cats, otters, abundant horses, camels, oreodonts, Moropus, pikas, musteline and procyonine mustelids, extinct horned artiodactyl groups, rhinos, rodents dogs, pronghorns, saber-tooth cats, sloths, bears, tapirs, and mastodonts, birds, fish amphibians, and reptiles are also represented.	5

*A draft classification system has been developed wherein geological units, usually at the formation or member level, are classified according to the probability of yielding paleontological resources that are of concern to land managers. The classification is based largely on how likely a geologic unit is to produce vertebrate fossils of terrestrial (i.e. non-marine) origin. The five classes in the system are described below (Probable Fossil Yield Classification, 1996).

- Class 1 - Igneous and metamorphic geologic units that are not likely to contain recognizable fossil remains.
- Class 2 - Sedimentary geologic units that are not likely to contain vertebrate fossils nor scientifically significant invertebrate fossils.

- Class 3 - Fossilferous sedimentary geologic units whose fossil content varies in significance, abundance, and predictable occurrence. Also sedimentary units of unknown fossil potential.
- Class 4 - Class 4 geologic units are Class 5 units (see below) that have lowered risks of human-caused adverse impacts and / or lowered risk of natural degradation.
- Class 5 - Highly fossilferous geologic units that regularly and predictably produce vertebrate fossils and / or scientifically significant invertebrate fossils, and that are at risk of natural degradation and / or human-caused adverse impacts.

Existing management priorities include: survey of high potential fossil occurrence areas; fossil excavation in partnership with local universities; management and interpretation of special paleontological areas, such as Toadstool Park; presentation of educational programs regarding public land fossil management; and investigation of vandalized sites. Toadstool Park receives approximately 20,000 visitors a year and that number is expected to increase with the completion of interpretive signing on the site.

Environmental Consequences

Resource Protection Measures

Standards and guidelines are designed to protect the fossil resource. Standards and guidelines common to all alternatives include provisions for petrified wood collection; prohibits commercial collection of fossils; requires paleontologic surveys prior to ground disturbing activities in locations with a high likelihood of fossils; and sets priorities for land survey and posting of boundaries in areas of high ranked paleontologic sites. Alternatives 1 and 5 allow the on-top-the-surface collection of non-vertebrates without a permit for personal use, while Alternatives 2-4 would require authorization to collect any fossil resource.

General Effects

All alternatives would include inventory, analysis, evaluation, stabilization and public interpretation of the fossil resources. Alternatives 1 and 2, which emphasize commodities and motorized recreation, would have the greatest potential to affect fossil resources. Therefore, these alternatives would require the greatest amount of inventory and mitigation and would emphasize protection and mitigation. As a result, more land would be surveyed, thereby increasing the knowledge of the natural history on the units. Survey, mitigation and monitoring would dominate the workload, leaving fewer personnel for public interpretation and education.

Alternative 3 would have the potential to provide a mix of data collection, public participation and research. A reduction in projected commodity outputs in Alternative 3 compared to Alternatives 1 and 2 would result in less inventory and mitigation. Motorized access is also reduced as compared to Alternatives 1 and 2 which would result in less vandalism and theft of the resource.

Alternative 4 would have the least potential to adversely affect fossil resources, because this alternative would have the least amount of needed access for commodity production and motorized recreation. Fewer project-driven inventories would be accomplished. Maintenance of the inventory and site monitoring would be emphasized. Alternative 4 would have the greatest amount of prescribed burning which could increase the discovery of fossil sites, increasing our knowledge of Northern Plains natural history.

Alternative 5 would also be comparatively lower in commodity-driven access needs, but would have slightly higher motorized recreation and would increase the potential for adverse impacts to fossil resources. The addition of developed recreation sites would also have the potential to adversely impact fossil resources. The recreation emphasis in Alternative 5 would encourage development of public interpretive sites of fossil resources and could result in higher public awareness and concern for the protection of the resource. Opportunities for recreational collection of fossil resources in this alternative would result in the loss of specimens for research and site contextual information.

Direct and Indirect Effects

Effects from Fire and Fuels Management

Fire suppression activities, such as fireline construction and the use of motorized equipment, have the potential to damage fossil resources. Wildfires also have the potential to damage exposed fossils, especially fragile specimens. This effect would be similar in all alternatives. Prescribed burning for fuel management with reduced fire intensities may enhance the discovery of fossil sites. Alternative 4 with the most acreage of prescribed burning could provide the most opportunities to discover fossils, followed by Alternative 5.

Effects from Fish and Wildlife Management

Impacts from wildlife and fish habitat management activities are generally limited to the project level. These projects include, but are not limited to, prescribed burns, water impoundments, exclosures, facilities construction for species reintroduction, and timber-stand manipulation. Prior to project initiation, site-specific surveys on Formation Classes 3 through 5 would be completed to determine if fossils were evident. Furthermore, mitigation procedures would be developed. No adverse impacts would be anticipated from any alternative.

Effects from Land Exchanges

The exchange of federal land for private land has the potential to affect fossil resources. Protection for fossils would likely end once the landownership became private, unless a paleontological reservation was retained by the Forest Service. In all alternatives, fossil resources would be considered prior to landownership adjustments.

Effects from Oil, Gas, Minerals Management

In all alternatives, the heavy machinery involved in the construction of roads to access energy and mineral extraction areas, as well as the actual extractive activities themselves, are direct effects that would be mitigated through a controlled surface use stipulation applied to the lease in Alternatives 2-5. The stipulation requires that, prior to ground disturbing activities, a paleontologic survey in areas with a high likelihood of fossils be accomplished and mitigation measures be implemented to protect significant fossils. Indirect effects include the potential for vandalism of a site or theft of fossils during the execution of the project and increased potential for vandalism and theft due to increased public access.

Effects from Range Management and Livestock Grazing

Impacts on fossil sites from grazing can be divided into two categories: impact to the soil that contains the unexposed fossil sites and damage and/or displacement of fossils located on the

surface. Paleontological sites are directly affected by livestock in the form of "chiseling" in damp soils and sloughing / collapse of stream banks. In all alternatives, prior to initiation of livestock facility construction, site-specific surveys on Formation Classes 3 through 5 would be completed to determine if fossils were evident. Furthermore, mitigation procedures would be developed and implemented. Indirect effects of grazing include removal of vegetation and trampling. These effects can lead to reduced infiltration, increased runoff and an increase in vandalism of sites and theft of fossils due to increased visibility. The potential for indirect effects would be greatest in Alternative 2 followed by Alternatives 1, 3, 5 and 4.

Effects from Recreation Management and Use

Alternatives 1 and 5 would allow the surface collection of invertebrate fossils without a permit. Recreational fossil collecting would not provide the Forest Service any information on the amount, type and location of fossils collected. Therefore, the surface removal of invertebrate fossils without site documentation would result in the loss of contextual site information pertinent for understanding the natural history of an area. In Alternative 5, areas would be designated for personal non-commercial surface collection of vertebrate fossils. Current management requires vertebrate fossil collection to a specified standard and the curation of vertebrate fossils in public facilities with retained federal ownership. This alternative would result in the loss of vertebrate specimens from the public realm. This type of collection would also result in the loss of contextual site information. Alternatives 2 through 4 would allow, but would not require, area designation of surface collection of any paleontological resources. Area designation would have the same effect on the fossil resource as Alternative 5.

The construction of recreational facilities (campgrounds, trails, comfort facilities, parking areas, etc.) could directly affect fossil resources. Under all alternatives, these direct effects would be mitigated before the initiation of the construction. Indirect effects from recreational management can be beneficial or adverse. The negative impacts include vandalism of sites and theft of fossils, inadvertent camping directly on sites and soil erosion. Positive effects can include the edification and education of the public about fossils, which in turn provide public support for the preservation and interpretation of fossil resources. Alternative 5, followed by Alternative 3, would provide the greatest opportunity for fossil interpretation. The construction of new trails into areas that previously had little access creates an indirect effect on fossil resources as it opens new areas to recreational activities and increases the potential for disturbances. Alternative 5, with the greatest amount of new trail construction, would have the greatest adverse impact on fossils, followed by Alternative 3.

Effects from Special Area Designations

In areas managed as recommended for Wilderness, backcountry recreation non-motorized, National River System Wild Rivers recommended, and Research Natural Areas, fewer ground-disturbing projects would likely occur, resulting in the need for fewer fossil resource surveys. Natural degradation of sites--from erosion and wildfire, for example--can cause damage to fossil resources. Alternatives 4 and 5 (and Alternative 3 for the Dakota Prairie Grasslands) have larger portions of the planning area managed in these special area designations. Although these alternatives reduce the amount of potential damage to fossil resources from management activities, they also reduce the amount of surveys conducted and the number of sites located and protected.

Special Interest Area (SIA) designation would likely have both beneficial and adverse effects on the fossil resource. Areas designated as Special Interest Areas due to fossil resources would receive additional protection for fossil resources . More scientific study of the fossil resource would likely occur in these SIAs. Increased public knowledge and use of these areas may increase the likelihood of theft and vandalism. The designation of fossil Special Interest Areas remains the same for Alternatives 2 through 5, except for Indian Creek on the Wall and Fall River Districts of the Buffalo Gap National Grassland. Indian Creek is included as an SIA in Alternatives 3 and 5 only. Alternative 5, followed by Alternative 3, would provide the greatest opportunity for interpretation within the fossil SIAs. Special Interest Area designations for other than fossil resources may or may not directly affect the fossil resource. There may be a tendency to have less ground-disturbing activities within the SIAs, resulting in reduced resource surveys.

Effects from Timber Management

Potential for timber management occurs only on a small portion of the planning area so the likelihood of impact to the fossil resource is not large. Road construction, heavy harvest machinery, and the harvesting methods have the potential to directly affect fossil resources. Paleontological sites are threatened by disturbances to the soil. Direct effects would be mitigated in all alternatives on Formation Classes 3 through 5. Indirect effects of timber harvest include, but are not limited to, soil erosion and compaction. Another indirect effect is the potential for vandalism of a site or theft of fossils during the execution of the project or if more access is created by road construction into timber sale areas. Alternatives 2 and 4 would require more surveys and mitigation for the protection of fossil resources, resulting in more recorded sites.

Effects from Travel Management

Impacts to fossil resources in the form of vandalism and theft of fossils are generally the greatest in areas of motorized use and dispersed camping. These threats generally occur within one-quarter mile of developed or two-track roads. Motorized access to fossil sites increases the probability of damage to sites. Alternatives 1 and 2 have the greatest acreage allowing motorized use and would therefore have the greatest likelihood of fossil vandalism and theft. Alternative 4 would have the least amount of designated travel routes open to motorized travel and therefore would be least likely to have an adverse impact on fossil sites.

Effects from Utility Corridors

Construction activities for utility developments could directly and adversely affect fossil resources. Grouping of utilities within established corridors would reduce effects. In all alternatives, these direct effects would be mitigated on Formation Classes 3 through 5. One indirect effect is the potential for vandalism of a site or theft of fossils during the execution of the project.

Cumulative Effects

Cumulative effects over time can include loss of sites or parts of sites prior to development of better research techniques, loss of interpretive values and incremental loss of the fossil resource base. Most impacts cited above could have long-term cumulative consequences. These consequences include land management projects that cause surface disturbance, increased public visitation, long-term consequences of non-sanctioned activities, such as vandalism and illegal excavation, natural weathering and deterioration, erosion, landslide, fires and other physical processes. Differences in cumulative effects to fossil resources under the alternatives as a result of sanctioned management activities would be slight because protection and mitigation measures are common to all.

Enforcement of protective measures is also common to all alternatives and should result in an extremely low level of cumulative effects.

Non-project-related, proactive, fossil resource management would also help preserve fossil resources. Fossils merit careful management planning for inventory, evaluation, conservation, protection and fossil interpretation.

Cumulatively, fossil resources on federal lands may assume greater importance because similar resources on lands of other ownership are not provided the same degree of protection.

Construction, development and unregulated fossil collecting on private lands may destroy fossil values without providing for recovery of data or other mitigation.

Heritage Resources

Introduction

Heritage resources on all federal land are protected by a series of federal laws enacted to protect these resources from damage or loss due to federally funded or permitted activities. The public's recognition that these non-renewable resources are important and should be protected began very early in this century and continues to present.

Laws, Policy and Direction

New directions and emphases that have come to the forefront over the past ten years include the Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 13007, the consideration of historic and traditional landscapes, and the increased awareness and consultation for traditional cultural properties.

- Antiquities Act of 1906 - This act protects historic or prehistoric remains or any object of antiquity on federal lands and applies to both heritage and paleontological resources. It imposes criminal penalties for unauthorized destruction or appropriation of antiquities without a valid permit.
- National Historic Preservation Act (NHPA) of 1966, as amended - This act protects historic and archeological values during the planning and implementation of federal projects (CFR 36 800 and CFR 36 60). The law outlines the section 106 compliance process and requires the location and identification of heritage resources during the planning phase of a project, a determination of "significance" (based on scientific archeological values) for potentially affected resources, and provisions for mitigation of any significant sites that may be affected.
- Federal Land Policy and Management Act of 1976 Section 102(8) - This act requires that "public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition..."
- American Indian Religious Freedom Act of 1978 (AIRFA) - This act protects American Indian rights to exercise traditional religions including access to sites and freedom to worship through ceremonial and traditional rites.
- Archeological Resources Protection Act (ARPA) of 1979 - This act imposes civil penalties for the unauthorized excavation, removal, damage, alteration, or defacement of archeological resources.
- Native American Grave Protection and Repatriation Act of 1990 (NAGPRA) - This act protects American Indian burials and sacred items.
- Uniform Rules and Regulations (16 U.S.C.G. 432-433) - These regulations coincide with the Antiquities Act of 1906. They give the Secretary of Agriculture "jurisdiction over ruins, archeological sites, historic and prehistoric monuments and structures, objects of

antiquity, historic landmarks, and other objects of historic or scientific interests" on National Forest System lands.

- Executive Order 13007 (1997) - This order directs federal agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites and, where appropriate, to maintain the confidentiality of sacred sites.

Affected Environment

Evidence of human occupation and use of the Northern Great Plains has been culturally diverse and extends back more than 12,000 years. Although archeological site densities are as high on the Northern Plains as they are in most other landscapes in North America, our understanding of the human prehistory of the region is still in its earliest stages. Early researchers were attracted to the study of past cultures that built impressive villages and monumental earth-works. Such preferences meant that the Northern Plains, where even the most ephemeral of architectural features are rare, were passed up for the prodigious structures of the Southwest or the artifact-laden ceremonial mounds of the Mississippi and Ohio River Valleys. It was not until the 1930s that archeologists began paying serious attention to the Northern Plains, and research did not commence within the assessment area until 1961. Since then, most archaeological sites have been recorded in response to federal mandates for historic preservation.

About 20 percent of National Forest System (NFS) lands within the Northern Great Plains planning area has been inventoried for heritage resources, and 3,437 sites have been recorded. Most heritage sites have been found during surveys conducted prior to ground-disturbing activities. Areas without ground-disturbing activities have not be surveyed, but heritage sites likely do occur in these areas.

The planning area contains some of the most varied and complete assemblages in the Northern Great Plains due in part to three factors: 1) ecological diversity, which includes the short, mixed and tall grass prairies; 2) sparse contemporary populations; and 3) the number and complexity of the Plains cultures that occupied the area for thousands of years. Based on archaeological, ethnographic, and historical data, the chronological sequence of human adaptation and use of the assessment area can be divided into at least five taxonomic units. These periods include: Paleo-Indian (13,000 to 15,000 years ago); Archaic (2,000 to 7,500 years ago); Late Prehistoric (100 B.C. to 1800 A.D.); Protohistoric (1800 A.D. to onset of reservation system); and Historic.

Historic Native American Tribal Groups

Numerous tribal groups occupied and used the grasslands and forests during the historic period. Identification of known historic groups and their relationship to archaeological complexes of the Protohistoric period is difficult. Tribal groups known to have used the grasslands and forests prehistorically and historically include three Affiliated Tribes (Mandan, Hidatsa, and Arikara), Cheyenne, Assiniboin, Arapaho, Blackfoot, Crow, Lakota, Pawnee, Chippewa, and Kiowa tribes. The Three Affiliated Tribes of Fort Berthold Indian Reservation, Standing Rock Sioux Indian Reservation, Cheyenne River Sioux Indian Reservation, Pine Ridge Sioux Indian Reservation, Rosebud Sioux Indian Reservation, Lower Brule Indian Reservation, and Sisseton Sioux Indian Reservation have close ties with the current federal grasslands and

forests and are located within or adjacent to portions of the grassland and forest units under review.

The Forest Service makes decisions that may limit the use of lands over which it has responsibilities. The effect these decisions may have on American Indian traditional use must be considered as directed by the American Indian Religious Freedom Act PL 95-341 and the Archeological Resources Protection Act of 1979, which also specifies federal land managers to notify in advance the appropriate Indian tribe if a permit issued under the act may result in harm to religious or cultural sites. National Park Service Bulletin 38 provides information concerning traditional cultural properties. If sites meet the national criteria, they must be considered under the National Historic Preservation Act. A property demonstrates traditional cultural value if its significance to Native American beliefs, values, and customs has been ethnohistorically documented and if the site can be clearly defined.

Natural features significant in mythology, cosmology, and history to a Native American group are potentially eligible to the National Register of Historic Properties. The key factor is traditional use---use by Indian people from the local area over time. Preliminary identification of traditional cultural properties has been conducted during an ethnographic overview of the Little Missouri National Grassland (Deaver and Manning, 1995) and in a compilation of potential significant sites over the area as a whole in an *Ethnographic Gazetteer*, or list of sites, from the literature of the entire Northern Plains region (Sundstrom, 1997). Some of the site types and landscapes of traditional concern are briefly discussed in the paragraphs below.

Earthnaming ceremonial buttes are located throughout the national grasslands. Earthnaming ceremonies were based on the belief that certain spirits, including bison, were residents of various buttes across the prairies and badlands. The buttes also marked tribal territory. Several of these buttes are located on or near federal lands and can be directly affected by federal actions. Exact locations of these buttes and their identification have not been made, along with numerous other potentially significant locations identified by Sundstrom (1997). These buttes are not currently known to be utilized by traditional groups, but the sites can be rediscovered and use could begin again at any time. The only known traditional use occurs within the Blue Buttes on the McKenzie District of the Little Missouri National Grassland.

The Little Missouri National Grassland is of special significance to the Mandan and Hidatsa Indians who claim the area for eagle trapping rights. Trapping of eagles was a sacred activity and the remains of the trapping pits are also considered to be sacred ground. Wooden ceremonial lodges are associated with the trapping locations.

Another type of site that has special significance to the tribal groups are battle sites. These relate primarily to the Sioux Indian Wars of 1860-70's. In addition, a large number of tribal groups used areas within the planning units for a great many secular and sacred activities.

Dakota Prairie Grasslands

The Dakota Prairie Grasslands is exceedingly rich in cultural resources. Over 1.700 sites are presently recorded within the study area boundaries and provide a unique natural laboratory for studying Northern Plains prehistory and history. Information accumulated to date demonstrates the long and diverse series of human occupation that spans at least the last 12,000 years. Sites range in type from prehistoric hunting camps, bison kill sites, and conical timber

lodges with associated eagle trapping pits, to Lt. Col. Custer's trail and campsites, and numerous remains from the homestead period.

At the current time, 1,738 cultural sites have been recorded within the Dakota Prairie Grasslands, with about 17 percent of the total land area inventoried. The sites recorded represent 18 different site types, with the most common being lithic scatters and stone ring sites. National Register eligibility status for the sites within the Dakota Prairie Grasslands includes 210 sites that are considered eligible for nomination to the National Register of Historic Places.

The Blue Buttes is at least one area within the planning area with documented evidence that it is used for the practice of traditional activities and there may be other areas as yet unidentified. The Blue Buttes include significant religious sites for the Low Hat Clan of the Hidatsa. The area is also very rich in archaeological sites dating from historic to prehistoric and a proportion of these sites may be considered traditional cultural properties. As a result of consultation with the Low Hat Clan, this area was designated a special Management Area K under the first Custer Land and Resource Management Plan. This designation was done in order to protect these resources from conflicts which are incompatible with their traditional Indian use.

Thunder Basin National Grassland

About 40 percent (or 215,000 acres; however, 100,000 surveyed acres have left public ownership via land exchange) of the Thunder Basin National Grassland has undergone some degree of archeological surface examination since the mid-1970s. Practically all of the inventory was the result of activities related to oil and gas exploration and coal mining activities. Just over 1,200 sites have been located and recorded on the grassland. The variety of individual resources (sites) range from aboriginal encampments, to historic trails and wagon roads, to more recent homesteads and pastoral camps. Although the average site size is under one-half acre, some linear features, such as the Bozeman and Texas Trails, extend for many miles across the national grassland.

About 160 of the historic and prehistoric sites recorded on the national grassland have been determined eligible to the National Register of Historic Places, but none are currently listed on the National Register. Site densities are high, with an average of 4 sites per square mile. The most common sites encountered consist of small, temporary, prehistoric hunting camps and historic pastoral camps.

Nebraska National Forest Units

Three percent of the Nebraska National Forest Units have been surveyed for heritage resources. The surveyed lands contain 740 recorded heritage sites, representing a density of 4 sites per square mile. Of these sites, 54 are considered eligible for listing on the National Register, 620 are not considered eligible, and 45 have not been evaluated. As with the other planning areas, most of the sites are prehistoric scatters of stone artifacts. The Sidney to Deadwood Trail crosses the Nebraska National Forest and Oglala National Grassland.

The Bessey Administrative Complex and the Hudson-Meng Bison Bonebed have been listed on the National Register of Historic Places. Both of these sites have strong public interpretation components to their management. In addition, the Warbonnet Battlefield and the Fiddle Creek Heritage Complex will likely be proposed for listing on the National Register in the future.

Environmental Consequences

Resource Protection Measures

Heritage resources are protected by the National Historic Preservation Act. Prior to any undertaking as defined in 36 CFR 800, all heritage resources that could be affected are located and evaluated for their potential to be placed on the National Register of Historic Places. Sites determined to be eligible are identified as "historic properties." The State Historic Preservation Office and, in some cases, the Advisory Council on Historic Preservation, must be informed of potential effects to historic properties. Agreement on mitigation of effects to all historic properties must be reached through consultation with State Historic Preservation Offices and the Council before any project may take place.

General Effects

As use of the grassland and forest units continues to rise from population increases and non-resident visits, impacts to heritage resources are expected to increase. Unauthorized collection, theft, excavation and vandalism will continue under all alternatives. Natural erosional and depositional processes will also continue to degrade heritage resources. Data collection through excavation, the most common mitigation for unavoidable impacts, also results in some loss of the resource. Inadvertent damage during project implementation may also occur.

As surveys are completed and projects are implemented, additional resources will be located that will require inventory, evaluation, protection and interpretation. Based on the current number of sites and acres surveyed, an additional 6,700 sites on the Dakota Prairie Grasslands, 2,200 sites on the Thunder Basin National Grassland, and 6,400 sites on the Nebraska National Forest may exist. This represents about 4 sites per square mile. Recent surveys indicate that site densities may be even higher. On the Thunder Basin National Grassland, 300 sites and 500 sites on the Nebraska National Forest are expected to be eligible for nomination to the National Register. Based on past evaluative site testing and investigation, about 2,500 new sites may be found eligible for listing to the National Register on the Dakota Prairie Grasslands.

In all alternatives, heritage resources will be managed as required by the legal administrative framework. The program will include inventory, analysis, evaluation, stabilization, and public interpretation under all alternatives. Alternatives 1 and 2 emphasize commodities and motorized recreation and have the greatest potential to affect heritage resources. These alternatives would require the greatest amount of inventory and mitigation. Alternatives 1 and 2 with the commodity and motorized recreation emphasis, also have the most potential to affect unidentified areas that may have traditional cultural importance to American Indian people.

All alternatives allocate the Blue Buttes, an area important to American Indian traditional practices, to Management Area 2.4 (American Indian Traditional Use Areas), which will protect the traditional uses of the area.

Alternative 1

While Alternative 1 meets Section 106 compliance requirements of the National Historic Preservation Act, it would not address the larger issues of site stewardship, interpretation, sacred sites, traditional cultural properties or survey provisions in Section 110 of the Act.

Alternative 1 would continue current travel management policies. Off-road motorized travel under that policy has caused some land degradation, which affects the historical landscape. Any increase in oil and gas development could further degrade the historical landscape, and possibly affect sacred landscapes.

Alternative 2

Increased commodity development that would occur in Alternative 2 would require more inventories for cultural resources, which would lead to more information for the site record. However, formal recording in itself can be regarded as disrespectful treatment through the very act of recordation and public knowledge (even though locational information is protected). This can lead to looting or simply inappropriate visitation, from a traditional point of view. It would also continue the project-oriented approach to understanding grassland prehistory and history rather than a more holistic approach designed to provide information on other areas. Introduction of visual, audible and atmospheric elements associated with commodity development may compromise the sense of place and alter the setting of many heritage sites.

While Alternative 2 meets the Section 106 compliance requirements of the National Historic Preservation Act, it would not address the larger issues of site stewardship, interpretation, sacred sites, traditional cultural properties or survey provisions in Section 110. Minimal investments in recreation would limit opportunities for public education and interpretation. Alternative 2 would continue current travel management policies. Off-road motorized travel under that policy has caused some land degradation, which affects the historical landscape.

Alternative 3

Alternative 3 would provide a mix of survey, interpretation, public participation and research. With less commodity production than currently occurs, there would be a lower potential for adverse impacts to heritage resources. Motorized travel restrictions would also lessen the potential for adverse impacts to heritage resources.

Alternative 4

Alternative 4 would have the least potential of the alternatives to adversely affect heritage resources because it would have the least amount of commodity outputs and motorized recreation. Fewer project-driven compliance inventories would be accomplished resulting in less opportunity for adding to the overall inventory of sites. Maintenance of the inventory and site monitoring would be emphasized. Alternative 4 would prescribe burn the most acres, which would increase the discovery of heritage sites and further knowledge about Northern Plains history.

Restoration envisioned under this alternative would more closely resemble pre-ranching landscapes and provide places more suitable for traditional cultural activities. The native landscapes, sacred areas and American Indian traditions and practices would be further enhanced with the presence of bison.

Alternative 5

Alternative 5 would also include lower levels of commodity-driven activities than currently occurs. However, it would offer slightly more motorized travel opportunities than Alternatives 3 and 4 (which would also restrict motorized use to designated routes). The motorized access would have the potential to adversely impact heritage resources. The recreation emphasis in Alternative 5 would encourage development of public interpretive sites of heritage resources, which could result in higher public awareness and concern for the protection of such resources. Alternative 5 maintains and promotes the historic landscape, while providing some opportunities for solitude and remoteness.

Direct and Indirect Effects

Effects from Facilities Maintenance

The administrative facilities at the Bessey Ranger District, Denbigh Experimental Forest, and McKelvie National Forest are listed historic properties. The maintenance, reconstruction, remodeling, and removal of these properties is considered to be a direct effect. In all alternatives, these activities would be conducted in compliance with the National Historic Preservation Act.

Effects from Fire and Fuels Management

The suppression of wildfires has the potential to affect historic properties if a fire line is constructed across heritage resources. Fire control measures, such as emergency road blading, can also destroy culturally sensitive sites, as well as prehistoric sites. Wildfires can destroy irreplaceable structures and flammable site types, such as log cabin remains, historic corrals, building remains, or conical timbered lodges. Burning in woody draws and juniper slopes would require intensive archaeological inventory due to potential presence of eagle trapping lodges.

Prescribed burns, as well as unregulated fires, can increase the propagation of certain tree and grass species that have traditional uses. They can also increase the discovery of heritage sites. Surveys will be conducted in advance of prescribed fire in all alternatives if a file search indicates the project area is likely to contain dense, significant prehistoric remains, historic structures, conical lodges, or other sites that should be avoided. Studies of high-intensity, short-duration grassland burns indicate that little effect occurs to sites, such as lithic scatters and tipi rings, which are the most common site type on the grasslands. Alternative 4 would have the most amount of prescribed fire, followed by Alternatives 5, 3, 2 and 1.

Effects from Fish and Wildlife Management

Fish and wildlife projects can include prescribed burns, water impoundments, fence exclosures, facilities construction for species reintroduction, and timber stand manipulation. Effects to historic properties will be mitigated in compliance with the National Historic Preservation Act in all alternatives. Effects from these activities are generally limited to the project area.

Areas near water sources are often areas with a high density of heritage sites. Fish and wildlife enhancement projects in areas with high site density increase the potential for extensive site mitigation. In addition, sites near these areas (such as fishing areas) may require monitoring to

protect them from illicit collection and vandalism. Development of these areas also offers the opportunity for site interpretation and public education.

Bullion Butte, Lone Butte, Square Butte and the Hansen Eagle trapping complex all fall within the Management Area 3.51 (Bighorn Sheep) and would be afforded some additional protection from development and preserve, in part, the pristine qualities of the landscape and its remoteness.

Effects from Land Exchanges

The exchange of federal land for private land has the potential to affect heritage resources because the legal protection for historic properties ends once the land ownership changes. In all alternatives, this direct effect must be mitigated, in compliance with the National Historic Preservation Act before a land exchange takes place. Heritage surveys will be conducted prior to land adjustment in all alternatives.

Traditional cultural properties will be considered in all alternatives prior to any land adjustment. Changing land ownership patterns through land exchanges and other mechanisms has the potential to affect traditional cultural practices by changing access patterns.

Effects from Oil, Gas, Minerals Management

In all alternatives, the heavy machinery involved in the construction of and access to energy and mineral extraction areas, as well as the actual extractive activities themselves, are direct effects that must be mitigated in compliance with the National Historic Preservation Act. Also, construction activities could isolate a site from its surrounding environment, or introduce visual, audible or atmospheric elements that are out of character with the site. Indirect effects include the potential for vandalism of a site or theft of artifacts during the execution of the project and the increased potential for vandalism and theft due to new public access.

One possible benefit of oil and gas development is that it results in more archaeological inventory, which could identify more archaeological sites and traditional cultural properties and provide more information on the distribution of culturally significant plant, animal and fossil resources.

Roads developed in support of oil and gas development can make access to traditionally significant ceremonial or gathering places easier. Increases in access to traditionally significant ceremonial or gathering areas can also decrease the seclusion and quiet necessary for many of the traditional cultural practices.

Adverse effects to settings have especially serious consequences for traditional cultural properties because these sites were often chosen for their pristine qualities and remoteness, among other things. Introduction of noise, odors, and visual modifications may reduce the appeal and use of the traditional cultural properties.

Alternatives 4 and 5 would be more likely to preserve and protect heritage sites from roads, well pads, and facility construction because they contain more restrictions on oil and gas development than the other alternatives.

Effects from Range Management and Livestock Grazing

Grazing can impact archaeological sites both on and below the surface. Effects include trampling, trailing, soil compaction, and erosion related to pipeline and water tank construction, and

associated vehicle trails which can expose artifacts and make them vulnerable to theft. While the historic landscape may be retained, individual sites may be adversely affected. The potential for direct effects would be greatest in Alternative 2, followed by 1, 3 5, and 4. In all alternatives, the direct effects from range management activities will be mitigated in compliance with the National Historic Preservation Act.

Livestock grazing can also affect the biodiversity of the rangeland and, hence, affect the distribution of traditionally significant animal and plant species. These effects would be most apparent in Alternative 1 and 2; Alternative 3, 4 and 5 would do more to restore the grassland ecosystem and promote plant diversity.

One common activity associated with range management is the development of springs. Springs were commonly used by prehistoric and historic Indian groups, as well as historic homesteaders, and sites are often found within close vicinity of springs. Development of springs, consequently, has the potential to adversely affect culturally sensitive sites. Any increase in spring developments for Alternatives 1 and 2 may affect these sites.

All action alternatives would require amendments to grazing agreements, if needed, to allow bison as a class of permitted livestock. Alternative 4 would set aside 5 percent of the grasslands for bison grazing. One of the factors in selecting areas for bison grazing would be the ability to enhance traditional American Indian practices and settings.

Effects from Recreation Management and Use

The construction of recreation facilities (campgrounds, trails, parking areas, etc.) can directly affect heritage resources. Under all alternatives, these direct effects will be mitigated before construction. Indirect effects from recreational management can be both beneficial and adverse. Adverse effects include site vandalism, artifact theft, soil compaction and erosion. Beneficial effects include the edification and education of the public about their heritage, which can further public support for the preservation and interpretation of heritage resources. Alternative 5 would provide the most emphasis on interpretation, followed by Alternative 3. Alternatives 1, 2 and 4 would have similar interpretation emphases.

The backcountry non-motorized recreation prescription offers recreation opportunities, while preserving the natural-appearing landscape and setting. Limits on motorized use would promote solitude. Alternative 4 would provide the greatest acreage in backcounty management, followed by Alternatives 5 and 3.

Effects from Special Area Designations

The preservation of special environmental values through the designation of Special Interest Areas, Research Natural Areas and recommended Wilderness would protect and preserve the historical record while offering opportunities investigate and study these areas. Fewer ground-disturbing projects would occur in areas with special designations, such as Special Interest Areas and areas recommended for Wilderness, resulting in fewer heritage resource surveys. Also, natural degradation from erosion and wildfire, for example, can cause damage to heritage resources. Alternative 4 would include the most acres with special area designations, followed by Alternatives 3, 5, 2 and 1. Although these management prescriptions reduce the amount of potential damage to heritage resources from management activities, they also reduce the amount of required surveys conducted and the number of sites located and protected. These management prescriptions do, however, often promote natural, remote settings that preserve

and protect sacred and historic landscapes, traditional cultural properties, and the "sense of place" some people seek. Designation of Special Interest Areas for heritage resources do offer opportunities for education, interpretation and research. Alternatives 3, 4 and 5 would have the greatest number of heritage Special Interest Areas designated.

In Alternatives 4 and 5, some eagle trapping complexes along the Little Missouri River are within Management Area 3.4 (National River System: Scenic River) where the river's scenic values and natural landscape would be emphasized. While the general emphasis is compatible with the preservation and protection of these unique traditional use sites, increased use of the river corridor may promote access, discovery and possibly vandalism and theft of the sites.

Effects from Timber Management

Less than 8 percent of the planning area may be affected by timber management, with most of those acres in the Pine Ridge area of the Pine Ridge Ranger District. Road construction, heavy machinery and timber harvesting can directly affect heritage resources. Direct effects must be mitigated in compliance with the National Historic Preservation Act in all alternatives. Indirect effects of timber harvest include, but are not limited to, soil erosion and compaction. Another indirect effect is the potential for vandalism of a site or theft of artifacts during the execution of the project. Alternatives 2 and 4 would require more surveys and mitigation for the protection of historic properties as required by Section 106 of the National Historic Preservation Act. Thus, more sites would be recorded.

Effects from Travel Management

Increased road construction and off-road motorized access into areas containing significant sites or structures would expose sites to the public, and potentially decrease the seclusion and quiet necessary for many traditional practices. Artifact collecting or similar activities could physically alter sites and may increase with more public access. Alternatives 1 and 2 have the most motorized access and the most facility construction. Restricted access in Alternatives 3, 4 and 5 should reduce vandalism and illegal collection but may also reduce access for traditional users searching for plants or animals.

The construction of new trails into areas with limited access creates an indirect effect to heritage resources by opening up new areas to recreational activities and increasing the potential for disturbance. Impacts to heritage resources in the form of vandalism and theft of artifacts are generally the greatest in areas of motorized use and dispersed camping These threats generally occur within one-quarter mile of a road. Motorized access to heritage sites could increase the probability of damage to a site. Alternative 5, followed by Alternative 3, would construct the most miles of new trails.

Restricting motorized travel to designated routes under Alternatives 3, 4, and 5 would have both beneficial and adverse effects on traditional cultural activities. Less motorized access would promote the solitude necessary for fasting, prayer and other ceremonies. However, restrictions on access could also reduce the ability of American Indians to collect traditionally important plants, animal, and other natural resources.

Effects from Utility Corridors

The construction of utility developments could directly affect historic properties. Grouping of utilities within established corridors would reduce effects. In all alternatives, these direct effects

must be mitigated in compliance with the National Historic Preservation Act. One indirect effect is the potential for vandalism of a site or theft of artifacts during the execution of the project.

Cumulative Effects

Cumulative effects over time can include loss of sites or parts of sites prior to development of better research techniques, loss of interpretive values, and incremental loss of the heritage resource base. Most of the impacts cited above could have long-term cumulative consequences. These include land management projects that cause surface disturbance, increased public visitation, long-term consequences of non-sanctioned activities, such as vandalism and illegal excavation, natural weathering and deterioration, erosion, landslides, fires, and other physical processes. The alternatives differ only slightly in their potential for cumulative effects to heritage resources even though sanctioned management activities vary because protection and mitigation measures are common to all alternatives. Enforcement of protective measures would also be common to all alternatives and should result in an extremely low level of cumulative effects.

Non-project-related, proactive heritage resource management would also help preserve heritage resources. It is required that important known sites be inventoried and evaluated under the Archeological Resources Protection Act. Areas likely to contain sites should also be examined because heritage resources are important in their own right and merit careful management planning for inventory, evaluation, nomination, enhancement, protection and heritage interpretation.

Cumulatively, heritage resources on federal lands may assume greater importance because similar resources on lands of other ownership are not provided the same degree of protection. Construction and development on private lands may destroy heritage values without providing for recovery of data or other mitigation unless the projects are the result of federal licensing, permitting or funding. Cumulative risks to heritage resources on state and private lands are furthermore thought to be greater than on federally administered areas for several reasons. There is a higher likelihood that important heritage resources occur on these lands from historic settlement patterns and more favorable environmental patterns. Where federal licensing, permitting or funding is not involved, less inventory or evaluation is being conducted, implementation of protection or mitigation measures is rarely instituted, and local governments have few ordinances to protect the full range of heritage resources.

Minerals Other Than Oil and Gas

Introduction

Mineral resource use varies over the planning area. For example, Thunder Basin National Grassland administers six coal mines (including the Nation's largest). Interest in uranium leasing in the next 10-20 years on the Nebraska National Forest Pine Ridge Ranger District has also been expressed. Otherwise, mineral use over the planning area has been limited and sporadic in nature.

The Forest Service administers its mineral program to:

- Encourage and facilitate the orderly exploration, development, and production of mineral resources with NFS lands.
- Ensure that exploration, development, and production of mineral resources are conducted in an environmentally sound manner and that these activities are integrated with the planning and management of other National Forest resources.

Laws, Policy and Direction

Policies regarding mineral activities on National Forest System (NFS) lands is guided by statutes, and expressed in statements by the President of the United States, the Secretary of Agriculture, and the Secretary of Interior.

- General Mining Law of 1872 allows exploration, development, and production of minerals from mining claims located on public domain lands.
- Mineral Lands Leasing Act of 1920 established a leasing system for the acquisition of coal, phosphate, oil, oil shale, gas, and sodium.
- Bankhead-Jones Farm Tenant Act of 1937 authorized the Secretary of Agriculture to develop energy resources on lands acquired by the act.
- Common Varieties of Mineral Materials Act of 1947 provides for the disposal of mineral materials on the public lands through bidding, negotiated contracts, or free use.
- Mineral Leasing Act for Acquired Lands of 1947 extends the provisions of the mineral leasing laws to federally owned mineral deposits on acquired NFS lands and requires the consent of the Secretary of Agriculture prior to leasing.
- The Multiple Use Mining Act of 1955 allows the sale of mineral materials, such as sand and gravel, and provides direction for use of surface resources of mining claims.

Affected Environment

Statutory and regulatory direction separate mineral resources in lands owned by the United States into three categories: leasable, locatable, and mineral materials.

Leasable Minerals

Federally owned leasable minerals include fossil fuels (coal, oil, gas, oil shale, etc.), geothermal resources, potassium, sodium, carbon dioxide, and phosphates. These minerals are subject to exploration and development under leases, permits, or licenses granted by the Secretary of the Interior. The principal statutes are the Mineral Lands Leasing Act of 1920, as amended, the Mineral Leasing Act for Acquired Lands of 1947, the Geothermal Steam Act of 1970, and the Federal On-shore Oil and Gas Leasing Reform Act of 1987. The Secretary of the Interior's authority is administered by the BLM.

When NFS lands are involved, the Forest Service has authority and responsibility to determine which lands are available for leasing and for prescribing lease terms that protect the surface resources and values. The Secretary of the Interior has the authority to administer operations on NFS lands leased, licensed, or permitted. The Office of Surface Mining is responsible for coal, and the BLM is responsible for other minerals.

The Nebraska Wilderness Act of 1985 established the Soldier Creek Wilderness. This act also withdrew the area from mineral entry and leasing, as well as withdrawing the Pine Ridge National Recreation Area.

Major coal development occurs on the Thunder Basin National Grassland. The six mines on the grassland produced 138 million tons in 1997 (Reddick, per com). The Little Missouri National Grassland also contains coal resources, although no current production exists in the area and previous development has been minimal (McCoy-Brown, 1997). A coal suitability has been done for both the Little Missouri and Thunder Basin National Grasslands. There were no areas on the Little Missouri National Grassland considered unsuitable for coal mining.

On the Thunder Basin National Grassland, areas considered unsuitable for mining include buffers for State Highway 450, railroads, the utility line paralleling the railroad, 160 acres used by University of Wyoming for scientific study, and 400 acres of alluvial valley floors significant to farming. Areas with deferred suitability decisions include state highways, county roads, occupied dwellings, 480 acres of the University of Wyoming scientific site, areas of bald or golden eagle nests (these sites have buffer zones drawn around them), prairie falcon nest sites, habitat for migratory bird species, grouse leks, and the remaining alluvial floors not listed above (Coal Screening Process, 1997). For further information on the suitability report, see Federal Coal Management Program Coal Screening Process, December 1997.

Uranium is available for location under the General Mining Laws if it occurs on public domain lands; if it is on acquired lands, it is available under the leasing laws. Most of the national grass-lands have acquired minerals, so in most cases, uranium would be available only by lease; however, much of the mineral estate on Thunder Basin National Grassland is public domain. No lands within the planning area are leased for uranium mining. An operating uranium mine is located adjacent to the Nebraska National Forest Pine Ridge Ranger District, near Crawford, Nebraska, and a request to lease uranium under the national forest is likely within the next 10 to 20 years. Other known uranium resources exist on the western portion of the Buffalo Gap National Grassland near Edgemont, South Dakota; eastern Buffalo Gap National Grassland near Scenic, South Dakota; western Thunder Basin National Grassland, near Wright and Bill, Wyoming (Raymond and Dersch, 1997); the western edge of the Grand River National Grassland near Lodgepole, South Dakota; and the Little Missouri National Grassland,

particularly in the Bullion Creek formation (McCoy-Brown, 1997). Except for the area around the Pine Ridge District, the development potential for uranium within the planning area is low.

Geothermal resources exists under the entire eastern half of the Buffalo Gap National Grassland, as well as the eastern half of the Fall River District of the Buffalo Gap. Oil test holes that have penetrated hot water aquifers have had bottom holes temperatures as high as 121^{o}C (250^{o}F). It is estimated that the total volume of water stored in hot water aquifers in South Dakota exceeds 1.5 billion acre feet (Raymond and Dersch, 1997).

There is a sizeable bentonite deposit on the northeast side of the Thunder Basin National Grassland and existing bentonite leases on the acquired mineral estate (mineral ownership not retained by the government from public domain lands and then acquired at a later date).

Locatable Minerals

Locatable minerals are those valuable deposits subject to exploration and development under the Mining Law of 1872, as amended. Locatables are referred to as hardrock minerals. Examples include deposits of iron, gold, silver, lead, zinc, copper, and molybdenum. The public has the statutory right to explore for, claim, and mine mineral deposits found on federally owned lands, subject to the U.S. mining laws. Through a memorandum of understanding with the BLM, the Forest Service administers most aspects of U.S. mining laws on NFS lands.

There are four areas within the planning area, all on the Nebraska National Forest, that have been withdrawn from mineral entry. They are the public domain lands adjoining Merritt Reservoir (880 acres), Toadstool Park (320 acres) , Soldier Creek Wilderness (7,794 acres), and the Pine Ridge National Recreation Area (6,559 acres).

There are no records in the geologic literature that document any hardrock mineralization on or near any of the Dakota Prairie Grasslands. No indications of hardrock mineralization have been discovered, and there is no history of locatable mineral activity occurring in the area (McCoy-Brown, 1997).

Small amounts of placer gold have been found along the Cheyenne River and also in an area between Red Shirt and Scenic on Nebraska National Forest units (Raymond and Dersch, 1997).

Gold and silver have been reported in coal near the eastern boundary of the Thunder Basin National Grassland (Raymond and Dersch, 1997). Because much of the mineral estate is public domain, a portion of the uranium resource would be considered locatable. No active uranium mining occurs on the grassland. Bear Creek Uranium is in the final stages of reclamation. American Colloid, based out of Upton, Wyoming, has bentonite claims on public domain lands within the Thunder Basin National Grassland.

Mineral Materials

Mineral materials, or common variety minerals, are generally low-value deposits of sand, clay, and stone that are used for building materials and road surfacing. Extraction of these materials from the NFS lands is at the discretion of the Forest Service. The major controlling statutes are the Bankhead-Jones Farm Tenant Act of 1937, the Mineral Materials Act of 1947 and the Multiple Use Mining Act of 1955. The Bankhead-Jones Act specifically forbids sale of mineral materials from lands acquired under the act (which includes most of the national grasslands).

The only uses allowed (either by the Forest Service or other agencies) are those that benefit the public.

The primary aggregate source on the Little Missouri National Grassland is "scoria." Scoria is a local term for reddish layers of baked and fused clay, shale, and sandstone that occur where seams of lignite have burned and baked adjacent sediments to a form of natural brick (McCoy-Brown, 1997). Scoria is commonly used for road surfacing, although it is a poor road surfacing material because it breaks down within a year or two of use. The Cedar and Grand River National Grasslands contain aggregate sources enough to meet in-service needs, as well as possibly meeting the aggregate needs of other agencies (McCoy-Brown, 1997). The southwest corner of the northern unit of the Sheyenne National Grassland contains gravel deposits.

Sand and gravel resources can be found on all units of the Nebraska National Forest, primarily along stream courses. The Buffalo Gap and Oglala National Grasslands contain known bentonite, clay, shale, and gemstones. The Buffalo Gap National Grassland also contains known limestone and sandstone resources. The northeast portion of the Pine Ridge District (Nebraska National Forest) contains limestone resource. Shale is found throughout the Fort Pierre National Grassland (Raymond and Dersch, 1997).

Mineral resources on the Thunder Basin National Grassland include scoria scattered through the center of the unit in a north-south direction and shale and sandstone on the eastern portion of the unit (Raymond and Dersch, 1997).

Environmental Consequences

Resource Protection Measures

Reclamation standards would apply to any disturbed sites, as needed, to prevent resource damage. Some management areas limit disturbance from mineral activities in order to protect resource values. Examples of management areas with limitations include MA 1.2, 1.31, and 2.2,

Effects from Fire and Fuels Management

Fire suppression of burning coal veins would affect the natural geologic process. This effect would be similar in all alternatives. Otherwise, there would be no measurable effects from fire and fuels management on the mineral resource.

Effects from Land Adjustments

Land adjustments can either retain or exchange the mineral estate. A mineral report is completed prior to any land adjustment. The report details the mineral occurrence potential for the land involved. In the case of a land exchange, the intent to is exchange for like mineral resources occurrence potential or retain the mineral estate. There would be no measurable difference among alternatives on the impacts to the mineral resource from land adjustments. In the case of public domain mineral estate, the BLM decides whether the mineral estate is retained or exchanged.

Effects from Oil, Gas, Minerals Management

On the Thunder Basin National Grassland, the area of high potential for oil and gas coincides with high potential for coal and can all be leased. If the lease for oil and gas is issued prior to the coal lease, the development of coal could be delayed until after the expiration of the oil and gas lease. Presently, in the case of overlapping leases, the lease holders work out a mutually agreeable solution. In the case where coal bed methane and coal are the conflicting leases, the issue becomes more complex, because mining the coal would cause the loss of the coal bed methane. Effects are similar for all alternatives.

Effects from Recreation Management and Use

There would be no effect to leasable minerals, other than oil and gas, from developed recreation in any of the alternatives as there are no known leasable minerals located within developed recreation sites.

Removal of locatable minerals within developed recreation sites would be subject to the existing improvements. In other words, development of the mining claim would not be allowed to interfere with or destroy existing improvements. Due to the limited amount of known locatable mineral resources on the planning units, there is no difference between alternatives.

Mineral material removal would not be allowed in developed recreation sites. Alternative 5, which would contain the most developed recreation sites, would have the greatest effect on mineral material removal, followed by Alternative 3. Alternatives 1, 2, and 4 would cause the least effects to mineral material removal.

Effects from Special Area Designations

Effects to leasable minerals, other than oil and gas, would be minimal under all alternatives. Leasable minerals, other than oil and gas, do not occur in locations where special area allocations would restrict leasing.

Special area designations may affect mineral removal from some areas. Mineral withdrawals would be in considered in the following management areas if the areas have a history of mineral findings:

- 1.2 (Recommended for Wilderness).
- 1.31 (Backcountry Recreation Non-motorized).
- 1.5 (National River System: Wild Rivers Recommended).
- Some 2.1 (Special Interest Areas).
- 2.2 (Research Natural Areas).
- 5.31a and b (Experimental Forests).
- 8.5 (Nursery).

Withdrawals must be applied for through the Secretary of Interior. All withdrawals are subject to valid existing rights at the time of withdrawal. Because there are few locatable mineral

resources on any of the planning units, even without withdrawal, the effects to removal of locatable minerals would be minimal under all alternatives.

Acres allocated to above management areas would restrict removal of mineral material. Alternative 4, with the most acres allocated to these management areas, would have the greatest impact on mineral material removal. Alternative 5, followed by Alternative 3, would have next greatest impact on mineral material removal. For the Nebraska National Forest units and Thunder Basin National Grassland, Alternative 1 would contain the most area allowing mineral material removal, followed by Alternative 2. On Dakota Prairie Grasslands, Alternative 2 would allow the most mineral material removal, followed by Alternative 1.

Cumulative Effects

Cumulatively the effect to development of mineral resources other than oil and gas would be minimal in all alternatives. Although locatable mineral withdrawals could be applied for in areas with special area designations, it is unlikely that this would occur since mineral development potential is low for these areas. Development of mineral materials would be most restricted in Alternative 4, followed by Alternatives 5 and 3. Again the development potential of mineral materials is low throughout the planning area, so it is unlikely that restrictions placed on mineral material removal would create an adverse effect.

Timber Management

Introduction

Although timber resources derived from the planning area are relatively small--less than 2 percent of the area--the need to evaluate suitable lands for timber harvest is required. A suitaability analysis was conducted and management direction established for the three Revised Management Plans.

Laws, Policy and Direction

The National Forest Management Act (NFMA) of 1976 (16 U.S.C. 472a) sets forth the requirements for land and resource management plans for the National Forest System. The regulations on land and resource management planning (36 CFR 219) require that lands suitable and available for timber harvest and the allowable sale quantity (ASQ) from those lands should be identified.

Affected Environment

Tentatively Suitable Forest Land

The following table shows tentatively suitable forest lands determined for the Northern Great Plains planning units using criteria in Forest Service Handbook 2409.13, Chapter 20 and the Federal Register, Vol. 47, No. 190, 36 CFR Part 219.3 and 219.14:

Table TR-1: Tentatively Suitable Forest Land

Criteria	Grand River/Cedar River National Grasslands	Little Missouri National Grassland	Sheyenne National Grassland	Pine Ridge District/Oglala National Grassland	Thunder Basin National Grassland
Total acres	161530	1027520	70260	144630	552,490
Total acres forested	500	117810	5110	48100	30900
Acres non-forested	161030	909710	65150	96530	521590
Forest land withdrawn from timber production	0	0	0	7860	0
Acres not capable of producing crops of industrial wood	0	49500	0	440	4385
Acres where irreversible damage is likely to occur due to soils	0	0	0	0	6515
Acres that cannot be restocked within 5 years	0	0	0	0	5500
Acres where inadequate response information is available	500	67360	0	0	14500

Criteria	Grand River/Cedar River National Grasslands	Little Missouri National Grassland	Sheyenne National Grassland	Pine Ridge District/Oglala National Grassland	Thunder Basin National Grassland
Tentatively suitable forest land	0	940	5110	39800	0

The Pine Ridge Ranger District has the greatest amount of tentatively suitable forest land. Based on soils, the evaluation shows approximatley 9,000 more acres capable of producing timber than what is actually forested. This is principally due to fire events that have occurred on this unit and are poorly stocked. It is expected that these areas will eventually reforest and be capable of producing timber and, therefore, should be considered in the evaluation.

The 26,000 acres of forested type on the Samuel R. McKelvie National Forest and Bessey unit of the Nebraska National Forest were not considered tentatively suitable based on the following factors:

- Potential for irreversible soil damage;
- Questionable ability to reforest the site within five years, and
- Inadequate information.

The Ft. Pierre and Buffalo Gap National Grassland units do not contain forested acres.

Environmental Consequences

Direct and Indirect Effects

General Effects

A timber suitability analysis resulted in a tentatively suitable forest land base of about 45,800 acres; 87 percent is located in the Pine Ridge area on the Pine Ridge Ranger District. Alternative 2 contains about 10,140 acres of suitable timber on the (See Determination of Timber Suitability in Appendix B) Pine Ridge Ranger District, which are allocated to Management Area 5.13 (Timber Production). The Little Missouri and Sheyenne National Grasslands contain tentatively suitable forest land but those lands did not meet the criteria of suitable timber lands. The Grand River / Cedar River and Thunder Basin National Grasslands along with the Bessey unit and Samuel R. McKelvie National Forest did not contain tentatively suitable forest land, and the Ft. Pierre and Buffalo Gap National Grasslands do not contain classified forested lands.

While timber harvest may be allowed in most management areas on all units to meet other resource objectives, harvest in these areas would not contribute towards an allowable sales quantity (ASQ) but would contribute towards the total timber sale program. In reality, the amount of timber that would be harvested is dependent on the desired conditions based on the emphases of the alternative. For example, on the Little Missouri National Grassland, some personal-use post, pole and sawlog production could potentially exist, especially on the Medora Ranger District. On the Sheyenne National Grassland, some cottonwood stands could be harvested with a sustained harvest level of .2 to .3 MMBF (million board feet). On the Thunder Basin National Grassland, some ponderosa pine, at about 2 MBF (thousand board feet) per acre, are interspersed among the grasslands. Personal-use firewood permits are available. On the

Samuel R. McKelvie National Forest and the Bessey unit, the majority of the tree stands are hand-planted forests, with a total volume estimated at 563 MBF. In the last 5 years, about 2,000 posts have been sold to a local milling firm.

On the Pine Ridge Ranger District, timber harvest estimates were based on assumptions agreed to by a panel made up of Nebraska State Forest Service and county extension foresters, a National Forest Service silviculturist and forester, and a timber industry representative. It was assumed that a typical initial harvest removes 2.5 MBF / acre from a mature stand with a return entry at 30 years. To achieve an open savanna timber stand in 10 years, a commercial harvest with a removal of 4.0 MBF / acre would be used. Alternative 4 would harvest the most timber in the first 10 years, after which no timber harvest would occur until decade 4 and the desired conditions would be maintained using prescribed burns every 2 to 7 years.

The following table displays the volume that could be harvested by alternative, which includes regulated and unregulated timber harvest on the Pine Ridge District only:

Table TR-2: Timber Volume (MMBF) per year by Decade

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Decade 1	0.2	4.412	6.119	7.614	6.303
Decade 2	0.2	0.845	0	0	0
Decade 3	0.2	0.845	0	0	0
Decade 4	0.2	0.845	2.976	0.255	2.671

The following assumptions were to calculate timber volume:

- Dense Mosaic - A harvest at 30 year intervals which brings the basal area down to 60 - 80 square feet consisting of 10% seed / sap, 20% post / pole, and 70% mature with a harvest that averages 2.5 MBF / acre. On suited forest land, the harvest is spread out evenly among all 12 decades of the planning horizon. On unsuited timber land, all acres are harvested in the first decade and then future harvests are scheduled at 30 year intervals so harvests occur in decades 1, 4, 7, and 10
- Savanna - One time departure harvest on unsuited timber lands which brings the basal area down to 20 - 40 square feet on 12 - 20 DBH inch trees with an average yield of 4 MBF / acre. This will leave 10 - 20 trees per acre with an average spacing of 45 feet between trees.
- Seed / sap and post / pole size trees will have a basal area of less than 5. Maintain a fire frequency of 2 to 7 years within these stands.
- For marginal sites not part of Alternative 2, the suited base that has a sustained yield prescription applied will assume a 5% volume decline over time.
- For other than suitable timber sites, assume sustained yield and savanna prescriptions are applied to all timbered sites less than 40% slope to either create a savanna mosaic or to reduce the risk of catastrophic fire.

It is unlikely that the harvest level in the above table could be achieved for the following reasons (Also see budget discussion in Chapter 2):

- Concerns on budget for the first decade. The Forest would need at least a 30 percent increase in budget to implement the decade one program.

- The analysis showed it to be a below-cost sale program. Revenues are expected to be $116 / MBF, costs are $160 / MBF.
- A non-declining yield constraint was added because of concerns for community stability. This was simply modeled at 10 percent of the decade 1 harvest.

Based on these reasons, the original analysis was modified to reflect the harvest level depicted in the following table:

Table TR-3: Average Timber Volume (MMBF) per year by Decade

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Decade 1	0.2	1.202	0.612	0.761	0.63
Decade 2	0.2	1.202	0.612	0.761	0.63
Decade 3	0.2	1.202	0.612	0.761	0.63
Decade 4	0.2	1.202	0.612	0.761	0.63

Only Alternative 2 would contain an allowable sale quantity (ASQ). Under Alternative 2, the ASQ would be about .8 MMBF from suitable forest land. The remainder of the volume shown for Alternative 2 (about .4 MMBF) would be unregulated harvest. Alternative 2 would have the highest harvest level, followed by Alternatives 4, 5, 3, and 1.

Effects from Fire and Fuels Management

During the first 10 years under Alternative 4 and 5, active management would create open park-like stands. This management would increase the fine fuels so fire frequencies could increase but intensity would decrease. Areas where there is no active management could result in fire damaging or killing trees on a few or many acres, depending largely on climatic conditions. It would also be difficult to prevent or suppress fires within the areas managed for timber. Even though Alternative 2 would have the highest number of acres being managed for timber production, the potential for wildfires would be the highest unless the activity fuels are treated and prescribed fire is used to maintain the ecosystem function.

Effects from Insect and Disease Management

Insects and disease can affect the production of timber by killing and damaging trees. Under all alternatives, potential exists for salvage / sanitation cuts to harvest dead and damaged timber and to attempt to slow or impede infestations. The degree to which these harvests are undertaken depends largely upon the risks associated with wildfire potential, infestation spread into healthy stands, public safety, presence of high-value resources, and the resource emphasis of the infected or adjoining area.

Cumulative Effects

Timber from the Pine Ridge area is shipped to mills outside the area. Several timber companies have established offices in Chadron but only one has maintained an office over the past 10 years. Timber operators do see the Pine Ridge area as a source for timber to supplement their timber needs and over the past decade have become dependent on the timber that comes from the Pine Ridge area. Currently, this harvest is coming off private and State School Section lands.

As the demand to supplement their timber needs increases, timber sources on the National Forest System lands will be more closely evaluated to consider this need.

Timber harvesting would affect the type of wildfire on an area. Under Alternative 2, even though this alternative has the most amount of timber harvesting and the most acres being actively managed, regeneration is also the greatest. This would create ladder fuels that would allow fires to burn in the crowns of the timber stand. Alternative 4 would mimic a late successional forest type, which are open parklike ponderosa pine stands. Ladder fuels would be reduced, thus reducing the risk of fires to burn and spread in the crowns of the timber stand. However, fine fuels would build up, increasing the risk of low-intensity fires in the understory. Alternatives 3 and 5 would create a mosaic of dense timber stands and open parklike timber stands where there would be a higher potential of crown fires in the dense timber stands.

There is a risk of insects and disease under all alternatives. Properly managing a timber stand would reduce this risk. Alternative 1 would have the least amount of timber harvesting and increase the risk of insect and disease infestations. Alternative 2 would harvest the most timber. Its effect would be to reduce the magnitude of insect and disease loss to a lower level without resulting in stand destruction from pests. Alternatives 3, 4, and 5 wold result in a mosaic of dense and open parklike stands. The denser stands would be subject to greater insect and disease loss whereas the more open parklike stands stands would experiencce a scattered mortality effect which may contribute to the recruitment of wildlife tree snags. The denser stands would have a greater fuel loading resulting in higher intensity burn patterns when fire occurs.

Wildlife

Introduction

This section describes the effects of the alternatives on selected wildlife species, including game and furbearers. Effects of the alternatives on imperiled native fish and wildlife species and management indicator species are described in the Rangeland and Forest Health section of this chapter. Predicted effects of each alternative on recreational fisheries are discussed in the Recreation and Travel Management section of this chapter.

Laws, Policy and Direction

The National Forest Management Act (NFMA) of 1976 (16 U.S.C. 472a) sets forth the requirements for land and resource management plans for the National Forest System. These regulations require that planning provide for a diversity of plant and animal communities. The species addressed in this section help make up the diversity found in many of the biological communities that occur on the national grasslands and forests on the Northern Great Plains.

Many other laws and regulations provide for or mandate wildlife and fish conservation on federal lands. The Endangered Species Act of 1973 is discussed in the Rangeland and Forest Health section. The Sikes Act of 1974 provides for carrying out wildlife and fish conservation programs on federal lands in cooperation with state agencies. The Multiple Use, Sustained - Yield Act of June 12, 1960, recognizes and clarifies the authority and responsibility of the Forest Service to manage wildlife and fish. The Bankhead-Jones Farm Tenant Act of 1937, as amended, provides for protection of fish and wildlife on those areas that are now national grasslands.

The U.S. Department of Agriculture's policy on wildlife, fish, and plant habitat management on National Forest System lands is presented in Departmental Regulation 9500-4. This policy includes the establishment of habitat goals through the planning process for plants and animals, including fish and wildlife species in demand for hunting, fishing and trapping and those with special habitat needs.

Affected Environment

Big Game

Predicted effects are presented for mule deer (Odocoileus hemionus), white-tailed deer (O. virginainus), pronghorn (Antilocapra americana), elk (Cervus elaphus), and wild turkey (Meleagris gallopavo). Effects on California bighorn sheep (Ovis canadensis californiana) may be found in Appendix H (Biological Assessment and Evaluation) and are not repeated here. However, habitat for Rocky Mountain bighorn sheep (O. canadensis canadensis) on the Nebraska National Forest is discussed here. Moose (Alces alces) are occasional visitors to the Sheyenne National Grassland, but because their occurrence is so incidental, effects on moose were not evaluated. Although bison (Bison bison) were once one of the major native herbivores in this region, free-ranging wild bison herds have been gone for over a century, and the few confined herds that now graze National Forest System lands in the planning area are considered

administratively as permitted livestock. Because of these reasons, bison were not considered wildlife for the purpose of this evaluation.

Deer

Mule deer are native to the planning area and occur on all units except the Sheyenne National Grassland. This species uses a variety of habitats including grasslands, badlands, shrublands, wooded draws, riparian areas and other prairie woodlands. They use both vegetation and topography as thermal and escape cover, and forage on both native vegetation and agricultural crops. White-tailed deer have extended their range westerly and now occur on each planning unit. They prefer more heavily forested environments than mule deer but also commonly forage on agricultural croplands adjoining National Forest System lands. The expansion of white-tailed deer populations may be at the expense of mule deer in some areas.

Pronghorn

The pronghorn is a unique native of the plains. Contrary to public belief, they are not antelope, nor goats. Instead, they are the sole surviving species of the family Antilocapridae, a family with fossil records dating back to the Miocene. They occur only in North America and are commonly observed on every planning unit except the Sheyenne National Grassland and Nebraska National Forest (Pine Ridge Ranger District). Pronghorn inhabit open rangelands where sagebrush and forbs make up much of their diet. Like deer, they commonly forage on green winter wheat and alfalfa on private lands that adjoin National Forest System lands. They rely on their excellent sight and speed to avoid predators. Although they evolved in open and unfenced rangelands, they are reasonably adept at negotiating fences that are designed and constructed to facilitate pronghorn movement. Although it is important to have properly designed fences, fences still contribute to major winter die-offs during severe snowstorms when pronghorn herds try to move to more favorable areas. Snowdrifts along fences can make it difficult for pronghorn to negotiate fences.

Elk

Elk were also a common grazer on the Northern Great Plains prior to Euro-American settlement but were almost extirpated by the turn of the twentieth century. Small free-ranging elk herds are re-establishing on the prairie and are now found on the Thunder Basin, Oglala and Little Missouri National Grasslands and Nebraska National Forest (Pine Ridge Ranger District). Reintroduction programs by state wildlife agencies have augmented their return to the prairie. Like mule deer, elk use a variety of habitat types on National Forest System lands, including open rangelands and forested areas, and they also commonly forage on adjoining private croplands and haylands.

Wild Turkeys

Wild turkeys have been introduced into suitable habitats across the planning area and now occur on each planning unit except the Ft. Pierre and Grand River / Cedar River National Grasslands. They occupy a variety of habitats, but are commonly associated with ponderosa pine forests and / or riparian habitats in the planning area. Ponderosa pine seeds and agricultural

crops are some of the more important foods for wild turkeys, especially during the hard winters that are not uncommon in the planning area.

Small Game

The primary upland gamebird species found on these lands include plains sharp-tailed grouse, greater prairie chicken and sage grouse. The habitat preferences and the predicted effects of each alternative on these species are discussed in Appendix H (Biological Assessment and Evaluation) and in the Rangeland and Forest Health section of this chapter under Management Indicator Species discussion and are not repeated here. It should be noted that hunting seasons are closed yearlong for greater prairie chicken and sharp-tailed grouse on the Sheyenne National Grassland and for sage grouse on the Buffalo Gap National Grassland.

Ring-necked pheasants (Phasianus colchicus) are another popular gamebird that has been successfully introduced to this region. Although this species is primarily associated with agricultural croplands, it is found on most of the planning units in riparian habitats, other prairie woodlands and grassland habitats, often in conjunction with adjoining private croplands. They most often occur on National Forest System lands where woody and grassland cover is abundant.

The gray partridge (Perdix perdix) is another non-native species that has been successfully introduced into the northern part of the planning area. This species is found on the Grand River / Cedar River and Little Missouri National Grasslands. It is most often found on these units in grassland habitat near private croplands.

Other small game includes cottontail (Sylvilagus spp.), gray squirrel (Sciurus carolinensis), and fox squirrel (S. niger). Cottontail and the non-native fox squirrel occur on all planning units, while the gray squirrel occurs only on the Sheyenne National Grassland. The two species of tree squirrels occur in forested habitats, while the cottontail occurs in a wide range of habitats, including prairie dog colonies, grasslands, shrublands, badlands, wetlands, riparian habitats and other prairie woodlands.

Migratory Birds

The national grasslands and forests on the Northern Great Plains provide important seasonal habitats for many migratory bird species. Essentially every acre of National Forest System land and water that remains in its natural state is habitat for one or more species of migratory birds. This includes numerous species of raptors, shorebirds, songbirds, waterfowl and other water-birds. Many of these species are referred to as neotropical migrants because they spend most of summer in North America and migrate south into Central or South America for winter. Both waterfowl and the neotropical migrants are of high public interest and recent cooperative conservation initiatives demonstrate this concern and interest. The North American Waterfowl Management Plan is an international conservation initiative that emphasizes conservation and habitat protection and development for waterfowl and other wetlands wildlife. The Partners in Flight Program is another international initiative that focuses attention on the need to conserve neotropical birds and their habitats across national borders. The Forest Service is signatory to both of the above programs and committed to conservation of these species and wildlife communities on National Forest System lands.

This discussion on the effects of the alternatives on migratory birds is limited to waterfowl and neotropical bird species. The Draft Biological Assessment and Evaluation (Appendix H)

discloses the effects of the alternatives on numerous raptor species and other migratory bird species.

The national grasslands and forests in the planning area provide substantial amounts of uplands and wetlands habitat for waterfowl. There are about 3,000 constructed ponds and dugouts on National Forest System lands in the planning area, as well as many additional natural and seasonal wetlands, providing important pairing, brooding, feeding and resting habitat for waterfowl. The total acres of seasonal and permanent wetlands, including natural and constructed wetlands, on each planning unit is presented in Table W-1. The acres of potential nesting habitat for upland nesting waterfowl species is also significant because most uplands within a half mile or more of many of the natural and constructed wetlands are potential waterfowl nesting habitat.

Table W-1. Acres of semi-permanent and permanent wetlands (constructed and natural) on each planning unit, based on the National Wetlands Inventory.

National Grassland or Forest	Total Acres of Wetlands
Little Missouri National Grassland	2,450 [a]
Sheyenne National Grassland	7,870 [a]
Grand River / Cedar River National Grassland	700
Fort Pierre National Grassland	2.990
Buffalo Gap National Grassland	3,930
Oglala National Grassland	570
Nebraska National Forest (Pine Ridge R.D.)	<10 a
Nebraska National Forest (Bessey R.D.)	180
Samuel R. McKelvie National Forest	380
Thunder Basin National Grassland	Data Unavailable

[a] Some information may be missing so these figures may represent minimum acreages.

Some of the more common waterfowl species that breed on these National Forest System units include Canada goose (*Branta canadensis*), mallard (Anas platyrhyncos), gadwall (*A. strepera*), blue-winged teal (*A. discors*), green-winged teal (*A. crecca*), pintail (*A. acuta*), American wigeon (*A. americana*) and shoveler (*A. clypeata*). Conservation goals established in the North American Waterfowl Management Plan (U.S. Fish and Wildlife Service 1986) prioritize conservation activities for mallard, pintail and blue-winged teal. These are dabbling ducks that nest in uplands and then move their broods after hatching to ponds and other wetland habitats. Trumpeter swans (*Cygnus buccinator*), the largest of North American waterfowl and a species that was once on the endangered species list, occur on and near the Buffalo Gap National Grassland where a small number of adults nest each year. It is also not uncommon to see non-breeding subadult swans feeding or resting on ponds on the national grassland. Effects of each alternative on this species is presented in Appendix H and are not discussed in this section.

These planning units also provide important seasonal habitats for a large number of neotropical migratory bird species. Because of the number of species and the wide diversity of preferred habitats, priority neotropical species were identified for each planning unit using a protocol (Carter and Barker 1993) endorsed by the national Partners in Flight program. This protocol takes into account the relative importance of each planning unit in providing habitat for each species, as well as the risks and status of each neotropical species. Alternative effects are summarized in this section only for the priority species. However, the complete species list for

each planning unit as well as a more detailed effects analysis for neotropical migratory birds are available on request.

The priority neotropical bird species (landbirds only) for each national grassland and forest are identified in Tables W-2 to W-4. These species are further grouped by preferred habitats in Table W-5.

Table W-2. Priority neotropical migratory landbirds on the Dakota Prairie Grasslands.

Species	Scientific Name	LM NG	GR/CR NG	S NG
Burrowing Owl	*Speotyto cunicularia*	X	X	
Ferruginous Hawk	*Buteo regalis*	X	X	
Chestnut-collared Longspur	*Calcrius ornatus*	X		
Prairie Falcon	*Falco mexicanus*	X	X	
Upland Sandpiper	*Bartramia longicauda*	X	X	X
Long-billed Curlew	*Numenius americanus*	X	X	
Grasshopper Sparrow	*Ammodramus savannarum*	X	X	X
Marbled Godwit	*Limosa fedoa*	X	X	X
Northern Harrier	*Circus cyaneus*	X	X	X
Baird's Sparrow	*Ammodramus bairdii*	X	X	X
Bobolink	*Dolichonyx oryzivorus*	X	X	X
Clay-Colored Sparrow	*Spizella pallida*	X	X	X
Short-eared Owl	*Asio flammeus*	X	X	X
Dickcissel	*Spiza americana*	X	X	X
Loggerhead Shrike	*Lanius ludovicianus*	X	X	X
Yellow-Headed Blackbird	*Xanthocephalus xanthocephalus*	X	X	X
Sedge Wren	*Cistothorus platensis*			X
Willow Flycatcher	*Empidonax traillii*	X	X	X
Lazuli Bunting	*Passerina amoena*	X	X	
Marsh Wren	*Cistothorus palustris*	X	X	X
Ovenbird	*Seiurus aurocapiilus*	X		X
Scarlet Tanager	*Piranga ludoviciana*			X
Least Flycatcher	*Empidomax minimus*	X	X	X
Yellow-billed Cuckoo	*Coccyzus americanus*	X		X
Yellow-throated Vireo	*Vireo flavifrons*			X
Warbling Vireo	*Vireo gilvus*	X	X	X
Orchard Oriole	*Icterus spurius*	X	X	X
Brewer's Sparrow	*Spizella brewi*	X		
Black-billed Cuckoo	*Coccyzus erythropthalmus*	X	X	X

Table W-3. Priority neotropical migratory landbirds on the Nebraska National Forest and Associated Units.

Species	Scientific Name	FPNG	BGNG	ONG	NNF PRRD	NNF & SRMNF
Burrowing Owl	*Speotyto cunicularia*	X	X	X		
Ferruginous Hawk	*Buteo regalis*	X	X	X		
Chestnut-collared Longspur	*Calcrius ornatus*	X	X	X		
Prairie Falcon	*Falco mexicanus*		X	X	X	
Upland Sandpiper	*Bartramia longicauda*	X				X
Long-billed Curlew	*Numenius americanus*		X	X		
Mountain Bluebird	*Sialia currucoides*				X	
Swainson's Hawk	*Buteo swainsoni*					X
Northern Harrier	*Circus cyaneus*	X				X
Bobolink	*Dolichonyx oryzivorus*	X				
Dickcissel	*Spiza americana*	X				X
Loggerhead Shrike	*Lanius ludovicianus*	X	X	X	X	
Lewis Woodpecker	*Melanerpes lewis*				X	
Willow Flycatcher	*Empidonax traillii*					X
Lazuli Bunting	*Passerina amoena*				X	
Ovenbird	*Seiurus aurocapiilus*				X	
Bell's Vireo	*Viroe bellii*		X			X
Great-crested Flycatcher	*Myiarchus crinitus*					X
Blue Grosbeak	*Guiraca caerulea*					X
Lark Bunting	*Calamospiza melanocorys*	X	X	X		X
Brewer's Sparrow	*Spizella brewi*		X			
Black-billed Cuckoo	*Coccyzus erythropthalmus*	X	X	X	X	X

Table W-4. Priority neotropical migratory landbirds on the Thunder Basin National Grassland.

Species	Scientific Name
Mountain Plover	*Charadrius montanus*
Burrowing Owl	*Speotyto cunicularia*
Ferruginous Hawk	*Buteo regalis*
McCown's Longspur	*Calcarius mccownii*
Prairie Falcon	*Falco mexicanus*
Swainson's Hawk	*Buteo swainsoni*
Northern Harrier	*Circus cyaneus*
Loggerhead Shrike	*Lanius ludovicianus*
Lewis Woodpecker	*Melanerpes lewis*
Western Tanager	*Piranga ludoviciana*
Yellow-Headed Blackbird	*Xanthocephalus xanthocephalus*
Lark Bunting	*Calamospiza melanocorys*
Brewer's Sparrow	*Spizella brewi*

The following table identifies the primary summer habitats for the priority neotropical species.

Table W-5. Primary summer habitats of priority neotropical migratory landbirds.

Species	Prairie Dog Colony	Grassland[1]			Riparian, [2] Deciduous Forests or Wetlands [3]	Shrubland [2]	Coniferous Woodlands
		L	M	H			
Mountain Plover	X	X					
Burrowing Owl	X						
Ferruginous Hawk	X	X				X	
McCown's Longspur		X					
Chestnut-collared Longspur		X	X				
Prairie Falcon			X			X	
Upland Sandpiper			X				
Long-billed Curlew			X				
Grasshopper Sparrow			X				
Sprague's Pipit			X				
Marbled Godwit			X				
Mountain Bluebird			X			X	
Swainson's Hawk			X			X	X
Northern Harrier			X	X	X		
Baird's Sparrow				X		X	
Bobolink				X	X		
Clay-Colored Sparrow				X		X	
Short-eared Owl				X		X	
Dickcissel				X			
Loggerhead Shrike					X	X	
Lewis Woodpecker					X		X
Western Tanager					X		X
Yellow-Headed Blackbird					X		
Sedge Wren					X		
Willow Flycatcher					X	X	
Lazuli Bunting					X	X	
Marsh Wren					X		
Ovenbird					X		
Scarlet Tanager					X		X
Least Flycatcher					X		
Yellow-billed Cuckoo					X	X	
Eastern Wood-Pewee					X		X
Yellow-throated Vireo					X		
Warbling Vireo					X		
Orchard Oriole					X		
Bell's Vireo					X		
Great-crested Flycatcher					X		
Blue Grosbeak					X		
Lark Bunting						X	
Brewer's Sparrow						X	
Black-billed Cuckoo					X		
TOTAL	**3**	**4**	**10**	**6**	**22**	**13**	**5**

1 L = species prefers habitats where low structure grasslands are abundant; H = species prefers habitats where high structure grasslands are abundant; M = species is a grassland generalist (most of these species benefit from management that results in diverse grasslands with a mosaic of low to high structural conditions, based on local site potential)

2 The species that occur primarily in riparian habitats, deciduous shrublands and other deciduous prairie woodlands obviously benefit from management that perpetuates the trees and/or shrubs that make up the overstories and midstories of these habitats. If the overstories are not regenerating and midstories are being grazed out, these habitats will eventually be lost and converted to grasslands.

3 The species in this table that rely heavily on marshes and other wetlands prefer wetlands with some development and maintenance of herbaceous shoreline and emergent vegetation.

Furbearers

For the purposes of this evaluation, the following species are included as furbearers: beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), coyote (*Canis latrans*), badger (*Taxidea taxus*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitus mephitus*), and bobcat (*Felis rufus*). Most of these species occur on most of the planning units with the exception of the gray fox that is found only in the area of the Sheyenne National Grassland. The beaver, muskrat, mink, raccoon and opossum are typically found in wetlands, riparian habitats or other prairie woodlands. Badgers are commonly found in grassland and shrubland habitats and are especially attracted to prairie dog colonies. The remaining species can be found in a wide variety of habitats. Evaluations for the black-footed ferret, swift fox, mountain lion and river otter are presented in Appendix H.

Environmental Consequences

Direct and Indirect Effects

Big Game

Some of the most significant direction in the proposed Revised Management Plans for mule and white-tailed deer on the planning units relates to the management and condition of riparian habitats, wooded draws and other prairie woodlands. The importance of these habitats in providing primarily cover and shelter, but also forage, for prairie deer is well substantiated (Severson 1981, Johnson and Strickland 1996). Many woodland areas that are intensively grazed by livestock are currently not regenerating. The eventual fate of these areas, if grazing modifications are not made, would be the loss of the woody habitat and conversion to a grassland type. In addition to the eventual loss of the woody habitat, the reduced understory and brushy midstories in these areas as they deteriorate provide reduced suitability for deer (Johnson and Strickland 1996).

Riparian management occurring under current direction (Alternative 1) is resulting in less areas being managed for woody regeneration than would occur under Alternatives 2 through 5. Under Alternatives 2 through 5, at least 80 percent of these habitats on each planning unit is to be managed for regeneration and an additional guideline calls for management that promotes thick and brushy understories and midstories where quality deer fawning habitat is desired. Based on information collected by the North Dakota Game and Fish Department in 1992 and

1993 (unpublished file memo), about 35 percent of the wooded draws on the Little Missouri National Grassland are not regenerating under current management, and regeneration is questionable in another 35 percent of the draws.

Proposed management direction in Alternatives 2 through 5 for sagebrush communities would enhance and/or protect this habitat for big game, as well as for other sagebrush-dependent wildlife species on several of the planning units. This direction calls for management programs that promote productive sagebrush communities, including enhanced productivity and diversity of the herbaceous vegetation within the community and the desired height and density of sagebrush.

Under current management direction (Alternative 1) for the Thunder Basin National Grassland, a 4,300-acre big game range is identified for big game management emphasis. This special management emphasis would not occur in Alternatives 2, 4 and 5. However, Alternative 3 would expand the area for big game management emphasis to about 33,900 acres, a substantial increase over current direction.

Bighorn sheep habitat to support expansion of sheep populations is identified under some of the alternatives for the Little Missouri National Grassland and Nebraska National Forest (Pine Ridge Ranger District). The effects of the alternatives on habitat management for California bighorn sheep on the Little Missouri National Grassland are presented in Appendix H. The acreages of National Forest System lands identified under each alternative to support expansion of the Rocky Mountain bighorn sheep population on the Pine Ridge are presented below in Table W-6. To summarize, similar amounts of bighorn sheep habitat are designated on the Nebraska National Forest under Alternatives 3, 4 and 5, and no sheep habitat is identified under Alternatives 1 and 2.

Table W-6. Acreages identified as bighorn sheep habitat on the Nebraska National Forest (Pine Ridge Ranger District).

Alternative	Acres
1	0
2	0
3	6,590
4	5,950
5	5,950

There are currently 65 to 75 bighorn sheep in the Pine Ridge area of Fort Robinson State Park in northwest Nebraska. The Nebraska Game and Parks Commission has established a goal of establishing a metapopulation of 150 to 200 sheep across the Pine Ridge, including the Nebraska National Forest (Pine Ridge Ranger District) and the existing state park population. Alternatives 3, 4, and 5 would provide habitat for additional transplants.

Alternatives 2 through 5 would also include specifications for fence construction standards to facilitate big game movement. These specifications would reduce entanglement risks to both adult and young big game, and also allow less restricted movement between important foraging and cover areas, and less restricted movement for pronghorn during winter storms. Direction to maintain or increase average pasture sizes on many of the planning units is also proposed in several of the action alternatives, and this direction result in lower fence densities and, therefore, less risk and movement restrictions for big game on several of the planning units. Detailed

information by alternative on the management direction for average pasture size is presented in this chapter under the livestock grazing section. Although it varies considerably between planning units, generally Alternative 4 and/or 5 would provide(s) for the largest increases in pasture sizes and, therefore, the greatest reduction in average fence densities. Alternative 3 would generally provide for intermediate reductions in fence densities through reductions in pasture size. Alternatives 1 and 2 do not include direction on pasture sizes.

Wild turkey populations that rely primarily on riparian zones would benefit from the management direction for enhanced riparian regeneration that would occur under Alternatives 2 through 5. Brooding habitat for wild turkey is enhanced when herbaceous vegetation is increased in riparian areas (Hoffman et al. 1993) through grazing management. Generally, the increased vegetative biomass is associated with an increase in invertebrate populations that are important in the diets of turkey poults. Under Alternatives 2 through 5, at least 80 percent of the riparian areas would be managed for regeneration, and this would result in substantial increases in the amount of herbaceous understory in many of these areas.

As previously mentioned, many of the turkey populations occur in association with ponderosa pine forests, primarily on the Nebraska National Forest, and Oglala and Thunder Basin National Grasslands. There is no quantitative management direction for the wild turkey habitat that occurs in the ponderosa pine habitat on the Thunder Basin, Little Missouri, Nebraska National Forest (Bessey Ranger District), and Samuel R. McKelvie National Forest. However, specific management direction is presented in the proposed Revised Management Plans for wild turkey habitat in the ponderosa pine woodlands on the Nebraska National Forest (Pine Ridge Ranger District). These guidelines were modified from those recommended by Hoffman et al. (1993) and would enhance turkey habitat over current conditions by modifying silvicultural prescriptions and livestock grazing in locations identified at the project level for wild turkey management emphasis.

Small Game

Management direction in the alternatives and proposed management plans that relates to riparian and wooded draw conditions and grassland structure will obviously influence habitat suitability for tree squirrels. As discussed under the big game section, at least 80 percent of the riparian and wooded draws are to be managed for regeneration under Alternatives 2 through 5. This is above the levels that currently occur under Alternative 1.

Habitat suitability for upland game birds is generally enhanced when high structure grasslands are readily available within their home ranges. The desired amounts of high structure grasslands under each alternative and for each planning unit are summarized in the Rangeland and Forest Health section in this chapter. To summarize, Alternatives 1 and 2 would provide for the least amounts of high structure grasslands, while Alternative 4 would generally provide the most. Alternatives 3 and 5 would generally provide intermediate levels of high structure grasslands.

Effects of each alternative on sage grouse and their habitat are presented in Appendix H.

Migratory Birds

Direction is presented under several of the alternatives for the maximum number of water developments that can occur on any planning unit. This direction is summarized under the

Livestock Grazing section in this chapter. Where limits are imposed, the number of additional water developments that could be constructed and that would provide additional waterfowl brooding and pairing habitat is constrained. These limitations are proposed under some of the alternatives for several reasons, including maintaining or enhancing the diversity of grassland vegetation through less uniform livestock grazing. However, with these limitations, habitat suitability levels for upland nesting waterfowl should be maintained or enhanced by providing more areas with lighter livestock grazing intensities and more quality nesting cover. Direction for providing a mosaic of emergent and shoreline vegetation in and around wetlands under Alternatives 2 through 5 would also enhance habitat suitability for waterfowl brooding in existing constructed and natural wetlands.

As previously mentioned, the neotropical migrants represent a wide variety of habitat preferences and needs. Those species that make seasonal use of prairie dog colonies (Table W-5) would benefit the least under Alternatives 1 and 2 where direction results in maintaining or further reducing existing prairie dog populations through the use of rodenticides. Management direction under Alternative 4 would provide the largest acreages of black-tailed prairie dog colonies for these species because rodenticides are not used under this alternative. Alternatives 3 and 5 provide intermediate levels of active prairie dog colonies.

Those species that prefer habitats where low structure grasslands dominate the landscape, such as McCown's longspur and chestnut-collared longspur, (Table W-5) would generally benefit the most under Alternatives 1 and 2. The greatest amount of low structure grasslands would occur under these alternatives for most planning units. Those species that prefer landscapes dominated by high structure mixed grass prairies, such as the dickcissel and baird's sparrow, (Table W-5) would generally benefit the most under management direction in Alternative 4. Alternatives 3 and 5 would generally provide intermediate levels of high structure grasslands. As a group, those species that use grassland habitats for breeding, nesting and feeding would likely benefit from the enhanced structural diversity that would occur under Alternatives 3 through 5.

A relatively large number of neotropical migrants use riparian habitats extensively (Table W-5). Some are canopy species, while others mostly use the midstory shrubs and tree saplings. The key to management for these areas is to ensure adequate regeneration. This further translates to maintaining a midstory, as well as an overstory. As mentioned under the big game and small game sections, Alternatives 2 through 5 would require that at least 80 percent of the riparian habitats are regenerating. This level exceeds that occurring under current management.

Several of the priority neotropical species are inhabitants of coniferous forests (Table W-5). Ponderosa pine, Rocky Mountain juniper and limber pine forests occur naturally on several of the planning units. Some neotropical migrants prefer more open savannah, such as Lewis woodpecker and Swainson's hawk, while others prefer more dense forests. There is some general direction to use prescribed fire on several of the national grasslands for reducing juniper and pine encroachment, and could result in more savannah. However, this direction does not specify the quantity of different desired conditions for the coniferous habitats so it was not possible to predict the effects of the alternatives on coniferous forest management as they related to the neotropical birds that use these habitats. The acres of desired late successional coniferous forests is also not specified. Management direction for the amount of dense ponderosa pine versus savannah was described for the Nebraska National Forest (Pine Ridge Ranger District). Under this direction, the most savannah would occur under Alternative 4, while the least would occur under Alternative 2. Alternatives 3 and 5 would provide

intermediate levels of savannah. The most and least amounts of dense forest is the reverse of that order. Most of these effects would not occur until after decades because the amount of annual timber manipulation under each alternative would be minimal.

Furbearers

Several of the species frequently hunt for prey on prairie dog colonies. This includes badger, coyote, swift fox (see Appendix H), and bobcat. As a result, management direction for prairie dogs has a direct influence on habitat suitability levels for these species. A detailed summary of prairie dog management direction is presented in Appendix H and is not repeated here. However, to summarize, direction in Alternatives 1 and 2 would result in the smallest prairie dog colony acreages, while Alternative 4 would result in the largest acreages. Alternatives 3 and 5 would provide intermediate levels of prairie dog colonies and preferred habitat for these species.

Several of the furbearers, such as beaver, muskrat, coon, and mink, would benefit from the enhanced management of riparian and wetlands vegetation included in Alternatives 2 through 5. This management direction would result in more development of woody, emergent and shoreline vegetation in riparian and wetlands habitats than what occurs under current management.

Effects from Fire and Fuels Management

Fire and fuels management can have both adverse and beneficial effects on wildlife and their habitats, depending on the timing, intensity and frequency of fire. Fire can cause direct mortality and destroy nests but can also, if properly time, help control exotic vegetation and enhance the diversity of plant species and habitat suitability for many species.

Because of the variable nature of the effects of fire on vegetation and habitat suitability for individual wildlife species, a comparison of effects among alternatives was not made. The amount of prescribed burning expected under each alternative for the planning units is presented in the Rangeland and Forest Health section of this chapter.

Effects from Fish and Wildlife Management

Habitat management that enhances habitat suitability for selected wildlife species or guilds may occur at the disadvantage of other species. For example, this is a consideration when trying to determine whether or not to manage mixed grass prairies for a dominance of mid grass species, such as western wheatgrass, or shortgrass species, such as buffalograss. Enhancing sharp-tailed grouse habitat suitability would probably lower suitability for the chestnut-collared longspur. Enhancing riparian habitats and other prairie woodlands by perpetuating or enhancing development of woody inclusions in grasslands may increase liability to the wildlife associated with the adjoining grasslands. Some examples of these types of interactions include increased cowbird parasitism of nests of grassland or shrubland species or increased nest losses to mammalian or avian predators that are associated with the woodland habitats. Alternatives 2 through 5 would enhance management of riparian and other woodland inclusions in grassland settings in for each planning unit. This would likely result in increased interactions between woodland and grassland wildlife species.

This same principle applies to the management of black-tailed prairie dogs and the wildlife species that are associated with prairie dog colonies. Black-tailed prairie dogs reduce grassland structure by their foraging, burrowing and clipping. They also reduce vegetation structure on shrublands by cutting down shrubs around the periphery of their colonies. This reduces on-site suitability for some ground-nesting birds, including upland gamebirds, but at the same time improves habitat for some migratory species.

Prairie dogs also serve as important prey that is available yearlong for avian and mammalian predators, including ferruginous hawks, badger and swift fox. Their burrows also provide shelter for many other wildlife, including burrowing owls.

The expected acreages of prairie dog colonies by alternative are presented in the Rangeland and Forest Health section in this chapter. The largest prairie dog populations would occur under Alternative 4 and the smallest under Alternatives 1 and 2. Alternatives 3 and 5 would result in intermediate levels of prairie dog populations.

Effects from Land Adjustments

Direction under Alternatives 2 through 5 suggests that the net gain or loss of lands important for outdoor recreation or fish and wildlife habitats should be considered in landownership adjustments. Because many of the species discussed in this section are closely tied to some of the predominant recreational activities on these lands, most landownership adjustments would result in a no net loss or a gain in habitat for many of these species.

Effects from Oil, Gas, Minerals Management

Potential effects of oil and gas development on some of the species discussed in this section are mitigated through standards and guidelines and stipulations that are common to most alternatives. See Appendix I for stipulations and the Oil and Gas section in this chapter for acres stipulated. Potential effects relate primarily to disturbance and displacement resulting from these activities. The effects of oil and gas development on various wildlife species and groups have been analyzed in the oil and gas leasing EIS's and EA. Decisions to be made based on the proposed Revised Management Plans analysis will incorporate by reference the oil and gas leasing analyses and decisions for the Northern and Southern Little Missouri, Cedar River, Thunder Basin, and western Buffalo Gap National Grasslands.

Effects from Plant and Animal Damage Control

If carefully implemented, noxious weed control helps maintain native vegetation and native habitats. The amount of noxious weed control by alternative is presented in the Plant and Animal Damage Control section of this chapter. The most aggressive control occurs under Alternatives 2 and 4.

Grasshopper spraying over large areas has the potential of reducing grasshoppers and other invertebrate populations that are valuable foods for gamebirds and waterfowl broods and many other migratory species. Direction for Alternatives 2 through 5 requires that potential effects to be considered if spraying is proposed.

Effects from Range Management and Livestock Grazing

Generally, increased livestock grazing intensity reduces habitat suitability for upland gamebirds and upland nesting waterfowl, but improves suitability for many migratory birds that prefer low structure grasslands. Alternative 4 would contain the lowest livestock grazing intensities, and Alternatives 1 and 2 would contain the lowest. Alternatives 3 and 5 would have intermediate grazing intensities

High livestock grazing intensities generally encourage expansion of black-tailed prairie dog populations. This indirectly enhances habitat for species that prefer prairie dog colonies, including several migratory bird species and several mammalian predators. Therefore, Alternatives 1 and 2 would provide the best conditions for prairie dog expansion and enhancement of habitat for those species that nest or hunt on prairie dog colonies. However, no prairie dog expansion would occur under Alternatives 1 and 2 because of rodenticide use. Under Alternative 4, prairie dog populations would likely grow slowly but steadily over the first decade and actually increase the most of the alternatives because of the lack of rodenticide use, even though livestock grazing would be the lowest of the alternatives. Alternatives 3 and 5 would provide intermediate conditions for livestock grazing intensities, rodenticide use, prairie dog population levels and habitat for species that make frequent use of prairie dog colonies.

Upland gamebirds and several species of upland nesting waterfowl generally prefer to nest in heavy undisturbed cover. Undisturbed cover can be provided in one of three ways: (1) uneven livestock grazing distribution within pastures, (2) deferred grazing during the spring and early summer, or (3) periodic annual rest from livestock grazing. Sedivec recommends that in North Dakota livestock not be turned into native pastures in rotational systems until late May or early June to provide undisturbed cover for upland-nesting birds, and grazing should not be initiated until mid June in areas grazed seasonlong (1994).

Most planning units contain very little secondary and inaccessible range, so grazing is relatively uniform across most pastures. This is the result of the relatively high density of water developments and decreasing average pasture sizes (see Rangeland and Forest Health section). The amount of areas rested annually from livestock grazing under each alternative is presented in the Rangeland and Forest Health section of this chapter. The amount of rest varies between alternatives; Alternatives 4 and 5 would provide the most rest, and Alternatives 1 and 2 would provide the least. Alternative 3 would provide an intermediate amount of annual rest from livestock grazing. However, most areas on the planning units are grazed under deferred rotation planned grazing systems, which allows a large number of pastures to be deferred at least during all or part of the early nesting season.

Livestock grazing can also have significant effects on woody vegetation in riparian habitats and other prairie woodlands. If livestock grazing in these areas is not closely monitored and managed, woody vegetation can fail to regenerate, resulting in an eventual loss of woody habitats used by many migratory bird species and some resident wildlife.

Construction of water sources (ponds, pipelines and tanks, wells) to support livestock grazing disturbs soils and creates intensively grazed areas ideal for prairie dog colonies. These developments can enhance habitat for prairie dogs and associated species, but if water developments are placed in areas currently receiving no or minimal use by livestock, valuable nesting and brooding cover for upland gamebirds and upland nesting waterfowl can be lost as a result of increased use by livestock. Fencing can also influence habitat suitability for many

wildlife species. More fences and smaller pastures would have a cumulative effect of further increasing uniform grazing by livestock, which in turn, would reduce the diversity and patch size of suitable habitat within pastures and, to some extent, between pastures for many ground-nesting birds.

Water source densities, livestock grazing intensity, stocking rates, season of use, pasture size and other factors are variables that affect how range management and livestock grazing strategies affect habitat suitability for wildlife species and would cause overall effects on wildlife.

Effects from Recreation Management and Use

Disturbance on sharp-tailed grouse, prairie chicken and sage grouse display grounds can disrupt breeding and cause abandonment of display grounds. Standards and guidelines to regulate human disturbance on or near display grounds apply to all action alternatives.

Effects from Special Area Designations

Special area designations vary considerably in type (Research Natural Areas, Wilderness, Special Interest Areas, etc.) and objectives. In most cases, special area designations would be compatible or beneficial for management of those species of wildlife that might be featured in a particular area. Special area designations are summarized under their own section in this chapter. The largest number of sites and total acreages for special areas would occur under Alternative 4, and the least under Alternatives 1 and 2. Alternatives 3 and 5 would provide intermediate levels of special area designations.

Effects from Travel and Motorized Use

Travel restrictions can result in less human disturbance to big game and other wildlife species. The acreages with travel restrictions expected under each alternative is displayed under the Recreation and Travel section in this chapter. The most travel restrictions would occur under Alternative 4; and the least would occur under Alternatives 1 and 2. Alternatives 3 and 5 would provide for intermediate levels of travel restrictions.

Cumulative Effects

Native grassland and shrubland habitats on private lands will continue to be converted to croplands, residential and other land uses. The Conservation Reserve Program helps compensate for some losses in wildlife habitat, but a net loss is expected in the long-term trend.

Private forests near the Nebraska National Forest (Pine Ridge Ranger District) are being extensively logged. This is likely improving habitat for wildlife species that prefer savanna over thick ponderosa pine forests but habitat losses for those species that prefer heavily forested habitats.