# Final Environmental Impact Statement
**for the**
# Northern Great Plains Management Plans Revision
# May 2001

**for**

**Dakota Prairie Grasslands, including:**

Cedar River National Grassland
Grand River National Grassland
Little Missouri National Grassland
Sheyenne National Grassland

**Medicine Bow-Routt National Forest, includes only:**

Thunder Basin National Grassland

**Nebraska National Forest and Associates Units, including:**

Bessey Ranger District
Charles E. Bessey Tree Nursery
Buffalo Gap National Grassland
Fort Pierre National Grassland
Samuel R. McKelvie National Forest
Oglala National Grassland
Pine Ridge Ranger District

| | | |
|---|---|---|
| **Impacted counties:** | Montana: | Dawson, Fallon, Richland, and Wibaux; |
| | North Dakota: | Adams, Billings, Bowman, Dunn, Golden Valley, McKenzie, Ransom, Richland, Sioux, Slope, Stark, and Williams; |
| | Nebraska: | Blaine, Cherry, Dawes, Sioux, and Thomas; |
| | South Dakota: | Custer, Fall River, Hughes, Jackson, Jones, Lyman, Pennington, Perkins, Shannon, and Stanley; |
| | Wyoming: | Campbell, Converse, Crook, Natrona, Niobrara, and Weston. |
| **Lead agency**: | USDA Forest Service | |
| **Cooperating agencies**: | USDI Bureau of Land Management | USDI National Park Service |
| **Responsible officials:** | Dale Bosworth, Regional Forester<br>Northern Region (Region 1)<br>Federal Building, P.O. Box 7669<br>Missoula, MT 59807<br>(406) 329-3511 | Rick Cables, Regional Forester<br>Rocky Mountain Region (Region 2)<br>740 Simms Street<br>Golden, CO 80401<br>(303) 275-5450 |
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**Abstract:** The planning effort represented by this Final Environmental Impact Statement (FEIS) is called the Northern Great Plains Management Plans Revision. Land and resource management plans have been prepared for the three participating administrative units. This FEIS provides environmental analyses for all three of the management plan revisions. Furthermore, this FEIS documents the analysis of five alternatives developed in detail for possible management of the 2.9 million acres administered by the USDA Forest Service in the planning area. This FEIS has been prepared for public review pursuant to federal laws and regulations.

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# Chapter 1 Purpose and Need for Action

## Changes from Draft to Final

Changes in Chapter I of this Final EIS (from the Draft EIS) include expanding the Purpose and Need for Change section, bringing forward into the FEIS information from a 1996 document prepared by the Forest and Grassland Supervisors on the Purpose and Need for Change (located in the administrative record).

## Introduction

The Northern Great Plains Management Plans Revision is a combined planning effort by the Dakota Prairie Grasslands and the Medicine Bow-Routt and Nebraska National Forests. This revision process affects the following national grassland and national forest units:

**Dakota Prairie Grasslands Units**

- Cedar River National Grassland
- Grand River National Grassland
- Little Missouri National Grassland
- Sheyenne National Grassland

**Medicine Bow-Routt National Forest Unit**

- Thunder Basin National Grassland

**Nebraska National Forest Units**

- Buffalo Gap National Grassland
- Fort Pierre National Grassland
- Oglala National Grassland
- Samuel R. McKelvie National Forest
- Nebraska National Forest

Land and resource management plans (management plans) currently direct management of the national forest and national grassland units. Issuance of these plans occurred June 10, 1987, for the Custer National Forest (which includes the Dakota Prairie Grasslands); November 20, 1985, for the Medicine Bow National Forest; and December 14, 1984, for the Nebraska National Forest. Other National Forest System units under the administration of the Medicine Bow-Routt National Forests that are not listed above are addressed in other planning efforts.

Revision of management plans is directed by the National Forest Management Act (NFMA), regulations 36 Code Federal Regulations (CFR) 219 and the Forest Service Directives System (*Forest Service Handbook* 1909.12). The instructions for revising management plans found in the *Code of Federal Regulations* (36 CFR 219.10[g]) state:

> A forest [and grassland] plan shall ordinarily be revised on a 10-year cycle or at least every 15 years. It also may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the plan have changed significantly or when changes in RPA [Forest and Rangeland Renewable Resources Planning Act] policies, goals or objectives would have a significant effect on forest level programs. In the monitoring and evaluation process, the interdisciplinary team may recommend a revision of the forest plan at any time. Revisions are not effective until considered and approved in accordance with the requirements for the development and approval of a forest [or grassland] plan. The Forest Supervisor shall review the conditions on the land covered by the plan at least every 5 years to determine whether conditions or demands of the public have changed significantly.

The existing management plans are all more than 10 years old. After study and consultation with the Forest Service interdisciplinary planning team (ID team) and the public, the three forest supervisors determined that extensive changes had taken place since implementation of the existing management plans. Therefore, these plans are being revised. Three proposed revised management plans (one for each participating administrative unit) and one Draft Environmental Impact Statement (DEIS) describing environmental effects for all three management plans have been prepared and are available for public review.

# The Planning Units

The planning units under study lie quite distant from each other (see map on inside cover), from eastern North Dakota to eastern Wyoming and from northwestern North Dakota to northwestern and central Nebraska. The table below lists the names of the units and the states and counties in which they are located.

**Table 1-1. Units Under Review, Affected Counties, and Approximate Federal Surface Acres of Each Unit.**

| Unit | Affected Counties | Acres |
|---|---|---|
| **Dakota Prairie Grasslands Administrative Unit** | | |
| **Planning Units** | | |
| Cedar River National Grassland | Grant and Sioux Counties, North Dakota | 6,800 |
| Grand River National Grassland | Corson, Ziebach and Perkins Counties, South Dakota | 154,200 |
| Little Missouri National Grassland | Billings, Dunn, Golden Valley, McKenzie and Slope Counties, North Dakota | 1,026,000 |
| Sheyenne National Grassland | Ransom and Richland Counties, North Dakota | 70,300 |
| **Medicine Bow-Routt National Forest Administrative Unit** | | |
| **Planning Unit** | | |
| Thunder Basin National Grassland | Campbell, Converse, Crook, Niobrara, Weston Counties, Wyoming | 553,300 |

| Unit | Affected Counties | Acres |
|---|---|---|
| **Nebraska National Forest Administrative Unit** | | |
| **Planning Units** | | |
| Bessey Ranger District | Blaine and Thomas Counties, Nebraska | 90,200 |
| Buffalo Gap National Grassland | Custer, Fall River, Jackson and Pennington Counties, South Dakota | 589,200 |
| Fort Pierre National Grassland | Jones, Lyman and Stanley Counties, South Dakota | 116,100 |
| Samuel R. McKelvie National Forest | Cherry County, Nebraska | 116,100 |
| Oglala National Grassland | Dawes and Sioux Counties, Nebraska | 94,200 |
| Pine Ridge Ranger District | Dawes and Sioux Counties, Nebraska | 50,500 |

# Dakota Prairie Grasslands:

## Cedar and Grand River National Grasslands

Located in Grant and Sioux Counties of North Dakota, the Cedar River National Grassland is a 6,800-acre tract of mixed-grass prairie on rolling hills, intersected by streams and dry gullies. Most of this unit lies within the boundaries of the Standing Rock Indian Reservation. The Grassland is administered by the Grand River / Cedar River Ranger District, Lemmon, South Dakota. The Cedar River National Grassland is managed for multiple purposes, including livestock grazing. The last significant buffalo hunt occurred near the grassland in 1883, when a group of Sioux and whites harvested about 10,000 head.

Located in Perkins, Ziebach, and Corson Counties of South Dakota, the Grand River National Grassland contains more than 154,200 acres and is administered by the Grand River / Cedar River Ranger District, Lemmon, South Dakota. Mixed-grass vegetation rises from its rolling landscape. The unit is home to pronghorn and mule and white-tailed deer. Nearby Shadehill Reservoir provides good fishing, camping and boating recreation.

## Little Missouri National Grassland

The Little Missouri National Grassland, at more than a million acres, is the largest national grassland in the nation. This mixed-grass prairie found in badlands topography is located in McKenzie, Billings, Slope, and Golden Valley Counties in western North Dakota. The Grassland is administered by the McKenzie Ranger District, Watford City, North Dakota, and the Medora Ranger District, Dickinson, North Dakota.

The Little Missouri is home to a great variety of wildlife, including bighorn sheep, eagles and falcons, prairie dogs, and pronghorn antelope. Oil and gas production and livestock grazing are important on this unit, as are opportunities for remote roadless experiences.

## Sheyenne National Grassland

The more than 70,300 acres of the Sheyenne National Grassland consists of tallgrass prairie, oak savanna, and river woodlands in southeastern North Dakota, including parts of Ransom and Richland Counties. This unit is administered by the Sheyenne Ranger District in Lisbon, North Dakota.

The Sheyenne National Grassland is home to occasional moose, white-tailed deer, sharp-tailed grouse, prairie chickens and a wide variety of other plants and animals, many of them rare. The western prairie fringed orchid is listed as a threatened plant. Several butterflies that find home on this unit are also of concern. There are many natural sandy blow-outs on this grassland, which is surrounded by intensive cultivation. This large contiguous tallgrass prairie unit is particularly significant since tallgrass is so rare on the Great Plains.

# Medicine Bow-Routt National Forest Unit:

## Thunder Basin National Grassland

The Thunder Basin National Grassland is located in northeastern Wyoming and occupies about 553,300 acres of land among a mosaic of state, federal, and private lands. These lands generally lie between Douglas on the south, Newcastle on the east, to the Montana border on the north, and Wright on the west. This unit is administered by the Douglas Ranger District, Douglas, Wyoming.

The Thunder Basin National Grassland is a blend of mixed-grass grassland, sagebrush grassland, cottonwood, greasewood, and ponderosa pine/juniper vegetation, within rolling plains, escarpment, dissected plains, and shale upland landscapes. The grassland is home to pronghorn, prairie elk, and prairie dogs. A great deal of coal is also mined on the grassland, including the largest coal strip-mine operation in the nation, located near Gillette.

# Nebraska National Forest Units:

## Nebraska National Forest (Bessey Ranger District) and Samuel R. McKelvie National Forest

About 90,200 acres of Sandhills country make up the Halsey unit of the Bessey Ranger District, located in central Nebraska in Thomas and Blaine Counties. This area is named after Dr. Charles E. Bessey. Bessey convinced the federal government to plant pine and other tree species in the treeless Sandhills. Beginning in 1902, work began in establishing a nursery and hand-planting a forest across the shifting dunes and grasslands of central Nebraska. The Bessey Tree Nursery is located within the unit and is administered separately from the Bessey Ranger District, Halsey, Nebraska.

Named for former Nebraska governor and cattleman S.R. McKelvie, the 116,100-acre Samuel R. McKelvie National Forest, administered by the Bessey Ranger District, lies in the Sandhills of north central Nebraska in Cherry County. Elevation rises to about 3,200 feet, and the topography consists of low rolling hills, ridges, and grass-covered dunes. The unit is administered by the Bessey Ranger District. Located in the Nebraska Sandhills, the unit historically contained mixed-grass prairie. Significant tree planting after the turn of the century provided a blend of grasslands and plantation forests of mainly ponderosa pine. The unit is home to sharp-tailed grouse and raptors.

## Buffalo Gap National Grassland

The Buffalo Gap National Grassland is located in southwestern South Dakota and includes more than 589,000 acres of land that borders and is intermingled with private, state, Indian reservation, and national park lands. The eastern half of this unit extends from near Kadoka, South Dakota on the east, to the Cheyenne River on the west, north to U.S. Highway 14, and south to the Pine Ridge Indian Reservation. The Wall Ranger District, Wall, South Dakota, administers the eastern half. The western half extends from the Cheyenne River on the east to the Wyoming and Nebraska borders on the west and south, respectively. The Fall River Ranger District, Hot Springs, South Dakota, administers the western half.

The Buffalo Gap National Grassland contains mixed-grass vegetation. The landscape includes rolling prairie and badlands topography. The unit is home to many wildlife species, such as pronghorn antelope, both mule and white-tailed deer, and prairie dogs. Currently, black-footed ferrets are being reintroduced into Conata Basin. Sizable beds of agates and vertebrate and invertebrate fossils can be found on the grassland.

In addition, the National Grassland Visitor Center is located in Wall, South Dakota. The center is administered by the Wall Ranger District. It focuses on interpretation of the Great Plains and offers information on the country's national grasslands. The Center features more than 20 exhibits.

## Fort Pierre National Grassland

The Fort Pierre National Grassland includes more than 116,000 acres of federal land. It lies south of Pierre, South Dakota, north of Interstate 90, and west of the Lower Brule Indian Reservation. This unit is administered by the Fort Pierre National Grassland, Pierre, South Dakota.

The Fort Pierre National Grassland consists of mixed-grass vegetation on a rolling hill landscape just west of the Missouri River. The grassland is home to many species of wildlife including prairie chicken, sharp-tailed grouse, antelope, mule and white-tailed deer, and waterfowl.

## Nebraska National Forest (Pine Ridge Ranger District)

These lands are in Dawes and Sioux Counties of northwestern Nebraska. Included are the Pine Ridge Ranger District at about 50,500 acres, with the Soldier Creek Wilderness at about 7,800 acres. The Pine Ridge Job Corps Center is also located in this district, although it is administered separately. Elevations rise to 5,000 feet along ridges of ponderosa pine. The unit is administered by the Pine Ridge Ranger District, Chadron, Nebraska.

The Pine Ridge Ranger District area is a popular outdoor destination. Its pine forests and rugged sandstone terrain, rising from the surrounding plains, provide a scenic backdrop for a number of recreational activities.

## Oglala National Grassland

The 94,200-acre Oglala National Grassland lies in Dawes and Sioux Counties of northwestern Nebraska. Topography consists of rolling hills and badlands country. The grassland is administered by the Pine Ridge Ranger District, Chadron, Nebraska. The grassland contains mixed-grass vegetation and is home to prairie dogs, pronghorn, mule deer, raptors, and a variety of ground-nesting birds and reptiles.

# Purpose of and Need for the Decision

This section describes the purpose and need to revise the Management Plans for these National Forest and Grassland units and establishes the need for change.

The purpose of revising the Management Plans is to develop and implement a science-based, ecosystem-management strategy for these National Forest System lands. The strategy will enable these lands to move where needed from current conditions to more ecologically sustainable and socially desirable future conditions, leaving options available to future generations.

The decisions to be made will provide an ecological context to the Management Plans and will help clarify the relationship of management activities to the capability of ecosystems, develop realistic expectations for the production of goods and services, sustain ecosystems by ensuring their health, diversity, and productivity, and integrate ecological, economic, and social factors in order to maintain and enhance the quality of the environment to meet current and future needs.

## Basis and Reasons for Planning

Long-range planning is a prudent management action and also required by law. The following sections discuss the regulatory basis and managerial reasons for the need to revise the Management Plans.

## Regulatory Basis for Planning

Congress recognized that public desires and demands for products and services, and physical, biological and social environments change through time. The National Forest Management Act, passed by Congress in 1976, requires that the Management Plans be reviewed and, in most cases, revised every 10-15 years to respond to changed conditions. The current Management Plans for these National Forest System lands were approved on June 10, 1987 for the Custer National Forest which included the grassland units of the Dakota Prairie Grasslands, November 20, 1985 for the Medicine Bow National Forest which included the Thunder Basin National Grassland, and December 14, 1984 for the Nebraska National Forest.

# Managerial Reasons for Revising Existing Plans

## What We Have Learned in the Last Decade

Over a decade has lapsed since the current Management Plans were approved. Implementation of these Plans has shown us the need for changes in management direction for some resources or programs on these ten grassland units. Several sources have led us to believe we have a need to change our current Management Plans through revision. New issues and changing public values have been identified through public interaction. New information and knowledge has been gained through scientific research and effectiveness monitoring. Management concerns have been derived through implementation experience of the current plans. And, a decade of experience in implementing current Management Plans has provided insight into relationships between prairie vegetation and other resources and better ways of accomplishing desired outcomes.

## Sources of Information for the Need for Change

The need for revision of current Management Plans comes out more than a decade of experience in implementing the current Plans. Monitoring and evaluation of implementation has helped us identify management concerns, new issues, new information, and better ways to achieve goals and objectives to meet public desires. The need for revision also comes from our understanding of new public issues, desires, and expectations for public land and resource management. Revision will help us better address the issues and demands of people today. Finally, some parts of the need for revision are based on updated ecological and socio-economic inventories and assessments and on new research.

To summarize, the major sources used to identify the need for change were:

- Experiences in implementing the Management Plans and working with the public;
- Public involvement in implementing projects;
- Need for Management Plan amendments as a result of implementing projects;
- Monitoring the effects of implementation;
- Understanding cumulative effects from implementing projects;
- Issues raised in routine communication with the public and in appeals and litigation;
- Knowledge gained from research on prairie ecosystems;
- Discussions with employees;
- Coordination and input from other federal agencies, state agencies, and partners;
- Public feedback on values for these National Forest and Grassland units;
- Results of assessments.

Some of this information is a product of research, other information has resulted from changes in technology which allow us to look at larger areas and understand the context and importance of the lands we manage. Scientific understanding of grassland / prairie ecosystems has also seen marked changes during the last decades. Early research frequently reflected a commodity production emphasis. Ecosystem-based research produced over the last decade is changing our understanding of these ecosystems and the importance of public lands in the Northern Great Plains.

Over a decade of experience in implementing these plans has identified some areas that should be changed in our Plans and others that need reinforcement. We have identified new management concerns that come from gaining new information. We have identified better ways of accomplishing desired conditions. Monitoring reports for each of the National Forests administering Grassland units all identify changes that should be made in the Management Plans.

Since the early to mid-1980s, the prairie ecosystem has developed some new constituencies who are requesting a different focus for management of these public lands within the Great Plains. They are asking that we address some different issues and uses in revising our Management Plans. Appeals and litigation of resource decisions implementing the Plans are also an important source of information. While the overall number of appeals in proportion to resource decisions is low, there has been a marked increase in appeal and litigation activity. This increase, in some part, reflects a change in constituencies that are interested in grassland and forest management and the resources of the National Grasslands and Forests.

## General Purpose of Revision

We are undertaking Management Plan revision to provide direction that will:

- Provide goods and services to people,
- Involve people and communities, and
- Sustain ecosystem functions.

Congress understood that resource conditions and human values change over time—public issues, demand for products and services, and our understanding of physical, biological and social environments change through time. Congress believed that planning helps us define desired conditions and set a course to achieve those conditions.

We must adjust our long-term direction in response to new information, technology, and demands. We revise and update Management Plans to restore and sustain ecosystems, and to identify stable, long-term resource outputs to benefit people.

Based on the information sources identified earlier, we have determined that the combined effect of the needed changes demand immediate attention through Management Plan revision. The following discussion articulates the identified need for change--need for management plan revisions—on these national grasslands and forests.

# Decisions Made with a Management Plan

Management plans establish key decisions for the long-term management of affected National Forest System lands. These decisions include:

- Establishment of grassland-wide and forest-wide multiple use goals and objectives (36 CFR 219.11).
- Establishment of grassland-wide and forest-wide management requirements (standards and guidelines) to fulfill the requirements of 16 USC 1604 (The National Forest Management Act) applying to the future activities (resource integration requirements 36 CFR 219.13 to 219.27).
- Establishment of management areas and direction applying to future activities in that management area [resource integration and minimum, specific, management requirements [36 CFR 219.11 (c)].
- Determination of the capability and potential suitability of lands for producing forage for grazing animals and for providing habitat for management indicator species (36 CFR 219.20), designation of lands not suitable for timber production and, where applicable, establishment of allowable timber sale quantity (36 CFR 219.14, 219.15, and 219.21).
- Establishment of monitoring and evaluation requirements [36 CFR 219.11 (d)].
- Recommendation to Congress for Wilderness classification where 36 CFR 219.17 applies.
- Establishment of rivers eligible for Wild and Scenic River consideration and recommendation to Congress of suitable rivers for inclusion into the Wild and Scenic River System (16 USC 1271-1287, 36 CFR 297, and 47 FR 39454, Sept. 7, 1982), in cooperation with the National Park Service.

## Plan Versus Project Decision-making

Forest Plans set out management area prescriptions with standards and guidelines for future decision-making and are adjustable through monitoring and evaluation, amendment and revision. The Land and Resource Management Plan management area prescriptions and forest and grassland wide direction are the “zoning ordinances” under which future decisions are made. Forest Plans establish multiple-use goals and objectives for the planning unit. Plan level actions are approval (16 USC 1604(d) and (j), amendment (16 USC 1604(f)(4)) and revision (16 USC 1604(f)(5)). Project decisions are not authorized, carried out or funded by Forest Plan approval, amendments or revisions except as specifically authorized in the Record of Decision or Decision Notice.

## Staged Decision-making

The Land and Resource Management Plans' Records of Decision, signed by the Regional Foresters, will set a course of action for management of the Dakota Prairie Grasslands, Thunder Basin National Grassland, and the Nebraska National Forest units for the next 10 to 15 years. The adoption of Land and Resource Management Plans makes key decisions for the long-term management of the National Forest and National Grassland units.

The Forest Service Planning Handbook (FSH 1909.12) provide for systematic stepping down from the overall direction provided in the Land and Resource Management Plan when making project-level decisions:

> "Planning for units of the National Forest System involves two levels of decisions. The first is the development of a Forest Plan that provides direction for all resource management programs, practices, uses, and protection measures. The second level of planning involves the analysis and implementation of management practices designed to achieve the goals and objectives of the Forest Plan. This level involves site-specific analysis to meet NEPA requirements for decision-making. FSM 1922, 53 Fed. Reg. 26807, 26809 (July 15, 1988)."

However, environmental analysis will still need to occur for specific project-level activities that carry out the direction in the Plan. A good example of this is travel management. The Land and Resource Management Plan contains direction to restrict travel to existing roads and trails, but a site-specific analysis and decision will have to be made for each area to determine which travelways should be closed or left open. This process is called "staged decision-making" because a series of decisions will be necessary to carry out projects as specific details, locations, and conditions become more apparent. For example, a proposed wildlife habitat project using prescribed fire would require additional environmental analysis to discuss the site-specific effects of the proposals.

The authorization of project-level activities within the planning area occurs through project decision-making, the second stage of forest and grassland planning. Project-level decisions must comply with National Environmental Policy Act (NEPA) procedures and must include a determination that the project is consistent with a management plan.

In addition to the management plan decisions listed above, oil and gas leasing decisions will be made, where applicable. These decisions include determination of lands administratively available for leasing under specified conditions (lease stipulations) and the leasing decision for specific lands [36 CFR 228.102 (d) and (e)]. Where applicable, the Bureau of Land Management (BLM) will issue a decision document on leasing for federal minerals, both under Forest Service administered surface and under private surface.

In regard to oil and gas leasing, BLM is responsible for advertising, selling, and issuing leases on NFS lands. The BLM, acting for the Secretary of the Interior, may issue leases on National Forest System lands determined to be available with specified conditions (lease stipulations) and authorized for leasing in the applicable Forest Service and BLM decision documents. Leases issued in authorized areas after the effective date of the plan will include the standard terms placed on all federal oil and gas leases, will include standard Forest Service notices attached to all leases on Forest Service administered lands, and may include special stipulations designed to protect surface resources. The BLM will decide whether or not to offer for lease the

specific lands made available and authorized by the Forest Service and whether or not to lease split-estate lands (non-federal lands with federal mineral ownership) within the National Forest System unit boundaries being reviewed for oil and gas leasing. The BLM will also make a decision on attaching stipulations recommended by the Forest Service on split-estate lands.

# Major Revision Topics

Major revision topics are those for which changes in resource conditions, technical knowledge, data improvement, or public opinion of national forest and national grassland resource management have created a need for change in the management plans. Changes generally are important enough to affect large areas, change the mix of goods and services produced, and involve choices in management direction where there is no public consensus on the best course of action.

Regulations found at 36 CFR 219.12 (b) require forest supervisors to determine the major public issues, management concerns, and resource use and development opportunities to be addressed in the planning process. The combined effect of the needed changes demand attention through plan revision. The seven major revision topics described below influenced the decision to revise the plans and represent the major issues addressed in this document.

- Community and Lifestyle Relationships
- Livestock Grazing
- Oil and Gas Leasing
- Plant and Animal Damage Control
- Rangeland and Forest Health
- Recreation and Travel Management
- Special Area Designations

All seven revision topics are described below and addressed in this FEIS. Key indicators are identified for each revision topic. These indicators help the reader compare the five alternatives by describing the effects of implementing each alternative.

## Community and Lifestyle Relationships

People who live in the Northern Great Plains attach a great deal of value to lands administered by the Forest Service. Commodity and amenity benefits contribute to the social fabric and the economic base of many neighbors and communities near these public lands.

Management decisions determine the use and availability of these lands and resources to the public. In resource-based communities, especially small communities without a diversified economy, these decisions can perpetuate or disrupt the local economy and lifestyles. More diversified communities can often cope with change, although some sectors may be more or less affected. The capacity to handle change without major hardships to social groups or institutions is an important component of community and lifestyle relationships.

Economic effects can include changes in local employment and income, payments to state and local government, and consequences associated with local government services and community infrastructure. National forests and national grasslands have a role in sustaining or diversifying area economies and providing amenity values.

American Indians make up the largest minority group in the planning area and include such tribal affiliations as the Lakota, Hidatsa, Arikara, Cheyenne, Lower Brule, Crow, and Pawnee. American Indian culture, religion, and social conventions add complexity, diversity, and context to the fabric of life on the Northern Great Plains, both historically and contemporaneously. Several Indian reservations either lie within or near the administrative boundaries of several of the planning units. American Indians visit the National Forest System lands in the area to collect medicinal and sacred plants, practice religious ceremonies, recreate, or work. For instance, some American Indians in the planning area hold livestock grazing permits and others work for energy-extraction industries.

Key indicators for the community and lifestyle relationships topic are listed below:

| **Indicator** | **Units of measure** |
|---|---|
| Jobs and income related to: | |
| Range-fed livestock grazing | Number and dollars |
| Oil and gas leasing | Number and dollars |
| Recreation and tourism | Narrative summary |
| Social group effects | Narrative summary in Chapter 3 |

# Livestock Grazing

Livestock grazing on National Forest System lands is a permitted and traditional use on public lands and plays a part in maintaining and improving ecosystem health, when managed appropriately. However, this use must be balanced with multiple-use objectives, such as flora and fauna diversity, soil and water protection, wildlife food and habitat, outdoor recreation, and other resource values dependent on rangeland vegetation. The public continues to have interest in what levels of permitted grazing and other uses are appropriate for these publicly owned grassland areas.

Management Plan direction can be developed to describe the desired condition of ecological units. In accordance with CFR 219.20, the capability and potential suitability of National Forests and Grasslands to produce forage for grazing animals and habitat for management indicator species will be determined. While management plans will determine desired vegetation conditions for these grasslands and forests, the plans will not determine the allowable number of livestock to be grazed. That decision will be made in subsequent site-specific allotment management plans.

The planning area has been inventoried to describe the current mix of vegetation to determine ecological units based on land types and geographic areas. Management direction relating to livestock grazing has been tied to desired vegetative conditions. Key descriptors of desired grassland and shrubland vegetation are composition, structure, and woody vegetation regeneration in draws and riparian areas. Grazing use may fluctuate annually, depending on moisture and the desired vegetative conditions.

Allocation of Animal Unit Months (AUMs) is currently based on 1,000 lb. cows. Genetic improvements in cattle have increased cattle size as large as 1,600 lbs. The larger cows require more forage to sustain them. Utilization appears to have increased, while the methodology used to determine AUMs has not changed. Appropriate methods for calculating grazing allocations are examined in this revision process.

Few of the planning units now have secondary range. This type of range, which occurs in larger pastures with few water developments and low utilization, is desirable for upland habitat and for diversity of native plant and animal species and for recreationists who desire large unfenced areas of grassland.

Forest Service managers have expressed concern on the reduced flexibility of sustaining grazing when disturbances such as drought, hail, and fire occur. Concepts such as swing pastures, rest areas, and use of yearlings give managers flexibility to sustain grazing when drought or fire reduces forage. Requiring that some areas be rested each year will give managers increased flexibility in meeting desired conditions.

Key indicators for livestock grazing topic are listed below:

| **Indicator** | **Units of measure** |
|---|---|
| Suitable rangeland | acres |
| Estimated grazing levels | AUMs (animal unit months) |
| Estimated available forage production | thousand of pounds |
| Average pasture size | acres |
| Water developments | number per section |

# Oil and Gas Leasing

Oil and gas are important resources for the people of the United States, and the Grasslands contain valuable oil and gas deposits. In 1987, Congress passed the Federal Onshore Oil and Gas Leasing Reform Act, which expanded the Secretary of Agriculture's role in managing oil and gas resources on National Forest System lands. Within the National Forest System, the Secretary of Agriculture has the responsibility to identify lands available for leasing and to authorize leasing for specific lands. In performing analyses for these decisions, the Forest Service must identify on maps the nature and extent of stipulations that will be applied to leases for the purpose of protecting surface resources.

Previously completed leasing analyses are currently in effect for about 2.4 million acres of federal minerals (1.7 million acres federal surface estate) in the planning area, including the Little Missouri, Cedar River, Thunder Basin and Oglala National Grasslands and the western half of the Buffalo Gap National Grassland. These decisions have been implemented continuously since their signing.

Since the current leasing decisions and associated analyses were completed, several changes have occurred. There have been improvements in the technology of oil and gas exploration and development, changes in the scientific understanding of how ecosystems function, and changes in management requirements necessary to meet the laws governing the national grasslands and forests. For example, the requirements to manage habitat for threatened or endangered plant and animal species are constantly changing. With this analysis, the existing leasing decisions are being reviewed in light of new information generated since the current decisions were made

(e.g., newly listed threatened and endangered species, rare ecosystem elements or habitats). In addition, good management and the law require oil and gas leasing to be consistent with the approved Management Plans. The new information and resulting changes in the Management Plans may result in changes to past leasing decisions or in the conditions of surface occupancy (stipulations) attached to new leases that will be issued under new decisions made based on this analysis. New leasing decisions, however, cannot force changes of terms on leases in existence as of the date of those new decisions. Such leases will continue as issued for the full extent of their terms. If such leases are not extended by conditions as specified in 43 CFR 3107 (such as establishment of production), and become available for lease under new leasing decisions, those lands will then be leased with stipulations as specified in this analysis and the resulting new leasing decisions. Future operations on pre-existing leases will be administered under new plan direction as much as possible without violating pre-existing lease rights.

Key indicators for the oil and gas leasing topic are listed below:

| **Indicator** | **Units of measure** |
|---|---|
| Available for leasing | acres |
| Available for leasing but currently not authorized | acres |
| Available with stipulations | acres |
| No Surface Occupancy (NSO) | acres |
| Controlled Surface Use (CSU) | acres |
| Timing | acres |
| Standard Lease Terms | acres |

# Plant and Animal Damage Control

Under certain conditions, some plant and animal species can cause unacceptable economic and/or environmental effects. Sometimes management activities on National Forest System lands include control of noxious or exotic plants, insects, predators, and rodents. Damage control is a cooperative effort involving the Forest Service, local and state government, and other federal regulatory agencies.

Prairie dog management on National Forests and Grasslands continues to generate public interest. Although prairie dog communities are major contributors to biological diversity on National Grasslands, adjoining landowners often view prairie dogs as potentially damaging to private land values and the land's agricultural production. Many livestock grazing permittees are also concerned about the loss of forage on National Grasslands to prairie dogs. Other people interested in prairie dogs include recreational shooters, watchable wildlife enthusiasts, and wildlife interests. This plan revision process addresses management direction for prairie dog poisoning and shooting.

Invasions of noxious and non-native plants are reducing or eliminating the integrity of native plant communities. Existing Management Plans direct managers to treat noxious and non-native species on a priority basis. Control is emphasized on newly infested areas, priority areas, and minor infestations. Research results have given us an integrated pest management menu of options to control undesirable vegetation. Management direction must be changed to help us implement more effective control methods.

The Animal and Plant Health Inspection Service (APHIS) has primary responsibility for providing technical assistance and coordinating programs directed at predator control, control of range insect pests (such as grasshoppers), biocontrol of noxious weeds, and animal damage control. State wildlife agencies and county weed and pest boards assist with damage control in some Northern Great Plains states. The Forest Health Protection group provides technical assistance and coordinates suppression programs for forest insect and disease pests.

A recently issued policy on animal damage, primarily targeting predators, outlines a cooperative approach between the Forest Service and APHIS. The Forest Service has revised its manual direction (FSM 2650 Animal Damage Management) to elaborate on the Master Memorandum of Understanding signed by both agencies.

Key indicators for the plant and animal damage control topic are listed below:

| Indicator | Units of measure |
|---|---|
| Prairie dog poisoning | acres |
| Noxious plants | percent change in total acres |

# Rangeland and Forest Health

The health of the national grasslands and forests is important to many people. Northern Great Plains ecosystems evolved under several major environmental forces, including grazing, fire, floods, and drought. The plants and animals that adapted and persisted are those best suited to the disturbance regimes of this region.

Human use and manipulation of these lands and waters have changed the natural disturbance regimes that originally shaped this region, affecting native plants and animals. Native animals play important ecological roles as pollinators, decomposers, soil builders, nutrient cyclers, and vital links in the food chain. Non-native or invasive plant species have replaced many native plant communities. The diversity of native plants and animals on national grasslands and forests is largely determined by the ability of the Forest Service and other cooperators to manage vegetation for a variety of successional and structural stages.

Biological diversity is defined as the full variety of life in an area, including the ecosystems, plant and animal communities, species and genes, and the processes through which individual organisms interact with one another and with their environments. We are directed by law and regulation to provide for the viability of all native and selected non-native plants and animal species. Maintaining biological diversity, or "keeping all the pieces," will help us to ensure we meet our legal mandates.

Public interest for maintaining the biological integrity and diversity of these public lands has grown substantially over the last decade. Biodiversity has surfaced as an issue in preliminary discussions and environmental analyses conducted in recent years. The scientific community, supported by published research, has emphasized the importance of biodiversity conservation. The Council on Environmental Quality recommends incorporation of the issue of biodiversity conservation in environmental analyses.

The existing Management Plans do not fully address all biological diversity elements, especially for the National Grasslands. New and revised management guidance and direction are needed that address conservation of biological diversity and ecological processes (structure, function and pattern).

New information on species and their habitats found on or near national grasslands and forests in the planning area has also been gathered. Eight species are federally listed or proposed for listing and three are candidates for federal listing as threatened or endangered under the new proposed rules of the US Fish and Wildlife Service. Species listed or proposed for listing include: Black-footed ferret, Whooping crane, American burying beetle, Bald eagle, Blowout penstemon, Western prairie-fringed orchid, Topeka shiner, and mountain plover. Five of these species were listed or proposed for listing after existing plans were developed. South Dakota and Nebraska list another 20 species under state laws. The Nature Conservancy maintains a list of 50 to 60 species of concern in the Northern Great Plains. Many of these same species are among the 86 listed by the USDA Forest Service as sensitive species in Forest Service Regions 1 and 2.

Prairie dogs are a keystone grassland herbivore, and are a sensitive species in some areas of the Great Plains. They now exist in about 2 percent of their historic range. Many associate species (e.g., ferret, swift fox, ferruginous hawk, burrowing owls, mountain plover) are endangered, threatened, or experiencing significant declines.

In 1998, black-tailed prairie dogs were petitioned for listing as a threatened species. In 1999, the FWS completed their status review of this species and determined that its listing was warranted but precluded due to higher priority of listing needs for other species. Black-tailed prairie dogs have been classified as a candidate species for protection under the Endangered Species Act. The status of this species will now be reviewed annually.

The largest remaining prairie dog complexes exist on Indian reservations and national grasslands. The opportunity to conserve this declining species within the planning area lies heavily on the ability to increase prairie dog complexes on national grasslands. This will require changes in direction (affecting livestock grazing intensities, poisoning, shooting, etc.) from current management plans in order to conserve the species.

During 2000, states within the planning area have been working to develop statewide prairie dog conservation strategies. The Forest Service has been involved in these statewide planning efforts and realizes that states are relying heavily on national grassland prairie dog populations to play a role in conservation efforts. These statewide plans are not completed as this FEIS goes to print. The management plans for these units will be updated as needed as cooperative agreements are developed or if the species is listed. A change in management direction for protection of this species from the direction described in existing management plans is warranted.

The status of breeding birds in the United States is gaining interest. Of the 435 bird species breeding in the U.S., 330 have been documented to breed on the Great Plains. Great declines in some species from 14-91 percent result from habitat loss, degradation, and fragmentation. Since the plan revision process began, the mountain plover has been proposed for listing as a threatened species. It is also expected that the northern sage grouse will be petitioned for listing. Existing management plans did not address specific management direction to maintain the viability of these species on national grasslands. Failure to address the management needs of these species could result in legal vulnerability that could affect future management activities on these public lands.

Biodiversity conservation encompasses management for threatened, endangered and sensitive species, and management indicator species, as well as many additional considerations, including habitat for game species. Current and potential habitat conditions for these species

must be assessed and desired habitat conditions defined. The information contained in state Fish and Wildlife plans will be considered in defining desired habitat conditions. Additionally, agency biologists and members of the public have questioned the biological appropriateness of Management Indicator Species (MIS) identified in the existing land and resource management plans, suggesting other species in place of those currently used as MIS. Monitoring and research have indicated that some different and additional species are more appropriate to use as indicators of our management on the variety of species that have habitats in the planning units.

Native diversity has undergone changes from land-use and agricultural practices. Also, invasions of noxious and invasive plants are reducing or eliminating native plant species.

Some authorized activities and land uses, such as livestock grazing have major influences on watershed health and soil stability. The quantity and type of vegetation maintained on uplands and along drainages, streams and rivers largely determine water and soil conditions.

The health of forest ecosystems is closely tied to the ability of riparian and other prairie woodlands to regenerate and sustain themselves. Fire, insects and disease in coniferous forests are significant influences on forest health.

Key indicators for the plant and animal damage control topic are listed below:

| **Indicator** | **Units of measure** |
|---|---|
| Prairie dog colonies | acres |
| Black-footed ferret reintroduction areas | number and acres |
| Habitat suitability for management indicator species (by species) | |
| low | percent |
| moderate | percent |
| high | percent |
| Endangered Species Act species, candidate species, other species of concern | |
| Grass / shrub structure | |
| low | percent |
| moderate | percent |
| high | percent |
| Grass / shrub composition | |
| early | percent |
| early intermediate | percent |
| late intermediate | percent |
| late | percent |
| Forest structure | |
| late successional | percent |
| Riparian / woody draw regeneration | percent |
| Area being rested | percent |
| Suitable rangeland bison-only grazing | percent |
| Tree plantations (Nebraska NF – Bessey RD) | acres / decade |
| Restoration (prescribed burning, mechanical treatment, etc.) | acres |

# Recreation and Travel Management

Recreation on public lands in the prairie ecosystem is increasing dramatically. Contributing factors are: 1) national grasslands have been recognized for hunting opportunities; 2) the public has increased appreciation for the beauty of the prairie; 3) more people are taking short vacations to the closest public lands; and 4) there has been a loss of solitude in mountain areas. Current recreation use exceeds the levels anticipated in the existing Management Plans. Some leisure activities, such as mountain biking and use of all-terrain vehicles, have greatly increased in popularity since the existing Management Plans were written. The public is demanding recreational uses and values on our Great Plains grassland areas be addressed more fully.

Monitoring indicates that recreation users are generally satisfied with their recreation experiences, but also some people want more developed facilities, improved roads, more site and area information, and better signing. Plan revision is needed to improve developed recreation site direction.

Hunting opportunities, such as upland bird hunting, is a major dispersed recreational activity on many of these public lands. Big game hunting is also popular. The amount of hiding and holding cover for game species depends on sufficient vegetative cover following livestock grazing season. The Management Plans need to more fully address the need for wildlife cover.

While there are few designated "roads" in some areas, portions of the grasslands are well traveled. Topography and vegetation make it possible for all terrain vehicles to drive just about anywhere. Some people are asking us to address road or area restrictions to address resource impacts and recreational desires for solitude. Revision is needed to provide improved direction on access and travel management.

User preferences vary widely over available recreational opportunities. Some users desire primitive recreation experiences with restricted motorized travel, while others, such as all-terrain vehicle users, prefer motorized access. Because recreation use on these public lands has increased over the last decade, the conflicts have also increased. There is a need for improved plan direction on providing a range of recreation opportunities to meet a variety of user expectations.

Key indicators for the recreation and travel management topic are listed below:

| **Indicators** | **Units of measure** |
|---|---|
| Scenic Integrity Levels | acres |
| Recreation Opportunity Spectrum allocations | acres |
| Use levels at developed sites / clusters of dispersed sites | PAOTs |
| Trails | miles |
| Dispersed Recreation | |
| Fishing emphasis | ponds added |
| Big game hunting emphasis | change in opportunity |
| Upland game hunting cover | change in opportunity |
| Prairie dog colonies closed to shooting | areas |
| Prairie dog colonies for viewing / educational studies | acres |
| Travel restricted | acres |
| Expected designated routes | miles and miles per square mile |

# Special Area Designations

The Northern Great Plains National Forest and Grassland units include many unique and outstanding combinations of physical and biological resources, and areas of social interest. These are collectively referred to as "special areas."

Special area designations may include wildernesses, wild and scenic rivers, cultural and historic sites, research natural areas, geologic and paleontology sites, rare habitats, botanical areas, prairie dog colonies, black-footed ferret habitat, wetland conservation areas, unique ecological communities, and areas of biodiversity richness. Special areas already designated in the planning area include three research natural areas, one wilderness, one national recreation area, one experimental forest, one purchase unit, and one prairie dog management area.

Special area designation has received a great deal of interest from many. Maintaining grassland roadless areas and developing grassland wilderness areas has become important to many people. Roadless areas must be evaluated for potential wilderness designation during the Management Plan revision process (36 CFR 219.17). Likewise, interest in Research Natural Areas in the grassland ecosystem has increased. Forest planning must make provisions for the establishment of Research Natural Areas (36 CFR 219.25).

There is also interest in maintaining wild and scenic rivers. Consideration of potential wild and scenic rivers is an inherent part of the land and resource management planning process (FSH 1924). Other special areas may be desired for their contributions to furthering knowledge about natural systems, interpretive / educational opportunities, or other objectives. There is a need to periodically review the need for special area designations as demonstrated by public interest, law and regulation.

The purpose and authority for study of Wild and Scenic Rivers are in the Wild and Scenic Rivers Act of October 1, 1968, as amended. The process for valuation and recommendation for designation can be found in Chapter 8, FSH 1909.12, and Department of Interior and Department of Agriculture National Wild and Scenic Rivers System: Final Revised Guidelines for Eligibility, Classification and Management of River Areas. All rivers recommended by Congress for study, identified in the National Park Service / Nationwide River Inventory, or identified as a potential Wild and Scenic River as part of this revision process have been analyzed.

Key indicators for the special area designations topic are listed below:

| **Indicators** | **Units of measure** |
|---|---|
| Recommended for Wilderness | number and acres |
| Recommended Wild / Scenic rivers | |
| wild classification | miles |
| scenic classification | miles |
| recreation classification | miles |
| Special Interest Areas | number and acres |
| Research Natural Areas | number and acres |

From the above information, the Forest Service developed the Purpose and Need for Change and defined the major revision topics. In February 1997, the Forest Service published (in the *Federal Register*) a Notice of Intent to Prepare an Environmental Impact Statement to revise the

management plans. The federal notice initiated the formal public involvement process. In response to the federal notice and many other public outreach efforts, the Forest Service received public comments to help further define the major revision topics. In December 1998, a revised Notice of Intent was published in the *Federal Register* to describe some changes that had occurred.

# Other Topics

Other topics identified as important to the public, such as fossils, land adjustments, heritage resources, forest management, minerals (other than oil and gas), and water resource management, are addressed through this revision process but were not considered major revision topics.

# Other Topics Raised But Not Addressed

The public and other agencies raised a number of additional topics and issues that are not addressed in detail in these revision documents. Such topics require departmental or legislative actions or come under the authority of other governmental agencies and are outside the scope of land management planning decisions. These topics include but are not limited to the following:

- Departmental and Legislative Topics:

  Grazing fee levels.

  Recreation user fees.

  Sale or transfer of administration of the national grasslands.

  Transfer of the Cedar River and Grand River National Grasslands to the Standing Rock Sioux Tribe.

  Transfer of the Buffalo Gap National Grassland to the Oglala Sioux Tribe.

  Transfer of the Fort Pierre National Grassland to the Lower Brule Sioux Tribe.

  Primacy of livestock grazing on national grasslands.

- Topics for Other Governmental Agencies:

  Predator control.

  Grasshopper control.

  Transfer of Shadehill Reservoir to another federal agency.

- Topics to be Addressed by the Forest Service at the Project Level:

  DM&E railroad expansion.

  Establishment of livestock stocking rates.

  Numbers of AUMs (to be established through the allotment management planning process).

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# Chapter 2 Description and Comparison of the Alternatives

## Changes from Draft to Final

Changes from the Draft EIS include a more complete description of the alternatives considered in detail and an expanded discussion of the alternatives considered but eliminated from detailed study.

## Introduction

This chapter contains the following information:

- An explanation of how the alternatives were developed.
- A description of the alternatives considered in detail, including the "no-action" alternative, which, if chosen, would continue current management direction.
- A description of alternatives considered but eliminated from detailed study.
- A comparison of the alternatives and their major features, including a review of how they respond to the major revision topics. The review compares the alternatives at two budget levels: full funding and historical funding.

## Development of Alternatives

After identifying the seven major revision topics described in Chapter 1, the interdisciplinary team (ID Team) analyzed how well the three current management plans associated with this revision process (the 1987 Custer National Forest Management Plan, the 1985 Medicine Bow National Forest Management Plan, and the 1984 Nebraska National Forest Management Plan) responded to the major revision topics. The ID Team then began to consider potential changes to those plans based on the revision topics.

Appropriate analytic tools, land-based inventories, and dialogue with the public, other agencies, local, state, tribal and federal governments were used to clarify the development of alternatives. After reviewing more than 3,100 comment documents received in response to public outreach and scoping, forest and district personnel fully developed the five alternatives presented in the Draft Environmental Impact Statement (DEIS) and the three proposed Revised Management Plans that accompany it.

Each of the alternatives has identical or similar features to the others, and certain portions of the three Revised Management Plans are the same for all alternatives. In many other respects, the alternatives are distinctly different from each other, especially in how they address the revision topics. Each alternative is, in effect, a stand-alone management plan, which, if chosen, would guide management of the lands under review for the next 10 to 15 years.

The major components of the Revised Management Plans are goals, objectives, standards and guidelines, geographic areas, management areas, monitoring and evaluation strategies, suitable lands for grazing, management indicator species, oil and gas availability determinations, recommendations for Wilderness and Wild and Scenic Rivers.

It was the intent to make all of the alternatives meet the purpose and need of this revision effort and to be fully implementable and achievable, subject to budgetary allocations. All of the alternatives represent the principles of multiple use and sustained yield, maintain or improve ecosystem health, and attempt to comply with environmental laws, although they may do so in slightly different ways. While all the alternatives provide a wide range of multiple uses, goods and services, some alternatives give more or less emphasis to particular ones. After analyzing the effects of the alternatives on imperiled species, it appears some alternatives may not be fully implementable until some adjustments are made in mitigation measures and allocations. Although information was available on the conservation of some of the imperiled species in the development of alternatives, effects on other imperiled species were not known until after the alternatives were fully developed, mapped, and analyzed. Needed adjustments were made between the draft EIS and final EIS.

# Important Points Concerning All the Alternatives

All alternatives represent the philosophies of multiple use and ecosystem management. The alternatives provide basic protection for the grassland and forest resources and comply fully with environmental laws. The alternatives are implementable and fully achievable. As directed by federal law, Forest Service policy and regulations, and guidance described in the Regional Guides for Regions 1 and 2, all the alternatives will:

- Maintain basic soil, air, water and land resources.
- Provide a variety of life through management of biologically diverse ecosystems, though they may differ in how they emphasize native plant and animal management.
- Provide recreation opportunities and maintain scenic quality in response to the needs of national forest and national grassland users and local communities. Protect heritage resources in accordance with applicable laws and regulations, while also providing recreational and educational opportunities. Protect fossils and antiquity resources.
- Sustain multiple uses, products and services in an environmentally acceptable manner. This includes timber harvest, livestock grazing, locatable and leasable minerals extraction and recreation uses.
- Through cooperation with other landowners, place emphasis on improved landownership and access patterns that benefit both private landowners and the public.

- Improve financial efficiency for most programs and projects by minimizing expenses, recognizing, however, that not all programs and projects produce revenue.
- Emphasize cooperation with individuals, organizations, Indian Tribes and other agencies to coordinate the planning and implementation of projects.
- Promote rural development opportunities to enrich rural cultural life, to enhance the environment, to provide employment and to improve rural living conditions.

All alternatives use a consistent numbering and naming scheme, which differs from the schemes shown in the three current Management Plans.

Budgets prepared for each alternative at two funding levels project actual outcomes and practical results. Historically, the Forest Service has not received the funds necessary to fully implement its management plans. The budgets were allocated between programs based on the theme of each alternative, the expected goods and services provided, and the necessary actions and expenditures required to deliver those goods and services. The first budget level for each alternative is based on the funds necessary to most fully implement the three revised forest / grassland management plans. The second is a reduced budget based on the typical level of funding received to implement the three current forest / grassland plans.

# Collaborative Group Results Used in Alternatives

## Introduction

Recognizing the value of citizen participation in the planning process, Forest Service managers organized five "collaborative groups" across the Northern Great Plains to assist in developing alternatives.

The five collaborative groups were organized on the following units: Bessey Ranger District and Fall River Ranger District (Buffalo Gap National Grassland) of the Nebraska National Forest, Grand River National Grassland, Little Missouri National Grassland, and Sheyenne National Grassland of the Dakota Prairie Grasslands. Each group chose topics most suited to issues facing their respective unit. Over a series of meetings, the groups produced options or alternatives to be considered in the analysis process.

A summary of each group's contribution is described below.

## Dakota Prairie Grasslands

## Grand River Collaborative Group

A group of mostly local people, representing a wide range of interests including ranching, wildlife, recreation and the environment, met to discuss prairie dog management on the Grand River National Grassland. Their ideas are represented in the range of alternatives for prairie dog management.

## Little Missouri Collaborative Group

A group of about a dozen mostly local people, with interests and residences in Slope County, western North Dakota, met to discuss numerous issues pertaining to the Little Missouri National Grassland, particularly with respect to Slope County. The group included members of the Little Missouri Grazing Association, as well as representatives from the Theodore Roosevelt National Park, the North Dakota State Game and Fish Department, the North Dakota Parks and Recreation Department, and the Roosevelt-Custer Regional Development Council.

## Sheyenne Collaborative Group

A group of eight people representing interests in southeastern North Dakota met to discuss what the desired future conditions for the Sheyenne National Grassland ought to be and how best to achieve those desired conditions. Representatives from government agencies, private conservation, and livestock interests formed the group. The group provided input on vegetative structure, composition and seral stage, which helped assist Forest Service managers in developing vegetative matrices for the grassland alternatives.

# Nebraska National Forest Units

## Bessey Collaborative Group

A 14-member group met to discuss issues related to forest plantation management for the Bessey Ranger District of the Nebraska National Forest. The two Sandhills units (Bessey Ranger District and the McKelvie National Forest) contain about 20,000 acres of hand-planted forests on a native grassland landscape. Primary tree species include ponderosa pine, Eastern red cedar, and jack pine. The group devised four alternatives, ranging from actively converting the forest plantations to native prairie to maintaining the 20,000 acres of forest plantations, that have been incorporated into the alternatives.

## Fall River Collaborative Group

About 25 to 30 individuals, representing specific uses and environmental elements, such as ranching, wildlife, motorized and nonmotorized recreation, met to develop a draft alternative to be considered for the Fall River Ranger District (western half of the Buffalo Gap National Grassland). Their proposal is being examined as Alternative 3a in this environmental impact statement.

# Elements Common to All Action Alternatives

Management direction contained in the Revised Management Plans applies to all action alternatives unless otherwise noted in Appendix D - Differences Among the Alternatives. Standards and guidelines for basic resource protection for air, soil, water, geology, minerals, fish, wildlife, rare plants, fire, insects and diseases, livestock grazing, noxious and undesirable plants, scenery management, landownership, heritage, infrastructure, special uses, plant collecting apply to all action alternatives.

Direction that varies among alternatives includes:

- Management area allocations.
- Objectives for noxious weeds and undesirable plant reductions.
- Objectives for recreation developments and trail construction.
- Objectives for desired vegetation composition and structure, rest, prescribed fire, pasture size, water developments, and areas dedicated to bison-only grazing.
- Standards and guidelines for paleontological resources.
- Standards and guidelines for prairie dog management.

# Description of the Alternatives Considered in Detail

Each alternative is essentially a separate and distinct set of Management Area allocations and a distinct Management Plan. Management Area allocations define management emphases. Major components of Management Plans include goals and objectives, standards and guidelines, management area direction, geographic area direction, monitoring and evaluation strategies, oil and gas leasing decisions, recommendations for new Wilderness, and recommendations of inclusion into the Wild and Scenic Rivers System. Most of the direction in the accompanying proposed Revised Management Plans (which were part of the DEIS) applies to action alternatives 2, 4, and 5, except for differences which were noted in Appendix D of the FEIS.

The alternatives in the DEIS were developed without preconceived notions of a preferred alternative. The preferred alternative (Alternative 3) in the DEIS has been changed in the Final EIS in response to public comments.

While all alternatives provide a wide range of multiple uses, goods, and services, some alternatives give slightly more emphasis to particular uses in order to respond to public comment and to explore management options, opportunities, and trade-offs.

The themes of alternatives considered in detail, and modified based on public comment received on the DEIS, are described below:

# Alternative 1 - (No Action)

The no action alternative is required by regulation. Current Land and Resource Management Plan (Management Plan) direction and emphases would continue with this alternative. Since current plans were developed, management area titles and the management area numbering system have changed. Therefore, Management Area titles and numbers have been changed to make this alternative more easily comparable to other alternatives; however, management direction remains the same as in current Management Plans. See map of Alternative 1 for an understanding of current Management Area allocations and acres within each Management Area.

For the Dakota Prairie Grasslands, this alternative had the most acres (1,176,600 ac) of MA 6.1 Rangeland with Broad Resource Emphasis and the least acres of special management area designations (MA 1.2, 1.31, 1.5, 2.1, 2.2, 3.4, 3.51, and Category 4). For the Nebraska National Forest, this alternative had the most acres of MA 6.1 Rangeland with Broad Resource Emphasis (977,180 ac) and the least acres of special management area designations. For the Thunder Basin National Grassland, this alternative had the most acres of MA 6.1 Rangeland with Broad Resource Emphasis (514,470 ac) and the least acres of special management area designations.

For Nebraska National Forest tree plantations, this alternative would provide for partial reversion of pine and cedar plantations on the Bessey Ranger District to native prairie. Firewood cutting, post and pole cutting, and other forms of wood product removal would be encouraged. Prescribed fire would be used to reduce cedar encroachment on native grasslands.

There were no changes to this alternative from Draft EIS to the Final EIS.

# Alternative 2

This multiple-use alternative would emphasize production of commodities such as livestock, minerals, oil, gas, and timber. Plant and animal habitats would be managed to meet viable populations. Recreation opportunities, and special area designations would be provided where they would not foreclose commodity production. See map of Alternative 2 for an understanding of Management Area allocations and acres within each Management Area.

For the Dakota Prairie Grasslands, this alternative had the most acres of MA 3.51 Bighorn Sheep Habitat (118,490 ac) and the least acres of MA 2.2 Research Natural Areas and other special management area designations. It had the second highest acreage (1,128,770 ac) of MA 6.1 Rangeland with Broad Resource Emphasis. For the Nebraska National Forest, this alternative had the most acres of MA 5.13 Forest Products, and it had 891,380 acres of MA 6.1 Rangeland with Broad Resource Emphasis. It had no recommended wilderness, wild and scenic rivers, or bighorn sheep habitat management areas. For the Thunder Basin National Grassland, Alternative 2 had the most acres of MA 5.12 General Forest and Rangelands, Range Vegetation Emphasis (253,550 ac) and MA 8.4 Mineral Production and Development (49,350 ac).

For Nebraska National Forest tree plantations, this alternative would provide for partial reversion of pine and cedar plantations on the Bessey Ranger District to native prairie. Firewood cutting, post and pole cutting, and other forms of wood product removal would be encouraged. Prescribed fire would be used to reduce cedar encroachment on native grasslands.

There were no changes to this alternative from Draft EIS to the Final EIS.

# Alternative 3 FEIS (Preferred Alternative)

This multiple-use alternative would modify current Management Plan direction by adopting additional special area designations, such as Research Natural Areas, Special Interest Areas, and Recommended Wilderness Areas. It would also place added emphasis on native plants and animals and recreation opportunities. Refer to the map of Alternative 3 FEIS for an understanding of Management Area allocations and acres within each management area as well as Geographic Area Management Direction in the Final Management Plan.

Changes in Alternative 3 from the Draft EIS include the following: changes in goals, objectives, standards and guidelines, and monitoring requirements, proposed Management Area allocations, Geographic Area direction, oil and gas stipulations (See Final Land and Resource Management Plans). "Bison-friendly" grazing policies were also included.

This alternative would facilitate bison grazing on the lands administered by the Dakota Prairie Grasslands, the Nebraska National Forest, and the Thunder Basin National Grassland. In this alternative, bison will be treated as a type of livestock, not as free-roaming wildlife herds, and permittee requests to graze bison would be fully considered. The following factors will be considered when evaluating the suitability of allotments for bison grazing:

- Public safety.
- Livestock health.
- Livestock structures; including but not limited to fences and handling facilities.
- Economic viability of the permittee.
- Desired recreational experiences of National Grassland visitors.
- Desired spiritual experiences for American Indian tribes.

For Nebraska National Forest tree plantations, this alternative would entail managing and maintaining about 20,000 acres of pine plantations on the Bessey Ranger District through a combination of thinning, prescribed burning, planting, and insect and disease control. Cedar plantations would be harvested for forest products and cedar stands would be converted to either pine plantings or native grasslands. Within the next ten to fifteen years, approximately 20% of the pine plantations with cedar understories or cedar encroachment would be treated to remove the cedar. Firewood cutting, post and pole cutting, and other forms of wood product removal would be encouraged where needed to meet stand objectives. Prescribed fire would be actively used to reduce cedar encroachment on native grasslands. Active reforestation of ponderosa pine through tree planting would occur on plantations burned in the 1960's.

The following three tables summarize, by unit, the major changes in management area allocations from Draft to Final EIS for this alternative.

**Table 2-1. Dakota Prairie Grasslands**

| MA | MA Title | DEIS Acres | FEIS Acres |
|---|---|---|---|
| 1.2 | Recommended for Wilderness | 22,190 | 0 |
| 1.2a | Suitable Wilderness | 0 | 41,500 |
| 1.31 | Backcountry Nonmotorized | 121,950 | 69,400 |
| 2.1 | Special Interest Area | 6,390 | 6,400 |
| 2.2 | Research Natural Area | 20,030 | 19,700 |
| 2.4 | American Indian Traditional Use | 6,280 | 6,300 |
| 3.51 | Bighorn Sheep | 67,210 | 19,300 |
| 3.51a | Bighorn Sheep-Non Federal Minerals | 0 | 35,800 |
| 3.63 | Black Footed Ferret Reintroduction | 0 | 29,200 |
| 3.64 | Special Plant and Wildlife Habitat | 1,010 | 2,300 |
| 3.65 | Rangelands with Naturally-Appearing | 329,300 | 383,100 |
| 3.66 | Ecosystem Restoration: Tall Grass | 53,050 | 63,800 |
| 4.22 | Scenic Area, Vistas, Travel Corridors | 22,450 | 23,600 |
| 4.32 | Dispersed Recreation: High Use | 9,550 | 8,000 |
| 5.12 | General Forest and Rangelands | 10,640 | 0 |
| 6.1 | Rangeland with Broad Resource Emphasis | 587,080 | 549,700 |

**Table 2-2. Nebraska National Forest Units**

| MA | MA Title | DEIS Acres | FEIS Acres |
|---|---|---|---|
| 1.1 | Wilderness: Soldier Creek | 7,810 | 7,800 |
| 1.2 | Recommended for Wilderness | 15,970 | 40,500 |
| 1.31 | Backcountry Nonmotorized | 14,000 | 13,900 |
| 1.31a | Pine Ridge National Recreation Area | 6,500 | 6,500 |
| 2.1 | Special Interest Area | 54,490 | 26,900 |
| 2.2 | Research Natural Area | 6,740 | 6,800 |
| 3.51 | Bighorn Sheep | 6,590 | 5,600 |
| 3.63 | Black Footed Ferret Reintroduction | 109,140 | 105,000 |
| 3.64 | Special Plant and Wildlife Habitat | 107,290 | 105,000 |
| 4.32 | Dispersed Recreation: High Use | 6,350 | 6,500 |
| 5.12 | General Forest and Rangelands | 27,000 | 27,900 |
| 6.1 | Rangeland with Broad Resource Emphasis | 691,300 | 702,800 |

**Table 2-3. Thunder Basin National Grassland**

| MA | MA Title | DEIS Acres | FEIS Acres |
|---|---|---|---|
| 1.2 | Recommended for Wilderness | 14,850 | 0 |
| 1.31 | Backcountry Nonmotorized | 6,540 | 6,500 |
| 2.1 | Special Interest Area | 12,570 | 26,700 |
| 2.2 | Research Natural Area | 1,210 | 1,200 |
| 3.63 | Black Footed Ferret Reintroduction | 45,470 | 47,900 |
| 3.65 | Rangelands with Naturally-Appearing | 116,560 | 83,400 |
| 3.68 | Big Game Range | 33,890 | 33,900 |
| 4.32 | Dispersed Recreation: High Use | 25,780 | 25,800 |
| 5.12 | General Forest and Rangelands | 129,480 | 160,900 |
| 6.1 | Rangeland with Broad Resource Emphasis | 118,130 | 118,100 |
| 8.4 | Mineral Production & Development | 47,990 | 48,000 |

# Alternative 3 DEIS

This alternative is carried forward in its entirety from the DEIS to the FEIS; there were no changes. A public working group convened for the Fall River Ranger District of the Buffalo Gap National Grassland (west half) proposed a modification to this alternative. The working group recommended this modification of Alternative 3 in the DEIS. See map of Alternative 3a for an understanding of management area allocations and acres within each Management Area.

For the Dakota Prairie Grasslands, Alternative 3 had the most acres of MA 1.31 Backcountry Recreation Nonmotorized (121,950 ac), MA 2.1 Special Interest Area (6,390 ac), MA 2.2 Research Natural Area (21,030 ac), MA 3.65 Rangelands with Diverse, Natural-appearing Landscapes (329,300 ac), and MA 4.22 Scenic Area, Vistas or Travel Corridors (22,450 ac). For the Nebraska National Forest, this alternative would provide the most acres of MA 2.1 Special Interest Areas (103,030 ac), MA 3.51 Bighorn Sheep Habitat (6,590 ac), and MA 3.64 Special Plant and Wildlife Habitat (107,290 ac). For the Thunder Basin National Grassland, this alternative would have the most acres of MA 2.1 Special Interest Area (12,570 ac), MA 3.65 Rangeland with Diverse, Natural-appearing Landscapes (116,560 ac), MA3.68 Big Game Range (33,890 ac), and MA 4.32 Dispersed Recreation: High Use (25,780 ac).

For the Nebraska National Forest, this alternative would entail managing and maintaining about 20,000 acres of pine plantations on the Bessey Ranger District through a combination of thinning, prescribed burning, planting, and insect and disease control. Cedar plantations would be harvested for forest products and cedar stands would be converted to either pine plantings or native grasslands. Within the next ten to fifteen years, approximately 20% of the pine plantations with cedar understories or cedar encroachment would be treated to remove the cedar. Prescribed fire would be actively used to reduce cedar encroachment on native grasslands. Active reforestation of ponderosa pine through tree planting would occur on plantations burned in the 1960s.

# Alternative 4

This multiple-use alternative would feature natural processes and restoration of impaired native ecosystems. It would demonstrate the role that national grasslands and forests have in sustaining rare animal and plant communities within the Northern Great Plains. This alternative would allow for "bison-only" grazing on a minimum of 5% of the lands administered by each of the Dakota Prairie Grasslands, the Nebraska National Forest, and the Thunder Basin National Grassland. In this alternative, bison will be treated as a type of livestock, not as free-roaming wildlife herds. The following factors will be considered when evaluating the suitability of allotments for bison grazing:

- Public safety.
- Livestock health.
- Livestock structures; including but not limited to fences and handling facilities.
- Economic viability of the permittee.
- Desired recreational experiences of National Grassland visitors.
- Desired spiritual experiences for American Indian tribes.

With this alternative, permittees requests to graze bison would be fully considered as well as the opportunities to convert to "bison-only" grazing on vacant and newly acquired allotments determined to be desirable and suitable for bison grazing.

For the Dakota Prairie Grasslands, this alternative has the largest acreages of MA 1.2 Recommended Wilderness (85,940 acres), MA 3.63 Black-footed Ferret Reintroduction Habitat (74,670 acres), and MA 3.66 Ecosystem Restoration: Tall Grass Prairie (55,150 acres). For the Nebraska National Forest, it has the largest acreages of MA 1.2 Recommended Wilderness (174,970 acres), MA 3.4 Scenic Rivers Recommended (1,790 acres), Black-footed Ferret Reintroduction Habitat (109,930 acres), and MA 3.66 Ecosystem Restoration (22,410 acres). For the Thunder Basin National Grassland, it has the largest acreages of MA 1.2 Recommended Wilderness (59,280 acres), MA 2.2 Research Natural Areas (3.520 acres), and MA 3.63 Black Footed Ferret Reintroduction Habitat (112,510 acres). See map of Alternative 4 for an understanding of management area allocations and acres within each management area as well as Management Area Direction in Chapter 2 of the Management Plan.

For Nebraska National Forest tree plantations, this alternative would include actively converting non-native pine and cedar plantations on the Bessey Ranger District to native prairie through tree cutting and burning over the next 20 years. Firewood cutting, post and pole cutting, and other forms of wood product removal would be encouraged. Prescribed fire would be actively used to reduce cedar encroachment on native grasslands. No active reforestation through tree planting would occur.

There were no changes in this alternative from Draft to Final EIS.

## Alternative 5

This multiple-use alternative would accentuate recreation opportunities and non-commodity services and also provide commodity outputs that complement or fit within recreation objectives. See map of Alternative 5 for an understanding of management area allocations and acres within each management area as well as Management Area Direction found in Chapter 2 of the Management Plan. For the Dakota Prairie Grasslands, this alternative would result in the 72,670 acres of MA 1.2 Recommended Wilderness and the most acres in MA 3.4 National River System: Scenic Rivers Recommended (18,280 ac), MA 3.64 Special Plant and Wildlife Habitat (16,400 ac), and MA 4.32 Dispersed Recreation: High Use (13,880 ac). For the Nebraska National Forest, this alternative would provide the most acres of MA 1.31 Backcountry Recreation Nonmotorized (126,660 ac), MA 2.1 Special Interest Area (55,190 ac), MA 4.32 Dispersed Recreation: High Use (11,550 ac), and MA 4.4 National River System: Recreation Rivers Recommended (1,790 ac). For the Thunder Basin National Grassland, this alternative had the most acres of MA 1.31 Backcountry Recreation Nonmotorized (22,710 ac), MA 4.22 Scenic Area, Vistas or Travel Corridors (6,030 ac), and MA 8.4 Mineral Production and Development (49,350 ac).

For Nebraska National Forest tree plantations, this alternative would entail managing and maintaining about 15,000 acres of pine plantations on the Bessey Ranger District through a combination of thinning, prescribed burning, planting, and insect and disease control and allowing for gradual reversion of remaining pine and cedar plantations on the Bessey Ranger District to native prairie. Cedar plantations would be harvested for forest products and cedar stands would be converted to either pine plantings or native grasslands. Within the next ten to fifteen years, approximately 5% of the pine plantations with cedar understories or cedar encroachment would be treated to remove the cedar. Firewood cutting, post and pole cutting, and other forms of wood product removal would be encouraged where needed to accomplish thinning objectives and cedar removal. Prescribed fire would be actively used to reduce cedar encroachment on native grasslands. Active reforestation of ponderosa pine through tree planting would occur on plantations burned in the 1960s.

There were no changes in this alternative from Draft to Final EIS.

## Forest Service Preferred Alternative

The Forest Service has identified Alternative 3 FEIS as our preferred alternative.

## National Park Service Preferred Alternative

The National Park Service has identified Alternative 3 FEIS as their preferred alternative for management of their portion of the Little Missouri River.

## Bureau of Land Management Preferred Alternative

The Montana State Office of the Bureau of Land Management, with responsibility for the federal mineral estate in the states of North Dakota and South Dakota, has identified Alternative FEIS 3 as their preferred alternative for leasing of federal minerals. This affects the federal mineral estate with non-federal surface within the boundaries of the Little Missouri, Cedar River and Buffalo Gap National Grasslands.

The Wyoming State Office of the Bureau of Land Management has responsibility for the federal mineral estate in the states of Wyoming and Nebraska, including the Thunder Basin, and Oglala National Grasslands. The Wyoming BLM's preference is to utilize existing land use decisions contained in the Platte River, Buffalo, and Newcastle Resource Management Plans that deal with federal mineral / private surface lands. The BLM Powder River Basin Oil and Gas EIS will address the proposed activities associated with coal bed methane and traditional oil and gas development in the western portion of the Thunder Basin National Grassland area that lies within Campbell and Converse Counties. The BLM will conduct Section 7 consultation with the US Fish and Wildlife Service on the preferred alternative for the Powder River Basin EIS. Consistency of surface protection stipulations will also be evaluated.

# Conformance with the Forest and Rangeland Renewable Resources Planning Act (RPA)

The NFMA regulations at 36 CFR 219.12 (f)(6) require at least one alternative be developed that responds to and incorporates the Resources Planning Act (RPA) Program's tentative resource objectives for each national forest / grassland as displayed in regional guides for Regions 1 and 2. However, the 1990 RPA Program establishes national guidance for the national forests and national grasslands by providing program emphasis and trend rather than specific, quantified output targets for individual Forest Service programs. As a result, no resource objectives were quantified for each region to display in regional guides, which would then be passed on to individual forests and grasslands.

The RPA Program is updated every five years and has three components: (1) roles in natural resource management for Forest Service management, (2) Forest Service program responses to contemporary issues, and (3) long-term strategies to guide the program development and budgetary process. It emphasizes four high priority themes: (1) recreation, wildlife and fisheries resource enhancement, (2) environmentally acceptable commodity production, (3) improved scientific knowledge about natural resources, and (4) response to global resource issues. This guidance was used in developing the action alternatives for this FEIS.

# Alternatives Considered But Eliminated from Detailed Study

Several alternatives were considered and eliminated from detailed study during the planning process. Following is a discussion of these alternatives and the reasons why they were eliminated.

## Passive Management Alternative

Early in the scoping process, an alternative was suggested that would restore biological communities and health through passive management. This alternative would not reasonably meet the Purpose and Need identified in Chapter 1 of this EIS for plan revision; therefore, it was considered but eliminated from detailed study. This alternative would not address the revision topics identified through scoping with the public and other agencies. Issues related to community and lifestyle relationships, livestock grazing, oil and gas leasing, plant and animal damage control, rangeland and forest health, recreation and travel management, and special area designations would not be addressed with this alternative.

This alternative would also not address legal requirements of the planning process. Legal requirements provided by the National Forest Management Act, Endangered Species Act, Federal Land Management Policy Act, and other laws and regulations would not be adequately addressed with this alternative, leaving the Forest Service legally vulnerable to challenges. New direction needed to protect listed threatened and endangered species, species at risk, and rare vegetation communities; to address noxious and invasive plant infestations; to protect watersheds and landscapes from physical degradation; etc, would not be considered with this alternative. Regarding roadless areas and wild and scenic rivers, the Forest Service is required to evaluate all roadless areas and eligible rivers for potential Wilderness or Wild and Scenic River designations. Actual wilderness and wild and scenic river designation is a Congressional responsibility; the Forest Service and other federal agencies can only make recommendations.

Specifically, this alternative was not considered in detail because passive management would not achieve restoration or ecosystem objectives, particularly for recovery of threatened or endangered plant and animal species or the assurance of maintaining viability of all species. Ecosystems in need of restoration must be actively managed using some combination of grazing, prescribed fire, species reintroductions, integrated pest management treatments, revegetation with native species, and other management practices. Noxious weeds and invasive plant species also require active management for control and conversion to native plants.

There were no comments to the Draft EIS in support of this alternative.

## Bison-Restoration/Free-Roaming Bison Alternative

This alternative was proposed in early scoping and also in comments to the Draft EIS. Several tribes, intertribal organizations, individual tribal members, and others requested the Forest Service explore opportunities in the EIS to remove domestic cattle and restore bison grazing (wild, free-roaming herds) to the National Grasslands.

Free-roaming bison would require that states manage the animals because free-roaming bison are considered wildlife. Discussions have indicated the states are not interested in accepting this responsibility. Free roaming bison as wildlife is outside the scope of this planning effort.

Bison are not listed by the USFWS as a threatened or endangered species; therefore, there is no requirement under the Endangered Species Act for formal bison restoration.

The Forest Service generally does not specify what kind of livestock are run under a grazing permit unless it is to meet resource objectives such as: sheep or goat grazing for leafy spurge control, preventing conflicts between domestic sheep and bighorn sheep, etc. This allows the producer maximum flexibility to determine what kind of livestock is best suited to his/her needs and what kind of livestock provides him/her with the highest economic returns.

Additionally, the need for bison grazing over cattle grazing was not identified in the Purpose and Need for plan revision identified in Chapter 1 of the EIS. Cattle grazing can adequately achieve the desired future vegetation conditions. This is supported in the scientific literature: "We conclude that conserving the soil, water, and biological resources of the mixed-grass prairie will be accomplished with sound grazing management, rather than determined solely by the choice between bison and cattle. Whether managing mixed prairie with bison or with cattle, the stocking rate and grazing management will determine the long-term health of both the prairie and grazing animal" (Steuter and Hidinger 1999).

## Conservation Reserve Alternative

An alternative that includes principles of conservation biology, establishes core reserve areas on the grasslands and forests, and links with other core areas by biological corridors was not considered in detail within this EIS. These planning units are highly fragmented at both broad- and landscape scales. Establishing and managing biological corridors between these units would require decisions on private, state, tribal, and other federal lands. Making management decisions for these lands is outside the scope of this planning effort. However, principles of conservation biology were used in developing goals, objectives, standards, guidelines, Management Area direction, Geographic Area direction, and monitoring protocols for several of the alternatives. Principles of conservation biology were also discussed in the effects analyses within this EIS. These principles considered habitat fragmentation and connectivity. Principles of conservation biology were addressed in the Broadscale Viability Assessment and in the Biological Assessment and Biological Evaluation of all species at risk. Principles of conservation biology were also addressed with respect to rare plant communities and how these communities can be protected in the future. No comments on the Draft EIS were received requesting further consideration of this alternative.

## Decisions on Designation of Site-Specific Motorized Routes

Managers agree that site-specific management direction is needed to determine specific routes and areas for motorized and nonmotorized use. The process to site specifically designate motorized routes could not be completed within the timeframe of this planning process because of the lack of complete road inventories and the need for extensive public involvement. Managers agree that future site-specific travel management analyses should take place on each grassland and forest to designate which roads, trails, and areas will be available for motorized use. Site-specific decisions for designated motorized roads, trails, and areas will be better handled at the local planning level tiered to the plan revision analysis and decisions. Proposed direction within the action alternatives gives managers additional time to work with interested parties to make site-specific decisions on designated motorized routes. This will allow enough time to get site-specific road and trail inventories, complete necessary roads analyses, and work with interested publics to determine travel and access needs and desires.

The preferred alternative in this EIS for the Dakota Prairie and Thunder Basin grasslands would restrict motorized use to existing roads and trails only and off-road motorized use will not be allowed. The preferred alternative for the Nebraska National Forest and grassland units will defer decisions on motorized use until site-specific analyses and public involvement is completed (except for motorized use restrictions to meet Management Area direction or for existing Forest Supervisor special orders on travel management needed to protect resources and provide for public safety).

## No Grazing Alternative

An alternative with no livestock grazing was considered but eliminated from detailed study because it does not reasonably meet the Purpose and Need for management plan revision described in Chapter 1 of this EIS. The Great Plains evolved with several natural ecological disturbance processes, including herbivory (grazing). Grazing is an important process in achieving desired vegetation and habitat conditions to address rangeland and forest health and other issues. Also, many rural communities have a co-dependent relationship with national grasslands and forests because of the intermingled landownership pattern and the dependency of these public lands to supply forage for livestock grazing. Eliminating livestock grazing would also be a hardship on many individuals and ranch families.

## Current Situation Alternative

Some Draft EIS respondents asked that an alternative maintaining current conditions on the national grasslands and forests be fully considered in the Final EIS. This is not the same as the No Action Alternative 1 that provides continued direction and emphases based on the current land and resource management plans.

A current situation alternative was considered but eliminated from detailed study because it does not reasonably meet the Purpose and Need described in Chapter 1 of this EIS. Maintaining the current situation and resource conditions on these grasslands and forests would not address all the revision topics identified through scoping with the public and other agencies. All the issues related to community and lifestyle relationships, livestock grazing, oil and gas leasing, plant and animal damage control, rangeland and forest health, recreation and travel management, and special area designations would not be addressed with this alternative.

Maintaining the current situation and resource conditions would also not address legal requirements of the planning process. Legal requirements provided by the National Forest Management Act, Endangered Species Act, Federal Land Management Policy Act, and other laws and regulations would not be adequately addressed with a current situation alternative, leaving the Forest Service legally vulnerable to challenges. New direction needed to protect listed threatened and endangered species, species at risk, and rare vegetation communities; to address noxious and invasive plant infestations; to protect watersheds and landscapes from physical degradation; etc, would not be considered with this alternative. Refer to a description of these issues in the Purpose and Need section of Chapter 1 of this EIS. Regarding roadless areas and wild and scenic rivers, the Forest Service is required to evaluate all roadless areas and eligible rivers for potential Wilderness or Wild and Scenic River designations. Actual wilderness and wild and scenic river designation is a Congressional responsibility; the Forest Service and other federal agencies can only make recommendations.

While we did not develop an additional alternative in this Final EIS to display the current situation, we did work to make changes in the EIS from draft to final to display the current situation and current conditions on these eight national grasslands and two national forests. The Final EIS was also rewritten to do a better job of comparing the action alternatives to the current situation and conditions.

## Return the Buffalo Gap, Fort Pierre, and Grand River/Cedar River National Grasslands to the Indians or Provide for Co-Management of these Grasslands by the Oglala Sioux, Lower Brule Sioux, and Standing Rock Sioux tribes, respectively.

This alternative was not studied in detail as there is no authority for either the return of the grasslands to the Sioux tribes or for co-management of the grasslands by individual Indian tribes. Return of the grasslands to the Sioux tribes will likely take legal and / or congressional legislative action, so it is outside the scope of the decision to be made on how to manage these public lands. While there is no authority for providing for co-management of the grasslands by tribes, there is federal policy that requires we consult with tribes on the management of these lands on a regular basis. Chapter 1 of the Management Plans and also federal policy and regulations provide direction for continued consultation with tribal governments on a government-to-government basis and also with Tribal Historic Preservation Offices on matters of cultural resource protection, protection of traditional cultural properties, and on repatriation issues. While we are not considering an alternative for co-management of the grasslands with Sioux tribes, we are interested in continued communication, consultation and cooperation through continued dialogue, and partnerships.

# The Major Revision Topics and the Alternatives Considered in Detail

The following section summarizes and compares how the alternatives would respond to the major revision topics introduced in Chapter 1. Select indicators of differences between alternatives are highlighted. Chapter 3 should be reviewed for a complete discussion of the effects expected from implementing the alternatives.

## Topic: Community and Lifestyle Relationships

Under existing conditions, the National Forests and Grasslands of the Northern Great Plains are responsible for an estimated 5,400 jobs and $123,333,000 in earned income (direct, indirect, and induced) from domestic livestock grazing, recreation, timber production, and oil and gas production, which represent 2.6% of the jobs and 1.7% of the income in the Northern Great Plains economic impact area. Excluded from these job and income estimates and the discussion below are an additional 1,900 jobs and $93,000,000 in income (direct, indirect, and induced) related to coal production from the federal mineral estate within the boundary of the Thunder Basin National Grassland. Current and future coal production related jobs and income are unaffected by the alternatives and have been excluded from the job and income discussion.

Alternative 1 would rank second of the alternatives in producing 17 additional direct, indirect, and induced jobs and $.4 million more in direct, indirect, and induced income, a increase of .01%in the Northern Great Plains Economic Impact Areas. Range-fed livestock grazing jobs attributed to the national grassland and forest pastures would increase an estimated 1%. Jobs attributed to the federal mineral estate would not change. Alternative 1 would produce the least jobs and income linked to timber management. It would be second best (behind Alternative 2) in achieving the principal management goals for the agriculture, oil, gas, minerals users/interest segments. It would be worst in achieving the principal management goals of the wood products user/interest segment. It would be most likely to continue current direction, emphases and levels of natural resource opportunities, causing the least disruption to economic and social institutions and associated lifestyles.

Alternative 2 would rank first of the alternatives in producing 66 additional direct, indirect, and induced jobs and $1.2 million more in direct, indirect, and induced income, a increase of .02% in jobs and .03%in income in the Northern Great Plains Economic Impact Areas. Range-fed livestock grazing jobs attributed to the national grassland and forest pastures would increase an estimated 3%. Jobs and income attributed to the federal mineral estate would increase slightly by an estimated 2 jobs and $40,000 in income. Alternative 2 would produce the most jobs and income linked to timber management. It would be best in achieving the principal management goals of the agriculture, oil, gas, minerals, and wood products user/interest segments. It would be worst in achieving the principal management goals of the recreation, wildlife, conservation, American Indian user/interest segments.

DEIS Alternative 3 would rank third of the alternatives in producing 216 fewer direct, indirect, and induced jobs and $3.6 million less in direct, indirect, and induced income, a decrease of .10%in jobs and .05%in income in the Northern Great Plains Economic Impact Areas. Range-fed livestock grazing jobs attributed to the national grassland and forest pastures would decrease an estimated 9%. Jobs and income attributed to the federal mineral estate would decrease by an estimated 55 jobs and $1,810,000 in income. DEIS Alternative 3 would produce an increase of 5 jobs and $131,000 in income linked to timber management. This alternative would place more emphasis on diverse landscapes, plants, and animals, and recreation opportunities; however, it would not clearly favor any user / interest segment.

FEIS Alternative 3 would rank fourth of the alternatives in producing 221 fewer direct, indirect, and induced jobs and $3.9 million less in direct, indirect, and induced income, a decrease of .11% in jobs and .06%in income in the Northern Great Plains Economic Impact Areas. . Range-fed livestock grazing jobs attributed to the national grassland and forest pastures would decrease an estimated 9%. Jobs and income attributed to the federal mineral estate would decrease by an estimated 55 jobs and $1,810,000 in income. FEIS Alternative 3 would produce an increase of 5 jobs and $131,000 in income linked to timber management. This alternative would place more emphasis on diverse landscapes, plants and animals, and recreation opportunities; however, it would not clearly favor any user / interest segment.

Alternative 4 would rank last of the alternatives in producing 656 fewer direct, indirect, and induced jobs and $11.0 million less in direct, indirect, and induced income, a decrease of .31% in jobs and .15%in income in the Northern Great Plains Economic Impact Areas. . Range-fed livestock grazing jobs attributed to the national grassland and forest pastures would decrease an estimated 30%. Jobs and income attributed to the federal mineral estate would decrease by an estimated 116 jobs and $3,760,000 in income. Alternative 4 would produce an increase of 7 jobs and $178,000 in income linked to timber management. It would be best in achieving the principal management goals of the conservation, wildlife, and American Indian user / interest segments. It would be worst in achieving the principal management goals of the agriculture, and oil, gas, minerals user / interest segments. Because of the active restoration emphasis, it would be second best in achieving the principal management goals of the wood products segment.

Alternative 5 would rank fifth of the alternatives in producing 418 fewer direct, indirect, and induced jobs and $6.4 million less in direct, indirect, and induced income, a decrease of .20%in jobs and .09% in income in the Northern Great Plains Economic Impact Areas. Range-fed livestock grazing jobs attributed to the national grassland and forest pastures would decrease an estimated 20%. Jobs and income attributed to the federal mineral estate would decrease by an estimated 55 jobs and $1,810,000 in income. Alternative 5 would produce an increase of 5 jobs and $136,000 in income linked to timber management. It would be best in achieving the principal management goals of the recreation user / interest segments; however, Alternatives DEIS 3, FEIS 3, and 4 would offer different mixes of motorized and nonmotorized recreation opportunities and favor particular recreation activities.

The impacts on income and employment could vary, possibly up to 20 percent, depending on grazing systems and intensities that may be used to meet desired conditions and market conditions for cattle, oil, gas, and coal.

Estimated total jobs linked to livestock grazing and oil and gas production are shown in the following figures.

**Figure 2-1: Total jobs attributable to livestock grazing on NFS lands and pastures.**

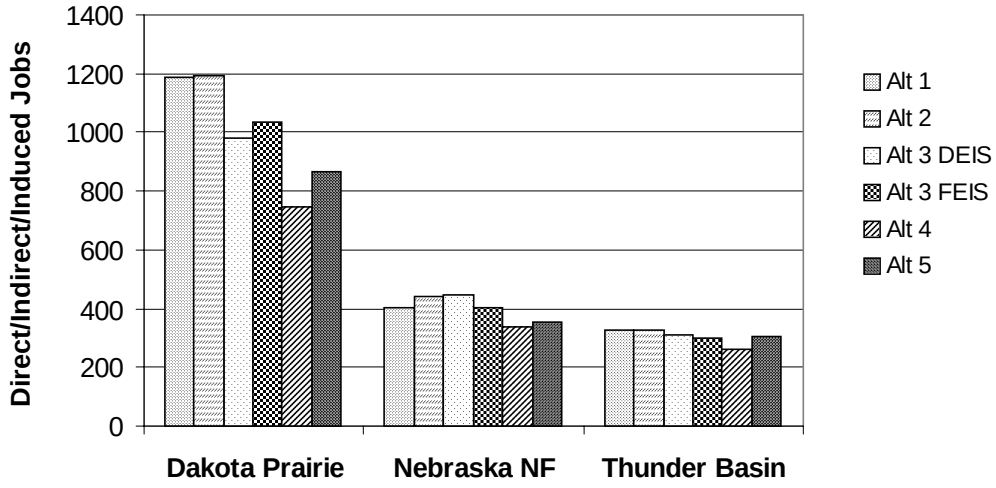
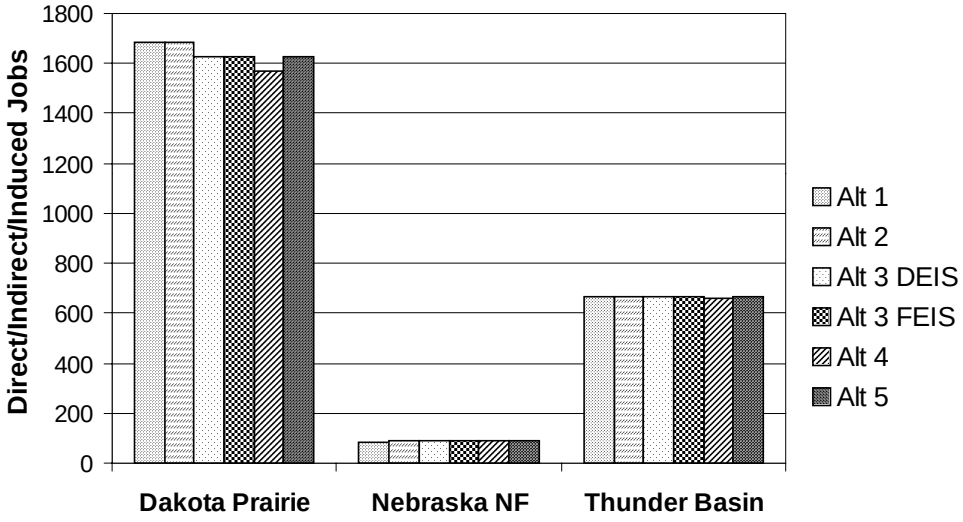



**Figure 2-2: Total jobs attributable to oil/gas production on NFS lands.**




# Topic: Livestock Grazing

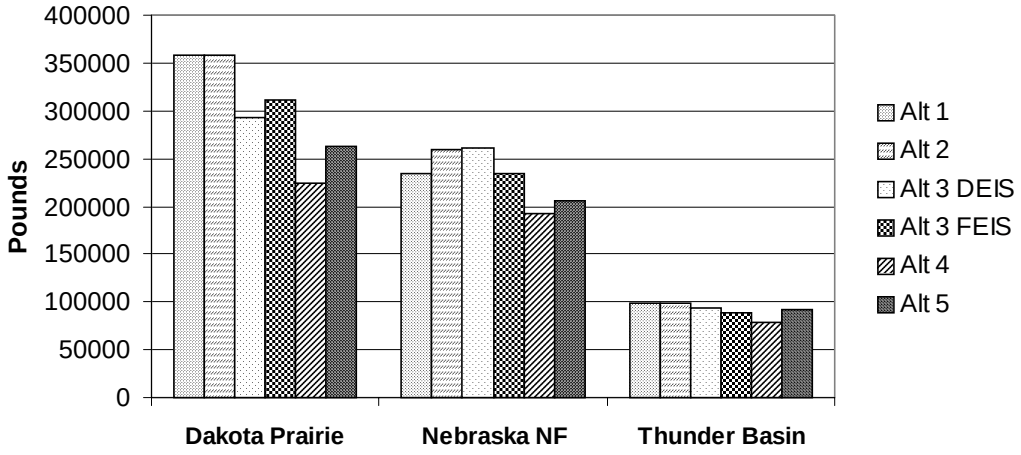
An analysis was completed on all planning units to determine what lands are physically and biologically capable of supporting livestock grazing. For example, areas containing slopes greater than 40 percent or not producing sufficient forage are not considered physically capable. A summary of the percent of each unit found capable of supporting livestock grazing is shown in the following table:

**Table 2-4. Capable Rangeland for Livestock Grazing.**

| Unit | Total Acres | Capable Rangeland Acres and Percent of Total Acres |
|---|---|---|
| Dakota Prairie Grasslands | 1,258,260 | 1,113,500 (88%) |
| Nebraska National Forest Units | 1,056,400 | 973,200 (92%) |
| Thunder Basin National Grassland | 552,490 | 532,100 (96%) |

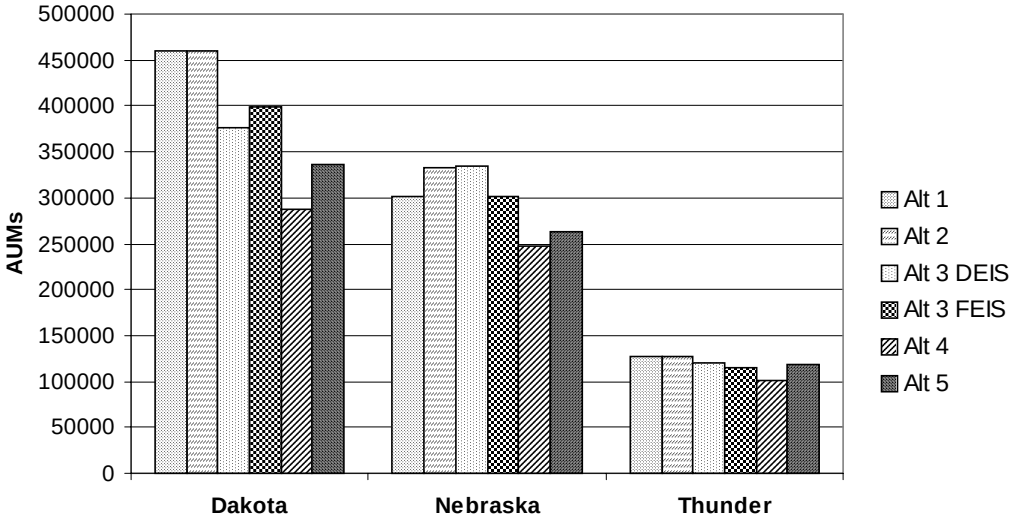
Next, a suitability analysis was conducted to determine the areas where grazing is appropriate, which included such factors as environmental, social and economic consequences and trade-offs. Regardless of the alternative, most areas found capable of supporting livestock grazing were also considered suitable. The alternatives do differ in the amount of estimated forage produced on the suitable acres that would be available to livestock. Because of its commodity emphasis, Alternative 2 would make the most estimated forage available to livestock, followed by Alternatives 1, DEIS 3, FEIS 3, 5, and 4, respectively. Alternative DEIS 3, FEIS 3, 4, and 5 vary in the amount of estimated forage available to livestock because fo other resource objectives such as wildlife, recreation, and ecological restoration. The following figure displays the differences in the alternatives.

**Figure 2-3: Estimated forage available to livestock.**




Animal units months (AUMs) of livestock grazing that may be expected with the alternatives are shown in the following figure. These are estimates and are used only for an effects analysis and would not be used to set stocking levels. Estimated AUMS for Alternative 1 may differ from actual use based on the implementation of the current Management Plans. It is expected that Alternative 2 would produce the most animal units months of grazing, followed by Alternatives 1, DEIS 3, 5, FEIS 3, and 4.

**Figure 2-4: Estimated animal unit months of livestock grazing.**




Other factors that could affect livestock grazing include limits on grazing developments. Alternatives 1 and 2 would have no limits on water developments and would allow the highest density of water developments to support livestock grazing. Alternative FEIS 3 for the Dakota Prairie Grasslands would also have no limits on water developments. Alternative 3 DEIS for the Dakota Prairie Grasslands would allow the next highest density of water developments, followed by Alternatives 4 and 5. For the Nebraska National Forest units, Alternative DEIS 3, FEIS 3, and 5 would allow for the next highest density, followed by Alternative 4. For Thunder Basin National Grassland, Alternative 5 would allow slightly higher densities than Alternatives DEIS 3 and 5. In Alternative FEIS 3, water development density would vary by Management Area.

The ability to manipulate pasture size would not be limited in Alternative 1 or 2. Alternatives DEIS 3, FEIS 3, 4, and 5 would maintain or increase pasture size. Alternative 4 would require that 5 percent of suitable rangeland acres be available for bison grazing only.

# Topic: Oil and Gas Leasing

A decision regarding oil and gas leasing is actually two decisions; first, what lands should be made available for leasing; and second, authorization of specific lands for leasing with appropriate stipulations applied. Previous decisions concerning leasing must be considered and incorporated in the management plan revision process. Existing leasing decisions have been reviewed for new information and changed circumstances. Where appropriate, decisions for the Revised Management Plans may change existing availability and leasing decisions. The decisions to be made based on this analysis are limited to areas with previous leasing decisions.

The DEIS alternatives vary in the acres of land allocated to management areas, which can affect acres available for oil and gas leasing to some degree. In total, Alternative 2 would make the most acres available for oil and gas leasing. The acres considered for leasing decisions include the entire federal mineral estate, whether or not the federal government owns the surface.

For the Dakota Prairie Grasslands, Alternatives 1, 2, DEIS 3, 4, and 5 would make about 955,000 acres available for leasing; while, Alternative FEIS 3 would make about 934,000 acres available. The specific lands leasing acreage varies by alternative and is detailed in the Table 2-8 at the end of this chapter. For the Dakota Prairie grasslands, it is important to note that Alternative FEIS 3 defers the specific lands decision on 26,200 acres of big horn sheep habitat until there is development on adjacent spacing units.

For the Nebraska National Forest units and Thunder Basin National Grassland, all alternatives contain the same number of acres available for leasing. The Nebraska National Forest units contain about 247,000 acres that are available for leasing. Thunder Basin National Grassland contains about 1.16 million acres that are available for leasing. The specific lands leasing acreage varies by alternative and is detailed in the Table 2-10, for the Nebraska National Forest and Table 2-12 for the Thunder Basin National Grassland. For the Thunder Basin National Grassland it is important to note that Alternative FEIS 3 defers the specific lands decision on 247,000 acres with coal bed methane potential until after completion of the Powder River Basin Oil and Gas EIS, that will evaluate the effects of coal bed methane development. The Bureau of Land Management is the lead agency for the Powder River Basin Oil and Gas EIS, and the Forest Service is a cooperating agency. The Powder River Basin Oil and Gas EIS is scheduled for completion in April 2002.

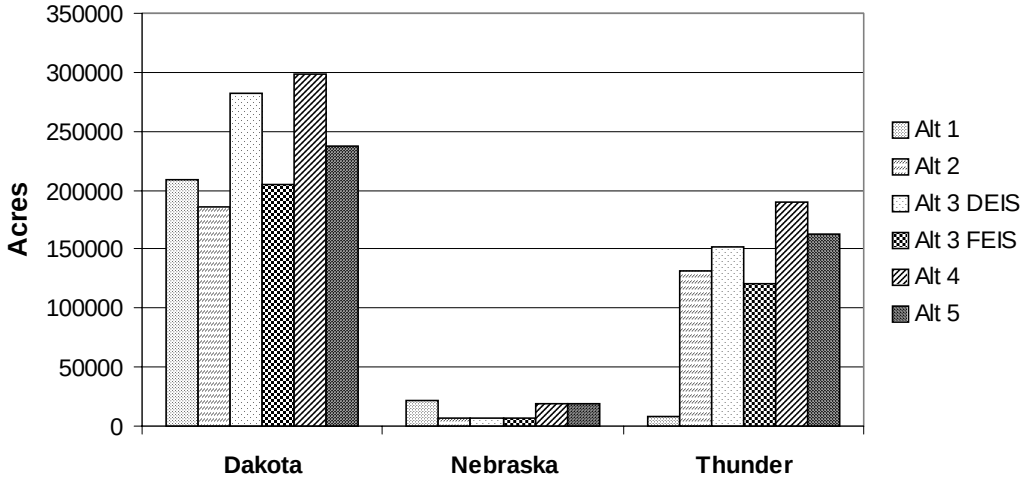
All leases are subject to Standard Lease Terms. Standard lease terms require compliance with laws and regulations. Generally, Standard Lease Terms allow year-round occupancy of the leased lands, with some limited exceptions for timing of drilling operations and locating well sites.

Certain resource concerns and conditions may put limits on exploration and development beyond the limitations allowed in the Standard Lease Terms. These additional limits are defined in special leasing stipulations, which change standard lease terms and include timing provisions for operations (Timing Limitation stipulations), spatial provisions for operations (Controlled Surface Use stipulations), and prohibitions on occupancy (No Surface Occupancy stipulations).

Each of the three standard categories of lease stipulations is designed for specific types of limitations on activities that could occur on a lease. Timing Limitation stipulations are temporal in nature and are most commonly used to reduce effects of drilling or development activities on wildlife during certain times of the year. Controlled Surface Use stipulations are spatial in nature and are used generally to avoid potential adverse effects to surface resources such as scenery, sensitive soils, steep slopes, water, fossils, and wildlife habitat. The most restrictive stipulation is No Surface Occupancy, which prohibits occupation of the surface for exploration or development of oil and gas resources. Subsurface minerals may be developed on leases with No Surface Occupancy stipulations by the use of directional or horizontal drilling, if such drilling is technologically and economically feasible. When they can be used, they generally increase both drilling and production costs.

The following figure displays the acres with No Surface Occupancy stipulations by alternative. The acreage in Table 2-5 represents the alternative applied uniformly across the grassland.

**Figure 2-5: No surface occupancy for oil/gas development**




Because valid existing rights will be honored in all alternatives, existing lease rights must be considered when looking at No Surface Occupancy areas.

No Surface Occupancy stipulations were applied to maintain landscape and habitat conditions, such as backcountry recreation areas and big horn sheep habitat. Alternative 4 would contain the most available leasing acres with No Surface Occupancy stipulations. For the Dakota Prairie Grasslands, Alternatives DEIS 3 and 5 would follow closely behind Alternative 4. Alternative 2 would have fewest acres with No Surface Occupancy stipulations.

For Nebraska National Forest units, Alternative 4 would contain the most available leasing acres with No Surface Occupancy stipulations followed by Alternatives 5 and 1. Alternatives 2, DEIS 3 and FEIS 3 have approximately the same acres with No Surface Occupancy stipulations.

For Thunder Basin National Grassland, Alternative 4 would contain the most available leasing acres with No Surface Occupancy stipulations followed by Alternatives 5 and DEIS 3. Alternative 1 would have the least area with No Surface Occupancy stipulations.

# Topic: Plant and Animal Damage Control

## *Noxious Weed Control*

Alternatives 2 and 4 would be expected to do the most in treating noxious and undesirable plant species by reducing affected acres by 15 percent within 15 years. Alternatives 1 and 2 would pose more risk of spreading noxious and undesirable plant species because of higher livestock grazing levels and more motorized access than the other alternatives. Alternative 4 would pose the least risk of spread. Alternatives 1, 3, and 5 would contain current acres of noxious weeds and undesirable plants or limit their rate of spread.

## *Prairie Dog Damage Control*

Current poisoning levels to control prairie dog damage would be expected to continue under Alternative 1. Poisoning to control prairie dog damage under Alternative 2 would be similar to or more than levels under Alternative 1. Poisoning levels under Alternatives DEIS 3, FEIS 3 and 4 would be less than expected under Alternatives 1 and 2 over the next 10 years; however, poisoning levels beyond 10 years could exceed levels expected under Alternatives 1 and 2 as more prairie dog colonies on National Grasslands and Forests expand towards adjacent landownership. No poisoning would occur under Alternative 4. Non-chemical control methods would be used under Alternatives DEIS 3, FEIS 3, 4, and 5 to slow prairie dog colony expansion as needed.

## *Predator Damage Control*

Under a Memorandum of Understanding, the Agricultural Plant Health Inspection Service (APHIS) has primary responsibility for predator damage control on most National Forest System lands. This includes responsibilities for ensuring compliance with the National Environmental Policy Act and the Endangered Species Act. To date, APHIS has completed and issued a Record of Decision and Final Environmental Impact Statement for their national animal damage control program and have also issued several statewide Decision Notices and Environmental Assessments for predator damage control. Forest Service responsibilities in predator damage control on National Forest System lands are primarily limited to ensuring that APHIS programs comply with direction in Land and Resource Management Plans for visitor and user safety, mitigation for sensitive wildlife species, and pesticide use. Because the APHIS documents evaluate a range of alternatives for predator damage control, direction for predator damage control in this planning effort does not vary by alternative.

## *Grasshopper Damage Control*

A 1987 Memorandum of Understanding between the Forest Service and APHIS identifies each agency's responsibilities regarding grasshopper damage control. APHIS is the lead agency for completion of the programmatic environmental analyses in accordance with the National Environmental Policy Act and is also responsible for consultation with the U.S. Fish and Wildlife Service on the effects of insecticides on plant and animal species that are protected under the Endangered Species Act. Forest Service officials are responsible for approval of pesticides for use on National Forest System lands and for ensuring compliance and compatibility with direction in Land and Resource Management Plans. This includes considering the effects of insecticides on plant and animal species identified as sensitive by the Forest Service. Resource protection alternatives are evaluated and described in environmental

analyses and decision documents issued by APHIS. Therefore, management direction for grasshopper damage does not vary by alternative.

# Topic: Rangeland and Forest Health

Rangeland and forest health is defined as the degree to which the integrity of the soil and ecological processes of rangeland and forest ecosystems are sustained. The diversity and abundance of native plants and animals are also addressed in this topic.

## *Plants*

Vegetation on the planning units has been classified by whether the major species on a site are grass, shrubs or trees. Vegetation composition and structure on the planning units will continue to be influenced by natural succession and disturbance processes that determined them. However, the alternatives differ in the levels of human-caused disturbances, such as logging and grazing.

Desired conditions for the structure and composition of vegetation have been identified by alternative, based on the theme of the alternative. Structure is described in terms of low, moderate and high for suitable livestock grazing acres. The desired vegetation structure is considered the grass and shrubs left after the grazing and growing season. The following figures display the midpoints of acceptable ranges in the percentage of low, moderate, and high structure desired for each alternative.

**Figure 2-6: Desired grass/shrub structure - Dakota Prairie Grasslands.**

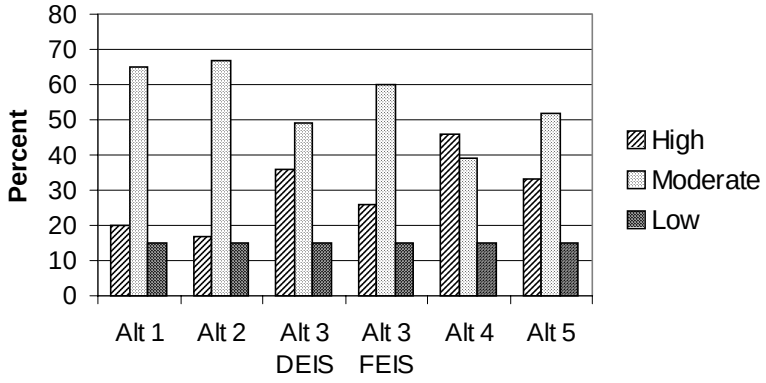


**Figure 2-7: Desired grass/shrub structure - Nebraska National Forest.**

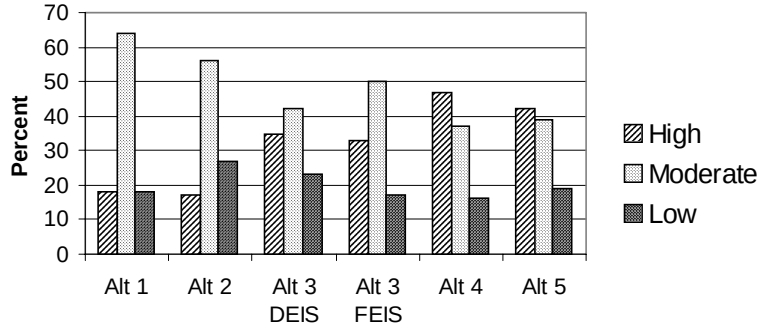
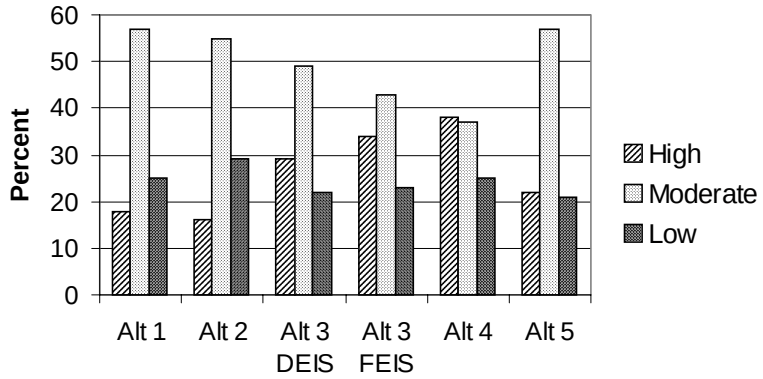



**Figure 2-8: Desired grass/shrub structure -Thunder Basin National Grassland.**



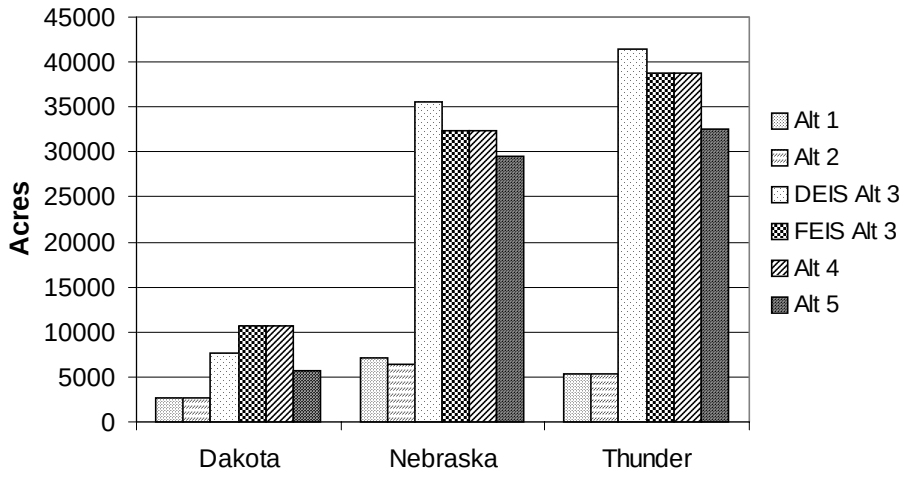

Alternative 4 would provide the most acres of high grassland structure in all units. On the Dakota Prairie Grasslands, Alternative DEIS 3 would provide the second most high grassland structure, followed by Alternatives 5 and FEIS 3. On the Nebraska National Forest units, Alternative 5 would be second in providing high grassland structure over Alternatives DEIS 3, and FEIS 3. On the Thunder Basin National Grassland Alternative FEIS 3 would provide the second most high grassland structure followed by Alternatives DEIS 3 and 5. Shifts in structure can change plant composition and seral stages of plant communities.

The effects of each alternative on plant species that are at risk of range-wide, regional or more local imperilment were also evaluated. Alternatives 2 through 5 provide for restoration efforts for blowout penstemon and western prairie fringed orchid, both species listed and protected under the Endangered Species Act. These two species are imperiled range-wide. Concerns over the viability of numerous other plant species at the individual National Grassland and Forest level has also been identified. The Forest Service identifies many of these species as sensitive. Additional conservation measures that have been recently identified for these plant species will be considered for inclusion in the final management plans.

## *Animals*

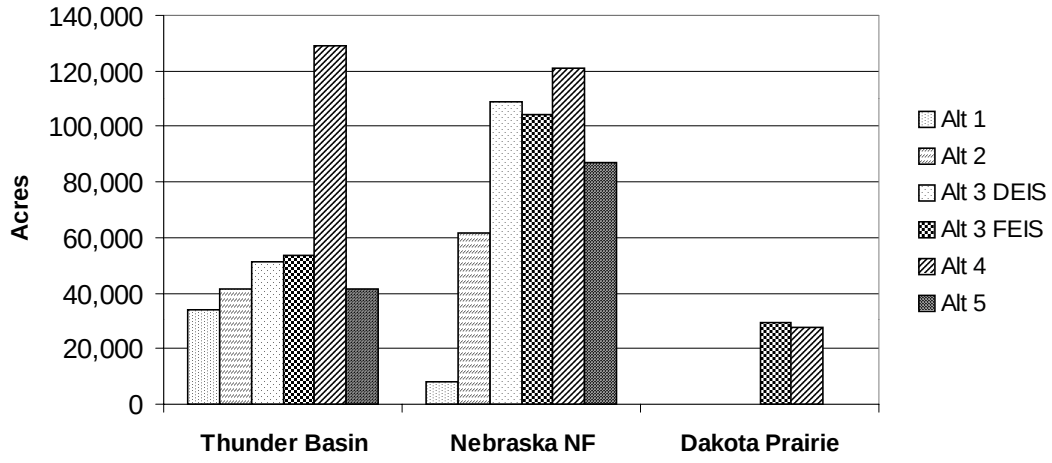
The effects of each alternative on species that are at risk of range-wide, regional or more local imperilment have been evaluated. In many cases, conservation measures have been incorporated into Alternatives 2 through 5 to reduce possible negative effects to individual species and to enhance the probability of maintaining viable populations of these species. Additional conservation measures for several other species were recently identified and will be considered for inclusion in the final management plans.

**Figure 2-9: Estimated acres of active prairie dog colonies predicted in 10 years.**




Considerable public interest has been expressed in the management of black-tailed prairie dogs and several wildlife species that are commonly found on prairie dog colonies. Black-tailed prairie dogs and several associated species including the black-footed ferret and burrowing owl are considered imperiled species. Prairie dogs were once one of the primary herbivores in this region and added considerably to the diversity of plant and animal life that occurred on grasslands. Although much reduced today, prairie dog populations still occur on several of the National Grasslands and Forests. Proposed direction for the management of these prairie dog populations varies by alternative, with the largest increase in prairie dog populations occurring under Alternative DEIS 3 followed by Alternatives FEIS 3, 5, and then 4. The smallest prairie dog colony acreages would occur under Alternatives 1 and 2.

**Figure 2-10: Potential black-footed ferret reintroduction habitat.**




The black-footed ferret, one of the most endangered mammals in North America, is directly dependent on black-tailed prairie dogs. Reintroduction of this endangered species is already underway on the Northern Great Plains planning units, with a successful program on the Wall Ranger District of the Buffalo Gap National Grassland. A suitability analysis for additional black-footed ferret reintroduction sites on the National Grasslands was conducted as part of the revision process. The figure above shows the number of areas and acres identified as potential reintroduction habitat by alternative.

Alternative 4 would provide the most potential black-footed ferret reintroduction areas and acres. By administrative unit, Dakota Prairie Grasslands would offer one reintroduction site in Alternatives FEIS 3, and 4. Nebraska National Forest would offer one reintroduction site in Alternatives 1 and 2, and two reintroduction sites in Alternatives DEIS 3, FEIS 3, 4, and 5. Thunder Basin National Grassland would provide one reintroduction in all alternatives; however, the acres of that site vary between alternatives, with Alternative 4 providing the most acres, followed by Alternatives FEIS 3, DEIS 3, 5, 2 and 1.

Substantial conservation efforts to help restore secure populations of other imperiled species on the National Grasslands and Forests are also proposed under Alternatives DEIS 3, FEIS 3, 4 and 5. Some of the species that these conservation measures will benefit include bighorn sheep, greater prairie chicken, mountain plover, sage grouse, Dakota skipper and the regal fritillary butterfly. Extending the same or similar direction for some of these species to Alternative 2 will be considered for inclusion in the final management plans.

Management indicator species were also selected for some of the major biological communities in the planning area. These species are selected because changes in their populations are believed to indicate the effects of management activities on the biological communities that they represent. Black-tailed prairie dogs were selected to represent the biological community associated with prairie dog colonies and low structure grasslands. Plains sharp-tailed grouse and greater prairie chickens were selected for high structure grasslands. Sage grouse were

identified as the management indicator species for high structure sagebrush with diverse herbaceous understories. Estimates of habitat capability and current suitability for each indicator species are provided in Chapter 3.

## Topic: Recreation and Travel Management

Alternative 5 would show the largest increase in the capacity to accommodate developed recreation activities because it would provide the most developed recreation facilities (campgrounds, information/interpretive materials, trails, etc.) Alternatives DEIS 3, and FEIS 3 would provide the second highest capacity. Alternatives 2 and 4 would have the same developed recreation capacities as Alternative 1.

As part of the planning process, Scenic Integrity Levels were identified for the planning units by alternative. Alternative 5 would have the most acres with moderate or high Scenic Integrity Levels, followed by Alternatives DEIS 3, 4, FEIS 3, 1, and 2, respectively.

Alternatives DEIS 3, FEIS 3, 4, and 5 would result in more diverse landscapes than Alternatives 1 and 2. Alternative 4 would provide the most variety of recreation settings because of its ecosystem restoration emphasis and many acres of special area designations, followed by Alternatives FEIS 3, DEIS 3, 5, 2 and 1. All alternatives require installation of easier-opening fence gates and more fence openings, resulting in easier recreation access. For most planning units, Alternatives DEIS 3, FEIS 3, 4, and 5 would increase the size of fenced pastures, which could reduce the number of fences encountered. Limits on facilities to support livestock grazing included under Alternatives DEIS 3, FEIS 3, 4 and 5 could promote a sense of vastness and provide a more natural-appearing landscape.

Alternatives DEIS 3, FEIS 3, 4, 5 are similar in the number of acres offering semi-primitive recreation opportunities, with Alternative 4 offering the most, followed by Alternatives 5 DEIS 3, and FEIS 3, respectively. However, the alternatives do differ between units in the amount of semi-primitive nonmotorized recreation settings. On the Dakota Prairie National Grassland, Alternative 4 offers the most semi-primitive nonmotorized recreation settings, followed by Alternatives 5, DEIS 3, FEIS 3, 1 and 2. On the Nebraska National Forest Units, Alternative 4 offers the most semi-primitive settings, followed by Alternatives 5, FEIS 3, DEIS 3, 2 and 1. On the Thunder Basin National Grassland, Alternative 4 offers the most semi-primitive nonmotorized settings, followed by Alternatives 5, DEIS 3, FEIS 3, 2 and 1.

Alternative 5 would provide more fishing opportunities than the other alternatives because of the construction and renovation of more ponds. Alternatives 2, DEIS 3, FEIS 3, 4 and 5 would improve deer habitat over existing conditions (Alternative 1). Alternatives DEIS 3, FEIS 3, 4, and 5 would improve upland bird habitat over Alternatives 1 and 2, with Alternative 4 improving upland bird habitat the most of the alternatives. Alternatives FEIS 3 and 4 would have the most acres of active prairie dog colonies in 10 years, followed by Alternatives 5 and DEIS 3. However, Alternatives DEIS 3, FEIS 3 and 4 could reduce opportunities for prairie dog recreational shooting because of possible seasonal and yearlong restrictions.

The following figures show the recreational opportunity spectrum (ROS) by alternative for the three units.

**Figure 2-11: Dakota Prairie ROS by alternative.**

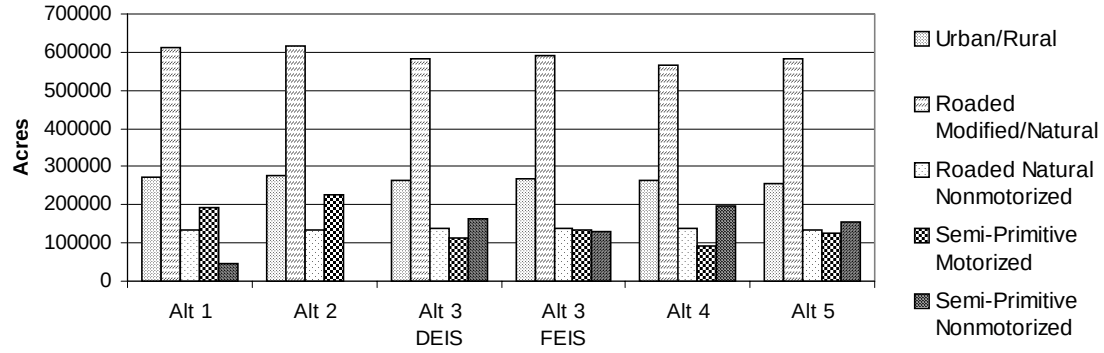



**Figure 2-12: Nebraska National Forest ROS by alternative.**

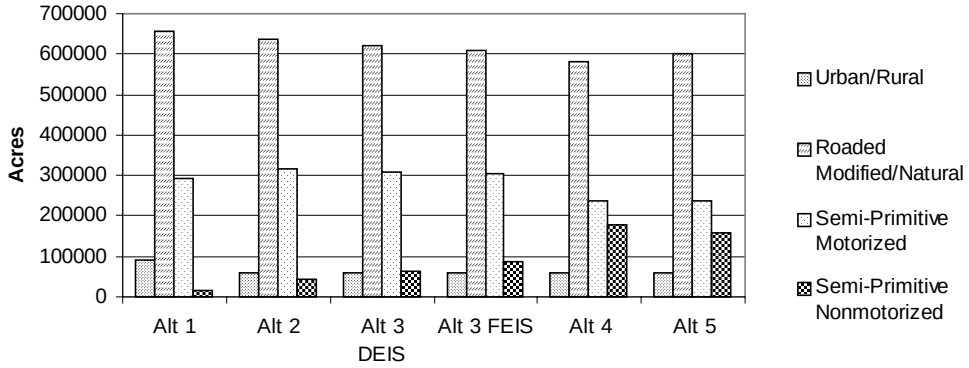
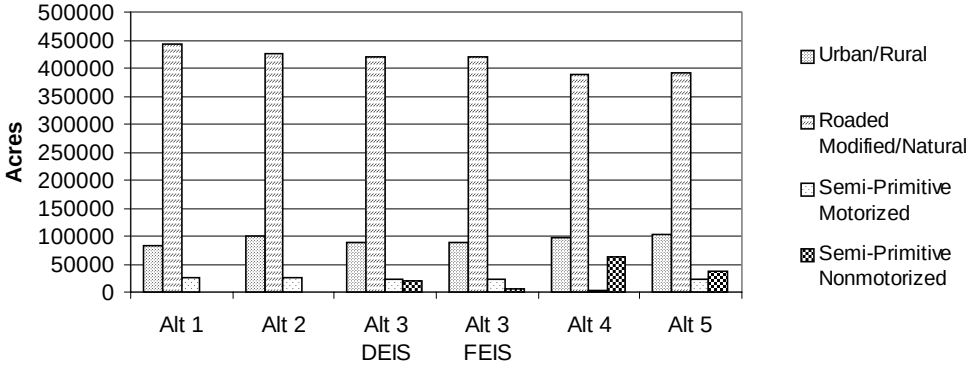



**Figure 2-13: Thunder Basin ROS by alternative.**



Alternatives 1 and 2 would continue current travel management direction, which allows motorized travel in most areas on the planning units (see following figures). Alternatives DEIS 3, FEIS 3, 4, and 5 would restrict motorized travel to designated routes, which could reduce access for some recreation-related activities, such as driving for pleasure, rock collecting, game retrieval. (The units would have up to five years after implementation of the land and resource management plan to complete travel management plans (including public involvement) to designate motorized travelways).

A few areas under Alternatives DEIS 3, FEIS 3, 4, and 5 would allow off-road travel opportunities. Overall, Alternative 5 would have the most miles of designated motorized travelways, followed closely by Alternative FEIS 3, and DEIS 3. Alternative 4 would have the most acres where no motorized use is allowed, which would benefit recreation users seeking solitude and more primitive experiences.

**Figure 2-14: Travel management by alternative - Dakota Prairie Grassland**

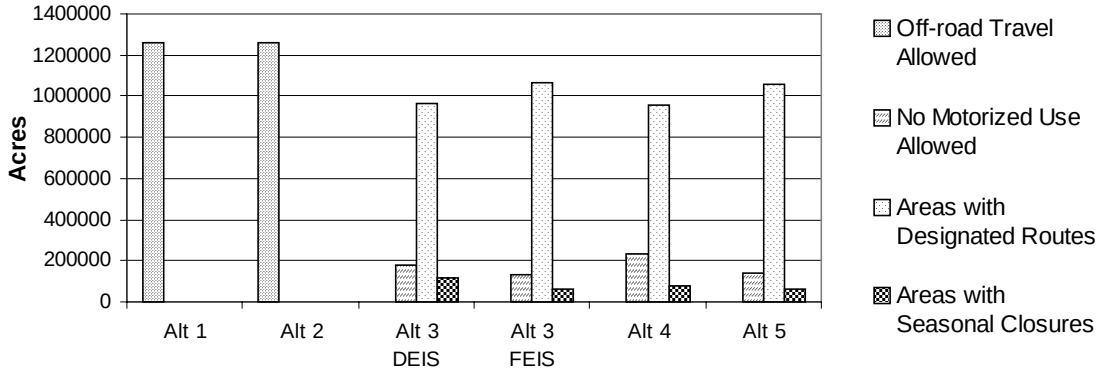



**Figure 2-15: Travel management by alternative - Nebraska National Forest.**

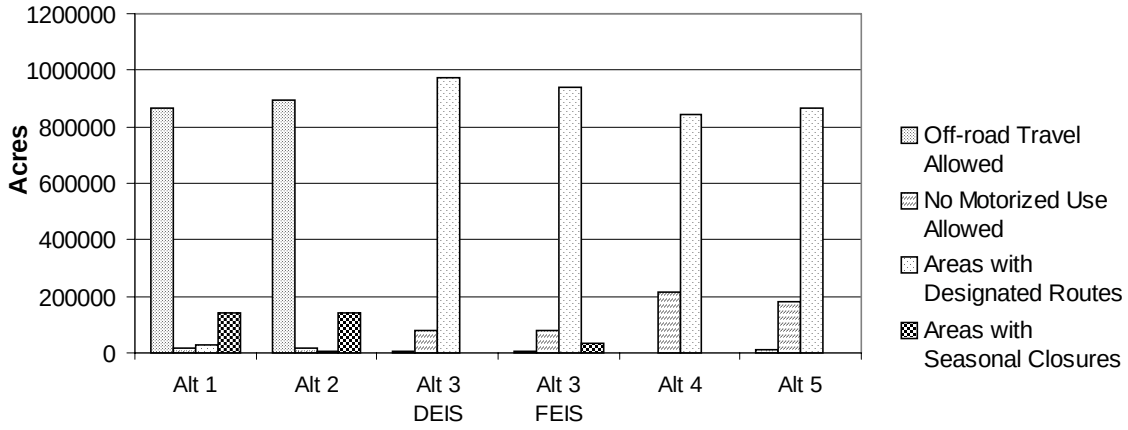
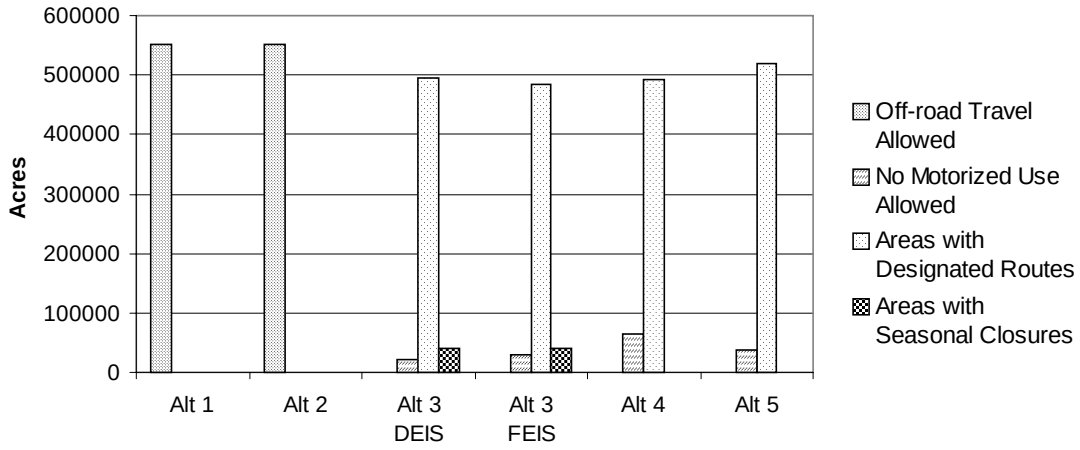


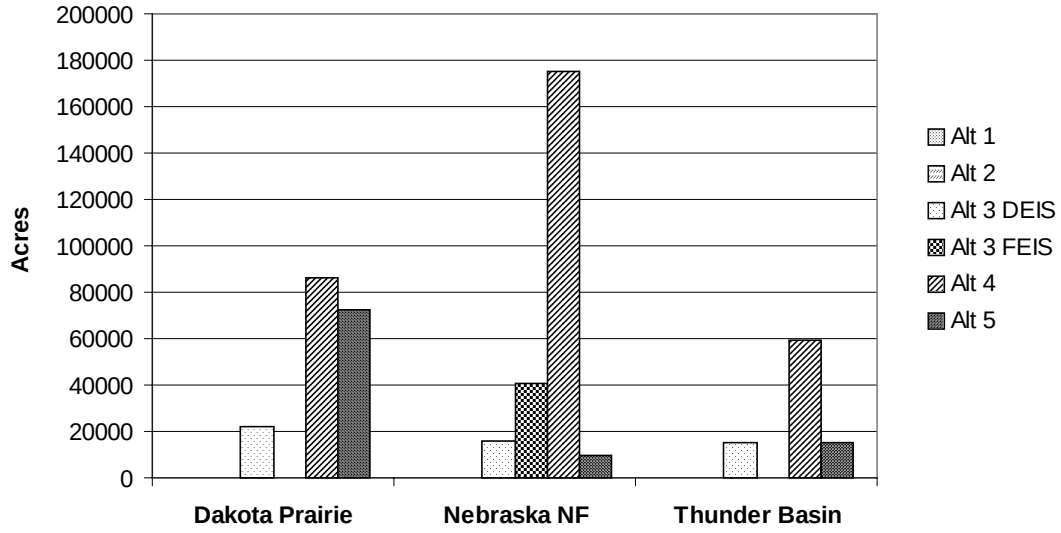
**Figure 2-16: Travel management by alternative - Thunder Basin National Grassland.**




# Topic: Special Area Designations

Alternative 4 would allocate more acres to Research Natural Areas, Special Interest Areas, and recommended Wilderness than the other alternatives (about 371,600 acres compared to 170,100 acres in Alternative 5, 156,400 acres in Alternative DEIS 3, 129,030 acres in Alternative FEIS 3, 13,300 acres in Alternative 2, and 1,490 Acres in alternative 1).

**Figure 2-17: Acres recommneded for Wilderness.**



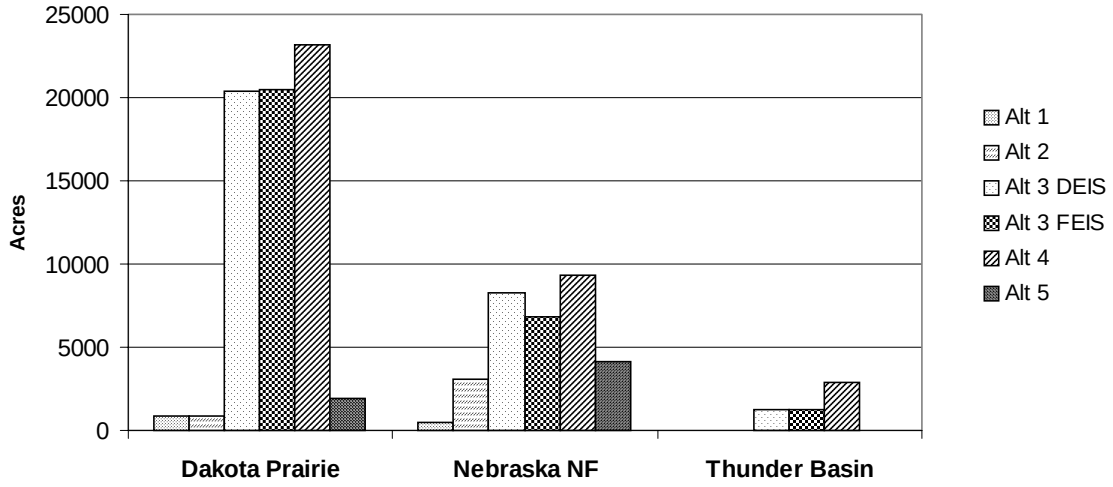
Alternative 4 would recommend the most acres for Wilderness, with 25 areas containing about 320,200 acres. Alternative 5 would recommend the second most acres for Wilderness, with 11 areas containing about 97,600 acres. Alternative DEIS 3 would recommend 5 areas for Wilderness containing about 53,000 acres. Alternative FEIS 3 would recommend 2 areas for Wilderness containing about 40,400 acres, and designate 41,500 acres as suitable for wilderness. Alternatives 1 and 2 would not recommend any additional areas or acres for Wilderness.

Alternative 5 would recommend slightly more river miles (about 126 miles) on National Forest System lands as additions to the Wild and Scenic River system than Alternative 4 (about 117 miles). Alternatives 1, 2, and DEIS 3, and FEIS 3 would not recommend any river miles for federal designation on National Forest System lands.

For the National Park Service portion of the Little Missouri River, Alternative 4 would recommend the most miles (about 27 miles) for federal designation, followed by Alternatives DEIS 3 and 5 (about 22 miles) and Alternative FEIS 3 (about 21 miles). Alternatives 1 and 2 would not propose any river miles for federal designation. Alternatives DEIS 3, FEIS 3 and 4 would propose that nearly 15 miles be designated as "wild," the most restrictive designation. Alternative 5 would propose that all 22 miles be designated as "scenic," a less restrictive designation than "wild."

Alternative 4 would establish the most Research Natural Areas, with 26 additional Research Natural Areas (about 35,040 acres). Alternative DEIS 3 would establish the second most, with 20 additional Research Natural Areas (about 29,920 acres). Alternative FEIS 3 would establish the next most, with 19 additional Research Natural Areas (about 28,510 acres). Alternative 5 would establish 11 additional Research Natural Areas (about 6,020 acres). Alternative 2 would establish 6 additional Research Natural Areas (about 3,930 acres). Alternative 1 would establish 4 additional Research Natural Areas (about 1,420 acres).

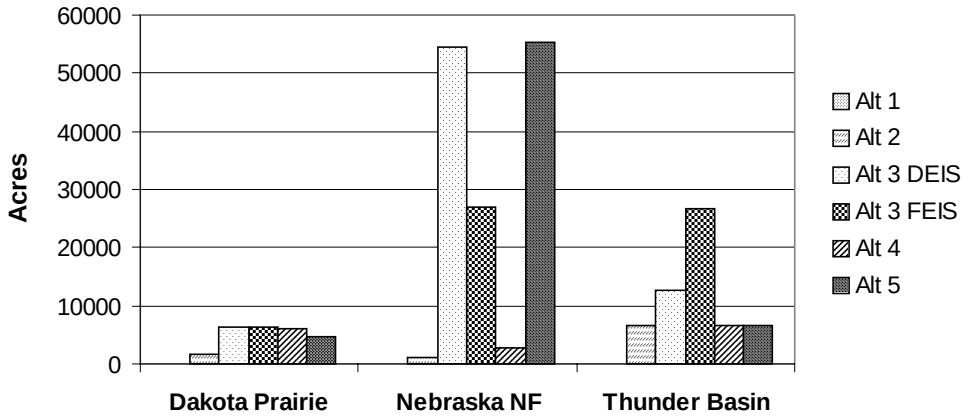
**Figure 2-18: Research Natural Areas.**




Alternative FEIS 3 would include the most Special Interest Areas, with 38 Special Interest Areas (about 73,400 acres). Alternative 5 would include the second most, with 34 Special Interest Areas (about 66,400 acres). Alternative 4 would include 29 Special Interest Areas (about 15,300 acres). Alternative DEIS 3 would include the next most, with 38 Special Interest Areas (about

73,400 acres). Alternative 2 would include 14 Special Interest Areas (about 9,400 acres). Alternative 1 would establish 2 Special Interest Areas (about 70 acres).

**Figure 2-19: Special Interest Areas.**




# Management Area Allocations by Alternative

Management areas are defined as parts of the grassland or forest that are managed for a particular emphasis. Each management area has a prescription that consists of a theme, desired conditions, and standards and guidelines that apply to it. Management areas describe where different kinds of resource opportunities are available and where different kinds of management activities occur. The management area prescriptions are grouped into eight major categories, based on a continuum from least evidence of human disturbance to most:

**Table 2-5. Management Area Prescription Categories.**

| Category | Description | Example |
|---|---|---|
| 1 | Natural processes dominate with little human influence. | Wilderness. |
| 2 | Conservation of representative ecological settings, components, unique features. | Research Natural Areas, Special Interest Areas. |
| 3 | Balance of ecological values and human occupancy. | Special wildlife habitats; ecosystem restoration. |
| 4 | Recreation areas. | Scenery, dispersed recreation. |
| 5 | Forested ecosystems providing timber and range products. | General forest and rangelands. |
| 6 | Rangeland management emphasized. | |
| 7 | Residential/forest intermix. | |
| 8 | Utility corridors and mineral developments. | |

The following management areas are used in the alternatives. The alternative maps show the distribution of these management areas across the planning units.

**Table 2-6. Management Area Prescriptions Used in the Alternatives.**

| Management Area | Title |
|---|---|
| 1.1 | Wilderness: Soldier Creek |
| 1.2 | Recommended for Wilderness |
| 1.2a | Suitable for Wilderness |
| 1.31 | Backcountry Recreation Nonmotorized |
| 1.5 | National River System: Wild Rivers Recommended |
| 2.1 | Special Interest Areas |
| 2.2 | Research Natural Areas |
| 2.4 | American Indian Traditional Use Areas |
| 3.4 | National River System: Scenic Rivers Recommended |
| 3.51 | Bighorn Sheep |
| 3.51a | Bighorn Sheep with Non-Federal Mineral Ownership |
| 3.63 | Black-footed Ferret Reintroduction Habitat |
| 3.64 | Special Plant and Wildlife Habitat |
| 3.65 | Rangelands with Diverse Natural-Appearing Landscapes |
| 3.66 | Ecosystem Restoration |
| 3.68 | Big Game Range |
| 4.22 | Scenic Areas, Vistas, Travel Corridors |
| 4.32 | Dispersed Recreation: High Use |
| 4.4 | National River System: Recreation Rivers Recommended |
| 5.12 | General Forest and Rangelands: Range Vegetation Emphasis |
| 5.13 | Forest Products |
| 5.31 | Experimental Forests |
| 6.1 | Rangeland with Broad Resource Emphasis |
| 7.1 | Residential/Forest Emphasis |
| 8.3 | Designated Utility Corridors: Existing and Proposed |
| 8.4 | Mineral Production and Development |
| 8.5 | Nursery |
| 8.6 | Administrative Sites |

Each alternative would allocate the national grassland and forest units under review to management areas. Appendix D describes the emphasis of each management area and lists the applicable standards and guidelines. Although allocations may change from current direction, most commodity uses, such as grazing, and oil and gas development, would continue in balance with desired conditions. The percent of acres allocated to management areas by alternative are shown for each of the administrative units in the following figures. (0nly those management area categories used in that alternative appear in the graph legend.) The figures are followed by tables that display the acres assigned to management areas by alternative:

## *Dakota Prairie Grasslands Management Area Allocations*

**Figure 2-20: Alternative 1 management area allocations, Dakota Prairie Grasslands.**

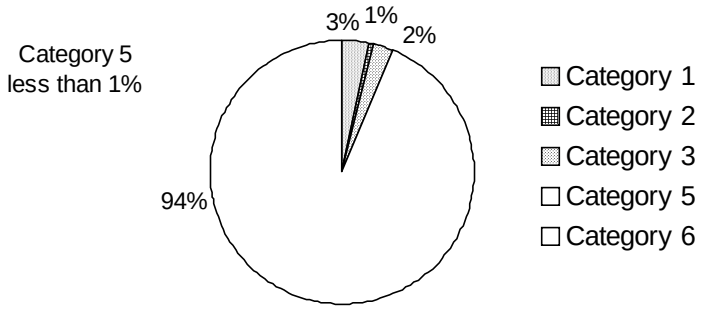



**Figure 2-21. Alternative 2 management area allocations, Dakota Prairie Grasslands.**

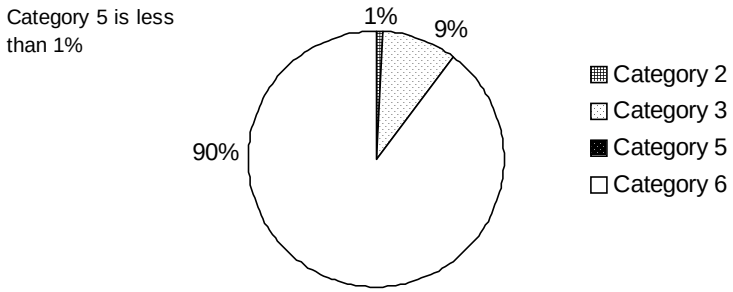



**Figure 2-22. Alternative 3 DEIS management area allocations, Dakota Prairie Grasslands.**

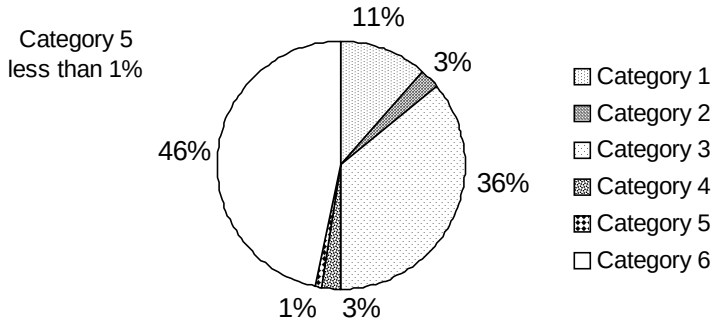


**Figure 2-23. Alternative 3 FEIS management area allocations, Dakota Prairie Grasslands.**

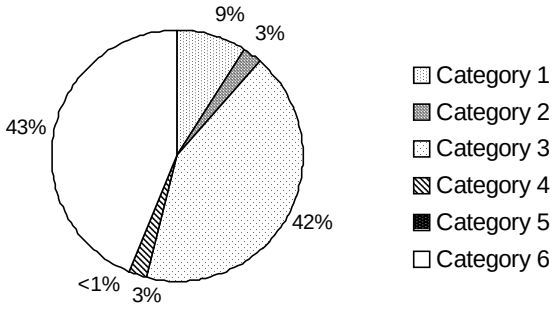



**Figure 2-24. Alternative 4 management area allocations, Dakota Prairie Grasslands.**

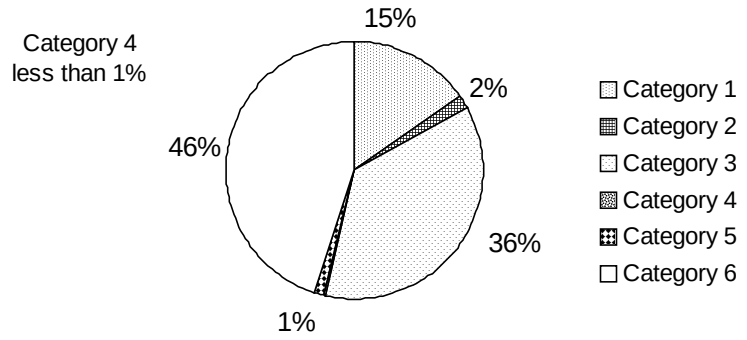
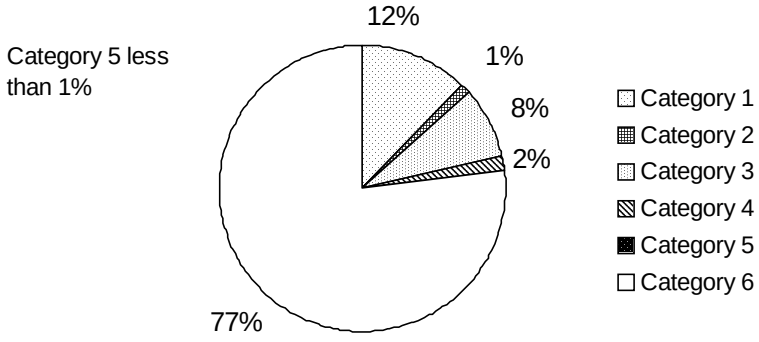



**Figure 2-25. Alternative 5 management area allocations, Dakota Prairie Grasslands.**



## *Nebraska National Forest Units Management Area Allocations*

**Figure 2-26. Alternative 1 management area allocations, Nebraska National Forest.**

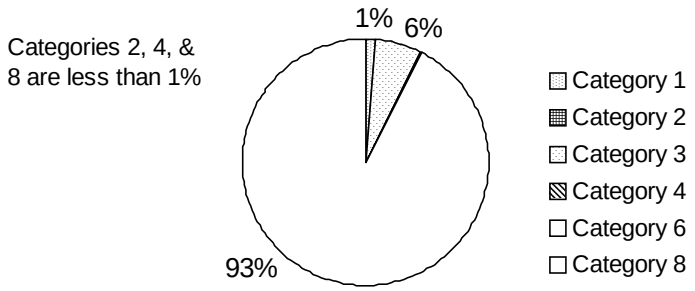



**Figure 2-27. Alternative 2 management area allocations, Nebraska National Forest.**

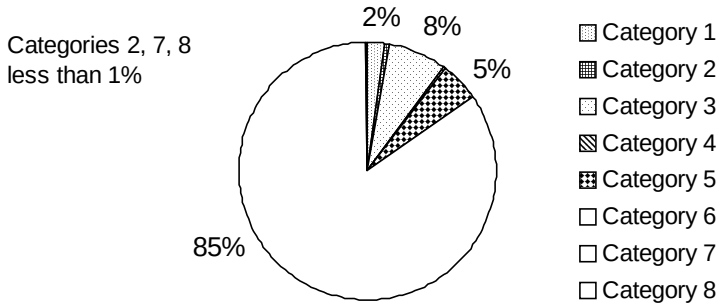



**Figure 2-28. Alternative 3 DEIS management area allocations, Nebraska National Forest.**

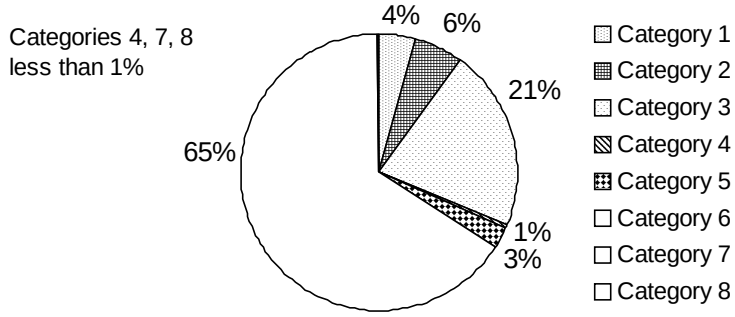


**Figure 2-29. Alternative 3 FEIS management area allocations, Nebraska National Forest.**

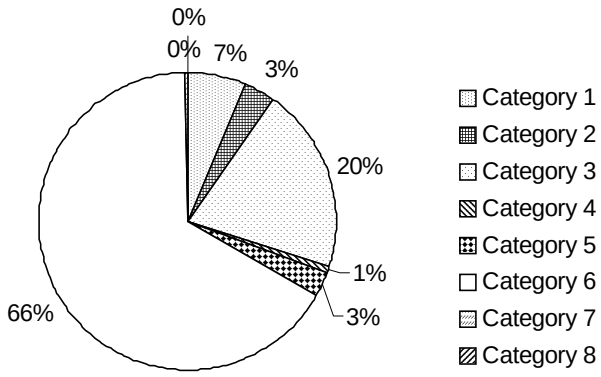



**Figure 2-30. Alternative 4 management area allocations, Nebraska National Forest.**

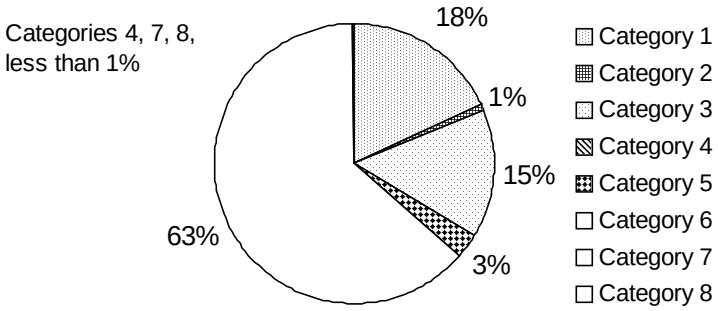
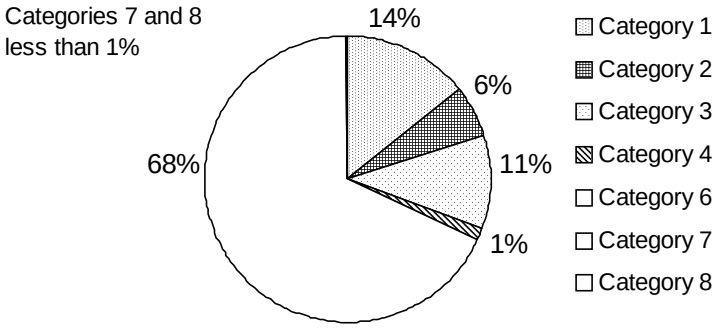



**Figure 2-31. Alternative 5 management area allocations, Nebraska National Forest.**



## *Thunder Basin National Grassland Management Area Allocations*

**Figure 2-32. Alternative 1 management area allocations, Thunder Basin National Grassland.**

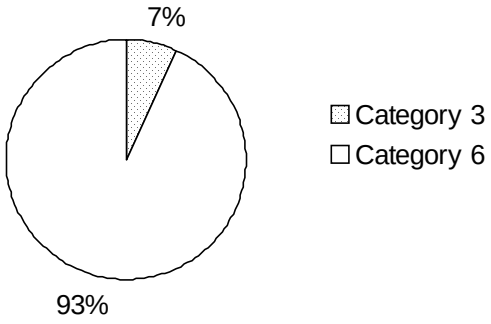



**Figure 2-33. Alternative 2 management area allocations, Thunder Basin National Grassland.**

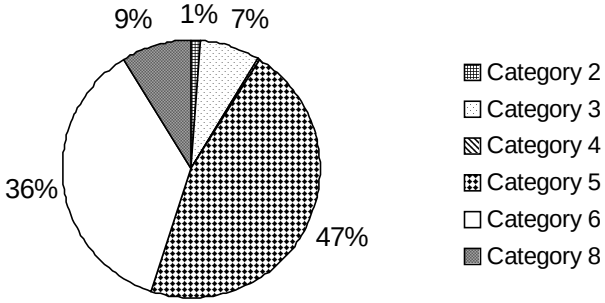



**Figure 2-34. Alternative 3 DEIS management area allocations, Thunder Basin National Grassland.**

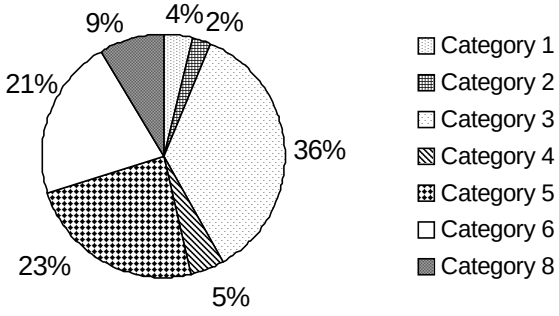


**Figure 2-35. Alternative 3 FEIS management area allocations, Thunder Basin National Grassland.**

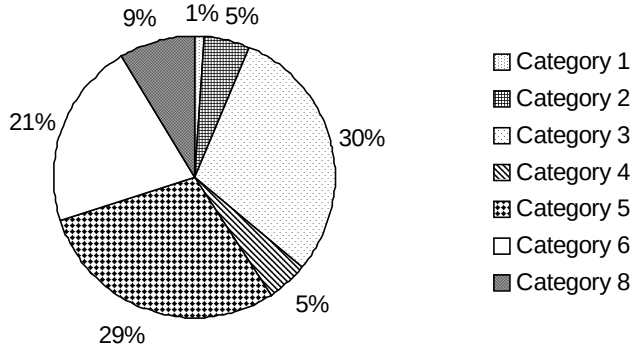



**Figure 2-36. Alternative 5 management area allocations, Thunder Basin National Grassland.**

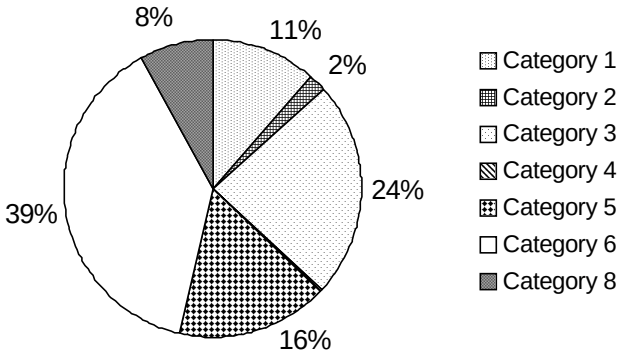
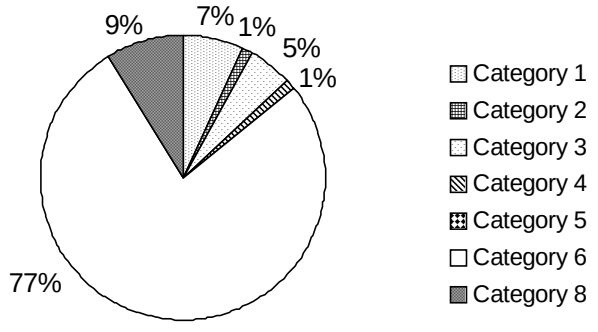



**Figure 2-37. Alternative 6 management area allocations, Thunder Basin National Grassland.**



# Comparison Tables of Differences in Alternatives

The following tables show the differences among the alternatives by management area acres and by major revision topic using the key indicators identified in Chapter 1. The tables are not replacements for the full effects disclosure provided in Chapter 3 of the Draft Environmental Impact Statement. Chapter 3 should also be reviewed for more detailed and technical discussions about this summarized information. Acreages in the tables have been rounded to the nearest 10.

## Dakota Prairie Grasslands

In the following table, acres are rounded to the nearest 10. Acres in parentheses are concurrent management area acres, meaning they overlap other management areas.

**Table 2-7. Management Area Acres by Alternative for Dakota Prairie Grasslands**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Category 1** | | | | | | |
| 1.2 Recommended for Wilderness | 0 | 0 | 22,190 | 0 | 85,940 | 72,670 |
| 1.2a Suitable for Wilderness | 0 | 0 | 0 | 41,520 | | |
| 1.31 Backcountry Recreation Nonmotorized | 42,990 | 0 | 121,950 | 69,050 | 103,840 | 81,490 |
| 1.5 National River System: Wild Rivers Recommended | 0 | 0 | 0 | 0 | 840 | 0 |
| **TOTALS** | **42,990** | **0** | **144,140** | **110,570** | **193,620** | **154,160** |
| **Category 2** | | | | | | |
| 2.1 Special Interest Areas | 0 | 1,770 | 6,390 | 6,420 | 5,930 | 4,640 |
| 2.2 Research Natural Areas | 840 | 840 | 20,030 (380) | 20,120 (380) | 9,040 (14,150) | 1,070 (830) |
| 2.4 American Indian Traditional Use Areas | 6,250 | 6,280 | 6,280 | 6,280 | 6,280 | 6,280 |
| **TOTALS** | **7,170** | **8,890** | **32,710** | **32,820** | **21,250** | **11,990** |
| **Category 3** | | | | | | |
| 3.4 National River System: Scenic Rivers Recommended | 0 | 0 | 0 | 0 | 17,260 (520) | 18,280 (350) |
| 3.51 Bighorn Sheep | 27,940 | 118,490 (350) | 67,210 (51,510) | 19,320 (51,130) | 74,670 (49,600) | 68,710 (50,090) |
| 3.51a Bighorn Sheep – Non Federal Minerals | 0 | 0 | 0 | 35,800 | | |
| 3.63 Black-footed Ferret Reintroduction Habitat | 0 | 0 | 0 | 29,180 | 16,220 (11,690) | 0 |
| 3.64 Special Plant and Wildlife Habitat | 2,730 | 1,010 | 1,010 | 2,270 | 1,010 | 16,400 |
| 3.65 Rangelands with Diverse, Natural- appearing Landscapes | 0 | 0 | 329,300 | 383,120 | 295,350 | 0 |
| 3.66 Ecosystem Restoration: Tall Grass Prairie | 0 | 0 | 53,050 | 63,760 | 55,150 | 0 |
| **TOTALS** | **30,670** | **119,500** | **450,570** | **533,480** | **460,070** | **103,390** |
| **Category 4** | | | | | | |
| 4.22 Scenic Area, Vistas or Travel Corridors | 0 | 0 | 22,450 | 23,570 | 0 | 2,960 |

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| 4.32 Dispersed Recreation: High use | 0 | 0 | 9,550 | 7,990 | 1,710 | 13,880 |
| 4.4 National River System: Recreation Rivers Recommended | 0 | 0 | 0 | 0 | 2,470 (60) | 3,070 |
| **TOTALS** | **0** | **0** | **32,000** | **31,560** | **4,180** | **19,910** |
| **Category 5** | | | | | | |
| 5.12 General Forest and Rangelands: Range Vegetation Emphasis | 0 | 0 | 10,640 | 0 | 12,680 | 0 |
| 5.31a Experimental Forests (Denbigh) | 800 | 800 | 800 | 800 | 800 | 800 |
| 5.31b Experimental Forests (Souris) | 160 | 160 | 160 | 160 | 160 | 160 |
| **TOTALS** | **960** | **960** | **11,600** | **960** | **13,640** | **960** |
| **Category 6** | | | | | | |
| 6.1 Rangeland with Broad Resource Emphasis | 1,176,600 | 1,128,770 | 587,080 | 549,720 | 568,760 | 967,710 |
| **TOTALS** | **1,176,600** | **1,128,770** | **587,080** | **549,720** | **568,760** | **967,710** |

**Table 2-8. Comparison of Alternatives by Major Revision Topic for Dakota Prairie Grasslands**

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Community/Lifestyle Relationships** | | | | | | | |
| Range-fed livestock grazing on NFS & Intermingled lands (Change From Existing Condition) | | 5% | 5% | -13% | -9% | -34% | -24% |
| direct and indirect jobs (number) | 1132 | 1190 | 1191 | 983 | 1033 | 747 | 865 |
| direct and indirect income (millions of 1997 $) | $14.2 | $15.0 | $15.0 | $12.5 | $13.0 | $9.4 | $10.9 |
| Oil / gas activities on NFS lands (Change From Existing Condition) | 0% | 0% | 0% | -3% | -3% | -7% | -3% |
| direct and indirect jobs (number) | 1,686 | 1,686 | 1,686 | 1,629 | 1,629 | 1,572 | 1,629 |
| direct and indirect income (millions of 1997 $) | 36.9 | 36.9 | 36.9 | 35.6 | 35.6 | 34.3 | 35.6 |
| Effects on major use / interest segments | See Social Effects section in Chapter 3. | | | | | | |
| **Livestock Grazing** | | | | | | | |
| Acres suitable rangeland | 1,073,516 | 1,113,070 | 1,113,000 | 1,051,800 | 1,112,970 | 1,051,970 | 1,053,580 |
| Estimated AUMs of livestock grazing | 434,451 | 459,410 | 459,530 | 376,300 | 398,160 | 287,650 | 336,050 |
| Thousands lbs. forage available to livestock | 339,675 | 358,350 | 358,430 | 293,510 | 310,560 | 224,380 | 262,160 |
| Acres average pasture size | 425 – 1,150 | NA | 430 - 1,150 | 430 - 1,300 | variable | 430 - 1,500 | 540 - 1,300 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Livestock Grazing, cont.** | | | | | | | |
| Average # water developments / sq. mile | 2.5 – 3.5 | NA | NA | 2.2 - 3.4 | NA | 1.8 - 3.5 | 2.0 - 3.2 |
| **Oil and Gas** | | | | | | | |
| Access with existing leasing decisions | 992,870 | 992,870 | 992,870 | 992,870 | 992,870 | 992,870 | 992,870 |
| Not currently authorized for leasing | 16,230 | 16,230 | 0 | 0 | 26,200 | 0 | 0 |
| Acres available for leasing | 967,930 | 967,930 | 967,930 | 967,930 | 946,280 | 967,930 | 967,930 |
| No Surface Occupancy (NSO) | 209,520 | 209,520 | 185,600 | 281,860 | 204,380 | 298,610 | 237,960 |
| Controlled Surface Use (CSU) | 77,920 | 77,920 | 45,230 | 129,110 | 159,230 | 220,650 | 317,490 |
| Paleontology CSU | 742,180 | 742,180 | 782,330 | 686,070 | 715,700 | 669,320 | 729,970 |
| Timing Limitation (TL) | 133,630 | 133,630 | 185,650 | 170,720 | 202,990 | 176,040 | 176,610 |
| Standard Lease Terms Only | 589,840 | 589,840 | 569,800 | 412,590 | 407,430 | 389,050 | 306,320 |
| **Plant and Animal Control** | | | | | | | |
| Acres prairie dog poisoning | Variable | No change | Increase | Decrease | Minimal poisoning | No poisoning | Decrease |
| Reduction in noxious weeds and invasive plants | No change | No change | Reduce by 15% | Contain or reduce | Contain or reduce | Reduce by 15% | Contain or reduce |
| **Rangeland and Forest Health** | | | | | | | |
| Predicted habitat suitability for management indicator species | | | | | | | |
| western prairie fringed orchid | Not estimated | Not estimated | Not estimated | Not estimated | Not estimated | Not estimated | Not estimated |
| plains sharp-tailed grouse | 1-10% | 15-30% | 10-30% | 0-60% | 20-40% | 35-65% | 25-55% |
| greater prairie chicken | 1-10% | 20-30% | 20-30% | 50-60% | 30-40% | 60-70% | 45-55% |
| sage grouse | Unknown | 15-25% | 10-20% | Maintain or increase | 20-30% | 45-55% | 25-35% |
| black-tailed prairie dog (predicted total colony acreage) | 2,600 | 2,600 | $\leq$ 2,600 | 4,400 to 11,000 | 7,900 to 13,400 | 7,900 to 13,400 | 4,400 to 6,900 |
| Endangered Species Act species, candidate species, other species at risk | See Biological Assessment and Evaluation | | | | | | |
| Black-footed ferret areas (number and acres) | 0<br>0 | 0<br>0 | 0<br>0 | 0<br>0 | 1<br>29,180 | 1<br>27,920 | 0<br>0 |
| Desired grass / shrub structure (midpoint) | | | | | | | |
| percent area low | Unknown | 15 | 15 | 15 | 15 | 15 | 15 |
| percent area moderate | Unknown | 65 | 67 | 49 | 60 | 39 | 52 |
| percent area high | Unknown | 20 | 17 | 36 | 26 | 46 | 33 |
| Desired grass / shrub composition | | | | | | | |
| percent area early seral stage | 48 | 10-15 | 20 | 10-15 | 12 | 10 | 10-15 |
| percent area mid seral stage | 42 | NA | NA | NA | 69 | NA | NA |
| percent area late seral stage | 10 | NA | NA | NA | 19 | NA | NA |
| percent area mid / late seral stage | NA | 85-90 | 80 | 85-90 | NA | 90 | 85-90 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Percent of riparian / woody draw areas regenerating | 55 | 55 | 80 | 80 | 80 | 80 | 80 |
| Percent of the suitable rangeland rested | 0 | 0 | 0 | 5 | 5 | 20 | 14 |
| Percent suitable rangelands bison-only grazing | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Acres prescribed burning | 2,000 | 3,600 | 2,900 | 8,500 | 6,500 | 21,000 | 17,000 |
| **Recreation and Travel Management** | | | | | | | |
| Scenic Integrity Levels | | | | | | | |
| low acres | 1,190,620 | 1,190,620 | 1,203,800 | 827,140 | 908,220 | 836,490 | 656,640 |
| moderate acres | 16,400 | 16,390 | 44,480 | 260,400 | 237,930 | 208,820 | 434,400 |
| high acres | 50,170 | 50,170 | 8,890 | 170,570 | 111,980 | 211,870 | 166,150 |
| Recreation Opportunity Spectrum Classes | | | | | | | |
| urban acres | 760 | 760 | 760 | 440 | 450 | 760 | 440 |
| rural acres | 276450 | 269730 | 276440 | 264380 | 266830 | 264920 | 254490 |
| roaded modified acres | 116720 | 116620 | 116620 | 112900 | 112920 | 114080 | 114350 |
| roaded natural acres | 501790 | 496730 | 500770 | 468090 | 477730 | 450710 | 470000 |
| roaded natural nonmotorized acres | 134090 | 135010 | 135220 | 137100 | 137460 | 137140 | 135170 |
| semi-primitive motorized acres | 226610 | 194580 | 226610 | 112060 | 133410 | 91720 | 127800 |
| semi-primitive nonmotorized acres | 1710 | 44710 | 1710 | 163170 | 129320 | 198810 | 155870 |
| Capacity of developed sites / clusters of dispersed sites (persons at one time) | 185 | 185 | 185 | 330 to 350 | 330 to 350 | 185 | 480 to 650 |
| Trails miles | 170 | 170 | 170 | 210 | 210 | 170 | 170 |
| Dispersed Recreation | | | | | | | |
| change in fishing opportunity | No change | No change | No change | Add 1 pond | Add 1 pond | No change | Add 2-3 ponds |
| change in quality deer habitat | No change | No change | + | + | + | + | + |
| change in quality upland bird habitat | No change | No change | No change or reduction | ++ | ++ | +++ | +- |
| acres prairie dog colonies closed to shooting yearlong | 0 | 0 | 0 | 0 | All ferret habitat on Little Missouri | All NFS lands | 0 |
| Acres allowing off-road motorized travel | 1,257,470 | 1,257,360 | 1,257,360 | 0 | 0 | 0 | 2,800 |
| Acres where no motorized use is allowed (except administrative use) | 660 | 660 | 660 | 175,770 | 131,670 | 230,460 | 136,430 |
| Acres with seasonal motorized travel restrictions (except administrative use) | 0 | 0 | 0 | 118,010 | 61,290 | 74,340 | 59,770 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Recreation and Travel Management, cont.** | | | | | | | |
| Acres with designated routes for motorized travel | 0 | 0 | 0 | 964,270 | 1,064,900 | 953,260 | 1,058,960 |
| Miles expected designated routes (does not restrict snowmobile use) | NA | NA | NA | 1,830 to 2,810 | 1,830 to 2,810 | 1,670 to 2,345 | 2,185 to 3,110 |
| Expected designated routes per sq. mile) | NA | NA | NA | 1.0 to 2.5 | 1.0 to 2.5 | 1.0 to 2.0 | 1.0 to 4.25 |
| **Special Area Designations** | | | | | | | |
| Recommended for Wilderness (number of areas and acres) | 0 | 0 | 0 | 3<br>22,140 | 0<br>0 | 9<br>85,940 | 9<br>72,630 |
| Recommended Wild / Scenic rivers | | | | | | | |
| Little Missouri River (Forest Service) | | | | | | | |
| miles wild classification | 0 | 0 | 0 | 0 | 0 | 3.3 | 0 |
| miles scenic classification | 0 | 0 | 0 | 0 | 0 | 88.9 | 92.2 |
| miles recreation classification | 0 | 0 | 0 | 0 | 0 | 13.7 | 13.7 |
| Little Missouri River (National Park ) | | | | | | | |
| miles wild classification | 0 | 0 | 0 | 14.9 | 14.9 | 14.9 | 0 |
| miles scenic classification | 0 | 0 | 0 | 6.8 | 5.8 | 10.8 | 21.7 |
| miles recreation classification | 0 | 0 | 0 | 0 | 0 | 1.5 | 0 |
| Sheyenne River | | | | | | | |
| miles wild classification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| miles scenic classification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| miles recreation classification | 0 | 0 | 0 | 0 | 0 | 0 | 10.2 |
| Special Interest Areas (number and acres) | 0 | 0 | 9<br>1,770 | 16<br>6,390 | 17<br>6,420 | 14<br>5,930 | 13<br>4,640 |
| Research Natural Areas (number and acres) | 3<br>840 | 3<br>840 | 3<br>840 | 12<br>20,410 | 11<br>20.500 | 13<br>23,190 | 7<br>1,900 |

# Nebraska National Forest Units

For the following table, acres are rounded to nearest 10. Acres for Alternative 3a are the same as Alternative DEIS 3 unless shown otherwise a shown in italic (these are not additive). Acres in parentheses are concurrent management area acres, meaning they overlap other management area acres.

**Table 2-9. Management Area Acres by Alternative for Nebraska National Forest Units.**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3<br>*Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Category 1** | | | | | | |
| 1.1 Wilderness: Soldier Creek | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 |
| 1.2 Recommended for Wilderness | 0 | 0 | 15,970<br>*0* | 40,450 | 174,970 | 9,700 |
| 1.31 Backcountry Recreation Nonmotorized | 0 | 9,700 | 14,000 | 13,860 | 1,830 | 126,660 |
| 1.31a Backcountry Recreation Nonmotorized: Pine Ridge Recreation Area | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 |
| **TOTALS** | **14,350** | **24,050** | **44,320** | **68,660** | **191,850** | **150,720** |

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Category 2** | | | | | | |
| 2.1 Special Interest Areas | 70 | 1,060 | 54,490 *103,030* | 26,870 | 2,820 | 55,190 |
| 2.2 Research Natural Areas | 500 | 3,090 | 6,740 *1,560* | 6,800 | 5,270 (4,060) | 4,120 |
| **TOTALS** | **570** | **4,150** | **61,230** ***104,590*** | **33,670** | **8,090** | **59,310** |
| **Category 3** | | | | | | |
| 3.4 National River System: Scenic Rivers Recommended | 0 | 0 | 0 | 0 | 1,790 (40) | 0 |
| 3.51 Bighorn Sheep | 0 | 0 | 6,590 | 5,650 | 5,950 | 5,950 |
| 3.63 Black-footed Ferret Reintroduction Habitat | 8,050 | 61,510 | 109,140 *83,870* | 104,030 | 109,930 (11,450) | 86,780 |
| 3.64 Special Plant and Wildlife Habitat | 54,340 | 16,640 | 107,290 *6,850* | 104,840 | 15,580 | 20,140 |
| 3.66 Ecosystem Restoration | 0 | 0 | 0 | 0 | 22,410 | 0 |
| **TOTALS** | **62,390** | **78,150** | **223,020** ***90,720*** | **214,520** | **155,200** | **112,870** |
| **Category 4** | | | | | | |
| 4.32 Dispersed Recreation: High Use | 1,110 | 1,110 | 6,350 *5,250* | 6,520 | 1,110 | 11,550 |
| 4.4 National River System: Recreation Rivers Recommended | 0 | 0 | 0 | 0 | 140 | 1,790 |
| **TOTALS** | **1,110** | **1,110** | **6,350** ***5,250*** | **6,520** | **1,250** | **13,340** |
| **Category 5** | | | | | | |
| 5.12 General Forest and Rangelands: Range Vegetation Emphasis | 0 | 22,410 | 27,000 | 27,940 | 27,000 | 0 |
| 5.13 Forest Products | 0 | 31,990 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **54,400** | **27,000** | **27,940** | **27,000** | **0** |
| **Category 6** | | | | | | |
| 6.1 Rangeland with Broad Resource Emphasis | 977,180 | 891,380 | 691,300 *673,790* | 701,750 | 670,130 | 716,980 |
| **TOTALS** | **977,180** | **891,380** | **691,300** ***673,790*** | **701,750** | **670,130** | **716,980** |
| **Category 7** | | | | | | |
| 7.1 Residential/Forest Intermix | 0 | 2,600 | 2,610 | 2,610 | 2,610 | 2,610 |
| **TOTALS** | **0** | **2,600** | **2,610** | **2,610** | **2,610** | **2,610** |
| **Category 8** | | | | | | |
| 8.3 Designated Utility Corridors: Existing and Potential | 240 | 0 | 0 | 0 | 0 | 0 |
| 8.4 Mineral Production and Development | 0 | 0 | 0 | 0 | 0 | 0 |
| 8.5 Nursery | 80 | 70 | 70 | 70 | 20 | 70 |
| 8.6 Administrative Sites | 390 | 230 | 230 | 230 | 190 | 230 |
| **TOTALS** | **710** | **300** | **300** | **300** | **210** | **300** |

**Table 2-10. Comparison of Alternatives by Major Revision Topic for Nebraska National Forest Units.**

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Community/Lifestyle Relationships** | | | | | | | |
| Range-fed livestock grazing on NFS & Intermingled lands (percent change from Existing Condition) | | -18% | -9% | -8% / -9% | -18% / -18% | -31% | -27% |
| direct and indirect jobs (number) | 487 | 402 | 442 | 448 / 445 | 401 / 401 | 336 | 356 |
| direct and indirect income (millions of 1997 $) | $7.9 | $6.5 | $7.2 | $7.2 / $7.2 | $6.5 / $6.5 | $5.4 | $5.7 |
| Oil / gas activities on NFS lands (percent change from Existing Condition) | 0% | 0% | 2% | 2% | 2% | 2% | 2% |
| direct and indirect jobs (number) | 85 | 85 | 87 | 87 | 87 | 87 | 87 |
| direct and indirect income (millions of 1997 $) | $2.3 | $2.3 | $2.4 | $2.4 | $2.4 | $2.4 | $2.4 |
| Effects on major use / interest segments | See social effects section in Chapter 3. | | | | | | |
| **Livestock Grazing** | | | | | | | |
| Acres suitable rangeland | 1,000,013 | 967,850 | 969,190 | 1,005,550 *1,005,550* | 969,860 *967,300* | 969,060 | 967,480 |
| Estimated AUMs of livestock grazing | 363,885 | 301,271 | 333,120 | 333,800 *332,200* | 301,064 *300,845* | 247,673 | 263,450 |
| Thousands lbs. forage available to livestock | 283,835 | 234,990 | 259,870 | 260,360 *259,110* | 234,830 | 193,185 | 205,488 |
| Acres average pasture size | 500 – 1,170 | NA | 500 - 1,170 | 620 - 1,170 | Variable | 680 - 1,290 | 680 - 1,290 |
| Average # water developments / sq. mile | 1.5 – 3.6 | 1 - 3 | 1 - 2.4 | 0.5 - 3.7 | 1.6 – 3.7 | 0.3 - 3.3 | 1 - 3.7 |
| **Oil and Gas** | | | | | | | |
| Acres with existing leasing decisions | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 |
| Acres available for leasing | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 |
| Available with stipulations (some acres have more than one type of stipulation) | 43,020 | 43,020 | 246,850 | 246,850 | 246,850 | 246,850 | 246,850 |
| Not currently authorized for leasing | 14,360 | 14,360 | 0 | 0 | 0 | 0 | 0 |
| No Surface Occupancy (NSO) | 21,720 | 21,720 | 6,600 | 6,600 | 6,600 | 19,610 | 19,170 |
| Controlled Surface Use (CSU) | 9,440 | 9,440 | 7,620 | 47,450 | 48,360 | 8,130 | 73,040 |
| Paleontology CSU | 0 | 0 | 232,640 | 192,820 | 191,910 | 219,100 | 154,630 |
| Timing Limitation (TL:) | 11,540 | 11,540 | 42,420 | 26,070 | 42,430 | 26,060 | 41,030 |
| Standard Lease Terms Only | 189,470 | 189,470 | 0 | 0 | 0 | 0 | 0 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Plant and Animal Control** | | | | | | | |
| Acres prairie dog poisoning | Variable | No change | Increase | Decrease | Minimal poisoning | No poisoning | Decrease |
| Reduction in noxious weeds and invasive plants | Contain or reduce | No change | Reduce by 15% | Contain or reduce | Contain or reduce | Reduce by 15% | Contain or reduce |
| **Rangeland and Forest Health** | | | | | | | |
| Predicted habitat suitability for management indicator species | | | | | | | |
| plains sharp-tailed grouse | 1-55% | 15-55% | 10-35% | 10-50% | 10-55% | 30-80% | 25-80% |
| greater prairie chicken | 1-25% | 30-55% | 10-35% | 40-50% | 35-55% | 45-80% | 45-80% |
| sage grouse | Evaluation Incomplete | 20-30% | 10-20% | Maintain or increase | 20-30% | 45-55% | 25-35% |
| black-tailed prairie dog (predicted total colony acreage) | 6,400 to 7,850 | 6,400 to 7,850 | $\leq$ 6,400 | 20,900 to 50,200 | 24,700 to 40,200 | 24,700 to 40,200 | 22,500 to 36,600 |
| pygmy nuthatch | Not estimated | Not specified | 10% | Not specified | 10% | 10% | 10% |
| Endangered Species Act species, candidate species, other species at risk | See Biological Assessment and Evaluation | | | | | | |
| Black-footed ferret areas (number and acres) | 1<br>8,050 | 1<br>8,050 | 1<br>61,510 | 2<br>109,140 | 2<br>104,000 | 2<br>120,920 | 2<br>86,780 |
| Desired grass / shrub structure (midpoint) | | | | | | | |
| percent low | Unknown | 18 | 27 | 23 | 17 | 16 | 19 |
| percent moderate | Unknown | 64 | 56 | 42 | 50 | 37 | 39 |
| percent high | Unknown | 18 | 17 | 35 | 33 | 47 | 42 |
| Desired grass / shrub composition | | | | | | | |
| percent early seral stage | 13 | 10-15 | 20 | 10-15 | 9 | 10 | 10-15 |
| percent early intermediate seral stage | 22 | NA | NA | NA | 16 | NA | NA |
| percent late intermediate seral stage | 57 | NA | NA | NA | 46 | NA | NA |
| percent late seral stage | 8 | NA | NA | NA | 29 | NA | NA |
| percent mid / late seral stage | NA | 85-90 | 80 | 85-90 | NA | 90 | 85-90 |
| Forest structure | | | | | | | |
| percent late successional | 0 | 0 | 10 | 20-30 | 20 | 90 | 30-40 |
| Percent riparian / woody draw regeneration | 40 | 40 | 80 | 80 | 80 | 80 | 80 |
| Acres / decade tree plantations maintained on Bessey Ranger District | NA | NA | Based on need | 20,000 | 20,000 | 0 | 12,000 to 15,000 |
| Percent rest | 2 | 2 | >1 | 5 | 6 | 13 | 11 |
| Percent suitable rangeland bison-only grazing | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Acres prescribed burning | 500 | 0 | 0 | 1,800 | 1,750 | 9,000 | 3,500 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Recreation and Travel Management** | | | | | | | |
| Scenic Integrity Levels | | | | | | | |
| very low | 900 | 0 | 0 | 0 | 0 | 0 | 0 |
| low acres | 907,660 | 945,000 | 926750 | 784,290 | 785,520 | 773,210 | 326,540 |
| moderate acres | 27,100 | 55,320 | 60,330 | 112,250 | 111,750 | 58,860 | 472,720 |
| high acres | 65,720 | 1,060 | 14,100 | 104,820 | 104,080 | 169,290 | 201,340 |
| Recreation Opportunity Spectrum Classes | | | | | | | |
| urban acres | 240 | 320 | 310 | 310 | 310 | 260 | 310 |
| rural acres | 59280 | 92540 | 59210 | 59210 | 59210 | 58380 | 58150 |
| roaded natural acres | 625820 | 626350 | 633650 | 617860 | 603160 | 577580 | 597470 |
| roaded natural nonmotorized acres | 0 | 31130 | 3090 | 4300 | 4240 | 5310 | 4120 |
| semi-primitive motorized acres | 337180 | 291060 | 315820 | 309430 | 303400 | 235600 | 238220 |
| semi-primitive nonmotorized acres | 33380 | 14490 | 43820 | 64780 | 85570 | 178730 | 157610 |
| Capacity of developed sites/clusters of dispersed sites (persons at one time) | 2,280 | 2,280 | 2,280 | 2,360 | 2,360 | 2,280 | 2,360 |
| Trails miles | 120 | 120 | 120 | 150 - 160 | 150 - 160 | 120 | 170 |
| Dispersed Recreation | | | | | | | |
| change in fishing opportunity | No change | No change | No Change | No change | No change | No change | Add 1 |
| change in quality deer habitat | No change | No change | ++ | ++ | ++ | ++ | ++ |
| change in quality upland bird habitat | No change | No change | No change | ++ | ++ | +++ | +++ |
| acres prairie dog colonies closed to shooting yearlong | All ferret habitat on Buffalo Gap NG | All ferret habitat on Buffalo Gap NG | All ferret habitat on Buffalo Gap NG | All ferret habitat on Buffalo Gap NG | All ferret habitat on Buffalo Gap NG | All NFS lands | All ferret habitat on Buffalo Gap NG |
| Acres allowing off-road motorized travel | 855,330 | 868,560 | 895,460 | 5,200 | 5,410 | 0 | 10,400 |
| Acres where no motorized use is allowed (except administrative use) | 55,793 | 17,820 | 18,820 | 81,060 | 77,770 | 214,020 | 180,910 |
| Acres with seasonal motorized travel restrictions (except administrative use) | 144,880 | 139,980 | 139,980 | 0 | 35,280 | 0 | 0 |
| Acres with designated routes for motorized travel | 0 | 30,900 | 3,000 | 971,000 | 937,540 | 843,240 | 865,950 |
| Miles expected designated routes (does not restrict snowmobile use) | NA | NA | NA | 1,450 to 3,040 *980 to 2,100* | 1,450 to 3,040 *980 to 2,100* | 1,264 to 1,977 | 1,970 to 2,710 |
| Expected designated routes per sq. mile) | NA | NA | NA | 0.5 to 2.0 *NA* | 0.5 to 2.0 *NA* | 0.5 to 1.75 | 1.5 to 2.0 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Special Area Designations** | | | | | | | |
| Recommended for Wilderness (number of areas and acres) | 0 | 0 | 0 | 1<br>15,970<br>*0* | 1<br>40,450 | 1<br>174,970 | 1<br>9,700 |
| Recommended Wild / Scenic rivers | | | | | | | |
| Cheyenne River | | | | | | | |
| miles wild classification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| miles scenic classification | 0 | 0 | 0 | 0 | 0 | 8.6 | 0 |
| miles recreation classification | 0 | 0 | 0 | 0 | 0 | 0 | 8.6 |
| Rapid Creek | | | | | | | |
| miles wild classification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| miles scenic classification | 0 | 0 | 0 | 0 | 0 | 1.7 | 0 |
| miles recreation classification | 0 | 0 | 0 | 0 | 0 | 0 | 1.7 |
| Middle Loup River | | | | | | | |
| miles wild classification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| miles scenic classification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| miles recreation classification | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 |
| Special Interest Areas (number of areas and acres) | 2<br>70 | 2<br>70 | 8<br>1,060 | 15<br>54,490<br>*17*<br>*105,256* | 14<br>26,870 | 12<br>2,820 | 18<br>55,190 |
| Research Natural Areas (number of areas and acres) | 1<br>500 | 1<br>500 | 3<br>3,090 | 6<br>8,300 | 6<br>6,800 | 9<br>9,330 | 4<br>4,120 |

# Thunder Basin National Grassland

For the following table, acres are rounded to nearest 10. Acres in parentheses are concurrent management area acres, meaning they overlap other management area acres.

**Table 2-11. Management Area Acres by Alternative for Thunder Basin National Grassland**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Category 1** | | | | | | |
| 1.2 Recommended for Wilderness | 0 | 0 | 14,850 | 0 | 59,280 | 15,260 |
| 1.31 Backcountry Recreation Nonmotorized | 0 | 0 | 6,540 | 6,550 | 4,200 | 22,710 |
| **TOTALS** | **0** | **0** | **21,390** | **6,550** | **63,480** | **37,970** |
| **Category 2** | | | | | | |
| 2.1 Special Interest Areas | 0 | 6,590 | 12,570 | 26,780 | 6,590 | 6,590 |
| 2.2 Research Natural Areas | 0 | 0 | 1,210 | 1,210 | 3,520 | 0 |
| **TOTALS** | **0** | **6,590** | **13,780** | **27,990** | **10,110** | **6,590** |

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Category 3** | | | | | | |
| 3.63 Black-footed Ferret Reintroduction Habitat | 33,750 | 41,230 | 45,470 (5,930) | 47,890 (5,930) | 112,510 (16,550) | 27,850 (13,380) |
| 3.65 Rangelands with Diverse, Natural-appearing Landscapes | 0 | 0 | 116,560 | 83,430 | 17,920 | 0 |
| 3.68 Big Game Range | 4,270 | 0 | 33,890 | 33,890 | 0 | 0 |
| **TOTALS** | **38,020** | **41,230** | **195,930** | **165,210** | **130,430** | **27,850** |
| **Category 4** | | | | | | |
| 4.22 Scenic Area, Vistas or Travel Corridors | 0 | 0 | 0 | 0 | 0 | 6,030 |
| 4.32 Dispersed Recreation: High Use | 0 | 1,930 | 25,780 | 25,780 | 1,930 | 0 |
| **TOTALS** | **0** | **1,930** | **25,780** | **25,780** | **1,930** | **6,030** |
| **Category 5** | | | | | | |
| 5.12 General Forest and Rangelands: Range Vegetation Emphasis | 0 | 253,550 | 129,480 | 160,870 | 89,630 | 0 |
| **TOTALS** | **0** | **253,550** | **129,480** | **160,870** | **89,630** | **0** |
| **Category 6** | | | | | | |
| 6.1 Rangeland with Broad Resource Emphasis | 514,470 | 199,850 | 118,130 | 118,090 | 212,840 | 424,690 |
| **TOTALS** | **514,470** | **199,850** | **118,130** | **118,090** | **212,840** | **424,690** |
| **Category 8** | | | | | | |
| 8.4 Mineral Production and Development | 0 | 49,350 | 47,990 | 47,990 | 44,060 | 49,350 |
| **TOTALS** | **0** | **49,350** | **47,990** | **47,990** | **44,060** | **49,350** |

**Table 2-12. Comparison of Alternatives by Major Revision Topic for Thunder Basin National Grassland**

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Community/Lifestyle Relationships** | | | | | | | |
| Range-fed livestock grazing on NFS & Intermingled lands (Percent change from Existing Condition) | | 13% | 13% | 7% | 2% | -10% | 5% |
| direct and indirect jobs | 291 | 329 | 327 | 311 | 298 | 261 | 304 |
| direct and indirect income (millions of 1997 $) | $6.2 | $7.0 | $6.9 | $6.6 | $6.3 | $5.5 | $6.4 |
| Oil and gas activities on NFS lands (Percent Change From Existing Condition) | 0% | 0% | 0% | 0% | 0% | -1% | 0% |
| direct and indirect jobs | 664 | 664 | 664 | 664 | 664 | 660 | 664 |
| direct and indirect income (millions of 1997 $) | $24.4 | $24.4 | $24.4 | $24.4 | $24.4 | $24.2 | $24.4 |
| Effects on major use/interest segments | See social effects section in Chapter 3. | | | | | | |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Livestock Grazing** | | | | | | | |
| Acres suitable rangeland | 572,518 | 532,100 | 532,100 | 532,100 | 532,060 | 531,060 | 532,100 |
| Estimated AUMs of livestock grazing | 112,700 | 127,530 | 126,940 | 120,700 | 115,430 | 101,340 | 117,840 |
| M pounds of forage available to livestock | 87,900 | 99,470 | 99,010 | 94,150 | 88,140 | 79,040 | 91,910 |
| Average pasture size in acres | 1,640 | NA | 1,640 | 1,720 | Variable | 1,720 | 1,720 |
| Average # water developments/sq. mile | 2.1 | NA | NA | 1.9 | Variable | 1.9 | 2.1 |
| **Oil and Gas** | | | | | | | |
| Acres with existing leasing decisions | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 |
| Not currently authorized for leasing | 0 | 0 | 0 | 0 | 246,850 | 0 | 0 |
| acres available for leasing | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 911,910 | 1,158,760 | 1,158,760 |
| Available with stipulations (some acres have more than one type of stipulation) | 205,740 | 205,740 | 1,158,760 | 1,158,760 | 911,910 | 1,158,760 | 1,158,760 |
| No Surface Occupancy (NSO) | 7,580 | 7,580 | 130,940 | 152,570 | 120,340 | 190,360 | 162,180 |
| Controlled Surface Use (CSU) | 106,470 | 106,470 | 92,580 | 144,540 | 143,810 | 112,240 | 182,970 |
| Paleontology CSU | 0 | 0 | 928,600 | 855,220 | 641,260 | 839,532 | 807,020 |
| Timing Limitation (TL) | 110,270 | 110,270 | 278,490 | 308,750 | 245,760 | 308,130 | 266,180 |
| Standard Lease Terms Only | 953,020 | 953,020 | 0 | 0 | 0 | 0 | 0 |
| **Plant and Animal Control** | | | | | | | |
| Acres of prairie dog poisoning | Variable | No change | Increase | Decrease | Minimal poisoning | None | Decrease |
| Reduction in noxious weeds and invasive plants | Contain or reduce | No change | Reduce by 15% | Contain or reduce | Contain or reduce | Reduce by 15% | Contain or reduce |
| **Rangeland and Forest Health** | | | | | | | |
| Predicted habitat suitability (where applicable) for management indicator species | | | | | | | |
| plains sharp-tailed grouse | Unknown | 10-20% | 10-20% | 5-15% | 30-40% | 25-35% | 15-25% |
| sage grouse | Evaluation Incomplete | 10-20% | 10-20% | Maintain or increase | 30-40% | 25-35% | 15-25% |
| black-tailed prairie dog (predicted total colony acreage) | $\geq$ 5,400 | $\geq$5,400 | $\leq$5,400 | 23,300 to 59,700 | 29,900 to 47,500 | 29,900 to 47,500 | 25,100 to 39,900 |
| Endangered Species Act species, candidate species, other species at risk | See Biological Assessment and Evaluation | | | | | | |
| Black-footed ferret reintroduction areas (numbers and acres) | 1<br>33,750 | 1<br>33,750 | 1<br>41,230 | 1<br>51,400 | 1<br>53,830 | 1<br>129,060 | 1<br>41,230 |
| Desired grass/shrub structure (midpoint) | | | | | | | |
| percent low | Unknown | 25 | 29 | 22 | 23 | 25 | 21 |
| percent moderate | Unknown | 57 | 55 | 49 | 43 | 37 | 57 |
| percent high | Unknown | 18 | 16 | 29 | 34 | 38 | 22 |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Rangeland and Forest Health, cont.** | | | | | | | |
| Desired grass/shrub composition | | | | | | | |
| percent early seral stage | 37 | 10-15 | 20 | 10-15 | 18 | 10 | 10-15 |
| percent early intermediate seral stage | 17 | NA | NA | NA | 32 | NA | NA |
| percent late intermediate seral stage | 45 | NA | NA | NA | 33 | NA | NA |
| percent late seral stage | 1 | NA | NA | NA | 17 | NA | NA |
| percent mid/late seral stage | NA | 85-90 | 80 | 85-90 | NA | 90 | 85-90 |
| Forest structure | | | | | | | |
| percent late successional | 0 | 0 | 10 | 20-30 | 10 | 90 | 30-40 |
| Percent riparian/woody draw regeneration | 27 | 27 | 80 | 80 | 80 | 80 | 80 |
| Percent rest | 0 | 0 | 0 | 5 | 10 | 10 | 5 |
| Percent suitable rangeland bison-only grazing | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Acres prescribed burning | 400 | 400 | 1,000 | 500 | Variable | 4,500 | 2,000 |
| **Recreation and Travel Management** | | | | | | | |
| Scenic Integrity Levels | | | | | | | |
| very low | 3,880 | 0 | 0 | 0 | 0 | 0 | 0 |
| low acres | 53,120 | 550,960 | 490,670 | 432,150 | 432,110 | 451,040 | 413,090 |
| moderate acres | 495,490 | 1,530 | 55,230 | 85,840 | 85,840 | 28,530 | 95,520 |
| high acres | 0 | 0 | 6,590 | 34,490 | 34,530 | 72,910 | 43,890 |
| Recreation Opportunity Spectrum | | | | | | | |
| urban acres | 13,250 | 13,250 | 49,780 | 48,130 | 48,130 | 44,680 | 49,790 |
| rural acres | 69,530 | 69,530 | 51,190 | 41,200 | 41,200 | 51,260 | 51,850 |
| roaded natural acres | 442,620 | 442,620 | 424,430 | 418,940 | 418,940 | 388,100 | 391,680 |
| roaded natural nonmotorized acres | 0 | 0 | 0 | 1,210 | 15,380 | 3,520 | 0 |
| semi-primitive motorized acres | 27,090 | 27,090 | 27,090 | 22,290 | 22,290 | 2,140 | 21,870 |
| semi-primitive nonmotorized acres | 0 | 0 | 0 | 20,720 | 6,550 | 62,800 | 37,300 |
| Capacity of developed sites/clusters of dispersed sites (persons at one time) | 5 | 5 | 5 | 80 | 80 | 5 | 200 |
| Trail miles | 0 | 0 | 0 | Add some trails | Add some trails | 0 | 100 |
| Dispersed Recreation | | | | | | | |
| change in fishing opportunity | No change | No change | No change | No change | No change | No change | No change |
| change in quality deer habitat | No change | No change | ++++ | ++++ | ++++ | ++++ | ++++ |
| change in quality upland bird habitat | No change | No change | No change | + | + | ++ | + |

| Revision Topic/Key Indicators | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| acres prairie dog colonies closed to shooting yearlong | 0 | 0 | All ferret habitat | All ferret habitat | All ferret habitat | All NFS lands | All ferret habitat |
| Acres allowing off-road motorized travel | 552,510 | 552,510 | 552,510 | 0 | 0 | 0 | 0 |
| Acres where no motorized use is allowed (except administrative use) | 0 | 0 | 0 | 22,600 | 28,560 | 65,500 | 38,000 |
| Acres with seasonal restrictions (except administrative use) | 0 | 0 | 0 | 39,800 | 39,880 | 0 | 0 |
| Acres with designated routes for motorized travel | 0 | 0 | 0 | 495,100 | 484,070 | 492,000 | 519,500 |
| Expected designated routes per sq. mile | NA | NA | NA | 1.0 - 2.0 | 1.0 - 2.0 | 1.0 - 1.5 | 1.5 - 2.0 |
| Expected miles of designated routes | NA | NA | NA | 970 to 1,550 | 970 to 1,550 | 960 to 1,150 | 1,220 to 1,620 |
| **Special Area Designations** | | | | | | | |
| Recommended for Wilderness (number and acres) | 0<br>0 | 0<br>0 | 0<br>0 | 1<br>14,850 | 0<br>0 | 6<br>59,280 | 1<br>15,260 |
| Special Interest Areas (number and acres) | 0<br>0 | 0<br>0 | 3<br>6,590 | 4<br>12,570 | 6<br>26,780 | 3<br>6,590 | 3<br>6,590 |
| Research Natural Areas (number and acres) | 0<br>0 | 0<br>0 | 0<br>0 | 2<br>1,230 | 2<br>1,220 | 4<br>2,880 | 0<br>0 |

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# Chapter 3 The Affected Environment and Environmental Consequences

## Purpose and Organization of this Chapter

Chapter 3 combines two chapters often published separately in environmental impact statements, "The Affected Environment" and "Environmental Consequences." The primary purpose of this chapter is to describe the environment of the grassland and forest units and to disclose the effects of the alternatives.

This chapter is organized around the major revision topics described in Chapter 1. Other environmental components and topics, such as heritage and fossils, follow the discussion of the major revision topics.

Many additional items were screened out of the analysis process. The reasons for eliminating them include the following:

- Analysis of the item was not considered important to the integrity of the environment.
- Analysis of the item would not disclose direct or indirect effects to the environment.
- Analysis of the item was not acknowledged or required by law.

## Resource Protection Measures

Mitigation measures, as defined by 40 CFR 1508.20, include the following:

- Avoiding the impact altogether by declining to take an action or part of an action.
- Minimizing impacts by limiting the degree or magnitude of an action or its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Key laws, regulations, and policies are identified in the Revised Management Plans in Appendices K and L. Applicable standards and guidelines are also found in the Revised Management Plan. The FEIS discusses key resource mitigation measures, unconstrained effects, and effects constrained by mitigation. Only those key mitigation measures, such as laws, regulations, policies, and grassland-wide and forest-wide standards, will be discussed in each section of environmental effects.

Key resource mitigation measures should be viewed in a programmatic context. Specific mitigation measures will be developed during individual project analysis.

Monitoring and evaluation will determine the effectiveness of mitigation measures. Please refer to Chapter 4, Monitoring and Evaluation, in the Revised Management Plans.

## Environmental Consequences

This section describes the direct, indirect, and cumulative effects to the environment resulting from activities associated with the alternatives.

Direct environmental effects are those that occur at the same time and place as the initial action. An example would be on-site soil compaction from trail use. Indirect environmental effects are caused by the action but occur later in time or are spatially removed from the action. An example would be downwind effects of a power plant on air quality. Most effects described would probably occur over the next 10 to 15 years; however, some resources, such as timber management, do make longer term projections.

Major management activity headings that can be expected under direct and indirect effects include the following:

- Effects Common to All Alternatives
- Effects from Fire and Fuels Management
- Effects from Fish and Wildlife Management
- Effects from Insects and Disease Management
- Effects from Land Adjustments
- Effects from Oil, Gas, Minerals Management
- Effects from Plant and Animal Damage Control
- Effects from Range Management and Livestock Grazing
- Effects from Recreation Management and Use
- Effects from Special Area Designations
- Effects from Timber Management
- Effects from Travel Management and Motorized Use

There is no heading or discussion for resource management activity that have no direct or indirect effect on a particular resource or activity under any of the alternatives. Effects may include expected output levels from implementing the alternatives.

Actions taken to achieve the goals of a particular alternative, along with past, present, and foreseeable future activities undertaken by either the Forest Service or other parties, are called combined or cumulative effects to the environment.

To ensure long-term productivity of the land, the environmental consequences of alternatives are limited by management requirements. Many are founded in law, federal regulations, and Forest Service policy. Other requirements to limit the environmental consequences are grassland-wide and/or forest-wide standards and guidelines detailed in the accompanying draft revised management plans. Appendix D, Differences Among the Alternatives, contains direction that varies by alternative.

## Relationship Between Programmatic and Site-Specific Effects Analysis

This FEIS is a programmatic document; it discusses alternatives and effects for a broad program -- overall management of a national grassland and forest unit. Environmental consequences for individual, site-specific projects are not described. The environmental effects of individual projects will depend on the implementation of each project, the environmental conditions at each project location, and the application of the standards and guidelines in each case.

## Budget Levels

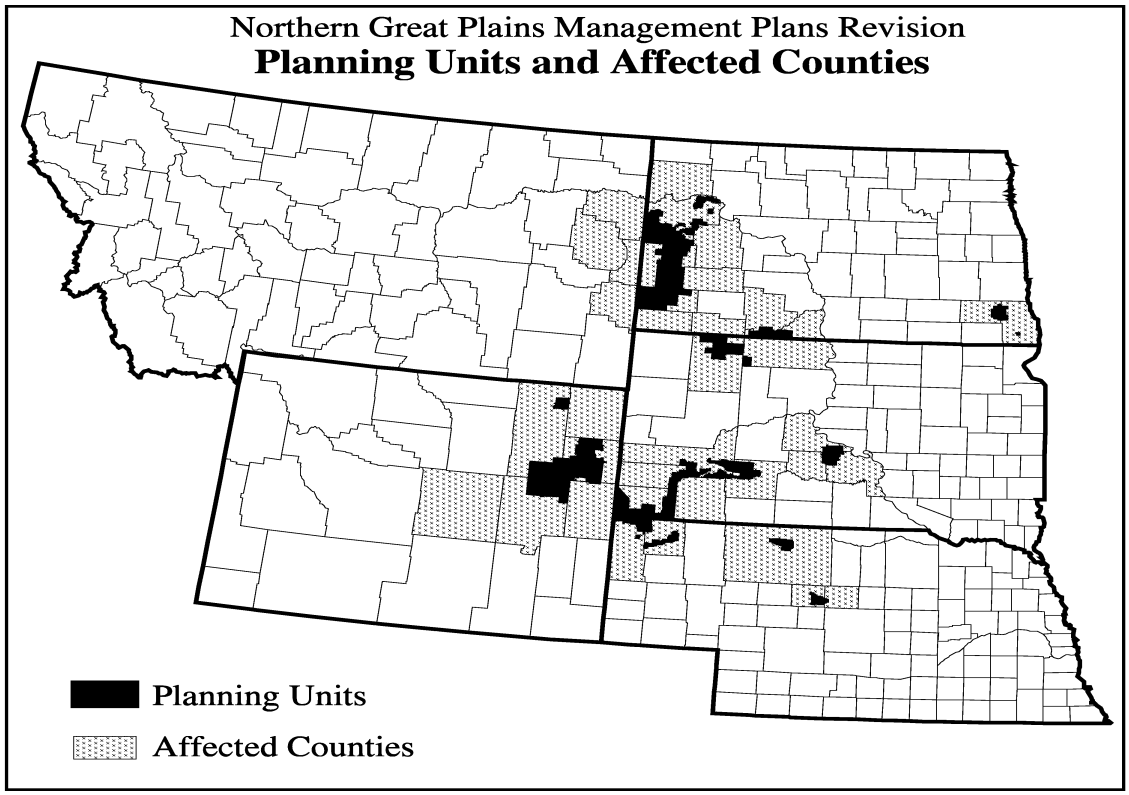
Because activities, outcomes, and effects are sensitive to budget levels, each alternative has been analyzed at two budget levels. The full implementation, or desired budget level, has been constrained by a budget level not to exceed 150 percent of an experienced budget. The experienced budget level analyzes activities, outcomes, and effects based on current budget levels.

# Community and Lifestyle Relationships

## Introduction

Although individuals and communities over a wide geographic area use grassland and forest resources, it is the residents and businesses of counties near the national grasslands and forests who depend most on the availability of resources. Commodity and amenity benefits from the public lands within the Northern Great Plains assessment area have contributed to the social systems and economic base of many neighboring communities. The following figure shows those counties most affected by the Northern Great Plains planning units.

**Figure 3-1. Planning units and affected counties.**




The national grasslands and forests within the planning area are limited in size and resources. There are more social demands being placed on these lands than they are capable of producing, and there are conflicting demands being placed on these lands by people with different values and interests. For example, these lands cannot simultaneously produce maximum forage for domestic livestock and maximum wildlife diversity and abundance, nor can they provide a maximum number of quality backcountry recreation acres and full development of all oil and gas fields.

Managers must achieve a relative balance between differing demands for these public lands while, at the same time, upholding the laws that govern national grasslands and forests management. This balance is achieved, in large part, through the Land and Resource Management Plan revision process. The goal of plan revision is to strike a balance between competing uses that will permit sustainable ecosystems, sustainable flows of goods and services, contributing toward a sustainable standard of living, and providing a wide sharing of amenities from these public lands.

There will be social tradeoffs in making any Land and Resource Management Plan decision. People who make a living from goods and services coming from the national grasslands and forests may not be able to obtain the quantity of goods and services they were accustomed to in the past. People who desire a natural landscape untrammeled by man may only be able to find this experience in a few places. Tradeoffs may include jobs, income, wildlife diversity and abundance, public revenue, ranch profitability, accustomed lifestyles, population, land use, the abundance of amenity values, the long-term benefits of restored ecosystems, and community identity.

## Economic Laws, Policy, and Direction

The National Environmental Policy Act of 1969 (NEPA) requires that natural and social sciences be integrated in all planning and decision-making that affect the human environment. The human environment includes the biological and physical environment and the relationship of people to that environment. Forest Service land management planning regulations also instruct that social science knowledge be considered in forest and grassland planning. The Forest Service has developed a handbook that provides basic principles, techniques and general guidance for assessing social effects.

Local governments having federal lands within their administrative boundaries are entitled to payments from one or more federal revenue programs. These revenue programs take two basic forms. PILT payments for "payments in lieu of taxes" and various federal revenue-sharing programs referred in total as non-PILT payments.

In October of 1976, Congress passed P.L. (Public Law) 94-565, commonly referred to as the "Payments in Lieu of Taxes Act." This act provides for payments to local units of government containing certain federally owned lands. These payments are designed to supplement other federal land-receipt-sharing payments that local governments may be receiving. The recipients may use payments received under the act for any governmental purpose. The act was amended in September 1982 and recodified at Chapter 69, 31 U.S.C.7

On July 30, 1983, the PILT Act (31 U.S.C.) was amended by Public Law 98-63, which refined the definition of "unit of general local government" and added a new section (31 U.S.C. 6907) that authorized state governments to enact legislation to reallocate PILT payments in whole or in part to other smaller units of general-purpose government.

On October 22, 1994, the PILT Act (31 U.S.C) was amended by P.L. 103-397, which called for increases to the $.75/$.10 variables used to compute section 6902 payments and to the population table used to determine each unit of local government's population ceiling. The increases will be 120 percent over the period 1995 to 1999 to $1.65/$.22 respectively.

Non-PILT payments refer to the amounts received by state, county, or other local units of government from several pieces of Federal revenue sharing. Those that pertain to National Grasslands and Forests include:

- USFS 25% Fund -Act of 5/23/08 - Dept. of Agriculture Appropriation Act; 35 Stat.251; 16 USC 500 - 25% of gross receipts to State for Counties.
- Mineral Land Leasing Act (BLM) Reserved lands - Act of 6/20/10 - Mineral Lands Leasing Act (Sec 35); 41 Stat. 450; 30 USC 191 - 50% of receipts to States. Mineral receipts coming from public-domain National Grassland acres are considered Mineral Leasing Act receipts. Acquired lands - Act of 8/7/47 - Mineral Leasing Act for Acquired Lands (Sec 6); 61 Stat. 915; 30 USC 355 - 50% of receipts to States. Mineral receipts coming from Bankhead-Jones-acquired National Grassland acres are considered Bankhead-Jones receipts or funds.
- Federal Power Act (Federal Energy Regulatory Commission) Act of 6/5/20 - Federal Power Act (Sec 17); 41 Stat 1072; 16 USC 810 - 37.5% of receipts to states.
- Bankhead-Jones Farm Tenant Act (USFS) Act of 7/22/37 - Bankhead-Jones Farm Tenant Act (Sec 33); 50 stat. 526; 7 USC 1012 - 25% of receipts to counties.
- Mineral Disposal Act (BLM) Act of 7/31/47 - Mineral Materials Act of 1947 (Sec. 3); 61 Stat. 681; 30 USC 601-604 - varies depending on type of receipt.
- Weeks Law Act of 3/1/1922 - As amended by PL 104-333 12/31/96. Authorized the Secretary of Agriculture to acquire National Forest System lands in the eastern United States in cooperation with the states for the protection of watersheds of navigable streams. 25% of receipts to states for public schools and roads of county or counties in which such national forest is situated.
- Secure Rural Schools and Community Self-Determination Act, signed into law on October 30, 2000. This legislation allows counties to choose either a USFS 25% Fund act payment or the average of the high three years of USFS 25% fund payments from 1986 to 1999. This act is intended to restore payments formerly based on timber and other commodities that have declined 36% over the last ten years. This legislation applies to National Forests, but does not apply to National Grasslands.

# Economic Affected Environment

The Affected Environment section identifies the current conditions of the planning area relating to economics. Included are assessments of the overall economic health of the region and individual counties, in terms of income, county payments and finances, jobs, and population.

## Introduction

One of the primary issues obtained from the analysis of DEIS public comments was concern over the economic well-being of local communities and the effects National Grassland and Forest land management decisions would have on the economic well-being of individuals and communities.

The following observation was made by Drabenstott (1996).

> The economy of the rural heartland, of which the Northern Great Plains states are a part, has been undergoing great change since 1980. After a dismal decade in the 1980s, the economy of this region has recovered somewhat. Although economic indicators have picked up on average, much of the new rural growth is in counties with scenic amenities or in emerging trade centers that draw much of their strength from surrounding counties. Many rural counties remain in steep economic decline, with dwindling populations and growing fiscal problems.

Barkema et al. (1996) made a similar assessment:

> The economic future of the Northern Great Plains will not depend so much on how many bushels of grain or pounds of meat produced; rather it will depend on the value added (from further processing or marketing) to these products before they are shipped to the rest of the nation and the world. It is clear that if the region remains mostly a producer of bulk farm commodities, the number of farms will continue to shrink, leaving fewer and fewer farm trade centers serving ever-expanding market regions. This outlook is one of economic decline, if not death, for many small, remote rural communities.

One can see these trends in the economic data presented later in this chapter. Table 3-2 shows a number of counties to be heavily dependent on livestock and mineral production and many of those same counties show declines in employment (see Table 3-4) and population (see Table 3-20) over the last ten years. Stark County is the only North Dakota County in the Little Missouri study area showing increases in jobs and population over the last ten years.

## Economic Dependency and Diversity

Economic dependency and diversity are important features of local economies that can assist managers in measuring the general health of the economy. The effects of changes in national grassland and national forest management on these indicators are discussed in this section. Also included in this section is a discussion on payments to counties and conservation practice funds.

Economic dependency and diversity can be measured by various indices and techniques. Income and employment (jobs) are the usual units of measure. Also, for purposes of this analysis, dependency and diversity are discussed at the county level. The county is the smallest geographic level for which reliable economic data is readily available. The economic input/output model, MicroIMPLAN (Alward et al. 1994), was used to conduct much of the analysis to determine dependency, diversity, and economic structure. The methodology used for this analysis is discussed in more detail below.

## Economic Dependency

Economic dependency is discussed in this report because it allows us to look at the relative magnitude of the industries affected by changes in national grassland and forest management plans. Economic dependency refers to a condition where an economy might depend on a limited number of industries. The larger a particular industry's role is in the economy, the more dependent the economy is on that industry. A high degree of dependency on one or a few

industries puts the fate of the economy within the hands of those few industries. The failure of one industry could cause substantial instability to a local economy.

Economic dependency is estimated by determining the approximate percentage of the total economy of each county that can be attributed to a particular industry. Of special interest in this analysis are those industries that can be affected by activities originating from national grassland or national forest management. These activities include livestock grazing, mineral extraction, recreation, and timber harvesting.

To determine how much of an economy is "attributable to" a particular industry, it is customary to divide the economy into its basic and derivative components. The basic component arises from the sale of products to entities outside the economic area being analyzed. This includes physical products being exported outside the economic area, as well as the consumption of local goods within the economic area by consumers residing outside the local area. An example of this would be tourism. In summary, the basic component includes that part of production in excess of local consumption. The remainder of the economy is termed the derivative component and is assumed to be "derived" from the basic component of the economy.

In Table 3-2, the dependency on mineral production and livestock production of each county's economy was determined and expressed in terms of total employment and income dependent on mineral and livestock production within a county, economic impact area, and the Northern Great Plains as a whole. The actual amount of jobs and income were determined, as well as the percent of each economic sector in relation to the basic total county economy jobs and income. Table 3-3 displays county economic dependency on livestock grazing, mineral (coal, oil, and gas) production, and recreation use from national grassland/forest sources. Livestock grazing, mineral production, and recreation is depicted in Table 3-3 because data was readily available. Recreation data was available from National Forest System lands for Table 3-3, but was not available on a countywide basis and was not included in Table 3-2. Wood products were not included in Table 3-2 or Table 3-3 as the Pine Ridge is the only location within the Northern Great Plains planning area that sells commercial timber and those timber sales make a relatively small contribution to the area timber supply which includes the Black Hills National Forest.

## *Livestock Grazing*

Agriculture is an important industry in the Northern Great Plains. Livestock grazing is an important part of this industry in certain locations. An analysis was done to determine the extent of those components of the livestock industry that relate to national grassland and forest activities. The analysis also estimated the effects of various management alternatives on the livestock industry and the local economy.

On National Forest System (NFS) lands on the Northern Great Plains, cattle are by far the most prevalent type of livestock grazed. Sheep grazing occurs on the Buffalo Gap, Grand River and Thunder Basin National Grasslands, it is less than 8 percent of total grazing and was not modeled separately.

Rangeland forage is a major food source for cattle and sheep. Total rangelands in the U.S. represent about 770 million acres or 34 percent of the nation's land base (Joyce 1989). Population growth, consumer tastes, disposable income, the financial condition of the livestock industry, and international trade are all factors that determine demands for rangeland forage.

The ten-year outlook for cattle production is not expected to change significantly from 1999-2008. The Interagency Agricultural Projections Committee says,

> "The cattle herd builds up only slightly from a cyclical low near 97 million head in 2000, remaining below 100 million head in 2002-2004 before turning downward again as producer returns provide economic incentives for only a brief and moderate expansion. Additionally, shifts toward a breeding herd of larger-framed cattle and heavy slaughter weights partially offset the need for further expansion in cattle inventories. The beef production mix continues to shift toward a larger proportion of fed beef, with almost all steers and heifers being feedlot fed. Beef production also continues to move toward a higher graded product being directed toward the hotel-restaurant and export markets. The U.S. remains the primary source of high quality, fed beef for export, including hotel-restaurant trade. However, the emergence of the United States as a long-term net beef exporter will be delayed until near the end of the baseline (2008), after the cow herd is reestablished and weak demand in the Pacific Rim recovers." (USDA Baseline Projections 1999).

Livestock production from NFS lands on the Northern Great Plains is very important to the people who hold grazing permits. Overall, though, the national grasslands and forests of the Northern Great Plains play a minor role in the total production of cattle and sheep. Total production from the 37 counties in the area of influence (those counties containing or adjacent to National Forest System lands in the planning area) is approximately 2.2 percent of the national cattle herd size. Of the 37-county cattle production total, less than 4 percent of the 2.2 percent contribution to the national cattle herd is derived from the national grasslands and forests on the Northern Great Plains (Census of Agriculture 1992; Forest Service grazing records[1]).

Nonetheless, local ranchers with grazing permits have an interdependent relationship with the national grasslands and forests. The public lands provide livestock forage for part of the year; with the permittee providing forage for the remainder of the year. Therefore, any increase or decrease in forage provided from public lands may cause adjustments in herd sizes or other factors related to permittees' livestock operations and affect efficient grazing use of their own lands.

The livestock industry is divided into three IMPLAN economic sectors: cattle feedlots, ranch-fed cattle, and range-fed cattle. For activities associated with national grasslands or forests, only the range-fed cattle sector is analyzed to determine direct economic effects. The range-fed cattle sector is connected with the cattle feedlots and ranch-fed cattle sectors in determining indirect and induced effects. Indirect effects result from economic activity between the range-fed cattle sector and all other sectors. Induced effects result from economic activity created from the numerous rounds of spending from direct and indirect economic activity.

The economic characteristics of the livestock industry analyzed included: jobs and income for each sector and economic diversity indices for all counties in the economic impact area.

The percentage of livestock grazing attributable to the national grasslands and forests was calculated using Forest Service grazing records and data from the 1997 U.S. Census of

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[1] See Appendix B - Methodology for Determining Economic Response Coefficients.

Agriculture (USDA National Agricultural Statistics Service 1997). This information was combined with the economic data for the appropriate grazing sectors. For example, 8.6% (71 out of 827 jobs) of direct, indirect, and induced employment in Billings County, North Dakota is attributable to the grazing industry (see Table 3-2).

Many counties are dependent on grazing for more than 10% to total employment, such as Cherry County, Nebraska, Campbell County, Wyoming, and Slope County, North Dakota (see Table 3-2) but only a fraction of that grazing occurs on NFS lands (see Table 3-3).

All economic impact areas show the national grassland and forest economic impact areas responsible for less than 2.5% of the direct, indirect, and induced employment and income linked to range-fed livestock grazing (see Table 3-3). The Little Missouri Economic Impact Area (EIA) is a relevant example. The Little Missouri EIA had 49,588 jobs in 1997 and 1,432 of those jobs were dependent on the livestock industry either directly or indirectly for an EIA livestock industry employment dependence of 2.9% (see Table 3-2). Of the 1,432 livestock industry related jobs, 666 are dependent on Little Missouri National Grassland grazing pastures, which relates to a Little Missouri EIA National Grassland dependence of 1.3% (see Table 3-3).

The demand for grazing permits on the Northern Great Plains national grasslands and forests exceeds the availability of such permits. A grazing permit is attached to the "base property" of a private landowner. A person must own and use that base property for grazing to qualify for grazing on the national grasslands or forests. Base property with a federal grazing permit sells for considerably more per acre than property without such a permit. Grazing associations and permittees have shown a consistent willingness to fill grazing permits that become available. Alternative sources for grazing capacity (feed, rented land, etc.) are generally more expensive than grazing on federal land for a permittee who has already invested in a grazing permit by owning base property. Several comments received on the DEIS indicate non-Forest Service grazing pastures are in short supply.

Although a grazing permit does not give a rancher permanent rights or title to National Forest System land (36 CFR 222.3 (c)), real property values are associated with a grazing permit by banks, real estate markets, and other institutions. A grazing permit does add to the real estate value of a ranch. A study in Wyoming (Bastian et al. 2000) found a USDA Forest Service permit had an average real estate value of $68.00 per animal unit month (AUM) with a range of $40 - $100 per AUM. The grazing permit real estate value will vary across the Northern Great Plains, but the key point is that various financial markets recognize this value. Further a rancher can obtain a loan based on a percentage of the real estate value of the AUMs in a Forest Service grazing permit. The ability to borrow working capital may determine whether some ranches are able to stay in business. The fact that the market demonstrates a willingness to pay more for ranch land with a Forest Service grazing permit attached to it supports the premise that a Forest Service grazing permit is a less expensive means of providing forage than are other sources of grazing capacity.

Generally livestock graze during the summer on National Forest System land and in the winter on private land. If a reduction occurs, a ranch can compensate for the loss by buying more forage, renting private grazing land, putting more land into crops for livestock, or reducing herd size and possibly increase profitability. Van Tassell et al. (1998).reported that average-annual-net-cash income declined significantly and that the probability of negative cash flow increased substantially with reductions in USFS AUMs.

One of the concerns presented during the DEIS comment period was over the possibility that reductions in grazing on the Little Missouri National Grassland could reduce ranching profits to the point that a significant number of ranches would go out of business concurrently or even cause a collapse in the local ranching industry. The assumption is that a high percentage of the ranches could be or are on the brink of going out of business and the reduction in grazing proposed by the FS would put these ranches under the economic viability threshold causing a collapse of the industry.

The above scenario is highly unlikely and inconsistent with the dynamics of the ranching or any other industry. The following is an explanation of why this in unlikely.

It is helpful to be aware of two types of economic thresholds - one for each individual firm or ranch and one for the industry as a whole. Each individual ranch has its own individual financial profile varying from those that are well managed and prosperous to those that are riding the margin of collapse. There is a wide and complete spectrum of financial conditions. As conditions improve new firms emerge at the margin – as conditions deteriorate existing firms fall out at the margin. We know this to be a fact based on the history of the industry.

In summary, ranches come and go, one at a time, depending on economic forces (such as availability of public grazing). As ranches drop out of the market, forage and other raw materials are quickly absorbed by surviving (more competitive) ranches. This adjustment is a feature of a well functioning economic system, which allows it to survive.

How does the above relate to the collapse of the industry as a whole? This is difficult to answer because we don't have any historical data that suggests how large the grazing industry must be to survive or remain viable. Theoretically an industry can consist of as little as one firm but we don't know how large that firm must be. We know that a certain infrastructure must be available for the industry to function. This infrastructure, in the case of the livestock industry would include, for example, all the suppliers, holding facilities, and transportation system. Rather than analyze each individual component one just has to look around (Census of Agriculture) to see that the grazing industry in the Northern Great Plains study area is far greater than it is in many other places suggesting that the threshold of viability is far less than the magnitude of the present industry and any reductions in grazing proposed by the FS would be of no threat to the viability of the industry.

### *Oil, Gas, and Minerals*

The minerals and mining industry on NFS lands in the Northern Great Plains are limited to oil and gas extraction and coal mining on the Thunder Basin National Grassland and oil and gas extraction on the Buffalo Gap and Little Missouri National Grasslands.

The entire Little Missouri and Cedar River National Grasslands are within the Williston Basin, one of the major oil producing basins in the United States. Management activities within this basin have a direct and immediate effect on the domestic oil and gas industry. A marginally producing well in the Williston Basin yields about 19 barrels per day, and the average well produces 30 barrels per day (ND Petroleum Council 1999). In many fields in the United States, this is considered a major producing well.

North Dakota is the ninth ranking state for oil and gas production in the United States. The four leading North Dakota counties in 1998 production were Bowman, Billings, McKenzie, and Williams. Much of this production was from Forest Service lands in Billings and McKenzie

Counties. In fiscal year 1998, acquired lands administered by the Forest Service in the Little Missouri National Grassland provided oil and gas rent and royalty revenues of $14 million. Of that amount, one fourth, or $3.5 million, was returned to McKenzie, Billings, Golden Valley, and Slope Counties for schools and roads. Public domain land administered by the Forest Service and BLM in the Little Missouri provided an additional $4.5 million; half of that was returned to the state of North Dakota.

Some of the federal mineral reserves are jointly owned by private individuals, state, or local units of government. In the process of acquiring the Little Missouri National Grassland, a court settlement was reached in which three counties were given a 6.25% interest in some acquired federal mineral royalties or half of the normal federal royalty of 12.5% (see Table 3-12). The extent to which these counties receive the 6.25% royalty depends on the location and production of individual wells.

The state of North Dakota has a 5% gross oil production value (minus a state or federal royalty) tax and a $.0405/thousand cubic feet gas tax which is also determined after state or federal royalties are subtracted. In addition, North Dakota-owned state lands receive a 16.7% royalty or 1/6th royalty (Hand 2000; Appendix D Energy Activities). Public domain energy receipts, state royalties, and gross production taxes paid to North Dakota are in turn shared with the originating county through a number of different formulas.

Most of the Thunder Basin National Grassland lies within the Powder River Geologic Basin, a 12,000 square mile oil, gas, and coal bearing area. There are 74 developed oil and gas fields within the Thunder Basin National Grassland. Oil and gas revenues from the Thunder Basin National Grassland provided $2.5 million in receipts during fiscal year 1997. Some of the oil and gas wells in the Newcastle, Wyoming area have been producing since the 1950s. The average well on Thunder Basin National Grasslands produces about 4.6 barrels of oil per day. This is an economically marginal stripper well. On a national basis, stripper wells produce 32 percent of the oil that comes from federal lands. Oil produced from stripper wells is an important group of our national oil production and significant to both local and national economy.

On the Nebraska National Forest, only a tiny fraction of total oil production for this area (Fall River County, South Dakota) comes from the Buffalo Gap National Grassland. No natural gas is produced. The overall economic impact and demand is small.

The same analysis processes that were used for the grazing sectors (discussed above) were used to determine the role of the minerals activity occurring on the national grasslands and forests in local economies. Forest Service production records were used to determine the percent of the oil, gas, and coal related industries attributable to Forest Service administered lands[2]. Several different mineral industry sectors were analyzed, including coal mining, natural gas and crude petroleum, natural gas liquids, and railroad transport.

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[2] See Administrative Record, "National Grassland Coal Production", "NGP Grasslands Min Prod FY 95-96", "Thunder Basin Oil and Gas Activity, Prod, Revenues."

Total oil and gas income is large in relation to employment because of the following:

- The industry is not labor intensive.
- Oil and gas leave the county with little value added (relatively few employees needed and county revenue sharing is estimated to be 3.125 percent of gross oil and gas receipts).
- Profits from gas and oil businesses in the county may end up with proprietors who live outside the county.

Again, Billings County, North Dakota is a good example. Economic data shows that 4.8% percent of the total income in Billings County is attributable to the oil and gas industry but that income only results in .6% of the employment (see Table 3-2).

The coal industry tends to produce more jobs than the oil and gas industry because more labor is involved in the mining and transport of coal than in drilling for and transporting oil and gas. Only the Little Missouri and Thunder Basin National Grasslands have significant coal reserves. Coal mining is currently occurring only on the Thunder Basin National Grassland.

Thunder Basin National Grassland produces significant quantities of coal. In 1997, 22.2 percent of all coal produced in the nation came from Campbell County, Wyoming. The nation's largest coal mine, the Black Thunder mine, resides in the Thunder Basin National Grassland. The Black Thunder mine produced 15% of Campbell County coal in 1997. There are six major coal mines in the Thunder Basin area; Antelope Coal Co., Black Thunder, Jacobs Ranch North Antelope, Rochelle, and North Rochelle. In 1997, these mines had a combined production of over 138,000,000 short tons or slightly more that 12% of the national total (Department of Energy 1997).

Nationwide, coal production and use are increasing. Total annual U.S. production grew from 600 million tons in 1970 to more than a billion tons in 1998. Production is projected to increase to nearly 1.3 billion tons by 2020. Most of this growth is expected to come from mines in the western U.S.; eastern U.S. mines continue to lose their market share to western mines. In 1970, western mine coal production was a small percentage of the nation's total, by 2020 western coal production is projected to be 772, million tons, more that 50 percent of the nation's total (Department of Energy 1998).

### *Recreation and Tourism*

A number of commentors on the DEIS questioned the ability of recreation and tourism to replace livestock grazing related jobs and income. At the present time, there is little data available on the dependency of each county on recreation/tourism activities linked to the national grasslands or forests. Several studies show the recreation/tourism industry does contribute significantly to income, employment, and diversity in local economies in the region. For example, DeVilbiss (1992) shows that the contribution from recreation, wildlife, and fish activities on Ft. Pierre National Grassland comprise $750,000 of income and 31 jobs in the Ft. Pierre area. By contrast, the livestock-related activities generate slightly more dollars but fewer jobs. (It should be noted that the activities associated with the national grassland in either industry combined do not contribute more than 6% of jobs and income to affected counties however, the activities do add diversity to the local economies. See Table 3-3). Fletcher

(Fletcher, et al, 1998) estimated that it would take 1,200 Tourism Visitor Days[3] (TVD) to replace the personal income of 1,000 AUMs and it would take 1,074 TVD to replace the employment of 1,000 AUMs on the Bighorn National Forest. Table 3-3 estimates recreation and tourism provides approximately two-thirds of the jobs and three-fourths of the income as does the livestock industry from National Forest System lands on the Northern Great Plains as a whole.

In another study of the Ft. Pierre area, Beutler (1991) compares the total annual economic impact from recreation on the Ft. Pierre National Grassland ($1.9 million) with the total economic impact from livestock grazing on the Ft. Pierre National Grassland ($2.6 million).

These studies and observations support the conclusion that recreation use of National Forest System lands contributes jobs and income to local economies comparable to levels contributed by livestock grazing on National Forest pastures.

Further, Bangsund and Lestritz's (1996) study for Billings County shows that in recent years income generated from livestock activities in the entire county is about equal to income generated from tourism in the county. Tourism nearly doubled in 5 years, from 3.3 percent of the economic base in 1989 to 6.5 percent in 1994 (corresponding to a 14.5% rate of increase), while other sectors remained nearly constant or declined. This study includes the Little Missouri National Grassland and other federal lands, such as Theodore Roosevelt National Park, so the exact contribution to recreation/tourism from the national grassland is unknown. Fletcher (Fletcher et al, 1998) indicated that recreation on the Big Horn National Forest in Wyoming experienced a 2.8% rate of increase from 1986 to 1990. See Table 3-1 for current and future projections of recreation use.

An economic job and income model was developed for general tourism in the Northern Great Plains economic impact areas. The response coefficients were developed for both (1) nonresident tourists and (2) resident tourists. Nonresident tourists are those that reside outside the economic impact area that is being analyzed. The analysis displayed in Table 3-1 below assumed a 50/50 ratio between resident and nonresident tourists and looks at current and 5 year estimated tourism impacts assuming a 5% and a 20% compound rate of growth in tourism on National Forest System Lands.

**Table 3-1. Current and Future Jobs and Income Related to Tourism On National Forest System Land.**

| Estimated Current and Projected Future Tourism Jobs and Income From Activities On National Forest System Lands* | | Current Direct Indirect, and Induced | | Year 5 With 5% Growth Rate Direct Indirect, and Induced | | Year 5 With 20% Growth Rate Direct Indirect, and Induced | |
|---|---|---|---|---|---|---|---|
| Economic Impact Area | 1992-1996 Est. Ave. RVDs | Jobs | Earned Income 1997 Dollars | Jobs | Earned Income 1997 Dollars | Jobs | Earned Income 1997 Dollars |
| Grand River/Cedar River | 14,700 | 35 | $466,000 | 45 | $595,000 | 88 | $1,160,172 |
| Little Missouri | 95,900 | 240 | $3,284,000 | 305 | $4,192,000 | 597 | $8,172,119 |

[3] A TVD is comparable to a the Recreation Visitor Day RVD used by the Forest Service to measure recreation use

| Estimated Current and Projected Future Tourism Jobs and Income From Activities On National Forest System Lands* | | Current Direct Indirect, and Induced | | Year 5 With 5% Growth Rate Direct Indirect, and Induced | | Year 5 With 20% Growth Rate Direct Indirect, and Induced | |
|---|---|---|---|---|---|---|---|
| Sheyenne | 21,300 | 55 | $673,000 | 70 | $859,000 | 135 | $1,674,891 |
| Thunder Basin | 64,100 | 160 | $2,200,000 | 205 | $2,808,000 | 399 | $5,474,803 |
| Buffalo Gap | 165,700 | 375 | $6,148,000 | 475 | $7,846,000 | 928 | $15,297,079 |
| Fort Pierre | 60,700 | 140 | $1,998,000 | 175 | $2,550,000 | 340 | $4,971,968 |
| Bessey/McKelvie | 85,000 | 205 | $2,498,000 | 260 | $3,188,000 | 508 | $6,215,139 |
| Pine Ridge/Oglala | 60,200 | 150 | $1,778,000 | 190 | $2,270,000 | 374 | $4,424,775 |

* See FEIS Chapter 3 Recreation and Travel Management

## *Wood Products*

Dependency in the wood-products sector was calculated for Dawes County, Nebraska, only because it is the only county with potential for commercial timber harvest. Total wood products exports are 2.1% of the total foreign and domestic exports of the county. About 1% of the local employment and 1.1% of the total income can be attributed to the wood products industry. Timber related income and employment from Nebraska National Forest activities are negligible at this time because most timber is obtained from private land.

Currently, there is no planned and sustained timber harvest program from any of the units under review. Only a small amount, if any, is likely in the future, simply because so little merchantable timber is found on the units. Timber programs for the three participating national forests are summarized below.

Personal-use firewood permits are available on the Little Missouri and Sheyenne National Grasslands. Some personal-use post, pole and sawlog production could potentially exist on the Little Missouri National Grassland in the future, especially on the Medora Ranger District. On the Sheyenne National Grassland, some cottonwood stands, mostly occurring as old shelterbelts, could be harvested and support a small, local, wood-pallet manufacturing operation. At most, a sustained harvest of .2 to .3 MMBF (million board feet) could be provided, according to district personnel.

No commercially suitable timber lands were identified on the Thunder Basin National Grassland. Stands of ponderosa pine, at about 2 MBF (thousand board feet) per acre, are interspersed among the grasslands. No inventory volumes are available. A few areas may have ponderosa pine stands with as much as 7 MBF per acre. Personal-use firewood permits are available on the Thunder Basin National Grassland.

Timber inventories for the Pine Ridge Ranger District of the Nebraska National Forest were last conducted 15 years ago. Two timber sales have been conducted since 1990. Each sale provided a little more than 1 MMBF. Personal-use firewood permits are available on the Pine Ridge Ranger District. Timber cut from the Pine Ridge is processed at mills throughout the region, as far away as Spearfish, South Dakota

Although the Samuel R. McKelvie and Nebraska National Forest (Bessey Ranger District) have timber resources, the tree stands are hand-planted, mostly recognized for their recreational value. Total volume is estimated at about 563 MBF. In the last ten years, about 2,000 posts have been sold to a local milling firm.

## Economic Diversity

Economic diversity is a measure of how much variety there is in a particular economy and is closely related to economic dependency. It is believed that diverse economies are more resilient to external impacts than less diverse economies. A relatively diverse economy would not be dependent on just one or a few industries. Where possible information is presented at the county level. When data is presented at a scale greater than the county level it is presented at the Economic Impact Area (EIA) level. Table 3-2 below identifies the Economic Impact Areas and the counties within them.

County economic diversity has been measured by an index, called the Shannon-Weaver Entropy Index, and includes all the different economic sectors within those counties. The resulting diversity indices are a function of the number of economic sectors in a county economy and the distribution of employment across those sectors, usually the larger the economy the larger the index. However, sometimes there can be large differences in economies that are of similar size. The index varies between 0 and 1, with higher numbers indicating greater diversity.

The last year for reliable data to calculate the index is 1996. The comparison year was 1982. Table 3-2 shows all counties gaining in economic diversity from 1982 to 1996. However, this does not show the effects of declining oil prices and increases in tourism. For this reason, the 7-year period from 1990 through 1996 was examined. From 1990 to 1996, Slope and Billings counties in North Dakota had a decline in the Shannon Weaver index. The decline in gas and oil and other markets early in the decade caused economic declines and even decreases in population in 37 Northern Great Plains counties for the period 1990 to 1993 as was displayed in the DEIS (Table CLR-2 pages 3-13-3-15). When the economy shrinks the number of sectors usually decrease and consequently the diversity index declines. By 1996, many of these counties appear to have recovered some of the diversity lost earlier in the decade.

**Table 3-2. Dependency and Diversity of Affected Counties**

| | **County Livestock Production (sectors 3,4, and 5)** | | **County Mineral Production (sectors 37, 38, and 39)** | | **Economic Diversity** | | |
|---|---|---|---|---|---|---|---|
| **Area** County | **Direct, Indirect, and Induced Employment % of Total** | **Direct, Indirect, and Induced Income % of Total** | **Direct, Indirect, and Induced Employment % of Total** | **Direct, Indirect, and Induced Income % of Total** | **Shannon-Weaver Index 1996*** | **=Diversity Direction* 1982-96** | **1990-96** |
| **Northern Great Plains EIAs** | | | | | | | |
| Total | 10.6% | 4.9% | 1.9% | 9.0% | | | |
| **Dakota Prairie Grasslands EISs** | | | | | | | |
| EIA Totals | 14.6% | 6.5% | 1.3% | 7.3% | | | |

| Area<br>County | County Livestock Production (sectors 3,4, and 5)<br>Direct, Indirect, and Induced Employment<br>% of Total | <br>Direct, Indirect, and Induced Income<br>% of Total | County Mineral Production (sectors 37, 38, and 39)<br>Direct, Indirect, and Induced Employment<br>% of Total | <br>Direct, Indirect, and Induced Income<br>% of Total | Economic Diversity<br>Shannon-Weaver Index<br>1996* | =Diversity Direction*<br>1982-96 | <br>1990-96 |
|---|---|---|---|---|---|---|---|
| **Grand River / Cedar River National Grassland EIA** | | | | | | | |
| EIA Total | 33.7% | 20.1% | NA | NA | | | |
| Adams, ND | 35.1% | 32.3% | NA | NA | 0.6133 | Up | Up |
| Corson, SD | 42.2% | 21.6% | NA | NA | 0.6226 | Up | Up |
| Perkins, SD | 38.9% | 17.98% | NA | NA | 0.6708 | Up | Up |
| Sioux, ND | 17.5% | 10.4% | NA | NA | 0.6007 | Up | Up |
| **Little Missouri National Grassland EIA** | | | | | | | |
| EIA Total | 14.1% | 5.7% | 1.9% | 10.5% | | | |
| Billings, ND | 42.4% | 27.5% | .6% | 4.8% | 0.5056 | Up | Down |
| Bowman, ND | 25.9% | 13.5% | 1.9% | 10.2% | 0.6883 | Up | Up |
| Dunn, ND | 55.9% | 28.0% | 3.3% | 16.1% | 0.6174 | Up | Up |
| Golden Valley, ND | 28.2% | 14.6% | NA | NA | 0.6706 | Up | Up |
| McKenzie, ND | 22.7% | 9.5% | 11.7% | 48.6% | 0.7148 | Up | Up |
| Slope, ND | 73.7% | 45.8% | 1.1% | 4.7% | 0.3991 | Up | Down |
| Stark, ND | 4.6% | 2.4% | 2.9% | 17.9% | 0.7381 | Up | Up |
| Williams, ND | 3.5% | 1.6% | 5.1% | 25.3% | 0.7377 | Up | Up |
| Richland, MT | 13.2% | 4.5% | 2.0% | 4.5% | 0.7096 | Up | Up |
| Wibaux, MT | 32.9% | 13.4% | NA | NA | 0.5571 | Up | Up |
| Dawson, MT | 13.2% | 4.4% | NA | NA | 0.7017 | Up | Up |
| Fallon, MT | 30.8% | 8.1% | 14.7% | 35.2% | 0.6970 | Up | Up |
| **Sheyenne National Grassland EIA** | | | | | | | |
| EIA Total | 6.0% | 2.2% | NA | NA | | | |
| Ransom, ND** | 13.5% | 5.5% | NA | NA | 0.6761 | Up | Up |
| Richland, ND | 3.7% | 1.3% | NA | NA | 0.7428 | Up | Up |
| **Thunder Basin National Grassland EIA** | | | | | | | |
| EIA Total | 10.4% | 4.9% | 8.1% | 33.9% | | | |
| Campbell, WY | 5.2% | 2.5% | 10.1% | 23.3% | 0.7141 | Up | Up |
| Converse, WY | 11.5% | 5.3% | 2.3% | 4.9% | 0.7530 | Up | Up |
| Crook, WY | 23.7% | 11.9% | 0.1% | 0.1% | 0.6995 | Up | Up |
| Natrona, WY | .8% | .5% | 9.5% | 32.2% | 0.7534 | Up | Up |
| Niobrara, WY | 35.5% | 24.7% | NA | NA | 0.5661 | Up | Up |
| Weston, WY | 9.5% | 4.1% | 16.2% | 47.2% | 0.7295 | Up | Up |
| **Nebraska National Forest and Associated Units EIAs** | | | | | | | |
| EIA Totals | 7.9% | 3.9% | .1% | .3% | | | |
| **Bessey Ranger District/Samuel R. McKelvie National Forest EIA** | | | | | | | |
| EIA Total | 47.8% | 42.9% | NA | NA | | | |
| Blaine, NE | 40.21% | 44.62% | NA | NA | 0.4856 | Up | Up |
| Cherry, NE | 52.07% | 44.69% | NA | NA | 0.5871 | Up | Up |
| Thomas, NE | 19.30% | 24.08% | NA | NA | 0.5151 | Up | Up |

| Area<br>County | County Livestock Production (sectors 3,4, and 5)<br>Direct, Indirect, and Induced Employment % of Total | <br>Direct, Indirect, and Induced Income % of Total | County Mineral Production (sectors 37, 38, and 39)<br>Direct, Indirect, and Induced Employment % of Total | <br>Direct, Indirect, and Induced Income % of Total | Economic Diversity<br>Shannon-Weaver Index 1996* | =Diversity Direction*<br>1982-96 | <br>1990-96 |
|---|---|---|---|---|---|---|---|
| **Buffalo Gap National Grassland EIA** | | | | | | | |
| EIA Total | 3.6% | 1.3% | .2% | .4% | | | |
| Custer, SD | 8.34% | 3.98% | 0.1% | 0.3% | 0.5834 | Up | Up |
| Fall River, SD | 13.95% | 5.58% | 0.1% | 0.2% | 0.5552 | Up | Up |
| Jackson, SD | 67.63% | 27.16% | NA | NA | 0.5590 | Up | Up |
| Pennington, SD | 1.25% | 0.44% | 0.3% | 0.7% | 0.6488 | Up | Up |
| **Fort Pierre National Grassland EIA** | | | | | | | |
| EIA Total | 9.2% | 3.9% | NA | NA | | | |
| Hughes, SD** | 2.2% | 0.9% | NA | NA | 0.5939 | Up | Up |
| Jones, SD | 40.3% | 20.2% | NA | NA | 0.5277 | Up | Up |
| Lyman, SD | 28.0% | 13.6% | NA | NA | 0.5418 | Up | Up |
| Stanley, SD | 25.0% | 11.2% | NA | NA | 0.5582 | Up | Up |
| **Pine Ridge Ranger District/Oglala National Grassland EIA** | | | | | | | |
| EIA Total | 22.4% | 9.2% | NA | NA | | | |
| Dawes, NE | 13.9% | 5.5% | NA | NA | 0.5940 | Up | Up |
| Sioux, NE | 117.1% | 54.8% | NA | NA | 0.5405 | Up | Up |

* See USDA Forest Service, 2001, Northern Great Plains County Economic Profile

** Hughes and Ransom Counties do have energy mineral sectors, but the sectors do not involve NFS lands or mineral rights and are not included.

Table 3-3 displays economic impact area (EIA) dependency on National Forest production of forage, energy minerals, and recreation production. Displayed are direct, indirect, and induced jobs and income versus area total jobs and income. Table 3-3 differs from Table 3-2 in that Table 3-2 is based on range production from all livestock producers in a county or EIA including National Forest and Grassland grazing, while Table 3-3 is based only on range production from National Forest and Grassland grazing. Note the dependency of Sioux County Nebraska and its 117.1% estimated dependency on the livestock industry for jobs. This error is due in part to the way jobs were determined in relation to the size and unique economy in Sioux County. The Dawes and Sioux county livestock industries are very similar and size and data viewed from the economic impact area (EIA) perspective scale yields more reliable results than from a county scale.

The main differences in dependency calculations between Table 3-2 and Table 3-3 is that Table 3-2 presents dependency on area wide industries, while Table 3-3 presents dependency on the Forest Service portion of area wide industries.

**Table 3-3. Economic Impact Area (EIA) Dependency on Current Forest Service Livestock, Mineral, and Recreation Production**

| | Livestock Production** | | Minerals** | | Recreation** | |
|---|---|---|---|---|---|---|
| Unit | Forest Service Dependent Employment | Forest Service Dependent Income | Forest Service Dependent Employment | Forest Service Dependent Income | Forest Service Dependent Employment | Forest Service Dependent Income |
| County | % of EIA Total+ | % of EIA Total+ | % of EIA Total | % of EIA Total | % of EIA Total | % of EIA Total |
| **Northern Great Plains EIAs** | | | | | | |
| Total | 0.90% | 0.40% | 1.20% | 1.10% | 0.60% | 0.30% |
| Dakota Prairie Grasslands EIAs | | | | | | |
| Dakota Prairie EIA Totals | 1.60% | 0.60% | 2.30% | 2.40% | 0.50% | 0.20% |
| Grand River / Cedar River National Grassland EIA | | | | | | |
| | 1.10% | 0.60% | NA | NA | 0.40% | 0.20% |
| Little Missouri National Grassland EIA | | | | | | |
| | 1.80% | 0.70% | 3.40% | 3.50% | 0.50% | 0.20% |
| Sheyenne National Grassland EIA | | | | | | |
| | 0.80% | 0.30% | NA | NA | 0.40% | 0.10% |
| **Thunder Basin National Grassland EIA*** | | | | | | |
| | 0.80% | 0.40% | 1.90% | 1.70% | 0.50% | 0.20% |
| **Nebraska National Forest and Associated Units** | | | | | | |
| Nebraska EIA Totals | 0.50% | 0.20% | 0.10% | 0.10% | 0.90% | 0.40% |
| Bessey Ranger District/Samuel R. McKelvie National Forest EIA | | | | | | |
| | 1.00% | 1.00% | NA | NA | 4.00% | 1.70% |
| Buffalo Gap National Grassland EIA | | | | | | |
| | 0.40% | 0.20% | 0.10% | 0.10% | 0.50% | 0.20% |
| Fort Pierre National Grassland EIA | | | | | | |
| | 0.50% | 0.20% | NA | NA | 0.70% | 0.30% |
| Pine Ridge Ranger District/Oglala National Grassland EIA | | | | | | |
| | 1.00% | 0.50% | 0.30% | 0.40% | 2.70% | 1.10% |

*Does not include approximately 1,250 and $51,000,000 direct, indirect, and induced jobs and income related to coal mining in Campbell, Converse, and Crook Wyoming corresponding to 3.6% of Thunder Basin EIA jobs and income.

** Data available did not allow the disaggregation of jobs and income dependent on National Forest System lands to the county level.

A number of comments on the DEIS questioned the ability of counties to absorb job losses. Table 3-4 below identifies the changes in insured employment (jobs covered by unemployment insurance) between 1990 and 1999.

**Table 3-4. Changes in Employment From 1990 to 1997.***

| Grassland / Forest County | Change in Employment (# of Jobs) 1990-1997 | % Change Compared To 1997 |
|---|---|---|
| **Grand River / Cedar River National Grasslands EIA** | | |
| Adams, ND | -58 | -3% |
| Corson, SD | 121 | 8% |
| Perkins, SD | 2 | 0% |
| Sioux, ND | 542 | 30% |
| **Total** | 607 | 8% |
| **Little Missouri National Grassland EIA** | | |
| Billings, ND | -118 | -15% |
| Bowman, ND | 78 | 3% |
| Dunn, ND | 144 | 7% |
| Golden Valley, ND | -113 | -10% |
| McKenzie, ND | 513 | 13% |
| Slope, ND | -42 | -9% |
| Stark, ND | 2308 | 15% |
| Williams, ND | 1187 | 9% |
| Richland, MT | 685 | 11% |
| Wibaux, MT | 34 | 6% |
| Dawson, MT | 450 | 8% |
| Fallon, MT | 167 | 8% |
| **Total** | 5293 | 10% |
| **Sheyenne National Grassland EIA** | | |
| Ransom, ND | 580 | 16% |
| Richland, ND | 2507 | 21% |
| **Total** | 3087 | 20% |
| **Thunder Basin National Grassland EIA** | | |
| Campbell, WY | 2158 | 10% |
| Converse, WY | 1008 | 15% |
| Crook, WY | 411 | 12% |
| Natrona. WY | 4328 | 10% |
| Niobrara, WY | 172 | 10% |
| Weston, WY | 479 | 10% |
| **Total** | 8556 | 11% |
| **Bessey Ranger District/Samuel R. McKelvie National Forest EIA** | | |
| Blaine, NE | -4 | -1% |
| Cherry, NE | 602 | 14% |
| Thomas, NE | 91 | 19% |

| Grassland / Forest County | Change in Employment (# of Jobs) 1990-1997 | % Change Compared To 1997 |
|---|---|---|
| **Total** | 689 | 14% |
| **Buffalo Gap National Grassland EIA** | | |
| Custer, SD | 503 | 13% |
| Fall River, SD | 359 | 9% |
| Jackson, SD | 144 | 11% |
| Pennington, SD | 6605 | 11% |
| **Total** | 7611 | 11% |
| **Fort Pierre National Grassland EIA** | | |
| Hughes, SD | 2230 | 18% |
| Jones, SD | 87 | 10% |
| Lyman, SD | 472 | 21% |
| Stanley, SD | 276 | 18% |
| **Total** | 3065 | 18% |
| **Pine Ridge Ranger District/Oglala National Grassland EIA** | | |
| Dawes, NE | 443 | 9% |
| Sioux, NE | -59 | -8% |
| **Total** | 384 | 7% |

Source - http://govinfo.kerr.orst.edu/reis-stateis.html

The ability of an economic region to reabsorb displaced workers depends on several factors. These factors include the qualifications of the workers and the characteristics of the job market. If the economy is growing and unemployment rates are low the chance of finding new employment are better than if these conditions do not exist. In the Northern Great Plains, unemployment rates are generally low but the economies are either growing very slow or not at all. Where jobs are being lost in agriculture and minerals industries and new jobs are occurring in the retail trade and services industry there may be a reluctance or inability to cross over without significant re-training. Another factor is commuting distance. Generally job losses are occurring in relatively remote agricultural areas beyond a reasonable commuting distance of the urban areas where new jobs are being generated.

The Little Missouri National Grassland and the Grand River National Grassland both show increases in total employment (see Table 3-4) by 10% and 8%, respectively . Adams, Billings, Golden Valley, and Slope counties lost jobs over the time period from a 3% loss in Adams County to a 15% loss in Billings County. All Buffalo Gap, Fort Pierre, and Thunder Basin economic impact area counties experienced gains in employment between 11% and 14%. In Nebraska, Blaine and Sioux Counties lost jobs by 1% and 8% respectively, but the Nebraska economic impact areas experienced an increase in jobs of between 7% and 14%.

# Federal Payments to Counties

Counties containing federal lands are entitled to payments from one or more federal revenue programs authorized by a long list of federal legislation. These revenue programs take two basic forms: "payments in lieu of taxes" (PILT payments) and other revenue-sharing programs referred to in total as "non-PILT payments." These payments help support county responsibilities, such as road maintenance and education, and are often very important to a county's financial health. Management decisions about levels of goods and services provided from the National Forest System lands affect these payments. Table 3-5 displays the source of county revenues exclusive of independent school district revenues.

**Table 3-5. Source of County Revenues.**

| Administrative Unit and County | Source of County Revenues 1996 - 1997* | | |
|---|---|---|---|
| | % Federal Revenue | % State Revenue | % Taxes and Misc. |
| **Cedar River National Grassland** | | | |
| Sioux, ND | 3% | 35% | 63% |
| **Grand River National Grassland** | | | |
| Adams, ND | 0% | 26% | 74% |
| Corson, SD | 4% | 12% | 83% |
| Perkins, SD | 0% | 31% | 69% |
| **Little Missouri National Grassland** | | | |
| Billings, ND | 25% | 33% | 42% |
| Bowman, ND | 0% | 68% | 32% |
| Dunn, ND | 2% | 37% | 61% |
| Golden Valley, ND** | 0% | 51% | 49% |
| McKenzie, ND | 25% | 34% | 41% |
| Slope, ND | 46% | 12% | 42% |
| Stark, ND | 0% | 45% | 55% |
| Williams, ND | 0% | 33% | 67% |
| Dawson, MT | 5% | 24% | 71% |
| Fallon, MT | 10% | 55% | 35% |
| Richland, MT | 4% | 29% | 66% |
| Wibaux, MT | 3% | 32% | 65% |
| **Sheyenne National Grassland** | | | |
| Ransom, ND | 1% | 29% | 69% |
| Richland, ND | 1% | 38% | 61% |
| **Thunder Basin National Grassland** | | | |
| Campbell, WY | 5% | 12% | 83% |
| Converse, WY | 2% | 8% | 90% |
| Crook, WY | 3% | 30% | 67% |
| Natrona, WY | 6% | 14% | 79% |
| Niobrara, WY | 8% | 27% | 65% |
| Weston, WY | 14% | 23% | 63% |
| **Bessey Unit Nebraska National Forest, McKelvie National Forest** | | | |

| Administrative Unit and County | Source of County Revenues 1996 - 1997* | | |
|---|---|---|---|
| | % Federal Revenue | % State Revenue | % Taxes and Misc. |
| Blaine, NE | 2% | 33% | 65% |
| Cherry, NE | 0% | 9% | 91% |
| Thomas, NE | 11% | 40% | 49% |
| **Buffalo Gap National Grassland** | | | |
| Custer, SD | 4% | 12% | 83% |
| Fall River, SD | 3% | 20% | 77% |
| Jackson, SD | 12% | 20% | 68% |
| Pennington, SD | 5% | 19% | 76% |
| **Fort Pierre National Grassland** | | | |
| Hughes, SD* | 1% | 16% | 83% |
| Jones, SD | NA | NA | NA |
| Lyman, SD | 3% | 25% | 72% |
| Stanley, SD | 9% | 20% | 71% |
| **Pine Ridge Unit, Nebraska National Forest, Oglala National Grassland** | | | |
| Dawes, NE | 4% | 31% | 66% |
| Sioux, NE | 24% | 33% | 43% |

+ USDA Forest Service, 2001, Northern Great Plains County Economic Profile / http://www.census.gov/prod/2/gov/gc92-4/gc924-3.pdf. and http://www.census.gov/prod/gc97/gc974-3.pdf

* 1996-1997 data not available, used 1991-1992 data

** Seems to be an error in the Census data

NA - Not Available

The following counties receive a larger portion of their annual funding from federal revenue sharing than do other counties in the Northern Great Plains. Golden Valley should also be included in the list, but an apparent error in census data made a meaningful comparison impossible. The increased federal revenue sharing provides additional revenues to these counties. These higher federal payments to these counties result in additional budgetary flexibility in these counties.

| | | |
|---|---|---|
| Slope, ND 46% | McKenzie, ND 25% | Weston, WY 14% |
| Billings, ND 25% | Sioux, NE 24% | Jackson, SD 12% |

The highest combined PILT and non-PILT payments per acre are received by Billings, Golden Valley, McKenzie, and Slope counties in North Dakota. These four counties receive $3.20 or more per acre in PILT plus non-PILT payments primarily due to oil and gas production (See Table 3-6). According to PILT records and Forest Service revenue sharing records (See Table 3-6) Golden Valley receives in excess of $300,000 annually from these two programs. According to census records (http://www.census.gov/prod/gc97/gc974-3.pdf), Golden Valley has an annual operating budget of approximately $1.5 million.

Another factor to be considered is that states also share federal revenues paid directly to states, state royalties, and state severance taxes with counties and other local units of government. The most significant source of state shared federal revenues would be from mineral related activities.

Non-PILT payments from other than mineral receipts to the affected counties generally come in two forms: the Forest Service 25 percent Fund (Payment Act of 5/23/1908) for the Nebraska and McKelvie National Forests, and the Bankhead-Jones Farm Tenant Act Fund (Payment Act of 7/22/1937) for the Buffalo Gap, Cedar River, Fort Pierre, Grand River, Little Missouri, Oglala, Sheyenne, and Thunder Basin National Grasslands. Both funds base their payment to counties on 25 percent of federal receipts. They differ in that the Forest Service 25 percent Fund is based on gross receipts, while the Bankhead-Jones Fund is based on net receipts. Generally, up to 75 percent of gross Bankhead-Jones receipts can be used for administration and Conservation Practice purposes on the National Forest System unit from which they were collected.

The following table displays the average PILT and non-PILT payments made to affected counties between 1990 and 1997 as available. As the table shows, payments are not evenly distributed among the counties.

**Table 3-6. Comparison of PILT to Non-PILT Payments to Counties**

| State<br>County | Average PILT Payment - 1997 $ From All Federal Entitlement Acres | Average PILT Payment – 1997 $ From Northern Great Plains Planning Unit Entitlement Acres | Average Non-PILT Payment 1997 $ From Northern Great Plains Planning Unit Receipts | Average PILT and Non-PILT Payments From Northern Great Plains Planning Units (1997$/Acre) |
|---|---|---|---|---|
| **Nebraska** | | | | |
| Blaine | $9,414 | $8,768 | $2,175 | $1.04 |
| Cherry | $87,955 | $72,356 | $15,994 | $0.76 |
| Dawes | $48,653 | $46,519 | $10,449 | $0.94 |
| Sioux | $65,216 | $62,668 | $7,942 | $0.83 |
| Thomas | $43,727 | $43,595 | $16,479 | $0.75 |
| **North Dakota** | | | | |
| Billings | $33,965 | $31,460 | $897,945 | $3.20 |
| Golden Valley | $11,937 | $11,937 | $297,991 | $3.22 |
| Grant | $7,219 | $388 | $70 | $0.95 |
| McHenry | $2,835 | $758 | $91 | $1.14 |
| McKenzie | $61,653 | $60,674 | $1,557,541 | $3.22 |
| Ransom | $24,753 | $24,753 | $9,624 | $0.82 |
| Richland | $16,348 | $16,348 | $6,453 | $0.81 |
| Sioux | $23,632 | $4,782 | $917 | $0.91 |
| Slope | $14,499 | $14,499 | $428,997 | $3.20 |
| **South Dakota** | | | | |
| Corson | $53,461 | $25,243 | $3,568 | $0.93 |
| Custer | $59,056 | $8,526 | $5,330 | $0.24 |
| Fall River | $184,715 | $151,071 | $21,662 | $0.74 |
| Jackson | $86,616 | $86,616 | $9,923 | $0.90 |

| State<br>County | Average PILT Payment - 1997 $ From All Federal Entitlement Acres | Average PILT Payment – 1997 $ From Northern Great Plains Planning Unit Entitlement Acres | Average Non-PILT Payment 1997 $ From Northern Great Plains Planning Unit Receipts | Average PILT and Non-PILT Payments From Northern Great Plains Planning Units (1997$/Acre) |
|---|---|---|---|---|
| Jones | $15,951 | $15,951 | $3,635 | $0.98 |
| Lyman | $84,854 | $49,156 | $11,043 | $0.99 |
| Pennington | $187,609 | $54,638 | $18,547 | $0.37 |
| Perkins | $88,482 | $88,482 | $14,196 | $0.83 |
| **South Dakota, cont.** | | | | |
| Stanley | $88,971 | $28,775 | $6,453 | $0.99 |
| Ziebach | $2,321 | $96 | $13 | $0.93 |
| **Wyoming** | | | | |
| Campbell | $165,218 | $66,550 | $108,699 | $1.10 |
| Converse | $156,509 | $68,742 | $123,931 | $1.11 |
| Crook | $41,640 | $37 | $207 | $0.81 |
| Niobrara | $73,970 | $497 | $575 | $1.28 |
| Weston | $78,488 | $57,648 | $155,599 | $0.94 |

Source Grassland Payments - Internal Forest Service Reports - Payments To Counties From National Grassland Receipts

Source National Forest Payments - (Payments To Counties From National Forest Receipts)

http://www.fs.fed.us/institute/economic_center/spatialdata4.html

Source NFS Acres - http://www.fs.fed.us/land/staff/

Source GNP Deflators 2/19/99 - http://www.fs.fed.us/institute/economic_center/financialdata2.html

PILT Source - http://www.fs.fed.us/institute/economic_center/spatialdata4.html

The calculation for non-PILT payments from federal receipts is easier to estimate than PILT payments. The PILT payment formula has undergone a gradual 120 percent increase from 1995 to 1999 as a result of a 1994 amendment to the PILT act. Even though Congress passed the legislation, they have not funded it. Instead, Congress has placed a limit on the amount of PILT that can be paid to qualifying counties in the United States. In 1998, PILT was funded at a little more than 45 percent of the payment levels established in the 1994 amendment. The 45 percent Congressional funding level has negated the 1994 amendment to the PILT act and has the general effect of funding at the 1994 level, although this could change at any time with full or partial funding of the 1994 amendment.

PILT payments are also reduced by the previous year's non-PILT county payment unless a state passes legislation allowing non-PILT payments to go to units of financially and politically independent units of government other than counties, such as school districts. South Dakota passes all Bankhead-Jones (non-PILT) funds to school districts. Nebraska passes most Bankhead-Jones and Forest Service 25 percent Funds (non-PILT) to local school districts. Wyoming and North Dakota do not have such legislation. For counties with non-PILT receipts that are large in relation to PILT payments, there is a minimum PILT payment (22 cents/acre), which is also subject to reduced Congressional PILT funding.

Payments for coal mining occurring on the Thunder Basin National Grassland is a very significant non-PILT payment not compared by alternative in the effects section below. While

the coal reserves are under the Thunder Basin National Grassland they are public domain coal reserves falling under the rules of the 1910 Mineral Lands Leasing Act. This provides revenue for the state of Wyoming. If the coal mineral reserves were acquired Bankhead-Jones reserves, the federal coal receipts and Wyoming counties would get 25 percent of coal receipts. Under the Mineral Land Leasing Act, the state of Wyoming (not Wyoming counties) receives 50 percent of Federal coal receipts. Mineral Leasing Act payments do not affect PILT because the payment is made to the state and not the counties. The state of Wyoming uses these coal receipts to fund school projects and other programs across the state.

Total Thunder Basin (Wyoming) federal coal royalties averaged $40 million annually between 1995 and 1999 in 1997 dollars. This does not include rentals, bonuses, and other fees associated with the Thunder Basin federal coal estate. Thunder Basin federal coal receipts seem to be decreasing; in 1999 Thunder Basin coal royalties were approximately $27 million. Wyoming receives half the annual coal royalties, rentals, bonuses, and other fees received from the federal mineral estate under the Thunder Basin National Grassland. Total PILT and non-PILT receipts received by the rest of the Northern Great Plains grasslands and forests are dwarfed by the revenue sharing associated with coal production on the Thunder Basin National Grassland.

An analysis of possible alternative effects to current and future Thunder Basin coal mining indicates coal mining will not be affected for the following reasons:

- The entire Thunder Basin area is currently a Class II airshed. A change to a Class I airshed could place severe restrictions on mining operations. No alternative would lead to a change in this classification. If Congress were to pass legislation creating a new wilderness in the Thunder Basin airshed, the airshed would remain Class II.
- None of the alternatives would affect coal leases. Future coal expansion will follow coal seams to the north and west away from sensitive wildlife and unroaded areas.
- The coal mines have a good working relationship with the US Fish and Wildlife Service and use direct consultation to mitigate threatened, endangered, and sensitive species issues.
- The Forest Service does not use buffer zones for visual quality. Coal mines have low scenic integrity objectives and it would be acceptable to look out from a high scenic quality area into a low scenic quality area such as a coal mine.

## Conservation Practice Funds

Bankhead-Jones legislation allows for the use of receipts from management of National Forest System lands on the units from which they were earned. Collectively, these funds are called Conservation Practice (CP) dollars. On the national grasslands, CP dollars have historically been obtained from grazing receipts. Twenty-five percent of these CP dollars must be returned to the Treasury. The remaining 75 percent may be used for a combination of conservation practices (50 percent) and for grazing association administration (no more than 25 percent). The Forest Service and the Grazing Association board develop a list of required conservation practices (e.g., water developments, fences, noxious weed control, cultural resource surveys). The grazing association then implements the conservation practices and the grazing fees paid to the Forest Service are reduced accordingly.

Other types of Bankhead-Jones federal receipts can be used for CP dollars, such as special use or mineral receipts, but the use for such purposes is rare. National forests are generally not Bankhead-Jones lands and CP dollars are not available for receipts from national forests (the Pine Ridge Ranger District of the Nebraska National Forest was acquired under Bankhead-Jones authorization. It is administered under the Weeks Law and CP funds are not available from it, although 25 percent of receipts are returned to counties).

Federal revenue sharing for grazing receipts collected from National Grasslands generally fall under the Bankhead-Jones legislation. Revenue sharing with counties is based on net receipts (generally 25% of the total grazing fee). The collection of CP funds from the gross grazing receipts does reduce the non-PILT payment to counties.

## Range Betterment Funds

Range Betterment Funds are authorized by section 1751 of the 1976 Federal Land Policy and Management Act (90 Stat. 2744; Public Law 94-579). Range Betterment Funds are collected for the two National Forests included in the Northern Great Plains Management Plan Revision effort; the Nebraska National Forest and the Samuel R. McKelvie National Forest. Both Forests are entirely in the State of Nebraska. Range Betterment collections consist of 50%of grazing receipts from the National Forests in Nebraska. Of the Range betterment Funds collected half go to the district, region, or national forest from which it was collected for on-the-ground range rehabilitation, protection, and improvements; the other half goes for on-the-ground range rehabilitation, protection, and improvements as the Secretary of Agriculture directs.

Federal revenue sharing from receipts collected on the Nebraska and Samuel R. McKelvie National Forests fall under the USFS 25% fund Act. Revenue sharing with counties is based on gross receipts, not net receipts. The collection of Range Betterment Funds from the gross grazing receipts do not reduce USFS 25% fund payments to counties.

## Economic Environmental Effects

The Environmental Effects section list the effects of the alternatives on the human environment as they relate to economics. Generally in economic analysis there are a number of choices that need to be made on the likely assumptions used in the analysis. When such choices were available in estimating economic environmental effects, assumptions were selected that presented the largest likely negative impact economic impact and the smallest likely positive impact. For example when determining the jobs and income from livestock grazing the indirect effect on intermingled state and private land (see Table 3-9) was used in all discussions and tables that follow instead of just the job and income effect on National Forest System (NFS) land. The choice presents greater declines in jobs and income among the alternatives than if just NFS land job and income effects were selected. This assumption was selected even though in recent history ranchers have chosen to fence their property from NFS land so they can manage their land as they see fit. In the case of recreation, use levels do not change among the alternatives because there was little evidence to support such differentiation. Although a few studies do document growth rates in recreation over time they are not consistent in approach or location. It was determined that a zero growth rate would be used so that the benefit of recreation and the value in jobs and income would not be overstated when compared to livestock grazing and energy development. The end result is a conservative analysis that neither

overestimates benefits or underestimates negative effects.

Some counties have very little or no national grassland or forest acreage but can attribute part of their economy to adjacent national forest or national grassland activities and were included in the Economic Impact Areas (EIA) analyzed in the economic effects analysis. If there is significant economic activity in adjacent counties arising from grassland management the counties were included in the economic impact areas. An example would be a rancher traveling to an adjacent county to buy ranch supplies or equipment or an employee spending ones paycheck in an adjacent county. This is why the Montana counties were included in the Little Missouri EIA.

Effects from grassland and forest activities were estimated with the aid of the MicroIMPLAN economic impact model, with 1997 used as the base year (see FEIS Appendix B for further information). The income and employment data in the model is based on several sources including County Business Patterns, Census of Agriculture, and the Regional Economic Information System. The model can describe the structure of an economy as well as measure potential changes based on changes in final demand. The model also projects what businesses typically purchase goods from other businesses, and uses these relationships to calculate indirect and induced employment and income.

## Effects on Income and Employment

Considerable controversy occurred over the income and employment analysis conducted in the DEIS. A review for Heritage Alliance of North Dakota (HAND) claimed the DEIS underestimated the impacts and did not disclose all significant effects. Another review, prepared for the National Wildlife Federation, refuted several of the claims in the HAND review, including the economic model HAND used to estimate economic impacts. A review of both studies indicates valid points made by both.

The Heritage Alliance study pointed out a number of cumulative and other impacts not included in the DEIS, such as the decrease in ranch market value as permitted AUMs decrease and the increased effects AUM reductions would have on ranchers using pastures with commonly fenced public and other ownerships. These points are analyzed in the FEIS.

The National Wildlife Federation study concludes, "The quantitative measures chosen and the assumptions made are not supported by either economics or the facts. It (HAND study) overstates any measure of reduced income to North Dakota citizens 4 to 6 fold" (Power 2000).

The HAND analysis uses a gross business volume (gross value of sales) analysis to track the gross value of business transactions in a study area. The economic impact analysis in the DEIS and this FEIS uses an income approach, the approach used by economists at the national level to characterize the economic well being of the Nation. Income is used because it is a better measure of how local area residents will be affected by the alternatives. In the case of coal, oil, and gas, for example, a very large percentage of these commodities are shipped out of the area, and it is not clear what a change in gross sales really means to the local economy and its residents. Thus the emphasis in regional economic analysis is to use income, not industry sales, to both describe the local economy and to evaluate the impacts of major projects or other events.

In summary, gross sales are not a good measure of economic well being. What is a more useful measure is what is left over after business expenses are paid (proprietor's income) and the wages employees take home (wage income). These are collectively a component of "personal income" used in the FEIS analysis.

## *Livestock Grazing*

As stated earlier, only the range-fed cattle sector is included in determining direct economic effects. Indirect effects result from economic activity between the range-fed cattle sector and all other sectors. Induced effects result from economic activity created from the numerous rounds of spending of wages resulting from direct, indirect, and induced economic activity. Table 3-7 summarizes direct and total jobs and income attributable to livestock grazing on the national grasslands and forests in the planning area. The rows depicting "% Change From Existing Condition" only reflect the change in grazing on National Forest System land. They do not reflect grazing industry or EIA-wide percent changes (see Table 3-25 for EIA-wide percent changes). In all cases, Alternative 1 (The Existing Forest Plan Alternative) is different from existing conditions. This difference is due to unit not being able to fully implement the current Forest Plans.

**Table 3-7. Direct and Total Livestock Grazing Jobs and Income from NFS Lands by Economic Impact Area*.**

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 / 3a | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **All Planning Units Total** | | | | | | | |
| Direct Jobs | 565 | 557 | 572 | 501 / 500 | 504 / 504 | 388 | 442 |
| Total Jobs | 1370 | 1346 | 1384 | 1223 / 1221 | 1221 / 1221 | 943 | 1070 |
| Direct Income (1997 M$) | $8,589 | $8,349 | $8,662 | $7,890 / $7,875 | $7,686 / $7,684 | $6,031 | $6,774 |
| Total Income (1997 M$) | $19,985 | $19,585 | $20,218 | $18,201 / $18,165 | $17,905 / $17,900 | $13,990 | $15,813 |
| % Change From Existing Condition** | | -2% | 1% | -11% / -11% | -11% / -11% | -31% | -22% |
| **Dakota Prairie Grasslands Total** | | | | | | | |
| Direct Jobs | 323 | 340 | 341 | 271 | 293 | 210 | 248 |
| Total Jobs | 778 | 819 | 820 | 660 | 708 | 509 | 598 |
| Direct Income (1997 M$) | $3,875 | $4,104 | $4,104 | $3,394 | $3,563 | $2,582 | $3,004 |
| Total Income (1997 M$) | $9,763 | $10,303 | $10,307 | $8,383 | $8,917 | $6,428 | $7,526 |
| % Change From Existing Condition** | | 5% | 5% | -15% | -9% | -35% | -23% |
| **Grand River / Cedar River National Grassland EIA** | | | | | | | |
| Direct Jobs | 30 | 34 | 34 | 31 | 30 | 23 | 27 |
| Total Jobs | 78 | 89 | 89 | 80 | 79 | 60 | 69 |
| Direct Income (1997 M$) | $606 | $692 | $691 | $623 | $614 | $463 | $541 |
| Total Income (1997 M$) | $1,159 | $1,323 | $1,321 | $1,192 | $1,174 | $886 | $1,034 |
| % Change From Existing Condition** | | 14% | 14% | 3% | 1% | -24% | -11% |

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 / 3a | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Little Missouri National Grassland EIA** | | | | | | | |
| Direct Jobs | 234 | 244 | 244 | 212 | 214 | 156 | 175 |
| Total Jobs | 575 | 600 | 600 | 521 | 525 | 384 | 430 |
| Direct Income (1997 M$) | $2,823 | $2,944 | $2,944 | $2,560 | $2,578 | $1,885 | $2,111 |
| Total Income (1997 M$) | $7,199 | $7,510 | $7,508 | $6,529 | $6,576 | $4,807 | $5,385 |
| % Change From Existing Condition** | | 4% | 4% | -9% | -9% | -33% | -25% |
| **Sheyenne National Grassland EIA** | | | | | | | |
| Direct Jobs | 59 | 62 | 63 | 28 | 49 | 31 | 47 |
| Total Jobs | 125 | 131 | 131 | 59 | 104 | 65 | 98 |
| Direct Income (1997 M$) | $446 | $468 | $470 | $211 | $371 | $233 | $352 |
| Total Income (1997 M$) | $1,404 | $1,471 | $1,477 | $662 | $1,167 | $734 | $1,106 |
| % Change From Existing Condition** | | 5% | 5% | -53% | -17% | -48% | -21% |
| **Nebraska National Forest Units Total** | | | | | | | |
| Direct Jobs | 186 | 154 | 169 | 171 / 170 | 154 / 153 | 128 | 136 |
| Total Jobs | 466 | 384 | 422 | 427 / 425 | 384 / 383 | 320 | 340 |
| Direct Income (1997 M$) | $3,592 | $2,976 | $3,294 | $3,296 / $3,280 | $2,974 / $2,972 | $2,441 | $2,597 |
| Total Income (1997 M$) | $7,539 | $6,244 | $6,888 | $6,943 / $6,907 | $6,238 / $6,233 | $5,149 | $5,481 |
| % Change From Existing Condition** | | -18% | -9% | -8% / -9% | -18% / -18% | -31% | -27% |
| **Bessey Unit of the Nebraska National Forest / Samuel R. McKelvie National Forest EIA** | | | | | | | |
| Direct Jobs | 25 | 22 | 25 | 24 | 22 | 16 | 18 |
| Total Jobs | 54 | 47 | 53 | 53 | 47 | 35 | 38 |
| Direct Income (1997 M$) | $831 | $731 | $822 | $812 | $731 | $536 | $590 |
| Total Income (1997 M$) | $1,493 | $1,314 | $1,476 | $1,460 | $1,313 | $963 | $1,060 |
| % Change From Existing Condition** | | -12% | -1% | -2% | -12% | -36% | -29% |
| **Buffalo Gap National Grassland EIA** | | | | | | | |
| Direct Jobs | 102 | 85 | 91 | 99 / 98 | 85 / 85 | 73 | 78 |
| Total Jobs | 271 | 226 | 242 | 262 / 260 | 225 / 225 | 193 | 207 |
| Direct Income (1997 M$) | $1,703 | $1,421 | $1,522 | $1,647 / $1,631 | $1,416 / $1,414 | $1,213 | $1,302 |
| Total Income (1997 M$) | $4,000 | $3,338 | $3,573 | $3,868 / $3,832 | $3,325 / $3,320 | $2,850 | $3,058 |
| % Change From Existing Condition** | | -17% | -11% | -3% / -4% | -17% / -17% | -29% | -24% |

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 / 3a | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Fort Pierre National Grassland EIA** | | | | | | | |
| Direct Jobs | 34 | 25 | 31 | 23 | 25 | 21 | 21 |
| Total Jobs | 84 | 62 | 74 | 57 | 62 | 52 | 52 |
| Direct Income (1997 M$) | $664 | $487 | $589 | $452 | $487 | $408 | $408 |
| Total Income (1997 M$) | $1,290 | $947 | $1,145 | $879 | $947 | $793 | $793 |
| % Change From Existing Condition** | | -27% | -11% | -32% | -27% | -39% | -39% |
| **Pine Ridge Unit Nebraska National Forest / Oglala National Grassland EIA** | | | | | | | |
| Direct Jobs | 25 | 21 | 23 | 24 | 21 | 18 | 19 |
| Total Jobs | 57 | 49 | 52 | 56 | 49 | 41 | 43 |
| Direct Income (1997 M$) | $394 | $337 | $361 | $384 | $340 | $283 | $297 |
| Total Income (1997 M$) | $755 | $645 | $693 | $737 | $652 | $543 | $570 |
| % Change From Existing Condition** | | -15% | -8% | -2% | -14% | -28% | -25% |
| **Thunder Basin National Grassland EIA** | | | | | | | |
| Direct Jobs | 55 | 63 | 62 | 59 | 57 | 50 | 58 |
| Total Jobs | 126 | 143 | 142 | 135 | 130 | 114 | 132 |
| Direct Income (1997 M$) | $1,122 | $1,269 | $1,263 | $1,201 | $1,149 | $1,009 | $1,173 |
| Total Income (1997 M$) | $2,684 | $3,037 | $3,023 | $2,875 | $2,749 | $2,414 | $2,807 |
| % Change From Existing Condition** | | 13% | 13% | 7% | 2% | -10% | 5% |

* Includes direct, indirect, and induced jobs and income from National Forest system lands only.
** Based on the percent change in Total Jobs from Existing Conditions.

An issue brought forward from the DEIS comments indicated livestock **stocking** decisions on National Forest System land affect adjacent private land because many livestock grazing pastures have multiple land ownerships fenced as a single pasture. In pastures with National Forest System land, non-Forest Service landowners have the right to fence out their land and manage their land as they see fit. If non-Forest Service landowners elect to not fence out their property, they are obligated to manage their land within the pasture as indicated in the Land and Resource Management Plan. Significant acreage of non-Forest Service System land on the Dakota Prairie units and the Thunder Basin National Grassland is currently included in allotments managed under Forest Service land management plans. The Nebraska units have relatively few multiple ownership pastures.

Table 3-8 below displays the estimated commonly fenced National Forest System acres and other ownership acres and determines the multiplier to be used in determining the cumulative job and income effects from the multiple land ownership pattern. At any time, non-Forest landowners can elect to fence their property out of a Forest Service pasture. The estimates below and the resulting cumulative AUM table (Table 3-9) assume no change in existing fencing patterns. Table 3-9 displays the total jobs and income affected by multiple land ownerships

within Forest Service pastures. Percent change is based on grazing associated with Forest Service pastures and do not reflect grazing industry percent change or EIA percent change.

**Table 3-8. Intermingled Ownership Grazing Pastures and Estimated Indirect Effects multiplier**

| Unit Name | National Forest System Acres Within National Forest Pastures | Other Ownership Acres Within National Forest Pastures | Indirect Effects Multiplier for Intermingled Ownership Pastures |
|---|---|---|---|
| Grand River / Cedar River National Grassland | 133,440 | 21,910 | 1.1642 |
| Little Missouri National Grassland | 997,140 | 590,740 | 1.5924 |
| Sheyenne National Grassland | 68,560 | 570 | 1.008314 |
| Bessey Unit of the Nebraska National Forest / Samuel R. McKelvie National Forest | 206,220 | 0 | 1 |
| Buffalo Gap National Grassland | 586,520 | 39,250 | 1.06690 |
| Fort Pierre National Grassland | 114,040 | 1,190 | 1.015 |
| Pine Ridge Unit Nebraska National Forest / Oglala National Grassland | 138,200 | 5,520 | 1.0399 |
| Thunder Basin National Grassland | 549,340 | 642,260 | 2.2981 |

**Table 3-9. Direct and Total Livestock Grazing Job and Income Effects From Multiple Ownership Federal Pastures*.**

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **All Planning Units Total** | | | | | | | |
| Direct Jobs | 789 | 796 | 811 | 717 / 716 | 716 / 716 | 555 | 632 |
| Total Jobs | 1910 | 1921 | 1959 | 1742 / 1740 | 1732 / 1732 | 1344 | 1525 |
| Direct Income (1997 M$) | $11,960 | $11,974 | $12,288 | $11,203 / $11,186 | $10,925 / $10,922 | $8,633 | $9,744 |
| Total Income (1997 M$) | $28,254 | $28,469 | $29,104 | $26,303 / $26,264 | $25,834 / $25,829 | $20,347 | $23,065 |
| % Change From Existing Condition** | | 1% | 3% | -9% / -9% | -9% / -9% | -30% | -20% |
| **Dakota Prairie Grasslands Total** | | | | | | | |
| Direct Jobs | 467 | 491 | 491 | 402 | 425 | 307 | 357 |
| Total Jobs | 1132 | 1190 | 1191 | 983 | 1033 | 747 | 865 |
| Direct Income (1997 M$) | $5,650 | $5,965 | $5,966 | $5,014 | $5,194 | $3,776 | $4,346 |
| Total Income (1997 M$) | $14,229 | $14,982 | $14,984 | $12,452 | $13,016 | $9,427 | $10,895 |
| % Change From Existing Condition** | | 5% | 5% | -13% | -9% | -34% | -24% |
| **Grand River / Cedar River National Grassland EIA** | | | | | | | |
| Direct Jobs | 35 | 40 | 40 | 36 | 35 | 27 | 31 |
| Total Jobs | 91 | 103 | 103 | 93 | 92 | 69 | 81 |

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Grand River / Cedar River National Grassland EIA, cont.** | | | | | | | |
| Direct Income (1997 M$) | $706 | $805 | $804 | $725 | $715 | $539 | $629 |
| Total Income (1997 M$) | $1,350 | $1,540 | $1,538 | $1,387 | $1,367 | $1,032 | $1,204 |
| % Change From Existing Condition** | | 14% | 14% | 3% | 1% | -24% | -11% |
| **Little Missouri National Grassland EIA** | | | | | | | |
| Direct Jobs | 372 | 388 | 388 | 338 | 340 | 249 | 279 |
| Total Jobs | 916 | 955 | 955 | 830 | 836 | 611 | 685 |
| Direct Income (1997 M$) | $4,495 | $4,689 | $4,688 | $4,076 | $4,106 | $3,001 | $3,362 |
| Total Income (1997 M$) | $11,464 | $11,959 | $11,957 | $10,397 | $10,472 | $7,655 | $8,576 |
| % Change From Existing Condition** | | 4% | 4% | -9% | -9% | -33% | -25% |
| **Sheyenne National Grassland EIA** | | | | | | | |
| Direct Jobs | 60 | 63 | 63 | 28 | 50 | 31 | 47 |
| Total Jobs | 126 | 132 | 132 | 59 | 105 | 66 | 99 |
| Direct Income (1997 M$) | $450 | $472 | $474 | $212 | $374 | $235 | $355 |
| Total Income (1997 M$) | $1,416 | $1,483 | $1,489 | $668 | $1,177 | $740 | $1,115 |
| % Change From Existing Condition** | | 5% | 5% | -53% | -17% | -48% | -21% |
| **Nebraska National Forest Units Total** | | | | | | | |
| Direct Jobs | 195 | 161 | 177 | 179 / 178 | 160 / 160 | 134 | 142 |
| Total Jobs | 487 | 402 | 442 | 448 / 445 | 401 / 401 | 336 | 356 |
| Direct Income (1997 M$) | $3,732 | $3,092 | $3,419 | $3,428 / $3,412 | $3,090 / $3,088 | $2,539 | $2,702 |
| Total Income (1997 M$) | $7,856 | $6,507 | $7,172 | $7,244 / $7,205 | $6,501 / $6,495 | $5,373 | $5,720 |
| % Change From Existing Condition** | | -18% | -9% | -8% / -9% | -18% / -18% | -31% | -27% |
| **Bessey Unit of the Nebraska National Forest / Samuel R. McKelvie National Forest EIA** | | | | | | | |
| Direct Jobs | 25 | 22 | 25 | 24 | 22 | 16 | 18 |
| Total Jobs | 54 | 47 | 53 | 53 | 47 | 35 | 38 |
| Direct Income (1997 M$) | $831 | $731 | $822 | $812 | $731 | $536 | $590 |
| Total Income (1997 M$) | $1,493 | $1,314 | $1,476 | $1,460 | $1,313 | $963 | $1,060 |
| % Change From Existing Condition** | | -12% | -1% | -2% | -12% | -36% | -29% |
| **Buffalo Gap National Grassland EIA** | | | | | | | |
| Direct Jobs | 109 | 91 | 97 | 105 / 105 | 91 / 90 | 78 | 83 |
| Total Jobs | 289 | 241 | 258 | 280 / 277 | 240 / 240 | 206 | 221 |
| Direct Income (1997 M$) | $1,817 | $1,516 | $1,623 | $1,757 / $1,741 | $1,511 / $1.508 | $1,295 | $1,389 |
| Total Income (1997 M$) | $4,268 | $3,561 | $3,812 | $4,126 / $4,088 | $3,548 / $3,542 | $3,041 | $3,263 |

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| % Change From Existing Condition** | | -17% | -11% | -3% / -4% | -17% / -17% | -29% | -24% |
| **Fort Pierre National Grassland EIA** | | | | | | | |
| Direct Jobs | 35 | 26 | 31 | 24 | 26 | 22 | 22 |
| Total Jobs | 85 | 62 | 76 | 58 | 62 | 52 | 52 |
| Direct Income (1997 M$) | $674 | $494 | $598 | $459 | $495 | $414 | $414 |
| Total Income (1997 M$) | $1,310 | $961 | $1,163 | $892 | $961 | $805 | $805 |
| % Change From Existing Condition** | | -27% | -11% | -32% | -27% | -39% | -39% |
| **Pine Ridge Unit Nebraska National Forest / Oglala National Grassland EIA** | | | | | | | |
| Direct Jobs | 26 | 22 | 24 | 25 | 22 | 19 | 19 |
| Total Jobs | 59 | 51 | 54 | 58 | 51 | 43 | 45 |
| Direct Income (1997 M$) | $410 | $350 | $376 | $400 | $354 | $295 | $309 |
| Total Income (1997 M$) | $785 | $671 | $720 | $766 | $678 | $564 | $593 |
| % Change From Existing Condition** | | -15% | -8% | -2% | -14% | -28% | -25% |
| **Thunder Basin National Grassland EIA** | | | | | | | |
| Direct Jobs | 127 | 144 | 144 | 137 | 131 | 115 | 133 |
| Total Jobs | 291 | 329 | 327 | 311 | 298 | 261 | 304 |
| Direct Income (1997 M$) | $2,578 | $2,917 | $2,903 | $2,761 | $2,640 | $2,318 | $2,695 |
| Total Income (1997 M$) | $6,168 | $6,980 | $6,948 | $6,606 | $6,318 | $5,547 | $6,450 |
| % Change From Existing Condition** | | 13% | 13% | 7% | 2% | -10% | 5% |

* Includes direct, indirect, and induced jobs and income from National Forest system lands and from intermingled state and private lands within federally controlled pastures.
** Based on the percent change in Total Jobs from Existing Conditions.

## *Oil, Gas, and Minerals*

As in the DEIS, the employment and income estimates associated with oil and gas activities were based upon the number of wells drilled and the oil and gas production levels projected in the Reasonably Foreseeable Development Scenario (RFDS) for the different alternatives. The alternatives reflect differing future oil and gas drilling scenarios and the economic effects of those scenarios. The RFDS for the Little Missouri and Thunder Basin National Grasslands were revised for the final environmental impact statement, so the employment and income estimates for those areas have been adjusted accordingly. Further, the IMPLAN base-year data used to conduct the impact analysis was updated. This is another explanation for the difference in effects (shown in Table 3-10) between the DEIS and the FEIS.

**Table 3-10. Employment and Income Impacts from Oil and Gas Drilling and Production**

| | Direct Jobs | | Total Jobs | | Direct Labor Income (millions of 1997$) | | Total Labor Income (millions of 1997$) | |
|---|---|---|---|---|---|---|---|---|
| | # | % Change | # | % Change | $ | % Change | $ | % Change |
| **Little Missouri NG*** | | | | | | | | |
| Existing Condition/ Alternative 1 | 894 | | 1,686 | | 36.9 | | 53.3 | |
| Alternative 2 | 894 | (0%) | 1,686 | (0%) | 36.9 | (0%) | 53.3 | (0%) |
| Alternative 3 | 863 | (-3%) | 1,629 | (-3%) | 35.6 | (-4%) | 51.4 | (-4%) |
| Alternative 3-D | 863 | (-3% | 1,629 | (-3%) | 35.6 | (-4%) | 51.4 | (-4%) |
| Alternative 4 | 833 | (-7%) | 1,572 | (-7%) | 34.3 | (-7%) | 49.6 | (-7%) |
| Alternative 5 | 863 | (-3%) | 1,629 | (-3%) | 35.6 | (-4%%) | 51.4 | (-4%) |
| **Thunder Basin NG**** | | | | | | | | |
| Current/Alt. 1 | 323 | | 664 | | 16.9 | | 24.3 | |
| Alternative 2 | 323 | 0%) | 664 | (0%) | 16.9 | (0%) | 24.3 | (0%) |
| Alternative 3 | 323 | (0%) | 664 | (0%) | 16.9 | (0%) | 24.3 | (0%) |
| Alternative 3-D | 323 | (0%) | 664 | (0%) | 16.9 | (0%) | 24.3 | (0%) |
| Alternative 4 | 321 | (-1%) | 660 | (-1%) | 16.8 | (-1%) | 24.2 | (0%) |
| Alternative 5 | 323 | (0%) | 664 | (0%) | 16.9 | (0%) | 24.3 | (0%) |
| **Buffalo Gap NG**** | | | | | | | | |
| Current/Alt. 1 | 43 | | 70 | | 1.1 | | 1.7 | |
| Alternatives 2-5 | 44 | (2%) | 72 | (2%) | 1.2 | (2%) | 1.8 | (2%) |
| **Oglala NG**** | | | | | | | | |
| Current/Alt. 1 | 9 | | 15 | | 0.5 | | 0.6 | |
| Alternatives 2-5 | 9 | (2%) | 15 | (2%) | 0.5 | (2%) | 0.6 | (2%) |

Numbers in parentheses represent the percentage change from Existing Conditions

* Represents jobs and income only from drilling on the Federal oil and gas mineral estate within the Little Missouri National Grassland.

** Represents jobs and income from drilling on all mineral estate ownerships within the Thunder Basin, Buffalo Gas, and Oglala National Grasslands.

Cost estimates from representative wells were used as the expenditure model for the drilling component of the IMPLAN analysis. The amount of drilling activity incorporated into the model was the annual average number of dry holes and producing wells projected for the 10-year planning horizon. Economic impacts related to the servicing and maintenance of producing wells were estimated based upon the forecast of annual average oil and gas output. Deviations from the annual averages would, of course, alter the impacts.

Within the accuracy of the RFDS, new producing wells are generally expected to replace old wells going out of production with neither loss nor gain in production over time on the Little Missouri National Grassland. The Thunder Basin RFD projects a modest gain in the number of

oil and gas wells with 120 wells being reclaimed and 150 wells being brought into production. The Thunder Basin RFD does not cover coal-bed methane production. The effects analysis that follows considers the jobs and income from new producing wells.

Among the alternatives, job and income effects are expected to change by no more than 7% in any alternative. For the Little Missouri, jobs and income levels are estimated to be greatest and identical for the existing condition, Alternative 1, and Alternative 2. Alternatives 3 and 5 also have identical job and income levels. Alternative 4 would have the greatest impact with an estimated decrease of 7%.

There would be little anticipated change in oil and gas development on the Thunder Basin National Grassland. With the exception of Alternative 4 all Alternatives and the existing condition are identical. Alternative 4 would have an estimated 1% decrease in jobs

There was little difference between alternatives for the Buffalo Gap and Oglala National Grasslands in the projected drilling activity and production levels over 10 years, so the employment and income impacts displayed in Table 3-10 are identical for Alternatives 2-5 and nearly identical with Alternative 1.

A key assumption in the oil and gas job and income analysis, as well as the oil and gas revenue analysis that follows, is the overall global energy market anticipated in the RFDS. If global market prices are significantly below those anticipated in the RFDS, there may be little of no additional exploration for oil and gas. If global market prices are significantly above RFD projections, additional exploration could easily exceed RFDS projections.

Most of the direct jobs and income generated from the projected drilling and production activities are concentrated in the oil and gas field services and wholesale trade sectors. The induced effects, those impacts that result from employees and business owners spending their income in the area, occur primarily in retail trade and services.

Oil and gas activities on federal mineral estate generate revenue to the U.S. Treasury in the form of bonus bids, lease rentals, and production royalties. Table 3-11 shows projected annual revenue from lease rentals and production royalties for each alternative over the planning horizon. Lease rentals were estimated by multiplying the expected average number of acres under lease in a given year by the lease rental rate of $1.50 per acre. Although lease rentals rise to $2.00 per acre after the first five years of a lease, no attempt was made to incorporate such increases into the revenue projections, as estimates of the number of acres advancing to the higher lease rental rate each year were not available.

Annual revenue from bonus bids (auctioned lease price of the right to explore and develop federal mineral rights) is highly variable and is not displayed in Table 3-11. Over the last six fiscal years, for example, bonus bid revenue from the Little Missouri National Grassland ranged from $70,580 to $949,595.

Production royalty estimates were made by multiplying the oil and gas output projections by price forecasts from the Department of Energy and by the applicable royalty rate. The normal federal royalty rate is 12-½ percent, but this rate was modified for portions of the Little Missouri National Grassland. Certain lands there are subject to a 6-¼ percent royalty reservation made by Billings, Golden Valley, and McKenzie Counties, North Dakota, at the time those lands were acquired by the federal government. Thus, the federal royalty rate on such lands is one-half the standard rate. Estimates of average annual revenue accruing to the three counties from the 6-¼

percent royalties under each of the alternatives are shown in Table 3-12.

A portion of federal revenue from oil and gas activities is returned to states and counties to be used for education and roads. The percentage of federal receipts paid to states and counties depends upon whether the revenue was generated from public domain or acquired lands. Generally, 50 percent of receipts from public domain lands are returned to the state, and they are then disbursed to counties according to prescribed formulas. Counties receiving the payments are not necessarily the ones where the oil and gas revenue originated. Twenty-five percent of acquired lands revenue is paid directly to the counties encompassed by the national forest or grassland where the revenue-generating activity occurred. The distributions between acquired and public domain lands used to develop the estimates of payments to states and counties shown in the following table were based upon historical experience and projections of where leasing and production activity would occur.

**Table 3-11. Estimated Returns to the Treasury and Payments to States and Counties from Oil and Gas Lease Rentals and Production Royalties (Annual Average for Years 1-10).**

| | U.S. Treasury Receipts (millions of 1997$) | | Payments to States and Counties (millions of 1997$) | |
|---|---|---|---|---|
| **Grand River / Cedar River** | | | | |
| Alternatives 1-5 | 0 | | 0 | |
| **Little Missouri** | | | | |
| Existing Condition / Alternative 1 | 12.3 | | 3.7 | |
| Alternative 2 | 12.3 | (0%) | 3.7 | (0%) |
| Alternative 3 | 11.8 | (-4%) | 3.5 | (-5%) |
| Alternative 3-D | 11.8 | (-4%) | 3.5 | (-5%) |
| Alternative 4 | 11.4 | (-7%) | 3.4 | (-8%) |
| Alternative 5 | 11.9 | (-3%) | 3.6 | (-3%) |
| **Thunder Basin NG** | | | | |
| Existing Condition / Alternative 1 | 8.0 | | 4.0 | |
| Alternatives 2-5 | 8.0 | (0%) | 4.0 | (0%) |
| **Buffalo Gap NG** | | | | |
| Existing Condition / Alternative 1 | 0.8 | | 0.3 | |
| Alternatives 2-5 | 0.8 | (0%) | 0.3 | (0%) |
| **Oglala NG** | | | | |
| Existing Condition / Alternative 1 | 0.4 | | 0.1 | |
| Alternatives 2-5 | 0.4 | (0%) | 0.1 | (0%) |

Numbers in parentheses represent the percentage change from Existing Conditions.

Anticipated revenue from oil and gas production for the Little Missouri National Grassland follows the pattern in the job and income analysis in Table 3-10, with the exception that Alternative 3 would provide a slightly lower revenue than Alternative 5. Thunder Basin, Buffalo Gap, and the Oglala National Grasslands are not expected to experience any changes in revenues between the alternatives.

**Table 3-12. Estimated Payments to Billings, Golden Valley, and McKenzie Counties, North Dakota, for Their 6¼ Percent Royalty Interest on Oil and Gas Production from the Little Missouri National Grassland**

| | Annual Average Royalty Payments for Years 1-10 (thousands of 1997$) | |
|---|---|---|
| Alternative 1 | 388.2 | |
| Alternative 2 | 388.2 | (0%) |
| Alternative 3 | 374.3 | (-4%) |
| Alternative 3-D | 374.3 | (-4%) |
| Alternative 4 | 360.5 | (-7%) |
| Alternative 5 | 374.3 | (-4%) |

Numbers in parentheses represent the percentage change from Existing Conditions.

Coal mining is a significant source of jobs and income for Campbell and Converse counties in Wyoming. Campbell and Converse county coal production results in an estimated 7,025 jobs and $349,480,000 in income annually from direct, indirect, and induced sources. Approximately 20% of Campbell and Converse county coal production occurs on federal mineral estate within the boundary of the Thunder Basin National Grassland corresponding to an estimated 1,865 jobs and $92,771,000 in income.

## *Recreation and Tourism*

If an alternative provides additional recreation opportunities, it does not always mean that there will be increased economic activity because increases in economic activity depend upon the demand non-residents have for recreating in a local area. A trend analysis completed by Schumacher (Schumacher, 1997) does suggest that recreation and tourism will continue to grow in the Northern Great Plains, with some activities predicted to have more increases than others. In particular, the activities that show the greatest increases in recreation use are: fresh water fishing, non-consumptive wildlife activities, small game hunting, big game hunting, and migratory bird hunting. Leistritz (HAND 2000) reports a 25% annual increase in tourism sector revenues in Billings County North Dakota from approximately 1996 to 2000. Fletcher et al. (1998) reports a 2.8% per year increase in tourism in the Big Horn Mountains of Wyoming from 1986 through 1990.

It cannot be said that any of the alternatives would increase or decrease tourism with any degree of certainty. Leistritz (Hand 2000) verifies this conclusion for Alternative 3. Rather some alternatives can be said to better support anticipated increases in tourism that are likely to occur whether or not additional facilities or services are provided by the Forest Service.

Alternatives that emphasize recreation opportunities and increase recreation capacity would likely enhance recreation opportunities for Forest and Grassland visitors.

Compared with Alternative 1, the action alternatives would likely rank in the following way:

**Alternative 5** - Because of increases in vegetation diversity, larger pastures, more trail and pond construction, a variety of motorized and nonmotorized recreation settings, and many special area designations, this alternative might be expected to enhance recreation opportunities the most. Also up to 5 to 7 campgrounds would be constructed in various planning units in the next decade, which would increase the amount of developed recreation.

**Alternative 3** - Increases in vegetation diversity, larger pastures, moderate amounts of trail and pond construction, construction of 2 campgrounds, a variety of motorized and nonmotorized recreation settings, and several special area designations would likely make this alternative generate the next best in enhancing recreation opportunities.

**Alternative 4** - Increases in vegetation diversity and larger pastures would enhance the recreation setting; however, this alternative would not make additional recreation investments. Although this alternative has the most restrictive opportunities for motorized travel, it does provide a variety of recreation settings, including the most recommendations for Wilderness and Wild and Scenic River designations.

**Alternative 2** - Although this alternative would provide the most opportunities for off-road travel, it would not increase vegetation diversity, increase pasture size, or make additional recreation investments. This alternative would likely provide the same level of recreation opportunities as Alternative 1.

## *Cumulative Effects*

The "Off-Highway Vehicle Final EIS (OHV FEIS) and plan amendment for Montana, North Dakota, and portions of South Dakota was released in January of 2001. The decision eliminates wheeled motorized cross-country travel with a few specific exceptions. The OHV FEIS (Table 3.9, page 52) estimated the job loss to be 9 jobs by 2005 and 11 jobs by 2015. The estimate recreation related jobs presented in Table 3-1 could be expected to be reduced accordingly.

Many DEIS commenters discussed whether or not anticipated growth in recreation related jobs would offset any anticipated livestock grazing or oil and gas related jobs. This question can be examined for National Forest System lands by comparing Table 3-1 with Table 3-9 and Table 3-10.

For the Grand River/Cedar River EIA, projected increases in recreation related jobs in five years using a 5% rate of increase would exceed anticipated losses in livestock related jobs for all alternatives. For the Little Missouri EIA, projected recreation related jobs in five years using a 5% rate of increase would not exceed anticipated losses in livestock and oil and gas related jobs in alternative 3-5. A 20% rate of increase in recreation related jobs would exceed all anticipated losses in livestock and oil and gas related jobs for all alternatives. For the Sheyenne EIA, projected recreation related jobs in five years using a 5% rate of increase would not exceed anticipated losses in livestock related jobs in alternative 4 and DEIS 3. A 20% rate of increase in recreation related jobs would exceed all anticipated losses in livestock related jobs for all alternatives. For the Thunder Basin, Buffalo Gas, Fort Pierre, Bessey/McKelvie, and Pine Ridge/Oglala EIAs, projected increases in recreation related jobs in five years using a 5% rate of

increase would exceed anticipated losses in livestock and oil and gas related jobs for all alternatives. Available tourism research has previously reported a 25% annual increase in Billings County North Dakota from approximately 1996 to 2000 (HAND 2000) and a 2.8% annual increase in the Big Horn Mountains of Wyoming from 1986 to 1990 (Fletcher et al. 1998).

### *Woods Products*

Because timber harvesting varies by alternative only on the Pine Ridge Ranger District of the Nebraska National Forest, changes in direct effects on income and employment would generally be limited to the area surrounding the Pine Ridge within an economical hauling distance. Pine Ridge timber is hauled as far away as Spearfish for processing. Effects on annual income and employment for the first decade are shown in the following table.

**Table 3-13. Annual Timber Volume and Total Jobs and Income**

| Pine Ridge Ranger District | Existing Condition | Alt 1 | Alt 2 | Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Volume harvested (MMBF) | 0.2 | 0.2 | 1.2 | 0.6 | 0.6 | 0.8 | 0.6 |
| Total Jobs | 3 | 3 | 16 | 8 | 8 | 10 | 8 |
| Total Income 1997 $ | $64,000 | $64,000 | $382,000 | $195,000 | $195,000 | $242,000 | $200,000 |

The alternatives also discuss restoration activities other than timber production. Generally these activities would be expected to create some jobs and income with Alternative 4 having the greatest restoration related jobs and income. Restoration related jobs and income were not assessed with the IMPLAN analysis.

## Returns to the U.S. Treasury

Many of the receipts the Forest Service receives for domestic livestock grazing, timber harvesting, and mineral production vary by alternative, with Alternative 2, in general, providing the greatest returns to the U.S. Treasury (see following table) because it provides the greatest opportunities for oil and gas leasing and livestock grazing.

**Table 3-14. Estimated Returns To Treasury by Alternative (Thousands of 1997 Dollars).**

| National Forest System Units | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 / 3a | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Northern Great Plains** | | | | | | | |
| Total | $61,662 | $61,645 | $61,682 | $61,192 | $61,081 | $60,605 | $61,147 |
| | | | | $61,191 | $61,081 | | |
| **Dakota Prairie Grasslands** | | | | | | | |
| Total | $12,598 | $12,610 | $12,513 | $12,087 | $12,000 | $11,552 | $12,087 |
| **Grand River / Cedar River National Grasslands** | | | | | | | |
| Grazing Returns to Treasury | $29 | $33 | $33 | $30 | $29 | $22 | $26 |
| Total | $29 | $33 | $33 | $30 | $29 | $22 | $26 |

| National Forest System Units | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 / 3a | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Little Missouri National Grassland** | | | | | | | |
| Grazing Returns to Treasury | $151 | $158 | $158 | $137 | $138 | $101 | $113 |
| Oil and Gas Returns to Treasury | $12,389 | $12,389 | $12,291 | $11,901 | $11,804 | $11,413 | $11,901 |
| **Little Missouri National Grassland, cont.** | | | | | | | |
| Recreation Returns to Treasury | $1 | $1 | $1 | $1 | $1 | $1 | $15 |
| Total | $12,541 | $12,547 | $12,450 | $12,039 | $11,943 | $11,515 | $12,029 |
| **Sheyenne National Grassland** | | | | | | | |
| Grazing Returns to Treasury | $28 | $29 | $29 | $13 | $23 | $14 | $22 |
| Recreation Returns to Treasury | $0 | $0 | $0 | $5 | $5 | $0 | $10 |
| Total | $28 | $29 | $29 | $18 | $28 | $15 | $32 |
| **Medicine Bow-Routt National Forest** | | | | | | | |
| **Thunder Basin National Grassland** | | | | | | | |
| Grazing Returns to Treasury | $54 | $61 | $61 | $58 | $55 | $48 | $56 |
| Recreation Returns to Treasury | $0 | $0 | $0 | $0 | $0 | $0 | $5 |
| Oil, Gas, and Coal Returns to Treasury* | $47,577 | $47,577 | $47,577 | $47,577 | $47,577 | $47,577 | $47,577 |
| Total | $47,631 | $47,638 | $47,638 | $47,635 | $47,632 | $47,625 | $47,638 |
| **Nebraska National Forest and Associated Units** | | | | | | | |
| Total | $1,433 | $1,397 | $1,532 | $1,470<br>$1,469 | $1,449<br>$1,449 | $1,427 | $1,422 |
| **Bessey Unit Nebraska National Forest / Samuel R. McKelvie National Forest** | | | | | | | |
| Grazing Returns to Treasury | $75 | $66 | $74 | $73 | $66 | $48 | $53 |
| Recreation Returns to Treasury | $22 | $22 | $22 | $22 | $22 | $22 | $22 |
| Total | $96 | $87 | $95 | $95 | $87 | $70 | $75 |

| National Forest System Units | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 / 3a | FEIS Alt 3 / 3a | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Buffalo Gap National Grassland** | | | | | | | |
| Grazing Returns to Treasury | $85 | $71 | $76 | $82 | $70 | $60 | $65 |
| | | | | $81 | $70 | | |
| Oil and Gas Returns to Treasury | $780 | $780 | $780 | $780 | $780 | $780 | $780 |
| Recreation Returns to Treasury | $0 | $0 | $0 | $5 | $5 | $0 | $0 |
| Total | $865 | $851 | $856 | $867 | $856 | $841 | $845 |
| | | | | $866 | $856 | | |
| **Ft. Pierre National Grassland** | | | | | | | |
| Grazing Returns to Treasury | $32 | $24 | $29 | $22 | $24 | $20 | $20 |
| Total | $32 | $24 | $29 | $22 | $24 | $20 | $20 |
| **Pine Ridge Nebraska National Forest / Oglala National Grassland** | | | | | | | |
| Grazing Returns to Treasury | $26 | $21 | $23 | $25 | $21 | $18 | $19 |
| Timber Returns to Treasury | $23 | $23 | $139 | $71 | $71 | $88 | $73 |
| Oil and Gas Returns to Treasury | $390 | $390 | $390 | $390 | $390 | $390 | $390 |
| Total | $440 | $435 | $552 | $486 | $483 | $497 | $482 |

* Estimated oil and gas royalty and lease payments plus 5-year average (1995-1999) coal royalty.

## Returns to State, County, and Local Governments

Energy minerals receipts from coal, oil, and gas are the predominant source of federal revenue sharing with state, county, and local governments. Determining state payments for national grasslands is complex in part because of acquired versus public domain federal mineral ownership. The ratio of acquired versus public domain oil and gas mineral ownership under the National Grasslands varies widely.

- Fall River oil and gas analysis area - 8 to 9 (Acquired to Public Domain).
- Medora District – 5 to 1.
- McKenzie District – 3.5 to 1.
- Oglala National Grassland – 70 to 1.
- Thunder Basin – 1 to 4.

Federal coal reserves under the Thunder Basin are public domain.

Fifty percent of public domain (Mineral Leasing Act) federal mineral receipts go to states, and 25 percent of acquired (Bankhead-Jones) federal mineral receipts go to counties or local units of governments. The amount paid directly to states versus the amount paid to counties (including local units of government) depends on where energy minerals are extracted and whether the Federal mineral ownership is acquired or public domain. The same is true for Federal receipts received for surface activities such as grazing and recreations, but federal surface ownership is almost entirely acquired.

A basic difference exists in how receipts, including grazing receipts, are used to calculate payments to counties between National Grasslands and National Forests on acquired lands and mineral estates. National Grassland surface ownership is predominately Bankhead-Jones land and payments to counties are based on 25% of net receipts. National Forests fall under the USFS 25% fund and payments to counties are based on 25% of gross receipts. In the case of National Grasslands county payments are based on total grazing receipts minus CP or Conservation Practice funds (usually 50% of total grazing receipts), while National Forest county payments are based on total grazing receipts.

Total PILT and non-PILT moneys received are important to counties and local units of government. Counties with non-PILT payments close to or greater than the PILT payment will likely receive the minimum PILT payment to maximize their total payment. These tend to be North Dakota and Wyoming counties within the Little Missouri and Thunder Basin National Grasslands, which receive large Bankhead-Jones payments from oil and gas receipts. For these counties a $4 increase or decrease in Federal receipts means a $1 increase or decrease in their total payment. North Dakota and Wyoming counties not receiving the minimum PILT payment, will usually not be affected by increases or decreases in federal receipts because the PILT payment will be reduced or increased as the non-PILT payment is increased or decreased.

For South Dakota counties, a $4 change in federal Bankhead-Jones receipts means a $1 change in receipts to local units of governments that are politically and financially independent of counties (usually school districts) because of South Dakota legislation that allows this to occur. South Dakota county PILT payments will not change by Forest Service decisions associated with this management plan revision. The situation would be similar for Nebraska, but because Nebraska legislation is more complicated, a $4 change in federal receipts will mean a $1 or less change in payments to counties and local units of government that are politically and financially independent of counties.

For a more detailed understanding of the complexities of predicting future PILT payments and other revenue sharing see *PILT, It's Purpose and Performance* (Schuster 1995) and *Revenue Sharing and Resource Management in Western States* (Schuster 1996).

There are additional sources of income for states and counties outside of federal revenue sharing that can be influenced by national forest and grassland decisions. These include sales taxes, property taxes, income taxes, severance taxes, and royalties.

Sales taxes are those paid for retail transactions. The sales tax rate and the types of goods taxed vary by state. Generally if there is a decline in income or population, a decline in sales taxes would also be expected.

Property taxes usually occur at the local level and fund counties, cities, and school districts. Property taxes usually will not change if a ranch or business fails, as whoever winds up with

the property whether it be a bank or new owner will be responsible for paying the property taxes. A decrease in valuation in property will decrease property taxes if the property tax rate does not increase. One mobile source of property that is taxed at the local level is business property associated with oil and gas production such as drilling equipment and pipelines. The tax rate and the rules for applying the taxes vary by state and locality.

State income taxes are another source of state revenue although Wyoming and South Dakota do not have a state income tax. As income increases or decreases so will the associated income tax received by a state.

Severance taxes are usually associated with mineral production. It is a way for a State to receive value for minerals produced within its borders before the minerals are shipped out of state for processing. The tax rates and the rules for applying the taxes vary by State. As the value of energy production changes, so will the revenues received by a State. The change can be the result of a change in the level or production or a change in the market price for the minerals.

States and counties own mineral rights and receive royalties when the mineral is extracted. The usual royalty rate is 1/8$^{th}$ of the value of the mineral produced, but this rate can vary by state, county, and circumstance.

States often share a portion of the taxes, royalties, and federal payments with counties and school districts using formulas that vary by state.

Alternatives which generate the greatest return in federal receipts would generate the greatest payments to counties, school districts, and states from taxes, royalties, and federal payments. Alternative 1 and 2 would generate the greatest payments to counties and states; alternative 4 would return the least.

## Economic and Financial Efficiency

The planning process specified in the National Forest Management Act regulations requires consideration of economic efficiency as a basic principal of planning, including formulation of alternatives, estimates of effects of the alternatives, and evaluation of the alternatives.

Economic efficiency is defined as how well dollars invested in each alternative produce quantifiable benefits (those we can assign a dollar value to) to society. The benefits for grazing and recreation are assigned a dollar value as originally estimated in the 1990 RPA program. Timber and mineral values are based on actual collected values. Some outputs, including environmental, economic, or social outcomes, are not assigned monetary values and are not part of the economic efficiency determination. Examples of nonmonetary benefits include the value to future generations in protecting threatened an endangered species, protecting and preserving cultural resources, and maintaining scenery. The costs included in the economic efficiency analysis are the annual estimated Forest Service budget.

Financial efficiency is like economic efficiency, but only actual collected revenues are considered. The main criterion used in economic and financial efficiency analysis is PNV (present net value). PNV is a measure in which discounted costs are subtracted from discounted benefits or revenues. A 4 percent discount rate was used. Future costs, benefits, and revenues were projected for 50 years.

**Table 3-15. Economic Efficiency (In thousands of 1997 dollars; summarized for the five decades).**

| Unit | Existing Condition | Alt 1 | Alt 2 | Alt 3 *Alt 3a* | FEIS ALT 3 *Alt 3a* | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Discounted Benefits - Range | $121,207 | $128,170 | $128,204 | $104,984 | $111,082 | $80,251 | $93,754 |
| Discounted Benefits - Minerals | $269,696 | $269,696 | $267,572 | $259,078 | $256,954 | $248,460 | $259,078 |
| Discounted Benefits - Recreation | **$30,811** | **$30,811** | **$30,811** | **$30,811** | **$30,811** | **$30,811** | **$30,811** |
| Discounted Costs | $108,504 | $127,680 | $139,281 | $145,396 | $145,396 | $163,268 | $162,718 |
| Economic PNV | $313,210 | $300,997 | $287,306 | $249,477 | $253,452 | $196,255 | $220,924 |
| **Nebraska National Forest Units** | | | | | | | |
| Discounted Benefits - Range | $101,520 | $84,051 | $92,937 | $93,127<br>*$92,680* | $83,994<br>*$83,932* | $69,098 | $73,500 |
| Discounted Benefits - Minerals | $25,483 | $25,483 | $25,483 | $25,483 | $25,483 | $25,483 | $25,483 |
| Discounted Benefits - Recreation | $86,804 | $86,804 | $86,804 | $86,804 | $86,804 | $86,804 | $86,804 |
| Discounted Benefits - Timber | $697 | $697 | $4,187 | $2,132 | $2,132 | $2,651 | $2,194 |
| Discounted Costs | $94,440 | $115,860 | $129,417 | $133,316 | $133,316 | $141,859 | $141,658 |
| Economic PNV | $120,063 | $81,175 | $79,993 | $74,229<br>*$73,783* | $65,097<br>*$65,035* | $42,176 | $46,323 |
| **Thunder Basin National Grassland** | | | | | | | |
| Discounted Benefits - Range | $25,154 | $28,464 | $28,332 | $26,939 | $25,763 | $22,618 | $26,301 |
| Discounted Benefits - Minerals | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 |
| Discounted Benefits - Recreation | $14,973 | $14,973 | $14,973 | $14,973 | $14,973 | $14,973 | $14,973 |
| Discounted Costs | $38,231 | $48,217 | $52,849 | $52,593 | $52,593 | $57,306 | $57,654 |
| Economic PNV | $1,037,608 | $1,030,932 | $1,026,169 | $1,025,032 | $1,023,856 | $1,015,998 | $1,019,333 |

**Table 3-16. Financial Efficiency (in thousands 1997 dollars; summarized for the five decades).**

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 *Alt 3a* | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Discounted Revenue - Range | $9,045 | $9,565 | $9,567 | $7,835 | $8,290 | $5,989 | $6,997 |
| Discounted Revenue - Minerals | $269,696 | $269,696 | $267,572 | $259,078 | $256,954 | $248,460 | $259,078 |

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 *Alt 3a* | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Discounted Revenue - Recreation | **$32** | **$32** | **$32** | **$141** | **$141** | **$32** | **$576** |
| Discounted Costs | $108,504 | $127,680 | $139,281 | $145,396 | $145,396 | $163,268 | $162,718 |
| Financial PNV | $170,269 | $151,612 | $137,890 | $121,657 | $119,989 | $91,213 | $103,932 |
| **Nebraska National Forest Units** | | | | | | | |
| Discounted Benefits - Range | $7,576 | $6,272 | $6,936 | $6,950 | $6,268 | $5,157 | $5,485 |
| | | | | *$6,916* | *$6,264* | | |
| Discounted Revenue - Minerals | $25,483 | $25,483 | $25,483 | $25,483 | $25,483 | $25,483 | $25,483 |
| Discounted Revenue - Recreation | $455 | $455 | $455 | $564 | $564 | $455 | $564 |
| Discounted Revenue - Timber | $505 | $505 | $3,035 | $1,545 | $1,545 | $1,922 | $1,591 |
| Discounted Costs | $94,440 | $115,860 | $129,417 | $133,316 | $133,316 | $141,859 | $141,658 |
| Financial PNV | ($60,421) | ($83,144) | ($93,508) | ($98,773) | ($99,455) | ($108,843) | ($108,535) |
| | | | | *($98,807)* | *($99,460)* | | |
| **Thunder Basin National Grasslands** | | | | | | | |
| Discounted Revenue - Range | $2,346 | $2,655 | $2,643 | $2,513 | $2,403 | $2,110 | $2,453 |
| Discounted Revenue - Minerals | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 | $1,035,712 |
| Discounted Revenue - Recreation | $0 | $0 | $0 | $0 | $0 | $0 | $109 |
| Discounted Costs | $38,231 | $48,217 | $52,849 | $52,593 | $52,593 | $57,306 | $57,654 |
| Financial PNV | $999,828 | $990,150 | $985,507 | $985,632 | $985,523 | $980,517 | $980,621 |

Numbers in parenthesis are negative.

Alternatives that emphasize timber, minerals, and livestock grazing have the highest PNV because of the emphasis on outputs that generate a monetary value to the government. Alternatives 1 and 2 have the highest PNV. Even with the emphasis on commodities, however, two of the outputs, timber and livestock grazing, would lose money. Only oil-, gas-, and coal-related outputs show a positive financial return to the government.

Alternatives that emphasize wildlife, recreation, native prairie restoration, and other non-monetary benefits generally have the lowest PNV because these activities are not assigned a value and production of oil, gas, coal, AUMs, and timber is reduced. Alternatives 4 and 5 would have the lowest PNV. These alternatives also have the highest costs because of the emphasis on restoration activities, such as prescribed burning, or recreation investments, such as trail or campground development. Special designations, such as wilderness or Research Natural Areas, did not add to the cost of these alternatives. Generally, these alternatives provide a qualitative value to present and future generations for these management practices and activities.

## Budget Analysis

Because activities, outcomes, and effects are sensitive to budget levels, each alternative has been analyzed at two budget levels. The full implementation, or desired budget level, has a budget that is constrained to 150 percent of experienced budgets. The experienced budget level for Alternative 1 analyzes activities, outcomes, and effects based on current budget levels. For other alternatives, the experienced budget level varies based on the emphasis on different resources. The experienced budget level for Alternative 1 is based on funds allocated to the national grasslands and national forests for fiscal year 1995. For Dakota Prairie Grasslands, this budget was estimated because of the recent creation of that administrative unit.

Funding by program area was adjusted by alternative to meet the theme of the alternative. The actual implementation of land management plans is dependent upon budgets allocated during the plan period. Each alternative, however, was designed with the understanding that large increases in funding are not likely to occur. (Alternatives 1 would require greater than 150 % for full implementation) Not all alternatives may require 150 percent of experienced budgets for full implementation.

For Alternative 1 (no-action alternative), not all activities required in current land management plans are fully funded. Estimates for full funding of Alternative 1 are given as desired budget levels. Desired budget levels for the action alternatives would vary in three main areas:

- Amount of prescribed fire.
- Amount of recreation investment.
- Implementation of ferret recovery areas.

Desired budgets for these three areas account for most of the difference between desired and experienced budget levels. For the Nebraska National Forest units, timber harvest levels also account for higher desired budget levels. Also, some alternatives have higher budgets for implementing wilderness recommendations and paleontology, wildlife, noxious weeds, and land adjustment programs. Changes in these programs are generally not nearly as great as the three program areas mentioned above.

To constrain Alternatives 1, 2, 3, 4, and 5 within experienced budget levels, several assumptions were made. These assumptions include legal implementation of all alternatives and protection of basic resources. Actions that require recovery of a threatened and endangered species, such as the black-footed ferret re-introduction, would continue to be funded but under a reduced budget scenario. This would include implementation of such allocations as ferret recovery management areas. Prescribed burning, recreation investments (including campground and pond construction), and timber harvest all were reduced to current levels to stay within experienced budget levels. The environmental effects of implementing these programs then would be similar to Alternative 1.

Implementation of wilderness recommendations was assumed to have a concurrent reduction in non-revenue recreation program funding. Increases or decreases in livestock grazing permit administration were not assumed to trigger large increases or decreases in funding because funding is generally related to the number of permits and not the number of livestock. Rangeland monitoring (rangeland ecosystem management) does vary by alternative in relation

to the intensity of livestock grazing. Monitoring of livestock grazing would continue at reduced levels under the experienced budget level.

Differences between experienced and desired budget levels by alternative are discussed below. A summary of the budget analysis is displayed in the following table.

### **Alternative** 1

**Desired**: Funding would be increased in rangeland vegetation monitoring, dispersed recreation, wildlife, heritage, threatened and endangered species management, and lands in order to implement current plans.

**Experienced:** Experienced budget was based on 95 budget expenditures. For the Dakota Prairie Grasslands, no budget information was available for experienced budget because of the recent creation of that Supervisor's Office. The experienced budget is estimated for this unit.

### **Alternative 2**

**Desired:** Funding would be increased in nearly all cost components, with emphasis on range vegetation monitoring, dispersed recreation, wildlife, threatened and endangered species management, and lands.

**Experienced:** Funding would be constrained to experienced levels or lower in most areas. Some increases in funding were retained in TES for ferret recovery and range vegetation monitoring.

### **Alternative 3**

**Desired:** Funding would be increased in nearly all cost components, with emphasis on range vegetation monitoring, dispersed recreation, wildlife, threatened and endangered species management, and lands. Prescribed burning would receive moderate increases to implement that program. On the Nebraska National Forest, timber management dollars would be increased.

**Experienced:** Funding would be constrained to experienced levels or lower in most areas. Some increases in funding would be retained in TES for ferret recovery and range vegetation monitoring. Prescribed burning and timber harvesting would decrease to experienced budget levels. Effects of these programs would be similar to Alternative 1 under this budget scenario.

### **Alternative 4**

**Desired:** Funding would be increased in nearly all cost components, with emphasis on prescribed burning, range vegetation monitoring, dispersed recreation, wildlife, threatened and endangered species management, and lands. Prescribed burning program would be the highest of any alternative for restoration purposes. On the Nebraska National Forest, timber harvesting dollars would be increased.

**Experienced:** Funding would be constrained to experienced levels or lower in most areas. Some increases in funding would be retained in TES for ferret recovery and range vegetation monitoring. Prescribed burning and timber harvesting dropped to experienced budget levels. Effects of these programs would be similar to Alternative 1 under this budget scenario.

### Alternative 5

**Desired:** Funding would be increased in nearly all cost components, with emphasis on range vegetation monitoring, developed recreation, dispersed recreation, wildlife, threatened and endangered species management, lands and prescribed burning. On the Nebraska National Forest, timber harvesting dollars were increased.

**Experienced:** Funding was constrained to experienced levels or lower in most areas. Some increases in funding were retained in TES for ferret recovery and range vegetation monitoring. Prescribed burning and timber harvesting would decrease to experienced budget levels. No investments in recreation would occur. Effects of these programs would be similar to Alternative 1 under this budget scenario.

**Table 3-17. Budget Analysis (in thousands of 1997 dollars; annual cost)***

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Desired Budget Level | | $5,865 | $6,398 | $6,679 | $6,679 | $7,500 | $7,475 |
| Experienced Budget Level | $4,984 | $4,984 | $4,984 | $4,984 | $4,984 | $4,984 | $4,984 |
| **Nebraska National Forest Units** | | | | | | | |
| Desired Budget Level | | $5,322 | $5,945 | $6,124 | $6,124 | $6,516 | $6507 |
| Experienced Budget Level | $4,338 | $4,338 | $4,338 | $4,338 | $4,338 | $4,338 | $4,338 |
| **Thunder Basin National Grassland** | | | | | | | |
| Desired Budget Level | | $2,215 | $2,428 | $2,416 | $2,416 | $2,632 | $2,648 |
| Experienced Budget Level | $1,756 | $1,756 | $1,756 | $1,756 | $1,756 | $1,756 | $1,756 |

# Social Affected Environment

The social affected environment examines:

- The history of the Northern Great Plains to provide a background context of past management and social structure.
- A characterization of different interest groups, to better understand their management preferences, for managing the Northern Great Plains units.
- The demographics of the Northern Great Plains to better understand the people and the changes occurring there.

## Northern Great Plains Human History

Archaeological evidence suggests that humans have had a presence on the Northern Great Plains for at least 10,000 years (Evans 1982). Using primitive tools, prehistoric people hunted game, such as mammoths and bison (von Ahlefeldt 1997). Between 5,000 and 3,000 years ago, people began to build mound dwellings along the Missouri River. Missouri River tribes on the Northern Great Plains include the Arikara, Hidatsa and Mandan (Evans 1982). Other tribes occupying the Northern Great Plains include Cheyenne, Crow, Kiowa, Pawnee and Lakota

(Sioux). Many of these tribes had mastered horses by the eighteenth century and were using them to follow and hunt buffalo as the herds moved across the prairie.

Life for these plains inhabitants would never be the same after early adventurers and explorers entered the area in the early 1700s (Prentiss, et al., 1996). Soon after President Thomas Jefferson sent Lewis and Clark in 1803 to record what lay west of the Missouri River, fur traders were floating down the rivers and striking out across the prairies. The fur trading industry peaked between 1820 and 1840, playing out prominently on the Northern Great Plains. Many fur trappers turned to buffalo when beaver populations declined and Eastern fashions changed (Prentiss et al. 1996). Fur trading posts continued to open all across the Northern Great Plains well into the 1860s.

In 1862, the federal government encouraged homesteading on the Great Plains when it offered 160 acres of public domain to those willing to work the land. Many emigrants took the government's offer. In doing so, the new residents often clashed with American Indians. With their homes and cultures threatened, tribal people defended themselves, which set off a series of wars between the U.S. government and dozens of tribes.

As America's railway system expanded across the continent, millions of bison were slaughtered, a devastating blow to people inherently bound to the buffalo. The age of the free Plains Indians was fast coming to an end. The U.S. Cavalry was dispatched to protect settlers and railway workers. By the mid- to late-1870s, most tribal people were forced onto reservations. Meanwhile, Euro-American settlers were reshaping the Great Plains.

Cattlemen used the open range to feed and water their cattle. Railroads further enhanced the profitability of the open-range livestock industry. Cattle were transported by rail to the nation's growing population centers or seaports for shipping to Europe.

The cattle industry suffered a sharp set back from a drought in 1883; hundreds of thousands of cattle died (Brown, 1989). However, drought was not the only trouble facing the fledgling livestock industry. As reported by Robinson, Theodore Roosevelt, who ran cattle along the Little Missouri River, worried in the summer of 1886 about an over-stocked range (Brown, 1989).

Homesteaders were also facing difficulties on the prairie. The 160 acres given to them by the government was not sufficient land to sustain a family on the climate and soils of the plains (Manning, 1995). The Kinkaid Act of 1904 recognized the settlers' dilemma and increased a homesteader's allotment to 640 acres (Manning, 1995). The Enlarged Homestead Act of 1909 further advanced homesteading. Previously uncultivated grasslands were tilled under in order to meet market demands for wheat before and after World War I (West, 1990).

While most of the nation prospered during the 1920s, farm prices were falling, causing hardship on the Northern Great Plains. The 1930s drought would hit the country's heartland hard. Many ranches and homesteads failed and, by the early 1930s, environmental and economic devastation led to federal action to rescue the Great Plains.

Lands identified as less than marginal for cultivation were purchased through the Agricultural Adjustment Administration under the authority of the National Industrial Recovery Act of 1933. Through that act and the later Emergency Relief Appropriations Act of 1935, the federal government purchased about 11 million acres and relocated nearly 24,000 families. These purchased lands were collectively called Land Utilization Projects.

President Franklin Roosevelt used the Civilian Conservation Corps to put the nation back to work in the 1930s. These civilian laborers transformed vast areas of the Great Plains through grassland restoration, erosion control and watershed management (Merrill, 1981). The Soil Conservation Service arose from the Soil Erosion Service in 1935. Another legislative response was the Taylor Grazing Act of 1934, which was designed to repair or prevent damage to the public rangeland.

Congress passed the Bankhead-Jones Farm Tenant Act in 1937, which gave permanent status and management direction for the Land Utilization Projects and still provides direction for national grasslands. In 1938, the Soil Conservation Service began administering the Title III lands named in the Bankhead-Jones Farm Tenant Act (Dethloff 1989). Cooperative grazing associations were also forming. These associations were instrumental in grassland recovery and still administer grazing agreements on some public lands today.

In the 1940s, some Western legislators and stockmen's associations advocated privatization of federal lands. These efforts were defeated, however, the legislative commotion contributed to the end of the Grazing Service and the General Land Office. They were replaced by the Bureau of Land Management in 1947 (Ferguson 1984).

After World War II, recreational demand on public lands increased notably. Wildlife interests and hunters pressured the government to recognize their escalating concerns about public lands. Water-quality issues continued to gain national attention. Irrigation for agriculture became an increasingly important tool all across the Great Plains.

The 1950s rendered important reorganization of federal properties. In 1953, the USDA Forest Service was assigned management of about 7 million acres of Land Utilization Projects (West, 1990). Other project lands were transferred to the Bureau of Land Management, the National Park Service, and the U.S. Fish and Wildlife Service and to some states.

In 1960, nineteen Land Utilization Projects were dedicated as national grasslands under authority of the USDA Forest Service. Today, about 3.8 million acres in 20 national grasslands are administered for multiple uses in 12 western states (USDA Forest Service 1999). The Northern Great Plains Management Plans Revision process includes 8 of the 20 national grasslands.

Also included are the Nebraska and Samuel R. McKelvie National Forests. The public domain parcels known today as the Bessey Ranger District of the Nebraska National Forest and the Samuel R. McKelvie National Forest were first established as forest reserves by a presidential proclamation in 1902, and became national forests by an executive order in 1908. The Pine Ridge Ranger District of the Nebraska National Forest is composed of lands purchased by the Resettlement Administration under the Bankhead-Jones Farm Tenant Act in 1937. Although this unit was purchased at the same time as lands that were later organized as national grasslands, it was established as part of the Nebraska National Forest because it was forested.

In addition, the Dakota Prairie Grasslands manage two experimental forests--Denbigh and the Souris Purchase Unit. Denbigh was established in 1931; a portion of the unit was acquired by the USDA. Forest Service at that time, with the remainder acquired from the state of North Dakota in 1971. The Souris Purchase Unit was acquired in 1935.

These public lands offer multiple benefits and hold the attention of various interests. By virtue of history, tradition and use, many groups and individuals have a stake in the management of these National Forest System lands on the Northern Great Plains.

## Management Preferences of Major Public User/Interest Groups

This section defines the social environment: who the various major public user/interest groups are and what they desire from National Forest system lands. These segments or groups will then be addressed in the Effects Section in terms of how the alternatives meet their desires.

The Forest Service considers the feelings, goals, and expectations people have for the public lands important to decision making. Public land settings and products have emotional and financial meanings to many people. Public involvement and interview data provide impressions about personal and community values.

In the fall of 1997, the Forest Service conducted interviews with 19 groups of people who identified with a use or interest in the national grasslands and forests in the Northern Great Plains. These groups were asked questions designed to explore principal management preferences for the public lands. The interest groups interviewed for the study are listed below, along with the key management preferences identified by each group. (See Appendix B for more information on interview methodology.) In some cases, public comments received in response to scoping have been used to supplement the interview results.

### *Agriculture Group*

This group includes livestock grazing permittees, non-permittee livestock producers and others who have some association to livestock production, such as feed suppliers. The primary management preferences for the public lands identified by this group include:

- Healthy grass and rangelands.
- Available water.
- Suitable access.
- Management appropriate to local conditions.
- Stable grazing permits.

### *Oil, Gas, Minerals Group*

This group contains mineral industry representatives and employees, and officials and residents of communities with strong links to those industries. The top management preferences for this group for the public lands include:

- Access to leased lands.
- Multiple-use management.
- Timely responses to applications.

### *Wood Products Group*

This group consists principally of timber industry representatives and wood products producers and operators. Their management preferences for the public lands include:

- Desired condition for timber stands.
- An allowable sales quantity based on good inventory and data.
- Timber management practices that reduce risks of insects and fire and improve overall forest health.

### *Consumptive Recreation Group (hunters, anglers, rock collectors, etc.)*

This group includes people who participate in or service recreation activities that remove or consume natural resources. Top management preferences include:

- Access to pursue their activities.
- Healthy vegetation to support wildlife and recreation experiences.

### *Nonconsumptive Recreation Group (trail users, campers, sightseers, etc.)*

This group includes trail users, campers, sightseers, photographers, naturalists, etc., and people associated with those recreation activities. Their main management preferences for the public lands include:

- Access to pursue their activities, and easier access with more fence openings and less fences overall.
- More and better recreation/interpretive information and trail signs.

### *Conservation/Preservation/Environmental Group*

This group includes natural resource specialists, and conservation, preservation, and environmental leaders and advocates. Important management preferences for the public lands include:

- Healthy grasslands and forests where natural processes are working properly.
- Mosaic of native vegetation across the landscapes.
- Viable wildlife populations.
- Opportunities to experience solitude and open spaces.

### *Wildlife Advocacy/Production Group*

Wildlife professionals, wildlife organization members, and wildlife-related activity participants are included in this group. Some of their management preferences include:

- Protection of habitat niches provided by the national grasslands and forests.
- Access to the lands.
- Habitat for a spectrum of species.
- Diverse, native grass across the landscape.

### *Government Group*

This group is made up of representatives and elected officials from a variety of local, state, and federal agencies and offices. Management preferences vary greatly depending on agency mission or the views of the constituency. Some common management preferences include:

- Continued availability of natural resources and opportunities from the public lands.
- Diverse vegetation, recreation opportunities, and wildlife habitats.
- Stable, economic conditions and lifestyles.

### *American Indian Community Group*

The Northern Great Plains contain a number of American Indian communities. In general, American Indian communities have the following management preferences for the public lands:

- Make national grassland and forest resources available to further the self-sufficiency of American Indians.
- Protect American Indian spiritual and cultural values on these public lands.
- Observe treaty rights of American Indians.

### *Adjacent Landowners Group*

This group is made up of people who own real estate next to the public land units. Although there are diverse views among this group, some common management preferences include:

- Management based on local conditions.
- Respect for the rights of private property owners.
- Honest, trustworthy relationship with Forest Service managers.
- Flexible, common-sense management approaches.

## Demographic Changes and Trends

Substantial demographic movement is still taking place within the Northern Great Plains assessment area. In general, rural areas are emptying out, and people are concentrating within a few metropolitan areas. As a report prepared by the Nebraska Rural Development Commission states, many Northern Great Plains rural counties were among the 600 counties that lost population between 1990-94, primarily in North Dakota, South Dakota, and Nebraska.

Economists Mark Drabenstott and Tim Smith summarize the great changes that have occurred over the past 15 years. They describe the 1980s as a "dismal decade" for the rural heartland. They attribute the hardship and changes to three main causes: deep recessions in agriculture and energy, restructuring in manufacturing, and the emergence of the service industry. The 1990s has seen some rebounds; however, they observe that "the new rural growth is occurring in counties with scenic amenities or in emerging trade centers" (Northern Great Plains Rural Development Commission, 1995). Generally, population growth in the region is occurring in urban and metropolitan areas (Northern Great Plains Rural Development Commission, 1995).

## *Population*

State populations of the Northern Great Plains assessment are growing (see Table 3-18). Montana experienced the most growth (12.9 percent, with most growth in the mountains); and North Dakota experienced the lease growth (.05%).

**Table 3-18. Recent State Population Changes**

| | 1990 Population | 2000 Population | % Change 1990-2000 |
|---|---|---|---|
| Montana | 799,065 | 902,195 | 12.9 |
| Nebraska | 1,578,385 | 1,711,263 | 8.4 |
| North Dakota | 638,800 | 642,200 | 0.5 |
| South Dakota | 696,004 | 754,844 | 8.5 |
| Wyoming | 453,588 | 493,782 | 8.9 |

http://www.census.gov/population/cen2000/tab05.xls

Population changes over time are shown in the following table. North Dakota recorded its highest population in the 1930 census. South Dakota finally exceeded its 1930 population in the 1990 census. (The state's highest population is highlighted in **bold**.)

**Table 3-19. Historic Population Changes in Northern Great Plains Assessment States**

| Year | Montana | Nebraska | North Dakota | South Dakota | Wyoming |
|---|---|---|---|---|---|
| 1870 | 21,000 | 123,000 | 2,000 | 12,000 | 9,000 |
| 1880 | 39,000 | 452,000 | 37,000 | 98,000 | 21,000 |
| 1890 | 143,000 | 1,063,000 | 191,000 | 349,000 | 63,000 |
| 1900 | 243,000 | 1,066,000 | 319,000 | 402,000 | 93,000 |
| 1910 | 376,000 | 1,192,000 | 577,000 | 584,000 | 146,000 |
| 1920 | 549,000 | 1,296,000 | 647,000 | 637,000 | 194,000 |
| 1930 | 538,000 | 1,378,000 | **681,000** | 693,000 | 226,000 |
| 1940 | 559,000 | 1,316,000 | 642,000 | 643,000 | 251,000 |
| 1950 | 591,000 | 1,326,000 | 620,000 | 653,000 | 291,000 |
| 1960 | 675,000 | 1,411,000 | 632,000 | 681,000 | 330,000 |
| 1970 | 694,000 | 1,483,000 | 618,000 | 666,000 | 332,000 |
| 1980 | 787,000 | 1,570,000 | 653,000 | 691,000 | 470,000 |
| 1990 | 799,000 | 1,578,000 | 639,000 | 696,000 | 454,000 |
| 2000 | **902,000** | **1,711,000** | 642,200 | **755,000** | **494,000** |

Not all counties are faring equally, as the following table shows. Many Northern Great Plains assessment counties are among rural counties losing population. Of the 40 counties making up the social impact area for the Northern Great Plains assessment, 26 estimate population losses between 1990 and 1999, most of them in eastern Montana, North Dakota, and western Nebraska. In difference, some counties showed large increases; both Shannon and Stanley Counties, South Dakota, posted the greatest population increases of 26 and 18 percent respectively in ten years.

**Table 3-20. Population Changes of Affected Counties**

| Planning Unit/County | 1990 Population | Est. 1999 Population | % Change 90-99 |
|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | |
| **Cedar River/Grand River National Grasslands** | | | |
| Adams, ND | 3,174 | 2,644 | -16.7 |
| Grant, ND | 3,549 | 2,854 | -19.6 |
| Sioux, ND | 3,761 | 4,156 | 10.5 |
| Perkins, SD | 3,932 | 3,466 | -11.9 |
| Corson, SD | 4,195 | 4,104 | -2.2 |
| Ziebach, SD | 2,220 | 2,165 | -2.5 |
| **Little Missouri National Grassland** | | | |
| Dawson, MT | 9,505 | 8,670 | -8.8 |
| Fallon, MT | 3,103 | 2,885 | -7.0 |
| Richland, MT | 10,716 | 10,053 | -6.2 |
| Wibaux, MT | 1,191 | 1,117 | -6.2 |
| Billings, ND | 1,108 | 1,066 | -3.8 |
| Bowman, ND | 3,596 | 3,269 | -9.1 |
| Dunn, ND | 4,005 | 3,457 | -13.7 |
| Golden Valley, ND | 2,108 | 1,782 | -15.5 |
| McKenzie, ND | 6,383 | 5,541 | -13.2 |
| Slope, ND | 907 | 887 | -2.2 |
| Stark, ND | 22,832 | 22,490 | -1.5 |
| Williams, ND | 21,129 | 19,764 | -6.5 |
| **Sheyenne National Grassland** | | | |
| Ransom, ND | 5,921 | 5,731 | -3.2 |
| Richland, ND | 18,148 | 17,924 | -1.2 |
| **MEDICINE BOW/ROUTT NATIONAL FOREST UNIT** | | | |
| **Thunder Basin National Grassland** | | | |
| Campbell, WY | 29,370 | 32,727 | 11.4 |
| Converse, WY | 11,128 | 12,396 | 11.4 |
| Crook, WY | 5,284 | 5,778 | 9.1 |
| Natrona, WY | 61,226 | 63,157 | 3.2 |
| Niobrara, WY | 2,499 | 2,684 | 7.4 |
| Weston, WY | 6,518 | 6,403 | -1.8 |
| **NEBRASKA NATIONAL FOREST UNITS** | | | |
| **Bessey Ranger District/Samuel R. McKelvie National Forest** | | | |
| Blaine, NE | 675 | 575 | -14.8 |
| Cherry, NE | 6,307 | 6,326 | 0.3 |
| Thomas, NE | 851 | 809 | -4.9 |
| **Buffalo Gap National Grassland** | | | |
| Custer, SD | 6,179 | 7,025 | 13.7 |
| Fall River, SD | 7,353 | 6,823 | -7.2 |
| Jackson, SD | 2,811 | 2,949 | 4.9 |
| Pennington, SD | 81,343 | 88,117 | 8.3 |

| Planning Unit/County | 1990 Population | Est. 1999 Population | % Change 90-99 |
|---|---|---|---|
| **Buffalo Gap National Grassland, cont.** | | | |
| Shannon, SD | 9,902 | 12,468 | 25.9 |
| **Fort Pierre National Grassland** | | | |
| Hughes, SD | 14,817 | 15,453 | 4.3 |
| Jones, SD | 1,324 | 1,204 | -9.1 |
| Lyman, SD | 3,638 | 3,783 | 4.0 |
| Stanley, SD | 2,453 | 2,895 | 18.0 |
| **Pine Ridge Ranger District/Oglala National Grassland** | | | |
| Dawes, NE | 9,021 | 8,831 | -2.1 |
| Sioux, NE | 1,549 | 1,424 | -8.1 |

The following table shows state population projections made by the U.S. Census Bureau are shown through 2025.

**Table 3-21. State Population Estimates and Projections**

| | 1995 | 2000 | 2005 | 2015 | 2025 |
|---|---|---|---|---|---|
| Montana | 870,000 | 950,000 | 1,006,000 | 1,069,000 | 1,121,000 |
| Nebraska | 1,637,000 | 1,705,000 | 1,761,000 | 1,850,000 | 1,930,000 |
| North Dakota | 641,000 | 662,000 | 677,000 | 704,000 | 729,000 |
| South Dakota | 729,000 | 777,000 | 810,000 | 840,000 | 866,000 |
| Wyoming | 480,000 | 525,000 | 568,000 | 641,000 | 694,000 |

Wyoming's population is projected to grow about 31 percent by 2025 from its estimated 1995 population. Montana's population is expected to grow by 22 percent over that time. South Dakota is looking for 16 percent growth over that period, and Nebraska could expect about a 15 percent population increase. North Dakota could see an increase of about 12 percent.

## *Age*

The out-migration from rural heartland counties is draining many counties of their young people. People leaving rural areas in the region are often in the 18-24 age group, recent high school graduates either heading to college or joining the work force (Northern Great Plains Rural Development Commission, 1995). Eighteen of the 40 Northern Great Plains social assessment counties report that their populations have an average age above the national average of 35; the notable exceptions in the region are counties with higher percentage of American Indian populations and some Wyoming energy-producing counties.

Births are also down. As an Omaha World Herald article reported, "America's breadbasket is lacking (an) essential crop: the next generation." Writer Harlow Hyde warns that the region is "undergoing a severe drop in births that, if it continues, could empty many small towns in just one generation" (Gale, Fred, 1994). This shrinking birthrate is reducing the number of young people growing up on farms, traditionally the people most likely to assume family farms and ranches (Gale, Fred 1994).

## *Education*

While many people with more formal education are moving out of rural counties in the region, fewer educated people are moving in (Northern Great Plains Rural Development Commission, 1995). The formal educational achievement of most Northern Great Plains assessment counties is less than the national average in which that about 25 percent of their residents 25 years of age or older have earned a bachelor's degree (see Table 3-23). Counties closer to higher education opportunities (Dawes, Hughes, Pennington, and Stark) are more likely to have a population with more formal education.

## *Ethnicity*

Northern Great Plains states are not very ethnically diverse. By far, the largest minority group is American Indians. Montana, North Dakota, South Dakota, and Wyoming all contain large American Indian reservations (see table below). American Demographics reported in December 1991 that the 1990 census counted 38 percent more American Indians in 1990 than in 1980. The report suggests that the increase was not from an increase in Indian births, but rather that more Americans with Indian heritage identified their race as Indian on the 1990 census forms, what the magazine identifies as a "returning to their roots."

**Table 3-22. American Indian Population in Assessment States.**

| | Rank of Population Nationally | Total American Indian Population | Percent of State Population |
|---|---|---|---|
| Montana | 13 | 47,679 | 5.8 |
| Nebraska | 35 | 12,410 | 0.7 |
| North Dakota | 18 | 25,917 | 4.0 |
| South Dakota | 11 | 50,575 | 7.1 |
| Wyoming | 38 | 9,479 | 2.0 |

Of the 40 counties directly impacted by the Northern Great Plains National Grasslands and Forests, 8 counties have minority populations greater than 10%, primarily American Indian. These counties are:

| | | |
|---|---|---|
| Sioux, ND (75.9%) | Corson, SD (49.9%) | Ziebach, SD (65.5%) |
| McKenzie, ND (14.0%) | Jackson, SD (42.8%) | Pennington, SD (11.6%) |
| Shannon, SD (95.0%) | Lyman, SD (29.2% | |

The other 32 counties generally have less than 4% minority populations.

## *Household Income*

Median household income in the Northern Great Plains affected counties often lags behind that found statewide. Exceptions are the metropolitan counties and western Wyoming energy-producing counties. High median household income counties include Campbell County, Wyoming, at over $49,000, compared to the statewide median household income of $33,000. Low median household income counties include Shannon and Corson Counties, South Dakota, which report 57 to 63 percent of the statewide median household income of $31,354. The

following table shows population characteristics and median household incomes by Northern Great Plains states compared to the national average.

**Table 3-23. Population Characteristics of Assessment States (1990 Census Results)**

| | Average Age | % White | % of Population Age 25 Years or Older College Graduate | Median Household Income (1997 Estimates) |
|---|---|---|---|---|
| **National** | **35.3** | **80.3** | **20.3** | **$37,005** |
| Montana | 35.5 | 91.8 | 19.8 | $29,672 |
| Nebraska | 35.7 | 92.5 | 18.9 | $35,337 |
| North Dakota | 35.4 | 94.2 | 18.1 | $31,764 |
| South Dakota | 35.5 | 91.2 | 17.2 | $31,354 |
| Wyoming | 33.5 | 91.0 | 18.8 | $33,197 |

Of the 40 counties directly impacted by the National Grasslands and National Forests covered by the social assessment, 11 are considered low income. Low income for the purposes of this assessment is defined as 200% of poverty level. Assuming a three-person household and a 1997 poverty level of $12,802 (www.census.gov/hhes/pverty/threshold/thresh97.html) when compared to the 1997 median household income. The following counties are considered low income.

| | | |
|---|---|---|
| Grand County, ND | Wibaux, MT | Thomas, NE |
| Sioux County, ND | Dunn, ND | Jackson, SD |
| Corson County, SD | Slope, ND | Shannon, SD |
| Ziebach, SD | Blaine, NE | |

The four counties with the highest median income levels are:

| | |
|---|---|
| Campbell County, WY | Natrona County, WY |
| Converse County, WY | Hughes County, SD |

The Wyoming counties have larger household income levels due to mineral industry employment levels., including income associated with coal mining which tends to be more labor intensive than oil and gas production. Hughes County has higher income levels due to the government sector jobs in the State Capitol and it serves as a trade center for surrounding communities.

The following table shows the same kind of data as in Table 3-23 for affected counties.

**Table 3-24. Population Characteristics of Affected Counties**

| | **Average Age** (1990 Census Results) | **% White (1999 Estimates)** | **% of Population Age 25 Years or Older College Graduate** (1990 Census Results) | **Median Household Income (1997 Estimates)** |
|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | |
| **Cedar River/Grand River National Grasslands** | | | | |
| Adams, ND | 40.1 | 99.4 | 11.2 | $27,346 |
| Grant, ND | 40.3 | 98.7 | 8.9 | $20,257 |
| Sioux, ND | 26.7 | 20.0 | 9.9 | $19,120 |
| Corson, SD | 31.3 | 49.9 | 10.5 | $19,878 |
| Perkins, SD | 39.8 | 97.6 | 12.7 | $26,543 |
| Ziebach, SD | 28.1 | 32.1 | 8.5 | $20,139 |
| **Little Missouri National Grassland** | | | | |
| Dawson, MT | 36.6 | 98.7 | 13.2 | $31,964 |
| Fallon, MT | 30.6 | 98.1 | 10.6 | $33,260 |
| Richland, MT | 34.4 | 97.7 | 13.4 | $31,855 |
| Wibaux, MT | 39.0 | 99.6 | 10.9 | $25,010 |
| Billings, ND | 34.0 | 99.7 | 12.6 | $29,541 |
| Bowman, ND | 38.4 | 99.7 | 13.9 | $31,058 |
| Dunn, ND | 36.1 | 87.9 | 10.1 | $25,257 |
| Golden Valley, ND | 38.1 | 97.3 | 15.7 | $26,669 |
| McKenzie, ND | 34.1 | 82.6 | 14.2 | $32,034 |
| Slope, ND | 35.3 | 94.4 | 10.4 | $22,759 |
| Stark, ND | 34.0 | 98.2 | 14.8 | $32,028 |
| Williams, ND | 35.0 | 93.6 | 14.3 | $33,249 |
| **Sheyenne National Grassland** | | | | |
| Ransom, ND | 40.3 | 99.3 | 11.1 | $32,823 |
| Richland, ND | 35.6 | 96.6 | 13.0 | $36,591 |
| **MEDICINE BOW/ROUTT NATIONAL FOREST UNIT** | | | | |
| **Thunder Basin National Grassland** | | | | |
| Campbell, WY | 28.2 | 97.9 | 15.7 | $49,042 |
| Converse, WY | 32.3 | 98.2 | 12.7 | $37,978 |
| Crook, WY | 34.1 | 99.3 | 15.6 | $35,003 |
| Natrona, WY | 33.6 | 97.7 | 20.4 | $34,685 |
| Niobrara, WY | 39.8 | 98.6 | 13.0 | $28,740 |
| Weston, WY | 35.0 | 98.3 | 12.7 | $35,667 |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | |
| **Bessey Ranger District/Samuel R. McKelvie National Forest** | | | | |
| Blaine, NE | 38.2 | 99.7 | 15.8 | $22,144 |
| Cherry, NE | 37.5 | 96.3 | 13.1 | $27,326 |
| Thomas, NE | 36.2 | 99.4 | 11.4 | $24,909 |

| | **Average Age** (1990 Census Results) | **% White (1999 Estimates)** | **% of Population Age 25 Years or Older College Graduate** (1990 Census Results) | **Median Household Income (1997 Estimates)** |
|---|---|---|---|---|
| **Buffalo Gap National Grassland** | | | | |
| Custer, SD | 37.1 | 96.2 | 17.5 | $31,095 |
| Fall River, SD | 40.9 | 91.9 | 16.3 | $28,440 |
| Jackson, SD | 32.7 | 52.9 | 10.9 | $23,783 |
| Pennington, SD | 32.2 | 87.9 | 21.2 | $34,507 |
| Shannon, SD | 25.3 | 5.0 | 10.7 | $17,814 |
| **Fort Pierre National Grassland** | | | | |
| Hughes, SD | 34.3 | 91.5 | 25.6 | $40,724 |
| Jones, SD | 37.5 | 99.4 | 14.4 | $30,038 |
| Lyman, SD | 33.8 | 66.6 | 10.5 | $27,283 |
| Stanley, SD | 31.6 | 92.2 | 14.6 | $33,630 |
| **Pine Ridge Ranger District/Oglala National Grassland** | | | | |
| Dawes, NE | 35.2 | 93.6 | 23.1 | $26,992 |
| Sioux, NE | 38.6 | 98.4 | 17.8 | $26,965 |

# Social Effected Environment

The social effects section describes how the alternatives would affect the social environment.

Management decisions determine the public land uses and resource availability from those lands. The following narrative discusses some anticipated effects associated with the alternatives. This section serves as a synthesis of effects on the human component of the environment. Other sections, such as Recreation and Travel Management, Heritage Resources, Livestock Grazing, Rangeland and Forest Health, in this DEIS provide more detail on these effects.

## General Effects

No alternative is expected to have a substantial effect on the demographic trends within the assessment area. Communities that are in decline or are growing will continue to decline or grow independent of the alternatives. The primary factor determining the economic health of many communities will be the market price for livestock, oil, gas, and coal, which is outside the span of control of Northern Great Plains communities and the Forest Service. Economic research (Drabenstott, et al. 1996; Barkema et al. 1996) suggests that growing Great Plains communities are those that have established themselves as a trade center (Dickinson, ND, Rapid City, SD, Casper, WY, and Chadron, NE), have an attractive natural setting (Mountain communities of Colorado), or have found ways to add value (process) to bulk agricultural or mineral commodities before they are shipped out of the area. The Forest Service alternatives only address one of these potential growth factors (attractive natural setting), the other factors are outside the scope of Forest Service natural resource decisions. All alternatives are estimated to change EIA total jobs and income by less than 1% (see Table 3-25) when considering direct, indirect, and induced jobs and income dependent on National Forest system lands.

**Table 3-25. National Forest System Direct, Indirect, and Induced Combined Jobs and Income for Grazing, Oil and Gas, Recreation, and Timber.**

| | Area Total Jobs and Income (Thousands 1997 $) | Existing Condition | Alt 1 Change From Area Total | Alt 2 Change From Area Total | DEIS Alt 3 Change From Area Total | FEIS Alt 3 Change From Area Total | Alt 4 Change From Area Total | Alt 5 Change From Area Total |
|---|---|---|---|---|---|---|---|---|
| **All Planning Units Total** | | | | | | | | |
| Jobs* | 208,691 | 5,444 | 17 | 66 | -216 | -221 | -656 | -418 |
| Income* | $7,128,268 | $123,333 | $398 | $1,215 | -$3,608 | -$3,931 | -$10,972 | -$6,441 |
| Area Total % Change – Jobs+ | | 2.61% | 0.01% | 0.03% | -0.10% | -0.11% | -0.31% | -0.20% |
| Area Total % Change - Income+ | | 1.73% | 0.01% | 0.02% | -0.05% | -0.06% | -0.15% | -0.09% |
| **Dakota Prairie Grasslands Total** | | | | | | | | |
| Jobs* | 72,956 | 3,148 | 58 | 59 | -206 | -157 | -500 | -324 |
| Income* | $2,230,419 | $71,927 | $755 | $755 | -$3,629 | -$3,066 | -$8,506 | -$5,186 |
| % Difference Jobs+ | | 4.31% | 0.08% | 0.08% | -0.28% | -0.21% | -0.69% | -0.44% |
| % Difference Income+ | | 3.22% | 0.03% | 0.03% | -0.16% | -0.14% | -0.38% | -0.23% |
| **Grand River / Cedar River National Grassland** | | | | | | | | |
| Jobs* | 8,013 | 126 | 13 | 13 | 3 | 1 | -21 | -10 |
| Income* | $227,932 | $1,816 | $190 | $189 | $38 | $17 | -$318 | -$146 |
| % Difference Jobs+ | | 1.57% | 0.16% | 0.16% | 0.03% | 0.01% | -0.27% | -0.12% |
| % Difference Income+ | | 0.80% | 0.08% | 0.08% | 0.02% | 0.01% | -0.14% | -0.06% |
| **Little Missouri National Grassland** | | | | | | | | |
| Jobs* | 49,588 | 2,842 | 40 | 39 | -142 | -136 | -419 | -288 |
| Income* | $1,544,470 | $68,023 | $498 | $492 | -$2,919 | -$2,844 | -$7,512 | -$4,740 |
| % Difference Jobs+ | | 5.73% | 0.08% | 0.08% | -0.29% | -0.28% | -0.84% | -0.58% |
| % Difference Income+ | | 4.40% | 0.03% | 0.03% | -0.19% | -0.18% | -0.49% | -0.31% |
| **Sheyenne National Grassland** | | | | | | | | |
| Jobs* | 15,355 | 180 | 6 | 7 | -66 | -21 | -60 | -27 |
| Income* | $458,017 | $2,089 | $67 | $74 | -$748 | -$238 | -$675 | -$301 |
| % Difference Jobs+ | | 1.17% | 0.04% | 0.04% | -0.43% | -0.14% | -0.39% | -0.17% |

| | Area Total Jobs and Income (Thousands 1997 $) | Existing Condition | Alt 1 Change From Area Total | Alt 2 Change From Area Total | DEIS Alt 3 Change From Area Total | FEIS Alt 3 Change From Area Total | Alt 4 Change From Area Total | Alt 5 Change From Area Total |
|---|---|---|---|---|---|---|---|---|
| **Sheyenne National Grassland, cont.** | | | | | | | | |
| % Difference Income+ | | 0.46% | 0.01% | 0.02% | -0.16% | -0.05% | -0.15% | -0.07% |
| **Nebraska National Forest Units Total** | | | | | | | | |
| Jobs* | 101,242 | 1,181 | -79 | -29 | -30 | -72 | -123 | -107 |
| Income* | $3,504,012 | $18,690 | -$1,169 | -$319 | -$417 | -$1,014 | -$1,744 | -$1,536 |
| % Difference Jobs+ | | 1.17% | -0.08% | -0.03% | -0.03% | -0.07% | -0.12% | -0.11% |
| % Difference Income+ | | 0.53% | -0.03% | -0.01% | -0.01% | -0.03% | -0.05% | -0.04% |
| **Bessey Unit of the Nebraska National Forest / Samuel R. McKelvie National Forest** | | | | | | | | |
| Jobs* | 5,148 | 258 | -6 | -1 | -1 | -6 | -19 | -16 |
| Income* | $148,771 | $3,991 | -$179 | -$17 | -$34 | -$180 | -$530 | -$433 |
| % Difference Jobs+ | | 5.01% | -0.13% | -0.01% | -0.02% | -0.13% | -0.37% | -0.30% |
| % Difference Income+ | | 2.68% | -0.12% | -0.01% | -0.02% | -0.12% | -0.36% | -0.29% |
| **Buffalo Gap National Grassland** | | | | | | | | |
| Jobs* | 71,863 | 732 | -48 | -29 | -8 | -47 | -81 | -66 |
| Income* | $2,543,821 | $12,146 | -$707 | -$441 | -$127 | -$706 | -$1,213 | -$991 |
| % Difference Jobs+ | | 1.02% | -0.07% | -0.04% | -0.01% | -0.07% | -0.11% | -0.09% |
| % Difference Income+ | | 0.48% | -0.03% | -0.02% | -0.01% | -0.03% | -0.05% | -0.04% |
| **Fort Pierre National Grassland** | | | | | | | | |
| Jobs* | 18,584 | 222 | -23 | -10 | -27 | -23 | -33 | -33 |
| Income* | $652,785 | $3,308 | -$348 | -$147 | -$418 | -$348 | -$505 | -$505 |
| % Difference Jobs+ | | 1.19% | -0.12% | -0.05% | -0.15% | -0.12% | -0.18% | -0.18% |
| % Difference Income+ | | 0.51% | -0.05% | -0.02% | -0.06% | -0.05% | -0.08% | -0.08% |

| | Area Total Jobs and Income (Thousands 1997 $) | Existing Condition | Alt 1 Change From Area Total | Alt 2 Change From Area Total | DEIS Alt 3 Change From Area Total | FEIS Alt 3 Change From Area Total | Alt 4 Change From Area Total | Alt 5 Change From Area Total |
|---|---|---|---|---|---|---|---|---|
| **Pine Ridge Unit Nebraska National Forest / Oglala National Grassland** | | | | | | | | |
| Jobs* | 5,647 | 227 | -9 | 9 | 5 | -2 | -9 | -8 |
| Income* | $158,634 | $3,237 | -$114 | $269 | $128 | $40 | -$27 | -$40 |
| % Difference Jobs+ | | 4.03% | -0.15% | 0.16% | 0.08% | -0.04% | -0.15% | -0.15% |
| % Difference Income+ | | 2.04% | -0.07% | 0.17% | 0.08% | 0.03% | -0.02% | -0.03% |
| **Thunder Basin National Grassland** | | | | | | | | |
| Jobs* | 34,493 | 1,115 | 38 | 37 | 21 | 7 | -33 | 13 |
| Income* | $1,393,837 | $32,715 | $812 | $779 | $438 | $149 | -$722 | $281 |
| % Difference Jobs+ | | 3.23% | 0.11% | 0.11% | 0.06% | 0.02% | -0.10% | 0.04% |
| % Difference Income+ | | 2.35% | 0.06% | 0.06% | 0.03% | 0.01% | -0.05% | 0.02% |

* Jobs are number of jobs not full time equivalents. Income is thousands of 1997 dollars. Existing Condition represents all jobs or income originating from National Forest system lands including indirect and induced effects. Alternatives 1-5 represent the change in jobs or income from the existing condition.

\+ Existing condition represents the percent contribution National Forest system lands make to the local economy including indirect and induced effects. Alternatives 1-5 represent the estimated percent change in jobs and income in the local economy.

For the Grand River / Cedar River EIA, FEIS Alternative 3 can be said to be job and income neutral. Alternative 4 would have the greatest impact with an estimated loss of 21 jobs, a -.27% change in total employment. Alternatives 1 and 2 would have the next greatest impact with a gain of 13 jobs, a .16% change in total employment. DEIS Alternative 3 has 2 more jobs than FEIS Alternative 3.

The Little Missouri EIA effects from FEIS Alternative 3 would result in a loss of 136 jobs, a -.28% change in total jobs. Alternative 4 would have the greatest impact with an estimated loss of 419 jobs, a -.84% change in total employment followed by Alternatives 5 with an estimated -.58% change in total employment. Alternatives 1 and 2 would provide an estimated increase of 40 and 39 jobs, a .08% change in employment. DEIS Alternative 3 would provide 6 fewer jobs than FEIS Alternative 3.

The Sheyenne EIA effects from FEIS Alternative 3 would result in a loss of 21 jobs, a -.14% change in total jobs. Alternative 4 would have the greatest impact with an estimated loss of 60 jobs, a -.39% change in total employment followed by Alternatives 5 with an estimated -.17% change in total employment. Alternatives 1 and 2 would provide an estimated increase of 6 to 7 jobs, a .04% change in employment. DEIS Alternative 3 would provide an estimated 45 fewer jobs than FEIS Alternative 3 and DEIS Alternative 3 would provide 6 fewer jobs than Alternative 4.

The Bessey/McKelvie EIA effects from FEIS Alternative 3 would result in a loss of 6 jobs, a -.13% change in total jobs. Alternative 4 would have the greatest impact with an estimated loss of 19 jobs, a -.37% change in total employment followed by Alternatives 5, FEIS Alternative 3 and Alternative 1 with estimated -.30%, -.13% and -.13% changes in total employment. Alternatives 1 and FEIS 3 would provide the same level of grazing. Alternatives 2 would provide an estimated decrease of 1 job, a .01% change in employment. DEIS Alternative 3 would provide 5 more jobs than FEIS Alternative 3. All alternatives are projected to reduce grazing over current levels.

The Buffalo Gap EIA effects from FEIS Alternative 3 would result in a loss of 47 jobs, a -.07% change in total jobs. Alternative 4 would have the greatest impact with an estimated loss of 81 jobs, a -.11% change in total employment followed by Alternatives 5, 1, FEIS 3, and 2 with estimated -.09%, -.07%, -.07 and -.04% changes in total employment. Alternatives 1 and FEIS 3 provide roughly equal levels of grazing. DEIS Alternative 3 would provide 39 more jobs than FEIS Alternative 3. All alternatives are projected to reduce grazing over current levels.

The Fort Pierre EIA effects from FEIS Alternative 3 would result in a loss of 23 jobs, a -.12% change in total jobs. Alternatives 4, and 5 would have the greatest impact with an estimated loss of 33 jobs, a -.18% change in total employment followed by Alternatives 1, FEIS 3, and 2 with estimated -.12%, -.12%, and -.05% changes in total employment. Alternatives 1 and FEIS 3 would provide the same levels of grazing. DEIS Alternative 3 would provide an estimated 4 fewer jobs than FEIS Alternative 3. All alternatives are projected to reduce grazing over current levels.

The Pine Ridge/Oglala EIA effects from FEIS Alternative 3 would result in a loss of 2 jobs, a -.04% change in total jobs. Alternatives 1 and 4 would have the greatest job impact with an estimated loss of 9 jobs, a -.15% change in total employment followed by Alternatives 5, and FEIS 3 with estimated -.18%, and -.04% change in total employment. Alternatives 2 would

provide an estimated increase of 9 jobs, a .16% change in employment. DEIS Alternative 3 would provide 7 more jobs than FEIS Alternative 3.

The Thunder Basin EIA effects from FEIS Alternative 3 would result in a gain of 7 jobs, a .02% change in total jobs. Alternative 4 would have the greatest impact with an estimated loss of 33 jobs, a -.10% change in total employment. Alternatives 1, 2, 5, and FEIS 3 would provide an estimated increase of 38, 37, 21, and 7 jobs, a .11%, .11%, .06%, and .02% change in employment respectively. DEIS Alternative 3 would provide 114 more jobs than FEIS Alternative 3.

Alternatives 3, 4 and 5 place more emphasis on diverse landscapes, plants, animals, and recreation opportunities to varying degrees across all EIAs. These emphases are achieved through goals and objectives, standards and guidelines, and management area allocations. Alternative 4 would call for the greatest decreases in jobs and income across all EIAs.

The shifts in emphases away from Existing Conditions related to jobs and income for the Little Missouri, Sheyenne, Bessey/McKelvie, Buffalo Gap, and Fort Pierre could cause some changes in user groups. The Grand River/Cedar River, Pine Ridge/Oglala, and Thunder Basin EIAs have preferred alternatives that provide job and income levels close to existing.

## Effects On The Management Preferences of Major Public User/Interest Groups

The following section discusses the effectiveness of the alternatives in accomplishing the principal management preferences identified for the public lands by the major public user/interest groups.

### *Agriculture Group Management preferences*

#### Healthy Grass and Rangelands

Alternative 2 would make the most forage available to livestock, followed by Alternatives 1, 3, 5, and 4. It is assumed that desired vegetation conditions for livestock grazing would be moderate grass structure. For all units, Alternative 1 would have the highest percentage of grass with moderate structure, followed by Alternative 2, 5, 3 and 4.

While all alternatives place a high emphasis on noxious weed and invasive plant control, Alternatives 2 and 4 place a higher emphasis on reducing noxious weeds and invasive plants than Alternatives 1, 3, and 5. Alternatives 2 and 4 would reduce the acres of noxious weeds and undesirable plants by 15 percent. Alternatives 3 and 5 would allow no increase in the acres of noxious weeds and invasive plants. Alternative 1 would provide no change from current direction.

#### Suitable Access

Livestock permittees may be authorized motorized access as needed for their livestock management under all alternatives, regardless of the travel restrictions imposed on other users as determined by site-specific analysis.

#### Management Based on Local Conditions

Based on available information, desired vegetation conditions have been developed for all planning units. More site-specific data collection on vegetation conditions will be needed to

validate assumptions and fine tune desired conditions based on local conditions. This will be done regardless of the alternative selected.

### Stable Grazing Levels

The less a planning unit is achieving the desired vegetation conditions, the more likely future adjustments in grazing systems and intensities would be needed. Adjustments in permitted livestock numbers would be least likely in Alternative 1 and 2, followed by 3, 5, and 4.

Impacts to specific permit holders can be moderated by the grazing associations as they have the power to move livestock across allotment boundaries, and spread a loss or gain in permited AUMs among many permittees versus a simgle permittee. Generally, the direct and indirect jobs and income linked to range-fed livestock grazing on the national grasslands and forests would be highest in Alternative 2, followed by Alternatives 1, 3, 5 and 4. The exceptions are on the Thunder Basin EIA where Alternative 2 is slightly greater than Alternative 1, and the Pine Ridge/Oglala were Alternative FEIS 3 is slightly greater than Alternative 1.

Grazing levels will fluctuate based on annual weather patterns and other factors as has occurred in the past. These fluctuations will continue in the future.

The concern that dramatic changes could occur on one allotment and drive one rancher out of business can be mitigated through management by the grazing associations. Grazing associations have the power to spread out reductions to avoid drastic changes to any one rancher.

### Summary

Based on the above factors, Alternative 2, followed closely by Alternative 1, would be the most effective in achieving the management preferences for the agriculture group except for the Thunder Basin where Alternative 1 would be preferred by a small margin. These alternatives would be followed by Alternatives 3, 5, and 4.

## *Oil, Gas, Minerals Group Management preferences*

### Access to Leased Lands

All alternatives would provide access to existing leases.

On the Little Missouri EIA Alternatives 1 and 2 would provide the most access for future leases (projected 37 wells drilled annually), Alternatives FEIS 3 and Alternative 5 would provide slightly less access (projected 36 wells drilled annually) and Alternative 4 would provide the lease access (projected 35 wells drilled annually).

On the Thunder Basin EIA all alternatives except for Alternative 4 provide the same level of access (projected 23 wells drilled annually) while Alternative 4 would provide slightly less access (projected 22 wells drilled annually).

The Buffalo Gap and Pine Ridge/Oglala alternatives generally have the same level of access in all alternatives.

### Timely Responses to Applications

All alternatives contain direction that instructs managers to respond in a timely manner to oil and gas leasing, exploration and development requests.

### Summary

Alternative 4 on the Dakota Prairie Grasslands and Thunder Basin National Grassland would offer the least opportunity for oil and gas development. Alternative 1 would offer the least oil and gas opportunity on the Buffalo Gap and Oglala National Grasslands.

## *Wood Products Group Management preferences*

### Desired Condition for Timber Stands

Desired conditions have been identified for all alternatives. All alternatives would move the forested landscapes toward a functioning mosaic of vegetation types, ages, sizes, and other characteristics. Alternative 2 would achieve those conditions more rapidly than the other alternatives.

### Allowable Sale Quantity

Alternative 2 would include an allowable sale quantity of about 1600 thousand board feet per year on the Nebraska National Forest. The other alternatives would allow timber harvest (Nebraska NF and Thunder Basin and Sheyenne National Grasslands only) but would not establish an allowable sale quantity. The amount of timber harvested would depend on the desired conditions based on the emphasis of the alternative. Alternative 4 would produce the next highest timber volume (1000 thousand board feet per year) because of its emphasis to restore impaired ecosystems, followed by Alternatives 5, 3, (800 thousand board feet per year each) and 1 (300 thousand board feet per year).

### Practices to Improve Forest Health

Alternative 2 would apply appropriate timber management practices on the largest acreage to maintain or improve forest health over the first 10 to 15 years, followed by Alternatives 4, 5, 3, and 1.

### Summary

Alternative 2 would be the most effective in achieving the management preferences for this group, followed by Alternatives 4, 5, 3 and 1.

## *Consumptive Recreation Group Management preferences*

### Access to Pursue Activities

Alternatives 1 and 2 would continue current travel management direction for the Thunder Basin and Nebraska National Forest and associated units, which allows motorized travel in most areas on the planning units. Alternatives 3, 4, and 5 would limit travel to designated routes, which could reduce access for some consumptive recreation activities, such as driving off travelways to retrieve game or collect rocks. The recent OHV decision on the Dakota Prairie National Grasslands has limited wheeled motorized use to existing roads and trails. This decision makes Alternatives 1 and 2 appear very similar to Alternatives 3, 4, and 5 for access.

Alternative 5 is expected to have the most designated motorized travelways, followed by Alternatives 3 and 4. Alternatives 4 and 5 would restrict motorized use on the most acres.

### Healthy Vegetation to Support Wildlife and Recreation Experiences

Alternatives 3, 4 and 5 would result in more diverse vegetation, which should enhance wildlife habitats and recreation experiences, than Alternatives 1 and 2. Alternatives 2, 3, 4, and 5 would improve deer habitat over existing conditions (Alternative 1). Alternatives 3, 4, and 5 would improve upland bird habitat over Alternatives 1 and 2, with Alternative 4 improving upland bird habitat the most of the alternatives. Alternative 4 would have the most acres of active prairie dog colonies in 10 years, followed by Alternatives 3, and 5. However, Alternatives 3 and 4 could reduce opportunities for prairie dog recreational shooting because of possible seasonal and year-long restrictions.

### Summary

Alternative 5 would be best overall for consumptive recreation activities. Although access would be reduced, Alternative 5 would, of the alternatives that restrict motorized travel to designated routes, offer the most access, but it also rates high in offering diverse landscape settings and habitats. It also would have fewer restrictions on prairie dog shooting than Alternatives 3 and 4. Alternative 5 would have less control actions taken to reduce prairie dog populations than Alternatives 1 and 2. Alternative 5 also plans for more fishing opportunities with pond construction on the Nebraska and Dakota units and would have fewer restrictions on noncommercial fossil collecting than Alternatives 2, 3, and 4. Alternative 1 would provide the most opportunity for noncommercial fossil collecting.

## *Nonconsumptive Recreation Group Management preferences*

### Access to Pursue their Activities, and Easier Access (more fence crossings and less fences overall)

Alternatives 1 and 2 would continue current travel management direction for the Thunder Basin and Nebraska National Forest and associated units, which allows motorized travel in most areas on the planning units. Alternatives 3, 4, and 5 could eventually limit travel to designated routes only, which could reduce access for some nonconsumptive recreation activities, such as driving for pleasure. Alternative 5 is expected to have the most designated motorized travelways, followed by 3 and 4. However, Alternatives 4 and 5 would have the most acres where no motorized use is allowed, which would benefit users seeking solitude and more primitive experiences, while at the same time possibly limiting access for the elderly or disabled.

The recent OHV decision on the Dakota Prairie Grasslands has limited wheeled motorized use to existing roads and trails. This decision makes Alternatives 1 and 2 appear very similar to Alternatives 3, 4, and 5 for access. The difference is now primarily in the amount of area where non-motorized used is allowed. Alternative 3, 4, and 5 for Thunder Basin and the Nebraska units, and Alternatives 1, 2, 3, 4, and 5 for the Dakota Prairie units would restrict motorized travel to designated routes. Alternative 4 would have the least miles of motorized routes. Alternative 4 would have the most acres of semi-primitive non-motorized recreation settings (followed by Alternatives 5, 3, 2, and 1) and would recommend the most acres for Wilderness of the alternatives (followed by Alternative 5 and 3; Alternatives 1 and 2 would not recommend any acres for Wilderness).

### More and Better Recreation/Interpretive Information and Trail Signs

Alternative 5 would plan for the most recreation improvements, such as developed interpretive facilities, trailheads, etc., followed by Alternatives 3, 4, 2, and 1.

### Summary

For nonconsumptive recreation activities on the Thunder Basin and the Nebraska Units that rely on motorized travel to their destination, Alternatives 3, 4, 5 would reduce their access by restricting motorized travel to designated routes while at the same time creating nonmotorized opportunities. Alternative 5 would provide the most designated travelways and the most recreation and interpretive information improvements of the alternatives.

Due to the OHV decision, access for all alternatives is limited to existing roads and trails on the Dakota Prairie Grasslands.

## *Conservation/Preservation/Environmental Group Management preferences*

### Healthy Grasslands and Forests Where Natural Processes are Working Properly

Alternative 4, which features natural processes and restoration of impaired native ecosystems, would be most effective in achieving this management goal. Alternative 4 would designate or recommend more acres to nonmotorized uses, and promote the continuation of natural processes; however, active restoration efforts could be hampered by nonmotorized restrictions.

### Mosaic of Native Vegetation Across the Landscape

Alternative 4 would provide the most diverse vegetation across the landscape with the most acres with high structure (grass left at the end of the growing and grazing seasons), followed by Alternatives 3, 5, 1 and 2. Alternative 4 would also do the most to restore or encourage native plant species.

### Viable Wildlife Populations

Alternative 4 would make less forage available to livestock than the other alternatives. With less vegetation consumed by livestock, more would be available to wildlife and other resource uses. Alternative 4 is also expected to provide the most diverse vegetative landscape, which would support a variety of wildlife. Alternative 4 would have the most acres of active prairie dog colonies and would improve habitat for deer and upland birds the most of the alternatives.

### Opportunities to Experience Solitude and Open Spaces

Motorized travel, depending on the amount, may be considered a detriment to solitude. Alternative 3, 4, and 5 for Thunder Basin and the Nebraska units, and Alternatives 1, 2, 3, 4, and 5 for the Dakota Prairie units would restrict motorized travel to designated routes; Alternative 4 would have the least miles of motorized routes. Alternative 4 would have the most acres of semi-primitive non-motorized recreation settings (followed by Alternatives 5, 3, 2, and 1) and would recommend the most acres for Wilderness of the alternatives (followed by Alternative 5 and 3; Alternatives 1 and 2 would not recommend any acres for Wilderness). The size of grazing pastures would be larger in Alternative 4 than the other alternatives, promoting a sense of vastness. Alternative 4 would also allow the least number of water developments in grazing pastures, which would provide a more natural-appearing landscape.

### Summary

Alternative 4 would be most effective in achieving the goals for this group, followed by Alternative 5, 3, 1 and 2.

## *Wildlife Advocacy/Production Group Management preferences*

### Protection of Unique Habitat Niches

Several categories of management areas contain considerations for unique habitats. Special Interest Areas are managed to protect or enhance areas with unusual characteristics, including terrestrial and aquatic habitats. Research Natural Areas are part of a network of ecological reserves for monitoring, research, education and maintenance of biological diversity. Wilderness and other similar management prescriptions (1.2, 1.2a, 2.2 and some 2.1 areas) is a management category that allows natural ecological processes to operate relatively free from human influences. Acres recommended for Wilderness often contain unusual habitats that are worthy of protection. Wild and Scenic Rivers often also possess special habitats. Also, there are other management areas designed to favor particular wildlife species, such as black-footed ferrets or bighorn sheep. Most of these areas fall within management area categories 1, 2 and 3. Alternative 4 includes the most acres of these types of management allocations, followed by Alternatives 3, 5, 2, and 1.

### Access to the Lands Already Discussed

Alternatives 1 and 2 would continue current travel management direction for the Thunder Basin and Nebraska National Forest and associated units, which allows motorized travel in most areas on the planning units. Alternatives 3, 4, and 5 would limit travel to designated routes, which could reduce access for some consumptive recreation activities, such as driving off travelways to retrieve game or collect rocks. The recent OHV decision on the Dakota Prairie National Grasslands has limited wheeled motorized use to existing roads and trails. This decision makes Alternatives 1 and 2 appear very similar to Alternatives 3, 4, and 5 for access. Alternative 5 is expected to have the most designated motorized travelways, followed by 3 and 4. However, Alternatives 4 and 5 would have the most acres where no motorized use is allowed, which would benefit users seeking solitude and more primitive experiences, while at the same time possibly limiting access for the elderly or disabled. For most planning units, Alternatives 3, 4 and 5 would increase the size of fenced pastures, which would also reduce the number of fences encountered.

### Habitat for a Spectrum of Species

All alternatives have goals to protect, conserve and restore important terrestrial and aquatic habitats, and ecosystem integrity, and provide sufficient habitat to support stable or increasing populations for Management Indicator Species. Most of these habitats are achieved by manipulating vegetation. Desired vegetation conditions have been developed for all alternatives, with the objective of achieving certain percentages of low, moderate and high grassland structure (amount of grass left after the growing and grazing season) to suit a spectrum of grassland species. Alternatives 3 and 4 are close in providing a diverse mix of grass conditions. Because Alternative 4 emphasizes natural processes, Alternative 3 would offer more opportunity for human intervention to achieve desired conditions.

### Diverse, Native Grass Across the Landscape

Alternative 4 would provide the most diverse landscape of native grasses. Alternatives 3 and 4 have similar objectives for grassland structure, with Alternative 4 favoring high structure and late seral grass/shrub species (those last to grow on a site). While the conditions may take longer to achieve under Alternative 4 than an alternative that would allow for more active management, in the longer term it would be expected to produce a more diverse landscape of native grasses.

### Summary

Alternative 4 would be best at satisfying the goals of this group, followed by Alternatives 3 and 5, which would be similar in achieving the goals, with Alternative 3 providing a slightly better balance of grassland habitats, and Alternative 4 providing slightly more access opportunities. These alternatives would be followed by Alternatives 1 and 2, respectively.

## *Government Group Management preferences*

### Continued Availability of Natural Resources and Opportunities

Alternatives 1 and Alternative 2 would emphasize commodity production continue most current programs. Alternative 3, with added emphasis on native plants and animals, and recreation opportunities, would make less forage available to livestock and could cause some shifts in resource uses. Alternative 4, with ecosystem restoration as a principal goal, and Alternative 5, with recreation as a management emphasis, are least likely to provide the current levels of resource outputs.

Changes in travel management in Alternatives 3, 4, and 5 (motorized travel on designated routes) could affect the availability of some recreation opportunities. While motorized access for administrative uses, such as for grazing permit administration, would not be restricted to designated routes, there would be other changes in use.

### Diverse Vegetation, Recreation Opportunities, Wildlife Habitats

Alternative 4, with its emphasis on ecosystem restoration, would provide the most diverse vegetation and wildlife habitats. Because vegetation diversity is key to wildlife habitats and associated recreation activities, Alternative 5 would also provide diverse landscapes. Alternative 3 would rank third in a comparison of these factors, followed by Alternatives 1 and 2, respectfully. Recreation opportunities can be affected by the type and amount of access. Restrictions on motorized travel in Alternatives 3, 4, and 5 could diminish some recreation opportunities and enhance others.

### Stable Economic Conditions and Lifestyles

The LRMP alternatives will not significantly affect the well being of the EIAs (see Table 3-25). Individuals will be impacted as the estimated change in jobs and income portrayed by Table 3-25. The Great Plains are in the midst of change. Market prices for bulk agricultural and mineral commodities fluctuate from year to year, many economies are in a state of decline, while other communities are growing. While the LRMP alternatives can do little to change these trends, some alternatives will promote less change than others.

## *American Indian Community Group Management preferences*

### National Grassland and Forest Resources Available

Plant collecting for personal or ceremonial uses will be allowed under all alternatives. Standards and guidelines have been developed to consider areas important to American Indian traditional practices. Some American Indian individuals and groups have encouraged the Forest Service to offer more opportunity for bison grazing. All alternatives require that grazing agreements be amended, if needed, to allow permittees to graze bison if they choose. Standards and guidelines have been written to address fencing and health issues. Alternative 4 would set aside 5% of suitable rangelands (except on the Thunder Basin) for bison-only grazing. Alternative 4 would be most likely to protect or restore cultural landscape values and native plants and animals, and would protect the most acres with special designations.

### Observe American Indian Treaty Rights

All alternatives recognize the rights of American Indians on the Northern Great Plains planning units. Forest Service managers will consult with American Indian tribal leaders on the design of projects that have potential to affect cultural rights and practices. All alternatives use a management prescription in the Blue Buttes area of the Little Missouri National Grassland intended to protect the traditional landscape values held by American Indians for the area.

### Summary

Alternative 4 would create conditions most likely to protect cultural values and practices of American Indian communities, followed by Alternatives 5, 3, 1, and 2.

## *Adjacent Landowners Group Management preferences*

### Management Based on Local Conditions

All alternatives require that monitoring be conducted to develop desired vegetation objectives that fit local conditions. Alternatives which would restrict motorized travel to designated routes require that District Rangers work with the public to determine the designated routes.

While all alternatives place a high emphasis on noxious weed and invasive plant control, Alternatives 2 and 4 place a higher emphasis on reducing noxious weeds and invasive plants than Alternatives 1, 3, and 5. Alternatives 2 and 4 would reduce the acres of noxious weeds and undesirable plants by 15 percent. Alternatives 3 and 5 would allow no increase in the acres of noxious weeds and invasive plants. Alternative 1 would provide no change from current direction.

### Respect for Private Property Rights

Under all alternatives existing legal private property rights will be maintained. This includes legal rights-of-way, mineral ownership, and existing oil and gas leases.

All alternatives direct that at least 30 percent of National Forest System land boundaries be surveyed and marked within 15 years to reduce potential for trespass, among other reasons. Levels of noxious weeds would be reduced most under Alternatives 2 and 4. Prairie dog colonies on National Forest System lands outside of black-footed ferret reintroduction areas will be controlled if it appears that unwanted colonization is occurring on adjoining lands and the

most likely source of prairie dogs appears to be from colonies located along the property boundary under alternatives 1, 2, and 5. Assuming that the more acres of active prairie dog colonies, the more potential exists for prairie dogs moving on to private property, Alternative 2 would pose the least risk of this occurring, followed closely by Alternatives 1 and 5. Increases in prairie dog populations would be expected in Alternatives 4, 3, 5, and 2. Restrictions on motorized travel under Alternatives 3, 4, and 5 (and Alternatives 1 and 2 for the Dakota Prairie units) could favor adjoining landowners because the restricted access would reduce opportunities for public trespass on to private property. Alternative 5, which emphasizes recreation, could increase public trespass issues on private property.

### Honest, Trustworthy Relationship with Forest Service Managers

Managers, **as always**, are instructed to cooperate with individuals, organizations, tribes, and local, state, and federal governments to promote ecosystem health and sustainability across landscapes. Relationships between Forest Service employees and adjacent landowners cannot be prescribed. Timely notification and consultation with Forest Service neighbors are courtesies that would be standard procedures, regardless of the alternative.

### Flexible, Common-sense Management Approaches

Many Forest Service management actions are directed by law or federal regulations, and give Forest Service managers little decision discretion. Objectives for desired conditions developed for the alternatives will be monitored to fit local conditions. Managers will have the flexibility to use a variety of vegetation management tools, such as grazing and fire, to achieve desired conditions tailored to specific sites. If common-sense management equates with a utilitarian philosophy, Alternative 4 would make the least forage available to livestock and could be viewed as wasteful use of resources.

**Table 3-26. Summary of Effects of Alternatives on Management preferences of Major public user/interest groups.**

| User/Interest Group | Management Goal | Summary of Effects |
|---|---|---|
| **Agriculture** | Healthy grass and rangelands | Alternative 1 would have the highest percentage of moderate grass structure. Alternative 2 would have the most forage available for livestock. |
| | Suitable access | All alternatives authorize livestock permittees to use needed motorized access for management activities. |
| **Oil, gas, minerals** | Suitable access | All alternatives will honor existing valid leases and would not further restrict access to existing leases. Alternative 4 would provide the least access to new leases. |
| | Timely response to applications | All alternatives contain direction to respond to oil and gas leasing requests in a timely manner. |

| User/Interest Group | Management Goal | Summary of Effects |
|---|---|---|
| **Wood products** | Defined desired conditions for timber stands | All alternatives contain desired conditions for timber stands. Alternative 2 would achieve desired conditions more rapidly than the other alternatives. |
| | Active management | Alternative 2 would treat the greatest number of acres to improve forest health over the first 10-15 years, followed by Alternatives 4, 5, 3, and 1. |
| **Consumptive recreation** | Suitable access | Alternatives 1 and 2 would maintain current motorized travel opportunities. Alternative 3, 4, 5 would eventually restrict motorized travel to designated routes. Alternative 5 would have the most designated motorized routes. |
| | Healthy vegetation conditions | Alternatives 3, 4, and 5 would result in more diverse vegetation conditions than Alternatives 1 and 2. |
| **Non-consumptive recreation** | Suitable access | Alternatives 1 and 2 would maintain current motorized travel opportunities. Alternative 3, 4, 5 would eventually restrict motorized travel to designated routes. Alternative 5 would have the most designated motorized routes. |
| | Recreation/interpretive information | Alternative 5 would plan for the most recreation improvements, followed by Alternatives 3, 4, 2, and 1. |
| **Conservation/ preservation/ environmental** | Healthy mosaic of native vegetation to accommodate rare species | Alternative 4 would provide the most diverse vegetation across the landscape, followed by Alternatives 3, 5, 1 and 2. Alternative 4 would also do the most to restore or encourage native plant species. |
| | Viable wildlife populations | Alternative 4 provide more wildlife habitat than the other alternatives.. |
| **Wildlife advocacy/ production** | Protection of unique habitats | Alternative 4 would include the most acres of management areas that protect or manage special habitats, followed by Alternatives 3, 5, 2, and 1. |
| | Habitat for a spectrum of species | Alternatives 3 and 4 are similar in providing a balance of habitat conditions. Because Alternative 4 emphasizes natural processes, Alternative 3 would offer more opportunity for human intervention to achieve desired conditions. |
| **Government** | Continued availability of resources and opportunities. | Alternatives 1 and 2 would continue current direction and emphases and stress commodity production. Alternative 3 would cause some shifts in resource uses. Alternatives 4 and 5 would be least likely to continue current levels of resource outputs. |

| User/Interest Group | Management Goal | Summary of Effects |
|---|---|---|
| **Government, cont.** | | |
| | Diverse vegetation and recreation opportunities | Alternative 4 would provide the most diverse vegetation and wildlife habitats, followed by Alternative 5, 3, 1 and 2. Because Alternatives 3, 4, and 5 would eventually restrict motorized travel to designated routes, they would reduce some current recreation opportunities. |
| | Economic contributions to communities | The Alternative that would be most likely to maintain the current economic and social conditions and associated lifestyles would be Alternative 1, 2, or 3 depending on the EIA. Alternative 5 would promote growth in recreation and tourism and reduce commodities, causing some economic and social adjustments. |
| **American Indian communities** | National grassland and forest resources available | Alternatives 3, 4, 5 would improve habitat for many plant and animal species to varying degrees, with Alternative 4 providing the most variety and abundance of native plants and animals, and the most protection/restoration of cultural landscape values. Alternative 4 would provide 5% of the suitable rangeland for bison-only grazing. |
| | Protection of spiritual and cultural values | All alternatives recognize the rights of American Indians. Forest Service managers will consult with American Indian tribal leaders on the design of projects that have potential to affect cultural rights and practices. |
| **Adjacent landowners** | Management based on local conditions | All alternatives require that monitoring be conducted to develop desired vegetation objectives that fit local conditions. All alternatives instruct Forest Service managers to work with all levels of government in the control of noxious weeds, insects, and predators, and to promote healthy, sustainable ecosystems. |
| | Protection of private property rights | Existing valid legal property rights would be protected under all alternatives. All alternatives contain an objective that at least 30% of NFS land boundaries be surveyed and marked within 15 years. Motorized travel under Alternatives 3, 4, 5 would eventually be restricted to designated routes, which could help with potential trespass issues. Alternatives 2 and 4 would provide the greatest reduction of noxious weeds. |

## Summary Effects

Some rural communities are recognizing that diversification of their economies will provide greater economic sustainability. Many see recreation and "multiple-use" activities as ways to smooth out the boom and bust cycle of some commodity industries. A key to accomplishing this is in developing recreation activities without dramatically compromising primary economic sectors, especially in agriculture, forestry or mineral extraction. (Shepard, The New Economy of the Great Plains: Implications for Economic Development, Economic Development Quarterly, Nov., 1997)

Alternative 3 would offer the most diversification for local economies because of an emphasis on more diverse landscapes for wildlife and recreation while maintaining close to current levels of livestock grazing and oil and gas opportunities. Other alternatives offer some diversification of economies, with Alternatives 1 and 2 offering the least diversification. Although the national grasslands and forest units are only two percent of the Northern Great Plains landscape, they are an important part of the local lifestyle and economic environment, and offer opportunities for local communities to diversify their economies.

## Environmental Justice

The composition of the affected counties was considered in an environmental justice review (based on 12/10/97 CEQ guidance) to determine whether minority populations, low-income populations, or American Indian tribes are present in the area affected by the proposed land and resource management plan revisions.

In examining the environmental and human health impacts of the decisions to be made in land and resource management planning, it was determined there was no disproportionately high and adverse human health or environmental effects on minority populations, low income populations, or American Indian tribes. There are also not disproportional social or economic impacts to these groups.

To the greatest extent practical and permitted by law, all populations were provided the opportunity to comment before decisions were made on the proposed land and resource management plan revisions. Tribal representation was sought in the process in a manner consistent with government-to-government relationships between the United States and tribal governments, the federal government's trust responsibility to federally recognized tribes, and any treaty rights.

Equal access by minorities and people with disabilities is maintained, created, or improved through the proposed action and Alternatives 2, DEIS 3, FEIS 3, 4, and 5.

# Livestock Grazing

## Introduction

Livestock grazing is a permitted use on National Forest System (NFS) lands in the Northern Great Plains. Livestock grazing permits are issued for the use of forage produced in grasslands, shrublands, riparian zones, wetlands and some forested areas. Livestock grazing is an important economic activity in the planning area. Coordinating livestock grazing with other land uses and management activities on the national grasslands and forests is an important responsibility of the Forest Service. For example, livestock must share the rangelands with wildlife that also depend on these lands for forage and cover through the year, as well as sharing the rangelands with all other uses that can occur on public lands.

## Laws, Policy, and Direction

The following list provides key direction for the livestock grazing topic:

- Forest Service Manual (FSM) 2201 summarizes laws and regulations governing range management and forest planning.
- National Forest Management Act (NFMA) of 1976 identifies information requirements concerning NFS grazing resources.
- Section 8 of the Public Rangelands Improvement Act of 1978 allows for consultation and cooperation in the development and execution of allotment management plans for grazing permits (This applies to the National Forest units only).
- Public Law 104-19, Section 504 from the 1995 Rescission bill directs the Forest Service to complete site-specific National Environmental Policy Act analyses and decisions on allotments on a scheduled basis.
- 36 CFR 222.3 (c) (1) authorizes the Forest Service to use grazing agreements as a type of grazing permit . A grazing agreement is a type of grazing permit which authorizes eligible grazing associations organized under state laws of incorporation and/or cooperatives to make a specified amount of grazing use on National Forest System lands for a period of ten years.
- Section 19 (209) of the 1950 Granger Thye Act states that grazing permits (including grazing agreements) and livestock use permits convey no right, title, or interest held by the United States in any lands or resources.

# Key Indicators

The following list provides key indicators for the livestock grazing topic:

- Suitable rangeland acres.
- Estimated animal unit months of livestock grazing.
- Estimated forage production available to livestock.
- Average pasture size.
- Average number of water developments per square mile.

# Affected Environment

## Introduction

Historically, wild ungulates, such as bison, pronghorn, mule deer and elk, grazed the prairies, along with other wildlife including prairie dogs. Domestic stock first entered the range during the last half of the 19th century, brought to the plains by ranchers and homesteaders in response to government programs, such as the 1862 Homestead Act. A combination of drought, the stock market crash, and national economic depression in the first few decades of the 20th century led to hard times for many of the Great Plains settlers. Hundreds of thousands of people left the region when faced with low land values, delinquent taxes, and foreclosures on their mortgages. As a result, banks, states, and the federal government acquired the title to millions of acres of land (Robinson 1966). Relief measures by the federal government included the Bankhead-Jones Farm Tenant Act of 1937, which stated:

> the Secretary is authorized and directed to develop a program of land conservation and land utilization ... in order thereby to correct maladjustments in land use, and assist in controlling soil erosion, reforestation, preserving natural resources, protecting fish and wildlife, mitigate floods, preventing impairments of dams and reservoirs, conserving surface and subsurface moisture, protecting the watersheds of navigable streams, and protecting the public lands, health, safety, and welfare.

The Bankhead-Jones Farm Tenant Act gave custody of these newly purchased lands to the U.S. Department of Agriculture (USDA). Later these purchased lands were administratively organized as Land Utilization Projects under the management of the Soil Conservation Service. The goal was to transform the marginal farmlands into productive rangelands. To accomplish this, fences, water developments, and other range developments were installed.

In 1954, as part of the consolidation of land management activities in the Department of Agriculture, certain lands administrated by the Soil Conservation Service were transferred to the USDA Forest Service. The Secretary's Administrative Order of June 23, 1960 named the land utilization projects as national grasslands. In 1974, the Forest and Rangelands Renewable Resources Planning Act defined the national grasslands as part of the National Forest System.

Domestic livestock are considered to be cattle, sheep and horses. Although some states do not recognize bison as livestock, for this analysis they are included as a class of permitted livestock.

## Suitable Rangeland Acres

The 1987 *Custer National Forest Management Plan* provides management direction for four national grassland units in North and South Dakota: Little Missouri, Sheyenne, Cedar River and Grand River. Of the 1,260,118 acres identified in the plan on the four national grasslands, 1,073,516 acres are listed as suitable and open for grazing as defined when the plan was completed.

The 1985 *Medicine Bow National Forest Management Plan* was approved in 1985. The Medicine Bow-Routt National Forest administers the Thunder Basin National Grassland. All of the Thunder Basin National Grassland, a total of 572,518 acres, is listed in the plan as suitable and open for grazing as defined when the plan was completed.

In 1984, the *Nebraska National Forest Management Plan* was approved. The plan indicates 1,000,013 of 1,059,444 acres as suitable and open for grazing on the Nebraska National Forest and its associated units as defined when the plan was completed.

A suitability analysis was completed that used the criteria outlined in the present Forest Service Handbook direction and is displayed in the Environmental Consequences section.

## Capable Rangeland Acres

Using the following criteria, a capability analysis was completed to identify areas with the physical characteristics conducive to livestock grazing. Criteria include:

- Areas with slopes less than 40 percent and accessible to livestock.
- Areas producing at least 200 pounds of forage per acre.
- Areas with stable soils.
- Areas with natural or developed water available or capable of being developed.

The tables below display capable rangeland:

**Table 3-27. Capable Rangeland**

| Dakota Prairie Grasslands | Total Acres | Percent Capable Rangeland | Total Capable Acres |
|---|---|---|---|
| Grand River National Grassland | 154,180 | 99 | 152,600 |
| Cedar River National Grassland | 6,750 | 98 | 6,650 |
| Little Missouri National Grassland McKenzie and Medora units | 1,026,900 | 86 | 884,730 |
| Sheyenne National Grassland | 70,280 | 99 | 69,500 |
| **Totals** | **1,258,110** | **89** | **1,113,480** |
| **Thunder Basin National Grassland** | 552,490 | 96 | 532,100 |
| **Nebraska National Forest Units** | | | |
| Bessey Ranger District | 90,470 | 99 | 89,580 |
| Samuel R. McKelvie National Forest | 115,950 | 98 | 114,190 |
| Buffalo Gap National Grassland (Fall River Ranger District) | 323,400 | 94 | 306,430 |

| Dakota Prairie Grasslands | Total Acres | Percent Capable Rangeland | Total Capable Acres |
|---|---|---|---|
| **Nebraska National Forest Units, cont.** | | | |
| Buffalo Gap National Grassland (Wall Ranger District) | 265,980 | 90 | 238,650 |
| **Nebraska National Forest Units, cont.** | | | |
| Fort Pierre National Grassland | 115,770 | 98 | 113,360 |
| Pine Ridge Ranger District | 50,530 | 63 | 31,560 |
| Oglala National Grassland | 94,170 | 85 | 79,390 |
| **Totals** | **1,056,000** | **96** | **973,160** |

# Forage Production

The ability of the land to produce forage is an important component of range management. It is also important component in calculating livestock grazing levels. The following table displays the average forage production expected from the areas determined capable of supporting livestock grazing on the national grasslands and forests (see Appendix B for discussion on methods used in determining herbage productivity).

**Table 3-28. Average Production on Capable Acres (measured in 1,000-pound units).**

| Dakota Prairie Grasslands | Capable Acres | Thousands of Pounds of Forage Production |
|---|---|---|
| Grand River National Grassland | 152,600 | 217,760 |
| Cedar River National Grassland | 6,650 | 9,490 |
| Little Missouri National Grassland McKenzie and Medora units | 884,730 | 803,335 |
| Sheyenne National Grassland | 69,500 | 147,827 |
| **Thunder Basin National Grassland** | 532,100 | 535,725 |
| **Nebraska National Forest Units** | | |
| Bessey Ranger District | 89,580 | 227,580 |
| Samuel R. McKelvie National Forest | 114,190 | 297,800 |
| Buffalo Gap National Grassland (Fall River Ranger District) | 306,430 | 453,470 |
| Buffalo Gap National Grassland (Wall RD) | 238,650 | 336,430 |
| Ft. Pierre National Grassland | 113,360 | 232,470 |
| Pine Ridge Ranger District | 31,560 | 46,280 |
| Oglala National Grassland | 79,390 | 123,070 |

# Grazing Levels

The following table displays current grazing use in terms of permitted and authorized animal unit months (AUMs). This data uses the NRCS definition of an AUM as "the amount of forage required by one mature cow of approximately 1,000 pounds and a calf up to weaning, usually 6 months of age, or their equivalent, for a period of one month" (National Range and Pasture Handbook, NRCS).

**Table 3-29. Current Grazing Use on the Dakota Prairie Grasslands.**

| Planning Unit | 1987 Forest Plan Projected AUMs | 1996 Permitted AUMs | 20-yr Average Authorized AUMs |
|---|---|---|---|
| **Dakota Prairie Grasslands Total** | 502,270 | 495,226 | 467,941 |
| Grand River/Cedar River National Grasslands | | 64,222 | 60,900 |
| Stocking Level (Acres/AUM) | | 2.5 | 2.6 |
| Little Missouri National Grassland/McKenzie and Medora units | | 368,940 | 315,900 |
| Stocking Level (Acres/AUM) | | 2.4 | 2.8 |
| Sheyenne National Grassland | | 64,300 | 57,650 |
| Stocking Level (Acres/AUM)l | | 1.1 | 1.2 |
| **Thunder Basin National Grassland** | 169,000 | 137,000 | 112,700 |
| Stocking Level (Acres/AUM)l | | 3.9 | 4.7 |
| **Nebraska National Forest Units Total** | 404,000 | 391,000 | 359,000 |
| Bessey Unit | | 36,000 | 34,930 |
| Stocking Level (Acres/AUM) | | 2.5 | 2.5 |
| Samuel R. McKelvie National Forest | | 45,000 | 43,020 |
| Stocking Level (Acres/AUM) | | 2.5 | 2.6 |
| Buffalo Gap National Grassland (Fall River) | | 100,000 | 97,500 |
| Stocking Level (Acres/AUM) | | 3.0 | 3.1 |
| Buffalo Gap National Grassland (Wall) | | 79,000 | 79,780 |
| Stocking Level (Acres/AUM) | | 3.0 | 2.9 |
| Fort Pierre National Grassland | | 69,700 | 67,255 |
| Stocking Level (Acres/AUM) | | 1.6 | 1.7 |
| Pine Ridge Ranger District | | 13,950 | 13,700 |
| Stocking Level (Acres/AUM) | | 2.2 | 2.3 |
| Oglala National Grassland | | 29,000 | 27,700 |
| Stocking Level (Acres/AUM) | | 2.8 | 2.9 |

Site-specific environmental analyses for livestock grazing occur during the allotment management planning process. National forest and grassland units in the Northern Great Plains have 15 years to update and revise allotment management plans as mandated by the Rescission Act of 1995 (Public Law 104-19, section 504). Allotment management plans are developed using goals, objectives, standards, and guidelines found in the land and resource management plans. More specific grazing prescriptions can be developed during the allotment management planning process to address site-specific resource issues; that is also when decisions for stocking levels are made.

Over the past 50 years, changes in stocking levels have occurred on some units. Initial stocking rates for the land utilization projects (later to become the national grasslands) were determined by the Soil Conservation Service. On some units, these rates increased over time as more intensive grazing systems were developed and range developments were implemented. For example, in 1947, Ft Pierre National Grassland and Medora Ranger District showed a stocking

rate of 2.2 and 2.8 acres/AUM respectively. Current stocking rate, based on authorized use, is 1.7 acres/AUM on the Ft. Pierre National Grassland and 2.7 acres/AUM on the Medora Ranger District, although actual use may be less than authorized use.

Cow size also has an effect on grazing use. Based on research studies, the larger a cow and/or calf become, the more forage is required to maintain them. In North Dakota, the 1945 average weight of a cow nursing a calf was 850 lbs while the average weaning weight of calves was 375 to 400 pounds[4]. Data obtained between 1993 and 1997 indicated that the average weight of cow nursing a calf was 1231 lbs while the average weaning weight of calves was 557 lbs[5]. Although this data may not apply uniformly across all units, it can generally be said that cow and calf sizes have increased since 1945, along with an associated increase in forage consumed per cow and calf pair.

The increase in stocking levels and the increase in cow size have had a combined effect of up to 50 percent increase in grazing use on some units. Some of this increase may have been compensated by implementation of more planned grazing systems and additional construction, including fencing and water developments.

## Grazing Distribution

Under current management direction on most planning units, almost all rangelands are grazed annually by livestock. Exceptions are mostly areas which are inaccessible or areas which are non capable (see glossary in plan Appendix G).

The distribution of livestock grazing across these areas is largely determined by topography and the amount of fencing and water developments. The effects of fencing and water developments on livestock grazing distribution on each planning unit were evaluated using a geographic information system (GIS) model (Appendix B). Results of this evaluation are presented in the following table. The results are expressed in terms of the amount of primary, secondary, and inaccessible range (see glossary in plan Appendix G). Primary range is level to gently sloping with nearby water sources for livestock and generally receives the most livestock use and the most uniform use. Secondary range has steeper terrain and is more distant from available livestock water sources. These areas generally receive less and more sporadic use by livestock. Inaccessible range is simply those areas without livestock water or those areas that are generally too steep for livestock.

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[4] Johnson, M.B. 1947. Range Cattle Production in Western North Dakota, North Dakota Agricultural Experiment Station Bulletin 347

[5] Ringwall, K.A. and K.J. Helmuth, 1998. *1998 NCBA-IRM-SPA Cow-Calf Enterprise Summary of Reproduction and Production performance Measures for CHAPS Cow-Calf producers*. Dickinson Research Extension Center, North Dakota State University.

**Table 3-30. Predicted Amounts of Primary, Secondary, and Inaccessible Range Under Current Management Direction.**

| Unit | Primary Range | Secondary Range | Inaccessible Range |
|---|---|---|---|
| **Dakota Prairie Grasslands** | | | |
| Grand River/Cedar River National Grasslands | 73% | 24% | 2% |
| Little Missouri National Grassland | 59% | 40% | 1% |
| Sheyenne National Grassland | 98% | 2% | 0% |
| **Thunder Basin National Grassland** | 86% | 14% | 1% |
| **Nebraska National Forest Units** | | | |
| Bessey Ranger District | 77% | 19% | 4% |
| Samuel R. McKelvie National Forest | 78% | 18% | 3% |
| Buffalo Gap National Grassland | 80% | 14% | 6% |
| Ft. Pierre National Grassland | 84% | 14% | 2% |
| Oglala National Grassland | 81% | 10% | 8% |
| Pine Ridge Ranger District | 33% | 60% | 7% |

Much of the secondary range shown in this table is almost exclusively the result of topography and not the lack of water. The amount of secondary range due to distance from water is minimal on each planning unit. These results suggest that most suitable rangeland on each unit is primary range that likely receives relatively uniform grazing. These results should be considered preliminary since future refinements to the predictive model are likely.

## Grazing Systems and Season of Use

Timing of livestock grazing is an important variable influencing wildlife and wildlife habitat. The use of current grazing systems and seasons of use is a very basic component of wildlife habitat assessments for public rangelands. Rangelands can be disturbed by wildlife, however the Forest Service does not control the wildlife. Livestock grazing is a contributing factor to wildlife habitat and cover. Typically, an assessment is made of the relative amounts of disturbed (livestock present) versus undisturbed (livestock absent) habitat/cover based on key dates. While direction is not given as to what grazing systems should be used or when use should occur, it is important to understand the current situation so any changes in livestock management can be assessed.

The following table displays the current grazing systems used on each unit expressed as a percentage of land in each grazing system:

**Table 3-31. Percent of Planning Unit by Grazing System.**

| | Grazing System | | | |
|---|---|---|---|---|
| | **Continuous** | **Deferred** | **Deferred Rotation** | **Rest Rotation** |
| **Dakota Prairie Grasslands** | | | | |
| Grand River National Grassland | 29% | 3% | 68% | |
| Cedar River National Grassland | | | 100% | |
| Little Missouri National Grassland/McKenzie | | 3% | 95% | 2% |
| Little Missouri National Grassland/Medora | 6% | 21% | 73% | |
| Sheyenne National Grassland | 3% | | 97% | |
| **Thunder Basin National Grassland** | 7% | 3% | 90% | |
| **Nebraska National Forest Units** | | | | |
| Bessey Ranger District | | | 100% | |
| Samuel R. McKelvie National Forest | 1% | | 99% | |
| Buffalo Gap National Grassland (Fall River RD) | | 46% | 54% | |
| Buffalo Gap National Grassland (Wall RD) | | | 97% | 3% |
| **Nebraska National Forest Units, cont.** | | | | |
| Ft. Pierre National Grassland | | | 90% | 10% |
| Pine Ridge Ranger District | | 11% | 89% | |
| Oglala National Grassland | | | 100% | |

The timing of use was also determined for each unit and the percent of area grazed in each calendar year. Most grazing use occurs between May and November; only a small portion of the grazing occurs between November and May. More detailed information on seasons of use is available upon request.

Although most capable acres of rangeland are grazed annually, not all acres are grazed simultaneously. Information in Table 3-32 illustrates this point.

**Table 3-32. Maximum Percent of Capable Acres Grazed Simultaneously.**

| **Unit** | **Maximum Percent of Capable Acres being utilized at one time** |
|---|---|
| **Dakota Prairie Grasslands** | |
| Grand River National Grassland | 62% |
| Cedar River National Grassland | 55% |
| Little Missouri National Grassland/McKenzie | 62% |
| Little Missouri National Grassland/Medora | 51% |
| Sheyenne National Grassland | 26% |
| **Thunder Basin National Grassland** | 40% |
| **Nebraska National Forest Units** | |
| Bessey Ranger District | 27% |
| Samuel R. McKelvie National Forest | 32% |
| Buffalo Gap National Grassland (Fall River ) | 54% |

| Unit | Maximum Percent of Capable Acres being utilized at one time |
|---|---|
| **Nebraska National Forest Units, cont.** | |
| Buffalo Gap National Grassland (Wall RD) | 49% |
| Ft. Pierre National Grassland | 27% |
| Pine Ridge Ranger District | 32% |
| Oglala National Grassland | 36% |

## Range Developments - Water

Water developments play a major role in the distribution of livestock. These developments can also help create a mosaic of vegetation conditions and patterns. At the same time, primary range (those areas within one mile of a water source) increases and secondary range decreases. The following table lists the current density of water developments by unit:

**Table 3-33. Current Water Development Density**

| Unit | Average Water Developments per Section |
|---|---|
| **Dakota Prairie Grasslands** | |
| Grand River/Cedar River National Grassland | 3.39 |
| Little Missouri National Grassland/McKenzie | 2.49 |
| Little Missouri National Grassland/Medora | 2.23 |
| Sheyenne National Grassland | 3.54 |
| **Thunder Basin National Grassland** | 2.12 |
| **Nebraska National Forest Units** | |
| Bessey Ranger District | 1.89 |
| Samuel R. McKelvie National Forest | 1.57 |
| Buffalo Gap National Grassland (Fall River R D) | 1.65 |
| Buffalo Gap National Grassland (Wall Ranger District) | 1.81 |
| Ft. Pierre National Grassland | 3.66 |
| Pine Ridge Ranger District | 1.72 |
| Oglala National Grassland | 2.40 |

## Fences and Pasture Size

The amount of fencing and the size of a pasture also contribute to the distribution of livestock. Pasture size influences livestock grazing distribution, scenic values, recreationists, and other land uses. The following table lists the current average pasture size by unit:

**Table 3-34. Average Pasture Size**

| Dakota Prairie Grasslands | Average Pasture Size in Acres |
|---|---|
| Grand River/Cedar River National Grassland | 1,150 |
| Little Missouri National Grassland/McKenzie | 1,140 |
| Little Missouri National Grassland/Medora | 560 |
| Sheyenne National Grassland | 430 |
| **Thunder Basin National Grassland** | 1,640 |
| **Nebraska National Forest Units** | |
| Bessey Ranger District | 870 |
| Samuel R. McKelvie National Forest | 1,170 |
| Buffalo Gap National Grassland (Fall River R D) | 1,030 |
| Buffalo Gap National Grassland (Wall Ranger District) | 1,150 |
| Ft. Pierre National Grassland | 500 |
| Pine Ridge Ranger District | 650 |
| Oglala National Grassland | 940 |

# Environmental Consequences

## Resource Protection Measures

Standards and guidelines are designed to maintain and improve conditions on rangelands, taking into consideration regeneration of riparian/woody draws, stream bank stability, vegetation structure requirements of upland nesting bird species, and intensity of livestock grazing. Desired vegetation conditions keyed to composition and structure are stipulated on a geographic area basis and are dependent upon the type of vegetation present, soil and water concerns, and site potential. Utilization levels are estimated to achieve the desired condition. When allotment management plans are revised, adjustments in animal unit equivalents to account for the variations in liveweight of livestock can be made. *Rangeland Analysis and Management Guides* for Region 1 and Region 2 provide information on documenting the analyses and management activities.

## Direct and Indirect Effects

### *General Effects*

Each alternative would result in a different level of estimated available forage for livestock, depending on capable rangeland, suitable acres, rest acres, and desired vegetation conditions. The grassland-wide and forest-wide standards and guidelines incorporate grazing management prescriptions designed to protect both upland and riparian resources. For example, the direct effects of annual livestock use are managed to achieve a desired vegetation condition. Key areas and plant communities are identified for monitoring purposes. These standards and guidelines are designed to minimize direct grazing effects that occur annually. Over the long term, the standards and guidelines are expected to improve unsatisfactory conditions on

rangelands and to maintain the quality of those in satisfactory condition. These direct and indirect effects are expected to be consistent across all alternatives.

## *Capable and Suitable Rangeland*

Capable rangeland is the same for all alternatives because the criteria to determine capable rangeland do not change by alternative (see Appendix B). Suitable rangeland varies by alternative dependent on the goals and objectives for the alternative. A suitability analysis identified where grazing is appropriate, considering environmental and economic consequences and alternative uses foregone (see Appendix B). Management area prescriptions were critical in determining areas not suitable for grazing. Areas that did not meet the suitability criteria were due to management area prescriptions that would not allow grazing. The districts also identified areas that weren't suitable due to economic or environmental factors. This is further described in the effects section. The following table displays suitable rangeland by alternative.

**Table 3-35. Suitable Grazing Acres by Alternative.**

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| Grand River National Grassland | 152,600 | 152,390 | 153,380 | 152,360 | 152,390 | 152,350 |
| Cedar River National Grassland | 6,650 | 6,650 | 6,580 | 6,650 | 6,650 | 6,650 |
| Little Missouri National Grassland/McKenzie and Medora units | 884,620 | 884,460 | 823,910 | 884,460 | 884,530 | 884,530 |
| Sheyenne National Grassland | 69,200 | 69,500 | 67,925 | 69,500 | 67,840 | 69,500 |
| **Totals** | **1,113,070** | **1,113,000** | **1,051,795** | **1,112,970** | **1,051,965** | **1,053,575** |
| **Thunder Basin National Grassland** | **532,100** | **532,100** | **532,100** | **532,060** | **531,060** | **532,100** |
| **Nebraska National Forest Units** | | | | | | |
| Bessey Ranger District | 88,580 | 88,480 | 88,770 | 89,010 | 88,490 | 88,480 |
| Samuel R. McKelvie National Forest | 112,270 | 112,240 | 111,680 | 112,470 | 112,070 | 111,670 |
| Buffalo Gap National Grassland (Fall River Ranger District) | 306,430 | 306,400 | 315,730 *315,730* | 306,340 303,780 | 306,400 | 306,400 |
| Buffalo Gap National Grassland (Wall Ranger District) | 237,450 | 238,650 | 239,235 | 238,650 | 238,650 | 238,650 |
| Ft. Pierre National Grassland | 112,550 | 112,560 | 113,390 | 112,560 | 112,560 | 112,560 |
| Pine Ridge Ranger District | 31,200 | 31,490 | 48,545 | 31,490 | 31,520 | 30,350 |
| Oglala National Grassland | 79,370 | 79,370 | 88,200 | 79,340 | 79,370 | 79,370 |
| **Totals for Nebraska National Forest Units** | **967,850** | **969,190** | **1,005,550** ***1.005.550*** | **969,860 967,300** | **969,060** | **967,480** |

## *Forage Available to Livestock*

The inherent productivity of the herbaceous component is constant, as is shown in the affected environment, and does not vary by alternative. However, the amount of forage allocated to livestock varies based on the goals and objectives of an alternative.

Estimated available forage was determined by following the predictive model process outlined in Appendix B (see Determination of Forage Analysis). This analysis is based upon a desired vegetation structure (see Rangeland and Forest Health, Vegetation Structure discussion). The desired vegetation structure varies by alternative and management area and is outlined in the geographic area direction. Utilization levels are also used to maintain desired structure. This utilization level is the amount of estimated forage available to livestock and does not include uses by wildlife or losses from trampling, insects, or other disturbances. Calculations also take into consideration the amount of capable, suitable, and rest acres, along with variations in productivity for each geographic area. The results displayed in the following table are based on the NRCS definition of an AUM.

Current management systems, along with timing of use and livestock class or size, are not taken into consideration because they vary on a pasture-by-pasture basis. For the purpose of describing effects, a continuous grazing system was assumed. The information used is an expression of the information or data currently known at a landscape level but does not reflect the site-specific conditions of all areas. This information was developed on an aggregation of existing data from the planning area and is used to delineate the differences in impacts of plan alternatives. Site-specific variation in available forage and AUMs may occur as a result of adaptive resource management, vegetation condition differences, or prairie dog colonies desired. Forage that is available to livestock may vary by up to 20 percent to account for more intensive management systems and would be determined at the project planning level. This would have an effect on estimating the amount of forage available to livestock. Based on the predictive model, the following table estimates forage available to livestock if grazed season-long. The table shows that Alternative 2 would make the most estimated forage available to livestock, followed by Alternatives 1, 3, and 5. Alternative 4 would make the least amount of forage available to livestock.

**Table 3-36. Estimated Forage Available to Livestock (1000s of Pounds)**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 *Alt 3a* | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River National Grassland | 46,370 | 51,170 | 51,100 | 47,030 | 45,440 | 34,360 | 40,110 |
| Cedar River National Grassland | 1,930 | 3,040 | 3,040 | 1,790 | 2,660 | 1,960 | 2,306 |
| Little Missouri National Grassland McKenzie and Medora units | 246,405 | 257,040 | 256,990 | 223,470 | 225,070 | 164,540 | 184,324 |
| Sheyenne National Grassland | 44,970 | 47,100 | 47,300 | 21,220 | 37,390 | 23,520 | 35,420 |
| **Totals** | **339,675** | **358,350** | **358,430** | **293,510** | **310,560** | **224,380** | **262,160** |
| **Thunder Basin National Grassland** | 87,900 | 99,470 | 99,010 | 94,150 | 88,140 | 79,040 | 91,910 |
| **Nebraska National Forest Units** | | | | | | | |
| Bessey Ranger District | 27,245 | 22,420 | 25,280 | 27,460 | 22,380 | 16,410 | 18,100 |
| Samuel R. McKelvie National Forest | 33,560 | 31,080 | 34,830 | 31,980 | 31,090 | 22,800 | 25,060 |
| Buffalo Gap National Grassland (Fall River Ranger District) | 76,050 | 64,760 | 70,130 | 77,610 *76,360* | 64,530 *64,358* | 54,700 | 59,410 |
| Buffalo Gap National Grassland (Wall Ranger District) | 62,230 | 50,615 | 53,390 | 56,080 | 50,410 | 43,810 | 32,110 |

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 *Alt 3a* | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Nebraska National Forest Units, cont.** | | | | | | | |
| Ft. Pierre National Grassland | 52,460 | 38,500 | 46,570 | 35,720 | 38,511 | 32,240 | 32,240 |
| Pine Ridge Ranger District | 10,690 | 6,860 | 7,160 | 9,750 | 6,940 | 6,310 | 6,000 |
| Oglala National Grassland | 21,600 | 20,750 | 22,470 | 21,760 | 20,960 | 16,910 | 18,380 |
| **Totals** | **283,835** | **234,990** | **259,870** | **260,360** ***259,110*** | **234,830** | **193,190** | **205,480** |

## *Grazing Levels*

The following table shows the estimated grazing use in animal unit months (AUMs) predicted with implementation of the alternatives. Estimated stocking levels are based on averages and will need to take into account the proposed objectives, deviation in meeting the desired conditions, management strategies, and monitoring. The estimated outputs do not guarantee that these levels can be maintained, again due to deviation in meeting desired conditions, management strategies, and use by other wildlife species such as prairie dogs. In general, a mid-point should be used in comparing alternatives. The table compares the estimated AUM capacity and estimated suitable rangeland acres per AUM.[6]

**Table 3-37. Estimated AUMs and Suitable Acres per AUM.**

| Planning Unit | Existing Condition | Alt 1[7] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River NG | | | | | | | |
| Estimated AUMs | 57,501 | 65,600 | 65,520 | 60,300 | 58,260 | 44,050 | 51,420 |
| (Acres/AUM) | 2.7 | 2.3 | 2.3 | 2.5 | 2.6 | 3.5 | 3.0 |
| Cedar River NG | | | | | | | |
| Estimated AUMs | 3,400 | 3,890 | 3,890 | 2,300 | 3,410 | 2,500 | 2,906 |
| (Acres/AUM) | 2.0 | 1.7 | 1.7 | 2.9 | 2.0 | 2.7 | 2.3 |
| **Little Missouri NG – McKenzie and Medora units** | | | | | | | |
| Estimated AUMs | 315,900 | 329,530 | 329,470 | 286,500 | 288,550 | 210,950 | 236,312 |
| (Acres/AUM) | 2.8 | 2.7 | 2.7 | 2.9 | 3.1 | 4.2 | 3.7 |
| Sheyenne NG | | | | | | | |
| Estimated AUMs | 57,650 | 60,390 | 60,650 | 27,200 | 47,940 | 30,150 | 45,410 |
| (Acres/AUM) | 1.2 | 1.2 | 1.2 | 2.5 | 1.5 | 2.3 | 1.5 |

[6] Estimated AUMs are shown for comparison of effects purposes only. Revised Management Plan decisions will not set stocking levels. Stocking levels will be determined in the site-specific allotment management planning process.

[7] Alternative 1, as modeled, may not match what is currently permitted or authorized due to variations in implementation of current land and resource management plans. Current actual use could be 20 percent less than the authorized use levels. Units have not historically reported actual use because it can vary considerably from year to year.

| Planning Unit | Existing Condition | Alt 1[7] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands Total Estimated AUMs** | **434,451** | **459,410** | **459,530** | **376,300** | **398,160** | **287,650** | **336,048** |
| **(Acres/AUM)** | **2.6** | **2.4** | **2.4** | **2.8** | **2.8** | **3.7** | **3.3** |
| **Thunder Basin National Grassland** | | | | | | | |
| Estimated AUMs | 112,700 | 127,530 | 126,940 | 120,700 | 115,430 | 101,340 | 117,840 |
| (Acres/AUM) | 4.7 | 4.4 | 4.3 | 4.5 | 4.9 | 5.5 | 4.7 |
| **Nebraska National Forest Units** | | | | | | | |
| Bessey Ranger District | | | | | | | |
| Estimated AUMs | 34,930 | 28,745 | 32,414 | 35,200 | 28,696 | 21,037 | 23,206 |
| (Acres/AUM) | 2.5 | 3.3 | 2.8 | 2.5 | 3.2 | 4.5 | 4.1 |
| Samuel R. McKelvie NF | | | | | | | |
| Estimated AUMs | 43,020 | 39,853 | 44,656 | 41,000 | 39,862 | 29,237 | 32,132 |
| (Acres/AUM) | 2.6 | 3.0 | 2.6 | 2.8 | 3.2 | 4.1 | 3.7 |
| Buffalo Gap NG (Fall River Ranger District) | | | | | | | |
| Estimated AUMs | 97,500 | 83,021 | 89,909 | 99,500 *97,900* | 82,729 *82,510* | 70,127 | 76,170 |
| (Acres/AUM) | 3.1 | 3.8 | 3.6 | 3.2 | 3.8 | 4.6 | 4.1 |
| Buffalo Gap NG (Wall Ranger District) | | | | | | | |
| Estimated AUMs | 79,780 | 64,891 | 68,450 | 71,900 | 64,632 | 56,169 | 59,349 |
| (Acres/AUM) | 2.9 | 3.8 | 3.6 | 3.3 | 3.6 | 4.5 | 4.1 |
| Ft. Pierre National Grassland | | | | | | | |
| Estimated AUMs | 67,255 | 49,368 | 59,708 | 45,800 | 49,375 | 41,337 | 41,337 |
| (Acres/AUM) | 1.7 | 2.4 | 1.9 | 2.5 | 2.5 | 2.8 | 2.8 |
| Pine Ridge Ranger District | | | | | | | |
| Estimated AUMs | 13,700 | 8,792 | 9,178 | 12,500 | 8,901 | 8,087 | 7,691 |
| (Acres/AUM) | 2.3 | 3.7 | 3.9 | 3.9 | 3.6 | 4.0 | 4.1 |
| Oglala National Grassland | | | | | | | |
| Estimated AUMs | 27,700 | 26,601 | 28,805 | 27,900 | 26,869 | 21,679 | 23,563 |
| (Acres/AUM) | 2.9 | 3.1 | 2.8 | 3.2 | 3.1 | 3.3 | 3.5 |
| **Total Nebraska National Forest Units Estimated AUMs** | **363,885** | **301,271** | **333,120** | **333,800** ***332,200*** | **301,064** ***300,845*** | **247,673** | **263,450** |
| **(Acres/AUM)** | **2.6** | **3.2** | **2.9** | **3.0** ***3.0*** | **3.2** ***3.2*** | **3.9** | **3.6** |

The above table shows that Alternative 2 could result in the highest number of AUMs, followed by Alternatives 1, 3, and 5. Alternative 4 could result in the lowest number of AUMs.

## *Bison Grazing*

Bison grazing as livestock has been considered in this analysis. Alternative 4 would dedicate 5 percent of the suitable rangeland acres to permitted bison use only. This would decrease the

amount of estimated available forage for other classes of livestock, depending on the areas selected for bison use.

## *Suitable Rangeland Acres Rested*

Rested rangeland contributes toward achieving habitat for wildlife species that require high structure. Grassland-wide and forest-wide structure standards and guidelines for upland game birds and waterfowl apply to all action alternatives.

Holecheck, Pieper, and Herbel (Holecheck et. al. 1989) indicate that a grazing system using rest improves grazing capacity due to better livestock distribution on upland areas in more rugged terrains and improves vegetation vigor and composition in more productive riparian zones. On flat desert or prairie ranges where the primary goal is livestock production, there are better management systems to be used than those that incorporate rest. However, to provide multiple use benefits, such as the public desire to see ungrazed areas, and to improve waterfowl habitat, management systems that utilize rest have their advantages.

The following table displays the amount of suitable rangeland devoted to rest acres on an annual basis:

**Table 3-38. Acres of Suitable Rangeland (%) Rested Annually from Livestock Grazing**

| Dakota Prairie Grasslands | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| Grand River National Grassland | 0 | 0 | 7,669 (5) | 7,630 (5) | 30,478 (20) | 15,235 (10) |
| Cedar River National Grassland | 0 | 0 | 329 (5) | 332 (5) | 1,330 (20) | 665 (10) |
| Little Missouri National Grassland McKenzie | 0 | 0 | 20,241 (5) | 22,141 (5) | 88,566 (20) | 66,424 (15) |
| Little Missouri National Grassland Medora | 0 | 0 | 20,954 (5) | 22,081 (5) | 88,340 (20) | 66,255 (15) |
| Sheyenne National Grassland | 0 | 0 | 3,396 (5) | 3,475 (5) | 13,900 (20) | 6,950 (10) |
| **Total Rest Acres (%)** | **0** | **0** | **52,589 (5)** | **55,659 (5)** | **222,614 (20)** | **154,864 (15)** |
| **Thunder Basin National Grassland** | 0 | 0 | 26,605 (5) | 53,206 (10) | 53,206 (10) | 26,605 (5) |
| **Nebraska National Forest Units** | | | | | | |
| Bessey Ranger District | 885 (1) | 885 (1) | 4,438 (5) | 4,450 (5) | 17,698 (20) | 8,848 (10) |
| Samuel R. McKelvie National Forest | 1,122 (1) | 1,122 (1) | 5,584 (5) | 5,623 (5) | 23,414 (20) | 11,167 (10) |
| Buffalo Gap National Grassland (Fall River R D) | 6,128 (2) | 1,532 (.5) | 15,786 (5) | 15,317 (5) | 30,640 (10) | 30,640 (10) |
| Buffalo Gap National Grassland (Wall R D) | 2,374 (1) | 2,386 (1) | 11,961 (5) | 11,932 (5) | 26,251 (11) | 26,251 (11) |

| Dakota Prairie Grasslands | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Nebraska National Forest Units, cont.** | | | | | | |
| Ft. Pierre National Grassland | 11,255 (10) | 0 | 5,669 (5) | 11,256 (10) | 22,512 (20) | 22,512 (20) |
| Pine Ridge Ranger District | 0 | 0 | 2,427 (5) | 1,560 (5) | 3,152 (10) | 3,035 (10) |
| Oglala National Grassland | 0 | 0 | 4,410 (5) | 3,968 (5) | 7,937 (10) | 7,937 (10) |
| **Total Rest Acres (%)** | **21,764 (3)** | **5,925 (>1)** | **50,275 (5)** | **54,106 (6)** | **131,604 (14)** | **110,390 (11)** |

Alternative 4 would rest the most acres, followed by Alternatives 5, 3, 1, and 2. The amount of rested acres has an effect on the estimated available forage; however, it is not a one-to-one relationship. Ten percent in rest does not equate to 10 percent loss in estimated forage availability for livestock. The reduction is closer to 7 percent because the rested acres would contribute toward high structure objectives, which could allow other areas to be grazed more intensely.

## *Grazing Distribution*

The most uniform livestock grazing distribution and additional developments to promote more uniform grazing would occur under Alternatives 1 and 2. The most restrictions on range developments to facilitate uniform and more extensive livestock grazing distribution occurs in Alternative 4. Alternatives 3 and 5 would provide more restrictions on range developments than Alternatives 1 and 2 but less than Alternative 4. See the following two sections for more detailed information on range developments and their effects on livestock grazing distribution.

## *Range Developments - Water*

Water developments were used to determine the extent of the area that could be grazed by livestock. The number and location of water developments can also be used to create diverse vegetation conditions. The following table displays the number of water developments per square mile allowed by alternative:

**Table 3-39. Average Density of Water Developments.**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River/Cedar River National Grassland | 3.39 | NA | No limits | 3.4 | NA | 2.7 | 3.1 |
| Little Missouri National Grassland/McKenzie | 2.49 | NA | No limits | 2.5 | NA | 2.0 | 2.2 |
| Little Missouri National Grassland/Medora | 2.23 | NA | No limits | 2.2 | NA | 1.8 | 2.0 |
| Sheyenne National Grassland | 3.54 | NA | No limits | 3.0 | NA | 3.5 | 3.2 |
| **Thunder Basin National Grassland** | 2.12 | NA | No limits | Variable | Variable | 1.9 | 2.1 |

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Nebraska National Forest Units** | | | | | | | |
| Bessey Ranger District | 1.89 | NA | No limits | 1.9 | 1.9 | 1.0 | 1.0 |
| Samuel R. McKelvie National Forest | 1.57 | NA | No limits | 1.6 | 1.6 | 1.0 | 1.0 |
| Buffalo Gap National Grassland (Fall River Ranger District) | 1.65 | NA | No limits | 1.7 | NA | 1.0 | 1.7 |
| Buffalo Gap National Grassland (Wall Ranger District) | 1.81 | 1.0 | No limits | 1.8 | NA | 1.0 | 1.8 |
| Ft. Pierre National Grassland | 3.66 | 3.0 | No limits | 3.7 | 3.6 | 3.3 | 3.7 |
| Pine Ridge Ranger District | 1.72 | NA | No limits | 1.7 | 1.7 | 0.3 | 1.7 |
| Oglala National Grassland | 2.40 | 1 | No limits | 2.4 | NA | 0.8 | 2.4 |

Alternative 2 would allow for the most water developments to be constructed, as there are no limits. Alternative 3 would have a "no net gain" in water development construction on some units. Alternatives 4 and 5 would decrease the amount of water developments present from current numbers.

Limiting future water developments by providing "no net gain" direction in Alternatives 4 and 5 would not affect estimated forage availability for livestock. In the past 50 years, placement of water has resulted in producing total forage capability within 1 mile of water for all grassland and forest units; therefore, allowing no net gain in water developments would not affect estimated forage availability for livestock.

### *Fences and Pasture Size*

The following table displays the average size of pastures by alternative. The percent increase over current levels is in parenthesis ( ).

**Table 3-40. Average Pasture Size Limits in Acres.**

| Dakota Prairie Grasslands | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Grand River/Cedar River National Grassland | 1,150 | No limits | No limits | 1,265 (10) | Variable | 1,380 (20) | 1,265 (10) |
| Little Missouri National Grassland/McKenzie | 1,140 | No limits | No limits | 1,311 (15) | Variable | 1,482 (30) | 1,311 (15) |
| Little Missouri National Grassland/Medora | 560 | No limits | No limits | 644 (15) | Variable | 728 (30) | 644 (15) |
| Sheyenne National Grassland | 430 | No limits | No limits | 430 (0) | Variable | 430 (0) | 538 (25) |
| **Thunder Basin National Grassland** | 1,640 | No limits | No limits | 1,722 (5) | Variable | 1,722 (5) | 1,722 (5) |
| **Nebraska National Forest Units** | | No limits | No limits | | | | |
| Bessey Ranger District | 870 | No limits | No limits | 1,001 (15) | 1,001 (15) | 1,044 (20) | 1,044 (20) |
| Samuel R. McKelvie National Forest | 1,170 | No limits | No limits | 1,170 (0) | 1,170 (0) | 1,287 (10) | 1,287 (10) |

| Dakota Prairie Grasslands | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Nebraska National Forest Units, cont.** | | | | | | | |
| Buffalo Gap National Grassland (Fall River Ranger District) | 1,030 | No limits | No limits | 1,133 (10) | Variable | 1,236 (20) | 1,236 (20) |
| Buffalo Gap National Grassland (Wall Ranger District) | 1,150 | No limits | No limits | 1,150 (0) | Variable | 1,265 (10) | 1,265 (10) |
| Ft. Pierre National Grassland | 500 | No limits | No limits | 625 (25) | 625 (25) | 750 (50) | 1,000 (100) |
| Pine Ridge Ranger District | 650 | No limits | No limits | 650 (0) | Variable | 683 (5) | 683 (5) |
| Oglala National Grassland | 940 | No limits | No limits | 1,128 (20) | 940 (0) | 1,222 (30) | 1,222 (30) |

On most units, pasture sizes would be the largest under Alternative 4, followed by Alternatives 5 and 3. Larger pastures result in less uniform forage use, which would resemble more natural vegetation patterns. There is no limit on pasture size under Alternatives 1 and 2.

## *Effects from Fish and Wildlife Management*

Standards and guidelines, along with wildlife habitat requirements defined as desired vegetation structure conditions (see Rangeland and Forest Health effects section), were applied to each alternative. These standards and guidelines could require changes in livestock management and range development construction but would not affect available forage. Available forage depends on the desired vegetation structural conditions and rested areas required by certain wildlife species. These considerations have been taken into account in the predictive model for estimated available forage on a landscape basis. When site-specific allotment management plans are developed, these wildlife habitat considerations will be incorporated in determining estimated forage available to livestock.

## *Effects from Oil, Gas, Minerals Management*

In certain areas, oil, gas and minerals management could affect the amount of estimated forage available for livestock. Construction of roads and pads for oil and gas development would reduce estimated forage availability. Impacts would be greatest under Alternative 2. Alternative 4 would have the least amount of impacts. Roads and oil pads generally occupy a small percentage of the landscape in areas where oil and gas development occurs. Although this is a small percentage, it does reduce the estimated available forage over the life of the development. All action alternatives require reclamation in accordance with plan direction. On the Dakota Prairie Grasslands, special-use and single-use roads will be obliterated and rehabilitated within one year from the end of their use period unless a documented decision is made to keep the road for other management needs. After rehabilitation of roads and pads has been completed, estimated forage availability would be restored. Rehabilitation of these areas would be done with native vegetation species.

Areas currently under existing active coal leases are not considered suitable for livestock grazing because mineral activities would preclude livestock use. When an area has been reclaimed, it would be available for livestock use following the completion of a capability analysis.

## *Effects from Plant and Animal Damage Control*

Control of noxious weeds could provide more estimated available forage. Because more control measures would be taken under Alternatives 2 and 4, these alternatives could provide additional available forage. However, due to predicted increased grazing levels under Alternative 2, this would provide more opportunities for the establishment and spread of invasive and noxious species. Alternative 1 is no change from current direction. How much available forage would be made available cannot be predicted because it is dependent on the estimated forage production on each ecological site.

The forage eaten or clipped by prairie dogs is obviously not available to livestock. On a long-term basis, shifts in plant species composition resulting from multiple years of combined prairie dog and livestock grazing can reduce forage production and livestock forage availability on the national grasslands.

Expected prairie dog populations and resulting reductions in available livestock forage would be largest under Alternatives 3 and 4 and lowest under Alternatives 1 and 2. Intermediate levels would occur with Alternative 5. The estimated reduction in available AUMs based on the predicted prairie dog populations in the next 10 to15 years under each alternative is presented in the following table. This information was not presented for Alternative 3 in the DEIS.

**Table 3-41. Estimated annual loss of AUMs from prairie dog foraging and clipping.**

| National Grassland or Forest | Alt 1 | Alt 2 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|
| LMNG | 92 | <92 | 312-543 | 312-543 | 168-272 |
| SNG | NA | NA | NA | NA | NA |
| GRNG | 58 | <58 | 145-225 | 145-225 | 81-127 |
| FPNG | 9-14 | <9 | 69-110 | 69-110 | 40-64 |
| BGNG | 353-425 | <353 | 1,295-2,104 | 1,295-2,104 | 1,214-1,983 |
| ONG | 353-425 | <353 | 69-110 | 69-110 | 40-64 |
| NNF(PRRD) | NA | NA | NA | NA | NA |
| NNF(BRD) | Unknown | Unknown | Unknown | Unknown | Unknown |
| SRMNF | NA | NA | NA | NA | NA |
| TBNG | 312+ | <312 | 1,728-2,746 | 1,728-2,746 | 1,451-2,306 |

The estimated reductions in available AUMs are based on research information from western South Dakota on prairie dog and livestock relationships (Collins et al. 1984, Uresk and Paulson 1985). These estimates only take into account forage loss from prairie dog foraging and clipping and not changes in plant production. Uresk (1985, 1987) found that controlling prairie dogs in western South Dakota did not result in an increase in forage production after 4 years. Uresk (op. cit.) also reported that on some sites, it may take more than 9 years to increase forage production by excluding livestock and removing prairie dogs, so the analysis for this FEIS made no attempt to consider the effects of reduced forage production on AUMs.

### *Effects from Recreation Management*

Dispersed recreation use could increase in all alternatives. Livestock grazing and range developments could conflict with recreation settings and activities. Recreation participants who desire natural-appearing landscapes may be negatively affected by the amount of fences viewed or encountered. As displayed previously, Alternatives 3, 4, and 5 would increase the average size of pastures on some units to create more natural-appearing landscapes and promote a sense of vastness. Alternative 4 would dedicate 5 percent of the suitable rangeland acres to bison-only use on all units. The type of fence constructed would be dependent on where the bison areas are located and could adversely affect scenic values and recreational settings.

### *Effects from Riparian and Wetlands Management*

All alternatives emphasize the management and protection of riparian areas and wetlands. For riparian areas and wetlands determined to be not properly functioning, adjustments in the estimated forage available to livestock would occur.

Standards and guidelines to manage and protect riparian areas and wetlands include:

- Avoiding season-long grazing in riparian/woody draw areas.
- Restricting activities, such as feeding, salting, herding, or watering, that concentrate livestock into riparian/woody draw areas.
- Controlling the timing, duration, and intensity of grazing in riparian areas to promote establishment and development of woody species, based on local growing conditions.
- Excluding livestock from riparian areas that are "not functioning" (as rated by the Proper Functioning Condition protocol) due to livestock impacts and where improvement is likely to occur only without livestock grazing.
- Removing or relocating fences or water developments that adversely affect riparian/woody draw areas.

### *Effects from Special Area Designations*

Under all alternatives, livestock grazing in designated Research Natural Areas, Special Interest Areas, recommended Wilderness areas, and Wild, Scenic and Recreation River corridors would be managed to meet desired vegetation conditions and to protect the special characteristics for each specific area. This could restrict and/or reduce livestock grazing use in such areas. Changes in estimated forage availability for these areas was accounted for in the estimates of forage available for livestock. Alternatives 3, 4, and 5 would designate or recommend the most acres to special areas. Alternatives 1 and 2 have the least acres of special areas and recommended Wilderness.

### *Effects from Threatened, Endangered and Sensitive Species Management*

In general, habitat in and around each known or discovered threatened, endangered, or sensitive species location would be protected, restored, or enhanced. The size of black-tailed prairie dog colonies varies by alternative to provide black-footed ferret habitat. Changes in estimated forage available for livestock in these areas was considered in the estimated forage calculations. Management requirements for threatened, endangered, and sensitive species may require changes in management and affect the amount of estimated forage available.

### *Effects from Timber Management*

Timber harvesting could increase estimated available forage for livestock and wildlife use. Only 8 percent of the planning units is forested, and only 2 percent will have actively managed timber stands. This will occur on the Pine Ridge area of the Pine Ridge District, Nebraska National Forest. As timber is harvested, previously unavailable areas may become available to livestock. While AUMs are not expected to significantly increase due to the limited amount of timber harvest on the various units, the newly available areas can reduce grazing pressure on other areas. Alternative 2 has the most timber harvest predicted, followed by Alternatives 4, 5, 3, and 1.

### *Effects from Travel Management and Motorized Use*

Alternatives 1 and 2 would not restrict motorized travel. Alternatives 3, 4, and 5 would restrict motorized travel to designated routes only, except for those specific areas which could be designated as allowing off-road motorized use. While authorized administrative uses, including permit administration, would be exempt from the motorized travel restrictions, livestock permittees are not likely to have the same access latitude they currently experience. Motorized travel restrictions could benefit livestock producers by reducing the potential for livestock harassment, gates being left open, and soil damage and rutting.

## Cumulative Effects

The estimated forage availability for livestock grazing varies by alternative. Several management activities and allocations change the amount of estimated forage available for livestock, including desired vegetative conditions; rest; threatened, endangered, and sensitive species habitat requirements; other wildlife habitat needs; coal, oil, and gas development; riparian and wetland management; and special use designations. Cumulatively, these changes have been considered in the calculations of available forage for livestock, with the exception of impacts due to oil and gas road and pad development; prairie dog colony expansion; some threatened, endangered, and sensitive species habitat requirements; and standards for meeting proper functioning conditions in riparian areas and wetlands. Estimating forage changes for these activities is highly variable, with the extent of some of the impacts unknown. All of these impacts will be considered on a site-specific basis during development of allotment management plans.

Other management practices in Alternatives 2 through 5 may cumulatively impact livestock operations. Some of these practices include requiring amendments to grazing agreements to allow permitted bison grazing, limiting water developments where applicable (no net gain),

maintaining or increasing average pasture size, and requiring use of certified weed-free hay during winter feeding. None of these practices are expected to impact livestock operations to a great degree because:

- Permitted grazing of bison already is allowed in many grazing agreements.
- Water developments and average pasture sizes are close to what occurs on private lands.
- Certified weed-free hay is already required in many current plans.

Under all alternatives, water developments are still within 1 mile of each other on most units. Estimated forage availability will not be affected by decreasing the amounts of water developments under Alternatives 4 and 5. Pastures sizes would be largest under Alternative 4, followed by 5 and 3. The size of the pasture does not affect the amount of estimated available forage.

Alternatives 1 and 2 provide for the greatest amount of estimated forage available for livestock and increased or existing levels of structural developments in support of livestock management. Alternatives 4 and 5 would provide the least amount of available forage for livestock and would decrease the amount of structural developments in support of livestock management. Alternative 4 would also dedicate 5 percent of the suitable acres as bison-only use areas. This would decrease the amount of estimated available forage for other classes of livestock, depending on where the bison-only areas are located. Alternative 3 would provide for less estimated available forage than Alternatives 1 or 2, but the amount of structural developments varies from unit to unit.

The most measurable cumulative effects are expected to occur in meeting standards and guidelines for riparian and wetland conditions along with the desired upland herbaceous vegetation conditions which vary by alternative. For example, Alternative 4 allows the least amount of water developments to be constructed and has larger pasture sizes. This would effect riparian and stream bank conditions since livestock are less intensively managed as compared to Alternative 2.

# Oil and Gas

## Introduction

The Federal Onshore Oil and Gas Leasing Reform Act of 1987 expanded the authority of the Secretary of Agriculture for oil and gas leasing and authorized the Secretary to develop procedures and regulations governing leasing and development of oil and gas resources in the National Forest System (NFS). The regulations, completed on April 20, 1990, set forth procedures for making leasing decisions. During the 1990s, NEPA and leasing decisions were completed for several grassland areas. After the Forest Service completes required National Environmental Policy Act analysis and decisions, the BLM offers the leases for sale.

The leasing decisions are based on and closely tied to the grassland plans. As the plans are revised, the leasing decisions also need to be modified to reflect the new plans. The following oil and gas analysis applies to about 2.4 million acres of federal minerals (1.7 million acres federal surface estate), including:

- The Little Missouri and Cedar River National Grasslands managed by the Dakota Prairie Grasslands.
- The Thunder Basin National Grassland managed by the Medicine Bow-Routt National Forest.
- The Oglala National Grassland and the western half of the Buffalo Gap National Grassland managed by the Nebraska National Forest.

These are the areas of moderate and high oil and gas development potential. The remaining 1.2 million acres of the planning area (Sheyenne, Grand River, Fort Pierre National Grasslands, eastern half of the Buffalo Gap National Grassland, and Nebraska and Samuel R. McKelvie National Forests) are not included in this analysis because they have low oil and gas development potential, and there is little industry interest.

With management responsibility and authority for the federal mineral estate, the Bureau of Land Management (BLM) also plays a role in management of oil and gas resources underlying NFS lands. The BLM is a cooperating agency in this analysis in accordance with the 1991 Interagency Agreement for Oil and Gas Leasing between the Forest Service and BLM. This oil and gas analysis addresses all federal minerals including those under non-federal surface (split estate) lands within the boundaries of the NFS units to which this analysis applies. Based on this oil and gas analysis the Forest Service will issue leasing decisions pursuant to 36 CFR 228.102, and the BLM will issue decisions for leasing federal mineral estate under Forest Service administered surface and under non-federal surface (split estate lands) within Forest Service units, as appropriate.

**Table 3-42. Mineral Estate Acres by National Forest and Non-federal Surface.**

| Planning Unit | Federal Minerals (total) | National Forest Surface, Federal Minerals | Non-federal Surface, Federal Minerals |
|---|---|---|---|
| **Dakota Prairie Grasslands** | | | |
| Little Missouri National Grassland | 980,360 | 897,480 | 82,880 |
| Cedar River National Grassland | 12,550 | 1,290 | 11,260 |
| **Medicine Bow/Routt National Forest Unit** | | | |
| Thunder Basin National Grassland | 1,158,760 | 532,390 | 626,370 |
| **Nebraska National Forest Units** | | | |
| Buffalo Gap National Grassland | 156,340 | 97,620 | 58,720 |
| Oglala National Grassland | 90,520 | 89,770 | 750 |

# Laws, Policy, and Direction

Oil and gas resources on NFS lands are managed under a large body of laws and regulations. A few, however, are specific to the mineral resource itself and provide direction on the disposition of federally owned oil and gas resources, as well as administration of surface activities associated with development of these resources.

- **Mineral Leasing Act of 1920 –** This act authorizes the Secretary of Interior to issue leases for the disposal of certain minerals (currently applies to coal, phosphate, sodium, potassium, oil, oil shale, gilsonite, and gas). The act applies to National Forest lands reserved from the public domain, including lands received in exchange for timber or other public domain lands and lands with minerals reserved under special authority.
- **Mineral Leasing Act for Acquired Lands of 1947** - This act states that all deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur that are owned or may be acquired by the United States and that are within lands acquired by the United States may be leased by the Secretary of Interior under the same conditions as contained in the leasing provisions of the mineral leasing laws. No mineral deposits shall be leased without the consent of the head of the executive department having jurisdiction over the lands containing the deposit and subject to such conditions as that official may prescribe.
- **Mining and Minerals Policy Act of 1970** - This act states that the continuing policy of the federal government is to foster and encourage private enterprise in the development of economically sound and stable domestic mining and minerals industries and the orderly and economic development of domestic mineral resources.
- **Energy Security Act of 1980** - This act directs the Secretary of Agriculture to process applications for leases and permits to explore, drill, and develop resources on NFS lands, notwithstanding the current status of any management plan being prepared.

**Laws, Policy, and Direction, cont.**

- **The Federal Onshore Oil and Gas Leasing Reform Act of 1987** - This act expands the authority of the Secretary of Agriculture in the management of oil and gas resources on NFS lands. Without Forest Service approval, Bureau of Land Management cannot issue leases for oil and gas on NFS lands. The Forest Service must approve all surface-disturbing activities on NFS lands before operations commence.

# Terms Used in This Section

Within the oil and gas section, there are several terms used that are specific to oil and gas leasing. A brief description of these terms is given below.

- Not Administratively Available (NAA): Designation given to lands that have been identified in a leasing analysis as closed to leasing through exercise of management direction.
- Not Currently Authorized for Leasing (NCA): A term used to describe specific lands that are determined to be administratively available for leasing with specified conditions (lease stipulations) but due to specified circumstances, no authorization is granted to BLM to issue leases. Decision to lease such specific lands (authorize BLM to lease) may be made at some future date.
- Stipulation: A provision that modifies standard lease rights and is attached to and made a part of the lease. Stipulations have been developed for the categories of: 1) No Surface Occupancy (NSO), 2) Timing Limitations (TL) or seasonal restrictions, and 3) Controlled Surface Use (CSU).
- No Surface Occupancy (NSO): Use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values.
- Timing Limitation (TL) (Seasonal Restriction): Prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless analysis demonstrates the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.
- Controlled Surface Use (CSU): Use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute for NSO or Timing stipulations.
- Lease Notice (LN): Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee should consider when planning operations, but does not impose new or additional restrictions.
- Standard Lease Terms (SLT): The terms incorporated into every oil and gas lease. Standard lease terms require compliance with all laws and regulations to ensure protection of other energy, mineral, and surface resources. Under standard lease terms, the authorized officer has limited authority to modify the siting and design of facilities and to control the rate of development and timing of activities as well as require other mitigation under standard lease terms (BLM Form 3100-11 and 43 CFR 3101.1-23).

# Historical Summary

In accordance with the Federal Onshore Oil and Gas Leasing Reform Act of 1987 and its implementing regulations (completed April 20, 1990), the area or forest-wide leasing decision[8] and the specific lands decision[9] were made during the 1990s on all the high and moderate oil and gas potential lands within the analysis area. These decisions, sometimes referred to as the *availability decision* and *authorization decision*, have been implemented continually since their signing and are listed in the following table.

**Table 3-43. Existing Leasing Analyses and Decisions Within the Analysis Area**

| Environmental Document | Decision Date |
|---|---|
| Northern Little Missouri Oil and Gas Leasing Final EIS | 9/1991 |
| Oil and Gas Leasing on the Thunder Basin National Grassland Final EIS | 4/22/1994 |
| Oil and Gas Leasing Decision Notice Buffalo Gap National Grassland | 9/27/1995 |
| Southern Little Missouri and Cedar River National Grasslands Final Oil and Gas Leasing EIS | 4/05/1996 |
| Oil and Gas Leasing Environmental Assessment, Oglala National Grassland and Portions of the Buffalo Gap National Grassland | 3/23/2000 |

# Oil and Gas Leasing Decisions

This analysis incorporates, by reference, the existing oil and gas leasing analyses and decisions.

The Leasing Reform Act requires consideration of a "no leasing" alternative (36 CFR 228.102 (c)(2)). The "No leasing" and the "Leasing with standard lease terms only" alternatives are incorporated by reference from the prior oil and gas leasing analyses (see following table).

**Table 3-44. Alternatives Incorporated by Reference.**

| Environmental Document | No Leasing Alternative | Leasing with Standard Lease Terms Only |
|---|---|---|
| Northern Little Missouri Oil and Gas Leasing Final EIS | Alternative 2 | Alternative 4 |
| Southern Little Missouri and Cedar River National Grasslands Final Oil and Gas Leasing EIS | Alternative E-1 | Alternative E-5 |
| Oil and Gas Leasing on the Thunder Basin National Grassland Final EIS | Alternative 5 | Alternative 6 |
| Oil and Gas Leasing Decision Notice Buffalo Gap National Grassland | Alternative B | Alternative C |
| Oil and Gas Leasing Environmental Assessment, Oglala National Grassland and Portions of the Buffalo Gap National Grassland | Alternative A | Alternative B |

[8] 36 CFR 228.102(d) - Determination of lands administratively available.

[9] 36 CFR 228.102(e) - Authorization of BLM to lease specific lands.

Both the Forest Service and BLM have responsibility for leasing decisions on the federal mineral estate underlying NFS administered lands. However, BLM is solely responsible for making leasing decisions on split estate lands where the federal government owns the mineral estate (oil and gas) but does not own the surface. In conjunction with the Northern and Southern Little Missouri, Cedar River, Thunder Basin, Oglala, and Buffalo Gap oil and gas leasing decisions, the BLM made previous decisions to lease federal minerals on split estate lands with stipulations similar to the stipulations chosen by the Forest Service. The BLM will revise those leasing decisions based on this analysis if changes are necessary and appropriate.

The acreages shown in all the tables to follow include all the federal minerals within the borders of the national grasslands, not just the federal minerals under Forest Service-administered surface.

## Oil and Gas Exploration

Some who commented on the DEIS wanted more information on geophysical exploration and on permitting oil and gas exploration drilling operations. Geophysical activities may be conducted prior to or after leasing by the lessee or someone other than the lessee. Conducting exploration drilling operations, however, is an exclusive right granted to a lessee on his/her lease. After a lease is issued, the lessee or lessee's assignee can conduct exploration drilling operations, in compliance with lease terms and other conditions.

Geophysical methods of exploration include gravitational and magnetic surveys that are completed on the ground. Seismic surveys are the most common form of geophysical exploration for oil and gas resources. Seismic surveys analyze acoustical properties of rocks deep beneath the surface and provide geophysicists and geologists a "picture" of rock characteristics and relationships (variation in rock types, the nature of rock layers, structural characteristics such as faults and folds, and sometimes the nature of fluids or gas filling pore spaces in the rock). The "picture" of these subsurface rock relationships depends on characteristics of artificially generated shock waves directed into the earth after they bounce off of rock layers and return to listening devices on the surface.

Generally, these surveys are conducted on foot and in trucks over large areas. In rough terrain, people on foot, supported by helicopter, may conduct such a survey. Sound sources include thumper trucks and dynamite. Thumper trucks have large metal plates that are mechanically dropped on the surface to force sound waves into the earth. Dynamite can be placed on sticks on the surface or in holes drilled in the ground. In either case, rock layers in the earth "bounce" the sound waves back to the surface where they are picked up by sound receivers. Sound receivers consist of a large number of small devices placed on the ground surface. The devices are evenly spaced along a wire connected to a truck that contains sophisticated computer equipment. The computer equipment collects and analyzes the subsurface sound data.

The two basic types of seismic surveys—conventional or single-line seismic and 3D or three-dimensional seismic—obtain data from the subsurface in much the same way. The arrangement of and relationship between sound sources and receivers, however, differs between the two types of surveys. The design of the survey depends on the objectives of the company seeking information about the subsurface. Surveys may cover a very large area (a grid over 10s of square miles, as in some 3D surveys) or may be limited in extent (one line over a mile or two, as in some conventional surveys).

Regardless of the size of the area surveyed, if any federally owned surface is affected, the geophysical company must obtain a permit from the agency with jurisdiction for the surface. In the case of the grasslands, where the Forest Surface administers any federally owned surface, the company must obtain a permit from the Forest Service. The special use permit authorizing such use includes conditional provisions for conducting seismic surveys, which by their very nature include some level of ground disturbance (generally minimal). The Forest Service imposes a fee with geophysical special use permits, except when the acquisition company or a client of the geophysical company is a leaseholder. Neither the geophysical company nor any of its clients must be a leaseholder in order to conduct a seismic survey. However, when one or more of the companies acquires data from a survey conducted on its lease, a fee is not imposed for that part of the survey on the lease.

Prior to approval or authorization, the Forest Service examines all proposals for geophysical operations on National Forest System lands, either on or off an oil and gas lease. The authorizing officer must comply with the National Environmental Policy Act implementing regulations at 40 CFR 1500-1508 and with Forest Service policy and procedures. Based on review of the environmental consequences, the proposed seismic survey may be modified to be consistent with the current approved land and resource management plan. The authorizing officer may approve the proposed survey as submitted, approve the proposed survey subject to specific conditions, or not approve the proposed survey for specific reasons.

Subsequent to obtaining a lease, a lessee or his/her appointed operator may drill on the lease to explore for and/or develop any hydrocarbon resources that might be present in the subsurface. Such drilling can occur only under the terms of the lease, including any special stipulations that may be attached to the lease. In addition, such drilling can occur only after additional permission is granted by the Forest Service and/or Bureau of Land Management. No drilling or surface occupancy associated with drilling may occur in areas covered by a No Surface Occupancy stipulation that may be attached to a lease, except under conditions as described in the stipulation.

Subsequent to obtaining a lease and prior to performing any exploration drilling or other surface disturbance on a lease, a lessee/operator must file and receive approval for an Application for Permit to Drill (APD). The APD includes a Surface Use Plan of Operations (SUPO) that itemizes certain conditions under which a well may be drilled. Such Conditions of Approval link to lease terms and special stipulations, standards and guidelines in the applicable land and resource management plan, and other applicable laws and regulations. Included in requirements to conduct drilling operations for exploration or development, the lessee/operator and the federal permitting agency(ies) must comply with the National Environmental Policy Act and its implementing regulations before surface-disturbing activities can be permitted.

The Bureau of Land Management administers all APDs for all federal minerals, regardless of surface ownership. In the case of federal minerals under Forest Service surface jurisdiction, the Forest Service works with the lessee/operator on developing the SUPO. The Forest Service must approve the SUPO before any surface-disturbing activities can occur. The BLM incorporates the approved Forest Service SUPO in the APD before granting final approval to drill a well. In the case of federal minerals under private surface ownership, the BLM alone administers the APD, and the lessee/operator must work with the private landowner on provisions for surface access.

# Affected Environment

## Dakota Prairie Grasslands

The Little Missouri and Cedar River National Grasslands are in Williston Basin, a significant oil-producing basin. There have been approximately 2,500 wells drilled in or near the Little Missouri National Grassland since drilling began in North Dakota in 1951. Many of those wells have been plugged. Currently, there are approximately 600 wells on federal minerals in the Little Missouri, including producing wells, water injection wells, shut-in wells, etc. Plugged and abandoned wells are not included in this count. There are approximately 100 more wells on lands where there is federal surface ownership and non-federal minerals.

An average active well in the basin produces 30 barrels of oil per day[10] and is considered a major producing well in the United States. Federal wells in the Little Missouri have produced an average of 4.3 million barrels of oil and 5.6 million cubic feet of gas per year, between fiscal years 1994 - 1998. Management activities within this basin have a direct and immediate effect on the regional oil and gas industry.

Oil and gas production in North Dakota ranks ninth in the nation. In 1998, leading producing counties were Bowman, Billings, McKenzie, and Williams, with most production occurring on NFS lands in Billings and McKenzie counties. The Little Missouri National Grassland produced $14 million in federal oil and gas rent and royalty revenues in fiscal year 1998. About one fourth of that amount was returned to McKenzie, Billings, Golden Valley, and Slope counties for schools and roads. Forest Service- and BLM-administered public domain land in the Little Missouri provided an additional $4.5 million, with half of that returned to the state of North Dakota.

Currently, all of the Little Missouri and Cedar River National Grasslands are legally available for leasing. However, under current leasing decisions, four areas (24,870 acres) on the Little Missouri National Grassland were determined "not administratively available" for leasing (Dutchman's Barn, Long X Divide, Blue Buttes, and Twin Buttes). In the FEIS, Bullion Butte and Kinley Plateau were also not administratively available.

The leasing decision for the Northern Little Missouri is summarized in the following table. The table shows both availability and authorization decisions and affected acres. There are two types of decision rationale. First, the analysis and decisions were based on the location of resources. Stipulations were developed to protect potentially affected resources, and the alternatives varied according to the degree of restriction applied by the stipulations, irrespective of management area boundaries. Second, the leasing decisions were also made based on certain management areas. Entire management areas were made not available, not currently authorized for leasing, or NSO.

[10] North Dakota Oil and Gas Industry Facts and Figures, 1999, North Dakota Petroleum Council

**Table 3-45. Alternative 1 for Northern Little Missouri Oil and Gas ROD.**

| | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| **Resources** | **Acres** | **Available Acres** | **NSO** | **TL** | **CSU** |
| Low development areas | 42,600 | 25,240[11] | 10,940 | 0 | 0 |
| Research Natural Areas | 140 | 140 | 140 | 0 | 0 |
| Prairie dogs | 2,660 | 2,660 | 2,660 | 0 | 0 |
| Ferruginous hawk | 1,690 | 1,690 | 470 | 1,220 | 0 |
| Bighorn sheep habitat | 18,500 | 17,730[12] | 15,750 | 0 | 0 |
| Sharp-tailed grouse | 3,340 | 3,340 | 110 | 3,230 | 0 |
| Golden eagle | 30,440 | 30,440 | 7,610 | 22,830 | 0 |
| Prairie falcon | 7,340 | 7,340 | 2,000 | 5,340 | 0 |
| Big game habitat | 2,460 | 2,460 | 340 | 0 | 2,120 |
| Woody Draws | 38,730 | 38,730 | 38,730 | 0 | 0 |
| Little Missouri River bottom | 5,480 | 5,480 | 5,480 | 0 | 0 |
| Little Missouri River and Theodore Roosevelt National Park Visuals | 41,340 | 41,340 | 24,240 | 17,100 | 0 |
| Theodore Roosevelt National Park - Heritage | 390 | 390 | 0 | 0 | 390 |
| Developed recreation sites | 1,210 | 1,210 | 230 | 980 | 980 |
| Management Area K - Blue Buttes | 6,740 | 0 | | 0 | 0 |
| Heritage resources | 1,450 | 1,450 | 1,450 | 0 | 0 |
| Steep slopes | 26,020 | 26,020 | 26,020 | 0 | 0 |

The Southern Little Missouri decision is summarized in the following table and also shows both the "availability" and "authorization" decisions (see the Record of Decision for the Southern Little Missouri Environmental Impact Statement for the complete table). The analysis and decision were not based on management areas but on the location of resources, similar to the method used in the Northern Little Missouri Oil and Gas Leasing analysis.

**Table 3-46. Alternative 1 for Southern Little Missouri Oil and Gas ROD**

| | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| **Resources** | **Acres** | **Available Acres** | **NSO** | **TL** | **CSU** |
| Inventoried roadless areas | 38,390 | 38,390 | 38,390 | 0 | 0 |
| Research Natural Areas | 680 | 680 | 680 | 0 | 0 |
| Special Interest Areas | 4,250 | 4,250 | 3,450 | 800 | 0 |

[11] 7,600 acres of Horse Creek and 6,650 acres of Lone Butte in Management Area J were made available for leasing but given a not currently authorized for leasing decision

[12] 1,980 acres of Lone Butte in Management Area C were made available for leasing but given a not currently authorized for leasing decision

| Resources | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| | Acres | Available Acres | NSO | TL | CSU |
| Prairie dogs | 1,230 | 1,230 | 1,230 | 0 | 0 |
| Ferruginous hawk | 10,230 | 10,230 | 2,670 | 7,560 | 0 |
| Bighorn sheep habitat | 24,650 | 24,650 | 24,650 | 0 | 0 |
| Sage grouse | 58,540 | 58,540 | 1,290 | 57,250 | 0 |
| Sensitive plants | 1,570 | 1,570 | | 0 | 1,570 |
| Sharp-tailed grouse | 53,300 | 53,300 | 4,660 | 48,640 | 0 |
| Golden eagle | 14,010 | 14,010 | 14,010 | 0 | 0 |
| Prairie falcon | 7,710 | 7,710 | 7,710 | 0 | 0 |
| Antelope winter range | 27,650 | 27,650 | 11,620 | 16,030 | 0 |
| Mule deer habitat | 57,620 | 57,620 | 0 | 0 | 57,620 |
| Ponderosa pine stands | 2,750 | 2,750 | 2,750 | 0 | 0 |
| Riparian areas | 2,790 | 2,790 | 0 | 0 | 2,790 |
| Woody draws | 3,200 | 3,200 | 3,200 | 0 | 0 |
| Little Missouri River foreground | 13,640 | 13,640 | 13,640 | 0 | 0 |
| Little Missouri River mid/background | 5,160 | 5,160 | 0 | 5,160 | 0 |
| Burning Coal Vein campground | 650 | 650 | 230 | 210 | 210 |
| Burning Coal Vein viewshed | 190 | 190 | 0 | 0 | 190 |
| National Forest access routes | 51,760 | 51,760 | 0 | 0 | 51,760 |
| Ponderosa Pine viewshed | 4,260 | 4,260 | 4,260 | 0 | 0 |
| Little Missouri River ¼-mile corridor | 13,340 | 13,340 | 13,340 | 0 | 0 |
| Heritage resources | 5,150 | 5,150 | 5,150 | 0 | 0 |
| Paleontological resources | 46,620 | 46,620 | | 0 | 46,620 |
| Steep slopes | 1,230 | 1,230 | 1,230 | 0 | 0 |
| Al Schaeffer Land Exchange[13] | 680 | 0 | 0 | 0 | 0 |
| **Cedar River National Grassland** | | | | | |
| Management Area C[14] | 175 | 175 | 175 | 0 | 0 |

[13] Al Schaeffle proposed land exchange temporarily not available. Upon becoming available would be leased with SLT.

[14] Cedar River Management Area C contains sensitive plants and riparian areas. Further analysis revealed no Management Area C with federal mineral ownership on the Cedar River National Grassland.

## Thunder Basin National Grassland

Most of the Thunder Basin National Grassland lies within the Powder River Geologic Basin, a 12,000-square-mile oil, gas, and coal-bearing area. There are 74 developed oil and gas fields within or partially within the Thunder Basin National Grassland. Production from wells on National Forest System lands in Thunder Basin National Grassland generated $1.7 million from royalties in fiscal year 1998. Average production from wells on Forest Service surface/federal minerals in Thunder Basin National Grassland is 4.6 barrels per day. Consequently, most oil wells on the grassland are "stripper" or marginally economic wells (wells that produce less than 15 barrels of oil per day). On a national basis, stripper wells produce 32 percent of the oil that comes from federal lands. This is an important component of national oil production and is significant to both local and national economies.

There are many oil and gas leases with only one producing well and several other wells that are temporarily abandoned (shut-in). Some wells have been shut-in for as long as 10 years without being put back into production or being plugged and abandoned. The longer wells are shut-in, the greater the risk no one will take responsibility for plugging them and reclaiming the sites. This management concern is currently being addressed through inspection, enforcement, and bonding policies.

Table 3-47 summarizes the 1994 Thunder Basin National Grassland oil and gas management decisions (area-wide availability decision and specific lands decision). The analysis and decisions were made on the basis of type, nature and extent of other land uses rather than on a management area basis. The 1994 analysis and decisions were made without benefit of GIS tools, so accurate acreage figures for specific resources were unavailable at that time. Consequently, the figures in Table 3-47 were applied to the existing (1994) leasing decision by use of currently available GIS tools. Standard lease terms only, were applied to lands (acres) not included in the categories listed in here. The 1994 decisions applied only to Forest Service surface/federal minerals. However, BLM has used the standards and criteria of those decisions in managing minerals on split estate lands (federal minerals/non-federal surface) within the grassland boundaries. The current analysis applies to all federal minerals within the grasslands. Based on this analysis, the Forest Service will issue leasing decisions for National Forest System lands, and the BLM will issue decisions for leasing both the federal mineral estate under National Forest System surface and federal mineral estate under non-federal surface (split estate lands) within Forest Service units, as appropriate.

**Table 3-47. Alternative 1 for Thunder Basin National Grassland Oil and Gas ROD.**

| | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| **Resources** | **Acres** | **Available Acres** | **NSO** | **TL** | **CSU** |
| Semi-primitive motorized and Biological diversity | 24,530 | 24,530 | 6,970 | 0 | 17,560 |
| Roaded natural and Biological diversity | 41,240 | 41,240 | 0 | 0 | 41,240 |
| Ferruginous hawk | 35,800 | 35,800 | 0 | 35,800 | 2,400 |
| Sage grouse | 3,610 | 3,610 | 0 | 0 | 3,610 |

| Resources | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| | Acres | Available Acres | NSO | TL | CSU |
| Sharp-tailed grouse | 200 | 200 | 0 | 0 | 200 |
| Golden eagle | 15,750 | 15,750 | 0 | 15,750 | 880 |
| Prairie falcon | 990 | 990 | 0 | 990 | 50 |
| Swainson's hawk | 1,960 | 1,960 | 0 | 1,960 | 120 |
| Bald eagle nest | 4,300 | 4,300 | 0 | 4,300 | 920 |
| Bald eagle roost | 7,420 | 7,420 | 0 | 7,420 | 0 |
| Mountain plover | 44,850 | 44,850 | 0 | 44,850 | 0 |
| Crucial winter range - deer | 4,600 | 4,600 | 0 | 4,600 | 4,600 |
| Riparian areas | 1,560 | 1,560 | 0 | 0 | 1,560 |
| Heritage resources | 320 | 320 | 320 | 0 | 0 |
| Fisheries - dispersed recreation sites | 870 | 870 | 0 | 0 | 870 |

## Nebraska National Forest Units

On the Nebraska National Forest, leasing decisions exist on the Oglala National Grassland and on the western portion of the Buffalo Gap National Grassland. Oil and gas development has occurred only on the Buffalo Gap National Grassland, on which there are three fields. Only a tiny fraction of total oil production from Fall River County, South Dakota comes from the Buffalo Gap National Grassland. The overall economic impact from oil and gas is low.

Table 3-48 summarizes an Oil and Gas Decision Notice for portions of the Buffalo Gap National Grassland and the entire Oglala National Grassland. The table shows the area-wide leasing availability decision and leasing decision for specific lands. The analysis and decision were not based on management areas. Instead, they were based on the type, nature, and extent of other resources and land uses. Stipulations were developed to protect potentially affected resources, and the alternatives varied according to the degree of restriction that would result from lease stipulations, irrespective of management area boundaries.

**Table 3-48. Alternative 1 for Oglala National Grassland and Portions of the Buffalo Gap National Grassland Oil and Gas DN.**

| Resources | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| | Acres | Available Acres | NSO | TL | CSU |
| Burrowing owl | 2,410 | 2,410 | 0 | 2,410 | 0 |
| Ferruginous hawk | 2,610 | 2,610 | 1,620 | 990 | 0 |
| Golden eagle | 60 | 60 | 0 | 60 | 0 |
| Long-billed curlew | 10,970 | 10,970 | 0 | 10,970 | 0 |
| Other raptor | 1,700 | 1,700 | 1,060 | 640 | 0 |
| Sage grouse | 2,230 | 2,230 | 210 | 2,020 | 0 |
| Swift fox | 460 | 460 | 0 | 460 | 0 |
| Paleontological Resources | 120,620 | 120,620 | 10,610 | 0 | 110,010 |

| Resources | Availability Decision | | Authorization Decision Stipulations | | |
|---|---|---|---|---|---|
| | Acres | Available Acres | NSO | TL | CSU |
| Soils | 1,190 | 1,190 | 0 | 0 | 1,190 |
| Unique Resources[15] | 2,740 | 90 | 90 | 0 | 0 |
| Visuals | 8,200 | 8,200 | 2,900 | 0 | 5,300 |

## Demand Assessment

Of the 10 planning units under review, three produce oil and gas: the Little Missouri, Thunder Basin, and Buffalo Gap National Grasslands.

The Little Missouri National Grassland produces more oil and gas than any of the other units under review. Oil and gas is produced from four North Dakota counties within the boundaries of the Little Missouri National Grassland: Billings, Golden Valley, Slope, and McKenzie. Acquired lands administered by the Forest Service in the Little Missouri National Grassland provided oil and gas rent and royalty revenues of $14 million during fiscal year 1998. From 1996 to 2000, production averaged 4.3 million barrels of oil and 4.4 billion cubic feet of gas per fiscal year. Approximately 10 to 12 percent of oil production in North Dakota came from the Little Missouri National Grassland in these years.

Oil and gas revenues from the Thunder Basin National Grassland provided $2.5 million in receipts during fiscal year 1997. There are 74 developed oil and gas fields within the Thunder Basin National Grassland.

Buffalo Gap National Grassland produces only a small fraction of the oil produced in Fall River County, South Dakota. There are 3 developed oil and gas fields within the Buffalo Gap National Grassland. The economic impact of the oil production from this area is small.

Reasonably Foreseeable Development Scenarios (RFDS) project oil and gas developments for the planning area. The complete RFDS are in the planning record. Table 3-49 displays findings from the following RFDS and assessments:

- *Oil and Gas Resources of Thunder Basin National Grassland, Wyoming,* May 2001.
- *Revised RFD for the Thunder Basin National Grassland*, May 2001.
- *Draft Revised RFD for the Little Missouri and Cedar River National Grassland*, July 21, 1997. Revised May 1999.
- *Oil and Gas Leasing Environmental Assessment, Western Half Fall River County South Dakota*, September 1995.
- *Oil and Gas Resources of the Oglala National Grassland, Nebraska, and Part of Buffalo Gap National Grassland, South Dakota*, April 1997.

[15] 2,650 acres of Toadstool Park Paleontological Area were made available for leasing but are not currently authorized for leasing.

Qualitative assessments of petroleum occurrence are based on the following BLM handbook definitions:

- **High Potential**: Demonstrated presence of a mature source bed, suitable reservoir strata (with satisfactory porosity and permeability), and traps into which petroleum has migrated.
- **Moderate Potential**: Inferred presence of a mature source bed, suitable reservoir strata, migration pathways, and traps with a hydrocarbon charge.
- **Low Potential**: Inference that a mature source bed, suitable reservoir strata, migration pathways, or charged traps may not be present.

For the Little Missouri National Grassland, a RFDS was prepared based on the scenarios built for the Northern and Southern Little Missouri Oil and Gas Leasing Decisions. The scenarios for the existing oil and gas decisions were updated to reflect recent discoveries in several formations, including the Red River and Duperow, and recent technological advances, primarily horizontal drilling and 3-D seismic. The existing RFDS predict 600-630 wells over a 10-year period. The updated forecast was increased by 60 wells to 660 wells for projected coal bed methane development. Also, areas most likely to be developed have changed somewhat because of the new discoveries. The predicted wells were plotted on a map to illustrate generally where drilling may occur. These predictions were used to help quantify the effects from various alternatives. The 660 predicted wells include land under all ownership in the Little Missouri National Grassland and predicted exploratory and development wells. Of the 660 wells, approximately 405 are predicted on federal minerals and 255 are predicted on private or state minerals.

An RFDS was prepared for the Cedar River as part of the Southern Little Missouri and Cedar River Oil and Gas Leasing Decision. The RFDS predicted 2 exploratory wells over the next 10 to 15 years. There has been no recent interest or drilling in the Cedar River area, therefore the RFDS was not changed. This analysis evaluated the potential effects of 2 wells in Cedar River.

The RFDS for the Thunder Basin, Oglala, and Buffalo Gap National Grasslands were referenced to scenarios from the prior analyses (1994, 1995, and 2000). The scenarios for this analysis considered recent exploration and development activities, advances in technology, and updated demand and price projections.

The Thunder Basin National Grassland has experienced relatively steady, moderate conventional [16] oil and gas development activity over the past 10 years. For the next ten years, up to 230 conventional oil and gas wells are projected, based on geologic potential, historical drilling trends, and favorable economic and technological conditions. Up to 150 of those should be producing wells. Because of declining production and depletion of older fields, up to 120 older wells are projected to be plugged and abandoned and their well sites and access roads reclaimed.

A small part of Thunder Basin National Grassland west of the coal outcrop near Highway 59 has high potential for coal bed methane resources (natural gas). This part of the grassland has experienced relatively high levels of development of coal bed methane resources on existing

[16] Conventional oil and gas development refers to development of discrete deposit(s) from which oil, gas, or natural gas liquids can be extracted using traditional development practices.

leases in the past 5 years. This part of the grassland is a small portion of a much larger area of the Powder River Basin that has high potential for coal bed methane resources. The BLM is preparing an EIS to disclose and analyze effects of 30,000 coal bed methane wells projected in the next 10 years. BLM's analysis covers the larger coal bed methane potential area, including the western part of Thunder Basin National Grassland. Consequently, this analysis for this FEIS has deferred consideration of coal bed methane development and its effects pending completion of the Powder River EIS (BLM lead) for coal bed methane.

The following table shows the occurrence and development potential for the planning units and represents the full oil and gas development projection based on geology and unlimited access.

**Table 3-49. Oil and Gas Occurrence and Development Potential**

| Planning Unit | Occurrence Potential | # Exploratory Wells Predicted to be Drilled Next 10-15 years[17] | # Development Wells Predicted to be Drilled Next 10-15 years[18] |
|---|---|---|---|
| **Dakota Prairie Grasslands** | | | |
| Cedar River National Grassland | Low to moderate | 2 | 0 |
| Little Missouri National Grassland | | | |
| Conventional | Moderate to high | 600 | 450 |
| Coal bed methane | Moderate to high | 60 | 60 |
| **Medicine Bow-Routt National Forest Unit** | | | |
| Thunder Basin National Grassland | | | |
| Conventional | High | Up to 230 | Up to 150 |
| Coal bed methane | High | Projections deferred | Projections deferred |
| **Nebraska National Forest Units** | | | |
| Buffalo Gap National Grassland Fall River District (R1-4E) | Moderate to high | 60 | 12 |
| Buffalo Gap National Grassland Fall River District (R5-7E) | Moderate to high | 15 | 10 |
| Oglala National Grassland | Moderate to high | 10 | 10 |

# Environmental Consequences

## Resource Protection Measures

Standard lease terms are incorporated into every lease and require compliance with laws and regulations to ensure protection of other energy, mineral, and surface resources, such as soil, water, vegetation, cultural, and threatened and endangered species. In addition to standard lease terms, supplemental lease stipulations may be necessary if the authority to control the

[17] Includes both federal and non-federal wells within the boundaries of the Grassland.

[18] The number of development wells predicted is included within the number of exploratory wells in the previous column.

activity on the lease does not already exist under laws, regulations, or orders. It is important to recognize that the authorized officer has the authority to modify the location and design of facilities and control the rate of development and timing of activities, as well as require other mitigation under Sections 2 and 6 of the standard lease terms (BLM Form 3100-11 and 43 CFR 3101.1-23). Using the *Uniform Format for Oil and Gas Leasing Stipulations*, March 1989, stipulations have been developed for the following categories: 1) No Surface Occupancy (NSO), 2) Timing Limitations (TL) or seasonal restrictions, and 3) Controlled Surface Use (CSU).

## Differences in Alternatives Between Previous Analyses and This Analysis

The oil and gas leasing analyses and decisions conducted in 1991, 1994, 1995, 1996, and 2000 for the various grasslands are incorporated by reference. A range of reasonable alternatives was examined in the existing leasing analyses and decisions. The alternatives ranged from no leasing of any lands (no lands available for leasing), to leasing with standard lease terms only, to leasing with standard lease terms and various combinations of supplemental lease stipulations.

For the current analysis, Alternative 1 (No Action) represents existing leasing decisions. For Alternatives 2, DEIS 3, FEIS 3, 4, and 5, stipulations were developed using the standards and guidelines in the proposed land use plans. This resulted in a consistent set of stipulations being applied across all alternatives (except Alternative 1). These alternatives vary by acres allocated to management areas, and in most cases, do not vary standards and guidelines except for those associated with management areas.

It is important to understand that Alternative DEIS 3 in this analysis does not represent what was contained in the DEIS. In this FEIS, Alternative DEIS 3 has been updated with new resource inventories, land status, and stipulations (the same stipulations used in Alternatives 2-5).

## Difference in Stipulations From Existing Decisions to Revised Direction

New research has furthered knowledge about wildlife requirements, such as habitat needs for species survival (see the *Biological Assessment and Evaluation for Revised Land and Resource Management Plans*, December 2000). As a result, Timing Limitation (TL) stipulations for many wildlife species in the Revised Management Plans are different from those contained in previous oil and gas leasing analyses. For this analysis, wildlife restrictions have been reviewed for consistency between grassland units and justified using the latest available literature (see Appendix H of the Revised Management Plans). Local variations have been maintained.

Some who commented on the DEIS expressed concern that some of the CSU stipulations effectively prohibited surface occupancy. We acknowledge that some CSU stipulations in the DEIS effectively prohibited surface occupancy. In the Revised Management Plans, we changed those stipulations; some management activities which were protected by CSU stipulations in the DEIS are protected with NSO stipulations in the FEIS.

# Direct and Indirect Effects

## *Determination of Effects*

Effects from various aspects of the Revised Management Plans and associated leasing decisions are discussed in the following sections. This section outlines the methods used to determine the magnitude of the effects.

The standards and guides in the Revised Management Plans were converted into stipulations that would be applied to new leases. Locations of the various resources where the stipulations would apply were mapped and input into the computer. Management areas and Special Interest Areas were also mapped. Throughout this analysis, resource inventories have been updated (from those used in the DEIS) to include the latest available data. Because the stipulations developed for the FEIS represent the best management practices, a consistent set of stipulations was used in Alternatives 2-5. Alternatives 2-5 vary by areas allocated to various management prescriptions. Oil and gas stipulations in Alternative 1 reflect the current leasing decisions and forest/grassland plans. The analysis uses a consistent set of resource inventories across all alternatives.

Reasonable Foreseeable Development Scenarios (RFDS), which predicted the number of wells over the next 10 years, were developed or updated for areas where leasing decisions will be made. The RFDS are predicted based on geologic potential and predicted economic factors and are not limited by Forest Service or BLM management decision. The RFDS predict a number of wells that could be drilled (assuming the geologic and economic assumptions come true) if there were no BLM or Forest Service limitations on drilling. The RFDS predictions assume compliance with all other federal and state laws and regulations (e.g., Clean Air Act, Clean Water Act, State Spacing regulations, etc.).

The magnitude of the effects was determined using two methods. For the Thunder Basin National Grassland and Nebraska National Forest units, the number of acres was calculated with a constraint, either by stipulation or management area direction, put on oil and gas leasing. Based on the amount of constrained acres, the proportionate number of wells to be eliminated or affected was determined. For the Little Missouri and Cedar River National Grassland, theoretical well locations were predicted and mapped in the RFDS. The number of theoretical wells located in stipulated lands or in the various management areas where drilling would not be allowed was counted from the maps.

## *Effects by Leasing Decisions*

Decisions to make lands not administratively available for leasing or not to authorize lands for leasing precludes the exploration and the potential discovery of oil and gas resources and can make subsurface federal mineral estates unrecoverable. If drilling and production occurs on adjacent private lands, drainage of federal reserves may occur, resulting in lost federal revenues and associated reduced returns to counties and states. The opportunity to explore and produce on adjacent leased lands may also be affected by precluding exploration and production from reservoirs under unavailable lands. Designating lands as "not administratively available" in areas where a NSO stipulation could provide the same protection may be more restrictive than necessary.

The following table displays acres of land that would be made not available, and available but not currently authorized for leasing. The total acres include the entire federal mineral estate, whether or not the federal government owns the surface.[19] See the oil and gas alternative maps for spatial application of the leasing stipulations.

**Table 3-50. Available Acres and Not Currently Authorized Acres by Alternative**

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| **Little Missouri National Grassland** | | | | | | |
| Total Federal mineral estate | 980,320 | 980,320 | 980,320 | 980,320 | 980,320 | 980,320 |
| Acres not available for leasing | 24,940 | 24,940 | 24,940 | 46,590 | 24,940 | 24,940 |
| Acres available for leasing | 955,380 | 955,380 | 955,380 | 933,730 | 955,380 | 955,380 |
| Acres not currently authorized for leasing | 16,230 | 0 | 0 | 26,200 | 0 | 0 |
| Acres open to leasing | 939,150 | 955,380 | 955,380 | 907,530 | 955,380 | 955,380 |
| **Cedar River National Grassland** | | | | | | |
| Total Federal mineral estate | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| Acres available for leasing | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| Acres not currently authorized for leasing | 0 | 0 | 0 | 0 | 0 | 0 |
| Acres open to leasing | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| **Medicine Bow/Routt National Forest Unit** | | | | | | |
| **Thunder Basin National Grassland** | | | | | | |
| Total Federal mineral estate | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 |
| Acres available for leasing | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 |
| Acres not currently authorized for leasing | 0 | 0 | 0 | 246,850[20] | 0 | 0 |
| Acres open to leasing | 1,158,760 | 1,158,760 | 1,158,760 | 911,910 | 1,158,760 | 1,158,760 |
| **Nebraska National Forest Units** | | | | | | |
| **Buffalo Gap National Grassland** | | | | | | |
| Total Federal mineral estate | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 |
| Acres available for leasing | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 |

[19] There are areas where the federal government owns the mineral resource below ground but does not own the surface. For example, the Thunder Basin National Grassland shows twice as many acres available for leasing as there are Forest Service administered acres. The BLM is responisble for leasing decisions on federal minerals with non-federal surface.

[20] On the Thunder Basin National Grassland, the entire grassland is available for leasing. However, in Alternative FEIS 3, 246,850 acres are not currently authorized for leasinguntil the Powder River Coalbed Methane EIS is completed, approximately spring 2002.

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Buffalo Gap National Grassland, cont.** | | | | | | |
| Acres not currently authorized for leasing | 0 | 0 | 0 | 0 | 0 | 0 |
| Acres open to leasing | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 |
| **Oglala National Grassland** | | | | | | |
| Total Federal mineral estate | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 |
| Acres available for leasing | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 |
| Acres not currently authorized for leasing | 14,360 | 0 | 0 | 0 | 0 | 0 |
| Acres open to leasing | 76,160 | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 |

Alternatives FEIS 3 would have the most acres not administratively available for leasing (decision that lands are not available for leasing). Alternative 1 would have the most acres available but currently authorized, followed by Alternatives FEIS 3, DEIS 3, 4, and 5. In Alternative 2, all lands are administratively available and currently authorized for leasing.

## *Effects by Type of Stipulation*

Lease stipulations can restrict the placement, number, and type of wells and facilities; reduce exploration and development opportunities; and increase drilling and operational costs. Reasonably Foreseeable Development Scenarios (RFDS) were used to evaluate the effects of stipulations on oil and gas resources and to identify the number of wells that would be affected. "Affected" is defined as displacement of a proposed well location or having constraints imposed that increase the cost of drilling. Types of stipulations are discussed below (also, see Revised Management Plans, Appendix D- Oil and Gas Stipulations for more information).

### Standard Lease Terms

All leases are subject to Standard Lease Terms (SLT). These are the least restrictive types of leases potentially available for leasing. With the exceptions noted below, SLT permit year-round occupancy of leased lands. Therefore, unless there are additional special restrictions, they provide full access and the highest potential for discovery and development of oil and gas resources.

SLT require an operator to minimize adverse impacts to air, water, land, visual, cultural, and biological resources and to other land uses or users. They require that the lessee comply with all applicable laws, regulations, and formal orders. SLT increase the uncertainty of operating conditions because some restrictions may not be known until an application for a permit to drill is submitted and the site inspections are completed. If threatened and endangered plant and animal species or cultural resources are present, then development may not be possible for those portions of the lease. Known potential for these situations to exist are noted in Lease Notices attached to leases in potentially affected areas. Previously unknown threatened or endangered species and/or cultural resources may be identified during pre-drilling, on-site inspections. Effects to these resources can usually be mitigated but may substantially increase the operator's costs.

If potential negative effects to surface resources can be mitigated under the following SLT provisions (43 CFR 3101.1-2), then no additional stipulations are necessary:

- Exploration drill site may be moved 200 meters.
- Exploration operations may be delayed up to 60 days.

Leases issued with SLT only have the lowest level of restrictions and meet the Forest Service mineral policy direction to encourage development of mineral resources.

## Special Lease Stipulations

The following are special lease stipulations—provisions that modify standard lease rights and are attached to and made a part of a lease. Special stipulations provide greater protection for identified resources and greater mitigation of negative effects than SLT. The Rocky Mountain Regional Coordinating Committee, a joint Forest Service-BLM committee, developed guidelines for use of these stipulations in 1989. For additional information about the use of these stipulations, refer to *Uniform Format for Oil and Gas Lease Stipulations*, Final Recommendations Prepared by Rocky Mountain Regional Coordinating Committee, March 1989.

**Timing Limitation Stipulation (TL) (Seasonal Restriction)**: Prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the analysis demonstrates the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

The TL is used, when necessary, to restrict exploration activities on leased lands for a period of time greater than 60 days. TL provides partial accessibility for a portion of the year and maintains the potential for discovery and utilization of potential oil and gas resources. TL could increase exploration costs if the window available for drilling is too narrow. Use of TL meets Forest Service national mineral policy to encourage development of mineral resources.

TLs could increase exploration costs if a well is not completed within required time limits. Shutting a drilling operation down and leaving the equipment idle or moving the equipment to another site and moving it back increases costs. TLs may push operations into the winter, where activities on frozen ground or in frigid weather can also increase operator costs.

**Controlled Surface Use (CSU)**: Use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute for NSO or timing stipulations.

CSU stipulations are designed to identify standards operators must meet and to control drilling or production operating standards to mitigate potential adverse effects to surface resources. Such stipulations permit year-round occupancy and accessibility to leased lands. They maintain potential for discovery and utilization of oil and gas resources while providing mitigation of effects on other resources. Compliance with a CSU stipulation could increase the cost of oil and gas activities by requiring use of expensive technology to meet mitigation requirements. CSU stipulations meet Forest Service mineral policy direction to encourage development of mineral resources.

**No Surface Occupancy (NSO)**: Use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values.

Even though NSO stipulations prohibit surface occupation for exploration or development of oil and gas resources; the subsurface resources are legally available if they can be accessed by means other than occupying the surface specified in the NSO stipulation. Leasing an area with NSO, rather than declaring it "not administratively available" for leasing, may allow development through directional drilling, if adjacent lands are available for leasing with surface occupancy or are privately owned. Technology limits the distance a well's surface location can be placed from the downhole location, and in some areas, directional drilling is technically impossible. Directionally drilled wells are more costly and can produce less than straight-hole wells. While drilling and production may be more costly, leasing with NSO does offer exploration and development opportunities on lands where surface occupancy is prohibited. Leasing with NSO meets Forest Service minerals policy direction to encourage development of mineral resources.

**Lease Notice (LN):** Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee should consider when planning operations, but does not impose new or additional restrictions. Lease Notices attached to leases should not be confused with Notices to Lessees (NTL).

**Notices to Lessees (NTL):** The NTL is a written notice issued by the authorized officer. NTLs implement regulations and operating orders and serve as instructions on specific items of importance within a specified area.

## *Effects by Alternative*

The following table displays acres of land that would be made not available for leasing, available but not authorized, or that would be stipulated by alternative. The total acres include the entire federal mineral estate, whether not the federal government owns the surface.[21] See the oil and gas alternative maps for spatial application of the leasing stipulations.

[21] There are areas where the federal government owns the mineral resource below ground but does not own the surface. For example, Thunder Basin National Grassland shows twice as many acres available for leasing than there are Forest Service administered acres. BLM is responsible for leasing decisions on split estate lands.

**Table 3-51. Acres Stipulated by Alternative**

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| **Little Missouri National Grassland** | | | | | | |
| Federal mineral acres | 980,320 | 980,320 | 980,320 | 980,320 | 980,320 | 980,320 |
| Not available | 24,940 | 24,940 | 24,940 | 46,590 | 24,940 | 24,940 |
| Not currently authorized for leasing | 16,230 | 0 | 0 | 26,200 | 0 | 0 |
| Acres open for leasing | 939,150 | 955,380 | 955,380 | 907,530 | 955,380 | 955,380 |
| Acres open for leasing with stipulations. Because areas may have more than one type of stipulation, the total area with stipulations plus SLT may be larger than the area open for leasing. | | | | | | |
| No Surface Occupancy (NSO) | 209,520 | 185,600 | 281,860 | 204,380 | 298,610 | 237,960 |
| Controlled Surface Use (CSU) | 77,920 | 45230 | 129,110 | 159,230 | 220,650 | 317,490 |
| Timing Limitation (TL) | 133,630 | 185,650 | 170,720 | 202,990 | 176,040 | 176,610 |
| Standard Lease Terms (SLT) | 577,290 | 557,250 | 400,040 | 394,880 | 376,500 | 293,770 |
| **Cedar River National Grassland** | | | | | | |
| Acres open for leasing | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| Acres open for leasing with stipulations. | | | | | | |
| No Surface Occupancy (NSO) | 175 | 0 | 0 | 0 | 0 | 0 |
| Controlled Surface Use (CSU) | 0 | 0 | 0 | 0 | 0 | 0 |
| Standard Lease Terms (SLT) | 12,375 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| **Medicine Bow/Routt National Forest Unit** | | | | | | |
| **Thunder Basin National Grassland** | | | | | | |
| Federal mineral acres | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 | 1,158,760 |
| Not currently authorized for leasing | 0 | 0 | 0 | 246,850 | 0 | 0 |
| Acres open for leasing | 1,158,760 | 1,158,760 | 1,158,760 | 911,910 | 1,158,760 | 1,158,760 |
| Acres open for leasing with stipulations. Because areas may have more than one type of stipulation, the total area with stipulations plus SLT may be larger than the area open for leasing. | | | | | | |
| No Surface Occupancy (NSO) | 7,580 | 130,940 | 152,570 | 120,340 | 190,360 | 162,180 |
| Controlled Surface Use (CSU) | 106,470 | 92,580 | 144,540 | 143,810 | 112,240 | 182,970 |
| Paleontology CSU | 0 | 928,600 | 855,220 | 641,260 | 839,532 | 807,020 |
| Timing Limitation (TL) | 110,270 | 278,490 | 308,750 | 245,760 | 308,130 | 266,180 |
| Standard Lease Terms | 953,020 | 0 | 0 | 0 | 0 | 0 |
| **Nebraska National Forest Units** | | | | | | |
| **Buffalo Gap National Grassland** | | | | | | |
| Acres open for leasing | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 |
| Acres open for leasing with stipulations. Because areas may have more than one type of stipulation, the total area with stipulations plus SLT may be larger than the area open for leasing. | | | | | | |
| No Surface Occupancy (NSO) | 11,100 | 2,670 | 2,670 | 2,670 | 2,670 | 2,670 |
| Controlled Surface Use (CSU) | 9,120 | 6,360 | 45,440 | 45,440 | 6,130 | 41,850 |

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Buffalo Gap National Grassland, cont.** | | | | | | |
| Paleontology CSU | 145,230 | 147,300 | 108,230 | 108,230 | 147,520 | 111,800 |
| Timing Limitation (TL) | 1,150 | 26,060 | 26,070 | 26,070 | 26,060 | 26,060 |
| Standard Lease Terms | 0 | 0 | 0 | 0 | 0 | 0 |
| **Oglala National Grassland** | | | | | | |
| Federal mineral acres | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 |
| Not currently authorized for leasing | 14,360 | 0 | 0 | | 0 | 0 |
| Acres open for leasing | 76,160 | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 |
| Acres open for leasing with stipulations. Because areas may have more than one type of stipulation, the total area with stipulations plus SLT may be larger than the area open for leasing. | | | | | | |
| No Surface Occupancy (NSO) | 10,620 | 3,930 | 3,930 | 3,930 | 16,940 | 16,500 |
| Controlled Surface Use (CSU) | 320 | 1,260 | 2,010 | 2,920 | 2,000 | 31,190 |
| Paleontology CSU | 65,540 | 85,340 | 84,590 | 83,680 | 71,580 | 42,830 |
| Timing Limitation (TL) | 10,390 | 16,360 | 0 | 16,360 | 0 | 14,970 |
| Standard Lease Terms | 0 | 0 | 0 | 0 | 0 | 0 |

The following discussions primarily focus on the differences between the alternatives—how the amount of acres under NSO or available for leasing in each alternative affects the oil and gas resource. Although acres where a CSU would be applied vary by alternative, a CSU stipulation permits year-round occupancy on leased lands, offers access, and maintains the potential for discovery and development of oil and gas resources. Timing stipulations allow drilling at certain times of the year and thus maintain the potential for discovery and development of oil and gas resources.

In addition to the amount of acres stipulated, the shape of an area with an NSO stipulation affects the ability to access the subsurface resource from adjacent lands. In Alternatives 2-5, areas assigned a NSO stipulation generally tend to be larger blocks, whereas in Alternative 1, areas with NSO tend to be smaller units. Refer to the oil and gas alternative maps for further information.

## Dakota Prairie Grasslands

On the Little Missouri National Grassland, wells that would not be drilled or would be eliminated by restrictions and the number of wells that would be affected were identified for each alternative (see the following table).

"Affected" is defined as those wells that were projected in the RFD within ½-mile of the boundary inside of blocks of NSO. The area affected has been reduced from 1 mile in the DEIS to ½-mile in response to comments on the DEIS. Although it is technically feasible to directionally drill up to a mile, it is unlikely that it would be economically feasible to explore for oil and gas resources beyond ½-mile. Even for wells that would be displaced, the cost of drilling is greater, and the optimum location for best recovery of the resource is not realized. The effects may be considerable.

Wells projected in the RFDS in areas beyond ½-mile are considered "eliminated." Wells projected within "not administratively available" or "available but not authorized" areas were considered eliminated.

The RFDS for the Little Missouri National Grassland predicted as many as 660 new wells throughout the area on all ownerships over the next 10 years. Decisions to not leas lands and stipulations applied by the various alternatives could affect well locations and could, in some cases, eliminate wells.

**Table 3-52. Effects of Alternatives on Wells Based on the Reasonably Foreseeable Development Scenario for the Dakota Prairie Grasslands**

| | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Wells Affected** | | | | | | |
| Conventional | 64 | 63 | 98 | 63 | 104 | 78 |
| Coal bed methane | 0 | 0 | 0 | 0 | 0 | 0 |
| **Wells Eliminated** | | | | | | |
| Conventional | 13 | 14 | 21 | 26 | 36 | 18 |
| Coal bed methane | 0 | 0 | 0 | 0 | 3 | 0 |
| **Total** | 77 | 77 | 119 | 89 | 143 | 96 |

On the Dakota Prairie Grasslands, Alternative 4 would have the most wells eliminated and affected by the proposed stipulations, followed by Alternatives DEIS 3, 5, and FEIS 3. Alternatives 1 and 2 would have the fewest wells affected or eliminated by the stipulations.

## Thunder Basin National Grassland

The acres available for leasing are the same under all alternatives. Alternative 4 would have the most acres with NSO stipulations, followed by Alternatives 5, DEIS 3, 2, FEIS 3, and 1. Alternative 1 would be the only alternative with area under standard lease terms only. Projected activity levels (conventional oil and gas: 140-250 wells drilled, 100-150 productive) are not expected to change across alternatives. Most of the area has been leased within the past 2 to 4 years, and much of the projected activity is expected to have occurred by the time the current leases expire and the BLM has opportunity to issue new leases with different stipulations as described under the various alternatives.

In the RFDS, wells projected in areas beyond 1/8-mile are considered "eliminated." Wells projected within "not administratively available" or "available but not authorized" areas were considered eliminated.

The RFDS for the Thunder Basin National Grassland predicted as many as 230 new wells throughout the area on all ownerships over the next 10 years. Stipulations applied by the various alternatives could, in some cases, eliminate wells.

**Table 3-53. Effects of Alternatives on Wells Based on the Reasonably Foreseeable Development Scenario for the Thunder Basin National Grassland.**

| | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Wells Eliminated** | | | | | | |
| Conventional | 0 | 13 | 4 | 4 | 10 | 4 |
| Coal bed methane | Projection deferred | Projection deferred | Projection deferred | Projection deferred | Projection deferred | Projection deferred |
| **Total** | 0 | 13 | 4 | 4 | 10 | 4 |

On the Thunder Basin National Grassland, Alternative 2 would have the most wells eliminated by the proposed stipulations, followed by Alternatives 4, DEIS 3, FEIS 3, and 5. Alternatives 1 would have the fewest wells affected or eliminated by the stipulations.

### Nebraska National Forest Units

The acres available for leasing are the same under all alternatives. Alternative 1 is the only alternative with acres not currently authorized for leasing. Alternative 1 would have the most acres stipulated with NSO, followed by Alternatives 4, 5, DEIS 3, FEIS 3, and 2. Alternative 1 is the only alternative with any area with Standard Lease Terms only.

The RFDS for the Nebraska National Forest predicted as many as 85 new wells throughout the area on all ownerships over the next 10 years. The RFDS projects no impacts on the number of wells drilled by the stipulations applied in the various alternatives.

## *Effects from Management Area Prescriptions*

This discussion focuses on management areas that, by their own management direction, place limits on oil and gas activities. Some management areas are proposed as not available for leasing, available but not currently authorized for leasing, or have standards and guidelines more restrictive than standard lease terms. Standard lease terms apply to all leases, whether or not they have additional special stipulations. Some management areas with management direction that does not require use of an area-wide stipulation may still include leases with special stipulations designed to protect certain specified resources.

Some management areas contain provisions that require NSO stipulations over large blocks of land. The effects of these large blocks of NSO are potentially greater than spatially small areas of NSO because the interiors may be essentially inaccessible. Assessing the impacts is complicated by the existing leases and by leases held by production. A separate analysis of the effects of NSO is located in the Cumulative Effects section of this oil and gas analysis.

The following discussion describes restrictions placed on oil and gas development based on management area direction. For effects of the stipulations on the development of oil and gas resources for the protection of other resources, such as wildlife, refer to the Effects on Oil and Gas by Type of Stipulation section. See Table 3-60 at the end of this section for management area allocations by alternative.

## MA 1.2 Recommended for Wilderness - NSO

Oil and gas leasing is allowed, but no surface occupancy or use is permitted. This means the mineral estate may only be accessed from adjacent areas, and activities must maintain Wilderness qualities. Road construction for geophysical uses is prohibited. Portable techniques must be used.

Protecting areas recommended for Wilderness to maintain their consideration for Wilderness designation would impact oil and gas. Effects would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use (except in drainage situations). Twin Buttes and Long X Divide (Little Missouri National Grassland), are areas recommended for Wilderness in some alternatives and are currently not administratively available for leasing; therefore, a wilderness recommendation would not affect the current oil and gas availability.

**Table 3-54. Acres of Stipulations by Management Area by Alternative (Recommended for Wilderness[22])**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| 1.2 - NSO | 0 | 0 | 720 | 0 | 67,630 | 8,770 |
| **Thunder Basin National Grassland** | | | | | | |
| 1.2 - NSO | 0 | 0 | 14,450 | 0 | 60,270 | 0 |
| **Nebraska National Forest Units[23]** | | | | | | |
| 1.2 – NSO | 0 | 0 | 0 | 0 | 0 | 12,7700 |

Alternative 4 has the most acres allocated to this management area, followed by Alternatives 5 and DEIS 3. Alternatives 1, 2, and FEIS 3 have no acres allocated to MA 1.2 within the moderate to high oil and gas potential areas.

## MA 1.2A Suitable for Wilderness - NAA

On the Dakota Prairie Grasslands, MA 1.2A Suitable for Wilderness was developed in response to public comments on the DEIS. These areas are not available for oil and gas leasing. This means the mineral estate is not available, and activities must maintain Wilderness qualities. Road construction for geophysical uses is prohibited. Portable techniques must be used. Management Area 1.2A is considered in Alternative FEIS 3 only, on 40,370 acres.

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[22] These acres have moderate and high oil and gas potential and all federal mineral estate. The MA 1.2 areas on the Nebraska National Forest units with low oil and gas potential are not included in this table.

[23] Red Shirt and Indian Creek (Nebraska National Forest units) are allocated to MA 1.2 Recommended for Wilderness in Alternative FEIS 3. Both of these areas have low development potential and are not considered in the oil and gas analysis, which only assess high and moderate oil and gas potential.

The protection of areas suitable for Wilderness to maintain their Wilderness suitability would impact oil and gas. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the not-available acreage are developed, drainage of the oil and gas under the not-available area could occur, resulting in a loss of resource and associated royalties to the United States government.

## MA 1.31 Nonmotorized Backcountry Recreation - NSO

In MA 1.31 Nonmotorized Backcountry Recreation, oil and gas leasing is allowed, but no surface occupancy is permitted. This means the mineral estate may only be accessed from adjacent areas. Road construction for geophysical activities is prohibited, but off-road geophysical access is allowed. If this is not feasible, portable techniques must be used. Although Alternative 1 for the Little Missouri National Grassland allocates 42,780 acres to MA 1.31, the areas were handled differently in the Northern Little Missouri Oil and Gas leasing decision. Twin Butte and Long X Divide were made not administratively available for leasing. In Alternative 2, areas not administratively available for leasing would be leased with a NSO stipulation. In Alternatives DEIS 3, FEIS 3, 4, and 5, they would remain not administratively available for leasing.

**Table 3-55. Acres of Stipulations by Management Area by Alternative (Backcountry Recreation Nonmotorized)**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| 1.31 - NSO | 42,780 | 0 | 110,560 | 60,330 | 87,750 | 90,630 |
| **Thunder Basin National Grassland** | | | | | | |
| 1.31 - NSO | 0 | 0 | 6,520 | 6,520 | 4,020 | 22,010 |
| **Nebraska National Forest Units** | | | | | | |
| 1.31 – NSO | 0 | 980 | 980 | 980 | 70 | 980 |

On the Little Missouri National Grassland, Alternative DEIS 3 would have the most roadless acres assigned a NSO stipulation, not currently authorized for leasing decision, or not administratively available decision, followed by the existing leasing decisions. Alternatives 5, 4, and FEIS 3 would follow with the next highest number of acres in MA 1.31. On the Thunder Basin National Grassland, Alternative 5 would have the most acres assigned to MA 1.31, followed by Alternatives DEIS 3, FEIS 3, and 4. There are no acres allocated to MA 1.31 in Alternatives 1 and 2 on the Thunder Basin National Grassland. On the Oglala National Grassland, Alternative 2, DEIS 3, FEIS 3, and 5 would have about the same number of acres allocated to MA 1.31, followed by Alternative 4. There are no acres allocated to MA 1.31 in Alternative 1 on the Oglala National Grassland.

## MA 1.5 Wild River - NSO

Oil and gas leasing is allowed, but no surface occupancy or use is permitted. The mineral estate may only be accessed from adjacent areas, and activities must maintain Wild River characteristics. Road construction for geophysical uses is prohibited. Portable techniques must be used. Only Alternative 4 for the Little Missouri National Grassland would allocate 720 acres to this management area.

Protecting areas recommended for Wild Rivers to maintain their consideration for designation would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss is expected to be small because, for the most part, areas considered for Wild River designation are relatively small and easily accessible from adjacent land.

## MA 2.1 Special Interest Areas

### Archeological Special Interest Areas - NSO

On the Thunder Basin National Grassland, there are two Special Interest heritage areas (Cellars and Buffalo Divide Archeological Sites). Similarly, the Oglala National Grassland has two Special Interest heritage areas (Hudson-Meng Bison Bonebed and Warbonnet/Yellowhand). In these areas oil and gas leasing would be allowed with no surface occupancy or use permitted. The mineral estate may only be accessed from adjacent areas. Geophysical operations are prohibited on the Thunder Basin National Grassland and allowed on the Oglala National Grassland.

Where no surface occupancy is applied, protection of areas to maintain their special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur. The result would be a loss of resource and associated royalties to the United States government.

Although the Buffalo Divide Site is not allocated to MA 2.1 in Alternative 1, the oil and gas leasing decision applied a NSO stipulation to this area. On the Thunder Basin National Grassland, Alternatives 2, DEIS 3, FEIS 3, 4, and 5 have the most acres assigned this management area, followed by Alternative 1. The two sites on the Oglala National Grassland would not be leased in Alternative 1 (No Action) and in Alternatives 2, DEIS 3, FEIS 3, 4, and 5 would have the NSO stipulation applied.

**Botanical Special Interest Areas - NSO**

On the Little Missouri National Grassland, eight botanical areas (Aspen Stand, The Bog, Grand River Sand Dunes, Black Butte, Black Cottonwood, Riparian Pools, and Roundtop Butte Special Interest Areas) would be allocated to MA 2.1. In these areas, oil and gas leasing would be allowed with no surface occupancy or use permitted. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection of botanical areas to maintain their special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

The NSO stipulation is applied to the Botanical Special Interest area in all action alternatives. Even though Alternative 1 (No Action) does not have any acres allocated to MA 2.1, the existing Southern Little Missouri Oil and Gas decision applied the NSO stipulation to Black Butte, Black Cottonwood, and Roundtop Butte.

**Geological Special Interest Areas - CSU**

On the Little Missouri National Grassland, three geological areas (Bullion Creek Formation Type Section, Slope Formation Type Section, Cannonball/Slope Formation Outcrop) would be allocated to MA 2.1, with a Controlled Surface Use stipulation applied. Oil and gas leasing would be allowed; however, operations may be moved or modified to preserve certain geologic type sections for future scientific research, education, and interpretation. Access and other development and production-related facilities would be allowed under the conditions described in the stipulation.

**Table 3-56. Acres of Stipulations by Management Area by Alternative (Geological Special Interest Areas)**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| 2.1 - CSU | 0 | 800 | 800 | 800 | 660 | 630 |

Alternatives 2, DEIS 3, and FEIS 3 would have the most Geologic Special Interest acres with the CSU stipulation, followed by Alternatives 4 and 5. The existing Southern Little Missouri Oil and Gas decision, Alternative 1, allocated these same geological areas (800 acres) to candidate special interest areas protected with a CSU stipulation, but they were not allocated to Management Areas 2.1.

**Geological Special Interest Areas - NSO**

On the Little Missouri National Grassland, three geological areas (White Buttes, Burning Coal Vein/Columnar Juniper and Ice Caves) would be available for oil and gas leasing, however, no surface occupancy or use is allowed. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection of geologic areas to maintain their special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

The NSO stipulation is applied to the heritage Special Interest Area in all action alternatives. Alternative 1 (No Action) does not have any acres allocated to MA 2.1, but the existing Land and Resource Management Plan protected Ice Caves with a NSO so the effects are similar.

**Heritage Special Interest Areas - NSO**

On the Little Missouri National Grassland, three heritage Special Interest Areas (Battle of the Badlands, Custer Trail/Davis Creek, and Square Buttes) would be available for oil and gas leasing, however, no surface occupancy or use is allowed. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection of heritage areas to maintain their special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

The NSO stipulation is applied to the heritage special interest area in all action alternatives. Even though Alternative 1 (No Action) does not have any acres allocated to MA 2.1, the existing The Northern and Southern Little Missouri oil and gas leasing decisions applied NSO stipulations to known traditional cultural properties.

**Historic Rangeland Special Interest Areas – NSO**

Cow Creek Historic Rangeland Special Interest Area on the Thunder Basin National Grassland is available for oil and gas leasing, however, no surface occupancy or use is allowed. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used. The existing situation on Cow Creek Historic Rangeland is that it is largely leased, although, a portion of the area was leased with NSO stipulations. Valid existing rights will be honored; however, at the end of use,

new roads and facilities will be restored an/or removed to approximate pre-disturbance conditions.

As with other areas where no surface occupancy is applied, protection of Cow Creek Historic Rangeland Special Interest Area to maintain its special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the area, and if existing leases are developed, the impact of the NSO may be delayed until the existing leases expire. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

In Alternatives 4 and 5, Cow Creek Historic Rangelands is considered for Wilderness designation with a NSO stipulation, in Alternatives 1 and 2 it is allocated to General Rangeland with Range Vegetation Emphasis and with a combination of NSO and CSU stipulations. Alternative FEIS 3 has the greatest number of acres of Cow Creek allocated to MA 2.1 with a NSO stipulation. It is followed by Alternative DEIS 3.

**Paleontological Special Interest Areas - CSU**

The Lance Geologic area on the Thunder Basin National Grassland and Edgemont Shark Locality, Marietta South, One-Mile Hill and Wallace Ranch Localities on the Buffalo Gap National Grassland would be allocated to MA 2.1 with a CSU stipulation. Oil and gas leasing is allowed; however, operations may be moved or modified to avoid disturbance to significant fossil resources. Access and other development- and production-related facilities would be allowed but may be moved to protect fossil resources. Delays and additional costs could result if fossils are encountered and mitigation is required. The CSU stipulation is applied to the paleontological areas in all action alternatives.

**Paleontology, Geology Special Interest Area - NSO**

Toadstool Park Special Interest Area on the Oglala National Grassland is available for oil and gas leasing, however, no surface occupancy or use is permitted. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection of the area to maintain its special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

All action alternatives would allocate Toadstool Park to MA 2.1 with a NSO stipulation. The area would not be leased under Alternative 1.

### Zoological Special Interest Areas - CSU

The Cheyenne Zoological area on Thunder Basin National Grassland would be allocated to MA 2.1 with a CSU stipulation. Oil and gas leasing is allowed; however, operations may be moved or modified if it is determined that the proposed action will have adverse effects on black-footed ferret reintroduction objectives. Access and other development- and production-related facilities would be allowed but may be moved to protect black-footed ferret habitat (prairie dog towns). Delays and additional costs could result where activities are proposed in prairie dog towns. Monitoring by a biologist may increase operator costs. The CSU stipulation is applied to the Zoological Special Interest area in all action alternatives.

## MA 2.2 Research Natural Areas- NSO

The areas potentially affected by this stipulation include Two Top-Big Top, Limber Pine, Bear Den-Bur Oak, Cottonwood Creek Badlands, Little Missouri River, Mike's Creek, Ponderosa Pines, and Bullion Butte 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. Oil and gas leasing is allowed; however, no surface occupancy or use is permitted. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection to maintain research natural area values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government. The following table displays, by alternative, the acreage nominated for RNA designation.

**Table 3-57. Acres of Stipulations by Alternative (Nominated Research Natural Areas)**

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| 2.2 - NSO | 140 | 780 | 16,740 | 17,030 | 20,180 | 780 |
| **Thunder Basin National Grassland** | | | | | | |
| 2.2 – NSO | 0 | 0 | 1,210 | 1,210 | 1,940 | 0 |
| **Nebraska National Forest Units** | | | | | | |
| 2.2 - NSO | 0 | 0 | 0 | 0 | 940 | 0 |

Alternative 4 would have the most acres allocated to Research Natural Areas, followed by Alternatives FEIS 3, DEIS 3, 5, 2, and 1. On the Little Missouri National Grassland, the two existing Research Natural Areas (Two Top-Big Top and Limber Pine) are the only areas stipulated with NSO in Alternative 1.

## MA 2.4 American Indian Traditional Use Area - NAA

This management area includes the Blue Buttes on the Little Missouri National Grassland. This area is not available for oil and gas leasing in all alternatives. This means the mineral estate is not available, and activities must maintain the traditional qualities of the area. Road construction for geophysical uses is prohibited. Portable techniques must be used. Timing restrictions may apply to geophysical activities.

Protecting an American Indian traditional use area would result in impacts to oil and gas. The magnitude of the loss would depend on the resources available in the area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the not available acreage are developed, drainage of the oil and gas under the not available area could occur, resulting in a loss of resource and associated royalties to the United States government.

## MA 3.51 Bighorn sheep – NSO and MA 3.51A Bighorn Sheep -- NCA

These management areas apply only to the Little Missouri National Grassland. Both MA 3.51 and MA 3.51A are available for leasing. MA 3.51 is available but no ground-disturbing activities area permitted. MA 3.51A is available, but the decision is to not lease until development on an adjacent spacing unit or adjacent non-federal mineral estate occurs. At that time, adjacent federal minerals may be leased using Controlled Surface Use stipulations if no additional significant adverse impact to bighorn sheep would occur.

Oil and gas leasing would be allowed, but no surface occupancy or use would be permitted. The mineral estate may only be accessed from adjacent areas. In some areas, this could be difficult because of the size of some of these management areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

Protection to maintain bighorn sheep range would result in impacts to oil and gas ranging from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the bighorn sheep range are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government. When areas adjacent to MA 3.51A are developed, the federal mineral in MA 3.51A would be leased to minimize losses to drainage. The following table displays the acres of bighorn sheep range designation by alternative.

**Table 3-58. Acres of Stipulations by Management Area by Alternative (Bighorn Sheep Range)**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| 3.51 - NSO | 42,780 | 103,440 | 57,269 | 49,860 | 107,750 | 103,400 |
| 3.51A - NCA[24] | 0 | 0 | 0 | 26,200 | 0 | 0 |

[24] MA 3.51A is administratively available but is not currently authorized for leasing of federal minerals. Once development on an adjacent spacing unit or adjacent non-federal mineral estate occurs, the adjacent federal minerals may be leased using Controlled Surface Use stipulations.

Alternative 4 would have the most acres of bighorn sheep range, followed by Alternatives 2, 5, FEIS 3, DEIS 3, and 1.

## MA 3.63 Black-footed Ferret Reintroduction Habitat – CSU

Except for a portion of MA 3.63 on the Little Missouri National Grasslands which has a no new roads constraint, oil and gas leasing is allowed in this management area, subject to operational constraints to preserve black-footed ferret habitat, prairie dog towns[25] (see the Revised Management Plans, Appendix D, Oil and Gas Stipulations). Access and other development- and production-related facilities would be allowed but may be moved to protect black-footed ferret habitat. Delays and additional costs could result where activities are proposed in prairie dog towns. Monitoring may increase operator costs.

**Table 3-59. Acres of Stipulations by Management Area by Alternative (Black-footed Ferret Reintroduction Habitat)**

| Management Area | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| 3.63 - CSU | 0 | 0 | 0 | 28,800 | 27,540 | 0 |
| 3.63 - NSO[26] | 0 | 0 | 0 | 5,510 | 0 | 0 |
| **Thunder Basin National Grassland** | | | | | | |
| 3.63 – CSU | 0 | 36,960 | 50,140 | 50,140 | 125,580 | 38,190 |

Alternative 4, has the most acres allocated to this management area followed by Alternative FEIS 3, DEIS 3, 5, and 2. Alternative 1 has no acres allocated to this management area.

## MA 3.63 Black-footed Ferret Reintroduction Habitat –NSO

Alternative 3 is the only alternative to apply NSO to any MA 3.63 acres. On the Little Missouri National Grasslands, portions of MA 3.63 within an area where new roads are prohibited are available for leasing, but no surface occupancy or use is permitted. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection of the area to maintain its roadless values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

[25] It is important to note that occupied black-footed ferret habitat is protected with a timing limitation stipulation (from March 1 to August 31 within 1/8 mile). See Effects of Fish and Wildlife Management.

[26] A portion of the black-footed ferret Management Area 3.63 on the McKenzie District also lies within an area of no new road construction and carries a NSO stipulation.

## MA 4.22 River and Travel Management Corridors --NSO

On the Little Missouri National Grasslands, MA 4.22 River and Travel Corridor is within ¼-mile on each side of the Little Missouri River. Within the Little Missouri River and Travel Corridor, the lands are available for oil and gas leasing; however, no surface occupancy or use is permitted. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protecting the area to maintain its natural appearing landscape for river and travel corridor values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss is expected to be small because, for the most part, areas considered for river and travel corridor designation are relatively small in area and easily accessible from adjacent land.

## Management Area Acres Affecting Oil and Gas

Unit plans prepared in the 1970s designated many of these same areas as low development areas. These designations were carried forward into the subsequent Land and Resource Management Plans and oil and gas leasing decisions. There is high interest and high potential for oil and gas development in many of these areas; however, the prior designations as a low development area resulted in a lack of exploration in the areas. The table below displays the acres stipulated by the various management areas by alternative.

**Table 3-60. Acres of Stipulations by Management Area by Alternative**

| Planning Unit | Alt 1[27] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| **Little Missouri National Grassland** | | | | | | |
| **Management Area** | | | | | | |
| 1.2 - NSO | 0 | 0 | 720 | 0 | 67,630 | 8,770 |
| 1.2A - NAA | 0 | 0 | 0 | 40,370 | 0 | 0 |
| MAJ-Low Development-NAA | 17,400 | 0 | 0 | 0 | 0 | 0 |
| MAJ-Low Development-NCA | 14,260 | 0 | 0 | 0 | 0 | 0 |
| 1.31- NSO | 42,780 | 0 | 110,560 | 60,330 | 87,750 | 90,630 |
| 1.5 - NSO | 0 | 0 | 0 | 0 | 720 | 0 |
| 2.1 - CSU | 0 | 800 | 800 | 800 | 660 | 630 |
| 2.1 - NSO | 0 | 700 | 8,630 | 4,720 | 4,470 | 3,490 |
| 2.2 - NSO | 140 | 780 | 16,740 | 17,030 | 20,180 | 780 |
| MA K and 2.4 - NAA | 6,740 | 6,130 | 6,130 | 6,130 | 6,130 | 6,130 |
| 3.51 - NSO | 40,030 | 103,440 | 57,270 | 49,860 | 107,750 | 103,400 |
| 3.51A - NCA | 0 | 0 | 0 | 26,200 | 0 | 0 |
| MAC–Wildlife Emphasis-NAA | 770 | 0 | 0 | 0 | 0 | 0 |

[27] Additional stipulations apply to unroaded areas that are not associated with management areas in this alternative. See the MA 1.31 discussion.

| Planning Unit | Alt 1[27] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Little Missouri National Grassland, cont.** | | | | | | |
| MAC–Wildlife Emphasis-NCA | 1980 | 0 | 0 | 0 | 0 | 0 |
| 3.63 - NSO[28] | 0 | 0 | 0 | 5,510 | 0 | 0 |
| 3.63 - CSU | 0 | 0 | 0 | 28,800 | 27,540 | 0 |
| 4.22 - NSO | 0[29] | 0 | 22,110 | 23,060 | 0 | 0 |
| **Medicine Bow-Routt National Forest Unit Thunder Basin National Grassland Management Area** | | | | | | |
| 1.2 - NSO | 0 | 0 | 14,450 | 0 | 60,270 | 0 |
| 1.31- NSO | 0 | 0 | 6,520 | 6,520 | 4,020 | 22,010 |
| 2.1 – CSU | 0 | 5,900 | 6,170 | 6,170 | 5,900 | 5,110 |
| 2.1 – NSO | 0 | 1,570 | 5,020 | 19,510 | 1,580 | 1,460 |
| 2.2 – NSO | 0 | 0 | 1,210 | 1,210 | 1,940 | 0 |
| 3.63 – CSU | 0 | 36,960 | 50,140 | 50,140 | 125,580 | 38,190 |
| 3.63 - TL | 0 | 39,580 | 55,020 | 55,020 | 137,460 | 41,240 |
| 3.68 – TL | 4,270 | 0 | 34,210 | 34,210 | 0 | 0 |
| **Nebraska National Forest Units Buffalo Gap National Grassland Management Area** | | | | | | |
| 2.1 – CSU | 0 | 0 | 1,840 | 1,840 | 1,860 | 1,860 |
| 2.1 - NSO | 0 | 0 | 10 | 10 | 10 | 10 |
| **Oglala National Grassland Management Area** | | | | | | |
| 1.2 – NSO | 0 | 0 | 0 | 0 | 0 | 12,7700 |
| 1.31 – NSO | 0 | 980 | 980 | 980 | 70 | 980 |
| 2.1 – NSO | 0 | 990 | 990 | 990 | 80 | 990 |
| 2.1 - CSU | 0 | 1,833 | 1,833 | 2,737 | 1,833 | 1,833 |
| 2.2 - NSO | 0 | 0 | 0 | 0 | 940 | 0 |

[28] A portion of the black-footed ferret Management Area 3.63 on the McKenzie District also lies within an area of no new road construction and carries a NSO stipulation.

[29] The River and Travel Corridor designation applies only to Alternatives DEIS 3 and FEIS 3; however, it should be recognized that 5,440 acres along the Little Missouri river bottom are protected by NSO in existing leasing decisions.

## *Effects by Major Resource Programs*

This section discusses how the mineral resource is affected by the proposed standards and guidelines developed for other resources. Stipulations are to be part of a lease only when the environmental and planning record demonstrates the necessity for the stipulations. Land use plans serve as the primary vehicle for determining the necessity for lease stipulations (BLM Manual 1624). Stipulations, which would be applied to new oil and gas leases issued during implementation of the Revised Management Plans, were developed based on standards and guidelines for other resources and activities.

In the following tables, the acres shown with the various stipulations include the entire federal mineral estate (there are areas where the federal government owns the mineral resource below ground but does not own the surface).

### Effects from Air

None of the standards and guidelines developed for air quality requires oil and gas stipulations. Mineral activities do generate emissions; however, these are regulated by the states and no further standards and guidelines are required. In areas of high emissions, the states may require gases to be contained or piped.

Hazardous gases such as hydrogen sulfide are produced from some oil and gas fields. Strict emission controls are enforced in these areas.

### Effects from Fire and Fuels Management

Heavy equipment use during fire suppression activities could affect buried pipelines; however this is addressed in the proposed Revised Management Plans and requires consultation with appropriate resource specialists for guidance. No stipulations are required.

### Effects from Fish and Wildlife Management

Stipulations by type applied for wildlife protection by management unit are displayed in the following table (see the Revised Management Plans, Appendix D for the stipulations).

**Table 3-61. Wildlife Stipulations by Management Unit**

| Species | DEIS all Units | Dakota Prairie Grasslands | Thunder Basin National Grassland | Nebraska National Forest Units |
|---|---|---|---|---|
| Bald eagle nest | TL | NSO | NSO | NSO |
| Bald eagle roost | TL | NSO | NSO | NSO |
| Bighorn sheep | CSU | NSO, CSU and TL | | |
| Big game range (deer, elk and pronghorn) | | | TL | |
| Black-footed ferret | | CSU and TL | CSU and TL | CSU and TL |
| Burrowing owl | TL | NSO | NSO | NSO |
| Ferruginous hawk | CSU and TL | NSO | NSO and TL | NSO and TL |
| Golden eagle | CSU | NSO | NSO and TL | NSO and TL |

| Species | DEIS all Units | Dakota Prairie Grasslands | Thunder Basin National Grassland | Nebraska National Forest Units |
|---|---|---|---|---|
| Goshawk | CSU | | | |
| Merlin | TL | NSO | NSO and TL | NSO and TL |
| Mountain plover | TL | | NSO, CSU and TL | NSO, CSU and TL |
| Peregrine falcon | | NSO | | |
| Prairie falcon | CSU | NSO | | |
| Pronghorn antelope | | TL | | |
| Sage grouse | CSU and TL | NSO and TL | NSO and TL | NSO and TL |
| Sharp-tailed grouse | CSU and TL | NSO and TL | NSO and TL | NSO and TL |
| Swainson's hawk | CSU | | NSO and TL | NSO and TL |
| Swift fox | TL | TL | TL | TL |

See the following table for the dates of the TL stipulations and the acreages affected under each alternative. Also see discussion below for effects from these two types of stipulations. Briefly, TLs restrict drilling activities during critical periods, such as breeding and nesting periods, and usually extend over a specific distance from the site if activities could cause an adverse effect. They also apply to nests or roost sites determined to be active within the previous seven years.

Normally, timing limitations apply to drilling, testing, and new construction phase of oil and gas development and not to operation and maintenance of production facilities. However, on the Thunder Basin, Oglala, and Buffalo Gap National Grasslands, timing limitations have been extended to workover operations for the following species: golden eagle, merlin, Swainson's hawk, ferruginous hawk, sage grouse, sharp-tailed grouse, and mountain plover. The objective is to prevent nest abandonment and reduced reproductive success. The effect will be that workover operations will have to be conducted outside the period of timing limitation. This does not apply to emergency repairs.

The CSU stipulation usually restricts drilling and other activities within a specified distance from the area requiring protection and is applied if activities would likely result in degradation of habitat, abandonment, disruption, or other failure (see the following table for the species and acreages affected by this stipulation).

**Table 3-62. Acres with Stipulations for Wildlife Species**

| Species Stipulated | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairies Grasslands** | | | | | | |
| **Bald eagle nest** | | | | | | |
| NSO[30] | 0 | 0 | 0 | 0 | 0 | 0 |
| **Bighorn sheep** | | | | | | |
| TL 4/1-6/15 | 0 | 15,120 | 15,120 | 13,970 | 13,560 | 7,630 |
| CSU | 0 | 15,120 | 15,120 | 13,970 | 13,560 | 7,650 |
| NSO MA 3.51 | 42,780 | 103,440 | 57,269 | 49,860 | 107,750 | 103,400 |
| NCA /CSU MA 3.51a | 0 | 0 | 0 | 26,200 | 0 | 0 |
| **Black-Footed Ferret** | | | | | | |
| TL 3/1-7/31 | 0 | 0 | 0 | 30,700 | 29,720 | 0 |
| CSU | 0 | 0 | 0 | 28,800 | 27,540 | 0 |
| NSO | 1,510 | 0 | 0 | 0 | 0 | 0 |
| **Burrowing owl** | | | | | | |
| NSO | 0 | 2,950 | 2,950 | 2,830 | 2,950 | 2,950 |
| **Ferruginous hawk** | | | | | | |
| NSO | 360 | 1,630 | 1,630 | 1,630 | 1,630 | 1,630 |
| TL 3/1-7/31 | 890 | 0 | 0 | 0 | 0 | 0 |
| TL 3/15-7/20 | 380 | 0 | 0 | 0 | 0 | 0 |
| **Golden eagle** | | | | | | |
| NSO | 13,370 | 47,340 | 47,340 | 46,470 | 47,340 | 47,340 |
| TL 2/15-7/15 | 33,970 | 0 | 0 | 0 | 0 | 0 |
| **Merlin** | | | | | | |
| TL 3/15-7/15 | 0 | 0 | 0 | 0 | 0 | 0 |
| NSO | 0 | 1,270 | 1,270 | 1,270 | 1,270 | 1,270 |
| **Prairie falcon** | | | | | | |
| NSO | 4,440 | 4,450 | 4,450 | 4,250 | 4,450 | 4,450 |
| TL 3/15-7/20 | 10,860 | 0 | 0 | 0 | 0 | 0 |
| **Pronghorn Antelope** | | | | | | |
| TL: 1/1-3/31 | 30,170 | 0 | 0 | 25,160 | 0 | 0 |

[30] Although there are no inventoried bald eagle nests on the Dakota Prairie Grasslands, bald eagle have been observed and historic nesting has been recorded. The NSO stipulation will apply if a bald eagle nest is identified.

| Species Stipulated | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Sage grouse** | | | | | | |
| NSO | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| TL 3/1-6/15 | 50,340 | 51,460 | 51,460 | 51,460 | 51,460 | 51,460 |
| **Sharp-tailed grouse** | | | | | | |
| NSO | 380 | 16,160 | 16,160 | 16,150 | 16,160 | 16,160 |
| TL 3/1-4/15nlmg | 10,730 | 0 | 0 | 0 | 0 | 0 |
| TL 3/1-6/15slmg | 5,050 | 161.730 | 161.730 | 161,260 | 161.730 | 161.730 |
| **Thunder Basin National Grassland** | | | | | | |
| **Bald eagle nest** | | | | | | |
| CSU | 920 | 0 | 0 | 0 | 0 | 0 |
| TL 2/1-7/31 | 4,300 | 0 | 0 | 0 | 0 | 0 |
| NSO | 0 | 4,390 | 3,090 | 4,390 | 4,390 | 4,390 |
| **Bald eagle roost** | | | | | | |
| TL 11/15-2/29 | 7,420 | 0 | 0 | 0 | 0 | 0 |
| NSO | 0 | 7,330 | 7,330 | 7,330 | 7,330 | 7,330 |
| **Big Game Range MA 3.68** | | | | | | |
| TL 12/1-4/30 (winter) | 20,366 | 0 | 0 | 0 | 0 | 0 |
| TL 12/15-3/15 (winter) | 0 | 0 | 20,366 | 20,366 | 0 | 0 |
| TL 5/1-6/31 (elk calving) | 0 | 0 | 22,740 | 22,740 | 0 | 0 |
| **Black-footed Ferret** | | | | | | |
| TL 3/1-8/31 | 0 | 39,580 | 55,020 | 55,020 | 137,420 | 41,240 |
| CSU[31] | 0 | 0 | 0 | 0 | 0 | 0 |
| CSU MA 2.1 | 0 | 0 | 5,980 | 5,980 | 5,980 | 0 |
| CSU MA 3.63 | 0 | 36,960 | 49,040 | 49,040 | 131,440 | 38,190 |
| **Burrowing owl** | | | | | | |
| NSO | 0 | 18,080 | 18,080 | 18,080 | 18,080 | 18,080 |
| **Ferruginous hawk** | | | | | | |
| NSO | 0 | 13,630 | 13,630 | 13,630 | 13,630 | 13,630 |
| CSU | 2,580 | 0 | 0 | 0 | 0 | 0 |
| TL 3/1-7/31 | 38,460 | 35,590 | 35,590 | 35,590 | 35,590 | 35,590 |
| **Golden eagle** | | | | | | |
| NSO | 0 | 13,320 | 13,320 | 13,320 | 13,320 | 13,320 |
| CSU | 1,000 | 0 | 0 | 0 | 0 | 0 |

[31] The black-footed ferret CSU stipulation applies only to occupied habitat and at present there are no black-footed ferrets on the Thunder Basin National Grassland.

| Species Stipulated | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| TL 2/1-7/31 | 18,030 | 35,740 | 35,740 | 35,740 | 35,740 | 35,740 |
| **Merlin** | | | | | | |
| NSO | 0 | 250 | 250 | 250 | 250 | 250 |
| TL 3/15-7/15 | 0 | 750 | 750 | 750 | 750 | 750 |
| **Mountain plover[32]** | | | | | | |
| TL 3/1-7/31 | 44,850 | 27,600 | 27,600 | 27,600 | 27,600 | 27,600 |
| NSO | 0 | 17,250 | 17,250 | 17,250 | 17,250 | 17,250 |
| CSU | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sage grouse** | | | | | | |
| NSO | 0 | 6,610 | 6,610 | 6,610 | 6,610 | 6,610 |
| CSU | 6,600 | 0 | 0 | 0 | 0 | 0 |
| TL 3/15-7/31 | 0 | 210,130 | 210,130 | 210,130 | 210,130 | 210,130 |
| **Sharp-tailed grouse** | | | | | | |
| NSO | 0 | 200 | 200 | 200 | 200 | 200 |
| CSU | 200 | 0 | 0 | 0 | 0 | 0 |
| TL 3/1-6/15 | 0 | 2,310 | 2,310 | 2,310 | 2,310 | 2,310 |
| **Swainson's hawk** | | | | | | |
| NSO | 0 | 1,970 | 690 | 1,970 | 1,970 | 1,970 |
| CSU | 130 | 0 | 0 | 0 | 0 | 0 |
| TL 3/1-7/31 | 1,970 | 0 | 0 | 0 | 0 | 0 |
| TL 3/7-7/31 | 0 | 4,870 | 1,640 | 4,870 | 4,870 | 4,870 |
| **Swift fox[33]** | | | | | | |
| TL | 0 | 0 | 0 | 0 | 0 | 0 |

[32] Mountain plover habitat has been identified on the Thunder Basin National Grassland, but the data is insufficient to distinguish nest aggregation areas, to which NSO is applied, from foraging areas, to which CSU is applied. For the purpose of this analysis all identified mountain plover habitat was stipulated with a NSO stipulation, the most conservetive measure, because listing this species as endangered is expected soon.

[33] Swift fox are know to exist on Thunder Basin National Grassland but den sites have not been surveyed or documented. Identified swift fox dens will be protected with the TL stipulation.

| Species Stipulated | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Nebraska National Forest Units** | | | | | | |
| **Bald eagle nest** | | | | | | |
| NSO | 0 | 130 | 130 | 130 | 130 | 130 |
| **Bald eagle roosts**[34] | | | | | | |
| NSO | 0 | 0 | 0 | 0 | 0 | 0 |
| **Black-footed ferret**[35] | | | | | | |
| CSU and TL | 0 | 0 | 0 | 0 | 0 | 0 |
| **Burrowing owl** | | | | | | |
| NSO | 0 | 870 | 870 | 870 | 870 | 3,590 |
| **Ferruginous hawk** | | | | | | |
| NSO | 490 | 490 | 490 | 490 | 490 | 490 |
| TL 3/1-7/31 | 1,260 | 1,260 | 1,260 | 1,260 | 1,260 | 1,260 |
| **Golden eagle** | | | | | | |
| NSO | 130 | 270 | 270 | 270 | 270 | 270 |
| TL 2/1-7/31 | 710 | 710 | 710 | 710 | 710 | 710 |
| **Merlin**[36] | | | | | | |
| NSO and TL 3/15-7/15 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Mountain Plover**[37] | | | | | | |
| NSO, CSU and TL 3/1-7/31 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sage grouse** | | | | | | |
| NSO | 20 | 20 | 20 | 20 | 20 | 20 |
| TL 3/1-6/15 | 660 | 4,350 | 4,350 | 4,350 | 4,350 | 4,350 |
| **Sharp-tailed grouse** | | | | | | |
| NSO | 3,590 | 3,590 | 3,590 | 3,590 | 3,590 | 3,590 |

[34] Although bald eagle are known to be on the Oglala and Buffalo Gap National Grasslands, no roosts have been identified. The NSO stipulation will be applied if a roost is identified.

[35] Black-footed ferret have been successfully reintroduced on the Buffalo Gap National Grassland; however, there are no known black-footed ferret populations in the area analyzed for oil and gas (moderate to high oil and gas potential). The black-footed ferret stipulations apply to habitat known to be occupied.

[36] Merlin and their young have been observed in the vicinity of the Oglala and Buffalo Gap National Grasslands; however, a nest has yet to be identified. The NSO and TL stipulations will be applied if a nest is identified.

[37] Although mountain plover have not been observed on the Oglala and Buffalo Gap National Grasslands, these grasslands are within the historic range of mountain plover. These stipulations would be applied if mountain plover nests or nest aggregation areas are identified.

| Species Stipulated | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| TL 3/1-6/15 | 37,500 | 37,500 | 37,500 | 37,500 | 37,500 | 37,500 |
| **Nebraska National Forest Units, cont.** | | | | | | |
| **Swainson's hawk** | | | | | | |
| NSO | 0 | 610 | 610 | 610 | 610 | 610 |
| TL 3/1-7/31 | 810 | 1980 | 1980 | 1980 | 1980 | 1980 |
| **Swift Fox** | | | | | | |
| TL 3/1-7/31 | 0 | 380 | 380 | 380 | 380 | 380 |

## Effects from Heritage Resource Management

On the Little Missouri National Grasslands, National Register eligible heritage sites are available for oil and gas leasing, but no surface occupancy or use is permitted. The mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

Where no surface occupancy is applied, protection of areas to maintain their special values would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss is expected to be small because, for the most part, heritage areas are relatively small in area and easily accessible from adjacent land.

An NSO stipulation is applied to 540 acres (federal mineral estate) of National Register eligible heritage sites on the Little Missouri National Grasslands in all alternatives. Additional heritage, archeological, and historic resources are allocated to Management Areas 2.1 and 2.4, and alternative discussions are located under those management areas above.

## Effects from Land Adjustment

Land ownership standards and guidelines do not require any lease stipulations. Land adjustments may have implications for ownership and management of the mineral estate, which are considered at the time a specific adjustment is proposed. The Federal Land Policy and Management Act of 1976 requires an equalization of land values, which includes its mineral value, when doing adjustments (exchanges, disposal, acquisitions).

## Effects from Paleontology Management

On the Thunder Basin, Oglala, and Buffalo Gap National Grasslands, this CSU stipulation requires a predevelopment literature search and a site-specific inventory by a Forest Service Paleontologist (as described in Appendix J of the Revised Management Plans). Oil and gas leasing is allowed subject to operational constraints to preserve vertebrate paleontological resources (see the Revised Management Plans, Appendix D, Oil and Gas Stipulations). Access and other development and production related facilities would be allowed but may be moved or modified to preserve paleontological resources. Delays and mitigation could increase operator costs. The following table shows the acreage where this stipulation would apply.

On the Dakota Prairie Grasslands, paleontological resources are protected with a lease notice (LN) rather than a stipulation. This lease notice requires a predevelopment literature search and a site-specific inventory by a Forest Service Paleontologist prior to ground-disturbing activities. Oil and gas leasing is allowed in this management area subject to operational constraints to preserve vertebrate paleontological resources (see the Revised Management Plans, Appendix D, Oil and Gas Stipulations). Access and other development- and production-related facilities would be allowed but may be moved or modified (within the constraints of standard lease terms) to preserve paleontological resources. Delays and mitigation could increase operator costs. The following table shows the acreage where this lease notice would apply.

**Table 3-63. Acreage with Paleontology Resource Stipulation (CSU) and Lease Notice (LN) by Alternative**

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| Little Missouri National Grassland (LN) | 729,630 | 769,780 | 673,520 | 703,150 | 656,770 | 717,420 |
| Cedar River National Grassland (LN) | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| **Medicine Bow-Routt National Forest Unit** | | | | | | |
| Thunder Basin National Grassland (CSU) | 0 | 928,600 | 855,220 | 641,260 | 839,532 | 807,020 |
| **Nebraska National Forest Units** | | | | | | |
| Buffalo Gap National Grassland (CSU) | 145,230 | 147,300 | 108,230 | 108,230 | 147,520 | 111,800 |
| Oglala National Grassland (CSU) | 65,540 | 85,340 | 84,590 | 83,680 | 71,580 | 42,830 |

Alternative 4 would have the greatest number of acres affected by the paleontological stipulation, followed by Alternatives 5, DEIS 3, FEIS 3, 2, and 1. On the Dakota Prairie Grasslands, a paleontological lease notice, rather than a stipulation, will be used in all alternatives.

## Effects from Plant and Animal Damage Control

Standards and guidelines for plant and animal damage control do not require any stipulations for oil and gas activities. Occupancy and use for minerals purposes are not restricted by management activities regarding noxious and undesirable plant species. Non-native and invasive plant species, noxious weed, insect, and animal damage management requirements may add to projects and operation costs. These constraints are normally applied at the site-specific stage of development (when an Application for Permit to Drill is approved).

## Effects from Range Management and Livestock Grazing

Standards and guidelines for range management and livestock grazing do not require any stipulations for oil and gas activities. Occupancy and use for minerals purposes are not restricted by range and livestock management activities. Certain grazing activities, such as

grazing on mineral sites that are being reclaimed, are addressed in site-specific management requirements at the Application for Permit to Drill stage of development.

### Effects from Recreation Management and Use

Standards and guidelines allow oil and gas leasing of developed recreation sites but surface occupancy and use by oil and gas is prohibited. On the Little Missouri National Grasslands, a timing limitation prohibits surface use from May 1 through December 1within ¼-miles of the following established boundaries:

- Burning Coal Vein.
- Buffalo Gap.
- Sather Lake.
- CCC.
- Campgrounds and Summit.
- White tail Picnic Areas.
- Maa Daa Hey Trail overnight camps: Wannagan, Roosevelt, Elkhorn, Magpie, Beicegel, and Bennett.

For the Thunder Basin National Grassland, a CSU stipulation limiting noise levels adjacent Weston, Upton, Kellog, and Upton Bass reservoirs was brought forward from Alternative 1 and included in the action alternatives. In Alternative FEIS 3, the CSU limitation on noise was extended to Turner and East Iron Creek reservoir, also on the Thunder Basin National Grassland.

On the Oglala National Grassland, Toadstool Park campground is the only campground within the high-to-moderate mineral potential area analyzed in this analysis. It is protected with an NSO stipulation as part of Toadstool Special Interest Area which is analyzed under MA 2.1. In the Little Missouri RFDS, there were no projected wells in areas affected by the NSO stipulation. See the following table for acres where these stipulations would be applied.

**Table 3-64. Acreage with Recreation Stipulations by Alternative**

| Planning Unit | Recreation | Alt 1 | Alt 2-5 | FEIS Alt 3 |
|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | |
| Little Missouri National Grassland | NSO | 460 | 560 | 570 |
| | CSU | 1,190 | 0 | 0 |
| | TL 5/15-9/15 | 1,210 | 0 | 0 |
| | TL 5/15-12/1 | 210 | 2,800 | 2,640 |
| **Medicine Bow-Routt National Forest Unit** | | | | |
| Thunder Basin National Grassland | CSU | 870 | 870 | 1,110 |

When assessing effects from recreation-related restrictions, the designation of a management area emphasizing recreation must also be addressed. This is done for MA 1.31 (Nonmotorized Backcountry Recreation). For more information, see the Effects by Management Area section.

In developed sites where no surface occupancy is allowed, protecting recreation areas would result in impacts to oil and gas ranging from increased costs of production, to the loss of some

rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss is expected to be small because, for the most part, recreation sites are relatively small in area and easily accessible for adjacent land. In areas adjacent to recreation sites where a timing limitation allows drilling only during a short period of the year (Dakota Prairie Grasslands) or a controlled surface use stipulation limits noise (Thunder Basin National Grassland), there could be delays and additional operator cost. Requirements that cause delays and increase costs for the operator could also reduce revenues to the United States government.

### Effects from Scenery Management

Two CSU stipulations were developed to meet standards and guidelines for scenery management. One stipulation applies to areas with a high scenic integrity objective; the second stipulation applies to areas with a moderate scenic integrity objective. Both stipulations allow surface occupancy and use subject to operational constraints to maintain the landscape character intact (see the Revised Management Plans, Appendix D, Oil and Gas Stipulations). Access and other development- and production-related facilities would be allowed but may be moved or modified to preserve scenic resources. Operational constraints may include utilizing topographic and vegetative screening, matching color tones of facilities with surrounding topographic features, orienting the well pad and facilities, redesigning production facilities to such scale that they may not be evident, or placing facilities outside the affected SIO area. Delays and mitigation could increase operator costs. The areas affected by alternative and scenic integrity objectives are shown in the following table.

**Table 3-65. Acreage with Scenic Integrity Stipulation by Alternative**

| **Dakota Prairie Grasslands Unit<br>Little Missouri National Grasslands** | | | | | | |
|---|---|---|---|---|---|---|
| **Stipulation** | **Alt 1** | **Alt 2** | **DEIS Alt 3** | **FEIS Alt 3** | **Alt 4** | **Alt 5** |
| CSU – High Scenic Integrity | 0 | 2,280 | 134,130 | 76,940 | 94,130 | 66,450 |
| CSU – Moderate Scenic Integrity | 0 | 31,460 | 182,450 | 105,870 | 121,930 | 203,660 |
| NSO | 10,620 | 0 | 0 | 0 | 0 | 0 |
| TL 5/15 – 9/15 | 10,700 | 0 | 0 | 0 | 0 | 0 |
| **Cedar River National Grasslands** | | | | | | |
| **Stipulation** | **Alt 1** | **Alt 2** | **DEIS Alt 3** | **FEIS Alt 3** | **Alt 4** | **Alt 5** |
| CSU - High Scenic Integrity | 0 | 0 | 0 | 0 | 0 | 0 |
| CSU - Moderate Scenic Integrity | 0 | 0 | 0 | 0 | 0 | 800 |
| **Medicine Bow-Routt National Forest<br>Thunder Basin National Grassland** | | | | | | |
| **Stipulation** | **Alt 1** | **Alt 2** | **DEIS Alt 3** | **FEIS Alt 3** | **Alt 4** | **Alt 5** |
| CSU - High Scenic Integrity | 0 | 7,460 | 27,200 | 33,400 | 73,700 | 73,700 |
| CSU - Moderate Scenic Integrity | 0 | 76,630 | 123,770 | 123,760 | 46,720 | 46,720 |
| **Nebraska National Forest<br>Buffalo Gap National Grasslands** | | | | | | |

| Stipulation | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| CSU - High Scenic Integrity | 0 | 0 | 2.260 | 2.260 | 2.260 | 2.260 |
| CSU - Moderate Scenic Integrity | 0 | 14,060 | 91,430 | 91,430 | 99,360 | 99,360 |
| NSO | 860 | 0 | 0 | 0 | 0 | 0 |

**Oglala National Grasslands**

| Stipulation | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| CSU - High Scenic Integrity | 0 | 990 | 990 | 2,070 | 14,640 | 13,930 |
| CSU - Moderate Scenic Integrity | 0 | 1,290 | 2,200 | 2,200 | 2,200 | 86,832 |

## Effects from Soils Management

In the DEIS, two CSU stipulations were applied to steep slopes: one on slopes over 40 percent and another on slopes between 25 percent and 40 percent. Some commenting on the DEIS correctly observed that the stipulations were worded to be effectively NSO stipulations. For the FEIS, these stipulations have been reworded as NSO stipulations. Slopes greater than 40 percent are available for oil and gas leasing, but no surface occupancy or use is permitted. Slopes between 25 percent and 40 percent with unstable soils are available for leasing, but no surface occupancy or use is allowed.

On the Little Missouri National Grasslands, the stipulation for slopes greater than 40 percent applies, but the stipulation for slopes between 25 percent and 40 percent does not (these areas are relatively small and are protected under standard lease terms). Both stipulations apply to the Thunder Basin, Oglala, and Buffalo Gap National Grasslands. In these areas, oil and gas leasing would be allowed, but the mineral estate may only be accessed from adjacent areas. Road construction for geophysical uses is prohibited. Portable geophysical techniques must be used.

As with other areas where no surface occupancy is applied, protection of steep slopes and unstable soils on steep slopes would impact oil and gas. Impacts would range from increased costs of production, to the loss of some rental income, to loss of oil and gas resources and associated royalties. The magnitude of the loss is expected to be small because, for the most part, steep slope are relatively small in area and easily accessible for adjacent land. Generally, in areas even with very steep slopes and high density of steep slopes, it is possible to find sites to locate well pads. Additionally, costs of development on steep slopes would be higher than on adjacent gentler slopes. However, where there is a need to relocate a well, there could be some increased costs. See the following table for breakdowns by stipulation.

**Table 3-66. Acreage with Soils Stipulations by Alternative**

| Planning Unit | Alt 1 | Alt 2-5 | FEIS Alt 3 |
|---|---|---|---|
| **Dakota Prairie Grasslands** | | | |
| **Little Missouri National Grassland** | | | |
| NSO – Greater than 40% Slope | 0 | 28,370 | 27,000 |
| NSO - Unstable soils on slopes between 25-40% | 0 | 101,180 | 0[38] |
| NSO- Greater than 40% Slope | 27,250 | 0 | 0 |
| **Cedar River National Grassland** | | | |
| NSO – Greater than 40% Slope | 0 | 10 | 0 |
| **Medicine Bow-Routt National Forest Unit** | | | |
| **Thunder Basin National Grassland** | | | |
| NSO – Greater than 40% Slope | 0 | 1,530 | 15,30 |
| NSO - Unstable soils on slopes between 25-40% | 0 | 10,130 | 9,890 |
| CSU - Unstable soils on slopes <34% | * | 0 | 0 |
| CSU - Unstable soils on slopes >34% and <60% | * | 0 | 0 |
| NSO- Greater than 60% Slope | * | 0 | 0 |
| **Nebraska National Forest Units** | | | |
| **Buffalo Gap National Grassland** | | | |
| NSO – Greater than 40% Slope | 0 | 10 | 10 |
| NSO - Slopes between 25-40% | 0 | 340 | 340 |
| CSU - Greater than 40% Slope | * | 0 | 0 |
| CSU - Unstable soils on slopes between 25-40% | * | 0 | 0 |
| **Oglala National Grassland** | | | |
| NSO – Greater than 40% Slope | 0 | 270 | 270 |
| NSO - Slopes between 25-40% | 0 | 810 | 810 |
| CSU - Greater than 40% Slope | * | 0 | 0 |
| CSU - Unstable soils on slopes between 25-40% | * | 0 | 0 |

*Acreage is not available from existing EIS.

## Effects from Special Use Management

No stipulations are required by standards and guidelines for special uses. However, certain mineral-related activities (roads, pipelines, gathering lines, power-lines, and lighting) require

[38] On the Little Missouri National Grassland slopes between 25-40% are protected by Standard Lease Terms in Alternative FEIS 3.

special use permits and will be affected by standards and guidelines for special uses. There are other restrictions regarding minerals operations included in the grassland-wide and forest-wide geology and minerals standards and guidelines in the Revised Management Plans. New standards and guidelines applied to special use activities associated with oil and gas could increase operator costs.

### Effects from Water Management

A CSU stipulation was developed to meet standards and guidelines for water, wetlands, woody draws, riparian, and floodplain areas. In these areas, surface occupancy and use are subject to operational constraints to maintain the character of these resources (see the Revised Management Plans, Appendix D, Oil and Gas Stipulations). Access and other development- and production-related facilities would be allowed subject to identified operational constraints. Required mitigation could cause delays and increase operator costs. Refer to the table below for acreages where the stipulation would be applied.

**Table 3-67. Acreage with a Riparian Stipulation by Alternative**

| Planning Unit | Alt 1 | Alt 2-5 | FEIS Alt 3 |
|---|---|---|---|
| **Dakota Prairie Grasslands** | | | |
| **Little Missouri National Grassland** | | | |
| CSU | 0 | 50,880[39] | 50,680 |
| NSO | 53,240 | 0 | 0 |
| **Cedar River National Grassland** | | | |
| CSU | 0 | 0 | 0 |
| **Medicine Bow-Routt National Forest Unit** | | | |
| **Thunder Basin National Grassland** | | | |
| CSU[40] | 3,030 | 3,030 | 3,030 |
| **Nebraska National Forest Units** | | | |
| **Buffalo Gap Grassland** | | | |
| CSU | 0 | 0 | 0 |
| **Oglala National Grassland** | | | |
| CSU | 0 | 0 | 0 |

## *Cumulative Effects*

### Restrictions and Oil and Gas Occurrence Potential

[39] On the Little Missouri National Grassland and in Alternatives 2-5, a CSU stipulation is applied to water, wetlands, woody draws, riparian and floodplains. However, no surface occupancy or use is allowed within ¼-mile each side of the Little Missouri River, as a River and Travel Corridor MA 4.22, effectively applying NSO to 23,060 acres of riparian.

[40] For the FEIS, improved inventories were used increasing the acerage of riparian and wetland on the Thunder Basin National Grassland from that shown in the DEIS (1,560 acres).

Restrictions that prohibit access in areas of high occurrence potential for oil and gas would have a greater effect on leasing than if such restrictions were imposed in areas with lesser potential. Such restrictions include NSO stipulations, designation of administratively available but not authorized for leasing, and designation of not administratively available. The following tables show, by alternative, the acres in different categories of restrictions or constraint on exploration and development activities for areas of high, moderate, and low occurrence potential for each planning unit. The numbers in the tables reflect the alternative as proposed without adjustment for existing leases and leases held by production.

**Dakota Prairie Grasslands**

Alternative 4 would have the most acres with high oil and gas occurrence potential not administratively available for leasing, administratively available but without authorization to lease, or with NSO stipulations. Alternative DEIS 3 would have the second most acres with those restrictions in high potential area, followed by Alternatives FEIS 3, 5, and 2.

**Table 3-68. Restrictions, in Acres, by Occurrence Potential for Each Alternative, Dakota Prairie Grasslands.**

| Oil andGas Occurrence Potential | Total Fed.[41] Acres | Alt 1[42] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **High** | 936,480 (90%) | | | | | | |
| NAA | | 24,870 | 24,930 | 24,930 | 46,490 | 24,930 | 24,930 |
| NCA | | 16,230 | 0 | 0 | 26,200 | 0 | 0 |
| NSO | | 187,680 | 182,200 | 272,490 | 193,930 | 292,580 | 231,960 |
| CSU | | 110,890 | 88,660 | 170,200 | 200,620 | 182,100 | 349,530 |
| Paleontology CSU | | 0 | 0 | 0 | 0 | 0 | 0 |
| TL | | 105,310 | 166,300 | 152,060 | 180,520 | 156,700 | 157,280 |
| SLT | | 544,525 | 491,980 | 341,60 | 339,430 | 318,060 | 241,240 |
| **Moderate** | 90,410 (9%) | | | | | | |
| NAA | | 0 | 24,930 | | 0 | 0 | 0 |
| NSO | | 21,840 | 3,400 | 8,480 | 8,680 | 6,030 | 6,010 |
| CSU | | 13,560 | 3,100 | 5,460 | 5,140 | 8,570 | 144,490 |
| Paleontology CSU | | 0 | 0 | 0 | 0 | 0 | 0 |
| TL | | 28,310 | 19,330 | 18,670 | 22,460 | 19,330 | 19,330 |
| SLT | | 33,520 | 66,010 | 59,180 | 56,200 | 59,170 | 53,270 |
| **Low** | 11,810 (1%) | | | | | | |

[41] This number includes total federal mineral acres, including split estate, where stipulations apply (does include Cedar River National Grassland).

[42] Due to differences in the way Alternative 1 was originally constructed the total Federal acres in Alternative 1 do not match Alternatives 2-5.

| Oil andGas Occurrence Potential | Total Fed.[41] Acres | Alt 1[42] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| NAA | | 0 | 0 | 0 | 0 | 0 | 0 |
| NSO | | 0 | 0 | 0 | 0 | 0 | 0 |
| CSU | | 0 | 0 | 0 | 0 | 0 | 0 |
| Paleontology CSU | | 0 | 0 | 0 | 0 | 0 | 0 |
| **Low, cont.** | | | | | | | |
| TL | | 0 | 0 | 0 | 0 | 0 | 0 |
| SLT | | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 |

NAA - Not Administratively Available, NCA – Available but Not Currently Authorized, NSO No Surface Occupancy, CSU - Controlled Surface Use, TL - Timing Limitation, SLT - Standard Lease Terms.

### Thunder Basin National Grassland

Alternative 5 would have the most acres not administratively available for leasing, or with NSO stipulations in areas with high oil and gas occurrence potential. Alternative 4 would have the second most acres with those restrictions in high potential area, followed by Alternatives DEIS 3, FEIS 3, 2, and 1.

**Table 3-69. Restrictions, in Acres, by Occurrence Potential for Each Alternative, Thunder Basin National Grassland**

| Oil andGas Occurrence Potential | Total Fed. Acres | Alt 1[43] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **High** | 1,150,250 (99%) | | | | | | |
| NCA | | 0 | 0 | 0 | 246,850 | 0 | 0 |
| NSO | | 7,580 | 130,690 | 152,330 | 120,100 | 190,110 | 161,940 |
| CSU | | 10,490 | 89,930 | 141,670 | 141,020 | 119,580 | 180,260 |
| Paleontology CSU | | 0 | 928,600 | 855,220 | 641,260 | 839,532 | 807,020 |
| TL | | 110,270 | 277,130 | 299,440 | 236,450 | 306,780 | 264,810 |
| SLT | | 949,450 | 0 | 0 | 0 | 0 | 0 |
| **Moderate** | 8,510(1%) | | | | | | |
| NSO | | 0 | 240 | 240 | 240 | 240 | 240 |
| CSU | | 5,960 | 2,650 | 2,850 | 2,850 | 2,660 | 2,710 |
| Paleontology CSU | | 0 | 6,650 | 6,450 | 6,450 | 6,650 | 6,600 |
| TL | | 0 | 1,350 | 9,300 | 9,300 | 1,350 | 1,350 |
| SLT | | 3,580 | 0 | 0 | 0 | 0 | 0 |

NAA - Not Administratively Available, NCA – Available but Not Currently Authorized, NSO No Surface Occupancy, CSU - Controlled Surface Use, TL - Timing Limitation, SLT - Standard Lease Terms.

[43] Due to differences in way Alternative 1 was originally constructed the total federal acres in Alternative 1 do not match Alternatives 2-5.

**Nebraska National Forest Units**

The greatest amount of acres with either a not currently authorized for leasing decision or NSO stipulation occurs in the moderate oil and gas potential area. Alternative 1 would have the most acres not authorized for leasing or with NSO stipulations in areas with moderate oil and gas occurrence potential. Alternative 5 would have the second most acres with those restrictions in high potential area, followed by Alternatives 4, DEIS 3, FEIS 3, and 2.

Alternative 1 would have the most acres not authorized for leasing, or with NSO stipulations in areas with high oil and gas occurrence potential. Alternative 4 would have the second most acres with those restrictions in high potential area, followed by Alternatives 5, DEIS 3, FEIS 3, and 2.

**Table 3-70**. **Restrictions, in Acres, by Occurrence Potential for Each Alternative, Nebraska National Forest**

| Oil and Gas Occurrence Potential | Total Fed. Acres | Alt 1[44] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **High** | 98.720 (40%) | | | | | | |
| NCA | | 513 | 0 | 0 | 0 | 0 | 0 |
| NSO | | 7,330 | 2,490 | 2,490 | 2,490 | 3,630 | 3,000 |
| CSU | | 2,550 | 1,430 | 14,190 | 14,190 | 1,630 | 24,030 |
| Paleontology CSU | | 83,320 | 94,800 | 82,030 | 82,030 | 93,450 | 71,690 |
| TL | | 4,280 | 16,570 | 16,570 | 16,570 | 16,110 | 16,570 |
| SLT | | 0 | 0 | 0 | 0 | 0 | 0 |
| **Moderate** | 138,830 (56%) | | | | | | |
| NCA | | 13,670 | 0 | 0 | 0 | 0 | 0 |
| NSO | | 14,170 | 4,110 | 2,690 | 4,110 | 15,980 | 16,160 |
| CSU | | 6,890 | 6,190 | 33,250 | 34,160 | 6,510 | 45,160 |
| Paleontology CSU | | 96,860 | 128,530 | 101,470 | 100,570 | 116,340 | 77,500 |
| TL | | 7,260 | 25,850 | 25,850 | 25,850 | 24,620 | 24,460 |
| SLT | | 0 | 0 | 0 | 0 | 0 | 0 |
| **Low** | 9,310 (4%) | | | | | | |
| NCA | | 0 | 0 | 0 | 0 | 0 | 0 |
| NSO | | 220 | 0 | 0 | 0 | 0 | 0 |
| CSU | | 0 | 0 | 0 | 0 | 0 | 3,850 |
| Paleontology CSU | | 8,990 | 9,310 | 9,310 | 9,310 | 9,310 | 5,450 |
| TL | | 0 | 0 | 0 | 0 | 0 | 0 |
| SLT | | 0 | 0 | 0 | 0 | 0 | 0 |

NAA - Not Administratively Available, NCA – Available but Not Currently Authorized, NSO No Surface Occupancy, CSU - Controlled Surface Use, TL - Timing Limitation, SLT - Standard Lease Terms.

[44] Due to differences in way Alternative 1 was originally constructed the total federal acres in Alternative 1 do not match Alternatives 2-5.

For the cumulative economic effects of the alternatives, refer to the Economic Effects section of this chapter.

## Effects of No Surface Occupancy Stipulations

Some people who commented on the DEIS were concerned about the effect of large areas with NSO stipulations on the development of the oil and gas resource. In the DEIS, large areas designated with NSO stipulations were described as being accessible for up to one mile inside their boundaries through the use of directional drilling techniques. The DEIS recognized that the oil and gas resource may be unrecoverable from the core of the large NSO blocks. However, some who commented contended that it would not be economically feasible to explore for and drill to that distance, making large areas essentially inaccessible.

On the Dakota Prairie Grasslands, horizontal drilling is a frequently used technology. The following NSO analysis was constructed on the premise that it would be economically and technologically feasible to access the oil and gas resource within ½-mile of the boundary of large NSO areas.

On the Thunder Basin National Grassland and the Nebraska National Forest, the oil-bearing strata are generally shallower, and horizontal drilling technologies are generally not feasible. Therefore, the NSO analysis considers that oil and gas resources would be available for 1/8-mile inside the boundary of large NSO areas using directional drilling technology.

### Leases Held by Production

Because valid existing rights will be honored in all alternatives, existing lease rights must be considered when looking at the effects of large areas available but not authorized for leasing and large areas with NSO stipulations. When a producing well is developed on a lease, the lessee can hold that lease for as long as there is production. The term used for this is "held by production." Leases held by production can be operated under the present lease terms as long as there is production and no expiration date can be defined for them.

In addition, leases have a ten-year term and expire at the end of those ten years, unless production is established. If production is established, the lease will be held by production under the existing lease terms as long as there is production. The probability of production being established on a specific lease is not defined in this analysis. Once a lease expires, a new lease can be issued for the same area. The area of the expired lease may be divided into different size and shaped leases, a process known as parceling.

The new lease or leases will contain the most current lease stipulations. If the existing lease terminates in an area determined by the Revised Management Plans to be available for leasing but no surface occupancy or use is allowed, then the new lease would contain a NSO stipulation. If the existing lease terminates in an area where the Revised Management Plans no longer allows leasing, the area would not be leased.

Leases held by production have a large affect on the amount of accessible mineral estate within large NSO areas. Some of these NSO areas have a significant amount of area covered by leases held by production. Leases held by production may be drilled under the existing lease terms, effectively making the area under and possibly adjacent to the lease accessible. In the following analysis, leases held by production are considered accessible for drilling. Areas adjacent to those leases for ½-mile on the Dakota Prairie Grasslands and 1/8-mile on the Thunder Basin National Grassland were considered accessible but affected.

The following table displays the area of leases held by production, the area held by production where NSO stipulations would be applied, and the area held by production in areas available for leasing but not currently authorized.

**Table 3-71. Acres Held by Production in Areas of NCA or NSO by Alternative**

| Area Lease Status | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| Held by production | 194,288 | 194,288 | 194,288 | 194,288 | 194,288 | 194,288 |
| Held by production in NSO areas | 39,060 | 39,770 | 55,290 | 41,260 | 56,910 | 49,660 |
| Held by production in NCA areas | 0 | 0 | 0 | 10,340 | 0 | 0 |
| **Thunder Basin National Grassland** | | | | | | |
| Held by production | 256,828 | 256,828 | 256,828 | 256,828 | 256,828 | 256,828 |
| Held by production in NSO area | 250 | 29,800 | 30,390 | 20,600 | 34,900 | 31,590 |

Because block NSO areas on the Oglala and Buffalo Gap National Grasslands are relatively small, the analysis of leases held by production was not conducted on these areas.

### Large Areas of No Surface Occupancy

In the area affected by NSO stipulations (½-mile on the Dakota Prairie Grasslands and 1/8-mile on the Thunder Basin National Grassland), wells would be displaced to areas outside the NSO area or onto existing leases and leases held by production. Impacts to oil and gas would include increased costs of development and production to directionally or horizontally drill the wells.

In areas beyond ½-mile on the Dakota Prairie Grasslands and 1/8-mile on the Thunder Basin National Grassland, the oil and gas resource would be essentially inaccessible. The magnitude of the loss would depend on the resources available in the particular area. In some circumstances, leaving the oil and gas in place preserves the resource for future use. When oil and gas resources adjacent to the area of no surface occupancy are developed, drainage of the oil and gas under the no surface occupancy area could occur, resulting in a loss of resource and associated royalties to the United States government.

The following table displays the area affected and the area inaccessible due to NSO stipulations by alternative on the Dakota Prairie Grasslands. The area affected is defined as the area from the boundary to ½-mile within the NSO area. The area made not accessible is defined as the area beyond ½-mile inside the NSO boundary.

**Table 3-72. Acres Affected and Not Accessible Due to NSO Stipulations by Alternative for the Dakota Prairie Grasslands**

| Area Lease Status | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Leases Expire prior to 2001** | | | | | | |
| Affected < 1/2 mile | 91,170 | 135,910 | 101,030 | 144,750 | 109,740 | 95,940 |
| Not Accessible > 1/2 mile | 5,280 | 16,360 | 11,540 | 20,330 | 12,260 | 11,560 |
| **Leases Expire in 2001 to 2004** | | | | | | |
| Affected < 1/2 mile | 17,620 | 25,400 | 17,740 | 31,380 | 20,990 | 12,340 |
| Not Accessible > 1/2 mile | 1,080 | 3,350 | 2,390 | 4,130 | 1,230 | 150 |
| **Leases Expire in 2005 to 2008** | | | | | | |
| Affected < 1/2 mile | 41,410 | 71,590 | 38,290 | 74,590 | 63,030 | 44,420 |
| Not Accessible > 1/2 mile | 5,360 | 10,020 | 2,640 | 10,720 | 8,140 | 5,310 |
| **Leases Expire in 2009 to 2012** | | | | | | |
| Affected < 1/2 mile | 630 | 760 | 700 | 630 | 630 | 0 |
| Not Accessible > 1/2 mile | 0 | 0 | 0 | 0 | 0 | 740 |
| **Total Acres Affected <1/2 mile** | 150,830 | 233,660 | 157,760 | 251,350 | 194,390 | 152,700 |
| **Total Acres Inaccessible >1/2 mile** | 11,720 | 29,730 | 16,570 | 35,180 | 21,630 | 17,760 |

On the Dakota Prairie Grasslands, Alternative FEIS 3 would have the most acres affected by NSO stipulations, followed by Alternative 2, Alternative 4, DEIS 3, 5, and 1. Alternative FEIS 3 would have the least accessible acres as a result of NSO stipulations, followed by Alternative 2, 4, 5, DEIS 3, and 1.

The following table shows the area affected and the area inaccessible due to NSO stipulations by alternative on the Thunder Basin National Grassland. The area affected is defined as the area from the boundary to 1/8-mile within the NSO area. The area made inaccessible is defined as the area beyond 1/8-mile inside the NSO boundary.

**Table 3-73. Acres Affected and Not Accessible Due to NSO Stipulations by Alternative for the Thunder Basin National Grassland**

| Area Lease Status | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Leases that Expire prior to 2001** | | | | | | |
| Affected < 1/8 mile | 680 | 30,130 | 31,962 | 23,908 | 34,466 | 32,287 |
| Not Accessible > 1/8 mile | 671 | 14,331 | 18,332 | 15,509 | 24,880 | 21,950 |
| **Leases that expire in 2001 to 2004** | | | | | | |
| Affected < 1/8 mile | 17 | 3,859 | 3,892 | 2,771 | 3,928 | 3,895 |
| Not Accessible > 1/8 mile | 0 | 2,208 | 2,342 | 1,672 | 2,727 | 2,342 |
| **Leases that expire in 2005 to 2008** | | | | | | |
| Affected < 1/8 mile | 1,705 | 28,767 | 31,211 | 25,891 | 34,514 | 31,921 |
| Not Accessible > 1/8 mile | 4,241 | 15,808 | 28,195 | 25,291 | 48,255 | 30,854 |
| **Leases that expire in 2009 to 2012** | | | | | | |
| Affected < 1/8 mile | 11 | 3,871 | 4,042 | 2,890 | 4,325 | 4,267 |
| Not Accessible > 1/8 mile | 0 | 2,153 | 2,203 | 1,500 | 2,359 | 3,071 |

| Area Lease Status | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Total Acres Affected <1/8 mile** | 2,413 | 66,627 | 71,107 | 55,460 | 77,233 | 72,370 |
| **Total Acres Inaccessible >1/8 mile** | 4,912 | 34,500 | 51,072 | 43,972 | 78,221 | 58,217 |

On the Thunder Basin National Grassland, Alternative 4 would have the most acres affected by NSO stipulations. Alternatives 5 would the next, followed by Alternative DEIS 3, 2, FEIS 3, and 1. Alternative 4 would have the fewest acres accessible for exploration as a result of NSO stipulations, followed by Alternatives 5, DEIS 3, FEIS 3, 2, and 1.

Because block NSO areas on the Oglala and Buffalo Gap National Grasslands are relatively small, the NSO analysis was not conducted on these grasslands.

## Effects of Declining Production

In the Williston Basin and Powder River Basin, a reduction in acres available for exploration would have a negative affect on the domestic oil and gas industry and could contribute to an increased dependency of the United States on foreign reserves. A declining domestic industry results in loss of personnel with expertise in oil and gas exploration and development and affects the ability of industry to respond to potential changes in the supply of imported energy. The industry has experienced such a decline recently as oil prices have decreased during the late 1990s. The following table displays the area open to leasing by alternative for each grassland.

**Table 3-74. Acres Open to Leasing by Alternative**

| Planning Unit | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | |
| **Little Missouri National Grassland** | | | | | | |
| Acres open to leasing | 939,150 | 955,380 | 955,380 | 907,530 | 955,380 | 955,380 |
| **Cedar River National Grassland** | | | | | | |
| Acres open to leasing | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 | 12,550 |
| **Medicine Bow/Routt National Forest Unit** | | | | | | |
| **Thunder Basin National Grassland** | | | | | | |
| Acres open to leasing | 1,158,760 | 1,158,760 | 1,158,760 | 911,910 | 1,158,760 | 1,158,760 |
| **Nebraska National Forest Units** | | | | | | |
| **Buffalo Gap National Grassland** | | | | | | |
| Acres open to leasing | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 | 156,330 |
| **Oglala National Grassland** | | | | | | |
| Acres open to leasing | 76,160 | 90,520 | 90,520 | 90,520 | 90,520 | 90,520 |

The Cedar River and Buffalo Gap National Grasslands have the same number of acres open to leasing in all alternatives. For the Little Missouri National Grassland, Alternatives 2, DEIS 3, 4, and 5 have the most acres open to leasing, followed by Alternative 1. Alternative FEIS 3 has the least acres open to leasing on the Little Missouri National Grassland. For the Thunder Basin National Grassland, Alternatives 1, 2, DEIS 3, 4, and 5 have the same and most acres open to

leasing. Alternative FEIS 3 has the least acres open to leasing on the Thunder Basin National Grassland. For the Oglala National Grassland, Alternatives 2, DEIS 3, FEIS 3, 4, and 5 have the same and most acres open to leasing. Alternative 1 has the least acres open to leasing on the Oglala National Grassland.

### Drainage

Drainage occurs when oil and gas migrates in the subsurface from areas of high pressure to areas of lower pressure, such as is found in the vicinity of a producing well. Production of migrated oil and gas without compensation to the owner and/or lessee from whose estate the hydrocarbons moved is called drainage. The remedy of choice is often drilling and completing a producing well on the mineral estate losing hydrocarbons.

The federal oil and gas lease obligates the lessee to protect federal minerals against drainage. Developing a well on the losing mineral estate is one method of drainage protection. Other protection may be achieved by including lands not leased in units, by agreements with adjacent mineral owners, or assessment of compensatory royalties. However, if the federal mineral estate is not leased, the existing mineral resource may be drained and produced from adjacent non-federal mineral estates without compensation to the federal government.

Drainage can also affect overall reservoir recovery. Spacing of wells over the reservoir is crucial to maximum reservoir recovery. When a portion of the lands are not available to be drilled, oil and gas recovery from the reservoir would be diminished, secondary recovery may be inhibited, and overall recovery and revenues reduced.

When lands are leased, the lessee can be required to protect the lease from further drainage. However, when land is not leased, there is no procedure to protect from drainage. By not allowing leasing, the recoverable reserves within a particular tract may be decreased, perhaps to the point where drilling within the federal tract is not economically feasible, even if leasing is later permitted.

For the Little Missouri National Grassland, the potential loss of federal royalties caused by drainage from lands not leased is expected to be greatest in Alternative FEIS 3 with the greatest number of acres not administratively available for leasing and available but not authorized. The next greatest loss would be in Alternative 1, followed equally by Alternatives 2, DEIS 3, 4, and 5.

For the Oglala National Grassland, the potential loss of federal royalties caused by drainage from lands not leased is expected to be greatest in Alternative 1 with the greatest number of acres not administratively available for leasing and available but not authorized. The next greatest loss would be in Alternative 2, DEIS 3, FEIS 3, 4, and 5 equally.

On the Cedar River and Buffalo Gap National Grasslands, none of the alternatives allocate any acreage to the categories of not administratively available for leasing, or available but not authorized for leasing. There should be no loss of federal royalties caused by drainage from lands not leased on these grasslands in any alternative.

### Access

Access to leases across federal lands is controlled by land and resource management plan standards and guidelines. The standards and guidelines are not specifically included in oil and gas leases but apply to the lessee, as well as any forest or grassland user. Generally, when a

stipulation is applied to a lease, similar or identical restrictions will apply to the placement, construction, and use of access roads, pipelines, and power-lines.

# Plant and Animal Damage Control

## Introduction

Under certain conditions, some plant and animal species cause unacceptable economic or environmental damage. As a result, management activities on National Forest System lands sometimes include control and management of damage caused by noxious weeds, non-native invasive plants, insects, predators, and rodents.

## Laws, Policy, and Direction

The following laws, policy, and direction apply to control and management of damage caused by noxious weeds, prairie dogs, predators, and grasshoppers:

- Federal Noxious Weed Act of 1974.
- Animal Damage Control Act of March 2, 1931.
- Federal Insecticide, Fungicide, and Rodenticide Act.
- Department of Agriculture Regulation (DR) 9500-4.
- Forest Service Manual 2650 (Animal Damage Management).
- Executive Order 12342, January 24, 1982.
- Forest Service Manual 2150 (Pesticide-Use Management and Coordination).
- Forest Service Manual 2323.35c (Predator Management in Wilderness).

## Key Indicators

- Acres of pesticide application and application rates.
- Reduction of noxious and invasive plants.
- Acres of prairie dog colonies poisoned.

## Noxious Weeds and Invasive Plants

The Federal Noxious Weed Act of 1974 authorizes the Secretary of Agriculture to use an integrated weed management approach to control and contain the spread of noxious weeds on and onto lands adjacent to National Forest System lands. Through that act, the Forest Service has an obligation to work cooperatively in identifying noxious weed problems and to develop control programs in areas where National Forest System lands are located (see CFR 222.8). These regulations have specific direction for the following:

- Preventing the introduction and establishment of noxious weeds.
- Containing and suppressing of existing noxious weed infestations.

**Specific direction, cont.**

- Cooperating (formally and informally) with state agencies, local landowners, weed control districts and boards, and other federal agencies in the management and control of noxious weeds.
- Educating and increasing awareness about noxious weed threats to native plant communities and ecosystems.

Even though many invasive plants are not considered noxious, they can convert native vegetation to a non-native species association. Current Forest Service direction for re-vegetation efforts is to use genetically local (at the ecological subsection level) native plant species where technically and economically feasible. To prevent soil erosion, non-native annuals or sterile perennial species may be used while native perennials are becoming established.

# Affected Environment

## *Dakota Prairie Grasslands*

The *Custer National Forest Management Plan* (which contains direction for the Dakota Prairie Grasslands) instructs managers to use an integrated pest management approach to treat noxious weeds. In May 1986, the Custer National Forest completed an environmental impact statement to analyze environmental consequences of control methods. A separate decision was signed for each national grassland.

Monitoring requirements in the *Custer National Forest Plan* specify actions to monitor noxious weeds and state that 20 percent of the acres treated annually should be monitored and the results reported every 5 years. Since 1987, the Dakota Prairie Grasslands have conducted annual field surveys of noxious weed infestation levels, with the primary focus on leafy spurge. An increase of more 10 percent in infested acres triggers additional evaluation and treatment.

The following table shows infestation levels of leafy spurge on the Dakota Prairie National Grasslands.

**Table 3-75. Noxious Weed Levels on the Dakota Prairie Units.**

| Planning Unit | Species | Infestation Level | Treatment Level |
|---|---|---|---|
| Grand River National Grasslands - Cedar River | Leafy spurge | 300 acres | 300 acres |
| Little Missouri National Grassland - McKenzie | Leafy spurge | 250 acres | 250 acres |
| Little Missouri National Grassland - Medora | Leafy spurge | 7,500-10,000 acres | 1,000 acres |
| Sheyenne National Grassland | Leafy spurge | 11,000 acres | 4,200 acres |

The Grand River District treats 300 acres annually. The Medora District infestation level has increased from about 2,000 acres of leafy spurge in 1987 to its current level of between 7,500 to 10,000 acres. Since 1987, the district has been treating more than 1,000 acres each year. The infestation level on the McKenzie District has increased by 10 percent in the last five years. However, the district, in cooperation with the McKenzie County Grazing Association, is part of a long-term (20- to 25-year) leafy spurge control program. As part of that program, the unit has been treating about 250 acres of leafy spurge per year. Leafy spurge infestation levels on the

Sheyenne National Grassland have increased from 5,000 acres in 1987 to 11,000 acres in 1995. Today, there is some level of leafy spurge on 30,000 acres of the unit's 70,000 acres. The unit uses an integrated pest management approach, in cooperation with the local grazing association, to treat an average of 4,200 acres per year.

Crested wheatgrass, a non-native grass species, has also been monitored. While this species is not considered invasive or noxious, it impacts available forage for livestock along with vegetative diversity for wildlife. Crested wheatgrass was used in revegetation projects to stabilize erosive soils and for its high herbage production values. However, it can only be utilized during the spring and late fall after green-up when it is most palatable to livestock and when seed production is available for wildlife. The following table provides estimates of crested wheatgrass acres for Dakota Prairie units.

**Table 3-76. Crested Wheatgrass Levels on the Dakota Prairie Units**

| Planning Unit | Species | Estimated Acres |
|---|---|---|
| Cedar River National Grasslands | Crested wheatgrass | 3,050 acres |
| Grand River National Grasslands | Crested wheatgrass | 19,200 acres |
| Little Missouri National Grassland McKenzie Ranger District | Crested wheatgrass | 17,430 acres |
| Little Missouri National Grassland Medora Ranger District | Crested wheatgrass | 34,620 acres |

## *Nebraska National Forest Units*

The current Nebraska National Forest Plan directs that noxious weeds be treated using the following priorities:

- Treat existing leafy spurge and Russian and spotted knapweed infestations.
- Treat invasions of new noxious weed species.
- Treat areas with new infestations of noxious weeds.
- Treat areas where existing infestations of Canada and musk thistle and other noxious weeds are expanding.
- Reduce acres currently infested with noxious weeds.

The monitoring section in the Forest Plan requires quarterly reporting based on the *Management Attainment Report* and the annual *Pesticide Use Report*. In 1993, the Nebraska National Forest completed an environmental analysis to disclose the environmental consequences of various control methods.

The following two tables display infestation and treatment levels and acres of crested wheatgrass, respectively, for Nebraska National Forest units:

**Table 3-77. Noxious Weed Levels on the Nebraska National Forest Units.**

| Planning Unit | Species | Infestation Level | Treatment Level |
|---|---|---|---|
| Samuel R. McKelvie National Forest<br>Bessey Ranger District | Canada thistle<br>Leafy spurge | 5 acres<br>15 acres | 0 acres<br>15 acres |
| Buffalo Gap National Grassland<br>Fall River Ranger District | Canada thistle | 180 acres | 60 acres |
| Buffalo Gap National Grassland<br>Wall Ranger District | Hoary cress<br>Russian knapweed<br>Canada thistle | 25 acres<br>25 acres<br>100 acres | 10 acres<br>15 acres<br>90 acres |
| Fort Pierre National Grassland | Russian knapweed<br>Canada thistle | 15 acres<br>80 acres | 15 acres<br>80 acres |
| Oglala National Grassland | Canada thistle | 1,910 acres | 605 acres |
| Pine Ridge Ranger District | Canada thistle<br>Leafy spurge | 700 acres | 700 acres |

**Table 3-78. Crested Wheatgrass Levels on the Nebraska National Forest Units**

| Planning Unit | Species | Estimated Acres |
|---|---|---|
| Buffalo Gap National Grasslands<br>Fall River Ranger District | Crested wheatgrass | 2,080 acres |
| Buffalo Gap National Grasslands<br>Wall Ranger District | Crested wheatgrass | 8,200 acres |
| Oglala National Grassland | Crested wheatgrass | 200 acres |

## *Thunder Basin National Grassland*

The *Medicine Bow National Forest Plan* and *Nebraska National Forest Plan* contain similar direction for the treatment of noxious weeds. In 1995, the Medicine Bow National Forest completed an environmental analysis that established direction for the treatment and control of noxious weeds. Monitoring requirements were not established in the *Medicine Bow National Forest Plan*. However, quarterly reporting in the *Management Attainment Report* and annual *Pesticide Use Report* is required.

The Thunder Basin National Grassland does not have a current inventory of noxious weed species and infestation levels. Between 1994-1996, about 160 acres of noxious weeds were treated on the Thunder Basin National Grassland. The species and approximate acres treated are listed in the table below. The Thunder Basin National Grassland also contains about 200 acres of crested wheatgrass.

**Table 3-79. Noxious Weeds and Acres Treated on Thunder Basin National Grassland (1994-96).**

| Species | Acres Treated |
|---|---|
| Leafy spurge | 72 |
| Spotted knapweed | 5 |
| Canada thistle | 80 |
| Musk thistle | 4 |

# Environmental Consequences

## Resource Protection Measures

Standards and guidelines that apply to all action alternatives require the use of weed-free products, native plant species for revegetation, contract provisions to prevent spread, weed-free haying, and integrated management techniques. Standards and guidelines also contain direction for the integrated control and treatment of noxious weeds and priority based on rare plant communities and sensitive species.

### *Direct and Indirect Effects*

#### General Effects

Soil disturbances create favorable conditions for invasive species and noxious weeds. While grassland-wide and forest-wide standards and guidelines apply to all action alternatives, the level of noxious weed treatment varies by alternative. Alternative 1 (No Action) would pose the highest risk of noxious weeds and invasive plants because the standards and guidelines developed for the action alternatives would not be applied. The following table shows the expected level of reduction by alternative:

**Table 3-80. Percent Reduction in Noxious Weeds by Alternative**

| Alternative 1 | Alternative 2 | DEIS Alternative 3 | FEIS Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| No change from current direction | 15% | No increase | No increase | 15% | No increase |

#### Effects from Fire and Fuels Management

Fire suppression activities that disturb the ground (i.e., fire-line construction) create opportunities for noxious weeds and invasive plants to establish until the disturbed areas can be rehabilitated. This risk would be the same for all alternatives.

The intensity and timing of prescribed burning affect the establishment and spread of noxious weeds and invasive plants. All of the species of noxious weeds listed within the planning units are adapted to fire. The increase in bare soil following a prescribed fire can increase the chance for noxious weed establishment or increase the density of weeds already present, especially noxious weeds with wind blown seeds.

Prescribed fire can also be used to aid in the treatment of noxious weeds. Chemical treatments of noxious weed infestations are more successful following prescribed burning. The reduction in standing decadent plant material provides a better avenue for chemical penetration. Chemical noxious weed control is also enhanced because the rapid growth following fire makes plants more susceptible to chemicals. Biological control can also be enhanced with prescribed fire by reducing plant vigor and making the plants more susceptible to pathogens.

Several invasive plants, such as smooth brome and downy brome, are cool-season plants, meaning their primary growth occurs in the spring and fall. Because most prescribed burning is conducted in the spring and fall, the rate of spread of cool-season plants can be slowed. Prescribed burning to set back cool-season plants would create openings and allow warm-season noxious weeds and invasive plants to become established. Depending on time of

burning, Alternatives 4 and 5 would offer the greatest opportunities for using fire to help reduce populations of noxious weeds and invasive plants.

### Effects from Wildlife Management

Wildlife can spread noxious and invasive plants via hooves, hide, feathers, and droppings. The management of most wildlife species is the responsibility of the respective state game agencies within the planning area. However, with the different alternatives, the Forest Service can manage the habitat for these individual wildlife species. The variability of wildlife and their habitats makes it difficult to compare wildlife effects on noxious and invasive plants between alternatives.

### Effects from Oil, Gas, Minerals Management

Ground disturbance resulting from road and facility construction to support oil, gas, and mineral activities is probably the single greatest risk for the spread of noxious weeds. Equipment brought into the area from out-of-state or from other areas infested by noxious weeds is a common source of new noxious weed infestations. Oil, gas, and mineral activities are allowed under all alternatives, but opportunities for disturbance would be the greatest under Alternative 2.

### Effects from Range Management and Livestock Grazing

Livestock can spread noxious weeds and invasive plants via hooves, hide, and droppings. The timing and intensity of livestock use are variables that affect risk levels. Alternative 2 would have highest level of livestock use and construct the most developments to support livestock management, which would result in the most ground disturbance of any of the alternatives. Additionally, livestock do not graze the listed noxious weeds; instead they graze other species in these plant communities. This reduces the competition and makes it easier for noxious weed species to become established or to spread. Recognizing the potential for increased risk of noxious weed infestations and loss of livestock forage due to its emphasis on commodities, Alternative 2 would treat more acres of noxious weeds and invasive plants than Alternatives 1, 3, and 5. Alternatives 4 and 5 would have the lowest level of livestock use and least developments to support livestock management. However, because of its emphasis on grassland restoration, Alternative 4 has the same objective as Alternative 2: to reduce noxious weeds and invasive plants.

### Effects from Recreation Management and Use

Ground-disturbing activities for trails and other recreation facilities can increase the risk of noxious weeds and invasive plants. Construction of recreation facilities and trails would be the greatest under Alternative 5. Thus, this alternative would pose the highest risk of noxious weed and invasive plant spread and establishment resulting from recreation-related ground disturbance.

Recreation visitors can spread the seeds of noxious weeds and invasive plants. Motor vehicles, mountain bikes, horses, mules, or llamas (used for transportation) offer additional mechanisms for noxious weed or invasive plant seed dispersal. It is difficult to predict which alternative may pose more risk of noxious weeds and invasive plants from recreation use overall. Alternative 4 has many acres of backcountry recreation opportunities that could encourage horse packing and increase the risks associated with that activity. Alternative 5, with its general

emphasis on recreation opportunities, could increase overall recreation use and related risks. Alternative 1 may pose more risk from recreation uses due to the lack of requirements for weed-free livestock feed.

### Effects from Timber Management

Alternative 2 would pose the greatest risk of increasing noxious weeds and invasive plants from ground-disturbing activities associated with timber harvest (road construction, log skid trails, etc). Alternative 2 would be followed by Alternatives 4, 5, and 3, respectively.

### Effects from Travel Management and Motorized Use

Motorized use can disturb the ground, allowing the establishment and spread of noxious weeds and invasive plants. Off-road and off-trail motorized use increases the risk of noxious weed establishment and spread. The spread of noxious weeds and invasive plants would probably be greatest under Alternatives 1 and 2. These alternatives would allow off-road and off-trail motorized travel. Under Alternatives 3, 4, and 5, there are restrictions limiting motorized use to designated travelways. This would confine the spread of invasive species and noxious weeds to those areas.

## Cumulative Effects

The risk of spreading existing weeds and invasive plants and potential for new invasions vary among alternatives based on the following factors:

- Amount of ground-disturbing activities.
- Timing and intensity of livestock grazing.
- Amount of recreation activities.
- Acres of prescribed burning.
- Amount of timber harvesting.
- Type of motorized vehicle use.
- Amount of noxious weed and invasive plant control actions.
- Priority on rare plant communities and sensitive species.
- Standards and guidelines designed to curtail the spread of noxious weeds and invasive plants.

Cumulatively, Alternatives 1 and 2 have more proposed activities that could facilitate the establishment and spread of noxious weeds and invasive plants. However, Alternative 1 does not include all the standards and guidelines designed to curtail the spread of noxious weeds and invasive plants. Although there are more proposed activities under Alternative 2, it would fund a more aggressive control program than Alternative 1.

The intermingled land patterns of the planning units increases the potential for invasions of noxious weeds from adjacent lands. All alternatives use an integrated management approach to control noxious weeds and invasive plants. Cooperation with other organizations that share similar concerns is also an integral part of all the alternatives. Alternatives 2 and 4 would provide the most funding for cooperative control efforts.

# Prairie Dog Damage Control

## Affected Environment

Landowners adjacent to the national grasslands and forests frequently ask the Forest Service to poison prairie dog colonies along adjoining property boundaries to reduce the dispersal of prairie dogs onto their lands. Many landowners are concerned about agricultural damage to their rangelands and haylands by prairie dogs and the costs of lost production and prairie dog poisoning. Impacts to croplands are generally less since croplands are annually cultivated and are mostly unsuitable for prairie dogs.

Livestock grazing permittees frequently request that prairie dog colonies on NFS rangelands be poisoned to reduce forage losses and livestock hazards in the national grassland and forest areas where they graze. The loss of livestock forage from prairie dog colonization varies between areas, depending on factors such as the amount of a pasture occupied by prairie dogs and the number of years prairie dogs have occurred in the area. Although prairie dogs can reduce the quantity of livestock forage, their grazing and clipping of the vegetation can also enhance forage quality. However, most landowners and livestock producers are hesitant to acknowledge positive values associated with prairie dogs and instead focus on the adverse consequences of continued prairie dog expansion.

Forest Service managers are guided by management direction contained in land and resource management plans and site-specific project plans when they respond to concerns about prairie dog damage. Current direction generally applies a target acreage, sometimes expressed as a range of acres, to be retained on federal lands. Colonies above the target acreage or outside the range may be poisoned in response to damage complaints. The proximity of the acreages to private, state, and tribal lands is an important factor in determining what colonies are poisoned. Poisoning in response to livestock permittee complaints also occurs on some planning units. Two percent zinc phosphide bait formulation is the rodenticide used to poison prairie dogs.

Acres of black-tailed prairie dog colonies poisoned since the late 1980s under the current management direction are shown in the following table:

**Table 3-81. Acres of Prairie Dog Colonies Poisoned Annually.**

| | Average Acres of Prairie Dog Colonies Poisoned Annually | | |
|---|---|---|---|
| **National Grassland/Forest** | **1988-92** | **1993-97** | **1988-97** |
| LMNG | 160 | 0 | 80 |
| SNG | NA | NA | NA |
| GR/CRNG | 280 | 0 | 140 |
| FPNG | 0 | 0 | 0 |
| BGNG | 3,880 | 1,750 | 2,810 |
| ONG | 360 | 130 | 240 |
| NNF (BRD) | 0 | 0 | 0 |
| NNF (PRRD) | NA | NA | NA |
| SRMNF | NA | NA | NA |
| TBNG | 3,900 | 1,190 | 2,540 |

In addition to rodenticides, vegetation is being managed on some planning units to slow prairie dog colony expansion and establishment. This involves using planned grazing systems and light livestock grazing intensities to leave higher levels of residual vegetation in uncolonized areas. Additional information on prairie dogs is presented under the Rangeland and Forest Health discussion in this chapter.

# Environmental Consequences

## *Resource Protection Measures*

Criteria that identify those circumstances when the use of rodenticides to poison prairie dogs can be considered vary by alternative. The differences in the criteria by alternative are presented in FEIS Appendix D. At this time, national direction limits when and where rodenticides can be used on NFS lands to reduce prairie dog populations. This is interim direction that could be withdrawn at any time so it is not considered in this effects analysis.

Management direction that is consistent across Alternatives 2, 3 and 5 includes prohibiting burrow fumigants and prohibiting use of rodenticides outside the period of October 1 through December 31 to reduce risks to other wildlife species. No poisoning would occur under Alternative 4. Vegetation management (planned grazing systems and light livestock grazing intensities) to slow prairie dog colony expansion and establishment in selected areas could be employed under each of the alternatives.

## *Direct and Indirect Effects*

### Effects by Alternative

#### Alternative 1

Existing land and resource management plans provide direction for responding to prairie dog damage complaints. The Forest Service response to damage complaints is largely determined by whether target acreages for active prairie dog colonies have been or are expected to be met. The proximity to adjoining private, state, and tribal lands is another important factor in determining what colonies along NFS boundaries will be poisoned. Forage loss concerns on NFS lands by livestock grazing permittees are also considered. Because of numerous factors, no attempt was made to project the average amount of annual poisoning that would likely occur under the direction established by each alternative. Therefore, this effects analysis is limited to relative comparisons. The amount of annual poisoning that would likely occur under this alternative would be less than or comparable to levels expected under Alternative 2 and higher than the amounts expected under Alternatives 3, 4, and 5.

#### Alternative 2

Use of rodenticides and prairie dog poisoning on NFS lands would be considered in response to agricultural damage concerns by livestock grazing permittees and neighboring landowners. The amount of annual poisoning expected under this alternative would be comparable or greater than Alternative 1 and greater than Alternatives 3, 4, and 5.

#### Alternative 3

Use of rodenticides would only be considered in response to public health and safety concerns and damage to infrastructure. Poisoning would not be authorized for loss of forage to support permitted livestock on NFS lands. Poisoning along NFS boundaries in response to agricultural

damage on adjoining lands would only be considered if compatible with meeting the guidance established in FWS-approved statewide prairie dog management plans. All or most colonies located in the interior of larger NFS blocks would be protected from poisoning. With poisoning limited to public health and safety concerns and damage to infra-structure, Alternative 3 would be expected to result in less poisoning than Alternatives 1, 2, and 5. The amount of poisoning under Alternatives 3 and 4 would be expected to be similar.

**Alternative 4**

Rodenticides would not be used to poison prairie dogs on NFS lands in response to damage complaints. Some poisoning could be authorized to respond to human health or safety concerns. Vegetation management and other nonchemical methods could be used to slow colony expansion and establishment in areas where damage complaints occur and where rapidly expanding prairie dog populations are not desired.

**Alternative 5**

Rodenticides could be used to address concerns involving public health and safety, damage to infrastructure, and agricultural damage on adjoining lands. Poisoning would not be authorized for loss of forage to support permitted livestock. All or most colonies located in the interior of larger NFS blocks would not be poisoned. Under this alternative, the amount of annual poisoning would be less than what is expected under Alternatives 1 and 2 but more than the levels expected under Alternatives 3 and 4.

### Effects from Fish and Wildlife Management

The need for conservation of prairie dogs and wildlife species closely associated with prairie dogs such as black-footed ferrets and burrowing owls limits the amount of prairie dog poisoning that can occur in response to damage complaints. Alternatives 1 and 2 would place the least restrictions on prairie dog poisoning, while Alternative 4 would prohibit poisoning. Alternatives 3 and 5 provide an intermediate level of poisoning on NFS lands.

### Effects from Range Management and Livestock Grazing

Water impoundments, pipelines, and tanks constructed for permitted livestock concentrate use and create sites of disturbed soils. These disturbed and heavily grazed sites are highly suitable for prairie dog colonization, and many colonies start at these locations. Increases in the number of new water developments would be expected under Alternatives 1 and 2 while construction limitations would apply under Alternatives 3, 4, and 5.

Livestock grazing intensities influence the rate and extent of prairie dog colony expansion and establishment. In the absence of poisoning, heavier grazing intensities on NFS lands enhance habitat suitability for prairie dogs and result in rapidly expanding prairie dog populations. Lighter grazing intensities or annual rest from livestock grazing reduce habitat suitability for prairie dogs and result in slower rates of colony expansion and establishment.

In the absence of poisoning, Alternatives 1 and 2 would result in the most rapid colony expansion and widespread prairie dog colony distribution because of the heavier livestock grazing intensities and additional water developments expected under these alternatives. Alternative 4 would have the lowest livestock grazing intensities, while Alternatives 3 and 5 would have intermediate levels of grazing intensity and water developments. Under Alternatives 3, 4, and 5, colony expansion rates would be slower and prairie dog populations

less extensive than under Alternatives 1 and 2. Damage complaints from adjoining landowners and livestock grazing permittees will vary as the distribution of prairie dog colonies changes in response to livestock grazing intensities. However, concurrent use of rodenticides under all alternatives, except 4, confounds this relationship and makes it impossible to accurately predict and compare the expected level of complaints under each alternative.

**Effects from Recreation Management and Use**

Intense recreational shooting could disrupt prairie dog foraging, thereby, reducing the effectiveness of rodenticides (grain bait) in reducing or eliminating selected prairie dog populations. The fewest areas where restrictions on prairie dog shooting would likely be applied are expected under Alternatives 1 and 2 while the most areas would likely occur under Alternative 4. Alternatives 3 and 5 would be expected to result in an intermediate numbers and sizes of areas with shooting restrictions.

### *Cumulative Effects*

The amount of prairie dog damage and control on private lands varies considerably across the planning area. In areas like the Fort Pierre National Grassland where much of the intermingled private lands are cultivated, prairie dogs are largely absent. On the other national grasslands, much of the intermingled lands are private rangelands and haylands, and agricultural damage by prairie dogs and poisoning are more prevalent. In some states, county weed and pest boards assist with poisoning of prairie dog colonies on private lands. In South Dakota, the Department of Game, Fish, and Parks also provides technical and operational assistance to landowners trying to reduce agricultural damage on their lands. In some locations, the Agricultural Plant Health Inspection Service (APHIS) also provides private landowners with technical and operational assistance for prairie dog poisoning.

# Predator Damage Control

## Affected Environment

Livestock grazing permittees and adjoining landowners frequently request assistance in reducing livestock losses by predators. Depending on the state, APHIS, state wildlife agencies, and or county weed and pest boards may respond to the requests for assistance. A recent Memorandum of Understanding with APHIS established that agency as the lead in managing predator damage on NFS lands. APHIS is also responsible for completing environmental analysis and Endangered Species Act consultation associated with predator control.

In cooperation with the Forest Service and the Bureau of Land Management, APHIS prepared a national programmatic environmental impact statement and issued a record of decision in 1994 for their Animal Damage Control Program. APHIS recently issued statewide environmental analyses and decision notices for animal damage control in Nebraska, eastern Wyoming, and North Dakota. The national and statewide documents evaluate and describe a range of alternatives and identify a selected alternative. The selected alternative describes the manner in which animal damage management programs will be conducted on both private and public lands. Management of predator damage does not vary among the alternatives.

APHIS issued a categorical exclusion for predator control in South Dakota where the Department of Game, Fish, and Parks conducts operational predator damage control on NFS lands.

Forest Service responsibilities in predator damage control are primarily limited to ensuring that APHIS programs comply with Forest Service management plans. Direction in the Revised Management Plans prioritizes visitor safety and mitigation for sensitive wildlife species during predator damage control. Forest Service officials are also responsible for approving all predacides (M-44 cyanide capsules, sodium nitrate gas cartridges, compound 1080 LP collar, etc.) used by APHIS and its cooperators on NFS lands.

Coyotes cause most predator damage to livestock on NFS lands and on adjoining private, state, and tribal lands in the planning area. A lesser amount of damage can be attributed to eagles and red fox. Domestic sheep and cattle losses occur primarily during lambing and calving seasons.

# Environmental Consequences

## *Resource Protection Measures*

Resource protection measures are evaluated and described in the national and statewide environmental analyses and decision documents issued by APHIS. A report by the U.S. General Accounting Office (1990) also evaluates and discusses the environmental consequences and resource protection measures of federal and state predator control programs.

APHIS and its state cooperators report annually on the number of predator damage complaints and number and kind of predators removed from NFS lands in the planning area.

## *Direct and Indirect Effects*

### Effects by Alternative

Management direction and the expected levels of predator control on NFS lands do not vary among the alternatives.

### Effects from Fish and Wildlife Management

Direction is provided to mitigate risks to proposed, endangered, threatened, and sensitive animal species during predator damage control activities. This direction does not vary among alternatives.

### Effects from Range Management and Livestock Grazing

Issuance of term livestock grazing permits and the presence of livestock on the federal lands contributes to the demand for predator damage control on National Forest System lands to reduce livestock losses.

### Effects from Recreation Management and Use

Direction requires that visitor safety be emphasized during predator control activities. This direction does not vary among alternatives.

### *Cumulative Effects*

Cumulative effects are addressed in the APHIS national and statewide environmental analyses.

# Grasshopper Damage Control

## Affected Environment

Livestock grazing permittees and adjoining landowners frequently request assistance, through APHIS, in reducing grasshopper damage to range- and cropland. Grasshopper spraying and baiting proposals commonly include mixed landownerships, including NFS lands. Aerial spraying projects use malathion or carbaryl; baiting uses powder or granular insecticides.

A 1987 Memorandum of Understanding between the Forest Service and APHIS identifies each agency's responsibilities regarding grasshopper damage control. APHIS is the lead agency for completion of the programmatic environmental analyses in accordance with NEPA. APHIS is also responsible for consultation with the U.S. Fish and Wildlife Service on the effects of insecticides on plant and animal species protected under the Endangered Species Act. Forest Service officials are responsible for approving pesticides for use on NFS lands and for ensuring compliance and compatibility with direction in land and resource management plans. This includes considering the effects of insecticides on plant and animal species identified as sensitive by the Forest Service.

Between 1988 and 1997, insecticide spraying to reduce grasshopper damage occurred on the Little Missouri and Thunder Basin National Grasslands. The average number of acres sprayed annually on the Little Missouri National Grassland during this period was about 15,700. Spraying on this national grassland occurred during 8 out of 10 years from 1988 through 1997, with no spraying in 1996 and 1997. In 1985 and 1986, 369,000 and 257,000 acres, respectively, were treated by aerial spraying on the national grassland. The last grasshopper-spraying project on the Thunder Basin National Grassland occurred in 1988 when about 150,000 acres of public land were sprayed. Aerial spraying over large blocks of the Buffalo Gap National Grassland occurred during the early 1980s, but acreage information could not be located.

## Environmental Consequences

### *Resource Protection Measures*

Resource protection alternatives are evaluated and described in environmental analyses and decision documents issued by APHIS. Therefore, management direction for grasshopper damage does not vary among the alternatives evaluated and considered by the Forest Service in this document.

### *Direct and Indirect Effects*

#### Effects by Alternative

Direction and the expected amount of grasshopper damage control on NFS lands do not vary among alternatives.

### Effects from Fish and Wildlife Management

Direction is provided to mitigate risks from grasshopper spraying and baiting to plant and animal species at risk. This direction does not vary among alternatives.

### Effects from Range Management and Livestock Grazing

Some research indicates that livestock grazing intensity influences grasshopper populations. Heavier grazing intensities usually result in increased grasshopper densities, while lower grasshopper densities can be expected where livestock grazing is more moderate. Therefore, grasshopper damage complaints would likely be greater under Alternatives 1 and 2 because of the higher grazing intensities. Grasshopper damage complaints would be expected to be lower under Alternatives 3, 4, and 5 because of lower livestock grazing intensities.

## *Cumulative Effects*

Cumulative effects are addressed in the APHIS environmental analyses.

# Rangeland and Forest Health

## I. Introduction

Rangeland and forest health are discussed in this section in terms of vegetation composition and structure, plant and animal diversity, soil stability, water quality, and ecosystem function and process.

## II. Reader's Guide to this Section

The following outline is provided to assist in understanding this section. As mentioned above, this section is divided into several main topics: plants, animals, soil and water, and process and function. For each of these topics, the affected environment is described, followed by environmental effects.

**III. Laws, Policy, and Direction**

**IV. Key Indicators**

**V. Overview of Analysis Area**

**VI. Plants - Affected Environment**

- A. Grasslands
- B. Shrublands
- C. Forest
- D. Rare Plant Communities
- E. Species at Risk

**VII. Plants - Environmental Consequences**

- A. Grasslands
- B. Shrublands
- C. Forest
- D. Rare Plant Communities
- E. Species at Risk

**VIII. Animals - Affected Environment**

- A. Species at Risk
  - 1. Aquatic
  - 2. Terrestrial
- B. Management Indicator Species

**IX. Animals - Environmental Consequences**

- A. Species at Risk
  - 1. Aquatic
  - 2. Terrestrial
- B. Management Indicator Species

**X. Affected Environment - Soil and Water**

**XI. Environmental Consequences - Soil and Water**

**XII. Affected Environment - Process and Function**

**XIII. Environmental Consequences - Process and Function**

# III. Laws, Policy, and Direction

According to National Forest Management Act (NFMA) regulations (CFR 219.26), grassland and forest planning must provide for diverse plant and animal communities consistent with the overall multiple-use objectives of the planning area. The Clean Water Act and the Safe Drinking Water Act are major pieces of federal legislation intended to protect aquatic resources. The Endangered Species Act provides for the conservation of threatened and endangered species. Additional direction for conservation of other species at risk is provided in FSM 2670.

# IV. Key Indicators

- Vegetation composition.
- Vegetation structure.
- Riparian and deciduous woodland regeneration.
- Tree plantation health.
- Disturbance processes (fire, herbivory, and rest).
- Diversity and abundance of native plants and animals.

# V. Overview of Analysis Area

This section discusses the results of broad-scale assessments completed to help understand the context of the planning units within the Northern Great Plains planning area.

## A. Current Land Cover Classes and Changes

The northern Great Plains assessment area falls within three provinces, as depicted by Bailey, et al. 1994, Ecoregions and Subregions of the United States. University of Nebraska-Lincoln, Center for Advanced Land Management Information Technologies (CALMIT) classified the provinces into land cover classes. The cover classes were further aggregated into six cover types. The following table shows the percent of the assessment area by the six cover types. [In this assessment, grassland includes Conservation Reserve Program areas (formerly croplands).]

**Table 3-82. Percent of Assessment Area by Cover Type.**

| Cover Type | Percent of Assessment Area |
|---|---|
| Cropland | 50 |
| Grassland | 42 |
| Forest | 6 |
| Riparian/wetland | 1 |
| Water | 1 |
| Urban | >1 |

The following figure displays these cover types (riparian/wetland, water, urban and areas with no data were lumped in this display). The map also displays the aggregated cover class by ecological province.

**Figure 3-2 here**

Grasslands in the northern Great Plains have been altered through land use practices, resulting in the following estimates of remaining grassland:

**Table 3-83. Percent of Grassland Remaining in Northern Great Plains.**

| Prairie Type | Percent Remaining |
|---|---|
| Short Grass | 50-60 |
| Mixed Grass | 25-35 |
| Tall Grass | 1-4 |

Recent changes in cropland, rangeland, and forestland have been summarized using information from the Natural Resource Conservation Service's National Resource Inventory (NRI) data for the northern Great Plains. The following table shows changes that occurred between 1982 and 1992:

**Table 3-84. Percent Change Between 1982-1992 in Broad Cover Uses.**

| Use | Percent Change |
|---|---|
| Cultivated Cropland | minus 10 |
| Noncultivated Cropland | plus 1 |
| Forestland | minus 2 |
| Rangeland | minus 3 |

Decreases in cultivated cropland, forestland and rangeland resulted primarily from urbanization, such as home subdivisions and roads. The increase in noncultivated cropland is attributed to previously cultivated lands being added to the Conservation Reserve Program (CRP).

The Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) compares the historical extent of rangeland to current urban lands, cropland and rangeland for the ecological sections that include the planning units (109 million acres). The biggest change has occurred in the amount of rangeland being converted to cropland. Of the areas classified as historic rangeland, 75 percent has been converted to cropland, with a majority of this occurring in the eastern portion of the assessment area.

Natural Resource Conservation Service (1996) information describes changes to rivers, lakes and wetlands. In general, acres of rivers have increased about 1 percent, acres of lakes have increased by 1.3 percent, and acres of wetlands have decreased about 3 percent per year.

The Natural Resource Conservation Service (1996) also reports that soil loss from wind erosion on cultivated cropland in the Northern Great Plains averages 3.7 tons/acre/year; wind erosion on rangeland in the northern Great Plains averages 3.4 tons/acre/year. Data for the northern Great Plains also shows that water erosion on cultivated cropland averages 2.3 tons/acre/year; water erosion on rangeland averages 1.2 tons/acre/year.

## B. Functioning Landscapes

The Nature Conservancy (TNC), Augustana College, and the EROS Data Center cooperatively prepared a report on functioning landscapes within the northern Great Plains. The report, titled *Report for The Nature Conservancy, Northern Great Plains Steppe Assessment Map* (Chuluun et al. 1997) delineates relatively "intact" grassland areas larger than 50 square miles (128 square kilometers). Intact areas were those that have not experienced intensive land management and

cultivation. Composition was based on estimates of the percent of grass and forest cover types from Landsat Thematic Mapper satellite imagery at 30-meter resolution. Integrity was based on the size, shape and the relationship of the areas to other "intact" grassland areas. The determination of quality was based on land-use patterns pertaining to agricultural development.

### *North Dakota*

Few intact blocks of grasslands are left in North Dakota. Areas in the eastern part of the state are small and barely meet the threshold size for delineation. The Sheyenne National Grassland is one of the few larger areas in the tallgrass prairie that still classified as grassland. There are a few of the larger grassland blocks of moderate size in western North Dakota, one of which includes the Little Missouri National Grassland.

### *Nebraska*

The largest intact area is in the Sandhills region. The Samuel R. McKelvie National Forest and Bessey Ranger District of the Nebraska National Forest fall within this area.

### *South Dakota*

The Missouri River is a dividing line between two major land-use regions: crop cultivation in the east and livestock grazing in the west. There are a few small grassland areas in eastern South Dakota, but these areas also contain small parcels of cropland. Western South Dakota contains several medium sized grassland blocks. The Buffalo Gap and Grand River National Grasslands are included in these areas. The Oglala National Grassland, in northwestern Nebraska, is part of the contiguous block including the Buffalo Gap National Grassland.

### *Wyoming*

Wyoming has the fewest number but the largest grassland areas and low agricultural cultivation. The largest area is approximately 11,500 square miles, adjacent to another area of approximately 8,400 square miles. The Thunder Basin National Grassland falls within these two areas.

## C. Aquatic Environment

An assessment of the aquatic resources was completed to examine the condition, status and trend of streams, rivers, lakes, wetlands, groundwater and aquatic species in the northern Great Plains. The Northern Great Plains Aquatic Assessment (Johnson 1998) covers the area from central Montana to the Red River Valley of North Dakota and from the Canadian border to the Sandhills of Nebraska. Portions of five states are within the assessment area: Montana, Nebraska, North Dakota, South Dakota and Wyoming. Major threats to aquatic resources were numerous including channelization, draining and dewatering, damming, removal of streamside vegetation, excavation of streambed material, realignment of drainages, point and nonpoint pollution, agriculture, non-point and point pollution, feedlots, fertilizers, pesticides, municipal wastes, mining, oil and gas production, refineries, and introduction of non-native aquatic species. Some of the major findings for the planning area are presented below. Additional site-specific information about impaired watersheds is included in the soil and water section in this chapter.

Most of the watersheds experience mean flows of less than 1,000 cubic feet per second (cfs) and undergo wide variations in flow from year to year. The hydrography of the Missouri River has changed from having two prominent flood peaks each year to a long steady flow covering most of the year. The watersheds with the highest percentages of assessed miles of streams partially supporting and not supporting uses are located in the Red River basin in North Dakota, Missouri River tributaries in South Dakota, the Milk and other Missouri tributaries in Montana and the Platte Basin in Nebraska. The watersheds with the lowest percentages of assessed miles of streams partially supporting and not supporting uses are located in the James River headwaters, Little Missouri River and Missouri River in North Dakota.

The greatest concentration of wetlands in the assessment area occurs in the Prairie Pothole region of North Dakota, South Dakota and Montana. It is estimated that 73 percent of historical wetland acres remain in Montana; 55 percent in North Dakota; 65 percent in South Dakota; 65 percent in Nebraska; and about 60 percent in Wyoming. Most wetland losses have resulted from agricultural activities. The greatest losses since presettlement by percentage have occurred in North Dakota, with the most extensive drainage occurring in the Red River Valley where the Sheyenne National Grassland is located. In the last 10 years, wetland losses overall in the assessment area have been reduced to less than 3 percent per year, and in some areas wetland acreages have actually increased.

Agricultural activities impact the ability of streams to meet designated uses across large portions of the assessment area. Generally, nutrient loading and pesticides appear lower in watersheds associated with the planning units than other portions in the assessment area. The lowest pesticide runoff potential is in western South Dakota, northeastern Wyoming and most of Montana. The potential for nutrient loading is lowest in western South Dakota and northeastern Wyoming. Areas where potentials for nutrient runoff, pesticide detection, and siltation are greatest include watersheds in southeastern North Dakota.

The aquatic assessment listed 18 aquatic species at risk within the planning area. Of the 18 animal species, four are now listed as endangered (pallid sturgeon, Topeka shiner, winged mapleleaf mollusk, fat pocketbook mollusk), and two species are candidates for future protection under the Endangered Species Act (sturgeon chub, sicklefin chub). The other species are ranked as being globally impaired and vulnerable by The Nature Conservancy.

## D. Terrestrial Environment

The Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) focused on the broad-scale status and trend of habitats and ecological processes characteristic of the major biological communities in this region. In this context, the ecological processes that shaped the biological communities of this area are viewed as the tools to maintain and restore the native and endemic biological diversity. This viability approach was conducted under the review and guidance of a committee of scientists, with members selected for their experience in viability assessment or knowledge of Great Plains flora and fauna.

A major finding presented in the assessment report is that the frequency, intensity and spatial patterns of the ecological processes of fire and herbivory that helped shape these communities historically, are much different today. These relatively recent changes have altered vegetation in this region and, in turn, have altered the diversity and abundance of many plant and animal species. The following table includes summaries of the conservation recommendations made in

the assessment report for maintaining viable wildlife populations on and in the vicinity of the national grasslands and forests.

**Table 3-85. Conservation Recommendations.**

| Habitat | Conservation Recommendations |
|---|---|
| Wetland | Projects should maintain and restore integrity of wetlands. Manage for an array of habitat conditions that support endemic species. |
| Coniferous Woodland | Projects should increase the amount of large diameter, open conifer stands within the context of the natural range of variability and potential of the landscape. |
| Deciduous Woodland | Projects should increase the full range of structural diversity within large diameter stands and within the context of the natural range of variability and potential of the landscape. |
| Grassland (shortgrass prairie) | Allotment management plans should provide for a diverse gradient of structure, emphasizing low seral habitats. Management should also optimize prairie dog colonies. |
| Grassland (mixed grass prairie) | Allotment management plans should provide for high degrees of heterogeneity of grassland structure, emphasizing low and high seral habitats. Management should emphasize prairie dog colonies on low seral habitats. |
| Grassland (tallgrass prairie) | Allotment management plans should provide for a high degree of heterogeneity of grassland structure. High seral habitats should be emphasized. Prescribed fire should be a primary tool for nutrient recycling and habitat restoration. |
| Shrubland | Projects and allotment management plans should provide for a diverse gradient of structure, emphasizing older seral habitats. Manage understories to maintain and enhance perennial herbaceous components. |
| Badland | Projects should retain/restore the full spectrum of communities within badlands. Manage towards a reduction in road densities. Reduce the number of water developments for livestock, and restore historic hydrologic regimes. |

The following table summarizes the conservation recommendations made in the assessment report for helping maintain viable populations of native plant species on and in the vicinity of the national grasslands and forests.

**Table 3-86. Conservation Recommendations**

| Plant Community/Guild | Conservation Recommendations |
|---|---|
| Eastern prairie boggy wetlands | Where feasible manage the landscape for maintenance of natural hydrological regimes, restore or maintain the natural wetland mosaic of vegetation communities, and control non-native plant species. Allotment management plans should preclude grazing in these areas. |
| Tallgrass prairie wetlands | Where feasible manage the landscape for maintenance of natural hydrological regimes, restore or maintain the natural mosaic of wetland vegetation communities, and control non-native plant species. Allotment management plans should permit grazing within the framework of historic processes. Properly timed fire and grazing may limit willow/shrub invasion. Management of Off Road Vehicle (ORV) and related recreation is important to reduce direct impacts and colonization by invasive plants. Impacts of proposed grasshopper spraying on insect pollinators should be evaluated. |
| Tallgrass prairie deciduous hardwoods | Where feasible manage the landscape for maintenance of natural hydrological regimes, restore or maintain the natural mosaic of seral vegetation communities including wetlands, and control non-native plant species. Allotment management plans should limit or preclude grazing in these areas. Properly timed fire and grazing may limit willow and shrub invasion. Management of Off Road Vehicle (ORV) and related recreation is important to reduce direct impacts and colonization by invasive plants. Impacts of proposed grasshopper spraying on insect pollinators should be evaluated. |
| Tallgrass prairie | Where feasible manage the landscape for maintenance of natural hydrological regimes, restore or maintain the natural mosaic of seral vegetation communities, and control non-native plant species. Allotment management plans should permit grazing within the framework of historic processes. Properly timed fire and grazing may limit willow and shrub invasion. Management of Off Road Vehicle (ORV) and related recreation is important to reduce direct impacts and colonization by invasive plants. Impacts of proposed grasshopper spraying on insect pollinators should be evaluated. |

| Plant Community/Guild | Conservation Recommendations |
|---|---|
| Tallgrass prairie choppy sandhills | Where feasible manage the landscape for maintenance of natural hydrological regimes. Restore the natural mosaic of seral vegetation communities including early seral sand dunes. Control non-native plant species. Allotment management plans should permit grazing within the framework of historic processes. Properly timed fire and grazing may limit willow and shrub invasion. Management of Off Road Vehicle (ORV) and related recreation is important to reduce direct impacts and colonization by invasive plants. Impacts of proposed grasshopper spraying on insect pollinators should be evaluated. |
| Western sandy plains | Manage projects for maintenance of natural landscape processes and restore or maintain the natural mosaic of seral vegetation communities. Control non-native plant species. Allotment management plans should permit grazing within the framework of historic processes. Impacts of proposed grasshopper spraying on insect pollinators should be evaluated. |
| Buttes | Projects should maintain or restore the full spectrum of communities associated with buttes. Unique habitats associated with buttes should be protected. Road densities should be reduced and fragile butte soils should be protected. Reduce the number of water developments for livestock. Where feasible restore historic hydrologic regimes. Impacts of proposed grasshopper spraying on insect pollinators should be evaluated. |

In addition to the broad-scale community approach described above for assessing viability, a second approach that focused primarily on the effects of alternatives on individual plant and animal species and guilds was also used. This evaluation process is fully described in the Forest Service Manual (FSM 2670) and in the Endangered Species Consultation Handbook (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998) and is documented in the Biological Assessment and Evaluation (FEIS Appendix H and Administrative Record). Biological determinations and risk assessments disclosed in the Biological Assessment and Evaluation address the viability of a large number of individual plant and animal species. A summary of the results is presented later in this section.

# VI. Plants - Affected Environment

## A. Grasslands

### *1. Vegetation Composition*

The acreage of grassland vegetation on each national grassland and forest in the planning area is displayed in the following table. The acreages include intermingled badland, butte and barren areas.

**Table 3-87. Acreage of Grassland Vegetation**

| National Grassland or Forest | Acres of Grassland Vegetation |
|---|---|
| LMNG | 661,700 |
| GR/CRNG | 153,700 |
| SNG | 59,300 |
| FPNG | 110,700 |
| BGNG | 475,800 |
| ONG | 83,600 |
| NNF(PRRD) | 23,800 |
| NNF(BRD) | 76,900 |
| SRMNF | 110,400 |
| TBNG | 67,100 |

Vegetation composition on the planning units is described in terms of existing and potential plant communities (grass, shrub, and trees). These classifications are based on the major species found in the vegetation type. The composition of a plant community changes over time due to the interactions of many factors, such as grazing, fire, and weather. In many cases, the potential composition of these units differs from the existing composition. These differences may imply a difference in primary productivity. Primary productivity is an expression of the ecological efficiency of a site to convert sunlight to plant material. Primary productivity can vary between the successional stages of a plant community. Because primary productivity is difficult to predict and model, vegetation composition is used as a key indicator. The methodology for determining the dominant existing and potential vegetation composition is discussed in Appendix B.

#### Dakota Prairie Grasslands

Existing vegetation and land cover classes on the Dakota Prairie Grasslands were derived from LANDSAT Thematic Mapper (TM) imagery, ground-truth plots, and expert knowledge about vegetation cover types and patterns. The potential grass habitat type is a derived layer in the Geographic Information System used to predict the spatial distribution of biophysical environments associated with habitat types across the grasslands. It should not be confused with a vegetation map in the traditional sense. It represents biophysical settings associated with habitat types based on moisture/temperature gradients across the landscape, which are a

function of soil properties, climate, and vegetation. (Please note: some exotic and invasive plant communities, such as Kentucky bluegrass and leafy spurge on the Sheyenne National Grassland, do not show up in these tables despite their presence over extensive areas.)

The following tables compare existing to potential vegetation types for planning units on the Dakota Prairie Grasslands.

### Grand River/Cedar River National Grasslands

Vegetation types on the Grand River and Cedar River National Grasslands are typical of a mixed-grass prairie. The dominant herbaceous vegetation types include wheatgrass-bluestem-needlegrass and wheatgrass-needlegrass associations.

**Table 3-88. Grand/Cedar River National Grassland (percent of existing upland grass cover classes).**

| Grass Cover Class | Percent of Grassland Acres |
|---|---|
| crested wheatgrass | 18% |
| blue grama - western wheatgrass<br>threadleaf sedge - needle and thread<br>blue grama, needle-and-thread | 71% |
| western wheatgrass - blue grama<br>needle-and-thread, blue grama<br>green needle grass - needle leaf sedge<br>needle-and-thread, threadleaf sedge | 10% |
| western wheatgrass - green needle grass<br>green needle grass - western wheatgrass<br>western wheatgrass, needle-and-thread<br>plains reedgrass - threadleaf sedge<br>little bluestem - threadleaf sedge<br>sand bluestem – sideoats grama | 1% |
| shrubs | less than 1% |
| trees | less than 1% |

**Table 3-89. Grand/Cedar River National Grassland (percent of upland-grass-dominated potential vegetation composition).**

| Grass Habitat Type | Percent of Grassland Acres |
|---|---|
| western wheatgrass-threadleaf sedge | 33% |
| western wheatgrass-needle and thread | 10% |
| western wheatgrass-green needle grass | 22% |
| western wheatgrass-green needle grass-blue gra | 10% |
| needle and thread-threadleaf sedge | 25% |
| shrubs | less than 1% |
| trees | less than 1% |

### Little Missouri National Grassland

The badland areas of the Little Missouri National Grassland contain silver sage, shadscale, creeping juniper and Wyoming big sagebrush shrubland species, including Rocky Mountain juniper forests. The woody draw areas are typical of an ash complex. Riparian areas contain a mix of broadleaf/hardwood/herbaceous species. The Little Missouri National Grassland also has complexes of limber pine and ponderosa pine.

**Table 3-90. McKenzie District, Little Missouri National Grassland (percent of existing upland grass cover classes)**

| Grass Cover Class | Percent of Grassland Acres |
|---|---|
| crested wheatgrass | 4% |
| blue grama- threadleaf sedge<br>club moss - blue grama<br>blue grama - club moss | 6% |
| blue grama - western wheatgrass<br>threadleaf sedge - needle and thread<br>blue grama, needle-and-thread | 17% |
| western wheatgrass - blue grama<br>needle-and-thread, blue grama<br>green needle grass - needle leaf sedge<br>needle-and-thread, threadleaf sedge | 30% |
| western wheatgrass - green needle grass<br>green needle grass - western wheatgrass<br>western wheatgrass, needle-and-thread<br>plains reedgrass - threadleaf sedge<br>little bluestem - threadleaf sedge<br>sand bluestem - sideoats grama | 8% |
| shrubs | 24% |
| trees | 11% |

**Table 3-91. McKenzie District, Little Missouri National Grassland (percent of upland-grass-dominated potential vegetation composition)**

| Grass Habitat Type | Percent of Grassland Acres |
|---|---|
| western wheatgrass-needle and thread | 4% |
| western wheatgrass-green needle grass | 52% |
| western wheatgrass-green needle grass-blue grama | 10% |
| needle and thread-threadleaf sedge | 2% |
| shrubs | 25% |
| trees | 7% |

**Table 3-92. Medora District, Little Missouri National Grassland (percent of existing upland grass cover classes).**

| Grass Cover Class | Percent of Grassland Acres |
|---|---|
| Crested wheatgrass | 7% |
| blue grama- threadleaf sedge<br>club moss - blue grama<br>blue grama - club moss | 5% |
| blue grama - western wheatgrass<br>threadleaf sedge - needle and thread<br>blue grama, needle-and-thread | 24% |
| western wheatgrass - blue grama<br>needle-and-thread, blue grama<br>green needle grass - needle leaf sedge<br>needle-and-thread, threadleaf sedge | 26% |
| western wheatgrass - green needle grass<br>green needle grass - western wheatgrass<br>western wheatgrass, needle-and-thread<br>plains reedgrass - threadleaf sedge<br>little bluestem - threadleaf sedge<br>sand bluestem - sideoats grama | 5% |
| shrubs | 26% |
| trees | 7% |

**Table 3-93. Medora District, Little Missouri National Grassland (percent of upland grass dominated potential vegetation composition).**

| Grass Habitat Type | Percent of Grassland Acres |
|---|---|
| western wheatgrass-needle and thread | 10% |
| western wheatgrass-green needle grass | 49% |
| western wheatgrass-green needle grass-blue grama | 9% |
| needle and thread-threadleaf sedge | 5% |
| shrubs | 20% |
| trees | 7% |

### Sheyenne National Grassland

The Sheyenne National Grassland is one of the last remnants of tallgrass prairie in the United States and includes big bluestem, switchgrass, Indian grass, and rough dropseed (see the following tables). The Sheyenne National Grassland also contains large areas of an oak/savanna type, with the riparian areas dominated by broadleaf/hardwood species.

**Table 3-94. Sheyenne National Grassland (percent of existing upland grass cover classes).**

| Grass Cover Class | Percent of Grassland Acres |
|---|---|
| blue grama- threadleaf sedge<br>club moss - blue grama<br>blue grama - club moss | 2% |
| blue grama - western wheatgrass<br>threadleaf sedge - needle and thread<br>blue grama, needle-and-thread | 11% |
| western wheatgrass - blue grama<br>needle-and-thread, blue grama<br>green needle grass - needle leaf sedge<br>needle-and-thread, threadleaf sedge | 35% |
| western wheatgrass - green needle grass<br>green needle grass - western wheatgrass<br>western wheatgrass, needle-and-thread<br>plains reedgrass - threadleaf sedge<br>little bluestem - threadleaf sedge<br>sand bluestem - sideoats grama | 29% |
| big bluestem - little bluestem | 8% |
| shrubs | 8% |
| trees | 7% |

**Table 3-95. Sheyenne National Grassland (percent of upland grass dominated potential vegetation composition).**

| Grass Habitat Type | Percent of Grassland Acres |
|---|---|
| big bluestem-little bluestem | 20% |
| sand bluestem-sun sedge | 10% |
| blue grama-needle and thread | 14% |
| wooly sedge-northern reedgrass | 51% |
| needle and thread-sun sedge | 4% |
| shrubs | less than 1% |
| trees | less than 1% |

## Medicine Bow-Routt National Forest Unit

### Thunder Basin National Grassland

Thunder Basin National Grassland utilized the analysis methods and ecological site description process developed by the Rocky Mountain Experiment Station, which compare existing species composition on a range or ecological site to the expected climax plant community for the same range or ecological site.

The grassland is in a broad transition area between the plains of the central United States and range physiographic provinces to the west. It occupies a north-south transition area between the southern and middle Rocky Mountains. Because of its location, the Thunder Basin National

Grassland contains plants characteristic of a variety of regions, such as hawthorn, big bluestem, little bluestem, creeping juniper, buffalo grass, blue grama and prickly pear cactus. The area also has extensive areas of sagebrush communities, greasewood and bluebunch wheatgrass. Foothill and lower-elevation mountain species, also occur, such as ponderosa pine, Rocky Mountain juniper, Oregon grape and boxelder.

**Table 3-96. Mix of Vegetation Types on the Thunder Basin National Grassland.**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| blue grama, buffalo grass, western wheatgrass | 14% | 10% |
| western wheatgrass, blue grama | 45% | 15% |
| green needlegrass, western wheatgrass | 4% | 30% |
| shrubs | 31% | 40% |
| trees | 6% | 5% |

## Nebraska National Forest Units

The Nebraska National Forest mainly described vegetation types using the Natural Resource Conservation Service (NRCS) analysis methodology. This process compares existing species composition on a range or ecological site to the expected climax plant community for the same range or ecological site.

### Bessey Ranger District, including Samuel R. McKelvie National Forest

The Bessey Ranger District and Samuel R. McKelvie National Forest are typical Sandhills prairie dominated by sand bluestem, little bluestem, prairie sand reed, sand lovegrass, switchgrass, porcupine grass, and needle-and-thread grass. Dominant broadleaf plants are leadplant, snowberry, rose, sandcherry, plum, chokecherry, silky prairie clover, and stiff sunflower.

**Table 3-97. Mix of Vegetation Types on the Nebraska National Forest (Bessey Ranger District).**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| blue grama, sedge | 16% | 1% |
| little bluestem, switchgrass, sedge | 49% | 1% |
| sand bluestem, prairie sandreed | 3% | 66% |
| shrubs | 10% | 30% |
| trees | 22% | 2% |

**Table 3-98. Mix of Vegetation Types on the Samuel R. McKelvie National Forest.**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| blue grama, sedge | 45% | 1% |
| little bluestem, switchgrass, sedge | 30% | 5% |
| sand bluestem, prairie sandreed | 11% | 78% |
| shrubs | 13% | 15% |
| trees | 1% | 1% |

### Buffalo Gap National Grassland (Fall River Ranger District)

The western half of the Buffalo Gap National Grassland is typical of a mixed-grass prairie. The dominant species are western wheatgrass, buffalo grass, and blue grama. Needle-and-thread and green needlegrass are important associated species. Common shrubs include western snowberry, silver sagebrush, and skunkbrush sumac. Isolated areas of greasewood or sagebrush are also found.

**Table 3-99. Mix of Vegetation Types on the Buffalo Gap National Grassland (Fall River Ranger District).**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| blue grama, buffalo grass | 3% | 13% |
| little bluestem, western wheatgrass | 77% | 6% |
| western wheatgrass, green needlegrass | 8% | 58% |
| shrubs | 10% | 22% |
| trees | 2% | 1% |

### Buffalo Gap National Grassland (Wall Ranger District)

The eastern half of the Buffalo Gap National Grassland contains three major ecosystem types. The wheatgrass/blue grama ecosystem is found in the Pierre Hills and is dominated by western wheatgrass, blue grama, and buffalo grass. The badlands ecosystem is dominated by western wheatgrass and blue grama on drier sites. There is also a predominance of Rocky Mountain Juniper in the badland breaks and drainages. On wetter sites, green needle grass may be present. Riparian and woody draw ecosystems are dominated by cottonwood or green ash with western wheatgrass and buffalo grass as ground cover.

**Table 3-100. Mix of Vegetation Types on the Buffalo Gap National Grassland, Wall Ranger District.**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| blue grama, buffalo grass | 5% | 20% |
| little bluestem, western wheatgrass | 72% | 15% |
| western wheatgrass, green needlegrass | 6% | 51% |
| shrubs | 11% | 9% |
| trees | 6% | 5% |

### Fort Pierre National Grassland

The Fort Pierre National Grassland contains two dominant ecosystem types. The wheatgrass/blue grama ecosystem occurs in the Pierre Hills and is dominated by western wheatgrass and blue grama. The wheatgrass/bluestem/needlegrass ecosystem is present in the Coteau du Missouri area and includes porcupine grass and prairie junegrass.

**Table 3-101. Mix of Vegetation Types on the Ft. Pierre National Grassland.**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| blue grama, buffalo grass, sedge | 12% | 7% |
| western wheatgrass, little bluestem, Big bluesten | 78% | 25% |
| western wheatgrass, little bluestem, green needl | 9% | 66% |
| shrubs | 1% | 2% |

### Pine Ridge Ranger District, including Oglala National Grassland

The Pine Ridge of the Nebraska National Forest is dominated by one major ecosystem unit. The eastern ponderosa pine ecosystem occurs on the Pine Ridge Escarpment and is dominated by ponderosa pine, with needle-and-thread, little bluestem and prairie sandreed as ground cover. The mixed-grass prairie occurs north of the Pine Ridge Escarpment and is dominated by western wheatgrass, green needlegrass and needle-and-thread. The shortgrass prairie ecosystem occurs south of the escarpment and is dominated by buffalo grass and blue grama. The riparian areas are dominated by cottonwood, green ash, and boxelder with blue grama and sedge in the understory.

The Oglala National Grassland contains similar vegetation types typical of a mixed-grass prairie. The dominant species are western wheatgrass, buffalo grass and blue grama. Needle-and-thread and green needlegrass are important associated species. Common shrubs include western snowberry, silver sagebrush and skunkbrush sumac. Isolated areas of greasewood or sagebrush are also found.

Ponderosa pine occurs on the Oglala National Grassland, with ground cover of little bluestem and needle-and-thread. The riparian areas are characterized by cottonwood stands, with western wheatgrass and needle-and-thread ground cover. Woody draws contain ash complexes.

**Table 3-102. Mix of Vegetation Types on the Nebraska National Forest (Pine Ridge Ranger District) and Oglala National Grassland**

| Potential Natural Community | Existing Mix of Vegetation | Potential Mix of Vegetation |
|---|---|---|
| buffalo grass, blue grama, hairy grama, sedge | 16% | 17% |
| little bluestem, big bluestem, western wheatgrass | 42% | 16% |
| western wheatgrass, green needlegrass | 18% | 44% |
| shrubs | 6% | 12% |
| trees | 18% | 11% |

## *2. Vegetation Structure*

The structure (height and density) of grassland vegetation is an important factor influencing the diversity and abundance of plants and animals across the national grasslands and forests. Grassland structure is largely determined by site characteristics, precipitation patterns, and livestock grazing intensity. Visual obstruction readings (VORs) are commonly used to measure grassland structure (Robel et al. 1970, Sousa 1987), and FEIS Appendix B includes more information on the use of this measurement method. VORs represent the height that herbaceous vegetation provides 100%visual obstruction of a round pole placed vertically in the vegetation.

### Little Missouri National Grassland

Grassland structure on flat to gently rolling grasslands was randomly sampled in Slope, Billings, Golden Valley and McKenzie Counties during the fall of 1996, 1997 and 1998. Sites within the canyonlands were not sampled. Samples included clayey, silty and sandy range sites. Monitoring results are presented in the following table.

**Table 3-103. Grassland Structure Levels (percent of transects) After Livestock Grazing on Little Missouri National Grassland.**

| Year | Number of Transects | Average VOR (inches) | | | |
|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4+ |
| 1996 | 221 | 53% | 37% | 6% | 3% |
| 1997 | 230 | 60% | 30% | 8% | 2% |
| 1998 | 207 | 75% | 20% | 3% | 2% |

Growing season (April through September) precipitation during 1996 and 1997 at seven weather stations across the national grassland ranged from average to slightly less than average. Precipitation and resulting growing conditions were highly variable between weather stations in 1998 and were difficult to characterize overall. The results in the above table indicate that grassland structure across much of this unit is strongly skewed towards the lower levels. The extent that this sampling was representative of grassland structure levels across the national grassland is not known.

### Grand River National Grassland

Grassland structure on this national grassland was randomly sampled during the fall of 1995, 1996 and 1997. Soils maps were not available to stratify sampling by soils or range site. Monitoring results for those sites dominated by western wheatgrass and/or blue grama are presented in the following table.

**Table 3-104. Grassland Structure Levels (percent of transects) After Livestock Grazing on Grand River National Grassland**

| Year | Number of Transects | Average VOR (inches) | | | |
|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4+ |
| 1995 | 54 | 24% | 54% | 20% | 2% |
| 1996 | 37 | 54% | 46% | 0% | 0% |
| 1997 | 63 | 59% | 35% | 6% | 0% |

Growing season precipitation during 1995 at two weather stations near the national grassland was 117 and 125 percent of average, indicating favorable plant growing conditions. Precipitation during the 1996 growing season three weather stations was variable and averaged 88, 89 and 132%of normal, and its difficult to characterize precipitation patterns across the grassland with this type of variability. Precipitation and growing conditions during 1997 were unfavorable. The monitoring results suggest that grassland structure on much of the unit is skewed towards the lower and intermediate levels.

### Fort Pierre National Grassland

The information presented in the following table summarizes the structural diversity of grassland vegetation on clayey and shallow clay range sites between 1992-96. These are the

dominant range sites on this national grassland and have similar capabilities to produce structure. Soils maps were used to delineate range sites, and transects were randomly located within a block sample of the national grassland.

**Table 3-105. Grassland Structure Levels (percent area) After Livestock Grazing on Fort Pierre National Grassland.**

| Year | Number of Acres Sampled (% Area) | Average VOR (inches) | | | | | |
|---|---|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4.0-4.9 | 5.0-5.9 | 6+ |
| 1992 | 13,600 (12%) | 0% | 30% | 31% | 10% | 17% | 11% |
| 1993 | 14,600 (13%) | 0% | 8% | 38% | 40% | 2% | 13% |
| 1994 | 15,000 (13%) | 12% | 39% | 26% | 11% | 4% | 8% |
| 1995 | 15,300 (13%) | 2% | 19% | 52% | 8% | 5% | 13% |
| 1996 | 15,200 (13%) | 1% | 34% | 43% | 4% | 7% | 9% |

Precipitation during the monitoring period was characterized as normal to favorable (97 to 142 percent of normal). This data suggests that during this period of average to favorable precipitation, livestock grazing management across this unit resulted in most structure occurring in the intermediate levels.

**Buffalo Gap National Grassland (Fall River Ranger District)**

Grassland structure on the clayey, silty, and sandy range sites on the west half of the Buffalo Gap National Grassland was randomly sampled during the fall of 1995, 1996 and 1997. Results for all range sites combined are presented in the following table.

**Table 3-106. Grassland Structure Levels (percent of transects) After Livestock Grazing on the Buffalo Gap National Grassland (Fall River Ranger District).**

| Year | Number of Transects | Average VOR (inches) | | | |
|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4+ |
| 1995 | 43 | 23% | 21% | 38% | 18% |
| 1996 | 47 | 26% | 41% | 15% | 19% |
| 1997 | 46 | 50% | 32% | 9% | 9% |

Based on precipitation at three weather stations on the grasslands, growing season precipitation in 1995 and 1997 was highly variable between stations and difficult to characterize overall. In 1996, it ranged from average to favorable. This information suggests that structure levels on this area were skewed towards the lower and intermediate levels.

**Buffalo Gap National Grassland (Wall Ranger District)**

Grassland structure on clayey, silty and sandy range sites were randomly sampled on the east half of the Buffalo Gap National Grassland during the fall of 1995 and 1996. Results for all range sites combined on the Wall Ranger District are displayed in the following table.

**Table 3-107. Grassland Structure Levels (percent of transects) After Livestock Grazing on Buffalo Gap National Grassland (Wall Ranger District).**

| Year | Number of Transects | Average VOR (inches) | | | |
|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4+ |
| 1995 | 93 | 15% | 35% | 28% | 22% |
| 1996 | 79 | 11% | 33% | 39% | 16% |

Based on precipitation at three weather stations on the grasslands, growing season precipitation in 1996 ranged from 106 to 129 percent of average, so growing conditions appeared to be favorable. In 1995, the Philip weather station had incomplete data, but precipitation at Cottonwood and Interior was near average to above average.

Grassland structure on this area during these two years was generally at the intermediate levels, with lesser amounts on both the low and high ends of the potential range of values.

**Oglala National Grassland**

Fall grassland structure was randomly sampled in 1994, 1995, and 1996. Monitoring results are presented in the following table.

**Table 3-108. Grassland Structure Levels (percent of transects) After Livestock Grazing on Oglala National Grassland**

| Year | Number of Transects | Average VOR (inches) | | | |
|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4+ |
| 1994 | 28 | 96% | 4% | 0% | 0% |
| 1995 | 28 | 57% | 25% | 14% | 4% |
| 1996 | 28 | 71% | 11% | 11% | 7% |

About 80 percent of the transects were located on sandy, clayey, and limy upland range sites, moderately productive range sites.

Growing season precipitation was obtained from weather stations at Harrison, Nebraska, and Ardmore, South Dakota. The 1994 precipitation ranged from 62 percent of average at Harrison, which is located south of the grassland, to 95 percent of average at Ardmore, which is located just north of the grassland. Precipitation during 1995 and 1996 at both stations was average to above average indicating good growing conditions.

The monitoring results indicate that structure was strongly skewed towards the lower levels. Few transects provided structure at the higher structure levels.

**Nebraska National Forest (Bessey Ranger District)**

Grassland structure measurements in the hills (sands/choppy sands range sites) were taken in 1987, 1988, and 1989. Transects were placed in representative locations within pastures. Results are displayed in the following table.

**Table 3-109. Grassland structure levels (percent area) After Livestock Grazing on Nebraska National Forest (Bessey Ranger District).**

| Year | Number of Acres Sampled (% area) | Average VOR (inches) | | | | |
|---|---|---|---|---|---|---|
| | | < 2 | 2.0-2.4 | 2.5-2.9 | 3.0-3.4 | 3.5+ |
| 1987 | 14,400 (21%) | 21% | 18% | 44% | 18% | 1% |
| 1988 | 13,800 (21%) | 17% | 47% | 20% | 16% | 0% |
| 1989 | 14,300 (21%) | 10% | 37% | 40% | 8% | 5% |

Growing season precipitation at the Halsey nursery weather station was normal to above normal in 1987 and 1988 and normal to below normal in 1989.

These results indicate that most of the grassland structure in the hills occurred mostly in the intermediate levels. Additional modifications in livestock grazing intensities and strategies since these measurements were taken has likely reduced the amount of structure at the lower levels and increased the amount of grasslands at the higher structural levels.

**Samuel R. McKelvie National Forest**

Grassland structure measurements in the hills (sands/choppy sands range sites) were taken in 1992, 1994, and 1995. These measurements were not random across the entire unit but instead were distributed evenly across individual pastures. Results are presented in the following table.

**Table 3-110. Grassland Structure Levels (percent area) After Livestock Grazing in the Hills on the Samuel R. McKelvie National Forest.**

| Year | Number of Acres Sampled (% area) | Average VOR (inches) | | | |
|---|---|---|---|---|---|
| | | < 2 | 2.0-2.4 | 2.5-2.9 | 3+ |
| 1992 | 34,070 (44%) | 71% | 22% | 8% | 0% |
| 1994 | 35,040 (45%) | 22% | 34% | 33% | 12% |
| 1995 | 37,530 (48%) | 22% | 40% | 21% | 16% |

Grassland structure in the more productive valleys and flats (sandy lowland, gravelly and sandy range sites) was also monitored during the same years. These measurements were taken in the same manner as that described above for the hills. Results are presented in the following table.

**Table 3-111. Grassland Structure Levels (percent area) After Livestock Grazing in the Large Valleys and Flats on the Samuel R. McKelvie National Forest.**

| Year | Number of Acres Sampled (% area) | Average VOR (inches) | | | | |
|---|---|---|---|---|---|---|
| | | < 2 | 2.0-2.9 | 3.0-3.9 | 4.0-4.9 | 5+ |
| 1992 | 1,770 (6%) | 68% | 33% | 0% | 0% | 0% |
| 1994 | 2,780 (9%) | 27% | 68% | 5% | 0% | 0% |
| 1995 | 1780 (6%) | 39% | 49% | 13% | 0% | 0% |

Grassland structure levels in the valleys and flats were strongly skewed towards the lower structural levels. Although sampling intensity in these areas was low and not random, visual observations during the monitoring period confirmed that most of these areas that were grazed by livestock during the growing season had minimal structure remaining.

Growing season precipitation at the Valentine weather station and at the nearby Valentine National Wildlife Refuge was above average in 1992 and average in 1994. However, in 1995 growing season precipitation was over 130%of average at both stations, indicating very favorable growing conditions that year. This information suggests that most of the hills provided low to intermediate levels of grassland structure after livestock grazing.

Grassland structure information from visual obstruction readings on the Nebraska National Forest (Pine Ridge Ranger District) and Sheyenne National Grassland is not presented due to small sample sizes and data analysis problems, respectively. Grassland structure on the Thunder Basin National Grassland was not measured.

# B. Shrublands

## *1. Vegetation Composition*

Big sagebrush is the predominant vegetation across much of the Thunder Basin National Grassland and occupies much smaller areas on the Little Missouri and Buffalo Gap National Grasslands. The acreages classified as big sagebrush vegetation are presented in the following table

**Table 3-112. Big Sagebrush Acreage.**

| National Grassland or Forest | Acres of Big Sagebrush |
|---|---|
| LMNG | 8,800 |
| GR/CRNG | 0 |
| SNG | 0 |
| FPNG | 0 |
| BGNG | 15,800 |
| ONG | 1,000 |
| NNF(PRRD) | 0 |
| NNF(BRD) | 0 |
| SRMNF | 0 |
| TBNG | 438,500 |

Mean canopy cover of big sagebrush on the Thunder Basin National Grassland can range as high as 55%. Western wheatgrass, blue grama, threadleaf sedge, prairie junegrass, needle-and-thread and cheatgrass are some of the main understory species. Prairie sandreed is a component of the understory on more sandy sites.

Mean canopy cover of big sagebrush on the Buffalo Gap National Grassland ranges up to 48%but averages 5 to 16%in most areas. Understory species are similar to that occurring on the Thunder Basin National Grassland. Characteristics of the small big sagebrush areas on the Oglala National Grassland are thought to be similar to those areas on the Buffalo Gap National Grassland.

On the Little Missouri National Grassland, mean canopy cover of big sagebrush in several stands ranged from 6 to 17%. Blue grama, western wheatgrass and pricklypear are understory components.

Vegetation communities dominated by other shrub species are found on the national grasslands and forests in the planning area. This includes upland areas and drainages dominated by silver sagebrush, spiny saltbush, sand sagebrush, fringed sagewort, greasewood, rabbitbrush, willow, or other shrubs. Wooded draws and upland thickets dominated by snowberry, buffaloberry, chokecherry, American plum, or other shrubs also occur on the planning units. The combined acreage dominated by shrubs other than big sagebrush is displayed in the following table. The acreages do not include riparian areas dominated by shrubs.

**Table 3-113. Acreage of Other Shrublands.**

| National Grassland or Forest | Acres |
|---|---|
| LMNG | 188,700 |
| GR/CRNG | 1,100 |
| SNG | 2,400 |
| FPNG | 1,000 |
| BGNG | 68,700 |
| ONG | 5,700 |
| NNF(PRRD) | 3,100 |
| NNF(BRD) | 900 |
| SRMNF | 800 |
| TBNG | 31,000 |

### *2. Vegetation Structure*

Both the height of the sagebrush overstory and the height and density of the herbaceous sagebrush understory are key factors in describing the structure of these native communities. Based on a large sample (765) of sagebrush study plots on the Thunder Basin National Grassland, it is estimated that approximately 46%, 49%, and 5%of the sagebrush stands classify as low (<12 inches), moderate (12-23 inches) and high (>23 inches) structure, respectively. All of the sagebrush on the Buffalo Gap National Grassland averages between 6 and 16 inches (low to moderate structure). Average heights on the Little Missouri National Grassland ranged from 13 to 26 inches. Measurements of the height and density of understory vegetation in big sagebrush stands were not available.

Little information was available on the structure in most other shrublands.

## C. Forests

### *Forest Composition and Health*

#### Dakota Prairie Grasslands

Sheyenne National Grassland has several oak savanna stands and river broadleaf forests and woodlands. The Little Missouri National Grassland contains stands of ponderosa pine, cottonwood, bur oak, green ash, aspen, Rocky Mountain juniper, and one stand of limber pine. The health and potential for insect and disease problems have not been evaluated. The following table shows acres of forested land by unit:

**Table 3-114. Forested Land on the Dakota Prairie Grasslands.**

| Unit | Forested Land (acres) |
|---|---|
| Cedar River/Grand River National Grass | 100 |
| Little Missouri National Grassland | 103,500 |
| Sheyenne National Grassland | 3,700 |

## Nebraska National Forest Units

The Pine Ridge area on the Pine Ridge Ranger District contains the largest natural stands of ponderosa pine on any of the planning units. Broadleaf forest containing cottonwood, green ash, box elder, and willow in the riparian areas also occur.

Nebraska National Forest has two large tree plantations on the Bessey Ranger District and the Samuel R. McKelvie National Forest. The largest plantation on the Bessey Ranger District contains about 12,000 acres of ponderosa pine, jack pine, Eastern red cedar, and some Scotch and Austrian pines. The McKelvie unit contains about 3,000 acres of the same species. A Collaborative Group addressing Plantation Management developed 5 alternatives ranging from active conversion of the plantations to a prairie ecosystem to maintaining the existing plantations. This report was completed in October 1997.

Several insect and disease studies have been conducted. A biological evaluation, completed in October 1997, *R2-98-1: Evaluation of Forest Overstory and Regeneration Conditions at the Bessey and McKelvie Ranger Districts of the Nebraska National Forest*, contains management recommendations to regenerate and protect the health of these forested stands. Several other studies have been conducted by the Rocky Mountain Forest and Range Experiment Station. These studies focus on disease in the plantations and indicate a considerable amount of root-rot and fungus in these plantation stands.

Studies and field evaluations in the 1990's for gypsy moth in the Pine Ridge area found gypsy moths present in low numbers on the Pine Ridge, but it has not affected tree stands on National Forest System lands. Gypsy moths were last noted in 1994 on private land near Camp Norwesca southwest of Chadron, Nebraska.

The following table shows acres of forested land by unit:

**Table 3-115. Forested Land on Nebraska National Forest Units**

| Unit | Forested Land (acres) |
|---|---|
| Bessey Ranger District | 11,900 |
| Samuel R. McKelvie National Forest | 2,900 |
| Pine Ridge RD/Oglala National Grassland | 21,900 |

## Thunder Basin National Grassland

Ponderosa pine stands also exist on the Thunder Basin National Grassland. No field studies or inventories have been completed on these stands. The following table shows acres of forested land.

**Table 3-116. Forested Land on the Medicine Bow-Routt National Forest Unit (Thunder Basin National Grassland).**

| Unit | Forested Land (acres) |
|---|---|
| Thunder Basin National Grassland | 9,300 |

### *Forest Structure*

Rocky Mountain Resource Information System (stage two) timber inventories were used to determine the vertical structure of the forest vegetation on the Nebraska National Forest units. Nearly all of the 21,900 forested acres on the Pine Ridge are mature (trees greater than 9 inches in diameter), single-storied stands. The same is true for the Bessey Ranger District and the Samuel R. McKelvie National Forest. On areas that have been thinned and where soils have been disturbed, a regeneration rate of between 50-90 percent has occurred. Regeneration is needed to create multiple age classes and ensure the future health of these stands.

Stage two stand information is not available for Thunder Basin National Grassland or Dakota Prairie Grasslands.

## D. Rare Plant Communities

Maintaining or enhancing biological diversity on the Great Plains requires identification and conservation of ecological communities as well as rare species (Ostlie et al. 1997, Faber-Langendoen et al. 1997). By identifying and conserving intact ecological communities, ecological processes, biotic interactions, and species (including poorly studied or understood taxa like microbes and soil invertebrates) are most likely to be conserved. This type of an approach to conservation of biological diversity includes identifying, inventorying, and conserving rare plant communities.

Rare plant communities known or suspected to occur on the national grasslands and forests in the planning area (see following table) were identified by reviewing data available through NatureServe (2000) and by contacting state Natural Heritage Program ecologists familiar with the plant communities in their respective states. Another key reference for identifying possible rare plant communities was *Rare Plant Communities of the Northern Great Plains*, a report prepared for the Forest Service by Faber-Langendoen et al. (1997).

The Nature Conservancy, the Association for Biodiversity Information, and state Natural Heritage Programs classify plant communities at the association level and then rank them according to their relative endangerment (Grossman and Goodin 1995). The ranking system is intended to help establish national conservation priorities. Community types are ranked on a global, national, and state scale of 1 to 5. A rank of G1 indicates that community type is critically imperiled globally; a rank of G5 implies that the community type is at little to no risk of global elimination.

The G1, G2 (imperiled), and G3 (vulnerable) rare plant communities that occur or may occur on each national grassland and forest in the planning area are presented in the following table. Field surveys on the national grasslands and forests have not been conducted for many of the plant communities so the presence of these communities on NFS lands has not been verified.

**Table 3-117. Rare Plant Communities**

| **Little Missouri National Grassland** |
|---|
| Eastern Cottonwood - Green Ash Forest |
| Rocky Mountain Juniper / Little-seed Mountain-rice Grass Woodland |
| Green Ash - American Elm / Chokecherry Woodland |
| Bur Oak / Chokecherry Woodland |
| Eastern Cottonwood - (Peach-leaf Willow) / Sandbar Willow Woodland |
| Eastern Cottonwood / Rocky Mountain Juniper Floodplain Woodland |
| Eastern Cottonwood / Western Snowberry Woodland |
| Silver Buffaloberry Shrubland |
| American Silverberry / Western Wheatgrass Shrubland |
| Shrubby Cinquefoil / Little Bluestem Shrub Herbaceous Vegetation |
| Ill Scented Sumac / Thread-leaf Sedge Shrub Herbaceous Vegetation |
| Greasewood / Bluebunch Wheatgrass Shrubland |
| Common Rabbitbrush / Bluebunch Wheatgrass Shrubland |
| Western Wheatgrass – Green Needlegrass Herbaceous Vegetation |
| Bluebunch Wheatgrass – Sideoats Grama Herbaceous Vegetation |
| Prairie Sandreed – Sun Sedge Herbaceous Vegetation |
| Little Bluestem – Sideoats Grama, Blue Grama Sand Herbaceous Vegetation |
| Sand Bluestem – Sun Sedge Herbaceous Vegetation |
| Little Bluestem - Plains Muhly Bunchgrass Herbaceous Vegetation |
| **Sheyenne National Grassland** |
| American Basswood - (Bur Oak) / Ironwood Forest |
| Green Ash – American Elm – (Boxelder, American Basswood) Northern Forest |
| Red Osier Dogwood – Beaked Willow, Pussy Willow, Meadow Willow / Bluejoint Shrubland |
| Big Bluestem – (Switchgrass) – Soft-leaf Muhly Herbaceous Vegetation |
| Big Bluestem - Porcupine-grass - Prairie Dropseed Herbaceous Vegetation |
| Sand Bluestem – Sun Sedge Herbaceous Vegetation |
| Prairie Cordgrass – Bluejoint – Sedge Herbaceous Vegetation |
| Little Bluestem - Porcupine-grass - Sideoats Grama, Blue Grama Sand Herbaceous Vegetation |
| Bur Oak - (Northern Pin Oak) / Little Bluestem - Prairie Junegrass Wooded Herbaceous Vegetation |
| **Grand River/Cedar River National Grasslands** |
| Western Wheatgrass – Green Needlegrass Herbaceous Vegetation |
| Three-square Bulrush Herbaceous Vegetation |
| Prairie Cordgrass – Sedge Herbaceous Vegetation |
| Little Bluestem – Sideoats Grama, Blue Grama – Thread-leaf Sedge Herbaceous Vegetation |
| Green Ash – American Elm / Chokecherry Woodland |
| Prairie Sandreed – Sun Sedge Herbaceous Vegetation |
| Silver Buffaloberry Shrubland |
| **Fort Pierre National Grassland** |
| Western Wheatgrass – Green Needlegrass Herbaceous Vegetation |
| Western Wheatgrass – Spikerush Herbaceous Vegetation |
| Prairie Cordgrass – Sedge Herbaceous Vegetation |
| Little Bluestem – Sideoats Grama – Porcupine-grass – (Western Wheatgrass) Herbaceous Vegetation |

**Fort Pierre National Grassland, cont.**
Little Bluestem – Sideoats Grama, Blue Grama – Thread-leaf Sedge Herbaceous Vegetation
Green Ash – American Elm / Chokecherry Woodland
Inland Saltgrass – Foxtail Barley – Alkali-grass – American Sea Blite Herbaceous Vegetation
Silver Buffaloberry Shrubland

**Buffalo Gap National Grassland**
Eastern Cottonwood – Green Ash Forest
Western Wheatgrass – Green Needlegrass Herbaceous Vegetation
Ill Scented Sumac / Thread-leaf Sedge Shrub Herbaceous Vegetation
Western Wheatgrass – Spikerush Herbaceous Vegetation
Rocky Mountain Juniper / Little-seed Ricegrass Woodland
Prairie Sandreed – Needle-and-thread Herbaceous Vegetation
Sand Sagebrush / Prairie Sandreed Shrubland
Prairie Cordgrass – Sedge Herbaceous Vegetation
Inland Saltgrass – Foxtail Barley – Alkali-grass – American Sea Blite Herbaceous Vegetation
Greasewood / Bluebunch Wheatgrass Shrubland
Green Ash – American Elm / Chokecherry Woodland
Eastern Cottonwood – (Peach-leaf Willow) / Sandbar Willow Woodland
Eastern Cottonwood / Switchgrass – Little Bluestem Woodland
Eastern Cottonwood / Western Snowberry Woodland
Three-square Bulrush Herbaceous Vegetation
Little Bluestem – Sideoats Grama, Blue Grama – Thread-leaf Sedge Herbaceous Vegetation

**Oglala National Grassland**
Rocky Mountain Juniper / Little-seed Ricegrass Woodland
Ponderosa Pine / Little Bluestem Woodland
Green Ash – American Elm / Chokecherry Woodland
Western Wheatgrass – Green Needlegrass Herbaceous Vegetation
Cattail – Common Scouring Rush – Sedge Seep Herbaceous Vegetation
Prairie Cordgrass Western Herbaceous Vegetation
Western Wheatgrass – Buffalo Grass – (Wedge-leaf Frog-fruit, Spotted Evening Primrose) Herbaceous Vegetation
Smartweed – *Echinochloa spp.* – Inland Saltgrass Playa Lake Herbaceous Vegetation
Prairie Sandreed – Needle-and-thread Herbaceous Vegetation
Eastern Cottonwood / Switchgrass – Little Bluestem Woodland
Eastern Cottonwood - (Peach-leaf Willow) / Sandbar Willow Woodland

**Nebraska National Forest (Pine Ridge Ranger District)**
Rocky Mountain Juniper / Little-seed Ricegrass Woodland
Ponderosa Pine / Little Bluestem Woodland
Ponderosa Pine / Chokecherry Forest
Eastern Cottonwood / (Peach-leaf Willow) / Sandbar Willow Woodland
Prairie Sandreed – Needle-and-thread Herbaceous Vegetation
Western Wheatgrass – Green Needlegrass Herbaceous Vegetation
Eastern Cottonwood / Switchgrass – Little Bluestem Woodland
Green Ash - American Elm / Ironwood Woodland
Cattail - Common Scouring Rush - Sedge Seep Herbaceous Vegetation

**Nebraska National Forest (Bessey Ranger District)**

Cattail – Common Scouring Rush – Sedge Seep Herbaceous Vegetation
Eastern Cottonwood / Switchgrass – Little Bluestem Woodland
Bluejoint - Rush - Sedge Sandhills Herbaceous Vegetation
Prairie Cordgrass – Bluejoint – Sedge Herbaceous Vegetation
Big Bluestem - Switchgrass Sandhills Herbaceous Vegetation
Eastern Cottonwood - (Peach-leaf Willow) / Sandbar Willow Woodland

**Samuel R. McKelvie National Forest**

Ponderosa Pine / Little Bluestem Woodland
Eastern Cottonwood / Switchgrass – Little Bluestem Woodland
Eastern Cottonwood / (Peach-leaf Willow) / Sandbar Willow Woodland
Prairie Cordgrass – Bluejoint Sedge Herbaceous Vegetation
Big Bluestem - Switchgrass Sandhills Herbaceous Vegetation
Bluejoint - Rush - Sedge Sandhills Herbaceous Vegetation
Cattail - Common Scouring Rush - Sedge Seep Herbaceous Vegetation

**Thunder Basin National Grassland**

Western Wheatgrass - Spikerush Herbaceous Vegetation
Eastern Cottonwood / Western Snowberry Woodland
Boxelder / Chokecherry Forest
Silver Sagebrush / Needle-and-thread Shrub Herbaceous Vegetation
Silver Sagebrush / Prairie Sandreed Shrub Herbaceous Vegetation
Prairie Sandreed – Needle-and-thread Herbaceous Vegetation
Bluebunch Wheatgrass – Sideoats Grama Herbaceous Vegetation
Greasewood / Bluebunch Wheatgrass Shrubland
Birdfoot Sagebrush / Western Wheatgrass Dwarf-shrubland
Gardner's Saltbush / Western Wheatgrass Shrub Herbaceous Vegetation
Eastern Cottonwood / Western Wheatgrass Woodland
Prairie Cordgrass Western Herbaceous Vegetation
Silver Sagebrush / Western Wheatgrass Shrub Herbaceous Vegetation
Black Greasewood / Alkali Sacaton Sparse Vegetation
Western Wheatgrass – Green Needlegrass Herbaceous Vegetation
Rocky Mountain Juniper / Big Sagebrush Woodland
Ponderosa Pine / Sun Sedge Woodland
Ponderosa Pine / Western Wheatgrass Woodland
Ponderosa Pine / Little Bluestem Woodland
Little Bluestem – Sideoats Grama, Blue Grama – Thread-leaf Sedge Herbaceous Vegetation
Three-square Bulrush Herbaceous Vegetation
Western Wheatgrass Herbaceous Vegetation
Prairie Cordgrass– Three-square Bulrush Herbaceous Vegetation

Endemic or near-endemic plant communities that occur only or primarily in the Great Plains are those that should receive the highest management and monitoring priority. Peripheral plant communities that simply extend into the Great Plains and occur primarily outside this region have a lesser priority. The priority G1, G2 and G2G3 endemic or near endemic communities listed in the preceding table are as follows:

- Eastern Cottonwood – Green Ash Forest (G2G3).
- Green Ash – American Elm / Chokecherry Woodland (G2G3).
- Eastern Cottonwood / Rocky Mountain Juniper Woodland (G1G2).
- Eastern Cottonwood / Western Snowberry Woodland (G2G3).
- Eastern Cottonwood / Switchgrass – Little Bluestem Woodland (G2).
- Bur Oak – (Northern Pin Oak) / Little Bluestem – Prairie Junegrass Wooded Herbaceous Vegetation (G2).
- Sand Sagebrush / Prairie Sandreed Shrubland (G2G3).
- Big Bluestem – Porcupine-grass – Prairie Dropseed Herbaceous Vegetation (G2G3).
- Little Bluestem – Porcupine-grass – (Sideoats Grama, Blue Grama) Sand Herbaceous Vegetation (G2G3).
- Saltgrass – Foxtail Barley – Nuttall's Alkali Grass – Seablite Herbaceous Vegetation (G2G3).
- Western Wheatgrass – Spikerush species Herbaceous Vegetation (G1).
- Western Wheatgrass – Buffalo Grass – (Wedge-leaf Frogfruit, Spotted Evening Primrose) Herbaceous Vegetation (G2G3).

## E. Species at Risk

Plant species in this analysis include those that meet one of the following criteria:

- Species protected under the Endangered Species Act (ESA) and at risk range-wide.
- Species that is globally imperiled (G-2) or vulnerable (G-3) and/or candidate for protection under ESA.
- Species that may be at risk regionally or at a more local level.

Other than ESA candidate species, each of the species included under the last two criteria also had to be classified as sensitive by the Forest Service to be classified as a species at risk for the purposes of the FEIS analyses. Using these criteria, forty-seven species at risk were identified (see following table). All the species included in the table are terrestrial plants although many occur in wetlands and riparian habitats. More detailed information on populations, habitat and distribution of these species is available in the Biological Assessment and Evaluation (FEIS Appendix H). All of the species are known or suspected to occur on or near one or more of the national grasslands and forests in the planning area.

Two federally listed species, blowout penstemon (endangered) and western prairie fringed orchid (threatened), occur on the planning units. Blowout penstemon populations on the Nebraska National Forest (Bessey Ranger District) are the result of recent transplants. This species grows in active sand dunes where winds create localized erosion sites (blowouts) on vegetated sand dunes. Suitable habitat for this species has undergone large reductions as range management, planned grazing systems and fire suppression increase vegetative cover across

the Nebraska Sandhills. The distribution of this endemic species is restricted to the Nebraska Sandhills and one additional population in eastern Wyoming. A national recovery plan for this species (U.S. Fish and Wildlife Service 1992) identifies the need to initially restore the species through transplants into the remaining suitable habitat. The species is successfully grown in greenhouses for transplant into suitable habitat. Western prairie fringed orchid occurs primarily in wetlands on the Sheyenne National Grassland. There's two other population centers for this species occurring in Minnesota and Manitoba. Major threats to the species include wetland loss and degradation, habitat fragmentation, and invasive non-native plant species. Livestock grazing, mowing and fire can be beneficial or destructive depending on numerous factors including timing, intensity, and frequency. The national recovery plan for this species (U.S. Fish and Wildlife Service 1996) focuses on protecting the habitat of remaining populations from conversion to agricultural use and assuring that land use practices are compatible with enhancing and maintaining orchid populations. A recovery strategy (Appendix N of the revised Dakota Prairie Grasslands Land and Resource Management Plan) has also been prepared to help conserve and protect orchid habitat on the Sheyenne National Grassland.

**Table 3-118. Plant Species at Risk.**

| | National Grassland or Forest | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Classification [1]** | **LMNG** | **GRCRNG** | **SNG** | **TBNG** | **BGNG** | **FPNG** | **ONG** | **NNF PRRD** | **NNF BRD** | **SRMNF** |
| Blowout Penstemon | Endangered | | | | | | | | | K | PSH |
| Western Prairie Fringed Orchid | Threatened | | | K | | | | | | PSH | PSH |
| Dakota Buckwheat | FS – Sensitive (R1 and 2)<br>G-3 | K | K | | | K | | P | | | |
| Smooth Goosefoot | FS – Sensitive (R1)<br>G-3 | K | K | | | P | | | | P | K |
| Barr's Milkvetch | FS – Sensitive (R1)<br>G-3 | | | | K | K | | P | | | |
| Labrador bedstraw | FS – Sensitive (R1) | | | K | | | | | | | |
| Marsh bellflower | FS – Sensitive (R1) | | | K | | | | | | P | K |
| Buckbean | FS – Sensitive (R1) | | | K | | | | | | | |
| Nodding buckwheat | FS – Sensitive (R1) | K | | | P | P | | P | | | |
| Slender cottongrass | FS – Sensitive (R1) | | | K | | | | | | P | P |
| Lanceleaf cottonwood | FS – Sensitive (R1) | K | | | P | P | | | | | |
| Torrey's cryptantha | FS – Sensitive (R1) | K | | | P | | | | | | |
| Dogberry | FS – Sensitive (R1) | | | K | | | | | | | |
| Crested shield fern | FS – Sensitive (R1) | | | K | | | | | | P | P |
| Marsh fern | FS – Sensitive (R1) | | | K | | | | | | P | K |
| Oak fern | FS – Sensitive (R1) | | | K | UQ | | | | | | |
| Sensitive fern | FS – Sensitive (R1) | | | K | | | | | | P | K |
| Leathery grape-fern | FS – Sensitive (R1) | | | K | | | | | | | |
| Little grape-fern | FS – Sensitive (R1) | | | K | | | | | | | |
| Spinulose woodfern | FS – Sensitive (R1) | | | K | | | | | | P | K |
| Northern lady-fern | FS – Sensitive (R1) | | | K | | | | | | | |
| Shining flatsedge | FS – Sensitive (R1) | | | K | UQ | | | | | P | P |
| Umbrella flatsedge | FS – Sensitive (R1) | | | K | | | | | | P | P |
| Frostweed | FS – Sensitive (R1) | | | K | UQ | | | | | P | P |
| Broad-leaved goldenrod | FS – Sensitive (R1) | | | K | | | | | | | |

| | | National Grassland or Forest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Classification [1]** | **LMNG** | **GRCRNG** | **SNG** | **TBNG** | **BGNG** | **FPNG** | **ONG** | **NNF PRRD** | **NNF BRD** | **SRMNF** |
| Beach heather | FS – Sensitive (R1) | | | K | | | | | | | |
| Marsh horsetail | FS – Sensitive (R1) | | | K | | | | | | | |
| Meadow horsetail | FS – Sensitive (R1) | | | K | | | | | | | |
| Sand lily | FS – Sensitive (R1) | K | P | | P | P | | P | P | P | P |
| Blue lips | FS – Sensitive (R1) | K | | | P | P | | P | | | |
| Alyssum-leaf phlox | FS – Sensitive (R1) | K | P | | P | P | | P | P | | |
| Limber pine | FS – Sensitive (R1) | K | | | | | | | | | |
| Upright pinweed | FS – Sensitive (R1) | P | | K | | | | | | P | P |
| Alkali sacaton | FS – Sensitive (R1) | K | P | | P | P | | P | | | |
| Purple sandgrass | FS – Sensitive (R1) | | | K | | | | | | P | P |
| Delicate sedge | FS – Sensitive (R1) | | | K | | | | | | | |
| Foxtail sedge | FS – Sensitive (R1) | | | K | | | | | | | |
| Handsome sedge | FS – Sensitive (R1) | | | K | | | | | | | |
| Showy lady's slipper | FS – Sensitive (R1) | | | K | | | | | | | |
| Small white lady's slipper | FS – Sensitive (R1) | | | K | | | | | | P | P |
| Wahoo spindle-tree | FS – Sensitive (R1) | | | K | | | | | | | |
| Golden stickleaf | FS – Sensitive (R1) | K | | | | | | | | | |
| Adder's tongue | FS – Sensitive (R1) | | | K | | | | | | P | K |
| Hooker's townsendia | FS – Sensitive (R1) | K | | | P | K | | P | | | |
| Loesel's twayblade | FS – Sensitive (R1) | | | K | | | | | | P | K |
| Bog willow | FS – Sensitive (R1) | | | K | | | | | | | |

[1] All species beginning with Labrador bedstraw and ending with bog willow are ranked as G4 (apparently secure globally) or G5 (secure globally).

K = Known occurrence in vicinity; date of last observation suggests that species still occurs in area

P = Possible but unconfirmed occurrence

PSH = Species occurrence is unlikely or questionable; within species range and potential or suitable habitat may occur (used only for federally-listed species)

UQ = Species occurrence is unlikely or questionable; within species range and potential or suitable habitat may occur (used only for candidate, sensitive and state-listed species)

Dakota buckwheat is endemic to western North and South Dakota and southeast Montana. The Little Missouri and Buffalo Gap National Grasslands contain some of the most extensive populations of this species. The species occurs in badlands areas along toeslopes of eroding formations. Barr's milkvetch is another endemic species to this region and also occurs where other vegetation is sparse. This species occurs in association with eroding sandstone or siltstone. It occurs on the Buffalo Gap and Thunder Basin National Grassland and might also occur on the Oglala National Grassland. Suitable habitats for these species are somewhat limited and there doesn't appear to be any widespread threats to these species. Off-road vehicle travel and invasive plant species may be local threats. The national grasslands provide valuable habitat for these endemic species. Smooth goosefoot is another globally vulnerable species (G-3) but is not endemic to this area and has a wider distribution. It occurs on the Little Missouri and Grand River National Grasslands and Samuel R. McKelvie National Forest. It may also occur on the Buffalo Gap National Grassland and Nebraska National Forest (Bessey Ranger District). It primarily occurs in sandy areas and sandy riverbanks. All three species share the common characteristic of being early successional species occupying erosion sites.

Many of the sensitive plant species occur in similar habitats with other sensitive species. These groups of species are referred to as plant guilds. Summary descriptions of the guilds are provided below.

**The eastern prairie boggy wetlands** guild is a large guild and includes marsh bellflower, delicate sedge, Labrador bedstraw, Loesel's twayblade, crested shield fern, slender cottongrass, spinulose woodfern, sensitive fern, showy lady's slipper, shining flatsedge, marsh fern, marsh horsetail, umbrella flatsedge, bog willow, buckbean and meadow horsetail. These species are associated with bogs, calcareous fens, springs, boggy woodlands and green ash/basswood forests on the Sheyenne National Grassland. Marsh bellflower, Loesel's twayblade, spinulose woodfern, marsh fern and sensitive fern are also found on wet sites on the Samuel R. McKelvie National Forest. Current management practices that may affect the viability of the species in this group include off-site drainage, off-site pumping, invasive exotic plants, lack of fire, and livestock grazing.

**The tallgrass prairie wetlands** guild includes little grapefern, Adder's tongue, and small white lady's slipper. The species occur on the Sheyenne National Grassland in areas with high groundwater tables, including lowlands swales, wetland depressions, and marshes. Off-site drainage and other activities that alter hydrology, lack of fire, competition from exotic plants, grazing and mowing are some of the primary management considerations associated with the viability of the species within this guild.

**The tallgrass prairie deciduous hardwoods** guild includes northern ladyfern, oak fern, foxtail sedge, dogberry, leathery grapefern, and broad-leaved goldenrod. This guild occurs primarily in the hardwood forests and woodlands found on the Sheyenne National Grassland. Invasive plant species, alteration of hydrologic regimes, and livestock trampling are primary threats to this guild.

**The tallgrass prairie choppy sandhills** guild includes beach heather, frostweed, purple sandgrass, and wahoo spindle-tree. This guild is found in the choppy sandhills intermingled with oak savannah on the Sheyenne National Grassland. Primary threats to some species in this group vary, and the Biological Assessment and Evaluation (FEIS Appendix H) should be consulted.

**The western plains riparian** guild includes lanceleaf cottonwood, Alkali sacaton, and blue lips. All currently known populations of these species occur on the Little Missouri National Grassland. Drainage, water impoundments and other activities that alter hydrology, competition from exotic plants, herbicide use, and livestock grazing are some of the primary management considerations associated with the viability of the species within this guild.

**The sandy** guild is small with only two sensitive plant species, sand lily and nodding buckwheat. This guild is more widespread in the planning area than some of the previously described guilds, and threats are similar to the previous guilds.

**The scoria hills** guild also includes only two sensitive plant species, golden stickleaf and limber pine. These species occupy scoria hills, scoria knobs, and rocky outcrops. This guild is found on the Little Missouri National Grassland and represents the only population of limber pine in North Dakota. Porcupines damage and kill limber pine.

**The buttes** guild includes nodding buckwheat, Torrey's cryptantha, alyssum-leaved phlox, and Hooker's townsendia. Three of these species are narrow range specialists while one is a mid-range specialist. All are known from one population each, and all occur on butte landforms on the Little Missouri National Grassland. Threats from livestock grazing, trampling and invasive plants are considered the primary threats to the local viability of these species.

It is likely that some of the plant guilds and their member species may also occur in association with rare plant communities identified earlier in this section (Susan Rinehart, correspondence dated 12/01/2000). If this does occur, it would be another illustration of the importance of managing at the biological community scale. The conservation recommendations in the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) for plant communities were helpful in developing management direction for these important botanical resources.

# VII. Environmental Consequences - Plants

## A. Grasslands

### *1. Vegetation Composition*

#### Effects by Alternative

The vegetation composition and structure of the planning units will continue to be influenced by the same succession and disturbance processes that shaped them but at different frequencies and intensities. The alternatives would influence vegetation by the degree to which natural disturbance events are allowed to operate, and by the levels of various human-caused disturbances, such as logging or grazing.

Plant succession is defined as the progressive replacement of plant communities on an ecological site that leads to the climax plant community. The vegetation composition that may result from interactions between succession and disturbance can only be described in general terms because they are difficult to predict. Disturbance greatly influences plant succession. As a result, often the successional pathway is not linear and does not follow a single pathway, making it difficult to predict seral stage. Monitoring existing vegetation composition and structure conditions can help in determining seral stage. Also, correlations can be made about management activities and desired vegetation conditions.

The following section describes desired early, mid, and late seral stages for the Dakota Prairie Units by Geographic Area

**Dakota Prairie Grasslands**
**Grand/Cedar Geographic Area**

Desired seral stages (plant species composition) and vegetation structure across the geographic area are as follows:

| Desired Seral Stages - Objective | | |
|---|---|---|
| Early | Mid | Late |
| 10 to 15% | 65 to 75% | 15 to 20% |

The potential mix of seral conditions within this geographic area (GA) is very diverse due to the influences of precipitation, soil types, and disturbances such as grazing and fire. Descriptions of species dominance/co-dominance associated with early, mid and late seral conditions follow below. Seral stages are aggregated into sites having similar soil texture and/or topographic features; together they provide an overview of the entire GA. Although dune and badland soils/topography are present within this GA, they are not of significant size and would not be discussed further. The following descriptions incorporate information from NRCS Range Site descriptions and *Rangeland Cover Types of the United States* (Society for Range Management 1994).

**Early seral:** This seral condition would most commonly occur in and around prairie dog towns, and in isolated areas of high livestock use such as around water developments or concentration areas near fences or natural barriers. This seral condition is important in providing habitat for prairie dogs and low structure obligate species. These sites often contain large areas where club moss is a dominant floristic feature.

- Sandy soil sites – Dominated by blue grama, sedge, and annual forbs. Mid and tall grass species such as prairie sandreed, needle-and-thread grass, western wheatgrass, and little bluestem are conspicuously absent. Many areas of bare soil can be present.
- Silty soil sites – Dominated by blue grama, annual forbs, fringed sage, and broom snakeweed. Mid and tall grass species such as western wheatgrass, needle-and-thread grass and green needlegrass are conspicuously absent. Many areas of bare soil can be present.
- Clay soil sites – Dominated by blue grama, annual forbs and annual grasses. Mid and tall grass species such as green needlegrass, needle-and-thread grass, western wheatgrass, and little bluestem are conspicuously absent. Many areas of bare soil can be present.
- Shallow soil sites – Dominated by blue grama, annual forbs, and annual grasses. Mid and tall grass species such as little bluestem and western wheatgrass are conspicuously absent. Many areas of bare soil can be present.
- Overflow sites – Dominated by blue grama, annual forbs, and Kentucky bluegrass. Tall and mid grass species such as big bluestem, needle-and-thread grass, and prairie sandreed are conspicuously absent. Water tables are usually lowered and some bare soil can be present.

**Mid seral***:* This seral expression can provide opportunities for achieving high structure as it moves toward late seral conditions and mid/tall grass species begin to increase. The species mix found in mid seral conditions is highly variable.

- Sandy soil sites – Blue grama, upland sedges, and Kentucky bluegrass primarily dominate in earlier mid seral conditions although sand dropseed and sideoats grama may be present in limited quantities. Blue grama continues to dominate as movement begins toward the latter stages of mid seral condition where prairie sandreed, needle-and-thread grass, and western wheatgrass begins to replace it as a dominant in the later mid seral condition. High structure can be achieved as this habitat type moves toward late seral conditions.
- Silty soil sites – Blue grama and sedge are primarily dominant in earlier mid seral conditions. These species continue to be present in large amounts as movement begins toward a higher seral condition where little bluestem and prairie Junegrass become more prominent in mid seral conditions. Western wheatgrass, needle-and-thread grass, and green needlegrass begin to replace these species as this habitat type moves toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.
- Clay soil sites – Blue grama and upland sedges primarily dominate in earlier mid seral conditions although buffalo grass, inland saltgrass, and needle grasses can be present in limited quantities. Blue grama continues to be present in large amounts as movement begins toward a higher seral condition where western wheatgrass and green needlegrass begin to appear in the composition. These two species begin to become co-dominant as these sites move toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.
- Shallow soil sites – Blue grama dominates early mid seral conditions, with limited occurrences of green needlegrass and needle-and-thread grass. Blue grama continues to be present in large amounts as movement begins toward a higher seral condition with associated increases of green needlegrass and needle-and-thread grass in mid seral conditions. Western wheatgrass, needle-and-thread grass, green needlegrass, and sideoats grama begin to replace blue grama as this habitat type moves toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.
- Overflow sites – Blue grama and Kentucky bluegrass tend to be more dominant in earlier mid seral conditions. As this type moves to the latter mid seral condition, switchgrass, sideoats grama, prairie sandreed and green needlegrass increase and becomes more prominent. Big bluestem and western wheatgrass begin to replace these species as this habitat type moves toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.

**Late seral**: This seral expression provides the best opportunity for achieving high structure objectives on all habitat types.

- Sandy soil sites – Dominated by prairie sandreed, needle-and-thread grass, and little bluestem. Associated species include lesser amounts of sand bluestem, sideoats grama, western wheatgrass, and sand dropseed. In some areas big bluestem can be an important component and blue grama may be present in limited (less than 10% by composition) quantities.
- Silty soil sites – Dominated by western wheatgrass, needle-and-thread grass, and green needle grass. Associated species include lesser amounts of little bluestem, sedge and prairie Junegrass. This seral condition also may contain limited (less than 10% by composition) occurrence of blue grama.
- Clay soil sites – Dominated by western wheatgrass, needle-and-thread grass, and green needlegrass. Contains lesser amounts of buffalo grass, needleleaf sedge, and inland saltgrass. On thinner clay sites this seral condition may also contain limited (10-15% by composition) occurrence of blue grama.
- Shallow soil sites – Dominated by little bluestem. Associated species include lesser amounts of western wheatgrass, sideoats grama, needle-and-thread grass, and green needlegrass. On very shallow soils, blue grama and needle-and-thread grass dominate. This seral condition may also contain limited (less than 10% by composition) occurrence of blue grama.
- Overflow sites – Dominated by big bluestem and western wheatgrass. Associated species include lesser amounts of prairie sandreed, green needlegrass, sideoats grama, and switchgrass.

**Badlands Geographic Area**

Desired seral stages (plant species composition) and vegetation structure across the geographic area are as follows:

| Desired Seral Stages - Objective | | |
|---|---|---|
| Early | Mid | Late |
| 10-15% | 65-75% | 15-20% |

The potential mix of seral conditions within this Geographic Area (GA) is very diverse, due to the influence of precipitation, soil types, and disturbances such as grazing and fire. Descriptions of species dominance/co- dominance associated with early, mid, and late seral conditions follow below. Seral stages are aggregated into sites having similar soil texture and/or topographic features. Together they provide an overview of the entire GA. These descriptions incorporate information from the NRCS Range Site descriptions and *Rangeland Cover Types of the United States* (Society for Range Management 1994).

**Early seral:** This seral condition would most commonly occur in and around prairie dog towns, and in areas of intensive livestock use such as around water developments or concentration areas near fences or natural barriers. This seral condition is important in providing habitat for prairie dogs and low structure obligate species.

- Steep south and west aspect slopes (all soil types) – Primarily short grasses such as blue grama and buffalo grass along with upland sedges, fringed sage, annual forbs and shrubs. Mid and tall grass species such as western wheatgrass, needle-and-thread grass, and prairie sandreed are conspicuously absent.
- Moderate slopes (less than 35% on all soil types) – Primarily short grasses such as blue grama and buffalo grass along with upland sedges, fringed sage, annual forbs and shrubs. Mid and tall grass species such as western wheatgrass, needle-and-thread grass, and green needlegrass, are conspicuously absent. Occurrences of bare soil can increase significantly from late or mid seral conditions.
- Saline lowland sites (fine textured soils) – Primarily large increases of inland saltgrass, with varying amounts of foxtail barley, mat muhly, silverweed cinquefoil, and other annual forbs. Mid and tall grass species such as Nuttall alkaligrass, western wheatgrass, and slender wheatgrass are conspicuously absent.

**Mid seral:** This seral expression can provide opportunity for achieving high structure as it moves toward late seral conditions and mid/tall grass species begin to increase. The species mix found in mid seral conditions is highly variable.

- Steep south and west aspect slopes (all soil types) – Species composition is highly variable with blue grama, Sandberg bluegrass, and upland sedges dominating in the early mid seral condition. In the early mid seral condition, blue grama dominates on these sites. As the seral condition improves, blue grama would decrease and western wheatgrass along with needle-and-thread begins to dominate this seral condition.
- Moderate slopes (less than 35% on all soil types) – Species composition is highly variable with blue grama, buffalo grass, Sandberg bluegrass, and upland sedges dominating the early mid seral conditions on clay soils and blue grama, sand dropseed, and upland sedges dominating the early mid seral condition on sandy soils. As the seral condition improves, those species decrease and western wheatgrass and needle-and-thread grass begin to dominate this seral condition.
- Saline lowland sites (fine textured soils) – Inland saltgrass increases as seral condition moves downward to the point where it is very dominant in early seral conditions. Inland saltgrass begins to decrease while Nuttall alkaligrass, alkali cordgrass, western wheatgrass and slender wheatgrass begin to increase and gradually dominate these sites as movement is made toward a higher seral condition.

**Late seral:** This seral expression provides the best opportunity for achieving high structure objectives especially on the moderate slopes.

- Steep south and west aspect slopes (all soil types) – Primarily western wheatgrass, needle-and-thread grass, little bluestem, and blue grama. Important associated species include plains muhly, red threeawn, sideoats grama, and upland sedges. For this seral condition, western wheatgrass and needle-and-thread grass are the dominant/co-dominant species on these sites.

- Moderate slopes (less than 35% on all soil types) – Primarily western wheatgrass, needle-and-thread grass, prairie sandreed, and sand bluestem. Important associated species include Sandberg bluegrass, sand dropseed, needleleaf sedge, and buffalograss on clay sites and Canada wild rye, prairie Junegrass, and upland sedges on sandy sites. For this seral condition, western wheatgrass and needle-and-thread grass are the dominant/co-dominant species on these sites.
- Saline lowland sites (fine textured soil types) – Primarily Nuttall alkaligrass, slender wheatgrass, alkali cordgrass, western wheatgrass, and very limited amounts of inland saltgrass. Important associated species include plains bluegrass, alkali sacaton, and mat muhly.

**Rolling Prairie Geographic Area**

The specific vegetative compositional and structural objectives follow.

Desired Seral Stages Objectives

| Early | Mid | Late |
|---|---|---|
| 10-15% | 65-75% | 15-20% |

The potential mix of seral conditions within this geographic area is very diverse due to the influences of precipitation, soil types, and disturbances such as grazing and fire. Descriptions of species dominance/co-dominance associated with early, mid and late seral conditions follow below. Seral stages are aggregated into sites having similar soil texture and/or topographic features; together they provide an overview of the entire GA. These descriptions incorporate information from the NRCS Range Site descriptions and *Rangeland Cover Types of the United States* (Society for Range Management 1994).

**Early seral:** This seral condition would most commonly occur in and around prairie dog towns, and in areas of intensive livestock use such as around water developments or concentration areas near fences or natural barriers. This seral condition is important in providing habitat for prairie dogs and low structure obligate species. These sites often contain large areas where club moss is a dominant floristic feature.

- Sandy soil sites (deeper soil development) - Dominated by blue grama, threadleaf sedge, sun sedge, and gray sagewort. Mid and tall grass species such as western wheatgrass, needle-and-thread grass, sand bluestem, and little bluestem are conspicuously absent. Many areas of bare soil can be present.
- Clay soil sites (deeper soil development) - Dominated by blue grama, threadleaf sedge, fringed sage, and broom snakeweed. Mid and tall grass species such as western wheatgrass, needle-and-thread grass, and prairie Junegrass are conspicuously absent. Many areas of bare soil can be present.
- Shallow soil sites (primarily loam and sandy loam soil textures) – Dominated by blue grama, threadleaf sedge, fringed sage, cactus and red threeawn. Mid and tall grass species such as western wheatgrass, needle-and-thread grass, plains muhly, and sideoats grama are conspicuously absent. Many areas of bare soil can be present.

**Early seral, cont.**

- Overflow sites (primarily clay and clay loam soil textures) – Dominated by blue grama, sedges, annual forbs, and Kentucky bluegrass. Tall and mid grass species such as big bluestem, needle-and-thread grass, and green needlegrass are conspicuously absent. Many areas of bare soil can be present.

**Mid seral:** This seral expression can provide opportunity for achieving high structure as it moves toward late seral conditions and mid/tall grass species begin to increase. The species mix found in mid seral conditions is highly variable.

- Sandy soil sites (deeper soil development) – Blue grama, upland sedges, and Kentucky bluegrass primarily dominate in earlier mid seral conditions. These species continue to be present in large amounts as movement begins toward a higher seral condition where big bluestem, green needlegrass, and western wheatgrass begin to replace those species. High structure can be achieved as this habitat type moves toward late seral conditions.
- Clay soil sites (deeper soil development) – Blue grama, threadleaf sedge, sun sedge and hairy grama primarily dominate in earlier mid seral conditions. These species continue to be present in large amounts as movement begins toward a higher seral condition where Sandberg bluegrass and upland sedges become a co-dominant in mid seral conditions. Western wheatgrass, needle-and-thread grass, green needlegrass begin to dominate as this habitat type moves toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.
- Shallow soil sites (primarily loam and sandy loam soil textures) – Blue grama and threadleaf sedge primarily dominate in earlier mid seral conditions. These species continue to be present in large amounts as movement begins toward a higher seral condition where Sandberg bluegrass becomes a co-dominant in mid seral conditions. Western wheatgrass, needle-and-thread grass, plains muhly, and sideoats grama begin to replace these species as this habitat type moves toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.
- Overflow sites (primarily clay and clay loam soil textures) – Blue grama and fescue sedge tend to be more dominant in earlier mid seral conditions. As this type moves to the latter mid seral condition, western wheatgrass increases and becomes a co-dominant. Big bluestem, needle-and-thread grass, and green needlegrass begin to replace these species as this habitat type moves toward late seral conditions. High structure can be achieved as this habitat type moves toward late seral conditions.

**Late seral:** This seral expression provides the best opportunity for achieving high structure on all habitat types.

- Sandy soil sites (deeper soil development) – Primarily prairie sandreed, needle-and-thread grass, sand bluestem, and little bluestem. Associated species include lesser amounts of prairie Junegrass, western wheatgrass, and sand dropseed.
- Clay soil sites (deeper soil development) – Primarily western wheatgrass, needle-and-thread grass, green needle grass, and prairie Junegrass. Associated species include lesser amounts of inland saltgrass, Sandberg bluegrass, and buffalo grass.

- Shallow soil sites (primarily loam and sandy loam soil textures) – Primarily western wheatgrass, needle-and-thread grass, and plains muhly. Associated species include lesser amounts of prairie Junegrass, little bluestem, upland sedges, and sideoats grama.
- Overflow sites (primarily clay and clay loam soil textures) – Primarily big bluestem, needle-and-thread grass, and green needlegrass. Associated species include lesser amounts of western wheatgrass, porcupine grass, bearded wheatgrass, and thickspike wheatgrass. Forbs comprise approximately 10% of this habitat type in late seral condition. Typical species include Rydberg's sunflower, tall goldenrod, and tall white aster.

**Sheyenne Geographic Area**

1. The specific vegetative compositional and structural objectives follow.

Desired Seral Stages Objectives

| Early | Mid | Late |
|---|---|---|
| 5-10% | 50-65% | 30-40% |

The potential mix of seral conditions within this GA is very diverse. Although topographic relief is minimal, the extremes in available moisture in the predominately sandy soils of this GA provide distinct vegetation changes within short distances. Although management such as prescribed fire and livestock grazing can have a significant influence on vegetation composition, hydrologic and topographic features such as sand dunes and depressions are the primary influence on floristic composition within the GA.

Blowout areas may be present in the sandy and sand soil sites during any of the seral conditions described below, but are generally more extensive in early seral stages.

Descriptions of species dominance/co-dominance associated with early, mid and late seral conditions are as follows below. Seral stages are aggregated into sites having similar soil texture and/or topographic features; together they provide an overview of the entire GA. These descriptions incorporate information from NRCS Range Site descriptions and *Rangeland Cover Types of the United States* (Society for Range Management 1994). It is important to note that the species composition and characterization of wetlands represents ecological condition as opposed to classic seral condition descriptions.

**Early seral:** Early seral conditions are a natural component of these highly erodible sandhills. Sparsely vegetated dunes in healthy condition provide important habitat for species dependent on early seral conditions. This seral condition would most commonly occur in and around areas of intensive livestock use such as around water developments or concentration areas near fences or natural barriers. This seral condition is important in providing habitat for Richardson's ground squirrel and other low structure obligate species.

- Sandy and sand soil sites in undulating prairie topography – In early seral conditions, blue grama, and annual forbs dominate. Mid and tall grass species are conspicuously absent. Blowout areas are common and would increase in size without changes in management to move them toward a higher seral condition.

**Early seral, cont.**

- Sandy and sand soil sites in choppy sandhills topography – In early seral conditions Kentucky bluegrass, blue grama, sun sedge, and annual forbs such as western ragweed dominate. Mid and tall grass species are conspicuously absent. Western snowberry can be dominant in early seral conditions. Blowout areas are common and would increase in size without management actions to move them toward a higher seral condition.
- Midsites in all topographies – In early seral condition Kentucky bluegrass, sun sedge and blue grama dominate the composition. Forbs such as ragweed, goldenrod, and hoary vervain are prevalent. Blowout areas may occur and would increase in size without management actions to move them toward a higher seral condition.
- Wet meadows (sub irrigated but can be seasonably flooded) – In the early seral condition, Kentucky bluegrass, foxtail barley and Baltic rush dominate. The water table drops in early seral condition creating areas of bare soil dominated by annual forbs.
- Wetlands (water tables at the soil surface with portions continually flooded) – In early seral conditions, Kentucky bluegrass, fowl bluegrass, foxtail barley, and Baltic rush dominate. Water tables drop earlier in the season and there are large areas of bare soil dominated by annual forbs for most of the year.

**Mid seral:** This seral expression can provide opportunity for achieving high structure as it moves toward late seral conditions and mid/tall grass species begin to increase. The species mix found in mid seral conditions is highly variable.

- Sandy and sand soil sites in undulating prairie topography – In the early stages of this seral condition blue grama, Kentucky bluegrass, western yarrow, western ragweed and goldenrod can be present with very limited occurrences of sand dropseed, sun sedge, and prairie Junegrass. As this type moves toward late seral conditions, sand dropseed and blue grama can increase while prairie sandreed, needle-and-thread grass, and little bluestem begin to reappear. In the latter stages of mid seral condition, sand dropseed and hairy grama begin to decrease while prairie sandreed, needle-and-thread grass, little bluestem, and porcupine grass increase. Kentucky bluegrass and blue grama may still be present in moderate amounts in the latter stages of mid seral conditions.
- Sandy and sand soil sites in choppy sandhills topography – In the earlier stages of mid seral condition, Kentucky bluegrass, sun sedge, and hairy grama can dominate. Curlycup gumweed may also dominate in the early stages of mid seral condition. As this type moves toward late seral conditions sideoats grama and needle-and-thread grass begin to reappear through the latter stages of mid seral condition, when prairie sandreed and sand bluestem also begin to reappear and become more visually prominent. Kentucky bluegrass and blue grama can still be present in moderate amounts.
- Midsites in all topographies – In the earlier stages of mid seral condition Kentucky bluegrass, sun sedge, and blue grama mostly dominate the composition. As this type moves toward late seral conditions these species decrease and tall grass species such as big bluestem, indiangrass and switchgrass begin to reappear. In the latter stages of mid seral conditions, those species become a more conspicuous part of the composition and sun sedge and blue grama begin to disappear although they still can be a dominant portion of the composition.

- Wet meadows (sub irrigated but can be seasonally flooded) – In the earlier stages of mid seral conditions, fowl bluegrass, fescue sedge, common spike sedge, Baltic rush, and Kentucky bluegrass dominate. As this type moves toward late seral conditions northern reedgrass and switchgrass begin to reappear. In the latter stages of mid seral conditions, those species begin to dominate and Kentucky bluegrass, fowl bluegrass, and Baltic rush begin to become less evident and northern reedgrass, switchgrass, and woolly sedge begin to dominate.
- Wetlands (water tables at the soil surface with intermingled open water) – In the earlier stages of mid seral conditions, fowl bluegrass, common spike sedge, Baltic rush, and Kentucky grass dominate. As this type moves toward late seral conditions prairie cordgrass and slough sedge begin to become more evident. In latter stages of mid seral conditions, those species begin to dominate and Kentucky bluegrass, fowl bluegrass, and Baltic rush begin to become less evident.

**Late seral:** This seral expression provides the best opportunity for achieving high structure objectives on all habitat types.

- Sandy and sand soil sites in undulating prairie topography – This type is dominated by prairie sandreed, needle-and-thread grass, and prairie Junegrass. Associated species include little bluestem, porcupine grass, sand lovegrass, and blue grama. On less coarse sandy sites, forbs can be an important component (up to 15% by composition) including purple prairie clover, penstemon, and dotted gayfeather. On coarser sand sites, shrubs can also be an important component (up to 10% by composition) including western snowberry, leadplant, and prairie rose.
- Sandy and sand soil sites in choppy sandhills topography – This type is dominated by sand bluestem, prairie sandreed, and needle-and-thread grass. Associated species include sideoats grama, Canada wild rye, and little bluestem. This type also supports a diverse forb life form in late seral conditions including penstemon, stiff sunflower, and prairie spiderwort. Shrubs and tree may be visually conspicuous across the landscape including western snowberry, sumac, leadplant, chokecherry, scattered bur oak, and small clumps of aspen in favored sites.
- Midsites in all topographies – This type is dominated by big bluestem, switchgrass, northern reedgrass, indiangrass, and to a lesser extent, little bluestem. Scattered forbs can include penstemon, large gayfeather, and white prairie clover. This site in late seral conditions provides excellent opportunity for quality prairie chicken nesting habitat.
- Wet meadows (sub irrigated but can be seasonally flooded) –This type is dominated by switchgrass, northern reedgrass, and wooly sedge. This site in late seral conditions can also contain a diverse number of forbs including the western prairie fringed orchid, a federally listed species. Willows can be a component of this type.
- Wetlands (water tables at the soil surface with portions continually flooded) – Extreme yearly and seasonal fluctuations in water depth are characteristic of wetlands. These water fluctuations result in plant composition shifts that may be beyond the influence of specific management activities. Typically, this type can be dominated by prairie cordgrass and several sedge species. Associated species include cattails and bulrushes along the edge of open flooded depressions. Baltic rush can be found in limited quantities, associated primarily with the edge of open water.

The following section describes desired early, mid, and late seral stages for the Thunder Basin National Grassland Units by Geographic Area

**Thunder Basin National Grassland**

**Broken Hills Geographic Area**

Desired seral stages (plant species composition) and vegetation structure (Appendix I) across the geographic area are as follows:

**Desired Seral Stages - Objective**

| Late | Late Intermediate | Early Intermediate | Early |
|---|---|---|---|
| 15 to 25% | 30 to 40% | 25 to 35% | 10 to 20% |

Across the landscape, grass and sagebrush are intermingled. In some areas, grasses are the dominant species; in other areas, sagebrush is the dominant species. The vegetation composition varies depending on seral stage.

In grass-dominated communities in mid to late seral stages, the dominant native grass species are western wheatgrass, needle and thread grass, green needlegrass, and little bluestem. In grass-dominated sites in early to mid seral stages, grasses such as blue grama often dominate. Threeawn and blue grama are commonly the dominant grasses on prairie dog colonies in early seral stage.

In sagebrush-dominated communities, there is more sagebrush in the mid to late seral stages than in early to mid seral stages. As the community moves from early to late seral stage, the percentage of grasses declines. In the understory, the dominant native plant species are western wheatgrass and green needlegrass.

**Cellars Rosecrans Geographic Area**

Desired seral stages (plant species composition) and vegetation structure (Appendix I) across the geographic area are as follows:

**Desired Seral Stages - Objective**

| Late | Late Intermediate | Early Intermediate | Early |
|---|---|---|---|
| 10 to 20% | 20 to 30% | 25 to 35% | 25 to 35% |

Across the landscape, grass and sagebrush are intermingled. In some areas, grasses are the dominant species; in other areas, sagebrush is the dominant species. The vegetation composition varies depending on seral stage.

In grass-dominated communities in mid to late seral stages, the dominant native grass species are western wheatgrass, needle and thread grass, green needlegrass, and little bluestem. In grass-dominated sites in early to mid seral stages, grasses such as blue grama often dominate. Threeawn and blue grama are commonly the dominant grasses on prairie dog colonies in early seral stage.

In sagebrush-dominated communities, there is more sagebrush in the mid to late seral stages than in early to mid seral stages. As the community moves from early to late seral stage, the percentage of grasses declines. In the understory, the dominant native plant species are western

wheatgrass and green needlegrass.

**Fairview Clareton Geographic Area**

Desired seral stages (plant species composition) and vegetation structure (Appendix I) across the geographic area are as follows:

**Desired Seral Stages - Objective**

| Late | Late Intermediate | Early Intermediate | Early |
|---|---|---|---|
| 10 to 20% | 30 to 40% | 30 to 40% | 10 to 20% |

Across the landscape, grass and sagebrush are intermingled. In some areas, grasses are the dominant species; in other areas, sagebrush is the dominant species. The vegetation composition varies depending on seral stage.

In grass-dominated communities in mid to late seral stages, the dominant native grass species are western wheatgrass, needle and thread grass, green needlegrass, and little bluestem. In grass-dominated sites in early to mid seral stages, grasses such as blue grama often dominate. Threeawn and blue grama are commonly the dominant grasses on prairie dog colonies in early seral stage.

In sagebrush-dominated communities, there is more sagebrush in the mid to late seral stages than in early to mid seral stages. As the community moves from early to late seral stage, the percentage of grasses declines. In the understory, the dominant native plant species are western wheatgrass and green needlegrass.

**Hilight Bill Geographic Area**

Desired seral stages (plant species composition) and vegetation structure (Appendix I) across the geographic area are as follows:

**Desired Seral Stages - Objective**

| Late | Late Intermediate | Early Intermediate | Early |
|---|---|---|---|
| 10 to 20% | 30 to 40% | 30 to 40% | 10 to 20% |

Across the landscape, grass and sagebrush are intermingled. In some areas, grasses are the dominant species; in other areas, sagebrush is the dominant species. The vegetation composition varies depending on seral stage.

In grass-dominated communities in mid to late seral stages, the dominant native grass species are western wheatgrass, needle and thread grass, green needlegrass, and little bluestem. In grass-dominated sites in early to mid seral stages, grasses such as blue grama often dominate. Threeawn and blue grama are commonly the dominant grasses on prairie dog colonies in early seral stage.

In sagebrush-dominated communities, there is more sagebrush in the mid to late seral stages than in early to mid seral stages. As the community moves from early to late seral stage, the percentage of grasses declines. In the understory, the dominant native plant species are western wheatgrass and green needlegrass.

**Spring Creek Geographic Area**

Desired seral stages (plant species composition) and vegetation structure (Appendix I) across the geographic area are as follows:

**Desired Seral Stages - Objective**

| Late | Late Intermediate | Early Intermediate | Early |
|---|---|---|---|
| 10 to 20% | 30 to 40% | 30 to 40% | 10 to 20% |

Across the landscape, grass and sagebrush are intermingled. In some areas, grasses are the dominant species; in other areas, sagebrush is the dominant species. The vegetation composition varies depending on seral stage.

In grass-dominated communities in mid to late seral stages, the dominant native grass species are western wheatgrass, needle and thread grass, green needlegrass, and little bluestem. In grass-dominated sites in early to mid seral stages, grasses such as blue grama often dominate. Threeawn and blue grama are commonly the dominant grasses on prairie dog colonies in early seral stage.

In sagebrush-dominated communities, there is more sagebrush in the mid to late seral stages than in early to mid seral stages. As the community moves from early to late seral stage, the percentage of grasses declines. In the understory, the dominant native plant species are western wheatgrass and green needlegrass.

**Upton Osage Geographic Area**

Desired seral stages (plant species composition) and vegetation structure (Appendix I) across the geographic area are as follows:

**Desired Seral Stages - Objective**

| Late | Late Intermediate | Early Intermediate | Early |
|---|---|---|---|
| 15 to 25% | 30 to 40% | 25 to 35% | 10 to 20% |

Across the landscape, grass and sagebrush are intermingled. In some areas, grasses are the dominant species; in other areas, sagebrush is the dominant species. The vegetation composition varies depending on seral stage.

In grass-dominated communities in mid to late seral stages, the dominant native grass species are western wheatgrass, needle and thread grass, green needlegrass, and little bluestem. In grass-dominated sites in early to mid seral stages, grasses such as blue grama often dominate. Threeawn and blue grama are commonly the dominant grasses on prairie dog colonies in early seral stage.

In sagebrush-dominated communities, there is more sagebrush in the mid to late seral stages than in early to mid seral stages. As the community moves from early to late seral stage, the percentage of grasses declines. In the understory, the dominant native plant species are western wheatgrass and green needlegrass.

The following section describes desired early, early intermediate, late intermediate and late seral stages for the Nebraska National Forest and Grassland Units by Geographic Area

**Nebraska National Forest And Grassland Units**
**Bessey Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 30-50% | 30-50% | 1-20% | 1-20% |

The description of the dominant native plant species in the late seral stage is as follows: The sands and choppy sands ecological type will be dominated by sand bluestem while little bluestem will be the codominant species. Prairie sandreed, hairy grama, switchgrass, sedges and sand lovegrass are also important grasses in the late seral stage on this ecological type. On the more productive dry valley ecological type blue grama will be the dominant species while sedges will be the codominant species. Prairie sandreed, sand bluestem, switchgrass, sand lovegrass, and little bluestem are also important grasses on dry valley sites in the late seral stage.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The sands and choppy sands ecological type will be dominated by little bluestem while sand lovegrass will be the codominant species. Sand bluestem, sedges, prairie sandreed, hairy grama, and switchgrass, are also important grasses in the late intermediate seral stage of the sands and choppy sands ecological type. On the more productive dry valley ecological type little bluestem will be the dominant species while sedges will be the codominant species. Switchgrass, blue grama, sand bluestem, hairy grama, and needle and thread are also important grasses on dry valley sites in the late intermediate seral stage.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The sands and choppy sands ecological type will be dominated by hairy grama while little bluestem will be the codominant species. Sand bluestem, sedges, prairie sandreed, switchgrass, and sand lovegrass, are also important species in the early intermediate seral stage of the sands and choppy sands ecological type. On the more productive dry valley ecological type sedges will be the dominant species while blue grama will be the codominant species. Little bluestem, switchgrass, prairie sandreed, sand bluestem, and hairy grama are also important grasses on dry valley sites in the early intermediate seral stage.

The description of the dominant native plant species in the early seral stage is as follows: The sands and choppy sands ecological type will be dominated by sand bluestem while switchgrass will be the codominant species. Sand lovegrass, sedges, little bluestem, prairie sandreed, and blue grama are also important species in the early seral stage of this ecological type. On the more productive dry valley ecological type switchgrass will be the dominant species while sand bluestem will be the codominant species. Little bluestem, prairie sandreed, needle and thread, blue grama, and sedges are also important species on dry valley sites in the early seral stage

**McKelvie Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 30 to 50% | 30 to 50% | 1 to 20% | 1 to 20% |

The description of the dominant native plant species in the late seral stage is as follows: On the more productive dry valley ecological type blue grama will be the dominant species while sedges will be the codominant species. Prairie sandreed, sand bluestem, switchgrass, sand lovegrass, and little bluestem are also important grasses on dry valley sites in the late seral stage. The sands and choppy sands ecological type will be dominated by sand bluestem while little bluestem will be the codominant species. Prairie sandreed, hairy grama, switchgrass, sedges and sand lovegrass are also important grasses in the late seral stage on this ecological type.

The description of the dominant native plant species in the late intermediate seral stage is as follows: On the more productive dry valley ecological type little bluestem will be the dominant species while sedges will be the codominant species. Switchgrass, blue grama, sand bluestem, hairy grama, and needle and thread are also important grasses on dry valley sites in the late intermediate seral stage. The sands and choppy sands ecological type will be dominated by little bluestem while sand lovegrass will be the codominant species. Sand bluestem, sedges, prairie sandreed, hairy grama, and switchgrass, are also important grasses in the late intermediate seral stage of the sands and choppy sands ecological type.

The description of the dominant native plant species in the early intermediate seral stage is as follows: On the more productive dry valley ecological type sedges will be the dominant species while blue grama will be the codominant species. Little bluestem, switchgrass, prairie sandreed, sand bluestem, and hairy grama are also important grasses on dry valley sites in the early intermediate seral stage. The sands and choppy sands ecological type will be dominated by hairy grama while little bluestem will be the codominant species. Sand bluestem, sedges, prairie sandreed, switchgrass, and sand lovegrass, are also important species in the early intermediate seral stage of the sands and choppy sands ecological type.

The description of the dominant native plant species in the early seral stage is as follows: On the more productive dry valley ecological type switchgrass will be the dominant species while sand bluestem will be the codominant species. Little bluestem, prairie sandreed, needle and thread, blue grama, and sedges are also important species on dry valley sites in the early seral stage. The sands and choppy sands ecological type will be dominated by sand bluestem while switchgrass will be the codominant species. Sand lovegrass, sedges, little bluestem, prairie sandreed, and blue grama are also important species in the early seral stage of this ecological type.

**Fall River Northeast Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 20 to 40% | 40 to 60% | 5 to 15% | 5 to 15% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent tall grasses. On clayey, silty, and thin upland range sites western wheatgrass, green needlegrass, porcupine grass, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent shortgrasses. The dominant grass species in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, porcupine grass, blue grama, and sedges. The mix of grasses making up the codominance in the late intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses and to a lesser extent midgrasses. The dominant grass species in the early intermediate seral stage should be blue grama, buffalo grass, western wheatgrass, needle and threadgrass, and sedges. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses with little if any presence of midgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama and buffalograss on all range sites. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses. The early seral stage should be emphasized on the less productive claypan soil types, in and around prairie dog towns, and in isolated areas of high livestock use.

**Fall River Southeast Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 20 to 30% | 40 to 60% | 15 to 25% | 1 to 10% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent tall grasses. On clayey, silty, and thin upland range sites western wheatgrass, green needlegrass, porcupinegrass, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent shortgrasses. The dominant grass species in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, porcupine grass, blue grama, and sedges. The mix of grasses making up the codominance in the late intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses and to a lesser extent midgrasses. The dominant grass species in the early intermediate seral stage should be blue grama, buffalo grass, western wheatgrass, needle and threadgrass, and sedges. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses with little if any presence of midgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama and buffalograss on all range sites. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses. The early seral stage should be emphasized on the less productive claypan soil types, in and around prairie dog towns, and in isolated areas of high livestock use.

**Fall River West Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 10 to 30% | 50 to 70% | 10 to 20% | 1 to 10% |

**Grasses**: The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent tall grasses. On clayey, silty, and thin upland range sites western wheatgrass, green needlegrass, porcupine grass, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent shortgrasses. The dominant grass species in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, porcupine grass, blue grama, and sedges. The mix of grasses making up the codominance in the late intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses and to a lesser extent midgrasses. The dominant grass species in the early intermediate seral stage should be blue grama, buffalo grass, western wheatgrass, needle and threadgrass, and sedges. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses with little if any presence of midgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama and buffalograss on all range sites. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses. The early seral stage should be emphasized on the less productive claypan soil types, in and around prairie dog towns, and in isolated areas of high livestock use.

**Sagebrush Stands:** The dominant native plant species in the understory of big sagebrush stands in the late seral stage is as follows: The late seral stage is dominated by midgrasses such as western wheatgrass, green needlegrass, and needle and thread with shortgrasses especially blue grama and buffalograss being a minor part of the understory component.

The dominant native plant species in the understory of big sagebrush stands in the late intermediate seral stage is as follows: Western wheatgrass is the dominant grass species in the understory with blue grama and buffalograss being the two codominant species.

The dominant native plant species in the understory of big sagebrush stands in the early intermediate seral stage is as follows: The early intermediate seral stage has an understory dominance of blue grama and buffalo grass while western wheatgrass is a lesser component of the understory.

The dominant native plant species in the understory of big sagebrush stands in the early seral stage is as follows: The early seral stage is dominated by shortgrasses such as buffalograss and blue grama. There is also a considerable amount of annual forbs, broom snakeweed, and plains cactus making up the understory of the sagebrush communities in the early seral stage.

**Wall North Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 20 to 40% | 30 to 50% | 10 to 30% | 1 to 20% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of midgrasses and to a lesser extent tall grasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses, while the less productive thin claypan and claypan range sites should be comprised of midgrasses and shortgrasses. On clayey and silty range sites western wheatgrass, green needlegrass, needle and thread, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. The dense clay range sites are comprised of mainly western wheatgrass and green

needlegrass to a lesser extent. On shallow clay range sites, found primarily on the slopes, western wheatgrass, and green needlegrass occur in amounts approximately equal to big bluestem, little bluestem, and sideoats grama. Western wheatgrass, blue grama, and buffalograss should dominate the less productive thin claypan and claypan range site. The mix of grasses making up the codominance on all range sites in the late seral stage will fluctuate according to precipitation and/or grazing intensities. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of midgrasses and to a lesser extent shortgrasses and tall grasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses and short grasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses and to a lesser extent midgrasses. The dominant grass species on clayey and silty range sites in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, blue grama, and sedges. The dense clay range sites are comprised of mainly western wheatgrass. On shallow clay range sites little bluestem, western wheatgrass, and sideoats grama are the dominant species while blue grama and sedges become more abundant. Blue grama, buffalograss and to a lesser extent western wheatgrass will dominate the less productive thin claypan and claypan range sites. The mix of grasses making up the codominance on all range sites in the late intermediate seral stage will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of shortgrasses and to a lesser extent midgrasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses and short grasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses. The dominant grass species on clayey and silty range sites in the early intermediate seral stage should be blue grama, buffalograss, western wheatgrass, needle and thread, and sedges. The dense clay range sites are comprised of mainly western wheatgrass and an increasing amount of forbs. On shallow clay range sites blue grama and threadleaf sedge dominate the site while little bluestem is the remaining midgrass component. The less productive, thin claypan and claypan range sites will be dominated by annual grasses and cactus. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of shortgrasses with little if any presence of midgrasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of short grasses with little presence of midgrasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama, buffalograss and annual grasses on all range sites. The mix of grasses making up the codominance in the early seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses.

**Wall Southeast Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 20 to 40% | 30 to 50% | 10 to 30% | 1 to 20% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of midgrasses and to a lesser extent tall grasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses, while the less productive thin claypan and claypan range sites should be comprised of midgrasses and shortgrasses. On clayey and silty range sites western wheatgrass, green needlegrass, needle and thread, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. The dense clay range sites are comprised of mainly western wheatgrass and green needlegrass to a lesser extent. On shallow clay range sites, found primarily on the slopes, western wheatgrass, and green needlegrass occur in amounts approximately equal to big bluestem, little bluestem, and sideoats grama. Western wheatgrass, blue grama, and buffalograss should dominate the less productive thin claypan and claypan range site. The mix of grasses making up the codominance on all range sites in the late seral stage will fluctuate according to precipitation and/or grazing intensities. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of midgrasses and to a lesser extent shortgrasses and tall grasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses and short grasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses and to a lesser extent midgrasses. The dominant grass species on clayey and silty range sites in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, blue grama, and sedges. The dense clay range sites are comprised of mainly western wheatgrass. On shallow clay range sites little bluestem, western wheatgrass, and sideoats grama are the dominant species while blue grama and sedges become more abundant. Blue grama, buffalograss and to a lesser extent western wheatgrass will dominate the less productive thin claypan and claypan range sites. The mix of grasses making up the codominance on all range sites in the late intermediate seral stage will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of shortgrasses and to a lesser extent midgrasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses and short grasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses. The dominant grass species on clayey and silty range sites in the early intermediate seral stage should be blue grama, buffalograss, western wheatgrass, needle and thread, and sedges. The dense clay range sites are comprised of mainly western wheatgrass and an increasing amount of forbs. On shallow clay range sites blue grama and threadleaf sedge dominate the site while

little bluestem is the remaining midgrass component. The less productive thin claypan and claypan range sites will be dominated by annual grasses and cactus. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of shortgrasses with little if any presence of midgrasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of short grasses with little presence of midgrasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama, buffalograss and annual grasses on all range sites. The mix of grasses making up the codominance in the early seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses.

**Wall Southwest Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 20 to 40% | 20 to 40% | 10 to 30% | 10 to 30% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of midgrasses and to a lesser extent tall grasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses, while the less productive thin claypan and claypan range sites should be comprised of midgrasses and shortgrasses. On clayey and silty range sites, western wheatgrass, green needlegrass, needle and thread, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. The dense clay range sites are comprised of mainly western wheatgrass and green needlegrass to a lesser extent. On shallow clay range sites, found primarily on the slopes, western wheatgrass, and green needlegrass occur in amounts approximately equal to big bluestem, little bluestem, and sideoats grama. Western wheatgrass, blue grama, and buffalograss should dominate the less productive thin claypan and claypan range site. The mix of grasses making up the codominance on all range sites in the late seral stage will fluctuate according to precipitation and/or grazing intensities. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of midgrasses and to a lesser extent shortgrasses and tall grasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses and short grasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses and to a lesser extent midgrasses. The dominant grass species on clayey and silty range sites in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, blue grama, and sedges. The dense clay range sites are comprised of mainly western wheatgrass. On shallow clay range sites little bluestem, western wheatgrass, and sideoats grama are the dominant species while blue grama and sedges

become more abundant. Blue grama, buffalograss and to a lesser extent western wheatgrass will dominate the less productive thin claypan and claypan range sites. The mix of grasses making up the codominance on all range sites in the late intermediate seral stage will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of shortgrasses and to a lesser extent midgrasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of midgrasses and short grasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses. The dominant grass species on clayey and silty range sites in the early intermediate seral stage should be blue grama, buffalograss, western wheatgrass, needle and thread, and sedges. The dense clay range sites are comprised of mainly western wheatgrass and an increasing amount of forbs. On shallow clay range sites blue grama and threadleaf sedge dominate the site while little bluestem is the remaining midgrass component. The less productive thin claypan and claypan range sites will be dominated by annual grasses and cactus. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey and silty range sites) should be comprised mainly of shortgrasses with little if any presence of midgrasses, the moderate productive soils (dense clay and shallow clay range sites) should be comprised of short grasses with little presence of midgrasses, while the less productive thin claypan and claypan range sites should be comprised of shortgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama, buffalograss and annual grasses on all range sites. The mix of grasses making up the codominance in the early seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses.

**Fort Pierre Geographic Area**

The desired plant species composition objective across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 20 to 40% | 30 to 50% | 10 to 30% | 1 to 20% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent tall grasses. On clayey, silty, and thin upland soils western wheatgrass, green needlegrass, porcupinegrass, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. Western wheatgrass, blue grama, and buffalograss should dominate the less productive claypan soil types. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of midgrasses and to a lesser extent shortgrasses, while the less productive claypan soils

should be comprised of shortgrasses and to a lesser extent midgrasses. The dominant grass species in the late intermediate seral should be western wheatgrass with the codominance made up of needle and threadgrass, porcupinegrass, blue grama, and sedges. The mix of grasses making up the codominance in both the late intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses and to a lesser extent midgrasses, while the less productive claypan soils should be comprised of shortgrasses. The dominant grass species in the early intermediate seral stage should be blue grama, buffalo grass, western wheatgrass, needle and threadgrass, and sedges. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses, mainly western wheatgrass, needle and threadgrass, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey, silty, and thin upland soils) should be comprised mainly of shortgrasses with little if any presence of midgrasses, while the less productive claypan soils should be comprised of shortgrasses. The early seral stage will be dominated by sedges, clubmoss, and short grasses such as blue grama and buffalograss on all soil types. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses. The early seral stage should be emphasized on the less productive claypan soil types, in and around prairie dog towns, and in isolated areas of high livestock use.

**Oglala Geographic Area**

The desired plant species composition objectives across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 10 to 30% | 50 to 70% | 10 to 20% | 1 to 10% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (clayey, shallow clay, limy upland, and silty range sites) should be comprised mainly of midgrasses and to a lesser extent tall grasses, while the less productive claypan soils should be comprised of midgrasses and shortgrasses. On clayey and silty range sites western wheatgrass, green needlegrass, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. On shallow clay range sites, found primarily on the slopes of the river breaks, western wheatgrass, ricegrass, and green needlegrass occur in amounts approximately equal to big bluestem, little bluestem, and sideoats grama. Leadplant should also be a common part of the grassland community on the above mentioned range sites in the late seral stage. Western wheatgrass, blue grama, and buffalograss should dominate the less productive claypan range site. Tallgrasses such as big bluestem, switchgrass, and prairie sandreed should be expressed in the overflow or run-in sites.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (clayey, shallow clay, limy upland, and silty range sites) should be comprised mainly of midgrasses and to a lesser extent shortgrasses, while the less productive claypan soils should be comprised of shortgrasses and to a lesser extent midgrasses.

The dominant grass species on clayey and silty range sites in the late intermediate seral stage should be western wheatgrass with the codominance made up of needle and thread, blue grama, and sedges. On shallow clay range sites little bluestem, western wheatgrass, and sideoats grama are the dominant species while blue grama and sedges become more abundant. The mix of grasses making up the codominance on all range sites in the late intermediate seral stage will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses, mainly western wheatgrass and green needlegrass.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (clayey, shallow clay, limy upland, and silty range sites) should be comprised mainly of shortgrasses and to a lesser extent midgrasses, while the less productive claypan soils should be comprised of shortgrasses. The dominant grass species on clayey and silty range sites in the early intermediate seral stage should be blue grama, buffalograss, western wheatgrass, needle and thread, and sedges. On shallow clay range sites blue grama and threadleaf sedge dominate the site while little bluestem is the remaining midgrass component. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities. Overflow sites will be made up of midgrasses and shortgrasses; mainly western wheatgrass, needle and thread, and blue grama.

The description of the dominant native plant species in the early seral stage is as follows: The more productive soils (clayey, shallow clay, limy upland and silty range sites) should be comprised mainly of shortgrasses with little if any presence of midgrasses, while the less productive claypan soils should be comprised of shortgrasses. The early seral stage will be dominated by sedges and short grasses such as blue grama and buffalograss on all range sites. Overflow sites will be dominated by shortgrasses and to a lesser extent midgrasses. The early seral stage should be emphasized on the less productive claypan range sites, in and around prairie dog towns, and in isolated areas of high livestock use or other persistent disturbances.

**Pine Ridge Geographic Area**

The desired plant species composition objectives across the geographic area is as follows:

| Late Seral | Late Intermediate Seral | Early Intermediate Seral | Early Seral |
|---|---|---|---|
| 15 to 25% | 40 to 70% | 5 to 15% | 1 to 20% |

The description of the dominant native plant species in the late seral stage is as follows: The more productive soils (silty and savannah range sites) should be comprised mainly of midgrasses and to a lesser extent tall grasses. On silty range sites western wheatgrass, green needlegrass, sideoats grama, and little bluestem are the primary mid grasses and big bluestem should make up the majority of the tall grass. Savannah range sites should be made up of little bluestem, sideoats grama, green needlegrass, and slender wheatgrass for midgrass species and big bluestem, prairie sandreed, and sand bluestem will make up the tallgrass species.

The description of the dominant native plant species in the late intermediate seral stage is as follows: The more productive soils (silty and savannah range sites) should be comprised mainly of midgrasses and to a lesser extent shortgrasses and tallgrasses. The dominant grass species in the late intermediate seral stage on silty range sites should be western wheatgrass with the codominance made up of needle and threadgrass, blue grama, and sedges. The dominant grass species in the late intermediate seral stage on savannah range sites should be

little bluestem, prairie sandreed, slender wheatgrass, sideoats grama, and blue grama. The mix of grasses making up the codominance in the late intermediate seral stages will fluctuate according to precipitation and/or grazing intensities.

The description of the dominant native plant species in the early intermediate seral stage is as follows: The more productive soils (silty and savannah range sites) should be comprised mainly of shortgrasses and to a lesser extent midgrasses. The dominant grass species in the early intermediate seral stage on silty range sites should be blue grama, buffalo grass, western wheatgrass, needle and threadgrass, and sedges. The dominant grass species in the early intermediate seral stage on savannah range sites should be little bluestem, prairie junegrass, prairie sandreed, blue grama, hairy grama, and plains muhly. The mix of grasses making up the codominance in the early intermediate seral stages will fluctuate according to precipitation and/or grazing intensities.

The description of the dominant native plant species in the early seral stage is as follows: The savannah range sites in an early seral stage will be dominated by broadleaf weeds such as annual ragweed, green sagewort, and lupine, sedges, and annual grasses like downy brome. Other species common to the early seral stage on savannah range sites are short stature grass species such as red threeawn, hairy grama, and blue grama. The silty range sites should be comprised mainly of shortgrasses with little if any presence of midgrasses. Sedges will dominate the early seral stage on silty range sites and short grasses such as blue grama and buffalograss. The early seral stage should be emphasized on the less productive saline upland range sites and in isolated areas of high livestock use or other persistent disturbances.

The following table displays the desired mix of dominant vegetation types (expressed as a seral stage) averaged across the planning units by alternative that was presented in the DEIS:

**Table 3-119. Percent Desired Mix of Dominant Vegetation Types by Alternative.**

| | Alt. 1 | Alt. 2 | DEIS Alt 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|
| Early seral stage | 10 - 15 | 20 | 10 - 15 | 10 | 10 - 15 |
| Mid/late seral stage | 85 - 90 | 80 | 85 - 90 | 90 | 85 - 90 |

The following tables compare the existing seral stage to the desired seral stage broken out by Geographic Areas within the planning area:

**Table 3-120. Percent Desired Versus Existing Composition by Seral Stage.**

| Dakota Prairie Grasslands | Early | Mid | Late |
|---|---|---|---|
| **Grand/Cedar GA** | | | |
| Existing | 86% | 12% | 2% |
| Desired | 10-15% | 65-75% | 15-20% |
| **McKenzie Badlands GA** | | | |
| Existing | 35% | 51% | 14% |
| Desired | 10-15% | 65-75% | 15-20% |
| **McKenzie Rolling Prairie GA** | | | |
| Existing | 38% | 49% | 13% |
| Desired | 10-15% | 65-75% | 15-20% |

| | | | |
|---|---|---|---|
| **Medora Badlands GA** | | | |
| Existing | 52% | 41% | 7% |
| Desired | 10-15% | 65-75% | 15-20% |
| **Medora Rolling Prairie GA** | | | |
| Existing | 48% | 43% | 9% |
| Desired | 10-15% | 65-75% | 15-20% |
| **Sheyenne GA** | | | |
| Existing | 15% | 75% | 10% |
| Desired | 5-10% | 50-65% | 30-40% |

| **Thunder Basin Units** | **Early** | **Early Intermediate** | **Late Intermediate** | **Late** |
|---|---|---|---|---|
| **Broken Hills GA** | | | | |
| Existing | 33% | 11% | 55% | 1% |
| Desired | 10-20% | 25-35% | 30-40% | 15-25% |
| **Cellars Rosecrans GA** | | | | |
| Existing | 36% | 24% | 39% | 1% |
| Desired | 25-35% | 25-35% | 20-30% | 10-20% |
| **Fairview Clareton GA** | | | | |
| Existing | 31% | 29% | 39% | 1% |
| Desired | 10-20% | 30-40% | 30-40% | 10-20% |
| **Hilight Bill GA** | | | | |
| Existing | 29% | 16% | 55% | 0% |
| Desired | 10-20% | 30-40% | 30-40% | 10-20% |
| **Spring Creek GA** | | | | |
| Existing | 70% | 6% | 24% | 0% |
| Desired | 10-20% | 30-40% | 30-40% | 10-20% |
| **Upton Osage GA** | | | | |
| Existing | 47% | 12% | 41% | 0% |
| Desired | 10-20% | 25-35% | 30-40% | 15-25% |

| **Nebraska Units** | **Early** | **Early Intermediate** | **Late Intermediate** | **Late** |
|---|---|---|---|---|
| **Bessey GA** | | | | |
| Existing | 32% | 36% | 26% | 6% |
| Desired | 1-20% | 1-20% | 30-50% | 30-50% |
| **McKelvie GA** | | | | |
| Existing | 58% | 8% | 22% | 11% |
| Desired | 1-20% | 1-20% | 30-50% | 30-50% |
| **Fall River Northeast GA** | | | | |
| Existing | 1% | 21% | 71% | 7% |
| Desired | 5-15% | 5-15% | 40-60% | 20-40% |
| **Fall River Southeast GA** | | | | |
| Existing | 1% | 19% | 78% | 2% |
| Desired | 1-10% | 15-25% | 40-60% | 20-30% |
| **Fall River West GA** | | | | |
| Existing | 7% | 20% | 61% | 12% |
| Desired | 1-10% | 10-20% | 50-70% | 10-30% |

| Nebraska Units, cont. | Early | Early Intermediate | Late Intermediate | Late |
|---|---|---|---|---|
| **Wall North GA** | | | | |
| Existing | 4% | 33% | 62% | 2% |
| Desired | 1-10% | 10-30% | 30-50% | 20-40% |
| **Wall Southeast GA** | | | | |
| Existing | 5% | 30% | 56% | 9% |
| Desired | 1-20% | 10-30% | 30-50% | 20-40% |
| **Wall Southwest GA** | | | | |
| Existing | 6% | 29% | 59% | 9% |
| Desired | 10-30% | 10-30% | 20-40% | 20-40% |
| **Fort Pierre GA** | | | | |
| Existing | 0% | 7% | 84% | 9% |
| Desired | 1-20% | 10-30% | 30-50% | 20-40% |
| **Oglala GA** | | | | |
| Existing | 1% | 28% | 67% | 4% |
| Desired | 1-10% | 10-20% | 50-70% | 10-30% |
| **Pine Ridge GA** | | | | |
| Existing | 30% | 40% | 3% | 28% |
| Desired | 1-20% | 5-15% | 40-70% | 15-25% |

## Direct and Indirect Effects

### Effects from Fire and Fuels Management

In most management areas, wildland fires are controlled using the most appropriate management response. Fire is usually accepted within Research Natural Areas as a natural disturbance process; however, each situation is evaluated individually to determine the appropriate management response. In all alternatives, frequent intense wildfires could set the composition back to an earlier seral stage.

### Effects from Oil, Gas, and Minerals Management

Revised Management Plan standards and guidelines should mitigate most adverse effects to the vegetation resource. Expected effects to vegetation composition from road construction associated with oil, gas, and mineral management would be greatest in Alternative 2 and least in Alternative 4. The Revised Management Plans for the Dakota Prairie Grasslands requires that special-use and single-use roads be obliterated and rehabilitated within one year from the end of their use period unless a documented decision is made to keep the road for other management needs. This direction would apply to all action alternatives. All areas would be reclaimed with native vegetation species.

### Effects from Plant and Animal Damage Control

The level of control of noxious weeds and invasive plants varies by alternative. Alternatives 2 and 4 contain objectives to reduce noxious weeds and invasive plants by 15 percent and would do the most to restore native plant species. Alternatives 3 and 5 contain objectives to contain or reduce current acres of noxious weeds and invasive plants.

**Effects from Range Management and Livestock Grazing**

Each alternative allows livestock grazing at different levels. Livestock grazing effects on succession depend on a number of factors, including the level and timing of grazing, seral stage of the area, and other environmental factors, such as drought. Livestock grazing would have a greater effect in alternatives that allow for higher levels of livestock use. Alternative 2 would have the highest amount of livestock grazing, while Alternative 4 would have the least amount of livestock grazing. Because livestock prefer some species for forage to others, over time, grazing can alter vegetation composition (also, see Livestock Grazing section).

Vegetation composition would vary by alternative based on desired levels in mid to late seral stages (80-90 percent). Alternatives 1 and 2 would have the most acres in early seral stage, and Alternatives 3, 4, and 5 would have the most in mid to late seral stage. Desired composition would be achieved primarily through livestock grazing management.

Because the frequency and intensity of livestock grazing influence plant composition, alternatives with more ungrazed or lightly grazed range (areas more than one mile from a water source) would have more acres in mid to late seral stage. Alternatives 3, 4, 5, which could place limits on the number of water developments, would likely maintain or increase the present amount of ungrazed or lightly grazed range (see Livestock Grazing for information on secondary range).

Resting an area from grazing (at least 12 consecutive months) can also have an important influence on vegetation composition by giving plants that reproduce by seed, such as many forb species, an opportunity to disperse their seed. Canadian researcher Stephen McCanny discusses the role of rest in prairie landscapes in *The Value of Long-term Rest in Grassland Conservation.* According to McCanny models, at least 5 percent of the Canadian prairie landscapes were ungrazed by bison (the primary large herbivore) for periods of 10 years or longer. McCanny concludes that regional species diversity is maximized when ungrazed lands make up 30 to 45 percent of the landscape and ungrazed areas have their greatest effect if they are intermingled with grazed lands.

The amount of suitable rangeland devoted to rest acres on an annual basis varies from 0 to 20 percent by unit (tables displaying acres of rest may be found in the Ecological Process Effects Section.). Alternative 4 would have the most acres in rest; Alternative 2 would have the least acres in rest.

Cattle and other livestock have replaced bison in most regions as the primary large herbivore. The effects of bison and domestic livestock grazing are not the same. Bison eat different plants and utilize rangelands differently than cattle, especially in riparian areas. Bison cool off in windy upland areas while cattle concentrate within the riparian area. Graminoids form the major portion of a bison diet while forbs, grass, shrubs, and tree saplings make up cattle diets. Free-ranging bison created large areas of low to very low vegetation structure that differed vegetatively from surrounding ungrazed prairie and was much different from vegetation conditions where cattle are confined. Furthermore, the wallowing, trampling, rubbing, and excretion of waste of millions of bison created habitats that were highly variable, both spatially and temporally.

Alternative 4 would allocate 5 percent of the suitable rangeland on each unit to bison-only grazing. The bison would be confined much like domestic livestock within grazing units. In those areas, impacts to riparian areas would likely be less with bison use than impacts expected

from cattle grazing since bison do not concentrate in the riparian areas on hot days. As mentioned previously, bison prefer different vegetation species than those preferred by cattle. Even if bison are grazed under the same management systems used for domestic livestock, bison usually do not eat forbs until palatable grass species are gone.

**Effects from Recreation Management and Use**

In general, effects from recreation management and use on plant composition would be minimal, except at points of concentrated use. Specific problems would be identified and managed at the site-specific level.

### Cumulative Effects

Cumulatively, land management practices, including grazing and cultivation, on the Northern Great Plains have altered plant composition and reduced species diversity. The changes in broad cover classes by converting rangeland and forest land to cropland that has occurred over the last 100 years are expected to continue. While the planning units are only 2 percent of the Northern Great Plains assessment area, they play a major role in maintaining and preserving native plant communities. Alternative 4 would have the greatest potential to restore native vegetation types by increasing the amount of secondary range and pasture size. Alternative 1 and 2 would not increase secondary range or restore native vegetation and would further reduce native vegetation diversity.

## *2. Vegetation Structure*

### Effects by Alternative

The vegetation structure objectives apply to lands determined suitable for livestock grazing and prescribe desired levels of low, moderate and high grassland structure at the end of the growing and grazing season. They do not apply to steep areas considered inaccessible to livestock. Appendices I and H in the Revised Management Plans provide descriptions of low, moderate, and high structure grasslands based on the habitat needs of management indicator species. The grassland structure objectives for each planning unit for each alternative are presented in the following table. The acreages in the table are based on the midpoints of the ranges established in the objectives for low, moderate, and high structure grasslands. The acreages displayed for Alternative 1 represent the anticipated acres had the alternative been fully implemented on each national grassland and forest. Although not directly comparable, existing grassland structure levels on individual planning units have been presented earlier in this chapter.

**Table 3-121. Grassland Structure Objectives for the Planning Units.**

| Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt. 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|
| **Little Missouri National Grassland** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 131.4 | 131.4 | 123.6 | 131.4 | 131.4 | 131.4 |
| Percent Area | (15%) | (15%) | (15%) | (15%) | (15%) | (15%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 578.3 | 604.5 | 394.0 | 525.7 | 324.2 | 481.9 |
| Percent Area | (66%) | (69%) | (48%) | (60%) | (37%) | (55%) |

| Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt. 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|
| **Little Missouri National Grassland, cont.** | | | | | | |
| High Structure | | | | | | |
| Acres (1,000s) | 166.5 | 140.2 | 306.1 | 219.0 | 420.6 | 262.9 |
| Percent Area | (19%) | (16%) | (37%) | (25%) | (48%) | (30%) |
| **Grand River/Cedar River National Grasslands** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 | 23.9 |
| Percent Area | (15%) | (15%) | (15%) | (15%) | (15%) | (15%)) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 103.5 | 103.4 | 99.3 | 95.4 | 71.6 | 79.5 |
| Percent Area | (65%) | (65%) | (62%) | (60%) | (45%) | (50%) |
| High Structure | | | | | | |
| Acres (1,000s) | 31.8 | 31.8 | 35.9 | 39.8 | 63.6 | 55.7 |
| Percent Area | (20%) | (20%) | (23%) | (25%) | (40%) | (35%) |
| **Sheyenne National Grassland** (objectives apply equally to upland, midland, and lowland sites) | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 9.7 | 9.7 | 6.8 | 5.2 | 6.8 | 8.3 |
| Percent Area | (14%) | (14%) | (10%) | (7.5%) | (10%) | (12%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 43.6 | 43.8 | 20.4 | 40.0 | 20.4 | 27.1 |
| Percent Area | (63%) | (63%) | (30%) | (57.5%) | (30%) | (39%) |
| High Structure | | | | | | |
| Acres (1,000s) | 15.9 | 16.0 | 40.7 | 24.3 | 40.7 | 34.0 |
| Percent Area | (23%) | (23%) | (60%) | (35%) | (60%) | (49%) |
| **Thunder Basin National Grassland** (acreages do not include sagebrush plant communities) | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 21.1 | 23.2 | 49.2 | 24.4 | 10.5 | 19.0 |
| Percent Area | (20%) | (22%) | (15%) | (23%) | (10%) | (18%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 60.2 | 57.0 | 15.1 | 45.7 | 36.6 | 60.2 |
| Percent Area | (57%) | (54%) | (48%) | (43%) | (35%) | (57%) |
| High Structure | | | | | | |
| Acres (1,000s) | 16.9 | 13.7 | 89.1 | 36.1 | 32.4 | 23.2 |
| Percent Area | (16%) | (13%) | (28%) | (34%) | (31%) | (22%) |
| **Buffalo Gap National Grassland** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 77.7 | 124.3 | 75.8 | 114.2 | 51.9 | 77.9 |
| Percent Area | (15%) | (24%) | (17%) | (22%) | (10%) | (15%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 300.3 | 310.8 | 246.2 | 254.3 | 212.8 | 259.7 |
| Percent Area | (58%) | (60%) | (54%) | (49%) | (41%) | (50%) |

| Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt. 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|
| **Buffalo Gap National Grassland** | | | | | | |
| High Structure | | | | | | |
| Acres (1,000s) | 139.8 | 82.9 | 132.6 | 155.7 | 254.3 | 187.0 |
| Percent Area | (27%) | (16%) | (29%) | (30%) | (49%) | (36%) |
| **Fort Pierre National Grassland** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 17 | 28.3 | 11.3 | 22.5 | 11.3 | 11.3 |
| Percent Area | (15%) | (25%) | (10%) | (20%) | (10%) | (10%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 56.8 | 68.0 | 22.7 | 45.0 | 45.3 | 45.3 |
| Percent Area | (50%) | (60%) | (40%) | (40%) | (40%) | (40%) |
| High Structure | | | | | | |
| Acres (1,000s) | 39.7 | 17.0 | 56.7 | 45.0 | 56.7 | 56.7 |
| Percent Area | (35%) | (15%) | (50%) | (40%) | (50%) | (50%) |
| **Oglala National Grassland** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 11.8 | 19.6 | 13.2 | 13.6 | 7.8 | 11.0 |
| Percent Area | (15%) | (25%) | (15%) | (20%) | (10%) | (14%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 45.5 | 47.0 | 52.7 | 40.8 | 31.4 | 38.4 |
| Percent Area | (58%) | (60%) | (60%) | (60%) | (40%) | (49%) |
| High Structure | | | | | | |
| Acres (1,000s) | 21.2 | 11.8 | 22.3 | 13.6 | 39.2 | 29.0 |
| Percent Area | (27%) | (15%) | (25%) | (20%) | (50%) | (37%) |
| **Nebraska National Forest - Pine Ridge Ranger District Grassland Parks and Ponderosa Pine Savannah** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 4.7 | 6.6 | 6.8 | 3.1 | 4.4 | 4.2 |
| Percent Area | (15%) | (21%) | (14%) | (10%) | (14%) | (14%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 17.2 | 17.0 | 26.0 | 23.6 | 16.7 | 11.5 |
| Percent Area | (55%) | (54%) | (54%) | (75%) | (53%) | (38%) |
| High Structure | | | | | | |
| Acres (1,000s) | 5.9 | 7.9 | 15.8 | 4.7 | 10.4 | 11.2 |
| Percent Area | (19%) | (25%) | (32%) | (15%) | (33%) | (37%) |
| **Nebraska National Forest - Bessey Ranger District** | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 1.8 | 1.8 | 2.2 | 1.8 | 1.8 | 1.8 |
| Percent Area | (2%) | (2%) | (2%) | (2%) | (2%) | (2%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 43.4 | 64.6 | 44.3 | 44.5 | 21.2 | 22.1 |
| Percent Area | (49%) | (73%) | (49%) | (50%) | (24%) | (25%) |

| Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt. 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|
| **Nebraska National Forest - Bessey Ranger District, cont.** | | | | | | |
| High Structure | | | | | | |
| Acres (1,000s) | 43.4 | 21.2 | 44.3 | 42.7 | 64.6 | 66.4 |
| Percent Area | (49%) | (24%) | (49%) | (48%) | (73%) | (75%) |
| **Samuel R. McKelvie National Forest** (objectives apply equally to the hills and large broad valleys) | | | | | | |
| Low Structure | | | | | | |
| Acres (1,000s) | 2.2 | 2.2 | 2.8 | 2.2 | 2.2 | 2.2 |
| Percent Area | (2%) | (2%) | (2%) | (2%) | (2%) | (2%) |
| Moderate Structure | | | | | | |
| Acres (1,000s) | 53.9 | 79.7 | 54.5 | 56.2 | 26.9 | 26.9 |
| Percent Area | (48%) | (71%) | (48%) | (50%) | (24%) | (24%) |
| High Structure | | | | | | |
| Acres (1,000s) | 56.1 | 30.3 | 57.1 | 54.0 | 81.8 | 81.8 |
| Percent Area | (50%) | (27%) | (50%) | (48%) | (73%) | (73%) |

The primary generalization that can be made from the information presented in the previous tables is that there were minimal differences between alternatives in the amount of low structure vegetation. The amounts of high structure grasslands prescribed by the different alternatives are highly variable between the different planning units and, as a result, it is difficult to generalize the alternative effects. It is important to point out that the acreages under Alternative 1 represent the acres that would likely exist had the original Land and Resource Plans been fully implemented. They do not represent existing structural characteristics of the grasslands.

## Direct and Indirect Effects

### Effects from Fire and Fuels Management

Fire can reduce grassland structure in the short-term. However, depending on the timing and intensity, fire can enhance the productivity and floral diversity of grasslands and increase grassland structural diversity in years following burns (Higgins et al. 1989, Sieg 1997). The amount of prescribed burning varies between planning units and between alternatives (see Ecological Processes section in this Chapter for more information on prescribed fire effects). The minimum amount of prescribed burning expected under each alternative for the planning units is presented in Table 3-215 and Table 3-216 in this chapter. The minimum amount of prescribed burning expected under each alternative for the planning units is also presented in these tables. The amounts vary considerably between areas and alternatives.

### Effects from Oil, Gas, and Minerals Management

Facilities, equipment and roads to support oil and gas development reduce grassland area. The amount of grasslands lost to this type of development is based on the number of wells. The amount of new oil and gas exploration and development over the next 10 to 15 years is presented in Table 3-49. Using information from this table and assuming 5 acres of habitat loss to pads, ancillary equipment and access roads (USDA Forest Service 1994), the additional future oil and gas activity would result in the loss of grasslands and shrublands (mixed

landownership) as follows; l 5,785 acres on the Dakota Prairie Grassland units; 6,900 acres on the Thunder Basin National Grassland; and 585 acres on the Nebraska National Forest units. Much of this loss would be native grasslands and shrublands as well as old crested wheatgrass seedings. The overall effects of each alternative on the future number of wells are disclosed in Table 3-52

**Effects from Plant and Animal Damage Control**

Prairie dogs have a major influence on grassland structure through their foraging, clipping and burrowing activities. The very low grassland structure class is typically limited to prairie dog colonies, and the extent and distribution of prairie dog colonies is primarily limited and controlled by the use of rodenticides. The most rodenticide use would occur under Alternatives 1 and 2 while poisoning is prohibited or greatly restricted under Alternatives 3 and 4. Alternative 5 would provide for intermediate amounts of rodenticide use.

**Effects from Range Management and Livestock Grazing**

Livestock grazing is the most significant and widespread activity affecting grassland structure. Livestock grazing occurs annually on almost every acre determined to be capable and suitable for livestock grazing. Range management strategies that result in relatively heavy annual grazing intensities typically cause shifts in species composition to shorter-stature grass species and also allocate larger amounts of the annual plant production to livestock (see Appendix I in the revised plans). These effects collectively produce lower grassland structure levels.

Strategies that result in light annual grazing intensities typically cause shifts in plant species composition to more mid and tall grass species and also leave more of the annual plant production as residual cover (see Appendix I in the revised plans). These effects combine to produce relatively high grassland structure and more structurally diverse grasslands. Light livestock grazing intensities and periodic grazing of areas not allocated to annual grazing can actually increase the biological potential of sites to produce grassland structure compared to grasslands that have not been grazed for a decade or more.

Range management strategies that combine livestock grazing with periods of annual or multiple-year rest from livestock grazing produce a variety of structure conditions over time. Areas that receive periodic annual rest from livestock grazing usually provide the highest and most diverse grassland structure. Across a grassland, a mosaic of rested and grazed pastures maximizes structural diversity between pastures. The amount of rest expected under each alternative is presented in Table 3-38 and Table 3-145. 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 rest.

Timing of livestock grazing during the year can also influence grassland structure. Given the same or similar stocking rates and sites, dormant season grazing usually results in higher grassland structure after grazing while growing season grazing usually produces lower grassland structure levels after grazing. Given comparable sites and stocking rates, livestock grazing during the early part of the growing season allows more regrowth and structure after grazing, while grazing during mid-summer and fall usually results in less regrowth and lower end-of-season structure levels. Management direction under each alternative generally does not address the timing of livestock grazing.

Livestock grazing distribution also affects the diversity of grassland structure within individual pastures. Uneven grazing patterns enhance structural diversity, while even grazing distribution tends to homogenize grassland structure within pastures. The extent of uneven livestock grazing within a pasture is primarily dependent on topography, water distribution and pasture size. More water sources and smaller pastures tend to encourage uniform grazing. Over the years, rangelands have been incrementally fenced into smaller and smaller units, and a large number of water developments have been constructed. This has been done to access additional livestock forage, encourage more uniform forage utilization, and provide for planned rotational grazing. This has resulted in some habitat improvements but in many cases, at the expense of inaccessible, secondary and late successional rangelands where higher and more diverse grassland structure would be expected. This, in turn, has resulted in more uniform and monotypic vegetation structure and less successional and structural diversity within pastures (Davis 2000, Knopf 1996a). Loss of late successional rangelands after construction of livestock water developments in previously un-watered areas has also been observed on southwestern rangelands (Holechek 1997). The loss of structurally diverse grasslands within pastures that receive uniform grazing was also documented by Mattise et al. (1982) during a study of grassland structure in season-long and deferred rotation grazing systems on the Little Missouri National Grassland. The vegetation composition (successional status) and structure objectives discussed in the previous paragraph are intended to help mitigate some of these losses and to enhance the successional and structural heterogeneity of grasslands and sagebrush understories within and between pastures.

The amount of primary, secondary, and inaccessible rangeland resulting from range developments (water and fence) is a major factor influencing the amount of structural diversity within pastures. When considering pastures that are moderately or heavily grazed, pastures with the most secondary and inaccessible rangelands generally have the most structurally diverse grasslands. The estimated amounts of primary, secondary and inaccessible rangeland currently existing on the national grasslands and forests are displayed in Table 3-30. The amounts of secondary rangeland shown in the table are largely the result of steep topography and not a lack of water sources.

**Effects from Fish and Wildlife Management**

Prairie dogs have a major influence on grassland structure through their foraging, clipping and burrowing activities. As prairie dog populations expand, increases in low grassland structure and decreases in moderate and/or high structure would be expected. Depending on current grassland structural diversity within an area, prairie dog colony establishment and expansion could enhance or reduce structural diversity. The current and expected prairie dog colony distribution under each alternative is presented later in this section. Alternatives 1 and 2 would have stable or decreasing prairie dog populations; Alternatives 3 and 4 would increase prairie dog populations the most. Alternative 5 would result in modest increases in prairie dog populations compared to the increases expected under Alternatives 3 and 4.

Management to provide quality habitat for management indicator species including greater prairie chicken, plains sharp-tailed grouse and sage grouse is expected to increase the amount of high structure grasslands and sagebrush understories. It will also enhance the structural diversity of these habitats.

**Effects from Special Area Designations**

Special area designations that would likely be managed with vegetation structure as a strong management focus include but are not limited to Management Areas 3.63 (Black-footed Ferret Reintroduction Habitat) and 3.64 (Special Plant and Animal Habitat). For example, the numerous MA 3.64 areas under Alternative 3 on the Buffalo Gap National Grassland emphasizing sharp-tailed grouse, sagebrush and sage grouse habitats would be managed for increased amounts of high structure grasslands and shrublands. Two of the MA 3.63 areas on the Buffalo Gap and Little Missouri National Grasslands would be managed for accelerated prairie dog colony expansion to facilitate possible future ferret reintroductions by the U.S. Fish and Wildlife Service. The accelerated prairie dog colony growth would require management emphasizing low structure grasslands.

**Cumulative Effects**

The same factors, both natural and human caused, that influence grassland composition and structural diversity on public lands also occur on private lands and other jurisdictions in the planning area. However, information for characterizing grassland structure on private lands is unavailable. Hay production influences grassland structure and is more prevalent on private lands than on public rangelands.

Conversion of grasslands to croplands or seeded grasslands can be expected to continue on private lands in the planning area. The trends for future oil and gas development, including coalbed methane, projected in the oil and gas demand analysis in this chapter also apply to private lands, so additional loss of grasslands habitat can also be expected on other land jurisdictions in the planning area. The threats of noxious weeds and other invasive plants to native grasslands will continue across the northern plains and across all land jurisdictions (Westbrooks 1998).

# B. Shrublands

## *1. Vegetation Composition*

Significant conversion of big sagebrush to other vegetation types through herbicides or prescribed burning is not prescribed under any of the alternatives. In fact, management direction under Alternatives 2 through 5 limits use of prescribed fire in big sagebrush to specific conditions where it would only result in habitat enhancement for sage grouse and other sagebrush wildlife.

Cheatgrass invasion of sagebrush understories is likely to continue and is especially problematic following fires in sagebrush. The relationships between cheatgrass invasion and livestock grazing are poorly understood at this time. Cheatgrass can be expected to continue displacing and reducing native forbs and perennial grasses in many sagebrush areas.

## *2. Vegetation Structure*

The height and density of the herbaceous understory vegetation is an important component of vegetation structure in sagebrush plant communities. Currently, the optimum and most meaningful way to measure and monitor the structure of sagebrush understories has not been determined. However, Appendix I in the revised Land and Resource Management Plans describes and defines different livestock grazing intensities (light, moderate and heavy) to help

meet the vegetation structure objectives. Appendix H in the revised plans also provides information for helping evaluate and manage vegetation structure in sagebrush areas. As previously discussed for grassland vegetation, the vegetation objectives apply only to lands suitable for livestock grazing.

## *Effects by Alternative*

The vegetation structure objectives for sagebrush understories for each planning unit are presented in the following table. The acreages displayed in the tables are based on the midpoints of the ranges established in the objectives for low, moderate and high structure understories. The acreages displayed for Alternative 1 represent the anticipated acres had the alternative been fully implemented on each national grassland and forest. Information on the current structure conditions for sagebrush understories is not available.

**Table 3-122. Vegetation Structure Objectives for Sagebrush Understories on the Planning Units.**

| Planning Unit | Alt. 1 | Alt. 2 | FEIS Alt 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|
| **Thunder Basin National Grassland** | | | | | |
| Low Structure | | | | | |
| Acres (1,000s) | 85.3 | 93.8 | 97.9 | 42.6 | 76.8 |
| Percent Area | (20%) | (22%) | (23%) | (10%) | (18%) |
| Moderate Structure | | | | | |
| Acres (1,000s) | 243.1 | 230.3 | 183.1 | 149.3 | 243.1 |
| Percent Area | (57%) | (54%) | (43%) | (35%) | (57%) |
| High Structure | | | | | |
| Acres (1,000s) | 68.2 | 55.5 | 144.8 | 132.2 | 93.8 |
| Percent Area | (16%) | (13%) | (34%) | (31%) | (22%) |
| **Buffalo Gap National Grassland** | | | | | |
| Low Structure | | | | | |
| Acres (1,000s) | 3.9 | 6.3 | 5.7 | 2.6 | 3.9 |
| Percent Area | (15%) | (24%) | (22%) | (10%) | (15%) |
| Moderate Structure | | | | | |
| Acres (1,000s) | 15.1 | 15.7 | 12.8 | 10.7 | 13.1 |
| Percent Area | (58%) | (60%) | (49%) | (41%) | (50%) |
| High Structure | | | | | |
| Acres (1,000s) | 7.0 | 4.2 | 7.8 | 12.8 | 9.4 |
| Percent Area | (27%) | (16%) | (30%) | (49%) | (36%) |
| **Little Missouri National Grassland** | | | | | |
| Low Structure | | | | | |
| Acres (1,000s) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| Percent Area | (15%) | (15%) | (15%) | (15%) | (15%) |
| Moderate Structure | | | | | |
| Acres (1,000s) | 5.5 | 5.8 | 5.0 | 3.1 | 4.6 |
| Percent Area | (66%) | (69%) | (60%) | (37%) | (55%) |
| High Structure | | | | | |
| Acres (1,000s) | 1.6 | 1.3 | 2.1 | 4.0 | 2.5 |
| Percent Area | (19%) | (16%) | (25%) | (48%) | (30%) |

On the Thunder Basin National Grassland, Alternatives 2 and 3 prescribe the largest acreages of low structure sagebrush understories and Alternative 3 and 4 prescribe the largest acreages of high structure sagebrush understories. Alternatives 2 and 3 also prescribe the largest acreages of low structure understories and Alternative 4 prescribes the largest amount of high structure understories on the Buffalo Gap National Grassland. Alternative 3 would provide an intermediate level of vegetation structure in sagebrush habitats on the Buffalo Gap National Grassland.

On the Little Missouri National Grassland, Alternative 4 prescribes the largest acreages of high structure sagebrush understories while Alternatives 1 and 2 prescribe the least. Alternatives 3 and 5 call for intermediate levels. The amount of low structure understories was the same across all alternatives.

## *Direct and Indirect Effects*

The direct and indirect effects of each alternative on big sagebrush plant communities are mostly the same as those previously described for grassland communities on the Thunder Basin, Buffalo Gap and Little Missouri National Grasslands and are not repeated here. Other effects specific to sagebrush are disclosed in the following discussions.

### Effects from Fire and Fuels Management

Fire and prescribed burning can eliminate sagebrush or reduce sagebrush structure, affecting both the sagebrush canopy and understory. Prescribed burning in sagebrush communities on these national grasslands is limited to specific conditions where it can be demonstrated to enhance habitat for sage grouse and other wildlife that utilize sagebrush habitats. Similar direction does not occur under Alternative 1.

### Effects from Fish and Wildlife Management

Big game habitat improvement may result in increased carrying capacities for big game populations on the planning units. Increased big game browsing, in combination with livestock grazing, could reduce sagebrush structure in some areas. However, long-term big game populations are determined by many factors including harvest regulations by the state and periodic extreme weather, and trying to predict future grazing intensities on sagebrush by big game is not attempted in this analysis.

Prairie dogs can reduce or eliminate sagebrush from their colonies. Through clipping, prairie dogs gradually reduce the density of shrubs on the edges of their colonies. The extent and distribution of prairie dog colonies and the resulting effects on shrubs are primarily determined by the amount of rodenticide use. However, the amount of big sagebrush that could be substantially altered by prairie dogs over the next 10 to 15 years is considered minimal or insignificant under all alternatives.

## *Cumulative Effects*

Conversion of sagebrush to croplands or seeded grasslands can be expected to continue on private lands in the planning area. The amount of future oil and gas development, including coalbed methane, projected in the oil and gas demand analysis in this chapter also applies to private lands, so additional loss of sagebrush habitat can also be expected on other land jurisdictions in the planning area. Fire suppression on other land jurisdictions will likely

continue at current levels or increase in the future. This will maintain or increase protection of sagebrush from wildfires. The threats of noxious weeds and other invasive plants like cheatgrass to big sagebrush communities will continue across the northern plains and across all land jurisdictions (Westbrooks 1998).

# C. Forests

## *Direct and Indirect Effects*

### Effects from Fire and Fuels Management

In the first decade, Alternatives 4 and 5 would use timber harvest to create open, park-like timber stands on the Pine Ridge Ranger District in Nebraska. Prescribed fire would be used to help maintain the open conditions. More fine fuels (grass) would be expected under these conditions. The increase in fine fuels could result in more frequent, low-intensity fires. Alternative 2, with the highest sustainable timber production, would have the highest potential for wildfires from the presence of logging slash. High-intensity fire would be more probable because of ladder fuels created by regeneration.

### Effects from Timber Management

The effects of timber management on vegetation would be limited to Management Areas 5.12 and 5.13, the only management areas in which forest vegetation would be specifically managed for health and the sustainable forest ecosystem. Only 8 percent of the planning units are classified as forested, and only 2 percent would be actively managed for a sustainable forest ecosystem in Alternative 2 which is on the Pine Ridge Ranger District in Nebraska (See Timber Management section in this chapter). For the most part, timber management would not change the cover type of an area. Occasionally, timber management practices can change the cover type; however, timber management usually affects structure. The Nebraska National Forest Collaborative Plantation Management Team Final Report developed 5 alternatives to address plantation management on the Bessey Ranger District. This group recommended maintaining the existing plantations at a level of 20,000 acres. Effects would be costs associated with growing and planting seedlings and benefits such as education, recreational, historic values.

The following table shows the percent of late successional forest expected on the planning units by alternative within Management Areas 5.12 and 5.13 to be achieved within a 100-year time frame. Usually, late successional forests on the Northern Great Plains are defined as 10 to 20 trees per acre of large diameter trees (12-20 inch DBH) spaced about 45 feet apart. The following table outlines the percent of late successional forest by alternative to be maintained within Management Areas 5.12 and 5.13:

**Table 3-123. Percent of Forest Acres in Management Areas 5.12 and 5.13 in Late Successional Forest.**

| Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| Less than 10 | Less than 10 | 10 | 20 - 30 | 10 | 90 | 30 - 40 |

## *Cumulative Effects*

Timber harvesting has occurred at a higher rate on private land on Nebraska's Pine Ridge than on the adjacent National Forest System lands. There has been limited prescribed burning to

reduce the fuel loading and limited precommercial or commercial thinning. As a result, this has created ladder fuels which are more susceptible to major fire events. Over the long term, the remaining timber stands would be more susceptible to insects and disease. Because of the small amount of forested acres on the planning units, no alternative would have a significant cumulative effect.

# D. Rare Plant Communities

This effects analysis was completed by two botanists and a range management specialist with a combined work experience of over 31 years in the planning area.

## *Effects by Alternative*

The existing land and resource management plans (Alternative 1) do not have specific management or monitoring direction for rare plant communities. Direction for rare plant communities that occurs under Alternatives 2 through 5 includes direction to identify and inventory rare plant communities on each national grassland and forest. Development and implementation of conservation strategies are also included as management direction under each alternative. Standards and guidelines also call for compatible land uses and management activities and control of invasive and noxious plant species within these communities. Management Areas 2.1, 2.2 and 3.64 provide the opportunity to place additional emphasis on conservation of native plants and animals and the amount of areas under these allocations vary by alternative. The effects of management area allocations are discussed below under "special area designations".

## *Direct and Indirect Effects*

### Effects from Fire and Fuels Management

Grasslands - In most cases, rare grassland communities would be enhanced by the use of prescribed fire as presented under the preferred alternative. Vegetation response varies dependant on timing, intensity, precipitation patterns before and after fire, and vegetation composition. Generally, grassland communities would not be negatively affected by fire because the growing points of grasses and many other herbaceous plants are located below the soil surface. Fire can enhance native species diversity and composition and can reduce non-native species, improving the ecological condition of grassland communities.

Shrublands - Rare shrub communities respond in different ways to fire, depending on frequency, intensity of the fire event, and fuel loads. Generally, many sagebrush communities may be reduced by fire events, while other communities dominated by species like rabbitbrush and skunkbush sumac may be minimally impacted from fire or may benefit from decreased competition.

Forests and Woodlands – The response of forested vegetation to fire also varies. In some rare forests communities, the dominant species would generally not be negatively affected by low-intensity fires. This would apply to the rare plant communities dominated by ponderosa pine. Rare forest communities dominated by Rocky Mountain juniper might be at a higher risk even with low intensity prescribed fires. High intensity fires pose higher levels of risk to most rare forest or woodland communities because they can kill both young and mature trees, affecting plant community composition and seral stage of rare plant communities. Since prescribed burns would not likely be planned for areas including rare forest or woodland communities,

unless it could be demonstrated to be beneficial to the community, adverse effects from prescribed burning on these communities are not expected.

Wetlands - Wetland grasses and sedge communities may be enhanced by properly timed, low intensity burns. In contrast, a slow moving fire which would burn deep into the organic soil or peat of wetland substrates will have an impact on all hydrophytes. Prescribed fires in these communities would be designed to be beneficial to rare wetland types.

The minimum acres of prescribed burning planned under each Alternative are presented in Table 3-215 and Table 3-216. Alternatives 1 and 2 have the least acres planned while Alternative 4 has the most. Alternatives 3 (preferred alternative) and 5 have intermediate levels planned.

### Effects from Oil, Gas, and Minerals Management

Grasslands, shrublands, forests, woodlands and wetlands - Development of mineral resources can have negative effects on rare plant communities through the development of access roads and facilities which may destroy or fragment these areas. Other impacts may occur from the potential spread of non-native species, although standards and guidelines for the prevention and reduction of noxious weed and invasive plant infestations should minimize these types of impacts. Under all alternatives, any potential adverse effects from oil, gas, and minerals development would be mitigated during project-level analyses and through the application of standard lease terms to relocate operations up to 200 meters (approximately 650 feet). For these areas greater than 400 meters (approximately 1300 feet) a controlled surface use stipulation requires operator to try to locate activities and facilities away from the water's edge and outside riparian areas, woody draws, wetlands an floodplains. If necessary to locate facilities in these areas, mitigation measures are specified. These measures will prevent any adverse effects on rare plant communities that occur in these habitat types.

### Effects from Plant and Animal Damage Control

Grasslands, Shrublands, Forests, and Woodlands - The use of herbicides to control noxious weeds can have negative effects on rare plant communities by impacting plant species susceptible to herbicides, primarily broad-leaved plants. Despite the potential negative impacts of herbicide use, the effects from the uncontrolled spread of noxious weeds and invasive non-native plants are considered a greater threat to rare plant communities. The highest level of noxious weed control would be expected to occur under Alternatives 2 and 4 where a 15% reduction in noxious weed populations is expected. Under Alternatives 3 and 5, noxious weed populations are expected to be controlled and maintained at current levels. Existing noxious weed control programs are maintained under Alternative 1.

Wetlands – Under all alternatives, herbicides are generally not used in or near these areas, so no or minimal impacts are expected to the rare plant communities found in or near wetlands.

### Effects from Range Management and Livestock Grazing

Grasslands and Shrublands - Livestock grazing effects on rare grassland and shrubland communities are dependant on timing and level of grazing as well as other factors. Most of the rare grassland and shrubland communities found on USFS lands are mid to late seral communities. Therefore, increases in the amount of late seral communities compared with current conditions would likely benefit rare plant communities in these habitat types. Rest would benefit grassland communities by permitting plant species such as forbs to complete their life cycle and reproduce by seed. The desired seral stages and amount of rest from annual

livestock grazing for each national grassland and forest under each alternative are presented in Table 3-119 and Table 3-38. The largest acreages in the later seral stages and under rest would occur with Alternative 4 and the least with Alternatives 1 and 2. Alternatives 3 and 5 provide for intermediate levels of the later seral stages and rest.

Forests and Woodlands - Livestock grazing effects on rare plant communities occurring in riparian and wooded draw habitats are also dependant on timing and level of grazing as well as numerous other factors. Heavy or prolonged grazing can reduce mid and understories in these communities and result in changes in plant species composition and in severe cases, type changes from woodland to herbaceous community types. Guidelines to provide for multi-story and multi-age woody habitats through livestock grazing management strategies should provide conditions for maintaining or enhancing these rare shrubland communities. Under Alternative 1, approximately 50% of the riparian and wooded draw habitat is projected to be regenerating with healthy mid and understory vegetation. Under Alternatives 2 through 5, an objective is established to have at least 80% of the riparian areas and woody draws regenerating.

Wetlands - Livestock grazing can affect species composition and structure of rare wetland communities, particularly in shallow wetlands accessible to livestock. Standards and guidelines to protect water quality and proper functioning condition of wetlands under Alternatives 2 through 5 would mitigate potentially adverse effects on rare plant communities in wetland areas.

### Effects from Recreation Management and Use

Rare plant communities could be adversely affected by recreation management in areas of concentrated recreation use. Any specific impacts or problems to rare plant communities from recreational impacts will be identified and managed at the site-specific project level.

### Effects from Special Area Designation

Some of the rare plant communities identified in Table 3-117 may occur in areas allocated to MA 2.1 (SIAs), 2.2 (RNAs), and 3.64 (Special Plant and Animal Habitat) (S. Rinehart, 11/29/00 memorandum in administrative record). It is assumed that as the acreages allocated to these management areas increases, so does the likelihood that rare plant communities will eventually be found in these management areas.

A summary of the acreages allocated to these management areas under each of the alternatives is presented in FEIS Tables 2-4, 2-6, and 2-8. Alternatives 1 and 2 have the least amounts of acreage while Alternative 4 has the most. Alternatives 3 and 5 have intermediate levels.

### Effects from Fish and Wildlife Management

Management direction to maintain or enhance the diversity of native animals can potentially have beneficial effects on rare plant communities by providing additional vegetation structure and later seral stages.

Grazing and clipping by prairie dogs could impact some of the rare herbaceous communities listed in Table 3-117. The projected acreages of prairie dog colonies under each of the alternatives are presented in Table 3-140. Management direction under Alternatives 3 and 4 is expected to result in the largest prairie dog colony acreages while the smallest acreages would occur under Alternatives 1 and 2. Alternative 5 would likely result in an intermediate acreage of prairie dog colonies.

Management of native and recreational fisheries is expected to have negligible effects on rare plant communities.

### Effects from Timber Management

Forests - Effects from silviculture would be limited to the Nebraska National Forest (Pine Ridge Ranger District). Silvicultural treatments would most likely benefit the rare ponderosa pine/grassland communities by opening up forested stands. The volume of timber that could be harvested under each alternative is presented in Table 3-219 and Table 3-220. This information indicates that the most timber volume that could be harvested occurs under Alternative 4 while the least occurs under Alternatives 1 and 2. Alternatives 3 and 5 provide for levels slightly less than under Alternative 4.

## *Cumulative Effects*

Land and water management practices across the Northern Great Plains have substantially impacted terrestrial and aquatic habitats and plant communities (USDA Forest Service 2000, Johnson 1998, Ostlie et al. 1997, Chuluun et al. 1997, Samson and Knopf 1996, Natural Resources Conservation Service 1996, LaRoe et al. 1995, Mac et al. 1998, Ricketts 1999, Abell et al. 2000, Sieg et al. 1999, and von Ahlefeldt 2000) and undoubtedly continue to increase the number and acreage of rare plant communities in the planning area. Urbanization, agriculture, energy development, construction of infra-structure, dams, water diversion, groundwater pumping and pollution are some of the major impacts that cause destruction of these communities or degradation through changes in plant species composition. These alterations can be expected to continue. Another major impact on native plants and plant communities on all land ownerships is invasive non-native plants (Westbrook 1998). The spread of invasive plants on rangelands will become an even greater biological and economic problem in the future, further threatening native biological diversity, land productivity and land values (Westbrook 1998). The logistics and costs associated with the control of these species will become an even more daunting challenge in the not so distant future. Application of insecticides for control of grasshoppers and other insect populations is another activity that may impact local populations of non-target insects that are important pollinators.

# E. Species at Risk

This effects analysis was completed by two botanists and a range management specialist with a combined work experience of over 31 years in the planning area.

Forty-seven plant species were identified as species at risk in the Biological Assessment and Evaluation (FEIS Appendix H and administrative record). The effects analyses procedures described in the Biological Assessment and Evaluation culminate in a biological determination for each species for each planning alternative. The Biological Assessment and Evaluation should be consulted for more detailed effects analysis information for individual species. The biological determination made for each species protected under the Endangered Species Act was one of the following:

- No effect.
- Is not likely to adversely affect.
- Is likely to adversely affect.

The biological determination made for each sensitive species was one of the following:

- No impact (NI).
- Beneficial impact (BI).
- May adversely impact individuals, but not likely to result in a loss of viability on the planning area nor cause a trend to federal listing or a loss of species viability range-wide (MAII).
- Likely to result in a loss of viability on the planning area, in a trend to federal listing, or in a loss of species viability range-wide (LRLV).

Biological determinations made for sensitive plant species were made at the scale of the individual national grassland and forest. Recommended management practices for conserving viable populations of rare plant species that were presented in the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) were considered during this effects analysis.

## *Effects by Alternative*

The biological determinations for each species are disclosed in the following tables.

**Table 3-124. Biological Determinations for Threatened and Endangered Plant Species.**

| Species | Planning Unit | DEIS | | | FEIS | | |
|---|---|---|---|---|---|---|---|
| | | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 3 | Alt. 4 | Alt. 5 |
| Blowout Penstemon | NNF(BRD) | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] |
| Blowout Penstemon | SRMNF | no effect [2] | no effect [2] | not likely to adversely affect [1] | no effect [2] | no effect [2] | no effect [2] |
| Western Prairie Fringed Orchid | SNG | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] | not likely to adversely affect [1] |
| Western Prairie Fringed Orchid | NNF(BRD), SRMNF | no effect | no effect | no effect | no effect | no effect | no effect |
| Ute Ladies' Tresses | TBNG | no effect | no effect | no effect | no effect | no effect | no effect |

[1] Beneficial effects are expected from management direction.

[2] Species is not known to occur on the planning unit but will likely be transplanted into the area in the future. A successful transplant would be a beneficial effect.

**Table 3-125. Biological Determinations for Sensitive Plant Species That Are Globally Imperiled or Vulnerable.**

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt. 3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Dakota Buckwheat | LMNG GR/CRNG BGNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Dakota Buckwheat | ONG | NI | NI | MAII | NI | NI | NI |
| Smooth Goosefoot | LMNG, GRNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |

NI = No Impact

MAII = "May Adversely Impact Individuals" but not likely to result in a loss of viability on the planning unit, nor cause a trend to federal listing or a loss of species viability range-wide

LRLV = "Likely to Result in a Loss of Viability" on the planning unit, in a trend to federal listing, or in a loss of species viability range-wide

**Table 3-126. Biological Determinations for Sensitive Plant Species That are at Risk Regionally.**

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Labrador Bedstraw | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Marsh Bellflower | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Buckbean | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Nodding Buckwheat | LMNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Slender Cottongrass | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Lanceleaf Cottonwood | LMNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Torrey's Cryptantha | LMNG | LRLV | LRLV | MAII | MAII | LRLV | MAII |
| Dogberry | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Crested Shield Fern | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Marsh Fern | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Oak Fern | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Sensitive Fern | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Leathery Grape-fern | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Little Grape-fern | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Spinulose Woodfern | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Northern Lady-fern | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Shining Flatsedge | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Umbrella Flatsedge | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Frostweed | SNG | LRLV | MAII | MAII | MAII | MAII | MAII |
| Broad-leaved Goldenrod | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Beach Heather | SNG | LRLV | MAII | MAII | MAII | MAII | MAII |
| Marsh Horsetail | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Meadow Horsetail | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Sand Lily | LMNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Blue Lips | LMNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Alyssum-leaf Phlox | LMNG | LRLV | LRLV | MAII | MAII | LRLV | MAII |
| Limber Pine | LMNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Upright Pinweed | SNG | MAII | LRLV | MAII | MAII | MAII | MAII |
| Alkali Sacaton | LMNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Purple Sandgrass | SNG | LRLV | MAII | MAII | MAII | MAII | MAII |
| Delicate Sedge | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Foxtail Sedge | SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Handsome Sedge | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Showy Lady's Slipper | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Small White Lady's Slipper | SNG | MAII | LRLV | MAII | MAII | MAII | MAII |
| Wahoo Spindle-tree | SNG | LRLV | MAII | MAII | MAII | MAII | MAII |
| Golden Stickleaf | LMNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Adder's Tongue | SNG | MAII | LRLV | MAII | MAII | MAII | MAII |
| Hooker's Townsendia | LMNG | LRLV | LRLV | MAII | MAII | LRLV | MAII |
| Loesel's Twayblade | SNG | LRLV | LRLV | LRLV | MAII | LRLV | LRLV |
| Bog Willow | SNG | MAII | LRLV | LRLV | MAII | LRLV | LRLV |

MAII = "May Adversely Impact Individuals" but not likely to result in a loss of viability on the planning unit, nor cause a trend to federal listing or a loss of species viability range-wide

LRLV = "Likely to Result in a Loss of Viability" on the planning unit, in a trend to federal listing, or in a loss of species viability range-wide.

None of the alternatives resulted in a "likely to adversely affect" biological determination for any of the threatened and endangered plants on the national grasslands and forests in the planning area (Table 3-124). Also, all of the additional conservation measures identified in the Draft Biological Assessment and Evaluation (DEIS Appendix H) for federally listed and protected plant species were incorporated into Alternative 3 in the revised plans. Management direction for blowout penstemon calls for establishing at least two new populations on both the Nebraska National Forest (Bessey Ranger District) and Samuel R. McKelvie National Forest. Initial transplants have already occurred on the Nebraska National Forest. Additional conservation and protection measures for blowout penstemon are also established under Alternative 3. A management strategy that expands conservation and protection measures beyond existing levels for the western prairie fringed orchid populations on the Sheyenne National Grassland is also included as direction under Alternative 3. This management strategy is included in Appendix N of the revised plan for the Dakota Prairie Grasslands. Direction to explore the potential of establishing future populations of western prairie fringed orchid on the Nebraska National Forest (Bessey Ranger District) and Samuel R. McKelvie National Forest is also included under Alternative 3. As indicated in the Biological Assessment and Evaluation, surveys for Ute ladies' tresses on the Thunder Basin National Grassland have been negative, but if the species should be located on the national grassland in the future, the U.S. Fish and Wildlife Service will be consulted to help ensure that appropriate conservation measures are in place.

A risk assessment was also conducted for blowout penstemon and western prairie fringed orchid under Alternative 3. The purpose of the assessment was to further characterize, beyond the biological determinations, the potential effects of the proposed alternative on each species so that an appropriate monitoring priority could be established for each species. The risk assessment process (described in detail in the Biological Assessment and Evaluation) resulted in the selection of the most biologically appropriate "outcome" for each species. The outcomes and associated level of risk used in this analysis were as follows:

- Outcomes 1 and 2 = lower level of risk.
- Outcomes 3 and 4 = intermediate level of risk.
- Outcomes 5 and 6 = higher level of risk.

The risk assessment for the blowout penstemon populations recently transplanted on the Nebraska National Forest suggests a higher level of risk. The obvious reason is that the species will likely continue to exist in refugia on the forest and elsewhere in its current range with strong limitations on interactions between populations. Also, re-establishment of any transplanted populations lost in the future will likely require transplants. The higher level of risk for this species indicates that monitoring the species and its habitat on the Nebraska National Forest warrants a high priority. The risk assessment for western prairie fringed orchid on the Sheyenne National Grassland is currently at the intermediate level under Alternative 3. However, if noxious weeds, especially leafy spurge, continue to spread on the national grassland and/or unfavorable changes in the hydrologic regime occur in the future, a higher level of risk would likely develop. An extended and severe drought could also elevate the risk for this species. Because of the intermediate to higher risk levels, continued monitoring of the species and its habitat on the Sheyenne National Grassland should be a high priority.

The only "likely to result in a loss of viability" determination for a sensitive plant species that is also globally imperiled or vulnerable was made for smooth goosefoot (Table 3-125). This

biological determination was made for the populations known to occur on or in the vicinity of the Little Missouri and Grand River National Grasslands for all alternatives except Alternative 3. Additional management direction under Alternative 3 provides expanded conservation and protection measures for the species. The additional direction was incorporated from conservation measures recommended in the Draft Biological Assessment and Evaluation (DEIS Appendix H). Some populations on or near the Little Missouri National Grassland may have already been extirpated by a significant flood event in 1993. Management direction for Dakota buckwheat under each of the alternatives was considered adequate to avoid a "likely to result in a loss of viability" biological determination. However, management direction to conserve and protect the species is expanded under Alternative 3. Barr's milkvetch is a sensitive plant species in Region 1 of the Forest Service but is not known to occur on any of the Dakota Prairie Grassland units. It does occur on the Buffalo Gap and Thunder Basin National Grasslands (Forest Service Region 2) where it is not listed as sensitive. Because it is not listed as a Region 2 sensitive plant species, no biological determinations were made for the species on the Buffalo Gap and Thunder Basin National Grasslands. However, expanded management direction to conserve and protect the species is provided under Alternative 3. The expanded management direction for these species is described and summarized in the Biological Assessment and Evaluation.

A lower level of risk was identified for Dakota buckwheat and Barr's milkvetch populations on the national grasslands and forests under the proposed alternative. This level of risk suggests a lower priority for monitoring, but because these species are both regional endemics and globally vulnerable, monitoring these species and their habitats on the planning units should be at least an intermediate priority level. The management direction for smooth goosefoot under Alternative 3 provides a high level of conservation and protection for the species on the planning units. However, the risk assessment suggested a higher level of risk because of the low number of populations and individual plants. Therefore, monitoring of the species and its habitat should be a high priority.

Numerous "likely to result in a loss of viability" biological determinations were made under the various alternatives, except Alternative 3, for many of the sensitive plant species that are at risk regionally (Table 3-126). These determinations were made for the plant populations occurring on or near the national grasslands and forests in the planning area. The lack of adverse determinations under Alternative 3 were the result of incorporating conservation measures recommended in the Draft Biological Assessment and Evaluation (DEIS Appendix H) for these species. Some of the conservation measures incorporated into management direction under Alternative 3 for plant species at risk include:

- Prioritize development of conservation strategies for globally impaired or vulnerable plant species.
- As appropriate, coordinate the timing of livestock grazing to avoid adverse impacts to species at risk populations. Some species at risk populations need to be protected from livestock grazing.
- As appropriate, manage for a mosaic of seral stages and disturbance regimes in habitats supporting selected species at risk.
- Apply special management area allocations (MA 2.1, MA 2.2 or MA 3.64) to areas supporting concentrations of species at risk populations.

- Aggressively control noxious weeds in habitats supporting populations of species at risk using methods that reduce the risks to the plants themselves.
- Do not place new water developments, oilers, salt and mineral blocks in or near habitats supporting species at risk.
- Maintain hydrologic regimes that are important to many species at risk.
- Restore natural disturbance regimes in selected areas to maintain habitat for species at risk.

The above recommendations assume that appropriate levels of inventorying and monitoring of plant species at risk will occur.

Alternatives 1 and 2 resulted in the largest number of adverse determinations while Alternative 3 had none. Alternatives 4 and 5 resulted in numerous "likely to result in a loss of viability" determinations but fewer than Alternatives 1 and 2. The rationale for each of the adverse determinations is presented in the Biological Assessment and Evaluation (administrative record).

The risk assessment to help prioritize the monitoring workload resulted in the following 23 species being identified at the higher risk level on one or more of the planning units:

| | | |
|---|---|---|
| Slender Cottongrass | Little Grapefern | Upright Pinweed |
| Lanceleaf Cottonwood | Shining Flatsedge | Purple Sandgrass |
| Torrey's Cryptantha | Frostweed | Foxtail Sedge |
| Dogberry | Broad-leaved Goldenrod | Handsome Sedge |
| Marsh Fern | Beach Heather | Golden Stickleaf |
| Oak Fern | Marsh Horsetail | Hooker's Townsendia |
| Sensitive Fern | Meadow Horsetail | Loesel's Twayblade |
| Leathery Grapefern | Sand Lily | |

These species, in addition to the federally listed plant species, should be a high priority for monitoring on one or more of the national grasslands or forests in the planning area. Use of the plant guilds identified and described in the Biological Assessment and Evaluation and earlier in this section should help focus and consolidate monitoring efforts for these high priority species.

The risk assessment resulted in the following 10 species being identified at the intermediate risk level:

| | |
|---|---|
| Labrador Bedstraw | Spinulose Woodfern |
| Marsh Bellflower | Umbrella Flatsedge |
| Buckbean | Delicate Sedge |
| Nodding Buckwheat | Showy Lady's Slipper |
| Crested Shield Fern | Bog Willow |

These species should be a moderate priority for monitoring. Once again, the plant guilds should be used to help consolidate monitoring efforts. All other species in Table 3-126 were identified as lower risk species. It is obvious that the largest monitoring workload for plant species at risk occurs on the Sheyenne National Grassland.

### *Direct and Indirect Effects*

**Effects from Management Activities**

Effects of a variety of management activities on each species at risk are fully disclosed for each alternative in the Biological Assessment and Evaluation (administrative record). Because of the relatively large number of species and because effects vary by species, the direct and indirect effects on each species under each alternative are not repeated here. However, the direct and indirect effects disclosure in this section for rare plant communities provides a good overview of the types of effects that would also impact individual plant species.

### *Cumulative Effects*

Cumulative effects on each species at risk are also disclosed in the Biological Assessment and Evaluation (FEIS Appendix H) and are not repeated here. However, the cumulative effects discussion in this section for rare plant communities provides a good overview of the types of cumulative effects that are also impacting individual plant species.

# VIII. Affected Environment - Animals

## A. Species at Risk

The species in this analysis include those that meet one of the following criteria:

- Species protected under the Endangered Species Act (ESA) and at risk range-wide.
- Species that are globally imperiled (G-2) or vulnerable (G-3) and/or candidates for protection under ESA.
- Species that may be at risk regionally or at a more local level.

Other than the ESA candidate species, each of the species included under the last two criteria also had to be classified as sensitive by the Forest Service or listed under State endangered species laws and regulations. Most of the species in the last two categories mentioned above are designated by the Forest Service as "sensitive" species. Using these criteria, fifty-one species were identified. Four of the species are fish and the remaining species are terrestrial species, including several that primarily occur in wetland and aquatic habitats. More detailed information on populations, habitat and distribution of these species is available in the Biological Assessment and Evaluation (FEIS Appendix H). With few exceptions, all of these species are known or suspected to occur on or near one or more of the national grasslands and forests in the planning area (Table 3-127). The few species that are known or thought to occur within the planning area but are not believed to occur within the vicinity of the national grasslands and forests were eliminated from further detailed analysis. In the case of aquatic species, those species that are known or suspected to occur downstream from the planning units and possibly impacted by management activities on those lands were also included in the assessment and evaluation. In the case of the black-footed ferret and mountain plover, they were included on national grasslands where they currently do not occur but where potential habitat is thought to exist.

**Table 3-127. Animal Species at Risk**

| | | National Grassland or Forest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Classification** | **LMNG** | **GRCRNG** | **SNG** | **TBNG** | **BGNG** | **FPNG** | **ONG** | **NNF PRRD** | **NNF BRD** | **SRMNF** |
| American Burying Beetle | Endangered | | | | | | PSH | | | K | PSH |
| Whooping Crane | Endangered | K | P | | | K | K | PSH | PSH | PSH/OS | PSH/OS |
| Bald Eagle | Threatened | K | K | K | K | K | K | K | K | K | K |
| Black-footed Ferret | Endangered | PSH | PSH | | PSH | K | PSH | PSH | | PSH | PSH |
| Mountain Plover | Proposed | | | | K | PSH | | PSH | | | |
| Topeka Shiner | Endangered | | | | | | | | | PSH/ OS | PSH/ OS |
| Dakota Skipper | FS – Sensitive (R1)<br>G2/3 | K | P | K | | | | | | | |
| Powesheik Skipper | FS – Sensitive (R1)<br>G2/3 | | | K | | | | | | | |
| Ottoe Skipper | FS – Sensitive (R1)<br>G3 | K | K | | UQ | P | P | P | P | P | P |
| Regal Fritillary | FS – Sensitive(R1andR2)<br>G3 | K | K | K | UQ | P | K | P | P | K | P |
| Sturgeon Chub | ESA Candidate<br>FS – Sensitive (R1)<br>G2 | UQ | UQ | | UQ | K/OS | | | | | |
| Swift Fox | FS – Sensitive(R1andR2)<br>G3<br>SD-Threatened<br>NE-Endangered | UQ | UQ | | K | K | UQ | K | UQ | | |
| Black-tailed Prairie Dog | ESA Candidate<br>FS – Sensitive(R1andR2)<br>G3 | K | K | | K | K | K | K | | K | UQ |
| Belfragi's Bug | FS – Sensitive (R1) | K | P | K | | | | | | | |
| Tawny Crescent Butterfly | FS – Sensitive (R1 andR2)<br>G4 | K | P | | P | | | P | K | | |
| Arogos Skipper | FS – Sensitive (R1)<br>G3/G4 | | P | P | P | P | P | P | | | |
| Flathead Chub | FS – Sensitive (R2)<br>G5 | K/OS | K/OS | | K/OS | K/OS | | K/OS | | K/OS | K/OS |

| | | National Grassland or Forest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Classification** | **LMNG** | **GRCRNG** | **SNG** | **TBNG** | **BGNG** | **FPNG** | **ONG** | **NNF PRRD** | **NNF BRD** | **SRMNF** |
| Longnose Sucker | SD – Threatened<br>G5 | K/OS | | | | | | | | | |
| Plains Topminnow | FS – Sensitive (R2)<br>G4 | | | | K/OS | K/OS | | | | K/OS | K/OS |
| Northern Leopard Frog | FS – Sensitive (R1 and R2)<br>G5 | K | K | K | K | K | K | K | K | K | K |
| Tiger Salamander | FS – Sensitive (R2)<br>G5 | K | K | K | K | K | K | K | K | K | K |
| Pale Milk Snake | FS – Sensitive (R2)<br>G5 | | | | P | P | P | P | K | K | P |
| Blanding's Turtle | SD – Endangered<br>G4 | | | | | | | | | P | K |
| American Bittern | FS – Sensitive (R2)<br>G4 | K | K | K | | K | K | K | | P | K |
| Greater Prairie Chicken | FS – Sensitive (R1 andR2)<br>G4 | | | K | | | K | | | K | K |
| Yellow-billed Cuckoo | FS – Sensitive (R2)<br>G5 | UQ | K | K | K | K | UQ | K | K | K | K |
| Long-billed Curlew | FS – Sensitive (R2)<br>G5 | K | P | | K | K | K | K | | K | K |
| American Peregrine Falcon | FS – Sensitive (R1 and R2)<br>G4 | K | P | P | K | K | K | K | K | P | P |
| Northern Goshawk | FS – Sensitive (R1 and R2)<br>G5 | P | P | P | K | P | P | P | P | P | P |
| Sage Grouse | FS – Sensitive (R1)<br>G5 | K | | | K | K | | | | | |
| Ferruginous Hawk | FS – Sensitive (R2)<br>G4 | K | K | | K | K | K | K | K | K | K |
| White-faced Ibis | FS – Sensitive (R2)<br>G5 | | | P | P | UQ | UQ | UQ | | | UQ |

| | | National Grassland or Forest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Classification** | **LMNG** | **GRCRNG** | **SNG** | **TBNG** | **BGNG** | **FPNG** | **ONG** | **NNF PRRD** | **NNF BRD** | **SRMNF** |
| Common loon | FS – Sensitive (R2)<br>G5 | | | | UQ | UQ | UQ | UQ | | UQ | UQ |
| Merlin | FS – Sensitive (R2)<br>G5 | K | P | P | K | K | K | K | K | K | K |
| Pygmy Nuthatch | FS – Sensitive (R2)<br>G5 | | | | P | | | P | K | | |
| Western Burrowing Owl | FS – Sensitive (R1 and R2)<br>G4 | K | K | P | K | K | K | K | K | K | K |
| Sprague's Pipit | FS – Sensitive (R1)<br>G4 | K | K | P | K | K | P | | | P | P |
| Upland Sandpiper | FS – Sensitive (R2)<br>G5 | K | K | K | K | K | K | K | K | K | K |
| Loggerhead Shrike | FS – Sensitive (R1 and R2)<br>G5 | K | K | K | K | K | K | K | K | K | K |
| Baird's Sparrow | FS – Sensitive (R1 andR2)<br>G4 | K | K | P | K | UQ | P | UQ | | | |
| Fox Sparrow | FS – Sensitive (R2)<br>G5 | P | P | P | K | P | K | P | P | K | K |
| Trumpeter Swan | FS – Sensitive (R2)<br>G4 | | | | | K | | | | | UQ |
| Black Tern | FS – Sensitive (R2)<br>G4 | K | K | K | K | K | K | P | | P | P |
| Black-backed Woodpecker | FS – Sensitive (R1 and R2)<br>G5 | | | | P | | | | | | |
| Lewis' Woodpecker | FS – Sensitive (R2)<br>G5 | | | | K | P | | K | K | | |
| Townsend's Big-eared Bat | FS – Sensitive (R1 and R2)<br>G4 | P | | | K | K | | P | P | | |
| Mountain Lion | SD – Threatened<br>G5 | P | | | K | P | | P | K | | |

| National Grassland or Forest | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Classification** | **LMNG** | **GRCRNG** | **SNG** | **TBNG** | **BGNG** | **FPNG** | **ONG** | **NNF PRRD** | **NNF BRD** | **SRMNF** |
| Fringe-tailed Myotis | FS – Sensitive (R2)<br>G4 | | | | K | K | | K | K | | |
| River Otter | NE - Endangered<br>SD – Threatened<br>G5 | | | | | | | | | P | P |
| California Bighorn Sheep | FS – Sensitive (R1)<br>G4/G5 | K | | | | | | | | | |
| Dwarf Shrew | FS – Sensitive (R2)<br>G4 | | | | UQ | UQ | | | | | |

K = Known occurrence in vicinity; date of last observation suggests that species still occurs in area

P = Possible but unconfirmed occurrence

PSH = Species occurrence is unlikely or questionable; within species range and potential or suitable habitat may occur (used only for federally-listed or proposed species)

UQ = Species occurrence is unlikely or questionable; within species range and potential or suitable habitat may occur (used only for candidate, sensitive and state-listed species)

The Topeka shiner (endangered) was eliminated from any further detailed analysis because there are no current or historic populations of this species in waters on or downstream from the Nebraska and Samuel R. McKelvie National Forests. Also, it is highly unlikely that any management activities addressed in the revised plans could significantly affect downstream habitat for this species.

American burying beetles (endangered) are carrion beetles known to occur on the Nebraska National Forest (Bessey Ranger District) and are suspected of occurring on the Samuel R. McKelvie National Forest. They seem to occupy a variety of habitats but little is known of their habitat requirements in the planning area.

Use of habitats on the national grasslands and forests by whooping cranes (endangered) has been documented but is rare and incidental. They have been observed resting and foraging on uplands on national grasslands and in shallows and sandbars on the Middle Loup River near the Nebraska National Forest (Bessey Ranger District).

Bald eagle (threatened) populations continue to increase in the planning area. They are increasingly observed on all the national grasslands and forests in the planning area. They utilize ponderosa pine woodlands, riparian woodlands and are occasionally observed hunting over prairie dog colonies. Recent nesting attempts have been observed on the Thunder Basin National Grassland and are expected to occur on or near other national grasslands and forests as their populations increase.

The black-footed ferret (endangered) is one of the rarest North American mammals in the wild. In fact, it was likely extirpated from the northern Great Plains until recently when reintroduced back into the wild in Wyoming, South Dakota and Montana. The South Dakota reintroduction occurred on the Buffalo Gap National Grassland and adjoining Badlands National Park, beginning in 1994. This species is mostly endemic to the Great Plains and depends exclusively on prairie dogs and their colonies for prey and shelter. The species is at risk range-wide, and a recovery plan has established national recovery objectives. The recovery program involves captive propagation and reintroductions into suitable habitat. There is a shortage of suitable reintroduction sites to meet the national recovery objectives. Buffalo Gap, Thunder Basin and Little Missouri National Grasslands contain suitable habitat for future reintroductions.

Nesting mountain plover (proposed as threatened) populations occur on the Thunder Basin National Grassland. They utilize areas with low and sparse grassland cover and also seem to prefer nesting and foraging on prairie dog colonies. Potential habitat may also exist on the nearby Buffalo Gap and Oglala National Grasslands. This species is likely to be listed as threatened in the near future.

Two species in the vicinity of the national grasslands and forests in the planning area are classified by the U.S. Fish and Wildlife Service as candidates for protection under ESA. The black-tailed prairie dog is mostly endemic to the Great Plains and has undergone major reductions in populations due to habitat loss and poisoning. Their colonies contribute greatly to the native plant and animal diversity of the region. Black-tailed prairie dogs prefer rangelands grazed by livestock or bison and lands with recent or past soil disturbances. Prairie dog distribution and abundance on the planning units are largely determined by the use of rodenticides. Plague may become a more prevalent factor in influencing prairie dog populations on the planning units in the future. The species has been recently petitioned for listing as a threatened species under the Endangered Species Act, and the U.S. Fish and Wildlife

Service 12-month finding was that listing of the species was warranted but precluded by other higher listing priorities. Another candidate species for listing under ESA is the sturgeon chub which is still found in the Cheyenne, White, and Grand Rivers in the planning area. They are associated with medium to large Great Plains rivers and are endemic turbid water specialists in this region.

Other globally imperiled or vulnerable species that are known or suspected to occur on the national grasslands and forests in the planning area include the swift fox and several species of butterflies and skippers, including the Dakota skipper, Powesheik skipper, Ottoe skipper, and Regal fritillary. The swift fox had been a candidate for ESA protection but was removed from that list in January 2001.

Some of the sensitive species that are at risk regionally or at state levels and have their yearlong or breeding distributions primarily centered in the Great Plains include Belfragi's bug, swift fox, long-billed curlew, Sprague's pipit, and Baird's sparrow. The current range of the greater prairie chicken is also centered in the Great Plains.

## B. Management Indicator Species

Planning provides the guidance for maintaining or restoring the diversity of plant and animal communities and the productive capacity of ecological systems, the core elements of ecological sustainability. Management indicator species (MIS) have been selected to serve as a barometer for species diversity and viability at the national grassland and forest level. Management indicator species serve multiple functions in grassland and forest planning including the basis for project-level effects analysis, and as a reliable feedback mechanism for land and resource management plan implementation. The latter is accomplished by monitoring population trends and by determining habitat relationships (36 CFR 219.19 (a)(6)). Objectives for the maintenance and improvement of habitat for these species have also been developed (36 CFR 219.19 (a)). Habitat suitability and potential capability on the national grasslands and forests for management indicator species must also be determined (36 CFR 219.20 (a)).

MIS selection is predicated on the assumption that their populations reflect effects of land management or resource use activities (36 CRF 219.19 (a)(1)). Criteria used for their selection are listed and described in FEIS Appendix B, and those species selected under these criteria as management indicator species are listed in the following table. This table also identifies the geographic areas on the national grasslands and forests where these species will be used for monitoring purposes as management indicator species and where habitat suitability and long-term population trends of each management indicator species will be monitored. Because most of these species are also species at risk, additional management direction would also apply outside the geographic areas where they are identified as management indicator species. Guidance for application of the management indicator species concept presented in the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) was also consulted.

**Table 3-128. Management Indicator Species for Each Geographic Area in the Planning Area.**

| Unit/ Geographic Area | Biological Community | Management Indicator Species |
|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | |
| **Grand River/Cedar River National Grasslands** | | |
| | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| **Little Missouri National Grassland** | | |
| Badlands | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| Rolling Prairie | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| **Sheyenne National Grassland** | | |
| Sheyenne | High Structure Grasslands | Greater Prairie Chicken |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| | Tallgrass Prairie Wetlands | Western Prairie Fringed Orchid |
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | |
| **Thunder Basin National Grassland** | | |
| Broken Hills | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| Cellars Rosecrans | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| Fairview Clareton | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| Highlight Bill | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| Spring Creek | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| Upton Osage | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| **NEBRASKA NATIONAL FOREST UNITS** | | |
| **Buffalo Gap National Grassland** | | |
| Fall River Northeast | High Structure Grasslands | Plains Sharp-tailed Grouse |
| Fall River Southeast | High Structure Grasslands | Plains Sharp-tailed Grouse |
| | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |

| Unit/ Geographic Area | Biological Community | Management Indicator Species |
|---|---|---|
| Fall River West | Sagebrush with Tall, Dense and Diverse Understories | Sage Grouse |
| | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| Wall North | High Structure Grasslands | Plains Sharp-tailed Grouse |
| Wall Southeast | High Structure Grasslands | Plains Sharp-tailed Grouse |
| Wall Southwest | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| **Fort Pierre National Grassland** | | |
| Fort Pierre | High Structure Grasslands | Greater Prairie Chicken |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| | Prairie Dog Colonies and Low Structure Grassland | Black-tailed Prairie Dog |
| **Oglala National Grassland** | | |
| Oglala | High Structure Grasslands | Plains Sharp-tailed Grouse |
| | Prairie Dog Colonies and Low Structure Grasslands | Black-tailed Prairie Dog |
| **Nebraska National Forest/Pine Ridge Ranger District** | | |
| Pine Ridge | Open Mature and Late Successional Ponderosa Pine Forests | Pygmy Nuthatch |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| **Nebraska National Forest/Bessey Ranger District** | | |
| Bessey | High Structure Grasslands | Greater Prairie Chicken |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |
| **Samuel R. McKelvie National Forest** | | |
| McKelvie | High Structure Grasslands | Greater Prairie Chicken |
| | High Structure Grasslands | Plains Sharp-tailed Grouse |

More detailed habitat descriptions for the management indicator species are presented in Appendix H of the revised plans.

Western prairie fringed orchids most often occur in tallgrass prairie wetlands that are temporarily, seasonally or semi-permanently flooded. Extreme yearly and seasonal fluctuations in water depth are characteristic of these wetlands. This species is classified as threatened under the Endangered Species Act, and a recovery strategy for the species on the Sheyenne National Grassland is provided in Appendix N of the revised plan for the Dakota Prairie Grasslands. Other plant species commonly found in association with this orchid include but are not limited to the following: adder's tongue, baltic rush, Canada goldenrod, fescue sedge, grass-leaved goldenrod, hedge-nettle, least grape-fern, northern reedgrass, panicled aster, prairie cordgrass, smooth scouring rush, switchgrass, western ragweed, Wilcox dicanthelium, wild strawberry, sandbar willow, and wooly sedge. These species and western prairie fringed orchid benefit from maintenance of natural hydrologic and disturbance regimes. It is estimated that there's between 6,700 and 7,400 acres of potential habitat for western prairie fringed orchid on the Sheyenne National Grassland. The distribution of orchids within these areas would be expected to be dynamic and shifting in time and location so not all acres of potential habitat

would be expected to simultaneously support orchids. Recognizing that orchid distribution is naturally dynamic and variable from one year to the next, the best estimate of current occupied habitat is 3,090 acres. The largest population count for orchids since 1982 is 9,759 flowering plants. Because of the dynamic nature of the plant and its habitat, no attempt was made to characterize population trend over the last 10 to 15 years.

Plains sharp-tailed grouse are found primarily in mixed grass prairies. Interspersed shrubs and shrub communities also contribute to habitat suitability for this species. The species is hunted across much of the planning area. Other wildlife species that utilize similar habitats for at least part of the year and generally respond in a similar manner to changes in habitat conditions include but are not limited to the following: American bittern, dickcissel, LeConte's sparrow, sharp-tailed sparrow, savannah sparrow, clay-colored sparrow, field sparrow, bobolink, Sprague's pipit, northern harrier, short-eared owl, mallard (nesting habitat), gadwall (nesting habitat), shoveler (nesting habitat), greater prairie chicken, prairie vole, Dakota skipper, Powesheik skipper, Ottoe Skipper, and Regal fritillary butterfly. These species generally respond favorably to increased structure and structural diversity on mixed grass prairies (Connelly et al. 1998, The Nature Conservancy 2000, Stewart 1975, Sisson 1976).

Estimates of potential habitat and current habitat suitability for plains sharp-tailed grouse are presented in Table 3-129. Current habitat suitability is based on the percentage of the potential habitat on each planning unit that is estimated to be quality habitat, based on the habitat description provided in Appendix H of the revised plans. Population trends over the last 10 to 15 years for this species are upward on the Buffalo Gap (Wall Ranger District), Fort Pierre, and Little Missouri National Grasslands and with limited data, appear to be upward in the vicinity of the Buffalo Gap and Grand River National Grasslands (Wall Ranger District). Trend has been stable to slightly downward on the Sheyenne National Grassland and appears to be downward in the Nebraska Sandhills where the Nebraska (Bessey Ranger District) and Samuel R. McKelvie National Forests are located. Population trend information for sharp-tailed grouse over the last 10 to 15 years is not available for the area including the Buffalo Gap (Fall River Ranger District) and Oglala National Grasslands. Information for the areas including the Thunder Basin and Grand River National Grasslands was inadequate for establishing trend.

The greater prairie chicken has undergone substantial habitat losses from large conversions of tallgrass prairie to agricultural production (Svedarsky et al. 1999, Schroeder and Robb 1993) They have been extirpated from 6 states and Canadian provinces since the 1960s. They were considered extirpated in Saskatchewan and Manitoba in the mid 1970s and only two remnant populations currently occur in North Dakota. In addition to being identified as a management indicator species, greater prairie chicken are also considered a species at risk and are designated by Regions 1 and 2 of the Forest Service as a sensitive species. This species needs open and expansive grasslands with substantial areas of high and diverse structure. In many areas, adjoining private croplands provide valuable winter foods. Other wildlife species that utilize similar habitats as greater prairie chicken for at least part of the year and generally respond in a similar manner to changes in habitat conditions include but are not limited to the following species: American bittern, dickcissel, LeConte's sparrow, sharp-tailed sparrow, savannah sparrow, Sprague's pipit, short-eared owl, mallard (nesting habitat), gadwall (nesting habitat), shoveler (nesting habitat), sharp-tailed grouse, prairie vole, Dakota skipper, Powesheik skipper, Ottoe Skipper, and Regal fritillary butterfly. These species generally respond favorably to increased structure and structural diversity on mixed and tallgrass prairies (Fitzgerald et al.

1999, Bjugstad 1988, Svedarsky and Amburg 1996, Svedarsky et al. 1999, Schroeder and Robb 1993, Kirsch 1974).

Estimates of potential habitat and current habitat suitability for greater prairie chicken are presented in Table 3-130. Current habitat suitability is based on the percentage of the potential habitat on each planning unit that is estimated to be quality habitat, based on the habitat description provided in Appendix H of the revised plans. Population trend over the last 10 to 15 years for this species on the Sheyenne National Grassland is downward. Population trend since 1988 for greater prairie chicken on the Fort Pierre National Grassland is upward. Population trend information on the Nebraska National Forest (Bessey Ranger District) is not available, but trend information for the entire Nebraska Sandhills area indicates a stable to slightly downward trend over the last 10 to 15 years.

Sage grouse are sagebrush obligates and are distributed across much of the Thunder Basin National Grassland. Small remnant populations are also found on the Buffalo Gap and Little Missouri National Grasslands. In addition to being identified as a management indicator species for sagebrush habitats, they are also considered a species at risk and are designated by Region 1 of the Forest Service as a sensitive species. Loss and deterioration of sagebrush communities from cultivation, spraying and livestock grazing are thought to be some of the significant factors causing declines of sage grouse populations (Connelly et al. 2000, Beck and Mitchell 2000, Paige and Ritter 1999, The Nature Conservancy 1999). Since grasshoppers and other insects are important foods for sage-grouse broods, grasshopper spraying may also negatively impact sage grouse populations (Johnson 1987). Other wildlife species that also depend on sagebrush habitats and generally benefit from management that enhances and maintains diverse sagebrush habitats, including tall and dense native understory vegetation, include but are not limited to the following: sage sparrow, sage thrasher, and Brewer's sparrow. Big game including pronghorn, mule deer and elk also rely heavily on sagebrush habitats, especially for winter foraging.

Estimates of potential habitat and current habitat suitability for sage grouse are presented in Table 3-131. Potential habitat is simply the current sagebrush habitat. Current habitat suitability is based on the percentage of the potential habitat on each planning unit that is estimated to be quality habitat, based on the habitat description provided in Appendix H of the revised plans. Data collection to complete habitat suitability analyses for sage grouse on the national grasslands is still ongoing or will be initiated in 2001. Population trends for sage grouse over the last 10 to 15 years are upward on the Thunder Basin National Grassland and appear to be slightly downward on the Little Missouri National Grassland. The numbers of males on the one display ground on the Buffalo Gap National Grassland has been relatively stable over the last 10 years. Several other display grounds on the Buffalo Gap National Grassland have apparently remained inactive since the late 1970s and early 1980s.

Black-tailed prairie dogs were once one of the major herbivores on the plains along with grasshoppers, bison, pronghorn and other native ungulates. Their colonies have been reduced to a small fraction of their historic abundance and distribution, resulting in declining populations of several other wildlife species that depend heavily on large complexes of prairie dog colonies (U.S. Fish and Wildlife Service 1999). Primary threats include habitat loss and deterioration as a result of cultivation, urban sprawl and fragmentation. Direct threats include disease (plague), poisoning, and shooting. Black-tailed prairie dogs also serve as a relatively stable year-round prey-base for several raptors and mammalian predators. Some of these

species include ferruginous hawk, golden eagle, bald eagle, badger, bobcat and swift fox. Rattlesnakes are also common in prairie dog colonies. Estimates of potential habitat and current habitat suitability for black-tailed prairie dogs are presented in Table 3-132. Potential habitat was estimated through habitat modeling (FEIS Appendix B), and current habitat suitability is simply represented by the current acreage (1996-98) of active colonies, recognizing that this acreage has been constrained by prairie dog poisoning over the last several decades. The estimates of potential prairie dog habitat should not be viewed as a prediction of the historic prairie dog distribution on the planning units because it is highly unlikely that the predicted habitat was ever occupied by prairie dogs, especially at the same time. The long-term population trends for black-tailed prairie dogs on the national grasslands are downward, but over the last 10 to 15 years, this trend has been reversed on some of the areas due to reduced prairie dog poisoning.

The pygmy nuthatch is a cavity-nesting species that favors open mature and late successional ponderosa pine forests with a snag component (USDA Forest Service 1996, Jones 1998). In addition to being a management indicator species, it is also a sensitive species in Region 2 of the Forest Service. Other wildlife species that utilize similar nesting or foraging habitats include the Lewis' woodpecker, mountain bluebird, wild turkey and merlin (USDA Forest Service 1996). Potential habitat on the Nebraska National Forest (Pine Ridge Ranger District) is estimated to be approximately 11,900 acres which is equivalent to the long-term objective of having approximately 60%of the current forest cover in structural stages 4 and 5. Current habitat suitability is unknown, but future inventories and evaluations are planned. There is no population trend information available for this species in the vicinity of the Nebraska National Forest.

**Table 3-129. Estimates of Potential Habitat for Plains Sharp-tailed Grouse Habitat and Current Levels of Habitat Suitability (for nesting).**

| Unit | Acres of Potential Habitat | Current Habitat Suitability |
|---|---|---|
| Little Missouri National Grassland | 1,003,000 | 1-10% |
| Grand River/Cedar River National Grasslands | 156,000 | 1-10% |
| Sheyenne National Grassland | 64,000 | 1-10% [1] |
| Fort Pierre National Grassland | 115,000 | 15-25% |
| Buffalo Gap National Grassland (FRRD) | 323,000 | 1-10% |
| Buffalo Gap National Grassland (WRD) | 264,000 | 10-20% |
| Oglala National Grassland | 92,000 [2] | 1-10% |
| Nebraska National Forest (PRRD) | 27,000 [2] | Unknown |
| Nebraska National Forest (BRD) | 78,000 | 45-55% |
| Samuel R. McKelvie National Forest | 113,000 [3] | 25-35% |
| Thunder Basin National Grassland | Unknown [4] | Unknown |

[1] McCarthy et al. (1997)

[2] The acreage includes only the preferred habitat of the open grasslands within the ponderosa pine forests and savannah.

[3] The acreage does not include plantations.

[4] Inventory and evaluation underway.

**Table 3-130. Estimates of Potential Prairie Chicken Habitat and Current Levels of Habitat Suitability (for nesting).**

| Unit | Acres of Potential Habitat | Current Habitat Suitability |
|---|---|---|
| Sheyenne National Grassland | 49,000 | 1-10% [1] |
| Fort Pierre National Grassland | 115,000 | 15-25% |
| Nebraska National Forest (BRD) | 4,000[2] | Unknown |
| Samuel R. McKelvie National Forest | 31,000[2] | 1-10% |

[1] McCarthy et al. (1997)

[2] The acreage includes only the preferred nesting habitat in the large valleys and flats. Additional habitat occurs in the adjoining hills, but this habitat is not accounted for in this table.

**Table 3-131. Estimates of Potential Sage Grouse Habitat and Current Levels of Habitat Suitability.**

| Unit | Acres of Sagebrush Habitat | Current Habitat Suitability |
|---|---|---|
| Little Missouri National Grassland | Inventory Incomplete | Unknown [1] |
| Buffalo Gap National Grassland | 15,800 | Evaluation Incomplete [2] |
| Thunder Basin National Grassland | 438,500 | Evaluation Incomplete [2] |

[1] Cooperative research study will begin in 2001.

[2] Additional data are needed to complete evaluation; some data are on file in administrative record.

**Table 3-132. Estimates of Potential Prairie Dog Habitat and Current Prairie Dog Colony Acreage.**

| Unit | Acres of Potential Habitat | Acreage of Active Colonies |
|---|---|---|
| Little Missouri National Grassland | 731,000 | 2,860 |
| Grand River/Cedar River National Grassland | 148,000 | 1,520 |
| Sheyenne National Grassland | Not applicable | 0 |
| Fort Pierre National Grassland | 96,000 | 720 |
| Buffalo Gap National Grassland | 455,000 | 13,280 |
| Oglala National Grassland | 84,000 | 740 |
| Nebraska National Forest (PRRD) | Not applicable | 0 |
| Nebraska National Forest (BRD) | Unknown | 70 |
| Samuel R. McKelvie National Forest | Not applicable | 0 |
| Thunder Basin National Grassland | 405,000 [1] | 18,340 |

[1] The potential of an additional 83,000 acres is unknown.

Species that were previously identified as MIS on the national grasslands and forests in the planning area but are not MIS in the revised plans are listed in the following table, along with the primary reasons for their non-selection.

**Table 3-133. Former Management Indicator Species and Reasons for Their Non-selection as MIS in**

**the Revised Plans**

| Species | Primary Reason for Non-selection |
|---|---|
| **Dakota Prairie Grasslands** | |
| Northern Oriole | Not a yearlong resident |
| Yellow Warbler | Not a yearlong resident |
| Ovenbird | Not a yearlong resident |
| Rufous-sided Towhee | Not a yearlong resident |
| Brewer's Sparrow | Not a yearlong resident |
| Largemouth Bass | Not indigenous |
| **Thunder Basin NG** | |
| Prairie Vole | Monitoring concerns |
| Yellow-breasted Chat | Not a yearlong resident |
| Golden Eagle | Not a habitat specialist |
| Brewer's Sparrow | Not a yearlong resident |
| Willow Flycatcher | Not a yearlong resident |
| Mountain Plover | Not a yearlong resident |
| Upland Sandpiper | Not a yearlong resident |
| Ferruginous Hawk | Not a yearlong resident |
| Red Crossbill | Not a yearlong resident |
| House Wren | Not a yearlong resident |
| Long-billed Curlew | Not a yearlong resident |
| Red-headed Woodpecker | Not a yearlong resident |
| Woodhouse's Toad | Not sensitive to management activities (populations irruptive primarily in response to climatic conditions) |
| **Nebraska NF Units** | |
| Pronghorn | Not a habitat specialist |
| Mule Deer | Not a habitat specialist |
| Black-footed Ferret | Black-tailed prairie dogs more appropriate (ferret habitat) |
| Wild Turkey | Not a habitat specialist |

# IX. Environmental Consequences - Animals

## A. Species at Risk

This effects analysis was completed by three wildlife biologists with over 40 years of combined experience in fish and wildlife management on the national grasslands and forests in the planning area.

Fifty-one animal species were identified as species at risk in the Biological Assessment and Evaluation (FEIS Appendix H and administrative record) and 41 of those were taken forward for further detailed effects analysis. The effects analysis procedures described in the Biological Assessment and Evaluation culminate in a biological determination for each species for each planning alternative. The Biological Assessment and Evaluation should be consulted for more detailed information on the effects analyses for each of these animal species. The biological determination made for each species protected or proposed for protection under the Endangered Species Act was one of the following:

- No effect.
- Is not likely to adversely affect.
- Is likely to adversely affect.
- Not likely to jeopardize proposed species, or adversely modify proposed critical habitat.
- Likely to jeopardize proposed species, or adversely modify proposed critical habitat.

The biological determination made for each sensitive species was one of the following:

- No impact (NI).
- Beneficial impact (BI).
- May adversely impact individuals, but not likely to result in a loss of viability on the planning area nor cause a trend to federal listing or a loss of species viability range-wide (MAII).
- Likely to result in a loss of viability on the planning area, in a trend to federal listing, or in a loss of species viability range-wide (LRLV).

Biological determinations made for sensitive animal species were made at the scale of the individual national grassland and forest. Recommended management practices for conserving viable populations of species at risk that were presented in the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) were consulted during this effects analysis.

## *Effects from Alternatives*

### Direct and Indirect Effects

#### Effects from Alternatives

The biological determinations for each species are disclosed in the following tables.

**Table 3-134. Biological Determinations for Threatened, Endangered and Proposed Animal Species**

| | | | | DEIS | FEIS | | |
|---|---|---|---|---|---|---|---|
| **Species** | **Planning Unit** | **Alt. 1** | **Alt. 2** | **Alt. 3** | **Alt.3** | **Alt. 4** | **Alt. 5** |
| American Burying Beetle | NNF(BRD) | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect |
| American Burying Beetle | SRMNF | No effect | No effect | No effect | No effect | No effect | No effect |

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Whooping Crane | LMNG, GRCRNG, BGNG, FPNG, NNF(BRD), SRMNF | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect |
| Bald Eagle | All | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect |
| Black-footed Ferret | GRCRNG, FPNG, ONG | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect |
| Black-footed Ferret | LMNG | Likely to adversely affect | Likely to adversely affect | Likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Likely to adversely affect |
| Black-footed Ferret | BGNG | Likely to adversely affect | Likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect |
| Black-footed Ferret | TBNG | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect | Not likely to adversely affect |
| Black-footed Ferret | NNF(BRD) | No effect | No effect | No effect | No effect | No effect | No effect |
| Mountain Plover | TBNG | Not likely to jeopardize | Not likely to jeopardize | Not likely to adversely affect | Not likely to jeopardize | Not likely to jeopardize | Not likely to jeopardize |
| Mountain Plover | BGNG, ONG | Not likely to jeopardize | Not likely to jeopardize | No effect | Not likely to jeopardize | Not likely to jeopardize | Not likely to jeopardize |

**Table 3-135. Biological Determinations for Sensitive Animal Species That Are Globally Imperiled or Vulnerable and/or Candidates for Protection Under ESA**

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Dakota Skipper | SNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Dakota Skipper | LMNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Dakota Skipper | GR/CRNG | MAII | MAII | NI | MAII | MAII | MAII |
| Powesheik Skipper | SNG | LRLV | LRLV | a | MAII | MAII | MAII |
| Ottoe Skipper | LMNG | MAII | MAII | MAII | MAII | MAII | MAII |

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Ottoe Skipper | GR/CRNG | NI | NI | MAII | NI | NI | NI |
| Regal Fritillary | SNG | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Regal Fritillary | LMNG, GR/CRNG, FPNG, NNF(BRD) | MAII | MAII | MAII | MAII | MAII | MAII |
| Regal Fritillary | BGNG, ONG, NNF(PRRD), SRMNF | NI | NI | MAII | NI | NI | NI |
| Swift Fox | TBNG, BGNG, ONG | MAII | MAII | MAII | MAII | MAII | MAII |
| Black-tailed Prairie Dog [b] | LMNG, GR/CRNG, TBNG, BGNG, FPNG, ONG, NNF(BRD) | MAII | MAII | MAII | MAII | MAII | MAII |

NI = No Impact

MAII = "May Adversely Impact Individuals" but not likely to result in a loss of viability on the planning unit, nor cause a trend to federal listing or a loss of species viability range-wide

LRLV = "Likely to Result in a Loss of Viability" on the planning unit, in a trend to federal listing, or in a loss of species viability range-wide

a Preliminary biological determination was not made in the DEIS Draft Biological Assessment and Evaluation.

b Prairie dog populations on NNF(BRD) may not be viable because of marginal habitat in the sandhills and not land uses or management.

**Table 3-136. Biological Determinations for Sensitive Animal Species That are at Risk Regionally or at a State Level.**

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Belfragi's Bug | LMNG, SNG | MAII | MAII | a | MAII | MAII | MAII |
| Belfragi's Bug | GR/CRNG | NI | NI | a | NI | NI | NI |
| Tawny Crescent Butterfly | LMNG, NNF(PRRD) | MAII | MAII | MAII | MAII | MAII | MAII |
| Tawny Crescent Butterfly | GR/CRNG, TBNG, ONG | NI | NI | MAII | NI | NI | NI |
| Arogos Skipper | GRCRNG, SNG | NI | NI | a | NI | NI | NI |
| Flathead Chub | TBNG, BGNG, ONG, NNF(BRD), SRMNF | MAII | MAII | MAII | MAII | MAII | MAII |
| Plains Topminnow | TBNG, BGNG, NNF(BRD), SRMNF | MAII | MAII | MAII | MAII | MAII | MAII |

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Northern Leopard Frog | All | MAII | MAII | BI | MAII | MAII | MAII |
| American Bittern | All planning units except TBNG and NNFPRRD | MAII | MAII | BI | MAII | MAII | MAII |
| Greater Prairie Chicken | SNG, SRMNF | LRLV | LRLV | MAII | MAII | MAII | MAII |
| Greater Prairie Chicken | NNF(BRD), FPNG | MAII | LRLV | MAII | MAII | MAII | MAII |
| Yellow-billed Cuckoo | BGNG, ONG, TBNG, NNF(PPRD), NNF(BRD), SRMNF | MAII | MAII | BI | MAII | MAII | MAII |
| Long-billed Curlew | All planning units except SNG and NNFPRRD | MAII | MAII | BI | MAII | MAII | MAII |
| American Peregrine Falcon | All planning units | NI | NI | NE | NI | NI | NI |
| Northern Goshawk | TBNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Sage Grouse | LMNG | MAII | LRLV | MAII | MAII | MAII | MAII |
| Ferruginous Hawk | FPNG, BGNG, ONG, TBNG, NNF(BRD), NNF(PRRD), SRMNF | MAII | MAII | MAII | MAII | MAII | MAII |
| Merlin | FPNG, BGNG, ONG, TBNG, NNF(BRD), NNF(PRRD), SRMNF | MAII | MAII | MAII | MAII | MAII | MAII |
| Pygmy Nuthatch | NNFPRRD, | MAII | MAII | a | MAII | MAII | MAII |
| Pygmy Nuthatch | ONG, TBNG | NI | NI | a | NI | NI | NI |
| Western Burrowing Owl | All Except SNG | MAII | MAII | MAII | MAII | MAII | MAII |
| Western Burrowing Owl | SNG | NI | NI | a | NI | NI | NI |
| Sprague's Pipit | LMNG, GR/CRNG | MAII | MAII | a | MAII | MAII | MAII |
| Upland Sandpiper | All planning units | MAII | MAII | a | MAII | MAII | MAII |

| Species | Planning Unit | Alt. 1 | Alt. 2 | DEIS Alt. 3 | FEIS Alt.3 | Alt. 4 | Alt. 5 |
|---|---|---|---|---|---|---|---|
| Loggerhead Shrike | All planning units | MAII | MAII | BI | MAII | MAII | MAII |
| Baird's Sparrow | LMNG, GRCRNG, SNG, TBNG | MAII | MAII | BI | MAII | MAII | MAII |
| Fox Sparrow | FPNG, BGNG, ONG, TBNG, NNF(PPRD), NNF(BRD), SRMNF | NI | NI | BI | NI | NI | NI |
| Trumpeter Swan | BGNG | MAII | MAII | BI | MAII | MAII | MAII |
| Black Tern | FPNG, BGNG, ONG, NNF(BRD), SRMNF, TBNG | MAII | MAII | BI | MAII | MAII | MAII |
| Black-backed Woodpecker | NNF(PRRD), ONG | NI | NI | a | NI | NI | NI |
| Lewis' Woodpecker | ONG, NNF(PRRD) | MAII | MAII | BI | MAII | MAII | MAII |
| Lewis' Woodpecker | TBNG | NI | NI | MAII | NI | NI | NI |
| Lewis' Woodpecker | BGNG | NI | NI | a | NI | NI | NI |
| Fringe-tailed Myotis | TBNG, BGNG, ONG, NNF(PRRD) | MAII | MAII | BI | MAII | MAII | MAII |
| California Bighorn Sheep | LMNG | MAII | MAII | MAII | MAII | MAII | MAII |

NI = No Impact

BI = Beneficial Impact

MAII = "May Adversely Impact Individuals" but not likely to result in a loss of viability on the planning unit, nor cause a trend to federal listing or a loss of species viability range-wide

LRLV = "Likely to Result in a Loss of Viability" on the planning unit, in a trend to federal listing, or in a loss of species viability range-wide

[a] Preliminary biological determination was not made in the DEIS Draft Biological Assessment and Evaluation.

## *Aquatic Species*

There are no federally listed or proposed aquatic species that could be significantly effected by land and water uses and management on the national grasslands and forests in the planning area. The sturgeon chub is the only aquatic species that is currently a candidate for protection under ESA. Since the species occurrence is questionable in Region 1 where it is listed as a sensitive species, biological determinations were not made for the species. The species occurs on the Buffalo Gap National Grassland in the Cheyenne and White Rivers and tributaries, but the species is not listed as sensitive in Region 2 of the Forest Service, so no biological determinations were made for the species on this national grassland. However, direct, indirect, and cumulative effects are disclosed in the Biological Assessment and Evaluation, and management direction is provided for the species in the revised plans for the national

grasslands in both Forest Service regions. It is believed that land and water uses and management on the national grasslands are not major factors influencing the sturgeon chub but monitoring of this candidate species is a high priority. Management direction under Alternatives 2 through 5 calls for evaluations of potential downstream impacts of small impoundment construction on the national grasslands.

Two other fish species, flathead chub and plains topminnow, are listed as sensitive in Region 2 of the Forest Service and occur in rivers and streams on the national grasslands and forests in the region. Neither of these species are globally imperiled or vulnerable. None of the alternatives resulted in "likely to result in loss of viability" determinations for these species. Numerous conservation measures for these species and the sturgeon chub were recommended in the DEIS Draft Biological Assessment and Evaluation and most of these have been incorporated into FEIS Alternatives 2 through 5. Management direction that now occurs in the revised plans for these fish species is summarized in more detail in the Biological Assessment and Evaluation. The monitoring priority for the flathead chub and plains topminnow was low based on the biological determination (Table 3-136) and results of the risk assessment. However, monitoring of native fishes by other federal and state agencies will likely continue.

### *Terrestrial Species*

The only adverse determinations for federally listed terrestrial species were for the black-footed ferret under Alternatives 1 and 2 (Table 3-134). This species is endangered and considered one of the rarest North American mammals in the wild. The "likely to adversely affect" determinations were based on not allocating potential black-footed ferret reintroduction habitat (MA 3.63) to help meet recovery objectives outlined in the national black-footed ferret recovery plan. More detailed information on the rationale for these determinations is presented in the Biological Assessment and Evaluation. A preliminary adverse decision was made in the Draft Biological Assessment and Evaluation for the Little Missouri National Grassland under DEIS Alternative 3 for omission of the potential ferret reintroduction habitat in the Horse Creek area of the Little Missouri National Grassland. This area had been included under DEIS Alternative 4 but not under DEIS Alternative 3. An on-site evaluation of this site by an interagency group of biologists, including black-footed ferret and prairie dog specialists, was conducted in April of 1999. The review indicated that this area has potential as a future reintroduction habitat area, and as a result, this area is allocated as black-footed ferret reintroduction habitat under FEIS Alternative 3. Under FEIS Alternative 3, the existing black-footed ferret reintroduction area on the Buffalo Gap National Grassland (Conata Basin/Badlands) is substantially expanded and one additional area on the national grassland is allocated as reintroduction habitat. Two additional areas, one on the Thunder Basin National Grassland and another on the Little Missouri National Grassland are also allocated as black-footed ferret reintroduction habitat. The new ferret reintroduction habitats on the Little Missouri and Buffalo Gap National Grasslands are sites where intensive prairie dog management would first be required to produce colony complexes large enough to warrant consideration by the U.S. Fish and Wildlife Service for ferret reintroduction. The Conata Basin/Badlands reintroduction area and the reintroduction habitat on the Thunder Basin National Grassland currently have the potential to support viable ferret populations based on information and analyses presented in the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) and the Biological Assessment and Evaluation. A comparison of the number and size of areas allocated as black-footed ferret habitat under each alternative is presented in the Biological Assessment and Evaluation

(administrative record).

The black-tailed prairie dog is a candidate species for protection under ESA. Recommendations from the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) for maintaining viable prairie dog populations on the national grasslands in the planning area were incorporated into Alternatives 3 through 5. This increased the probability of maintaining viable populations of this species under these alternatives. With one exception, viable populations are expected under all alternatives, and the additional conservation measures for the species under Alternatives 3 through 5 increase the probability of sustaining viable populations in the future if plague epizootics become problematic. The small isolated prairie dog colonies on the Nebraska National Forest (Bessey Ranger District) may not be viable in the long-term due to marginal habitat conditions in this area of the Nebraska Sandhills. There are no records of prairie dog poisoning on this area and it is doubtful that land use or management is further threatening prairie dog populations on this national forest. Steep and rough topography along with loose sandy soils result in naturally low habitat suitability levels for prairie dogs. Expected prairie dog populations over the next 10 to 15 years under management direction in each alternative are provided in the Biological Assessment and Evaluation.

The swift fox was recently removed from the list of species considered candidate for future protection and conservation under ESA. This action by the U.S. Fish and Wildlife Service followed development and implementation of a multi-state conservation assessment and strategy for the species. Although it is no longer a candidate species, management direction for this species was retained in alternatives 2 through 5. For example, under Alternative 3, habitat on the Buffalo Gap National Grassland for one of the most significant swift fox populations in South Dakota and northwestern Nebraska was specifically allocated (MA 3.64) for conservation of the species. This area is over 9,000 acres in size and is partially the result of a recent land exchange that consolidated landownership in this area.

Three species that are listed by states as threatened or endangered occur on national grasslands or forests in the state where they are listed. The mountain lion is listed as threatened in South Dakota and probably occur at times on the Buffalo Gap National Grassland. Factors other than land uses and management on the national grassland largely determine the use of this area by mountain lions so this species was eliminated from further detailed analysis in the Biological Assessment and Evaluation. River otter are listed as endangered in Nebraska and may periodically occur along and in the riparian systems along the boundaries of the Nebraska and Samuel R. McKelvie National Forests in the Nebraska Sandhills. These populations are the result of reintroductions. Once again, the incidental nature of their occurrence in these areas and the fact the other factors largely determine their use of the areas resulted in this species being excluded from further detailed analysis. However, for both of these species, the enhanced riparian habitat management under Alternatives 2 through 5 would possibly improve conditions for both species when they pass through these habitat corridors. The swift fox is listed as threatened in South Dakota and endangered in Nebraska. The effects analysis for this species did not result in a "likely to result in loss of viability" biological determination. The effects analysis for swift fox is presented in the Biological Assessment and Evaluation. Monitoring of state-listed species is also identified as a high priority in the revised plans.

The only "likely to result in loss of viability" determinations were for Powesheik skipper and Regal fritillary butterfly on the Sheyenne National Grassland under Alternatives 1 and 2 (Table 3-135). Both of these species are both globally impaired species and classified as a sensitive

species in Region 1 of the Forest Service. The regal fritillary is also a sensitive species in Region 2 of the Forest Service. Habitats for these species on the Sheyenne National Grassland are highly isolated and fragmented. Also, under Alternatives 1 and 2, livestock grazing on the national grassland would result in minimal undisturbed and high quality habitat for these invertebrate species. The rationale for these determinations is discussed in more detail in the Biological Assessment and Evaluation. Management practices for sustaining viable populations of both of these species are also presented in the Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000) and many of these recommendations were incorporated into Alternatives 3 through 5. Most of the conservation recommendations presented in the Draft Biological Assessment and Evaluation for these species were also brought forward into Alternatives 3 through 5.

The only other "likely to result in loss of viability" determinations were for the greater prairie chicken on the Sheyenne National Grassland and Samuel R. McKelvie National Forest under Alternatives 1 and 2 and for the Nebraska National Forest (Bessey Ranger District) and Fort Pierre National Grasslands under Alternative 2 (Table 3-136). This species is designated sensitive in Regions 1 and 2 of the Forest Service but is not considered globally imperiled or vulnerable. These determinations were the result of existing or anticipated livestock grazing intensities under Alternatives 1 and 2 on some of these areas, and the reduced levels of quality habitat. The determinations were also based on prairie chicken viability information that is presented in the Biological Assessment and Evaluation. Additional conservation measures recommended for the species in the DEIS Draft Biological Assessment and Evaluation were incorporated into Alternatives 3 through 5 for these areas.

The small sage grouse population on the Buffalo Gap National Grassland is dangerously low and is now found on a single display ground in the spring. A biological determination was not made for this species on the Buffalo Gap or Thunder Basin National Grassland because the species is not listed as sensitive in Region 2 of the Forest Service, but the long-term viability of this population is certainly in question. Most of the conservation measures recommended in the DEIS Draft Biological Assessment and Evaluation for the species were incorporated into Alternatives 2 through 5. The conservation measures included as management direction in the revised plans are summarized in the Biological Assessment and Evaluation. A significant action taken in Alternative 3 was to allocate a large area (45,760 acres) including the habitat of this population as special plant and wildlife habitat (MA 3.64) to emphasize management of sage grouse and sagebrush habitat.

The biological determination for trumpeter swans on the Buffalo Gap National Grassland (Table 3-136) does not suggest a viability problem for this reintroduced swan population. However, the current population in the vicinity of the national grassland consists of generally 2 to 3 nesting pairs and some subadults each year. Although the number of nesting pairs is down somewhat from levels in the 1970s and early 1980s, the trend does not appear to be the result of land uses and management on the national grassland. In fact, the primary swan habitat on the national grassland has been under special management since the 1980s and appears to be highly suitable. The concern is simply the small number of birds. This small nesting population is part of a larger regional swan population that appears to be over 480 birds and extending its range. Management direction for the management of emergent vegetation in natural and constructed wetlands under Alternatives 2 through 5 could improve or expand habitat for this species on the Buffalo Gap National Grassland.

Some of the animal species discussed in the preceding paragraphs are mostly endemic to the Great Plains, and this further supports the need for the management direction in the alternatives to expand and enhance conservation of these species. For example, much of the historic and current habitat of the black-footed ferret and black-tailed prairie dog is located in this region. Although the historic distribution of the greater prairie chicken encompassed the tallgrass prairie, most of its current range is restricted to northern and central mixed grass prairies. Management concern for these species is paramount because of their level of endemism and restricted range. Monitoring of these species is also identified as a high priority in the revised plans.

Priorities under the proposed alternative for monitoring other species at risk included in Table 3-134 through Table 3-136 were determined primarily from the results of a risk assessment. The risk assessment process was described earlier in the Environmental Consequences section for plant species at risk. The risk assessment resulted in the following species being identified at the higher risk level on one or more of the planning units: Dakota skipper, Powesheik skipper, California bighorn sheep. These species, in addition to state-listed, federally listed, proposed, candidate and management indicator species, should be a high priority for monitoring on one or more of the national grasslands and forests in the planning area. Also, because of the extremely low numbers, trumpeter swans should be a high monitoring priority on the Buffalo Gap National Grassland.

The following species were identified at the intermediate level of risk on one or more of the planning units: Ottoe skipper, regal fritillary butterfly, Belfragi's bug, and western burrowing owl. These species should be a moderate priority for monitoring on one or more of the national grasslands and forests in the planning area. All other species were identified as lower risk.

#### Effects from Other Management Activities

Effects of a variety of management activities on each species at risk are fully disclosed for each alternative in the Biological Assessment and Evaluation (administrative record). Because of the relatively large number of species and because effects vary by species, the direct and indirect effects on each species under each alternative are not repeated here.

### Cumulative Effects

Cumulative effects on each species at risk are also disclosed for each alternative in the Biological Assessment and Evaluation (administrative record) and are not repeated here. However, the cumulative effects discussion in the "Wildlife and Fish" section presented later in this chapter is equally relevant to the species at risk identified in this section.

## B. Management Indicator Species

This effects analysis was completed by four wildlife biologists with over 50 years of combined experience in fish and wildlife management on the national grasslands and forests in the planning area.

### *Direct and Indirect Effects*

### Effects of Alternatives

The predicted levels of habitat suitability for each management indicator species expected over the next 10 to 15 years under each alternative are presented in the following tables. These

predictions are based on the habitat descriptions in Appendix H of the revised plans and only apply to the acres identified as potential habitat for each management indicator species. The predicted levels of habitat suitability assume full implementation of the relevant management direction for wildlife, fish, and rare plants and that vegetation objectives are met. For prairie dogs, the total acreage of colonies on each planning unit is presented as the measurement of suitability. No attempt was made to quantify predicted levels of habitat suitability for western prairie fringed orchid as a management indicator species. However, under Alternatives 2 through 5, the recovery strategy described in Appendix N of the revised plan for the Dakota Prairie Grasslands substantially steps up the level of conservation and protection of the species on the Sheyenne National Grassland compared to the management direction under Alternative 1. Insufficient information was available at this time to predict habitat suitability over the next 10 to 15 years for pygmy nuthatch on the Nebraska National Forest (Pine Ridge Ranger District).

**Table 3-137. Predicted Nesting Habitat Suitability for Plains Sharp-tailed Grouse.**

| Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Little Missouri National Grassland | 1-10% | 15-25% | 10-20% | 10-20% | 20-30% | 45-55% | 25-35% |
| Grand River/Cedar River National Grasslands | 1-10% | 15-25% | 15-25% | 0-10% | 20-30% | 35-45% | 30-40% |
| Sheyenne National Grassland | 1-10% | 20-30% | 20-30% | 50-60% | 30-40% | 55-65% | 45-55% |
| Fort Pierre National Grassland | 15-25% | 30-40% | 10-20% | 40-50% | 35-45% | 45-55% | 45-55% |
| Buffalo Gap National Grassland (FRRD) | 1-10% | 20-30% | 10-20% | 10-20% | 20-30% | 45-55% | 25-35% |
| Buffalo Gap National Grassland (WRD) | 10-20% | 20-30% | 25-35% | 10-20% | 30-40% | 55-65% | 40-50% |
| Oglala National Grassland | 1-10% | 20-30% | 10-20% | [a] | 15-25% | 45-55% | 30-40% |
| Nebraska National Forest (PRRD) | Unknown | 15-25% | 20-30% | [a] | 10-20% | 30-40% | 35-45% |
| Nebraska National Forest (BRD) | 45-55% | 45-55% | 20-30% | 40-50% | 45-55% | 70-80% | 70-80% |
| Samuel R. McKelvie National Forest | 25-35% | 45-55% | 20-30% | 20-30% | 45-55% | 70-80% | 70-80% |
| Thunder Basin National Grassland | Unknown | 10-20% | 10-20% | 5-15% | 30-40% | 25-35% | 15-25% |

[a] The species was not listed as a management indicator species for this planning unit in the DEIS.

**Table 3-138. Predicted Nesting Habitat Suitability for Greater Prairie Chicken.**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Sheyenne National Grassland | 1-10% | 20-30% | 20-30% | 50-60% | 30-40% | 60-70% | 45-55% |
| Ft. Pierre National Grassland | 15-25% | 30-40% | 10-20% | 40-50% | 35-45% | 45-55% | 45-55% |
| Nebraska National Forest (BRD) | Unknown | 45-55% | 20-30% | 40-50% | 45-55% | 70-80% | 70-80% |
| Samuel R. McKelvie National Forest | 1-10% | 45-55% | 25-35% | 40-50% | 45-55% | 70-80% | 70-80% |

**Table 3-139. Predicted Habitat Suitability for Sage Grouse.**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Thunder Basin National Grassland | Evaluation Incomplete | 10-20% | 10-20% | a | 30-40% | 25-35% | 15-25% |
| Buffalo Gap National Grassland | Evaluation Incomplete | 20-30% | 10-20% | a | 20-30% | 45-55% | 25-35% |
| Little Missouri National Grassland | Unknown | 15-25% | 10-20% | a | 20-30% | 45-55% | 25-35% |

[a] Not presented in the DEIS.

The following table presents a range of prairie dog colony acreages for each planning unit for Alternatives 3-5. The lower end of the range is predicted if precipitation patterns tend to be normal or above normal over the next 10 to 15 years while the upper end of the range is predicted if extended dry conditions occur. These acreage predictions assume no plague epizootics.

**Table 3-140. Predicted Acreages of Active Black-Tailed Prairie Dog Colonies.**

| Planning Unit | Alt 1 [a] | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|
| Little Missouri National Grassland | 1,600 | $\leq$ 1,600 | 2,900-7,300 | 5,400-9,400 | 5,400-9,400 | 2,900-4,700 |
| Grand River/Cedar River National Grasslands | 1,000 | $\leq$ 1,000 | 1,500-3,700 | 2,500-3,900 | 2,500-3,900 | 1,400-2,200 |
| Ft. Pierre National Grassland | 150-250 | $\leq$ 150 | 700-1,700 | 1,200-1,900 | 1,200-1,900 | 700-1,100 |
| Buffalo Gap National Grassland | 6,100-7,350 | $\leq$ 6,100 | 19,600-47,000 | 22,400-36,400 | 22,400-36,400 | 21,000-34,300 |
| Oglala National Grassland | 150-250 | $\leq$ 150 | 600-1,500 | 1,200-1,900 | 1,200-1,900 | 700-1,100 |
| Nebraska National Forest BRD | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| Thunder Basin National Grassland | $\geq$ 5,400 | $\leq$ 5,400 | 23,300-59,700 | 29,900-47,500 | 29,900-47,500 | 25,100-39,900 |

[a] Colony acreages that are protected from rodenticide applications.

Generally, for those species addressed in the preceding four tables, Alternatives 4 and 5 would provide the highest levels of habitat suitability, and Alternative 2 would provide the least. Alternative 3 generally provides an intermediate level of suitability. Alternative 1 represents the desired levels under the current management plans, which, in most cases, have not been achieved to date.

Viability of management indicator species populations is a primary concern for MIS that are also species at risk. The two areas where population size and trend are an immediate concern for greater prairie chickens are Sheyenne National Grassland and Samuel R. McKelvie National Forest. On the Sheyenne National Grassland, Alternatives 4 and 5 provide the highest probability of maintaining viable populations while Alternatives 1 and 2 provide the lowest probability. Alternative 3 provides an intermediate level of probability. On the Samuel R. McKelvie National Forest, Alternatives 4 and 5 provide the highest level of probability for viable prairie chicken populations while Alternative 2 provides the lowest level of probability. Alternatives 1 and 3 provide an intermediate level of probability for supporting viable populations. The only area where population size and trend are an immediate concern for sage grouse is the Buffalo Gap National Grassland. On this area, Alternative 4 would provide the

highest probability for maintaining this small isolated population while Alternative 2 would provide the lowest level of probability that this population could be maintained. Alternatives 1, 3 and 5 provide an intermediate level of probability for sustaining the small population. The area where viability of black-tailed prairie dog populations is of greatest concern is the Nebraska National Forest (Bessey Ranger District). However, prairie dog populations here may not be viable under any alternative. Steep slopes, rough topography and sandy soils in this area of the Nebraska Sandhills creates marginal habitat for prairie dogs, regardless of land use and management. Plague could threaten the future viability of prairie dog populations on some of the smaller planning units like the Oglala, Fort Pierre and Grand River National Grasslands, but to date, the disease has not been detected or confirmed on any of these units. Alternatives 3 and 4 are believed to provide the highest probabilities for viable prairie dog populations on the planning units, even with plague considerations, and Alternative 1 and 2 provide the lowest probabilities. Alternative 5 provides an intermediate probability for viable prairie dog populations when considering the potential threat of plague.

### Effects from Fire and Fuels Management

Fire and fuels management have both negative and beneficial effects on wildlife including plains sharp-tailed grouse and greater prairie chicken, depending on the timing, intensity, extent and frequency of fire. Fire can destroy nests and broods but can also, if properly timed, help control exotic vegetation and enhance the diversity of grassland plant species and habitat suitability for these species (Higgins et al. 1989, Sieg 1997). Fire can also reduce vegetation structure on grassland and overall habitat suitability for these species. However, these negative effects are short term and temporary. Fire is an important natural disturbance to help create conditions favorable for diverse grassland flora, including suitable habitat for western prairie fringed orchid. Fire can also help control ponderosa pine regeneration and maintain more open ponderosa pine habitat preferred by pygmy nuthatch, but catastrophic wildfires can also eliminate all or most ponderosa pine cover across broad areas resulting in a loss of potential pygmy nuthatch habitat. Because of the variable nature of the effects of fire on grassland structure and habitat suitability for these species, effects comparisons between alternatives were not made.

The same effects described above for sharp-tailed grouse and prairie chicken also apply to sage grouse. However, the effects of fire on reducing vegetation structure within sagebrush communities are considered long-term and more permanent. Loss of structure in sagebrush communities to fire or other factors generally reduces habitat suitability for nesting greater sage grouse in the planning area. Fire is not recommended in Wyoming sagebrush or where cheatgrass invasion is likely (Connelly et al. 2000, Peterson 1995).

The effects of fire and fuels management on black-tailed prairie dogs are considered minor. It is possible that fire adjoining a prairie dog colony could facilitate expansion of that colony during the year of the fire.

The amount of prescribed burning expected under each alternative for the planning units is presented later in this chapter (Table 3-215 and Table 3-216).

### Effects from Fish and Wildlife Management

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 nesting sharp-tailed grouse,

prairie chicken and sage grouse. The expected acreages of prairie dogs by alternative are presented in Table 3-140. The largest prairie dog populations and the most opportunity for conflict with prairie grouse would occur under Alternatives 3 and 4 and the least under Alternatives 1 and 2. Alternative 5 would generally result in intermediate levels of prairie dog populations. The opposite relationship exists when emphasizing management for sharp-tailed grouse, greater prairie chicken and sage grouse which reduces habitat suitability for black-tailed prairie dogs.

Management to conserve habitat for swift fox, burrowing owls and ferruginous hawks and to help restore black-footed ferrets would encourage expansion of prairie dog populations. The number of sites and acres allocated to black-footed ferret habitat by alternative are presented in the Biological Assessment and Evaluation. To summarize, Alternative 4 would provide the most black-footed ferret reintroduction habitat (MA 3.63) and Alternative 1 would provide the least. Alternatives 2, 3 and 5 would provide intermediate levels of reintroduction habitat. Much of the area within MA 3.63 habitat would be managed for low grassland structure which would degrade habitat for prairie grouse.

### Effects from Oil, Gas, Minerals Management

Potential effects of oil and gas development on management indicator species (sharp-tailed grouse and sage grouse) are mitigated through standards and guidelines and stipulations (Appendix D in the revised plans). Oil and gas stipulations for these species are the same for Alternatives 2 through 5 and are partially based on information presented in several key references (Baydack and Hein 1987, Joslin and Youmans 1999, Connelly et al. 2000). The potential effects relate primarily to disturbance and displacement resulting from activities and construction of support facilities for oil and gas development. The effects of oil and gas development on sage grouse are analyzed in the Biological Assessment and Evaluation and in existing oil and gas leasing documents for the Thunder Basin, Buffalo Gap, Oglala, Little Missouri and Cedar River National Grasslands. They are also presented in FEIS Appendix B (Table B-6). Generally, the stipulations under Alternatives 2 through 5 are more protective of these species than those occurring under Alternative 1. They are similar in level of protection across all alternatives on the Medora Ranger District of the Little Missouri National Grassland.

Stipulations for these species under Alternatives 2 through 5 would not be applied to existing leases and would only be applied to new leases.

### Effects from Plant and Animal Damage Control

Noxious weed control helps maintain native vegetation for sharp-tailed grouse, prairie chicken and sage grouse, which helps maintain preferred forage and cover species. It can also help reduce competition to western prairie fringed orchid but at the same time can pose direct risks to orchids. The amount of noxious weed control by alternative is presented in the Plant and Animal Damage Control section of this chapter (Table 3-80). The most aggressive noxious weed control would occur under Alternatives 2 and 4.

Noxious weed control has no significant effect on black-tailed prairie dogs or pygmy nuthatches.

### Effects from Range Management and Livestock Grazing

Generally, moderate to heavy livestock grazing reduces habitat suitability for sharp-tailed grouse, prairie chicken and sage grouse under conventional planned grazing systems. High

livestock grazing intensities generally increase habitat suitability for black-tailed prairie dogs, at least when colonies are getting established and growing. After a period of time, combined large herbivore (livestock or bison) and prairie dog foraging and clipping can deplete perennial vegetation within prairie dog colonies and reduce habitat suitability for prairie dogs (Cincotta 1985, Archer et al. 1987, Coppock et al. 1983). Livestock grazing intensities are expected to be the lowest under Alternative 4 and highest under Alternatives 1 and 2. Alternatives 3 and 5 would have intermediate grazing intensities. Therefore, Alternatives 1 and 2 would provide the best conditions for colony establishment and growth. However, no prairie dog expansion would be expected because of rodenticide use. Under Alternatives 3 and 4, prairie dog populations would likely grow steadily with no (Alternative 4) or minimal use of rodenticides. The lower expected livestock grazing intensities under these alternatives would slow the growth however. Alternative 5 would provide intermediate conditions for livestock grazing intensities, rodenticide use and prairie dog population levels.

As previously stated, sharp-tailed grouse and prairie chickens prefer to nest in heavy undisturbed herbaceous cover, and sage grouse also benefit from livestock grazing in sagebrush stands that leaves adequate amounts of residual herbaceous cover for nesting. 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 (1994) 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.

The planning units contain very little ungrazed or lightly grazed range (Table 3-30), so grazing is relatively uniform in most pastures. This is the result of a relatively high density of water sources in most pastures (Table 3-33) and decreasing pasture sizes. However, most areas on the planning units are grazed under deferred rotation grazing systems (Table 3-31) where a large number of pastures are deferred during all or part of the early nesting season. The amount of areas rested annually from livestock grazing under each alternative is also presented earlier in this Chapter (Table 3-38). 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.

Construction of water sources (ponds, pipelines and tanks, wells) to support livestock grazing disturbs soils and creates intensively grazed areas ideal for prairie dog colony establishment (Knowles 1986, Licht and Sanchez 1993). However, in some cases, these developments are designed to disperse livestock grazing away from water sources, thereby reducing habitat suitability for prairie dogs in those areas.

### Effects from Timber Management

Timber management practices can either improve or degrade habitat suitability for pygmy nuthatch. Silvicultural practices that promote structural stages 4a and 5 and maintain or create snags improve pygmy nuthatch habitat. The amount of possible timber harvest on the Nebraska National Forest is discussed in the timber management section of this chapter.

### Effects from Recreation Management and Use

Human activities and disturbance in or near sharp-tailed grouse, prairie chicken and sage grouse nesting habitat and display grounds can disrupt breeding and reduce reproductive success (Baydack and Hein 1987, Joslin and Youmans 1999, Connelly et al. 2000). Standards and

guidelines to regulate human disturbance on or near display grounds are provided under Alternatives 2 through 5.

Prairie dog shooting may in some situations affect prairie dog population dynamics, demographics and colony size (U.S. Fish and Wildlife Service 1999, Knowles 1988, Vosburgh 1996). There is no direction for management of prairie dog shooting under Alternatives 1 and 2. Alternative 4 would eliminate recreational shooting. Alternatives 3 and 5 would restrict prairie dog shooting if deemed necessary to achieve management objectives for prairie dogs and/or other associated species. Prairie dog shooting is prohibited, unless specified otherwise, in black-footed reintroduction habitat under Alternatives 2 through 5.

**Effects from Special Area Designations**

Special area designations (MA 2.1 and 3.64) vary considerably in objectives. However, in most cases, these allocations would be compatible and beneficial for management indicator species and associated wildlife. For example, Alternative 3 on the Buffalo Gap National Grassland includes several MA 3.64 allocations (approximately 42,000 acres for sharp-tailed grouse and 46,000 acres for sage grouse) specifically emphasizing plains sharp-tailed grouse and associated species and sage grouse/sagebrush habitats. 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 Management and Motorized Use**

Travel restrictions could reduce recreational shooting of prairie dogs. The acreages with travel restrictions expected under each alternative is provided 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 provide for intermediate levels of travel restrictions.

### *Cumulative Effects*

Cumulative effects on western prairie fringed orchid, greater prairie chicken, sage grouse, pygmy nuthatch and black-tailed prairie dogs have already been discussed and disclosed in the Biological Assessment and Evaluation and will not be repeated here. Also, the cumulative effect disclosures in the "Wildlife and Fish" section later in this chapter and the numerous cumulative effects discussions earlier in the Environmental Consequences sections for grasslands, shrublands, forests and rare plant communities would equally apply to the management indicator species, their habitats and associated wildlife and plants. The cumulative effects disclosed in these various locations within the FEIS are also affecting habitat quality and quantity for plains sharp-tailed grouse.

# X. Affected Environment - Soil and Water

## A. Soils

Soil is a fundamental component of the environment. Conceptually, the quality or health of soil can be viewed simply as "its capacity to function." Soil is the growing medium for most plants and absorbs, stores, and releases water slowly over time. It supplies nutrients for vegetation,

which in turn supplies habitat for wildlife and other resources. All renewable resources within the planning area are dependent upon soil. Soil is considered a nonrenewable resource because of length of the time it takes to form.

The Soil Science Society of America defines soil quality as,

> the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation (SSSA 1995).

The underlying geology of the planning area is predominantly shale, with sandstone in the Sandhills, and alluvium covering granite under portions of the Red River Valley. In addition, the Red River Valley has lacustrine deposits left by Glacial Lake Agassiz. Glacial till covers the northern and eastern parts of the planning area. The central and western portions of the planning area have soils of fine to medium texture. The Sandhills are covered by loess and dune sand.

Surface material on Dakota Prairie Grasslands range from finer textured silty and clayey soils in the western Dakotas to sandy glacial outwash soils on the Sheyenne National Grassland.

Thunder Basin National Grassland has a wide variety of soils that range from deep well drained sand and loamy soils to very shallow clayey soils. Badland areas are made up of primarily shale.

Soils on the Nebraska National Forest units range from the deep Valentine soils in the Sandhills; Canyon, Bridget and Oglala soils on the Pine Ridge Ranger District. Oglala and Buffalo Gap National Grasslands have a wide variety of soils ranging from shallow clayey and deep sandy soils to badlands. Ft. Pierre National Grassland contains deep to moderately deep soils containing shale. Several planning units contain badland types, which have naturally high rates of erosion, exposed soils, and little surface organic matter.

Soil type data is not available for the Little Missouri National Grassland, Cedar River National Grassland, Grand River National Grassland, or the Spring Creek Unit of the Thunder Basin National Grassland. On the Nebraska National Forest units and the rest of the Thunder Basin National Grassland, soil information from the Natural Resource Conservation Service was used in predictive models for timber suitability, herbage productivity and prairie dog habitat suitability.

## B. Water/Riparian/Wetlands

Following is a listing of linear miles of streams and surface acres of lakes and ponds on planning units where data is available:

**Table 3-141. Miles of Streams and Acres of Lakes on the Planning Units.**

| Planning Unit | Linear Miles of Streams | Surface Acres of Lakes and Ponds |
|---|---|---|
| **Dakota Prairie Grasslands** | | |
| Cedar River/Grand River National Grasslands | 41 | 491 |
| Little Missouri National Grassland/McKenzie | 54 | 429 |
| Little Missouri National Grassland/Medora | 135 | 386 |
| Sheyenne National Grassland | 9 | 7 |
| **Thunder Basin National Grassland** | 99 | 87 |
| **Nebraska National Forest Units** | | |
| Bessey Ranger District | 5 | 3 |
| Samuel R. McKelvie National Forest | 24 | 454 |
| Buffalo Gap National Grassland (Fall River) | 53 | 478 |
| Buffalo Gap National Grassland (Wall RD) | 48 | 890 |
| Fort Pierre National Grassland | 28 | 558 |
| Pine Ridge Ranger District/Oglala National Grassland | 41 | 317 |

The planning units use project-level analyses to assess the condition of riparian/wetland areas called Proper Functioning Condition (PFC) (Bureau of Land Management 1995). An interdisciplinary team field-level process evaluates the interaction of vegetation, landform/soils, and hydrology. Riparian/wetland areas are functioning properly when there is adequate vegetation, landform or large woody debris to:

- Disperse stream energy during high water flows, thereby reducing erosion and improving water quality.
- Filter sediment, capture bedload, and aid floodplain development.
- Improve flood-water retention and groundwater recharge.
- Develop root masses that stabilize streambanks against cutting action.
- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses, and support greater biodiversity.

It is acknowledged that some Great Plains rivers and streams occurred naturally as very dynamic systems with high amounts of associated erosion and sediment deposition, and this must be considered when riparian and wetlands systems are evaluated in the planning area.

The Forest Service summarized rangeland riparian condition using the range statistical report, which defines riparian conditions as follows:

- Acres verified "meeting" Forest Plan objectives where the riparian areas have been field-evaluated and are at an upper mid-seral stage.

- Acres estimated "meeting" Forest Plan objectives where, based on ocular inspection, the acres are at an upper mid-seral stage.
- Acres verified "moving toward" Forest Plan objectives where they have been field-evaluated and there is an upward trend to an upper mid-seral stage.
- Acres estimated "moving toward" Forest Plan objectives where, based on ocular inspections, the acres have an upward trend.
- Acres verified "not meeting or moving toward" Forest Plan objectives where they have been field-evaluated and there is not an upward trend.
- Acres estimated "not meeting or moving toward" Forest Plan objectives where, based on ocular inspections, the acres do not have an upward trend.
- Undetermined status where no field evaluations or ocular inspections have taken place.

The following table shows the reporting categories for riparian conditions where data has been collected:

**Table 3-142. Riparian Condition on the Planning Units**

| Planning Unit | Total Riparian Acres | %Acres Verified Meeting | %Acres Estimated Meeting | %Acres Verified Moving Toward | %Acres Estimated Moving Toward | %Acres Verified not Meeting or Moving Toward | %Acres Estimated not Meeting or Moving Toward | % Undetermined Status |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands.** | | | | | | | | |
| Cedar River/Grand River NGs | 1,740 | 75 | | 15 | 2 | 5 | 3 | |
| Little Missouri NG McKenzie | 19,130 | | 65 | 0 | 20 | | 15 | |
| Little Missouri NG Medora | 21,000 | | 40 | | 30 | | 30 | |
| Sheyenne NG | 3,820 | | 40 | | 55 | | 5 | |
| **Thunder Basin National Grassland** | 6,740 | 10 | 20 | 20 | 25 | 0 | 5 | 15 |
| **Nebraska National Forest** | | | | | | | | |
| Bessey Ranger District | 120 | 45 | | 20 | | 35 | | |
| SR McKelvie NF | 1,155 | 40 | 0 | 60 | | | | |
| Buffalo Gap NG Fall | 2,975 | 30 | | 55 | 5 | 5 | 5 | |
| Buffalo Gap NG Wall | 4,640 | 5 | | 80 | | 15 | | |
| Fort Pierre NG | 200 | | 15 | | 10 | | 75 | |
| Oglala NG | 1,160 | | 5 | | 90 | | 5 | 0 |
| Pine Ridge Ranger District | 3,720 | 35 | 5 | 20 | 30 | | 10 | |

In November, 1998 the Northern Great Plains Aquatic Assessment (NGPAA) was completed and addressed five questions:

- What is known about the current status and apparent trends in water quality, aquatic habitat and aquatic species in the Northern Great Plains assessment area?
- What is the extent and composition of riparian and wetland areas?
- What laws, policies and programs for the protection of water quality, streams, wetlands and riparian areas are in place?
- What are the current and potential effects on aquatic resources from various human activities?
- What are the status and apparent trends in water usage and supplies within the Northern Great Plains assessment area including water rights and uses on National Forest System Lands?

Thirty-two, fourth-order, hydrologic-unit watersheds exist on the national grassland and national forest units in the assessment area. Preliminary information from state water quality reports [305(b)] and the NGPAA shows that all these watersheds contain miles of streams that do not fully support their uses. Several planning units are within these impaired watersheds, based on the evaluations of the mainstem stream. Even though the mainstem stream may not flow through a planning unit, the larger watershed containing the national forest or national grassland unit is impaired. Tributary streams located on the planning unit may not necessarily be impaired. A watershed is considered impaired or not fully supporting its uses if 25 percent of the state water-quality standard parameter values are not being met.

The following tables display impaired watersheds by unit:

**Table 3-143. Impaired Watersheds on the Planning Units**

| Planning Unit | Watershed |
|---|---|
| **Dakota Prairie Grasslands** | |
| Cedar River/Grand River National Grasslands | Grand River |
| Grand River National Grassland | North Fork Grand River<br>South Fork Grand River |
| Little Missouri National Grassland - McKenzie | Lower Yellowstone River<br>Lake Sakakawea<br>Lower Little Missouri River |
| Little Missouri National Grassland - McKenzie and Medora | Middle Little Missouri River |
| **Thunder Basin National Grassland** | Upper Little Missouri River |
| **Nebraska National Forest** | |
| Buffalo Gap National Grassland (Fall River RD) | Angostura Reservoir |
| Buffalo Gap National Grassland (Fall River RD) and Oglala National Grassland | Hat Creek |
| Buffalo Gap National Grassland (Wall Ranger District) | Middle Cheyenne River<br>Elk Creek |

| Planning Unit | Watershed |
|---|---|
| **Nebraska National Forest, cont.** | |
| Buffalo Gap National Grassland (Wall RD) and Fort Pierre National Grassland | Bad River |
| Samuel R. McKelvie National Forest | Middle Niobrara River |

Tordon from leafy spurge treatments is showing up in two shallow (30- to 40-feet) wells on the Sheyenne National Grassland. Tordon is no longer used to treat leafy spurge in these areas. Instead, 2,4-D, which breaks down more quickly, is now used.

In 1986, the North Dakota Game and Fish Department established permanent, randomly distributed plots across the Little Missouri National Grassland to inventory woody draws of ash. During 1992 and 1993, 88 plots were sampled using techniques developed by the Forest Service (Uresk 1990), and classical forest survey methods (e.g., tree-ring core sampling and seedling/sapling counts) (Curtis 1959).

The sampling results suggest that about 30 percent of the flat-bottomed ash draws is in "very good to good condition," about 35 percent is in a "degraded to highly degraded condition" (meaning they are not self-perpetuating), and the remaining 35 percent is in a "questionable" status. It appears, based on tree size and core sampling, no regeneration has occurred in degraded ash draws for 35 years. Because of the length of time, the observed conditions cannot be attributed to drought, disease or some unknown natural process.

Based on the life expectancy of ash trees on the Little Missouri National Grassland, between 35 to 50 percent of the flat-bottomed woody draws could die out in the next 20 to 30 years if management actions are not changed. The primary cause of the degraded conditions of the ash draws sampled appears to be mechanical damage and soil compaction from livestock (Preliminary Report: Vegetative Conditions of Ash Draws on the Little Missouri National Grassland, North Dakota Game and Fish Department).

# XI. Environmental Consequences - Soil and Water

## A. Soils

### *Resource protection measures*

Mitigation measures have been developed to protect the soil resource, which incorporate the Forest Service Region 2 Water Conservation Handbook, and would apply to all action alternatives for all units. Soil-disturbing activities associated with oil, gas and mineral operations would be prohibited (e.g., road construction, well pad construction) on slopes greater than 40 percent, and on the Nebraska National Forest and the Thunder Basin National Grassland operations would be prohibited on slopes between 25 and 40 percent with either highly erodible soils or soils susceptible to mass failure. For all activities, revegetation is required after ground-disturbing activities. To prevent soil erosion, non-native annuals or sterile perennial species may be used while native perennials are becoming established. Organic matter and nutrients are required to be maintained or improved. No change would be expected on naturally erosive soils, such as badlands types.

## *Direct and Indirect Effects*

### Effects from Fire and Fuels Management

Fire is one of the processes that shaped the soils of the Northern Great Plains. Soils in grassland ecosystems are normally not adversely affected by fire. Because most of the biomass occurs underground (in the form of roots), fire usually moves quickly across grasslands because they do not contain the large fuels found in forested ecosystems. Only the surface cover burns, releasing nutrients from the organic matter. Usually, the permeability and porosity of soils are not changed.

The frequency and intensity of fire is documented in the range of variation (See Fire and Fuels section later in this chapter). Because fire frequency in all alternatives is less than what occurred historically, fire is not expected to adversely affect soil function.

Wildfire in forested ecosystems can have serious implications for soil and water. Severe wildfires can detrimentally burn soils by consuming most of the woody debris, litter, duff, and humus down to bare mineral soil. Gullies, slumps, and decreased microbial activity may result. A severe wildfire may create hydrophobic soil conditions and decrease infiltration. This decrease in the soil's ability to absorb water, combined with reduced transpiration by vegetation loss, can result in significant streamflow increases. If the resulting streamflow destabilizes streambanks and undermines the integrity of downstream structures in the floodplain, soil erosion can occur. This is particularly important in forested areas where intense thunderstorms can create considerable overland flow if infiltration capacity is reduced.

The same potential hazards exist for prescribed burning in forested ecosystems as described for wildfires. The areas selected for burning are usually small and burn cool enough that widespread adverse effects are minimized. Prescribed burning can affect the physical and chemical nature of the soil. The amount of soil erosion after a prescribed burn depends on the inherent erodibility of the soil, intensity of the fire, length of time and amount of soil exposed, rainfall intensity, slope, steepness and length, amount of remaining debris, and vegetative recovery period. Project analysis and monitoring would be completed for all prescribed burn proposals so that long-term soil productivity would not be impaired. Alternative 4 would propose the most prescribed fire, followed by Alternatives 5, 3, 1 and 2.

### Effects from Oil, Gas, Minerals Management

Soil erosion from oil, gas and mineral activities depends on the amount of bare soil, slope steepness, slope length, inherent erodibility, and rainfall intensity. Road building and well pad construction remove vegetation. If too much soil is exposed, erosion can be excessive and reduce soil productivity. Equipment operation can disturb or remove vegetation and compact soil. Standards and guidelines would minimize impacts to the soil resource. On the Dakota Prairie Grasslands Alternative DEIS 3 would pose the least impacts to the soil resource from oil, gas and mineral activities because of development limits followed by Alternatives 4, FEIS 3, 5, 1 and 2. On the Thunder Basin National Grassland, Alternative FEIS 3 would pose the least impacts to the soil resource from oil, gas and mineral activities because of development limits followed by Alternatives 4, 5, DEIS 3, 2 and 1. On the Nebraska National Forest Alternative 1 would pose the least impacts to the soil resource from oil, gas and mineral activities because of development limits followed by Alternatives 4, 5, DEIS 3, FEIS 3 and 2. All alternatives require reclamation.

### Effects from Range Management and Livestock Grazing

Grazing is important to nutrient cycling in grassland ecosystems. Depending on the intensity of grazing, it can change the permeability and porosity of soils and cause compaction. Soil surface characteristics, such as rills, gullies or pedestaling of plants, are currently the best available indicators of soil stability and watershed function. All action alternatives would use the water and soil conservation practice standards and monitor their effectiveness as indicators of soil stability and watershed function.

Heavy grazing in riparian areas can cause streambanks to become raw and erosive. Heavy grazing on uplands can compact soils, reduce vegetation, and increase erosion. Livestock trails centralize water run-off and increase the amount and velocity of water. This high-energy run-off can reduce soil stability and productivity. These effects would be the greatest under Alternative 2, followed by Alternatives 4, 5, 3 and 1. All alternatives require 80% of the riparian areas to be in proper functioning condition, so these effects are anticipated to be limited to a small percentage of the planning units.

### Effects from Recreation Management and Use

The effects of recreation on soils are similar to some effects of livestock grazing. Concentrated use at recreation sites, such as campgrounds and trails, can compact and displace soil, cause erosion, and reduce productivity. Damage is generally more severe on moist or clayey soils.

Foot, horse and wheeled traffic can damage streambanks, leading to erosions. Bank damage is more severe where animals and people concentrate along streams. The impact of foot, horse, and wheeled traffic would be greatest in wet or sensitive areas.

In general, these effects would be minimal, except at points of concentrated use. Specific problems would be addressed with project-level analysis.

### Effects from Timber Management

The effects of timber management on soil would be limited to Management Areas 5.12 and 5.13, the only management areas in which forest vegetation would be specifically managed for health and the production of wood products. Only 8 percent of the planning units are classified as forested, and only 2 percent would be actively managed for timber production.

Timber harvesting can affect soil in many ways. Log skidding and decking, site preparation, and machine piling of slash can displace and compact soils and disturb vegetative cover. Skid trails can lead to erosion and gullying if not properly located and rehabilitated. Nutrients from tree boles, limbs, and branches would be lost.

Road construction and reconstruction excavates, cuts and reshapes the soil. When the vegetation is removed and bare soil is exposed, the risk of erosion increases.

All alternatives apply water and soil conservation practices to minimize disturbance levels. Disturbance levels would be the highest under Alternative 2.

### Effects from Travel Management and Motorized Use

Motorized vehicle use on established roads and trails can compact soil and increase erosion. Effects to soil from motorized use off established roads and trails is usually minimal if the use is infrequent. However, once the vegetation has been compressed with vehicle wheels, users tend to follow the same tracks.

When use is heavy or concentrated along corridors, ground cover can be damaged and not allowed the opportunity to recover. Soils are compacted and, in some instances, the topsoil layer is lost. Heavy use on unstable soils or steep slopes has caused soil erosion, permanent loss of ground cover, and gully formation.

Alternatives 1 and 2 would have no restrictions on off-road use; Alternatives 3, 4, and 5 would restrict motorized use to designated routes. Therefore, Alternatives 1 and 2 would pose the most risk of impacts to the soil resource from off-road travel.

### *Cumulative Effects*

The cumulative effects of the alternatives on soil were evaluated in terms of the amount of soil disturbed by any number of activities, the miles of new roads and trails developed, oil, gas and mineral development, grazing use, timber harvest, and areas projected for prescribed burning. All these activities have potential adverse effects. Alternative 2 would present the greatest risk of impacts from livestock grazing, off-road vehicle use, and timber harvest. Alternative 4 would pose the greatest risk from prescribed burning.

## B. Water/Riparian/Wetlands

### *Resource Protection Measures*

Best Management Practices (BMPs) and the *Water Conservation Practices Handbook* would be applied to protect the integrity of watersheds. Under all alternatives, remedial projects would be proposed, planned and implemented to restore the health of watersheds at risk. The proposed Revised Management Plans contain numerous grassland-wide/forest-wide standards and guidelines addressing watershed health. Additional guidelines have also been developed for several geographic areas.

### *Direct and Indirect Effects*

#### Effects from Oil, Gas, and Minerals Management

The Revised Management Plans do allow limited oil and gas related development in water, wetlands, woody draws, riparian, or floodplains. The standard and guidelines along with the stipulations in Appendix D of the Plans requires operators to try to located activities and facilities away from the waters edge and outside the wetlands, woody draws, riparian, and floodplains. The standards and guidelines along with the stipulations would prevent adverse impacts.

#### Effects from Range Management and Livestock Grazing

Excessive or concentrated livestock use can adversely affect riparian areas and water quality. The loss of streambank protection can increase water temperatures and reduce habitat for aquatic species. Healthy riparian zones and streambank vegetation are also important to maintaining the integrity of fluvial systems, water quality and aquatic habitat. Heavy livestock grazing can destabilize streambanks and reduce the vigor and density of riparian vegetation. The loss of stable streambanks can diminish habitat for aquatic species.

Livestock grazing would have a greater effect in the alternatives with the larger percentage of land available for livestock grazing. Alternative 2 would have the highest amount of livestock grazing and pose the highest risk of adversely affecting watersheds. Alternative 4 would have

the least amount of livestock grazing and pose the least risk of adversely affecting watersheds from livestock grazing (see Livestock Grazing section).

**Effects from Recreation Management and Use**

The effects of recreation on water resources are similar to some effects of livestock grazing. Concentrated use at recreation sites, such as campgrounds and trails, can compact and displace soil and cause erosion.

Foot, horse and wheeled traffic can damage streambanks, leading to erosion. Bank damage is more severe where animals and people concentrate along streams. The impact of foot, horse, and wheeled traffic would be greatest in wet or sensitive areas.

In general, these effects would be minimal, except at points of concentrated use. Specific problems would be addressed by project-level analysis.

### *Cumulative Effects*

Livestock grazing can degrade riparian areas, reduce riparian vegetation and decrease channel stability. Reductions in riparian vegetation can lead to less infiltration, more runoff flow rates and lower water tables. Alternative 2 would pose the highest risk of impacts; Alternative 4 would pose the least risk.

Standards and guidelines would protect riparian resources under all alternatives. Risks to riparian systems would be greatest in those alternatives with more ground-disturbing activities, such as road building, timber harvesting, oil and gas, mineral and livestock grazing. However, project planning and monitoring should prevent any widespread and long-term deterioration of riparian resources. Effects on riparian, wetlands or streams are minimized through the use of a controlled surface use stipulation and numerous Conditions of Approval that are attached to the permit for wells and associated facilities and roads. Reclamation of well and facility sites and roads is required at the completion of the operations.

Implementation of Best Management Practices and standards and guidelines should improve existing watershed and vegetation conditions. Also, 80% of the riparian areas are to be in proper functioning condition and self-perpetuating regeneration in all action alternatives.

# XII. Affected Environment - Ecological Processes

## A. Introduction

Historically, the primary disturbance processes on the Northern Great Plains were fire, drought and herbivory (including rest). These disturbance processes still influence ecosystems on the Northern Great Plains to varying degrees. Other influences include floods, wind, blizzards and insects. These processes have occurred with varying frequencies and intensities over time and have influenced the composition and structure of the rangelands and forests.

Many plant communities and species are dependent on disturbance, especially for regeneration. Management actions to preserve natural communities have historically protected these areas from physical disturbance. Typically, timber harvest and livestock grazing have been excluded, and fire suppressed. In attempting to preserve these areas, important disturbance processes that would occur in natural systems have been altered.

Drought was and is an overriding factor common across the Northern Great Plains, and affects herbivory patterns, and the size, frequency and intensity of fires. According to *Historical Ecology and Ecosystem Variation in Northern Mid-Continent Grasslands, U.S.A.*, (von Ahlefeldt 1997) severe droughts typically occur every 22 years and last about 5 years.

Moderate to severe droughts occur periodically in tallgrass prairie and can decrease plant production and diversity. Though pre-drought production levels may return rapidly with more normal precipitation, effects on diversity may be more persistent. Human activities likely exacerbate these effects. For example, under presettlement conditions, large herbivores likely migrated from drought-impacted areas, whereas fenced herbivores can severely damage pastures before being removed.

Precipitation is the dominant controlling variable in vegetation structure and species numbers on the short-grass prairie. In an area where precipitation averages 13 to 15 inches per year, any variation of precipitation has an immediate effect. However, many short-grass species have adapted to moisture and temperature variations. Plants lost during a drought can limit future production even after moisture increases. Water increases may increase the biomass of surviving plants, may increase the numbers of existing species, and may promote colonization of new species.

As previously discussed, resting 5% to 40% of an area plays a role in ecological diversity by creating a mosaic of vegetation and helps support fire as an ecological process.

## B. Tallgrass prairie

Fire plays a key role in the formation and maintenance of tallgrass prairie. Historically, large fires were more predominant during drought conditions but were limited in size by the presence of green matter and higher humidity conditions. Fires would occur every three to five years.

Herbivory was important but less of a factor as an ecological process than fire in the tallgrass prairie. Herbivores preferred the forage during the early part of the growing season but did not use the forage when it became taller and rank.

## C. Mixed-grass prairie

Fire and herbivory were also dominant ecological processes in mixed-grass prairie.

Fire was a frequent event in the northern mixed-grass prairie. In general, fire reduces standing crops of both cool- and warm-season species during dry years and maintains or increases standing crops in wet years. Fire improves herbage quality and decreases litter; it also increases bare ground, allowing more light to penetrate the canopy during the growing season.

Grazing on mixed-grass prairie increases short-statured, or rhizomatous, species, such as western wheatgrass and blue grama, over the taller or bunchgrass species, such as little bluestem. Grazing decreases litter, but litter accumulation does not appear to limit productivity. Although heavy grazing or the exclusion of grazing does not increase decomposition, moderate grazing increases decomposition and affects soil chemical properties. Thus, grazing is important in maintaining the ecosystem processes that occurred when large numbers of bison dominated the Great Plains grasslands.

## D. Short-grass prairie

The composition of short-grass prairie is more sensitive to environmental variables, water availability and grazing history than to grazing. Short-grass species adapt to grazing by spreading out rather than growing up. In areas with low productivity and a long history of grazing, moderate grazing has no effect on plant production. However, an evaluation of grazing based on species presence alone may be misleading. Changes in land use, such as grazing, may not result in changes in species composition for some time. Over the long-term, changes in species composition may be small compared to changes in other ecosystem attributes, such as soil nutrients. The long-term sustainability of a system is also dependent on site-specific conditions.

Like grazing, fire removes plant material and recycles nutrients. Fire may either compete with grazers or favor them by exposing or stimulating new plant growth.

# XIII. Environmental Consequences - Ecological Processes

## A. Resource Protection Measures

Standards and objectives would maintain or enhance desired biological and physical ecosystem components, and apply management practices that emulate the frequency, intensity, and duration of ecological processes (e.g., fire, rest, herbivory) to achieve desired landscape conditions.

## B. Direct and Indirect Effects

### *Effects from Fire and Fuels*

Fire affects vegetation productivity, diversity, structure, and nutrient cycling. The effects can vary, depending on the intensity and timing of fire. Prescribed fire is used to restore this disturbance process in the system. Alternative 4 would burn the most acres using prescribed fire, followed by Alternatives 5 and 3.

The following table lists the acres of prescribed fire expected by alternative per year:

**Table 3-144: Acres of Prescribed Burning per Year by Alternative.**

| Planning Unit | Total Acres | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River/Cedar River National Grassland | 161,800 | 500 | 500 | 500 | 500 | 2,000 | 2,000 |
| Little Missouri National Grassland/McKenzie | 500,800 | 300 | 200 | 2,000 | 1,000 | 4,000 | 3,500 |
| Little Missouri National Grassland/Medora | 525,390 | 300 | 200 | 2,000 | 1,000 | 4,000 | 3,500 |
| Sheyenne National Grassland | 70,270 | 2,500 | 2,000 | 4,000 | 4,000 | 6,000 | 5,000 |
| **Totals** | **1,258,260** | **3,600** | **2,900** | **8,500** | **6.500** | **16,000** | **14,000** |
| **Thunder Basin National Grassland** | 552,900 | 400 | 1,000 | 500 | Variable | 1,500 | 1,000 |

| Planning Unit | Total Acres | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Nebraska National Forest Units** | | | | | | | |
| Bessey Ranger District | 90,470 | 0 | 0 | 150 | 300 | 700 | 0 |
| Samuel R. McKelvie National Forest | 115,960 | 0 | 0 | 150 | 300 | 400 | 0 |
| Buffalo Gap National Grassland (Fall River Ranger District) | 322,720 | 0 | 0 | 450 | 450 | 2,500 | 600 |
| Buffalo Gap National Grassland (Wall Ranger District) | 266,510 | 0 | 0 | 100 | 150 | 1,000 | 500 |
| Ft. Pierre National Grassland | 116,000 | 0 | 0 | 500 | 300 | 2,500 | 0 |
| Pine Ridge Ranger District | 50,570 | 0 | 0 | 200 | 100 | 500 | 500 |
| Oglala National Grassland | 94,170 | 0 | 0 | 250 | 150 | 400 | 400 |
| **Totals** | **1,056,400** | **0** | **0** | **1,800** | **1,750** | **8,000** | **2,000** |

## *Effects from Fish and Wildlife Management*

Prairie dogs play a significant role in ecological processes on the grasslands. Historically, bison and prairie dogs were the major grassland herbivores. Prairie dog colonies helped shape the historical vegetation mosaic and reduce vegetation to carry fire across grasslands. Although in a much reduced capacity from historical times, they continue to be the primary herbivores on those sites where they occur today. Their herbivory still creates patches of altered plant species composition and structure, adding plant and animal diversity. While wind and water erosion may be accelerated on some prairie dog colonies, their burrowing and digging activities also benefit soil development. Because they are relatively stable year-round prey for various grassland predators, prairie dogs are a key part of the grassland food web and energy flow. Management activities that maintain and expand prairie dog populations contribute to ecological processes that shaped the grasslands.

## *Effects from Insects and Disease*

Insects and disease are dependent on disturbance variables. Fire, grazing and other types of disturbances can create opportunities for undesirable levels of insects and disease. All alternatives would use an integrated pest management strategy. Treatment activities would be based on risks to human health and the value of and risks to wildlife habitat, adjacent lands, public lands and other resources. Priority would be given to areas where values exceed protection costs.

## *Effects from Range Management and Livestock Grazing*

Grazing animals are conspicuous and important features of many grasslands and, as mentioned above, an important process on the Northern Great Plains. Grazing of a vegetation community type not previously subject to that type or level of grazing constitutes a disturbance. Likewise, removing grazing from a vegetation community type with a long grazing history also constitutes a disturbance and can change vegetation species diversity, fuel levels, and nutrient cycling. Grazing can also create openings that offer opportunities for invasions of undesirable species. Livestock use levels vary by alternative (see Livestock Grazing section). Alternative 2 would have the highest level of grazing and would pose the highest risk of adverse effects to processes, followed by Alternatives 3, 5, and 4.

Suitable rangeland acres rested from grazing vary by alternative (see the Livestock Grazing section in this chapter). Alternative 2 would have the least acres of rest and the most adverse affects to vegetation community types that distribute seed to reproduce; Alternative 4 would have the most acres of rest.

The following tables display the minimum amount of suitable rangeland expected to be rested annually:

**Table 3-145. Suitable Rangeland Acres (%) Rested**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River National Grassland | 0 | 0 | 0 | 7,700 (5) | 7,600 (5) | 30,500 (20) | 15,200 (10) |
| Cedar River National Grassland | 0 | 0 | 0 | 300 (5) | 300 (5) | 1,300 (20) | 700 (10) |
| Little Missouri National Grassland /McKenzie | 11,000 (2) | 0 | 0 | 20,200 (5) | 22,100 (5) | 88,600 (20) | 66,400 (15) |
| Little Missouri National Grassland /Medora | 0 | 0 | 0 | 21,000 (5) | 22,100 (5) | 88,300 (20) | 66,200 (15) |
| Sheyenne National Grassland | 0 | 0 | 0 | 3,400 (5) | 3,500 (5) | 13,900 (20) | 7,000 (10) |
| **Total Rest Acres (%)** | **11,000 (> 1)** | **0** | **0** | **52,600 (5)** | **55,700 (5)** | **222,600 (20)** | **155,500 (14)** |
| **Thunder Basin National Grassland** | | | | | | | |
| **Total Rest Acres (%)** | **0** | **0** | **0** | **26,600 (5)** | **53,200 (10)** | **53,200 (10)** | **26,600 (5)** |
| **Nebraska National Forest** | | | | | | | |
| Bessey Ranger District | 0 | 900 (1) | 900 (1) | 4,400 (5) | 4,500 (5) | 17,700 (20) | 8,900 (10) |
| Samuel R. McKelvie National Forest | 0 | 1,100 (1) | 1,100 (1) | 5,600 (5) | 5,600 (5) | 23,400 (20) | 11,200 (10) |
| Buffalo Gap National Grassland (Fall River RD) | 7,600 (3) | 6,300 (2) | 1,600 (.5) | 15,800 (5) | 15,300 (5) | 30,600 (10) | 30,600 (10) |
| Buffalo Gap National Grassland (Wall RD) | 0 | 2,400 (1) | 2,400 (1) | 12,000 (5) | 23,000 (5) | 26,300 (11) | 26,300 (11) |
| Ft. Pierre National Grassland | 11,300 (10) | 11,300 (10) | 0 | 5,700 (5) | 11,300 (10) | 22,500 (20) | 22,500 (20) |
| Pine Ridge Ranger District | 0 | 0 | 0 | 2,400 (5) | 1,600 (5) | 3,100 (10) | 3,000 (10) |
| Oglala National Grassland | 0 | 0 | 0 | 4,400 (5) | 4,000 (5) | 7,900 (10) | 7,900 (10) |
| **Total Rest Acres (%)** | **18,900 (1)** | **22,100 (2)** | **6,000 (>1)** | **50,300 (5)** | **54,100 (6)** | **131,500 (13)** | **110,400 (11)** |

## C. Cumulative Effects

Humans can affect the frequency and intensity of fire, rest, and herbivory. Rest and fire are not occurring within the natural range of variation under current management (Alternative 1), and herbivory is probably not at historical frequency and intensity levels. Alternative 2 would not increase the frequency and intensity of these processes, except for herbivory. Alternatives 3, 4, and 5 would restore fire and rest as ecological processes to various levels. Herbivory by livestock and prairie dogs would also occur at varying levels under these alternatives. Cumulatively, Alternative 4 would do the most to restore natural ecological processes, followed by Alternatives 5 and 3. Alternatives 1 and 2 would do the least to restore natural ecological processes.

# 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 traveling 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 all units in the analysis area.

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.

Some of those commenting on the Draft EIS expressed concern about the effects of travel management on the mobility impaired. The Americans with Disabilities Act (ADA) prohibits discrimination against those with disabilities in employment, public services, public accommodations and services operated by private entities. The act specifically allows wheelchair access in Wilderness. The Forest and Grassland Plans extend to all non-motorized areas the same access as ADA allows in Wilderness (see Standards and Guidelines, Q. Infrastructure). The environmental consequences section of this EIS has been expanded to include the effects on the mobility impaired.

## Laws, Policy, and Direction

Forest Planning Regulation 36 CFR 219.21 requires evaluation of the recreation resource including the Recreation Opportunity Spectrum (ROS), the 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 cannot 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 Nebraska and Medicine Bow National Forest Management Plans. The Custer Land and Resource Management Plan provides for additional campground construction. 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 is a nationally significant recreational destination. However, many do receive significant visitation, often from people in nearby states or Canadian provinces. Some units attract many visitors traveling 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. Travelers 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*

In January 2001, the Forest Service Northern Region, R-1, issued an *Off-Highway Vehicle Record of Decision and Plan Amendment for Montana, North Dakota and Portions of South Dakota,* which affected the Dakota Prairie Grasslands. That decision amended the Custer National Forest (including the Dakota Prairie Grasslands) plan to restrict yearlong, wheeled motorized cross-country travel. Because the travel management analysis was being conducted concurrently with the analysis in this EIS, the January 2001 decision is reflected in Alternative FEIS 3 and not in the existing condition and Alternative 1.

### 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. Theodore Roosevelt National Park is an attraction. The three units of this national park lie within the boundaries of the Little Missouri National Grassland. Nearby Medora, North Dakota, an historic, re-created 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 sufficient. 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. High rolling plains, rolling plateaus, steep rocky escarpments, and gentle plains characterize this unit. 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 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 Ranger District 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 north central 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 Ranger District 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 a fishpond, 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 Ranger District 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 Ranger District 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, 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 rock hounds 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 Ranger 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 bird watching, 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 Ranger District 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 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 Table 3-146 through Table 3-148. They also represent the existing benchmark capacity for the planning units.

**Table 3-146. Developed Recreation Sites on the Dakota Prairie Grasslands 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 |
| | CCC | Campground | 226 |
| Little Missouri National Grassland/Medora | Burning Coal Vein | Campground | 25 |
| | Buffalo Gap | Campground | 100 |

**Table 3-147. 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 3-148. Developed Recreation Sites on the Nebraska National Forest Units**

| Planning Unit | Site Name | Site Kind | Persons At One Time Capacity |
|---|---|---|---|
| Bessey Ranger 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 |
| Buffalo Gap National Grassland (Fall River RD) | Pioneer | Picnic Ground | 15 |
| | French Creek | Campground | 15 |
| Buffalo Gap National Grassland (Wall Ranger District) | National Grasslands Visitor Center | Interpretive Site | 200 |
| Oglala National Grassland | Hudson-Meng Bison Bonebed | Interpretive Site | 150 |
| | Toadstool Park | Campground | 60 |
| Pine Ridge Ranger 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 are generally greater than 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 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 would be more cost effective over the long term.

## *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 six fishing ponds totaling 85 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.
- Little Missouri National Grassland--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 Ranger 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 eight classes of ROS settings:

| | |
|---|---|
| Urban | Roaded Natural Nonmotorized |
| Rural | Semi-Primitive Motorized |
| Roaded Modified | Semi-Primitive Nonmotorized Primitive |
| Roaded Natural | Primitive |

For a more complete discussion on ROS classes refer to Chapter 4 of the 1986 Forest Service ROS Book. Brief descriptions of each ROS class are in the Glossary (Plans, Appendix G). The following tables display the acres by ROS classification for each forest and grassland:

**Table 3-149. Recreation Opportunity Spectrum Classes on the Dakota Prairie Grasslands Units.**

| | Acres | | | | |
|---|---|---|---|---|---|
| **Planning Unit** | **Urban** | **Rural** | **Roaded Natural** | **Roaded Modified** | **Semi-Primitive Motorized** |
| **Dakota Prairie Grassland Units** | | | | | |
| Cedar River National Grassland | 0 | 1,770 | 4,980 | 0 | 0 |
| Grand River National Grassland | 0 | 23,360 | 129,110 | 1,710 | 0 |
| 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 3-150. Recreation Opportunity Spectrum Classes on the Medicine Bow-Routt National Forest Unit (Thunder Basin National Grassland)**

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

**Table 3-151. Recreation Opportunity Spectrum Classes on the Nebraska National Forest Units**

| Planning Unit | Acres | | | | |
|---|---|---|---|---|---|
| | Urban | Rural | Roaded Natural | Semi-Primitive Motorized | Semi-Primitive Nonmotorized |
| Bessey Ranger 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 Ranger 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*

Grand vistas, “big skies,” and a sea of grass on a large scale often characterize grassland scenery. 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.

The two most significant broad scale changes likely to influence how people recreate over the next 50 years relate to anticipated increases in both 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. In addition, 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 jet skiing. Interestingly, the current fastest growing activities include bird watching, 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 3-152. 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% |
| Wyoming | -16% | +1% | +29% |

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

**Table 3-153. 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 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 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 3-154. 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 30 to 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. 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 horseback 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* did 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. Levels of dispersed recreation use and off-highway vehicle use are less than the anticipated accomplishment, although dispersed recreation use has been increasing.

**Table 3-155. 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 are 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 because 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 3-156. Developed Recreation Capacity in PAOTs by Alternative**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Cedar River/Grand River National Grasslands | 0 | 0 | 0 | 50 | 50 | 0 | 50 |
| Little Missouri National Grassland | 185 | 185 | 185 | 205 to 225 | 205 to 225 | 185 | 355 to 450 |
| Sheyenne National Grassland | 0 | 0 | 0 | 75 | 75 | 0 | 75 to 150 |
| **Medicine Bow-Routt National Forest** | | | | | | | |
| Thunder Basin National Grassland | 5 | 5 | 5 | 80 | 80 | 5 | 200 |
| **Nebraska National Forest** | | | | | | | |
| Bessey Ranger District | 870 | 870 | 870 | 870 | 870 | 870 | 870 |
| Samuel R. McKelvie National Forest | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Buffalo Gap National Grassland | 230 | 230 | 230 | 305 | 305 | 230 | 305 |
| Oglala National Grassland[1] | 560 | 560 | 560 | 560 | 560 | 560 | 560 |
| Pine Ridge Ranger District | 405 | 405 | 405 | 405 | 405 | 405 | 405 |

[1] It is assumed that the Prehistoric Prairies Discovery Center would be constructed in all alternatives with 485 PAOT additional to those shown in the Table.

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 DEIS 3 and 5 include increased developed recreation facilities. In both Alternative DEIS 3 and FEIS 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 Alternatives DEIS 3, and FEIS 3, two to three new campgrounds on the Little Missouri National Grassland and another campground on the Dakota Prairie Grasslands could be constructed 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 both Alternatives DEIS 3 and FEIS 3, then 4, 2, and 1 in descending order. 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 waterways. Activities may include primitive camping, picnicking, hunting, fishing, off-road vehicle use, hiking, horseback riding, mountain biking, and sightseeing.

### 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 both Alternatives DEIS 3, and FEIS 3 and then by 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). Both Alternatives DEIS 3, and FEIS 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 Ranger 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 next by Alternatives DEIS 3 and FEIS 3, and then by 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 Alternatives DEIS 3 and FEIS 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 both Alternatives DEIS 3 and FEIS 3, and then by 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 motorized travel off-existing routes, they probably offer the greatest opportunities to pursue rock collecting, providing the greatest access to even remote agate sites. Alternative FEIS 3 for the Dakota Prairie and Thunder Basin grasslands would restrict motorized use to existing roads and trails only; off-road motorized use will not be allowed. The Alternative FEIS 3 for the Nebraska National Forest and grassland units will defer decisions on motorized use until site-specific analyses and public involvement is completed (except for motorized use restrictions to meet Management Area direction or for existing Forest Supervisor special orders on travel management needed to protect resources and provide for public safety). Alternatives DEIS 3, 4 and 5 restrict motorized travel to existing routes only. As such, only those routes that bisect agate beds would provide motorized access for rock hounds. Remote agate beds could still be accessed using nonmotorized methods.

**Driving for Pleasure**

Driving for pleasure is affected by diverse vegetation, diverse landscapes, and by public access. 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 followed by Alternatives DEIS 3 and FEIS 3, and then by Alternatives 5, 1 and 2.

Motorized public access is affected by Special area allocations, including Wild and Scenic Rivers, Wilderness recommendations, Special Interest Area and Research Natural Area prescriptions, which may reduce motorized access in some areas, especially if any become Congressionally designated Wilderness areas or a Wild and Scenic River with a "wild" classification. Management area classifications which will affect public access, and thus driving for pleasure, are listed in the following table:

**Table 3-157. Management Area Acres with Yearlong Limitations on Motorized Access by Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Recommended for Wilderness | 1.2 | 0 | 0 | 0 | 22,190 | 0 | 85,940 | 72,670 |
| Suitable for Wilderness | 1.2A | 0 | 0 | 0 | 0 | 41,520 | 0 | 0 |
| Backcountry Recreation Nonmotorized | 1.31 | 42,990 | 42,990 | 0 | 121,950 | 69,050 | 103,840 | 81,490 |
| Wild and Scenic River System: Wild Rivers Recommended | 1.5 | 0 | 0 | 0 | 0 | 0 | 840 | 0 |
| Special Interest Areas | 2.1 | 0 | 0 | 1,770 | 6,400 | 6,420 | 5,930 | 4,640 |
| Research Natural Areas | 2.2 | 920 | 920 | 840 | 20,030 | 20,120 | 9,040 | 1,070 |
| American Indian Traditional Use Areas | 2.4 | 6,260 | 6,260 | 6,280 | 6,280 | 6,280 | 6,280 | 6,280 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Recommended for Wilderness | 1.2 | 0 | 0 | 0 | 14,850 | 0 | 59,280 | 15,260 |
| Backcountry Recreation Nonmotorized | 1.31 | 0 | 0 | 0 | 6,540 | 6,550 | 4,200 | 22,710 |
| Special Interest Areas | 2.1 | 0 | 0 | 6,590 | 12,570 | 26,780 | 6,590 | 6,590 |
| Research Natural Areas | 2.2 | 0 | 0 | 0 | 1,210 | 1,210 | 3,520 | 0 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Wilderness: Soldier Creek | 1.1 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 |
| Recommended for Wilderness | 1.2 | 0 | 0 | 0 | 15,970 | 40,450 | 174,970 | 9,700 |
| Backcountry Recreation Nonmotorized | 1.31 | 0 | 0 | 9,700 | 14,000 | 14,000 | 1,830 | 126,660 |
| Backcountry Recreation Nonmotorized: Pine Ridge RNA | 1.31A | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 |
| Special Interest Areas | 2.1 | 0 | 0 | 6,590 | 12,570 | 26,780 | 6,590 | 6,590 |
| Research Natural Areas | 2.2 | 500 | 500 | 3,090 | 6,740 | 6,800 | 5,270 | 4,120 |
| **Total by Alternative** | | **65,020** | **65,020** | **49,210** | **275,650** | **280,310** | **488,470** | **372,130** |

Alternative 4 provides the most acres of special area allocations. As such, Alternative 4 has the greatest adverse effect on driving for pleasure due to special area allocations. Alternative 5 has the second most acres of special area allocations, followed in order by Alternatives FEIS 3 DEIS 3, 1, and 2.

Management areas, which emphasize wildlife, also affect driving for pleasure. The effects are both beneficial, in that these areas may provide enhanced opportunities for wildlife viewing, and adverse, in that seasonal travel restrictions may be applied to meet wildlife needs. Management area acres with wildlife emphasis that provide seasonal limitations on travel management are listed in the following table:

**Table 3-158. Management Area Acres with Wildlife Emphasis and Seasonal Restrictions on Motorized Travel by Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Bighorn Sheep Habitat | 3.51 | 27,940 | 27,940 | 118,500 | 67,210 | 19,320 | 74,660 | 68,720 |
| Bighorn Sheep Habitat | 3.51A | 0 | 0 | 0 | 0 | 35,810 | 0 | 0 |
| Antelope Winter Range | NA | 57,110 | 57,110 | 0 | 0 | 57,110 | 0 | 0 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Cheyenne Zoological SIA | 2.1 | 0 | 0 | 0 | 5,980 | 5,980 | 0 | 0 |
| Big Game Range | 3.68 | 4,270 | 4,270 | 0 | 33,890 | 33,890 | 0 | 0 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Bighorn Sheep Habitat | 3.51 | 0 | 0 | 0 | 6,590 | 5,650 | 5,950 | 5,950 |
| **Total by Alternative** | | 89,320 | 89,320 | 118,500 | 113,670 | 157,760 | 80,610 | 74,670 |

Alternative FEIS 3 would have the greatest likelihood of affecting driving for pleasure, as this alternative would have the most acres allocated to wildlife management areas with seasonal travel restrictions. Alternatives DEIS 3 would have the next greatest affects followed by Alternatives 2, 4, and 5. Alternative 1 would have the least affects to travel from wildlife management.

### Off-highway Motorized Recreation

Alternatives 1 and 2 generally do not restrict motorized use. Alternatives FEIS 3, DEIS 3, 4, and 5 restrict motorized traffic to existing routes, a significant new restriction.

Generally, where off-highway use has caused 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, the greatest off-highway motorized recreation opportunities would be provided by Alternatives 1 and 2, followed equally by Alternatives DEIS 3, FEIS 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 FEIS 3, 5, DEIS 3, and 4 in descending order.

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, DEIS 3, FEIS 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 3-159. Change in Fishable Ponds by Alternative**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River/ Cedar River National Grasslands | No change | No change | No change | No change | No change | No change | Add 1 pond |
| Little Missouri National Grassland | No change | No change | No change | Add 1 pond | 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 | No change | No change |
| **Nebraska National Forest Units** | | | | | | | |
| All units combined | No change | No change | 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 DEIS 3, FEIS 3, 4, and 5 do restrict motorized access to existing routes only. In Alternatives DEIS 3, FEIS 3, 4, and 5 fishing opportunities would be an important consideration in designating routes for motorized use and would affect travel management planning and route designation.

### Quality Big Game Hunting

Big game hunting opportunities are affected by both the quality of habitat and hunter access which both affect game availability. Further some hunters prefer motorized access while others

prefer a walk-in hunting experience. Management Area's with limitations on travel management are detailed in Table 3-157. Alternative 4 has the most area of restricted travel management followed in order by Alternative 5, DEIS 3, FEIS 3, 1, and then 2. Hunters who prefer a motorized hunting experience would be most adversely affected by Alternatives 4 and followed in order by 5, DEIS 3, FEIS 3, 2, and then 1. Hunters who prefer a walk-in experience would be most adversely affected by Alternative 1 and 2, then by Alternatives FEIS 3, DEIS 3, 5 and 4 in order.

Areas with seasonal restrictions for wildlife purposes are listed in Table 3-158. Hunters preferring a motorized hunting experience would be most adversely affected by Alternative FEIS 3 and then in descending order by Alternatives DEIS 3, 2, 1, 4, and 5. Hunters desiring a walk-in experience would be most adversely affected by Alternative 5 and then by Alternatives 4, 1, 2, DEIS 3, and least by FEIS 3.

Alternative 4 with its emphasis on ecosystem restoration would most probably have the greatest beneficial effect on game and thus quality hunting. Alternative 2 with its emphasis on commodity production would likely have the most adverse effects on game and thus quality hunting. Given the differing expectations of hunters on what constitutes a quality hunt, it would be difficult to discern any real differences in the other alternatives.

**Bighorn Sheep –** Both the Little Missouri National Grassland and the Nebraska National Forest have proposed areas for bighorn sheep habitat as displayed in the following table.

**Table 3-160. Management Area Acres With Wildlife Emphasis by Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Bighorn Sheep Habitat | 3.51 | 27,940 | 27,940 | 118,500 | 67,210 | 19,320 | 74,660 | 68,720 |
| Bighorn Sheep Habitat | 3.51A | 0 | 0 | 0 | 0 | 35,810 | 0 | 0 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Bighorn Sheep Habitat | 3.51 | 0 | 0 | 0 | 6,590 | 5,650 | 5,950 | 5,950 |
| **Total by Alternative** | | 27,940 | 27,940 | 118,500 | 73,800 | 60,780 | 80,610 | 74,670 |

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. Alternative 2 has the most acres assigned to management area (MA) 3.51 followed in order by Alternatives 4, 5, DEIS 3, FEIS 3, and 1.

**Deer** - Hunting opportunities for deer are best on the flat to rolling prairie land when brushy and herbaceous holding and hiding cover along streams 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. For a comparison of these alternatives and their relationship to woody draw regeneration, see the comparison tables by alternatives under "major revision topics" found in Chapter 2 of this document.

In addition the Thunder Basin National Grassland considers one Management Area, MA 3.68, for big game habitat including deer winter range. Therefore, the greatest opportunity for deer hunting would be in Alternatives DEIS 3 and FEIS 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 deer hunting.

**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 increase. Therefore, the greatest opportunity for elk hunting would be in Alternatives DEIS 3, and FEIS 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 –** On the Dakota Prairie Grasslands Alternative 1 and FEIS 3 each allocate 57,110 acres to pronghorn antelope winter range. This is not a management area allocation but a overlay on the Management Areas applying a travel restriction to protect pronghorn during the sensitive winter period (January 1 to March 31). On the other units none of the alternatives would change expected opportunities to hunt or view pronghorn from what currently exists.

**Wild Turkey –** Like deer, hiding and holding cover along streams and woody draws affect hunting opportunities for wild turkey. 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. For a comparison of these alternatives and their relationship to woody draw regeneration, see the comparison tables by alternatives under "major revision topics" found in Chapter 2 of this document.

**Upland Bird Hunting**

Alternatives 1 and 2 would not generally restrict motorized travel, while Alternatives DEIS 3, 4 and 5 restrict motorized travel to existing routes only. While hunters who use motorized vehicles to hunt game would be restricted under Alternatives DEIS 3, 4 and 5, hunters looking for walk-in hunting opportunities would fare better under Alternatives DEIS 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 DEIS 3 (15%/49%/36%), Alternative 5 (15%/52%/33%), Alternative FEIS 3 (15%/60%/25%), 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

DEIS 3 (23%/42%/35%), Alternative FEIS 3 (31%/51%/18%), 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 DEIS 3 (22%/49%/29%), Alternative 5 (21%/57%/22%), Alternative FEIS 3 (31%/46%/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 FEIS 3, DEIS 3, 5, 1, and 2. 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 DEIS 3, FEIS 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. Black-footed ferret reintroduction habitat is displayed, by alternative, in the following table:

**Table 3-161. Black-footed Ferret Reintroduction Habitat by Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Concurrent Black-footed Ferret Reintroduction Habitat | 1.2 | 0 | 0 | 0 | 0 | 0 | 4,660 | 0 |
| Concurrent Black-footed Ferret Reintroduction Habitat | 1.31 | 0 | 0 | 0 | 0 | 0 | 7,030 | 0 |
| Black-footed Ferret Reintroduction Habitat | 3.63 | 0 | 0 | 0 | 0 | 29,180 | 16,220 | 0 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Concurrent Black-footed Ferret Reintroduction Habitat | 1.2 | 0 | 0 | 0 | 0 | 0 | 11,450 | |
| Black-footed Ferret Reintroduction Habitat | 3.63 | 8,050 | 8,050 | 61,510 | 109,140 | 104,030 | 109,930 | 86,780 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Concurrent Black-footed Ferret Reintroduction Habitat | 1.31 | 0 | 0 | 0 | 0 | 0 | 0 | 13,380 |

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Thunder Basin National Grassland, cont.** | | | | | | | | |
| Cheyenne Zoological Special Interest Area | 2.1 | 0 | 0 | 0 | 5,930 | 5,930 | 0 | 0 |
| Concurrent Black-footed Ferret Reintroduction Habitat | 2.2 | 0 | 0 | 0 | 0 | 0 | 16,550 | 0 |
| Black-footed Ferret Reintroduction Habitat | 3.63 | 33,750 | 33,750 | 41,230 | 45,470 | 47,890 | 112,510 | 27,850 |
| **Total by Alternative** | | **41,800** | **41,800** | **102,740** | **160,540** | **187,030** | **278,350** | **128,010** |

Alternative 4, with its heavy emphasis on ecological restoration would provide the most acres of black-footed ferret reintroduction sites followed by Alternative FEIS 3, and then by Alternative DEIS 3, 5, 2, and 1.

### 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 FEIS 3, DEIS 3, 5, and 2. Alternatives 1 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 and as such would have the least impact on prairie dog viewing. The other Alternatives all restrict motorized vehicles access, and therefore, reduce the viewing experience. The effects of travel management on prairie dog viewing are the same as for driving for pleasure and are displayed in that section above.

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 (see Table 3-161)

### Prairie Dog Shooting

The number and size of prairie dog colonies and type of shooting restriction in place influence the shooting of prairie dogs. While Alternative 4 would have the greatest number of active prairie dog colonies, all colonies would have a yearlong prairie dog shooting restriction. Alternatives FEIS 3, and DEIS 3 would have the next highest amount of prairie dog colonies but also have a seasonal shooting restriction from 3/1 through 7/31 in all colonies, in addition to yearlong restrictions in MA 3.63. Alternative 5 and 2 would provide more shooting opportunities, because they provide more prairie dog colonies, and because the only shooting restriction would be in MA 3.63 Black-Footed Ferret Reintroduction Habitat. Alternatives 1 would provide the same shooting restrictions as Alternative 5 and 2, but much few acres of prairie dog colonies (36%of Alternative 5 area).

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 DEIS 3, FEIS 3, 4 and 5 do require that motorized vehicles remain on existing routes and therefore reduce the shooting experience (for an analysis of the effects of travel management on recreation opportunities [prairie dog shooting] see the Driving for Pleasure section).

**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 FEIS 3, DEIS 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 FEIS 3, DEIS 3, 4, and 5 restrict motorized travel to existing 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 generally enhance the bicycling experience and may increase opportunities similar to those for hiking, backpacking, and horseback riding.

Trails designed for hiking and backpacking, bicycles (including mountain bikes), and horseback riding probably would increase these types of recreational opportunities. 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 Ranger District, would be completed under all alternatives. Both the Maah Daah Hey and Pine Ridge Trails are developed for nonmotorized uses including hiking, bicycling and horseback riding. 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 FEIS 3, and DEIS 3 (40 miles DPG, 30 to 40 miles NNF, some trails TBNG). Alternatives 4, 2, and 1 propose no new trail construction. For a comparison of these alternatives and their relationship to trail construction, see the comparison tables by alternatives under "Major Revision Topics" found in Chapter 2 of this document.

Alternatives 4 and 5 provide the most acres of nonmotorized 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 from designated Wilderness areas). Alternative DEIS 3 followed closely by Alternative FEIS 3 would provide the next most nonmotorized area and Alternatives 1 and 2 the least (see Table **3-158**).

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 DEIS 3, FEIS 3, 4, and 5 would increase the size of fenced pastures, which could reduce the number of fence lines 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 followed by Alternatives DEIS 3, FEIS 3, 5, and 1. Alternative 2 with its emphasis on commodity production would result in the most modified 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, DEIS 3, FEIS 3, 1 and then 2 (see Table 3-144).

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, wildlife habitat, and recreation opportunities.

### Effects from Fish and Wildlife Management

Fish and wildlife management activities would have both a beneficial and adverse effects on recreational activities. Management Areas with a wildlife emphasis that would affect recreational activities are displayed in the following table:

**Table 3-162. Management Area Acres with Wildlife Emphasis by Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Black-footed Ferret Reintroduction Habitat | 3.63 | 0 | 0 | 0 | 0 | 29,180 | 16,220 | 0 |
| Bighorn Sheep Habitat | 3.51 | 27,940 | 27,940 | 118,500 | 67,210 | 19,320 | 74,660 | 68,720 |
| Bighorn Sheep Habitat | 3.51A | 0 | 0 | 0 | 0 | 35,810 | 0 | 0 |
| Antelope Winter Range | NA | 57,110 | 57,110 | 0 | 0 | 57,110 | 0 | 0 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Black-footed Ferret Reintroduction Habitat | 3.63 | 0 | 8,050 | 61,510 | 109,140 | 104,030 | 109,930 | 86,780 |
| Bighorn Sheep Habitat | 3.51 | 0 | 0 | 0 | 6,590 | 5,650 | 5,950 | 5,950 |

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Thunder Basin National Grassland** | | | | | | | | |
| Cheyenne Zoological Special Interest Area | 2.1 | 0 | 0 | 0 | 5,980 | 5,980 | 0 | 0 |
| Black-footed Ferret Reintroduction Habitat | 3.63 | 33,750 | 33,750 | 41,230 | 45,470 | 47,890 | 112,510 | 27,850 |
| Big Game Range | 3.68 | 4,270 | 4,270 | 0 | 33,890 | 33,890 | 0 | 0 |
| **Total by Alternative** | | **123,070** | **131,120** | **221,240** | **268,280** | **338,860** | **319,270** | **189,300** |

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 recreation opportunities associated with those wildlife species or their habitats. Generally effects whether beneficial or adverse, would be greatest in Alternative FEIS 3 followed by Alternative 4, DEIS 3, 2, 5, and 1.

**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**

In areas with oil, gas and minerals development opportunities for recreation move toward the more developed end of the Recreation Opportunity Spectrum. With oil and gas developments motorized opportunities would tend to increase, although there could also be temporary motorized access restrictions. Semi-primitive experiences would tend to decrease as mineral developments displace wildlife, impact scenic resources, reduce areas offering semi-primitive experiences, and increase dust, noise and traffic hazards. Dispersed recreation opportunities temporarily lost to development could displace recreationists into fewer undeveloped areas.

Mineral activities other than oil and gas are not expected to have any measurable impact in any alternative because of low mineral occurrence within the areas. Sand, gravel, and common variety mineral extraction will occur affecting small, localized areas. The effects are expected to be minimal since each operation will be analyzed on a site-specific basis and appropriate mitigation applied.

Oil and gas development is expected to have the greatest effect of any mineral activity on grassland recreation. All of the alternatives allow for oil and gas leasing to varying degrees. A variety of availability and leasing decisions are applied in the alternatives. Some lands are not available for leasing, some are available but have a decision not to lease (No Lease), and others are available for leasing with a variety of lease stipulations for protection of resources. No Surface Occupancy (NSO) stipulations prohibit occupancy on or disturbance of the land surface to protect special values or uses. Controlled Surface Use (CSU) stipulations allow use and occupancy with special operational constraints for identified resource values. Timing

Limitation (TL) stipulations prohibit drilling during specified time periods to protect identified resource values.

In all alternatives, areas that are not available for leasing, areas available with a no lease decision, and areas with NSO stipulations, the existing scenic values will be preserved. In Management Areas, which permit leasing, a CSU stipulation is applied to preserve moderate and high scenic integrity levels, and to prohibit surface occupancy in and adjacent to identified developed and dispersed recreation sites as well as identified special resources such as some paleontological, historic or cultural sites. For a detailed analysis of the effects of oil and gas stipulations see the Oil and Gas section of this analysis.

Generally, Alternative 2, with its emphasis on commodity production, would have the greatest adverse effect on semi-primitive recreation opportunities and scenic integrity levels. Alternatives 1 would have the next greatest effect followed by Alternatives DEIS 3, FEIS 3, and 5. Alternative 4, with its emphasis on ecosystem restoration, would least affect semi-primitive recreation opportunities and scenic integrity levels.

**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 DEIS 3, FEIS 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 stream banks 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. Overall, large pastures promote a sense of open space natural landscape. For most planning units, Alternatives DEIS 3, FEIS 3, 4, and 5 would increase the size of fenced pastures, which would reduce the number of fence lines and improve the scenic integrity of the area. The size of livestock grazing pastures is largest in Alternative 4. Alternative 4 also allows the least number of water developments, such as dug-out stock ponds, which would promote a more natural-appearing landscape. Overall the effects of range and livestock management on recreation and travel management are expected to be greatest in Alternative 2 with its emphasis on commodity production followed by Alternatives 1, DEIS 3, FEIS 3, 5, and 4.

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

Forty-three areas were analyzed for recommendation to Congress as wilderness as part of the Northern Great Plains Plans Revision process (see Appendix C). The acreage to be managed for roadless characteristics is displayed in the following table:

**Table 3-163. Roadless Area Acres by Management Area and Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Recommended for Wilderness | 1.2 | 0 | 0 | 0 | 22,190 | 0 | 85,940 | 72,670 |
| Suitable for Wilderness | 1.2A | 0 | 0 | 0 | 0 | 41,520 | 0 | 0 |
| Backcountry Recreation Nonmotorized | 1.31 | 42,990 | 42,990 | 0 | 121,950 | 69,050 | 103,840 | 81,490 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Wilderness: Soldier Creek | 1.1 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 |
| **Nebraska National Forest and Associated National Grasslands, cont.** | | | | | | | | |
| Recommended for Wilderness | 1.2 | 0 | 0 | 0 | 15,970 | 40,450 | 174,970 | 9,700 |
| Backcountry Recreation Non-motorized | 1.31 | 0 | 0 | 9,700 | 14,000 | 13,860 | 1,830 | 126,660 |
| Backcountry Recreation Nonmotorized: Pine Ridge RNA | 1.31A | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Recommended for Wilderness | 1.2 | 0 | 0 | 0 | 14,850 | 0 | 59,280 | 15,260 |
| Backcountry Recreation Nonmotorized | 1.31 | 0 | 0 | 0 | 6,540 | 6,550 | 4,200 | 22,710 |
| **Total by Alternative** | | 57,340 | 57,340 | 24,050 | 209,850 | 185,780 | 444,410 | 342,840 |

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, DEIS 3, and FEIS 3. Alternatives 1 and 2 would not recommend any areas for Wilderness designation. Alternative 4 would also manage the largest number of acres for roadless characteristics followed by Alternatives 5, DEIS 3, FEIS 3, 1, and 2.

Special Interest Areas (SIAs) are managed to protect or enhance areas with unusual characteristics, such as scenic, historical, geological, botanical, zoological, paleontological or others. Special Interest Areas by alternative are displayed in the following table:

**Table 3-164. Special Interest Area Acres by Management Area and Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Special Interest Areas | 2.1 | 0 | 0 | 1,770 | 6,400 | 6,420 | 5,930 | 4,640 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Special Interest Areas | 2.1 | 70 | 70 | 1,060 | 54,490 | 26,870 | 2,820 | 55,190 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Special Interest Areas | 2.1 | 0 | 0 | 6,590 | 12,570 | 26,780 | 6,590 | 6,590 |
| **Total by Alternative** | | 70 | 70 | 9,420 | 73,450 | 60,070 | 15,340 | 66,420 |

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, recreation use would be encouraged within designated SIAs. Alternative DEIS 3 would manage the most special interest area followed by Alternatives 5, FEIS 3, 4, 2, and 1.

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. Research Natural Areas by alternative are displayed in the following table:

**Table 3-165. Research Natural Area Acres by Management Area and Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Research Natural Areas | 2.2 | 920 | 920 | 840 | 20,030 | 20,120 | 9,030 | 1,070 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Research Natural Areas | 2.2 | 500 | 500 | 3,090 | 6,740 | 6,800 | 5,270 | 4,120 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Research Natural Areas | 2.2 | 0 | 0 | 0 | 1,210 | 1,210 | 3,520 | 0 |
| **Total by Alternative** | | 1,420 | 1,420 | 3,930 | 27,980 | 28,130 | 17,820 | 5,190 |

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. Motorized recreation activities are prohibited in RNAs. The recreation experience of those desiring motorized activities would be restricted while the experience of those desiring non-motorized activities would be enhanced. Alternative FEIS 3 would allocate the most acreage to RNAs , followed by Alternative DEIS 3, 4, 5, 2, and 1.

Five streams were analyzed as part of Wild and Scenic River analysis process. Wild and Scenic River Area acres by alternative are displayed in the following table:

**Table 3-166. Wild and Scenic River Area Acres by Management Area and Alternative (National Forest System lands).**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Wild and Scenic River System: Wild Rivers Recommended | 1.5 | 0 | 0 | 0 | 0 | 0 | 840 | 0 |
| Wild and Scenic River System: Scenic Rivers Recommended | 3.4 | 0 | 0 | 0 | 0 | 0 | 17,260 | 18,280 |
| Wild and Scenic River System: Recreation Rivers Recommended | 4.4 | 0 | 0 | 0 | 0 | 0 | 2,470 | 3,070 |
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Wild and Scenic River System: Scenic Rivers Recommended | 3.4 | 0 | 0 | 0 | 0 | 0 | 1,790 | 0 |
| Wild and Scenic River System: Recreation Rivers Recommended | 4.4 | 0 | 0 | 0 | 0 | 0 | 140 | 1,790 |
| **Total by Alternative** | | 0 | 0 | 0 | 0 | 0 | 22,500 | 23,140 |

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.

Theodore Roosevelt National Park assessed segments of the Little Missouri flowing through the park for Wild and Scenic River designations.

**Table 3-167. Wild and Scenic River Area Acres by Alternative (Theodore Roosevelt National Park).**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Theodore Roosevelt National Park** | | | | | | | |
| Wild and Scenic River System: Wild Rivers Recommended | 0 | 0 | 0 | 14.9 | 14.9 | 14.9 | 0 |
| Wild and Scenic River System: Scenic Rivers Recommended | 0 | 0 | 0 | 6.8 | 5.8 | 10.8 | 21.7 |
| Wild and Scenic River System: Recreation Rivers Recommended | 0 | 0 | 0 | 0 | 0 | 1.5 | 0 |
| **Total by Alternative** | 0 | 0 | 0 | 21.7 | 20.7 | 27.2 | 21.7 |

Alternative 4 would provide the greatest number of miles of Wild and Scenic River designations on National Park administered lands, while Alternatives 5 and DEIS 3 would provide second

most followed by FEIS 3. Alternatives 1 and 2 provide no Wild or Scenic River designations on Park Service administered lands.

**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 disrupts 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, roads constructed for timber removal would be temporary and would be obliterated after the timber is harvested. Potential timber harvest would occur on least than 8% of the planning area. In the first decade of the plan, Alternative 4 would have the greatest amount of timber harvest, followed by Alternatives 5, DEIS 3, FEIS 3, 2, and 1 (see Table 3-220).

**Effects from Travel Management and Motorized Use**

Travel management has both beneficial and adverse effects on recreation. Restrictions on motorized travel would benefit people who prefer non-motorized recreation such as hiking, horseback riding, walk-in hunting and backcountry camping. Restrictions limit those who prefer motorized opportunities such as driving for pleasure, motorized camping, off-road driving and motorized hunting access. Limiting motorized activities 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, travel restrictions may make it more difficult for elderly or disabled people to access public lands.

Alternatives 1 and 2 generally do not restrict motorized use. Essentially, Alternatives DEIS 3, FEIS 3, 4 and 5 restrict motorized traffic to existing routes. As such, off-highway motorized recreation would be affected and would be more limited under Alternatives DEIS 3, FEIS 3, 4 and 5 than in Alternatives 1 and 2. For further information, see the Driving for Pleasure and the Travel Management sections 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 3-168. Recreation Opportunity Spectrum Classification by Alternative.**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS 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 | 25,130 | 25,130 |
| roaded natural acres | 134,090 | 134,090 | 134,090 | 134,090 | 134,090 | 134,090 | 134,090 |
| semi-primitive motorized areas | 1,710 | 1,710 | 1,710 | 1,710 | 1,710 | 1,710 | 1,710 |

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Little Missouri National Grassland - McKenzie** | | | | | | | |
| rural acres | 165,620 | 158,910 | 165,620 | 156,030 | 157,430 | 156,030 | 154,700 |
| roaded modified acres | 46,180 | 46,180 | 46,180 | 45,930 | 45,930 | 45,930 | 46,180 |
| roaded natural acres | 199,510 | 195,450 | 199,510 | 193,210 | 194,070 | 189,370 | 198,970 |
| roaded natural nonmotorized areas | 0 | 0 | 0 | 0 | 0 | 390 | 0 |
| semi-primitive motorized areas | 89,530 | 65,150 | 89,530 | 49,560 | 53,350 | 44,910 | 65,870 |
| semi-primitive nonmotorized acres | 0 | 35,160 | 0 | 56,120 | 50,060 | 64,210 | 35,120 |
| **Little Missouri National Grassland - Medora** | | | | | | | |
| urban acres | 750 | 750 | 750 | 430 | 440 | 750 | 430 |
| rural acres | 89,570 | 89,570 | 89,570 | 89,230 | 89,560 | 88,930 | 89,560 |
| roaded modified acres | 70,540 | 70,440 | 70,440 | 66,970 | 66,990 | 68,150 | 68,170 |
| roaded natural acres | 249,110 | 248,160 | 248,140 | 221,760 | 231,810 | 207,270 | 233,740 |
| roaded natural nonmotorized acres | 0 | 860 | 1,070 | 2,270 | 2,320 | 1,920 | 790 |
| semi-primitive motorized acres | 116,100 | 108,450 | 116,100 | 44,210 | 61,610 | 26,160 | 60,900 |
| semi-primitive nonmotorized areas | 0 | 7,840 | 0 | 101,200 | 73,330 | 132,890 | 72,470 |
| **Sheyenne National Grassland** | | | | | | | |
| urban | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| rural acres | 21,260 | 21,250 | 21,250 | 19,120 | 19,840 | 19,960 | 10,230 |
| roaded modified | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| roaded natural acres | 28,040 | 27,990 | 27,990 | 27,990 | 26,720 | 28,940 | 12,160 |
| roaded natural nonmotorized acres | 0 | 60 | 60 | 740 | 1,050 | 740 | 290 |
| semi-primitive motorized areas | 20,980 | 20,980 | 20,980 | 18,290 | 18,450 | 20,650 | 1,030 |
| semi-primitive nonmotorized areas | 0 | 0 | 0 | 4,140 | 4,220 | 0 | 46,570 |
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | | | | | | |
| **Thunder Basin National Grassland** | | | | | | | |
| urban acres | 13,250 | 13,250 | 49,780 | 48,130 | 48,130 | 44,680 | 49,790 |
| rural acres | 69,530 | 69,530 | 51,190 | 41,200 | 41,200 | 51,260 | 51,850 |
| roaded natural acres | 442,620 | 442,620 | 424,430 | 418,940 | 418,940 | 388,100 | 391,680 |
| roaded natural nonmotorized acres | 0 | 0 | 0 | 1,210 | 15,380 | 3,520 | 0 |
| semi-primitive motorized acres | 27,090 | 27,090 | 27,090 | 22,290 | 22,290 | 2,140 | 21,870 |
| semi-primitive nonmotorized acres | 0 | 0 | 0 | 20,720 | 6,550 | 62,800 | 37,300 |

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | |
| **Bessey Ranger District** | | | | | | | |
| urban acres | 0 | 80 | 70 | 70 | 70 | 20 | 70 |
| rural acres | 2,760 | 2,670 | 2,690 | 2,690 | 2,690 | 2,740 | 2,690 |
| roaded natural acres | 30,770 | 30,380 | 30,380 | 30,380 | 30,380 | 30,380 | 30,380 |
| roaded natural nonmotorized acres | 0 | 500 | 500 | 500 | 500 | 500 | 500 |
| semi-primitive motorized acres | 56,680 | 56,570 | 56,570 | 56,570 | 56,570 | 56,570 | 56,570 |
| **Samuel R. McKelvie National Forest** | | | | | | | |
| roaded natural acres | 13,340 | 14,400 | 14,400 | 14,280 | 14,280 | 7,170 | 7,380 |
| roaded natural nonmotorized acres | 0 | 0 | 0 | 120 | 120 | 120 | 0 |
| semi-primitive motorized acres | 102,600 | 101,540 | 101,540 | 99,050 | 99,050 | 24,170 | 26,680 |
| semi-primitive nonmotorized acres | 0 | 0 | 0 | 2,500 | 2,500 | 84,480 | 81,880 |
| **Buffalo Gap National Grassland - Fall River Ranger District** | | | | | | | |
| rural acres | 9,470 | 9,470 | 9,470 | 9,470 | 9,470 | 9,470 | 9,470 |
| roaded natural acres | 251,990 | 251,990 | 259,540 | 246,860 | 239,470 | 231,390 | 239,470 |
| roaded natural nonmotorized acres | 0 | 0 | 1,560 | 1,620 | 1,560 | 1,050 | 1,560 |
| **Buffalo Gap National Grassland - Fall River Ranger District, cont.** | | | | | | | |
| semi-primitive motorized acres | 61,910 | 61,910 | 42,390 | 50,620 | 44,410 | 44,520 | 44,410 |
| semi-primitive nonmotorized acres | 0 | 0 | 10,410 | 14,800 | 28,460 | 36,930 | 28,460 |
| **Buffalo Gap National Grassland - Wall Ranger District** | | | | | | | |
| rural acres | 30,630 | 63,980 | 30,630 | 30,630 | 30,630 | 30,630 | 30,630 |
| roaded natural acres | 152,350 | 152,350 | 151,990 | 150,890 | 143,580 | 140,870 | 150,920 |
| roaded natural nonmotorized acres | 0 | 30,630 | 1,030 | 1,030 | 1,030 | 1,030 | 1,030 |
| semi-primitive motorized acres | 63,980 | 19,030 | 63,310 | 52,170 | 52,350 | 52,350 | 52,350 |
| semi-primitive nonmotorized acres | 19,030 | 0 | 19,030 | 31,270 | 38,400 | 41,110 | 31,060 |
| **Fort Pierre National Grassland** | | | | | | | |
| rural acres | 9,810 | 9,810 | 9,810 | 9,810 | 9,810 | 9,810 | 9,810 |
| roaded natural acres | 98,380 | 98,380 | 98,380 | 98,330 | 98,330 | 98,330 | 98,330 |
| roaded natural nonmotorized acres | 0 | 0 | 0 | 1,030 | 1,030 | 1,030 | 1,030 |
| semi-primitive motorized acres | 7,480 | 7,480 | 7,480 | 6,490 | 6,490 | 6,490 | 6,490 |

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Pine Ridge Ranger District/Oglala National Grassland** | | | | | | | |
| urban acres | 240 | 240 | 240 | 240 | 240 | 240 | 240 |
| rural acres | 6,610 | 6,610 | 6,610 | 6,610 | 6,610 | 5,730 | 5,550 |
| roaded natural acres | 78,990 | 78,850 | 78,960 | 77,120 | 77,120 | 69,440 | 70,990 |
| roaded natural nonmotorized acres | 0 | 0 | 0 | 0 | 0 | 1,580 | 0 |
| semi-primitive motorized acres | 44,530 | 44,530 | 44,530 | 44,530 | 44,530 | 51,500 | 51,720 |
| semi-primitive nonmotorized acres | 14,350 | 14,490 | 14,380 | 16,210 | 16,210 | 16,210 | 16,210 |

All of the alternatives offer a mix of ROS settings, but to differing degrees. Generally, Alternative 4 provides the greatest area of primitive-type recreational settings, followed by Alternatives 5, DEIS 3, and FEIS 3. Alternative 2, followed by Alternative 1, provide 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. Grassland-wide and forest-wide 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 show the scenery integrity levels associated with the alternatives:

**Table 3-169. Scenery Integrity Levels by Alternative**

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | |
| **Grand River and Cedar River National Grasslands** | | | | | | | |
| low acres | 158,810 | 158,810 | 159,680 | 156,720 | 150,630 | 159,680 | 84,850 |
| moderate acres | 2,130 | 2,120 | 1,020 | 3,980 | 10,040 | 1,020 | 75,850 |
| high acres | 0 | 0 | 230 | 230 | 260 | 230 | 240 |
| **Little Missouri National Grassland McKenzie** | | | | | | | |
| low acres | 453,630 | 453,630 | 470,970 | 376,190 | 386,530 | 368,750 | 274,330 |
| moderate | 5,810 | 5,810 | 23,590 | 68,530 | 57,970 | 61,210 | 185,110 |
| high acres | 41,410 | 41,410 | 6,280 | 56,120 | 56,340 | 70,880 | 41,400 |
| **Little Missouri National Grassland Medora** | | | | | | | |
| low acres | 508,590 | 508,590 | 502,930 | 288,670 | 365,610 | 302,200 | 295,650 |
| moderate | 7,830 | 7,830 | 19,870 | 128,050 | 110,350 | 82,900 | 151,820 |
| high acres | 8,700 | 8,700 | 2,320 | 109,340 | 50,110 | 140,020 | 77,650 |
| **Sheyenne National Grassland** | | | | | | | |
| low acres | 69,590 | 69,590 | 70,220 | 5,560 | 5,450 | 5,860 | 1,810 |
| moderate acres | 630 | 630 | 0 | 59,840 | 59,570 | 63,690 | 21,620 |
| high acres | 60 | 60 | 60 | 4,880 | 5,270 | 740 | 46,860 |
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | | | | | | |
| **Thunder Basin National Grassland** | | | | | | | |
| very low | 3,880 | 0 | 0 | 0 | 0 | 0 | 0 |
| low acres | 53,120 | 550,960 | 490,670 | 432,150 | 432,110 | 451,040 | 413,090 |
| moderate acres | 495,490 | 1,530 | 55,230 | 85,840 | 85,840 | 28,530 | 95,520 |
| high acres | 0 | 0 | 6,590 | 34,490 | 34,530 | 72,910 | 43,890 |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | |
| **Bessey Ranger District** | | | | | | | |
| low acres | 80 | 89,670 | 69,660 | 69,700 | 69,700 | 69,580 | 220 |
| moderate acres | 90,120 | 0 | 20,000 | 400 | 400 | 20,090 | 69,890 |
| high acres | 0 | 530 | 550 | 20,100 | 20,100 | 530 | 20,100 |

| Planning Unit | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Samuel R. McKelvie National Forest** | | | | | | | |
| low acres | 0 | 114,830 | 110,190 | 104,890 | 104,890 | 26,090 | 20 |
| moderate acres | 114,970 | 1,110 | 5,750 | 5,580 | 5,580 | 5,250 | 31,190 |
| high acres | 970 | 0 | 0 | 5,470 | 5,470 | 84,600 | 84,730 |
| **Buffalo Gap National Grassland (Fall River)** | | | | | | | |
| very low acres | 480 | 0 | 0 | 0 | 0 | 0 | 0 |
| low acres | 4,230 | 323,380 | 299,050 | 201,350 | 201,380 | 271,900 | 198,270 |
| moderate acres | 286,440 | 0 | 12,360 | 103,350 | 103,320 | 11,210 | 92,810 |
| high acres | 32,230 | 0 | 11,970 | 18,670 | 18,670 | 40,260 | 32,300 |
| **Buffalo Gap National Grassland (Wall)** | | | | | | | |
| low acres | 2,970 | 212,660 | 263,420 | 224,910 | 226,110 | 222,320 | 84,070 |
| moderate | 230,500 | 53,330 | 1,330 | 1,630 | 1,160 | 1,330 | 138,040 |
| high acres | 32,520 | 0 | 1,030 | 39,450 | 38,710 | 42,340 | 43,080 |
| **Fort Pierre National Grassland** | | | | | | | |
| very low acres | 420 | 0 | 0 | 0 | 0 | 0 | 0 |
| low acres | 19,740 | 114,790 | 114,770 | 113,740 | 113,740 | 113,740 | 43,740 |
| moderate acres | 95,510 | 880 | 890 | 890 | 890 | 890 | 70,900 |
| high acres | 0 | 0 | 0 | 1,030 | 1,030 | 1,030 | 1,030 |
| **Pine Ridge Ranger District** | | | | | | | |
| very low acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| low acres | 80 | 89,670 | 69,660 | 69,700 | 69,700 | 69,580 | 220 |
| moderate acres | 90,120 | 0 | 20,000 | 400 | 400 | 20,090 | 69,890 |
| high acres | 0 | 530 | 550 | 20,100 | 20,100 | 530 | 20,100 |

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 DEIS 3, and FEIS 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, wildlife restrictions, miles of existing routes and number of new recreation developments, Alternative 5 may provide the most diverse recreation opportunities, followed by Alternatives FEIS 3, DEIS 3, 4, 2, and 1. Alternative 4 probably provides the most diverse landscapes and vegetation for recreationists, followed by Alternatives FEIS 3, DEIS 3, 5, 2 and 1.

Each of the 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 et al. 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, there are also shortcomings. For instance, some members of the public see themselves as "owners" not as "customers," 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 – places with values based on 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" person recreating on public lands may be described as follows:

- White male, 25 to 40 years old.
- Lives in a city of 50,000 or less.
- Has children and a multiple–career home.
- 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 not feeling crowded 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.

## *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 bird watching. "Avitourism" is beginning to be appreciated as a source of revenue in some areas, and the Northern Great Plains offers substantial opportunities to bird watch, 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 bird watching. Alternative 4, with its heavy emphasis on ecological restoration and special area allocations, may provide the most diverse vegetation, followed by Alternatives FEIS 3, DEIS 3 and 5, 1, and 2.

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 FEIS 3, DEIS 3 and 5, 1, and 2.

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 FEIS 3, DEIS 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 FEIS 3, DEIS 3, 4 and 5 than in Alternatives 1 and 2.

Fishing 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 FEIS 3, DEIS 3, 4, and 5 do restrict motorized access to existing routes only. It is assumed in Alternatives FEIS 3, DEIS 3, 4, and 5 that routes to fishing opportunities would be designated for motorized use.

Horseback riding is becoming increasingly 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 FEIS 3, DEIS 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 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 in the past decade or so. All of the alternatives would provide diverse hunting opportunities. Alternatives FEIS 3, DEIS 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 FEIS 3, DEIS 3, 4, and 5 do carry restrictions limiting travel to existing 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 has 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.

On the Dakota Prairie Grasslands a travel management analysis (*Off-Highway Vehicle Environmental Impact Statement and Proposed Plan Amendment for Montana, North Dakota and Portions of South Dakota*) and decision were completed in January 2001. That decision amended the Custer National Forest (including the Dakota Prairie Grasslands) plan to restrict yearlong, wheeled motorized cross-country travel. This is a very important change in travel management on the Dakota Prairie Grasslands that affected this analysis. Because the travel management analysis was being conducted concurrently with the analysis in this EIS, the January 2001 decision is reflected in Alternative FEIS 3. For the Dakota Prairie Grasslands, the existing condition and Alternative 1 reflect conditions prior to the January 2001 decision.

Currently on the Nebraska National Forest units, there are few restrictions to motorized travel; approximately 18,480 acres have year-round 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 Ranger District. In addition to year around travel restrictions, the Bessey Ranger District and Fort Pierre National Grassland have seasonal motorized travel restrictions during hunting season. Motorized travel on the entire Fort Pierre National Grassland is restricted to roads during hunting season.

On the Thunder Basin National Grassland, there are currently no travel management restrictions.

## *Roads*

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

**Table 3-170. Miles of Classified Road by Jurisdiction on the Dakota Prairie Grasslands 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 3-171. 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 3-172. 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 3-173. Miles of Road by Jurisdiction on the Nebraska National Forest Units**

| | Miles | | | | | | |
|---|---|---|---|---|---|---|---|
| **Planning Unit** | **Forest Service** | **County** | **Other Federal** | **State** | **Local** | **Private** | **Total** |
| Bessey Ranger 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 RD) | 271 | 197 | 0 | 0 | 0 | 1 | 469 |
| Buffalo Gap National Grassland (Wall RD) | 121 | 191 | 0 | 0 | 11 | 0 | 323 |
| Fort Pierre National Grassland | 60 | 147 | 0 | 16 | 0 | 0 | 223 |
| Pine Ridge Ranger 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 not inventoried, 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, visitors moving cross-country form unclassified roads and trails. 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 forest-wide and grassland-wide 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.

On March 3, 2000, the Forest Service published in the Federal Register a notice of proposed changes in the transportation system rules. The comment period on the proposed change closed May 17, 2000 and a final rule is expected before this EIS can be published. The proposed rule includes a requirement to use a science-based transportation analysis to identify the minimum Forest Service road system needed for administration, utilization, and protection of National Forest System lands and resources, while providing safe and efficient travel and minimizing adverse environmental effects. The requirement for this science-based Roads Analysis, including public involvement, is included in Revised Plan Goal 4.a, and for the purposes of the following analysis, it is assumed that a Roads Analysis will be conducted for all future road management decisions.

Simply, the Revised Plan defers road management decisions for up to 5 years, and requires site-specific Roads Analyses, which include full public involvement. Until transportation and Roads Analyses have been completed, existing travel management will remain in effect. The following analysis assumes that Roads Analyses will be completed, and represents a considered and reasonable projection for the purpose of evaluating environmental consequences.

## *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):

- 60 acres on Sheyenne National Grassland.
- 600 acres on Little Missouri National Grassland/Medora District.
- 500 acres on Nebraska National Forest/Bessey Ranger District.
- 520 acres on Fort Pierre National Grassland.
- 1,900 acres in Alternative 1 and 2,900 acres in Alternative 2 on Buffalo Gap National Grassland (Wall Ranger District).
- 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).

In addition, Fort Pierre National Grassland would have about 115,000 acres with seasonal closures affecting motorized use, and the Bessey Ranger District has about 29,630 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 nonmotorized areas and the Maah Daah Hey and North Country Trails. Alternative FEIS 3 for the Dakota Prairie and Thunder Basin grasslands would restrict motorized use to existing roads and trails only and off-road motorized use will not be

allowed. The Alternative FEIS 3 for the Nebraska National Forest and grassland units will defer decisions on motorized use until site-specific analyses and public involvement is completed (except for motorized use restrictions to meet Management Area direction or for existing Forest Supervisor special orders on travel management needed to protect resources and provide for public safety). Alternatives DEIS 3, FEIS 3, 4, and 5 would eventually restrict motorized traffic to designated roads or trails. The specific existing 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.

## *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 Nonmotorized 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 DEIS 3, FEIS 3, 4, and 5. Managers will have up to 5 years to work with interested parties to make site-specific decisions on existing routes. The effects analyses that follow were done as if the travel restrictions were in place for Alternatives DEIS 3, FEIS 3, 4, and 5.

Some who commented on the DEIS expressed concern that the acres displayed in the following table represented road management decisions without following established processes and allowing for adequate public involvement. This is not the situation. The Revised Plans defers road management decisions for up to 5 years, and require site-specific Roads Analyses, which include full public involvement. Until transportation and Roads Analyses have been completed, existing travel management will remain in effect.

On the Dakota Prairie Grasslands, a travel management analysis (Region 1, BLM and Forest Service Off-Highway Vehicle EIS) and decision were completed in January 2001. That decision amended the Custer National Forest (including the Dakota Prairie Grasslands) plan to restrict yearlong, wheeled motorized cross-country travel. Because the travel management analysis was being conducted concurrently with the analysis in this EIS, the January 2001 decision is reflected in Alternative FEIS 3 and not in the existing condition and Alternative 1.

The following analysis assumes that a Roads Analysis will be completed for each unit, and represents a considered and reasonable projection for the purpose of evaluating environmental consequences.

**Table 3-174. Travel Management Acres by Alternative for Dakota Prairie Grasslands**

| Planning Unit | | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Cedar River and Grand River National Grasslands** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 160,940 | 160,940 | 160,940 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 160,940 | 160,940 | 160,940 | 160,940 |
| **Little Missouri National Grassland: McKenzie Ranger District** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 500,840 | 500,840 | 500,840 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 0 | 0 | 0 | 57,220 | 50,060 | 79,500 | 15,730 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 61,890 | 23,350 | 49,830 | 55,120 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 381,730 | 427,430 | 371,510 | 429,990 |
| **Little Missouri National Grassland: Medora Ranger District** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 525,470 | 525,470 | 525,470 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 600 | 600 | 600 | 113,650 | 75,360 | 150,260 | 73,800 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 56,120 | 37,940 | 24,510 | 4,650 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 356,290 | 412,770 | 351,300 | 447,620 |
| **Sheyenne National Grassland** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 70,220 | 70,200 | 70,200 | 0 | 0 | 0 | 2,800[45] |
| Areas where no motorized use is allowed (except administrative use) | acres | 60 | 60 | 60 | 4,900 | 6,250 | 700 | 46,900 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 65,300 | 63,950 | 69,500 | 20,500 |

[45] Hankinson Hills.

**Table 3-175. Travel Management Acres by Alternative for Thunder Basin National Grassland**

| Thunder Basin National Grassland | | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| Areas allowing off-road motorized travel | acres | 552,510 | 552,510 | 552,510 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 0 | 0 | 0 | 22,600 | 28,560 | 65,500 | 38,000 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 39,880 | 39,880 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 490,030 | 484,070 | 487,010 | 514,510 |

**Table 3-176. Travel Management Acres by Alternative for Nebraska National Forest Units.**

| Planning Unit | | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Bessey Ranger District** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 60,070 | 65,500 | 65,500 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Areas with seasonal motorized travel restrictions (except administrative use)[46] | acres | 29,630 | 24,500 | 24,500 | 0 | 29,630 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 90,000 | 60,070 | 90,000 | 90,000 |
| **Samuel R. McKelvie National Forest** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 115,950 | 116,000 | 116,000 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 0 | 0 | 0 | 2,400 | 2,620 | 85,000 | 77,700 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 113,600 | 113,330 | 31,000 | 38,300 |
| **Fort Pierre National Grassland** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 520 | 520 | 520 | 1,520 | 1,030 | 1,520 | 1,520 |

[46] On the Bessey Ranger District within this 29,630 acre area, vehicle travel is restricted to designated routes from September 1 to November 30 each year.

| Planning Unit | | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Fort Pierre National Grassland, cont.** | | | | | | | | |
| Areas with seasonal motorized travel restrictions (except administrative use)[47] | acres | 115,250 | 115,250 | 115,250 | 0 | 0 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 114,250 | 114,740 | 114,250 | 114,250 |
| **Pine Ridge RD and Oglala National Grassland** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 130,300 | 130,300 | 130,300 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 14,400 | 14,400 | 14,400 | 16,170 | 16,230 | 31,600 | 29,120 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 0 | 5,650 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 128,530 | 122,820 | 113,100 | 115,580 |
| **Buffalo Gap National Grassland Wall Ranger District** | | | | | | | | |
| Areas allowing off-road motorized travel | acres | 226,110 | 233,180 | 260,080 | 0 | 0 | 0 | 0 |
| Areas where no motorized use is allowed (except administrative use) | acres | 39,870 | 1,900 | 2,900 | 43,070 | 38,710 | 46,400 | 42,970 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 30,900 | 3,000 | 223,430 | 227,270 | 219,580 | 223,010 |

| **Buffalo Gap National Grassland Fall River Ranger District** | | **Existing Condition** | **Alt 1** | **Alt 2** | **DEIS Alt 3** *Alt 3a* | **FEIS Alt 3** | **Alt 4** | **Alt 5** |
|---|---|---|---|---|---|---|---|---|
| Areas allowing off-road motorized travel | acres | 322,900 | 322,900 | 322,900 | 5,200 *284,700* | 5,410 | 0 | 10,400 |
| Areas where no motorized use is allowed (except administrative use) | acres | 500 | 500 | 500 | 17,400 *38,500* | 18,680 | 49,000 | 29,100 |
| Areas with seasonal motorized travel restrictions (except administrative use) | acres | 0 | 0 | 0 | 0 *0* | 0 | 0 | 0 |
| Areas with existing routes for motorized travel | acres | 0 | 0 | 0 | 300,800 *0* | 299,310 | 274,400 | 283,900 |

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

## 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 DEIS 3, 4, 5, and on the Dakota Prairie and Thunder Basin National Grasslands Alternative FEIS 3, all of which would restrict travel to existing routes, administrative travel by Forest Service personnel off existing routes would be allowed in most cases to effectively manage National Forest System lands. Examples include habitat management, noxious weed control, wildfire suppression, and law enforcement.

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

Finally, all alternatives honor valid existing rights. Reasonable access to private property and minerals 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 3.51 Bighorn Sheep during lambing, breeding and winter use. Management Areas with wildlife emphasis that carry travel restrictions are displayed by alternative in the following table:

**Table 3-177. Travel Management Acres For Wildlife Concerns by Alternative.**

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | | |
| Bighorn Sheep Habitat | **3.51** | 27,940 | 27,940 | 118,500 | 67,210 | 19,320 | 74,660 | 68,720 |
| Bighorn Sheep Habitat | **3.51A** | 0 | 0 | 0 | 0 | 35,810 | 0 | 0 |
| Antelope Winter Range | | 0 | 0 | 0 | 0 | 57,110 | 0 | 0 |
| **Thunder Basin National Grassland** | | | | | | | | |
| Cheyenne Zoological SIA | **2.1** | 0 | 0 | 0 | 5,980 | 5,980 | 0 | 0 |
| Big Game Range | **3.68** | 4,270 | 4,270 | 0 | 33,890 | 33,890 | 0 | 0 |

| Planning Unit | MA | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Nebraska National Forest and Associated National Grasslands** | | | | | | | | |
| Bighorn Sheep Habitat | **3.51** | 0 | 0 | 0 | 6,590 | 5,650 | 5,950 | 5,950 |
| **Total by Alternative** | | 32,210 | 32,210 | 118,500 | 113,670 | 157,760 | 80,610 | 74,670 |

Alternative FEIS 3 would have the greatest likelihood of affecting travel management, as this alternative would have the most acres allocated to wildlife management areas. Alternatives 2, would have the next greatest effect, followed by DEIS 3, 4, and 5. Alternative 1 would have the least effect on 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 Grassland, 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 DEIS 3, 5, and FEIS 3.

Present motorized recreation use would not be changed under Alternatives 1 and 2. Motorized recreation acres would be significantly reduced under Alternatives DEIS 3, FEIS 3, 4, and 5 because these alternatives limit motorized use to existing routes only. While motorized

recreation would be reduced under Alternatives DEIS 3, FEIS 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). Alternative FEIS 3 for the Dakota Prairie and Thunder Basin grasslands would restrict motorized use to existing roads and trails only and off-road motorized use will not be allowed. The Alternative FEIS 3 for the Nebraska National Forest and grassland units will defer decisions on motorized use until site-specific analyses and public involvement is completed (except for motorized use restrictions to meet Management Area direction or for existing Forest Supervisor special orders on travel management needed to protect resources and provide for public safety). Alternatives DEIS 3, 4, and 5 restrict motorized traffic to existing routes, a significant new restriction.

In all Alternatives, obliteration of unclassified roads would likely occur in designated Research Natural Areas. The number of miles of road to be obliterated is expected to be minor.

Alternatives DEIS 3, FEIS 3, 4, and 5, which would limit motorized travel to existing 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 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 existing routes, Alternative 5, with its emphasis on providing recreation opportunities, would be expected to provide the most miles of existing routes and travel opportunities followed by Alternative DEIS 3, and Alternative FEIS 3. Alternative 4 with its emphasis on ecosystem restoration would be expected to provide the least amount of existing routes for motorized travel.

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 open for motorized travel in Alternatives DEIS 3, FEIS 3, 4, and 5. Alternative 2 would have the most temporary road construction. In Alternatives DEIS 3, FEIS 3, 4, and 5 the amount of unclassified roads would be expected to decrease, as many of these would not be designated motorized travel ways. Evidence of these roads would disappear over time as the tracks are revegetated.

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. Alternatives DEIS 3, and FEIS 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.

The total amount of traffic is not likely to 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 outweigh 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.

# 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. Forty-three 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.

# 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. If the Forest Supervisor and Station Director concur, these manipulative management practices may include those 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:

- Quality: How well a site represents the targeted ecosystem type or protected biodiversity elements.
- Condition: How much the site has been degraded or altered from natural or optimal conditions.
- Viability: The likelihood of long-term survival for the ecosystem and its protected biodiversity.
- 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 experienced 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 minimal recreation use.

The Custer National Forest in Management Plan Amendment Number 19 established the Two Top-Big Top and Limber Pine RNAs. The 100-acre Two Top-Big Top Research Natural represents 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 and represents unique limber pine habitat type in North Dakota. The 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.

Twenty-one areas were evaluated and met the criteria to be considered and nominated for RNAs (totaling about 34,470 acres). In addition, field evaluations have not been completed for one other proposed RNA—Tree Farm, (totaling about 120 acres). Additional information on all nominated RNAs is provided in Appendix E. The following tables summarize the nominated RNAs.

**Table 3-178. Nominated Research Natural Areas**

| Planning Unit | RNA Name | Type | Acres |
|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | |
| **Little Missouri National Grassland McKenzie** | Cottonwood Creek-Badlands | botanical/ zoological | 5,880 |
| | Bear Den-Bur Oak | botanical | 2,840 |
| **Little Missouri National Grassland Medora** | Bullion Butte | botanical/ geological | 3,160 |
| | Ponderosa Pines | botanical/ zoological | 3,560 |
| | Mike's Creek | botanical/ zoological | 4,490 |
| | Little Missouri River | botanical/ geological | 1,190 |

| Planning Unit | RNA Name | Type | Acres |
|---|---|---|---|
| **Sheyenne National Grassland** | Oak Hills | botanical | 390 |
| | Fritillary Prairie | botanical/ zoological | 240 |
| | Bluestem Meadow | botanical | 80 |
| | Platanthera Prairie | botanical | 370 |
| | | **Totals** | **22,140** |
| **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 | 630 |
| | | **Totals** | **2,870** |
| **NEBRASKA NATIONAL FOREST UNITS** | | | |
| **Samuel R. McKelvie National Forest** | Steer Creek | botanical | 2,500 |
| **Buffalo Gap National Grassland (Fall River Ranger District)** | South Pasture, 777 Allotment | botanical | 1,560 |
| | Hay Canyon, Bochert Allotment | botanical | 1,010 |
| **Buffalo Gap National Grassland (Wall Ranger District)** | West Wall | botanical | 1,030 |
| **Fort Pierre National Grassland** | Mallard | botanical | 1,030 |
| **Oglala National Grassland** | Prairie Dog, Pasture 45 | botanical/ zoological | 940 |
| **Pine Ridge Ranger District** | West Ash, Pastures 6, 7, 11 | botanical | 640 |
| | | **Totals** | **8,710** |

**Table 3-179. Nominated 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 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 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 human-caused impacts, thus reducing the overall effect on

ecosystem composition, structure, and processes. The following table shows which RNAs were proposed by alternative and their acreage.

**Table 3-180. Proposed Research Natural Areas by Alternative**

| Planning Unit | RNA Name | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | |
| **Little Missouri National Grassland/McKenzie** | Cottonwood Creek-Badlands | 0 | 0 | 6,460 | 5,880 | 6,460 | 0 |
| | Bear Den-Bur Oak | 0 | 0 | 2,840 | 2,840 | 2,840 | 0 |
| **Little Missouri National Grassland/Medora** | Bullion Butte | 0 | 0 | 0 | 0 | 3,160 | 0 |
| | Ponderosa Pines | 0 | 0 | 3,530 | 3,560 | 3,530 | 0 |
| | Mike's Creek | 0 | 0 | 4,490 | 4,490 | 4,490 | 0 |
| | Little Missouri River | 0 | 0 | 1,260 | 1,190 | 1,260 | 0 |
| **Sheyenne National Grassland** | Oak Hills | 0 | 0 | 390 | 390 | 390 | 390 |
| | Fritillary Prairie | 0 | 0 | 240 | 240 | 240 | 240 |
| | Bluestem Meadow | 0 | 0 | 80 | 0 | 80 | 80 |
| | Platanthera Prairie | 0 | 0 | 400 | 370 | 400 | 400 |
| | **No. Areas** | **0** | **0** | **9** | **8** | **10** | **4** |
| | **Acres** | | | **19,690** | **18,960** | **22,850** | **1,110** |
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | | | | | | |
| **Thunder Basin National Grassland** | Rock Creek | 0 | 0 | 590 | 590 | 590 | 0 |
| | Prairie Creek | 0 | 0 | 0 | 0 | 560 | 0 |
| | Antelope Creek | 0 | 0 | 0 | 0 | 1,090 | 0 |
| | Wildlife Draw | 0 | 0 | 640 | 630 | 640 | 0 |
| | **No. Areas** | **0** | **0** | **2** | **2** | **4** | **0** |
| | **Acres** | | | **1,230** | **1,220** | **2,880** | |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | |
| **Samuel R. McKelvie National Forest** | Steer Creek | 0 | 0 | 2,500 | 2,500 | 2,500 | 0 |
| **Buffalo Gap National Grassland (Fall River Ranger District)** | South Pasture, 777 Allotment | 0 | 1,560 | 1,560 | 1,560 | 1,560 | 1,560 |
| | Hay Canyon, Bochert Allotment | 0 | 0 | 0 | 0 | 1,010 | 0 |
| **Buffalo Gap National Grassland (Wall Ranger District)** | West Wall | 0 | 1,040 | 1,040 | 1,030 | 1,040 | 1,040 |
| **Fort Pierre National Grassland** | Mallard | 0 | 0 | 1,050 | 1,030 | 1,050 | 1,050 |
| **Oglala National Grassland** | Prairie Dog, Pasture 45 | 0 | 0 | 0 | 0 | 940 | 0 |
| **Pine Ridge Ranger District** | West Ash, Pastures 6, 7, 11 | 0 | 0 | 0 | 0 | 640 | 0 |
| | **No. Areas** | **0** | **2** | **4** | **4** | **7** | **3** |
| | **Acres** | | **2,600** | **6,150** | **6,120** | **8,740** | **3,650** |

**Table 3-181. Proposed Research Natural Areas by Alternative**

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

**Table 3-182. Existing Research Natural Areas by Alternative**

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

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

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 as long as RNA management plan direction is followed.

## 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 from facilities are expected in any of the alternatives.

## 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." Grassland-wide 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 because of an RNA designation. There are no known eligible or listed heritage resources or other buildings or structures within any of the proposed 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, 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. Even though oil and gas leasing is allowed, no ground-disturbing activities are permitted within the boundaries of the RNA. A No Surface Occupancy stipulation would not cause a reduction in potential oil and gas productivity and would 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 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 3-183. 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 | 5,880 | 3,130 |
| | Bear Den-Bur Oak | 2,840 | 1,520 |
| **Little Missouri National Grassland Medora** | Bullion Butte | 3,160 | 2,490 |
| | Ponderosa Pines | 3,560 | 2,685 |
| | Mike's Creek | 4,490 | 1,330 |
| | Little Missouri River | 1,190 | 910 |
| **Sheyenne National Grassland** | Oak Hills | 390 | 385 |
| | Fritillary Prairie | 240 | 240 |
| | Bluestem Meadow | 80 | 80 |
| | Platanthera Prairie | 370 | 370 |
| | **Totals** | **22,220** | **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 | 630 | 630 |
| | **Totals** | **2,870** | **2,860** |
| **NEBRASKA NATIONAL FOREST UNITS** | | | |
| **Samuel R. McKelvie National Forest** | Steer Creek | 2,500 | 2,440 |
| **Buffalo Gap National Grassland (Fall River Ranger District)** | South Pasture, 777 Allotment | 1,560 | 1,540 |
| | Hay Canyon, Bochert Allotment | 1,010 | 990 |
| **Buffalo Gap National Grassland Wall** | West Wall | 1,030 | 1,000 |
| **Fort Pierre National Grassland** | Mallard | 1,030 | 1,020 |
| **Oglala National Grassland** | Prairie Dog, Pasture 45 | 940 | 940 |
| **Pine Ridge Ranger District** | West Ash, Pastures 6, 7, 11 | 640 | 480 |
| | **Totals** | **8,710** | **8,410** |

**Table 3-184. Nominated Research Natural Areas and Capable Rangeland**

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

**Table 3-185. 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 Ranger District** | Signal Hill | 500 | 500 |

Range capability to determine allowable livestock production has been examined for all nominated 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 nonmotorized 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. Physically challenged individuals may be less able to access these public lands.

### 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

Proposed RNAs are not available for timber harvest. The following tables list the approximate amount of tentatively suitable acres in each of the RNAs that contain timber. Although these lands are tentatively suitable, they would not be available for timber harvest if the RNA is established.

**Table 3-186. Tentatively Suitable Timber Acres by RNA by Alternative**

| Planning Unit | RNA Name | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Little Missouri National Grassland Medora** | Ponderosa Pines | 0 | 0 | 810 | 810 | 810 | 0 |
| **Sheyenne National Grassland** | Oak Hills | 0 | 0 | 390 | 390 | 390 | 0 |
| | **Totals** | **0** | **0** | **1,200** | **1,200** | **1,200** | **0** |

**Table 3-187. Tentatively Suitable Timber Acres by RNA by Alternative**

| Planning Unit | RNA Name | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Pine Ridge Ranger District** | West Ash, Pastures 6, 7, 11 | 0 | 0 | 0 | 630 | 630 | 0 |

In the determination of timber suitability, based on the suitability criteria, none of the areas listed above are suitable. 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 with terms listed in a permit but would be closed to the public. Other two-track roads within nominated RNAs would be obliterated.

## Effects from Wilderness Management

Acreages of RNAs within Existing, Suitable, 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 3-188. Proposed Research Natural Areas in Existing, Suitable, or Recommended Wilderness.**

| Planning Unit | RNA Name | Acres | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | | |
| **Little Missouri National Grassland Medora** | Bullion Butte | 3,160 | 0 | 0 | 0 | 0 | 3,160 | 0 |
| | Ponderosa Pines | 3,530 | 0 | 0 | 0 | 0 | 3,530 | 0 |
| | Little Missouri River | 1,260 | 0 | 0 | 0 | 0 | 1,260 | 0 |
| **Sheyenne National Grassland** | Oak Hills | 390 | 0 | 0 | 0 | 0 | 390 | 390 |
| | Fritillary Prairie | 240 | 0 | 0 | 0 | 0 | 0 | 240 |
| | Bluestem Meadow | 80 | 0 | 0 | 0 | 0 | 0 | 80 |

| Planning Unit | RNA Name | Acres | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Sheyenne National Grassland, cont.** | | | | | | | | |
| | Platanthera Prairie | 400 | 0 | 0 | 0 | 0 | 0 | 400 |
| | | **# Areas** | **0** | **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 | 0 | 2,500 | 0 |
| **Buffalo Gap National Grassland (Fall River)** | South Pasture, 777 Allotment | 1,560 | 0 | 0 | 0 | 0 | 1,560 | 1,560 |
| **Buffalo Gap National Grassland (Wall RD)** | West Wall | 1,040 | 0 | 0 | 0 | 0 | 0 | 1,040 |
| | | **# Areas** | **0** | **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 that 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. The current, nationwide network of Research Natural Areas represents certain ecosystem and vegetation types. There are currently only 4 Research Natural Areas established within the planning area. Alternative 4 would propose 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 propose 14 new RNAs, and Alternative 5 would propose 7 new RNAs to be established. Alternative 2 would propose 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 cannot detract from the values for which the RNA is established. There would be no cumulative effects.

# Roadless Areas

## Introduction

Maintaining grassland roadless areas and designating grassland Wilderness areas are important to some people. Forty-three roadless areas were analyzed as part of the Northern Great Plains Plans Revision process for potential recommendation to Congress for Wilderness designation. The inventory process to identify roadless areas and the results of the inventories are discussed below. More detailed information on the analysis is provided in Appendix C.

## 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 1980s 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, 25,100[48] acres on the Wall Ranger District of the Buffalo Gap National Grassland; and Red Shirt 9,210[49] acres and Cheyenne River 7,570 acres on the Fall River District of the Buffalo Gap National Grassland. The special designations of the two RARE II areas in Nebraska were 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 (information for table from The National Wilderness Preservation System Map 1964-1989).

**Table 3-189. 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** |

[48] In addition to the Indian Creek RARE II 25,100 acres, the analysis includes two public proposed areas adjacent to Indian Creek (Fall River District 3,210 acres; Wall District 3,770 acres)

[49] In addition to the RARE II 9,210 acres, the analysis includes 7,130 acres adjacent to Red Shirt RARE II.

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 3-190. 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** | | |

| Planning Unit | Inventoried Roadless Area | Acres* |
|---|---|---|
| **Thunder Basin National Grassland** | Cow Creek | 10,960 |
| | H A Divide | 5,060 |
| | Red Hills | 6,840 |
| **TOTAL** | | **22,860** |
| **NEBRASKA NATIONAL FOREST UNITS** | | |
| **Buffalo Gap National Grassland - Fall River** | Cheyenne River | 7,570 |
| | First Black Canyon | 4,960 |
| | Jim Wilson Canyon | 6,020 |
| | Red Shirt | 7,130 |
| | Red Shirt RARE II | 9,210 |
| **Buffalo Gap National Grassland - Wall** | Indian Creek | 25,100 |
| **TOTAL** | | **59,990** |

*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.

**Table 3-191. 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 | 6,540** |
| | Miller Hills | 10,370 |
| | Duck Creek | 12,330 |
| | Downs | 6,510 |
| **TOTAL** | | **35,750** |
| **NEBRASKA NATIONAL FOREST UNITS** | | |
| **Buffalo Gap National Grassland - Fall River** | Indian Creek | 3,210+ |
| **Buffalo Gap National Grassland - Wall** | Indian Creek | 3,770+ |
| | Rake Creek Badlands | 12,300 |
| **Fort Pierre National Grassland** | Cedar Creek | 8,730 |
| **Pine Ridge Ranger District/Oglala National Grassland** | Soldier Creek | 1,830++ |
| | Sugarloaf | 9,090 |
| | Toadstool | 5,280 |

| Planning Unit | Inventoried Roadless Area | Acres* |
|---|---|---|
| **Bessey Ranger District/ Samuel R. McKelvie National Forest** | Dismal River | 12,980 |
| | Steer Creek East | 60,790 |
| | Steer Creek West | 26,210 |
| **TOTAL** | | **144,190** |

* 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.

++ Acreage outside of Soldier Creek Wilderness.

# Environmental Consequences

## *General Effects*

In FEIS Alternative 3 on the Dakota Prairie Grasslands, there were no areas recommended for wilderness. Areas identified as being suitable for wilderness recommendations to Congress for inclusion in the National Wilderness Preservation System were placed in Management Area 1.2A Suitable for Wilderness. The Forest Service is not recommending these areas for wilderness at this time because of a lack of current Congressional and Gubernatorial support for wilderness. This delay is intended to allow time for consensus on this issue to develop. Although these areas will not be recommended to Congress for wilderness designation at this time, their wilderness character will be protected. The total acreage identified for Management Area 1.2A is 39,770. Management Area 1.2A applies only to the Dakota Prairie Grasslands.

For this analysis, Management Areas 1.2 and 1.2A are merged with MA 1.2A footnoted with an asterisk for easy identification. The following tables show roadless areas recommended for Wilderness by alternative and their approximate acreages.

**Table 3-192. Inventoried Roadless Areas Recommended for Wilderness by Alternative.**

| Planning Unit | Roadless Area Name | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | | |
| **Little Missouri National Grassland/McKenzie** | Collar/Bennett-Cottonwood | 0 | 0 | 0 | 0 | 0 | 15,590 | 0 |
| | John Town/Horse Creek | 0 | 0 | 0 | 0 | 0 | 5,460 | 5,460 |
| | Lone Butte | 0 | 0 | 0 | 0 | 0 | 11,470 | 0 |
| | Long X Divide | 0 | 0 | 0 | 10,100 | 10,100* | 10,100 | 10,100 |
| | Magpie | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Scairt Woman | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Total Acres** | **0** | **0** | **0** | **10,100** | **10,100** | **42,620** | **15,560** |
| **Little Missouri National Grassland/Medora** | Bell Lake | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blacktail | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Bullion Butte | 0 | 0 | 0 | 0 | 8,880* | 8,400 | 0 |
| | Dawson's Waterhole | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Planning Unit | Roadless Area Name | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Medora, cont.** | Easy Hill | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Kinley Plateau | 0 | 0 | 0 | 0 | 12,770* | 16,900 | 0 |
| | Magpie | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Ponderosa Pine | 0 | 0 | 0 | 0 | 0 | 7,470 | 0 |
| | Scairt Woman | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Strom Hanson | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Tracy Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Twin Buttes | 0 | 0 | 0 | 7,950 | 8,020* | 8,940 | 8,940 |
| | Wannagan | 0 | 0 | 0 | 0 | 0 | 1,600 | 1,600 |
| | **Total Acres** | **0** | **0** | **0** | **7,950** | **29,670*** | **43,310** | **10,540** |
| **Sheyenne National Grassland** | Delamere | 0 | 0 | 0 | 0 | 0 | 0 | 5,090 |
| | Durler | 0 | 0 | 0 | 0 | 0 | 0 | 12,470 |
| | McLeod | 0 | 0 | 0 | 0 | 0 | 0 | 9,120 |
| | Sheyenne | 0 | 0 | 0 | 4,090 | 0 | 0 | 14,540 |
| | Venlo | 0 | 0 | 0 | 0 | 0 | 0 | 5,320 |
| | **Total Acres** | **0** | **0** | **0** | **4,090** | **0** | **0** | **46,540** |
| **Total Acres for Dakota Prairie Grasslands** | | **0** | **0** | **0** | **22,140** | **39,770*** | **85,930** | **72,640** |
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | | | | | | | |
| **Thunder Basin National Grassland** | H A Divide | 0 | 0 | 0 | 0 | 0 | 5,060 | 0 |
| | Red Hills | 0 | 0 | 0 | 0 | 0 | 6,840 | 0 |
| | Cow Creek Buttes | 0 | 0 | 0 | 0 | 0 | 10,960 | 8,980 |
| **Total Acres for Thunder Basin National Grassland** | | **0** | **0** | **0** | **0** | **0** | **22860** | **8,980** |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | | |
| **Buffalo Gap National Grassland Fall River** | Red Shirt RARE II | 0 | 0 | 0 | 8,970 *0* | 8,450 | 9,210 | 9,210 |
| | Red Shirt Inventoried | 0 | 0 | 0 | 5,300 *0* | 5,300 | 5,840 | 0 |
| | Cheyenne River | 0 | 0 | 0 | 0 | 0 | 7,570 | 0 |
| | Jim Wilson Canyon | 0 | 0 | 0 | 0 | 0 | 6,020 | 0 |
| | First Black Canyon | 0 | 0 | 0 | 0 | 0 | 4,960 | 0 |
| | **Total Acres** | **0** | **0** | **0** | **14,270 *0*** | **13,750** | **33,600** | **9,210** |
| **Buffalo Gap National Grassland Wall** | Indian Creek | 0 | 0 | 0 | 0 | 23,890 | 24,940 | 0 |
| | **Total Acres** | **0** | **0** | **0** | **0** | **23,890** | **24,940** | **0** |
| **Total Acres for Nebraska National Forest Units** | | **0** | **0** | **0** | **14,270 *0*** | **37,640** | **58,540** | **9,210** |

* The Forest Service has identified these areas as being suitable for wilderness recommendations to Congress for

inclusion in the National Wilderness Preservation System. The Forest Service is not recommending these areas for wilderness at this time because of a lack of current Congressional and Gubernatorial support for wilderness. This delay is intended to allow time for consensus on this issue to develop. Although these areas will not be recommended to Congress for wilderness designation at this time, their wilderness character will be protected.

**Table 3-193. Public Proposed Wilderness Recommended for Wilderness by Alternative**

| Planning Unit | Roadless Area | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | | |
| **Grand River National Grasslands** | Grand River Badlands: 6,060 acres** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | South Fork: 12,830 acres** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Twin Buttes Creek: 6,540 acres** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Acres for Grand River National Grasslands: 25,430**** | | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **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 | 0 | 0 | 10,370 | 0 |
| | Duck Creek | 0 | 0 | 0 | 0 | 0 | 12,330 | 0 |
| | Downs | 0 | 0 | 0 | 0 | 0 | 6,510 | 0 |
| **Total Acres for Thunder Basin National Grassland** | | **0** | **0** | **0** | **6,380** | **0** | **36,940** | **6,800** |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | | |
| **Buffalo Gap National Grassland Fall River** | Indian Creek | 0 | 0 | 0 | 0 | 0 | 2,090 | 2,700 |
| | **Total Acres** | **0** | **0** | **0** | **0** | **0** | **2,090** | **2,700** |
| **Buffalo Gap National Grassland Wall** | Rake Creek Badlands | 0 | 0 | 0 | 0 | 0 | 12,030 | |
| | Indian Creek | 0 | 0 | 0 | 0 | 1,070 | 3,190 | 0 |
| | **Total Acres** | **0** | **0** | **0** | **0** | **1,070** | **15,220** | **0** |
| **Fort Pierre National Grassland** | Cedar Creek: 8,730** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Total Acres: 8,730**** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Pine Ridge Ranger District/Oglala National Grassland** | Sugarloaf | 0 | 0 | 0 | 0 | 0 | 8,360 | 0 |
| | Toadstool | 0 | 0 | 0 | 0 | 0 | 5,270 | 0 |
| | **Total Acres** | **0** | **0** | **0** | **0** | **0** | **13,630** | **0** |
| **Bessey Ranger District/Samuel R. McKelvie National Forest** | Dismal River | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Steer Creek East | 0 | 0 | 0 | 0 | 0 | 58,290 | 0 |
| | Steer Creek West | 0 | 0 | 0 | 0 | 0 | 26,120 | 0 |
| | **Total Acres** | **0** | **0** | **0** | **0** | **1,070** | **84,410** | **0** |
| **Total Acres for Nebraska National Forest Units** | | **0** | **0** | **0** | **0** | **1,070** | **115,350** | **2,700** |

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

** These areas are not analyzed in the Draft Environmental Impact Statement, were proposed by the public and have been included in this analysis.

## *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 44 roadless area analyzed in this section. To review the entire Roadless Area Evaluation for Northern Great Plains Planning Units, see Appendix C.

**Table 3-194. 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 |
| **Grand River National Grassland** | | | |
| Grand River | Moderate | High | Moderate |
| South Fork | Moderate | High | Moderate |
| Twin Butte | Moderate | High | Moderate |
| **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 |

| Roadless Area | Capability | Availability | Need for Wilderness |
|---|---|---|---|
| **Thunder Basin, cont.** | | | |
| H A Divide | Moderate | Moderate | Moderate |
| Miller Hills | Moderate | Moderate | Moderate |
| Red Hills | High | Moderate | High |
| **NEBRASKA NATIONAL FOREST UNITS** | | | |
| **Bessey Ranger District/Samuel R. McKelvie National Forest** | | | |
| Dismal River | High | High | Low |
| Steer Creek East | High | High | Moderate |
| Steer Creek West | High | High | Moderate |
| **Buffalo Gap National Grassland/Fall River** | | | |
| Cheyenne River | 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** | | | |
| Soldier Creek | Moderate | High | Moderate |
| 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 DEIS 3, 4, 5, and on the Thunder Basin National Grasslands and the Nebraska National Forest units Alternative FEIS 3 recommend to Congress different combinations of roadless areas. On the Little Missouri National Grasslands Alternative FEIS 3 makes no Wilderness recommendations but identifies areas Suitable for Wilderness. Alternative areas are recommended as Wilderness based on their capability, availability and evidence of need for Wilderness ratings.

Alternative FEIS 3 was developed as a result of public comment on the Draft Environmental Impact Statement and the Draft plans. On the Dakota Prairie Grasslands, roadless areas identified as suitable for wilderness recommendation were allocated to Management Area 1.2A.

The Forest Service is not recommending these areas for wilderness at this time because of a lack of current Congressional and Gubernatorial support for wilderness. Although these areas will not be recommended to Congress for wilderness designation at this time, their wilderness character will be protected. On the Thunder Basin National Grasslands no areas were identified for Wilderness recommendation, however, one area, Cow Creek Buttes, was identified as historic rangeland to be managed as a Special Interest Areas. On the Nebraska National Forest units, two areas were identified to be recommended for Wilderness designation. Roadless areas allocated to MA 1.2 in Alternative FEIS 3 include Red Shirt, and Indian Creek for a total of 38,710 acres. Areas identified as Suitable for wilderness include Long X Divide, Bullion Butte, Kinley Plateau, and Twin Buttes for a total of 39,770 acres.

Alternative DEIS 3 includes acres from the Long X Divide, Twin Buttes, Sheyenne, Cow Creek and Red Shirt Roadless Areas for a total of 42,790 acres. Roadless areas were assigned to MA 1.2 in this alternative 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, Grand River 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. The Grande River National Grasslands roadless areas were not allocated to management Area 1.2 because of the exiting level of development. 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 319,620 acres.

Roadless areas allocated to MA 1.2 in Alternative 5 were based on outstanding contributions to the recreation emphasis of the alternative. Alternative 5 includes acres from Johns Town/Horse Creek, Long X Divide, Twin Buttes, Wannagan, Delamere, Durler, McLeod, Sheyenne, Venlo, Cow Creek/Cow Creek Buttes and Red Shirt Roadless Areas for a total 100,330 acres.

**Table 3-195. Acres of Wilderness Recommendations by Alternative.**

| Alternative | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 Alt *3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **All Units** | 0 | 0 | 0 | 42,790 | 78,480 | 319,620 | 100,330 |
| **Dakota Prairie Grasslands** | 0 | 0 | 0 | 22,140 *0* | 39,770* | 85,930 | 72,640 |
| **Nebraska National Forest** | 0 | 0 | 0 | 14,270 *0* | 38,710* | 173,890 | 11,910 |
| **Thunder Basin National Grassland** | 0 | 0 | 0 | 6,380 *0* | 0 | 59,800 | 15,780 |

* See the footnote on Table 3-192.

## *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 3-196. Roadless Area Acreage[50] Allocations to Management Areas--Dakota Prairie Grasslands**

| Management Area Prescription | Existing Condition | Alternative 1 | Alternative 2 | DEIS Alternative 3 | FEIS Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|---|---|
| **1.2** | | | | 22,190 | | 85,950 | 72,680 |
| **1.2A** | | | | | 41,520 | | |
| **1.31** | 43,000 | 43,000 | | 120,180 | 69,050 | 103,850 | 81,490 |
| **2.1** | | | 780 | 780 | 780 | 310 | 70 |
| **2.2** | 60 | 60 | 60 | 11,700 | 11,510 | 710 | 60 |
| **3.4** | | | | | | 3,830 | 4,020 |
| **3.51** | 13,390 | 13,390 | 44,240 | 180 | 420 | 1,760 | 11,150 |
| **3.63** | | | | | 24,030 | 11,060 | |
| **3.64** | 30 | 30 | | | 120 | | |
| **3.65** | | | | 37,910 | 54,730 | 13,080 | |
| **3.66** | | | | 36,240 | 41,490 | 38,350 | |
| **4.22** | | | | 3,830 | 4,100 | | |
| **4.32** | | | | 120 | | 160 | |
| **9** | | | | | | 1,150 | 1,090 |
| **5.12** | | | | 5,620 | | 7,630 | |
| **6.1** | 217,380 | 217,380 | 228,790 | 35,120 | 26,120 | 6,020 | 103,300 |

[50] Total roadless acreage is 273,870. Acres may be off due to rounding

**Table 3-197. Roadless Area Acreage[51] Allocations to Management Areas - Thunder Basin National Grassland.**

| Management Area Prescription | Existing Condition | Alternative 1 | Alternative 2 | DEIS Alternative 3 | FEIS Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|---|---|
| **1.2** | | | | 14,170 | | 58,600 | 14,580 |
| **1.31** | | | | 6,500 | 6,500 | | 6,500 |
| **2.1** | | | | | 14,170 | | |
| **3.65** | | | | 37,930 | 32,870 | | |
| **5.12** | | | 58,600 | | 5,060 | | |
| **6.1** | 58,600 | 58,600 | | | | | 37,510 |

**Table 3-198. Roadless Area Acreage[52] Allocations to Management Areas--Nebraska National Forest.**

| Management Area Prescription | Existing Condition | Alternative 1 | Alternative 2 | DEIS Alternative 3<br>*3a* | FEIS Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|---|---|
| **1.1** | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 | 7,810 |
| **1.2** | | | | 15,970<br>*9,210* | 38,760 | 173,890 | 11,910 |
| **1.31** | | | 9210 | 12,160 | 13,860 | 1,830 | 117,950 |
| **1.31A** | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 | 6,540 |
| **2.1** | | | 910 | 30,860<br>*13,140* | 3,080 | | 30,610 |
| **2.2** | | | 1,560 | 4,060 | 5,160 | 1,050 | 2,610 |
| **3.4** | | | | | | 1,270 | |
| **3.63** | | | | 11,740<br>*10,980* | 11,740 | 120 | 10,980 |
| **3.64** | | | 1070 | 3,480 | 3,760 | 350 | 6,260 |
| **3.66** | | | | | | 2,170 | |
| **4.4** | | | | | | | 1,270 |
| **5.12** | | | 2,160 | | | | |
| **6.1** | 204,180 | 204,180 | 189,260 | 125,960<br>*183,630* | 127,870 | 23,500 | 22,590 |

Management Area prescriptions are broken into eight major categories based on a continuum from least evidence of human disturbance to most. No roadless or public proposed roadless acres were allocated to the most developed prescription categories 7 and 8. For roadless areas not designated by Congress as Wilderness, management area allocations as outlined in the alternatives may or may not retain undeveloped natural characteristics. Management area allocations by alternative are described in Table 3-196 through Table 3-198. For the most part, management area categories 1 and 2 retain existing undeveloped natural characteristics, while prescription categories 3, 4, 5, and 6 may not.

[51] Total roadless acreage is 58,600. Acres may be off due to rounding

[52] Total roadless acreage is 218,530. Acres may be off due to rounding

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 in Management Area 3.64 (Special Plant and Wildlife Habitat), where the extent to which managers allow natural-disturbance processes, may be limited because of the need to control intense fires.

The table below shows by alternative acres that generally do or do not retain undeveloped natural characteristics as determined by management area allocations. Acres shown may be off slightly due to rounding. The percentages shown are of the entire analysis area.

**Table 3-199. Management Area Acres (and Percentages) that Generally Do or Do Not Retain Undeveloped Natural Characteristics (Total Planning Area Acreages)**

| | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | DEIS Alt 3a*** | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| ***Acres and Percentages Retaining Wilderness Character** | 65,080 | 65,080 | 43,680 | 317,560 | 132,940 | 280,260 | 484,700 | 420,730 |
| | 2.3% | 2.3% | 1.5% | 11.1% | 14.2% | 9.8% | 16.9% | 14.7% |
| ****Acres and Percentages not Retaining Wilderness Characteristics** | 2,802,110 | 2,802,110 | 2,823,080 | 2,549,130 | 806,260 | 2,586,320 | 2,381,990 | 2,445,990 |
| | 97.7% | 97.7% | 98.5% | 88.9% | 85.8% | 90.2% | 83.1% | 85.3% |

* Acres represent Management Areas 1.2, 1.2A, 1.31, 1.31A, 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, 6.1 and 8.4.

*** Acres apply to the Nebraska National Forest units. Alternative 3a applies only to the Fall River District, Nebraska National Forest.

The table below shows the roadless area acres by alternative that generally do or do not retain undeveloped natural characteristics as determined by management area allocations. Acres shown may be off slightly due to rounding. The percentages shown are of the total area considered in the roadless evaluation (550,990).

**Table 3-200. Management Area Acres (and Percentages) that Generally Do or Do Not Retain Undeveloped Natural Characteristics (Roadless Evaluation Acreages only)**

| | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 | DEIS Alt 3a*** | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| ***Acres and Percent Retaining Wilderness Character** | 57,410 | 57,410 | 26,870 | 252,920 | 22,350 | 218,740 | 440,540 | 352,810 |
| | 10.4% | 10.4% | 4.9% | 45.9% | 4.1% | 39.7% | 80.0% | 64.0% |
| ****Acres and Percent Not Retaining Wilderness Character** | 493,580 | 493,580 | 524,120 | 298,070 | 528,640 | 332,250 | 110,450 | 198,180 |
| | 89.6% | 89.6% | 95.1% | 54.1% | 95.9% | 60.3% | 20.0% | 36.0% |

* Acres represent Management Areas 1.2, 1.2A, 1.31, 1.31A, 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 Nebraska National Forest units. Alternative 3a applies only to the Fall River District Nebraska National Forest.

# Direct and Indirect Effects

## *Effects Common to All Alternatives*

None of the alternatives would alter the management for Soldier Creek Wilderness, or for the Pine Ridge National Recreation Area on the Nebraska National Forest. These areas will be allocated to Management Area 1.1 Wilderness and 1.31A Backcountry Recreation Nonmotorized respectively in all alternatives.

It is the intent of the Forest Service that, under all alternatives, motorized use within recommended Wilderness or Backcountry Recreation Nonmotorized 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 (see LRMP Chapter 1, Infrastructure).

Wildfire suppression and prescribed burning for specific purposes would be allowed in recommended Wilderness and Backcountry Recreation Nonmotorized 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 to meet management area direction and specific resource needs. Livestock grazing has typically been authorized by Wilderness legislation. If an area is designated Wilderness by Congress adjustments to livestock grazing would be made to meet Wilderness bill requirements 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 (see LRMP Chapter 3, Management Area 1.2 and 1.2A).

Subsurface mineral ownership may be different than surface ownership. In some areas private minerals lie under federal surface ownership and in other areas federal minerals lie beneath non-federal (state or private) minerals. The owner of these subsurface mineral rights must be allowed reasonable access for exploration and development of the mineral estate by the surface managing entity even in the case where the surface may be Wilderness. If a federal agency denies access for development of non-federal minerals or in the case of mineral leases, 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 owner or lessee for potential lost revenue that may have resulted from that properties development.

Before development activities which could affect potential Wilderness characteristics can occur within any inventoried Forest Service roadless area, additional environmental analysis must be completed.

## *Effects from Fire and Fuels Management*

Wildfire suppression would be allowed within areas assigned to Management Areas 1.1, Wilderness; 1.2, Recommended for Wilderness; 1.2A, Suitable for Wilderness; 1.31, Backcountry Recreation Nonmotorized; and 1.31A, National Recreation Area. The suppression strategy

would be to control the perimeter as compared to the 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. Management Areas 1.1, 1.2, 1.2A, 1.31, and 1.31A are managed as roadless and summarized as follows:

**Table 3-201. Acres Managed as Roadless by Alternative (MA 1.1, 1.2, 1.2A, 1.31, 1.31A).**

| Alternative | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 Alt *3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Analysis Area Totals** | | | | | | | |
| **Acres** | 57,340 | 57,340 | 24,050 | 209,850 *28,350* | 185,780 | 445,250 | 342,840 |
| **Roadless Analysis Totals** | | | | | | | |
| **Acres** | 57,340 | 57,340 | 23,560 | 205,520 *9,210* | 184,040 | 438,470 | 319,460 |

Alternative 4 would allocate the most acres to Management Areas 1.1, 1.2, 1.2A, 1.31, and 1.31A, followed by Alternatives 5, DEIS 3, FEIS 3, 1, and 2. In Management Areas other than 1.2, 1.2A, 1.31, and 1.31A (see Table 3-200) wildfire suppression activities could affect the wilderness characteristics, if heavy equipment was used to build fire lines. 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, 1.2A, 1.31, and 1.31A, structures would be subordinate and in keeping with the semi-primitive/primitive character of the area. Roadless areas acres allocated to other than those management areas 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, and 1.2A, insect and disease control actions would only be taken when outbreaks threatened resource values outside of the area. This acreages by Alternative is as follows:

**Table 3-202. Roadless Evaluation Acreage Allocated to MA 1.2, 1.2A, by Alternative.**

| Alternative | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 Alt *3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Acres** | 0 | 0 | 0 | 52,330 *9,210* | 80,280 | 318,440 | 99,170 |

The effects from insects and disease could be more evident in Alternative 4 with the largest amount of roadless acreages allocated to Management Area 1.2, and 1.2A followed by Alternatives 5, FEIS 3, and DEIS 3. There are no acres allocated to Management Areas 1.2 and 1.2A in Alternatives 1 and 2. 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*

Because valid existing mineral rights will be honored (see LRMP Chapter 1, Minerals and Energy Resources, Objectives), mineral activities could change the roadless primitive and semi-primitive characteristics even in management areas designed to preserve roadless character (MA1.2, 1.2A, 1.31, 1.31A, 2.2, 3.51, and some 2.1). Several of the areas considered in the roadless evaluation have private mineral ownership within them. 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. In areas with existing mineral leases, usually oil and gas leases, activities would not be restricted beyond the requirements of the existing lease. Although private mineral rights and lease rights can be purchased to preserve roadless or wilderness characteristics, the cost may be prohibitive.

Oil and gas development, including wells, pumping stations and roads, alter the roadless primitive to semi-primitive character of an area to such an extent that future wilderness designation would be unlikely. Oil and gas activities are restricted to non-ground-disturbing activities in Management Areas 1.2, 1.2A, 1.31, 1.31A, 2.2 (Research Natural Areas), 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, DEIS 3, FEIS 3, 1and 2 (see Table 3-200).

Although there are coal resources under all roadless areas, the potential for development is low. Therefore, effects from coal development in the roadless areas in all alternatives are anticipated to be negligible.

Locatable mineral exploration and development can occur unless an area is withdrawn form mineral entry. 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 on roadless resources is low for all alternatives.

The removal of mineral materials would not be allowed in Management Areas 1.2, 1.2A, 1.31, 1.31A, 2.1 and 2.2. Even though the other management area prescriptions do not restrict the removal of mineral material, the potential for development of such minerals is low in all of the roadless areas in all alternatives.

For detailed mineral information see the availability analysis specific to each roadless area in Appendix C.

## *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 nonmotorized 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*

Some people view the presence of livestock as detracting from a primitive recreational experience, while others see livestock on the range as a cultural and historic feature. Livestock also trample soils causing soil compaction and soil erosion. Livestock may also contribute to the spread of noxious or undesirable weeds, spreading and planting seeds carried and deposited by hooves, hide and the fecal droppings.

Fences and water developments and livestock support facilities can alter the roadless primitive to semi-primitive character of an area to such an extent that future wilderness designation would be unlikely. Existing fences and livestock developments were taken into account in the 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. Structural range improvements numerous enough to detract from the semi-primitive/primitive setting, caused an area to be dropped from the roadless inventory.

Management Areas 1.2, 1.2A, 1.31, 1.31A, 2.1, 2.2, and 3.64 (Special Plant and Wildlife Habitat) prohibit a net gain in the amount of fences and water developments. This restriction would tend to maintain roadless primitive to semi-primitive characteristics. In addition, the vegetative matrices applied to these management areas and on the whole tend to have higher percentages of high vegetative structure. High vegetative structure would reduce noticeable effects to vegetation from livestock grazing and would result in a more natural-appearing landscape. This acreages by alternative is displayed in the following table:

**Table 3-203. Roadless Evaluation Acreage Allocated to MA 1.2, 1.2A, 1.31, 1.31A, 2.1, 2.2, and 3.64 by Alternative.**

| Alternative | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3<br>Alt *3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Acres** | 57,440 | 57,440 | 27,940 | 25,6400<br>*9,210* | 208,450 | 440,890 | 359,070 |

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. It is followed by Alternatives 5, FEIS 3, and DEIS 3. Alternatives 1 and 2, with no restrictions on the amount of fencing or number of range improvement structures could have the greatest effect on roadless primitive to semi-primitive character.

## *Effects from Recreation Management and Use*

The effects of recreation on roadless area acres vary by the Management Area to which those acres are assigned. Management Area prescriptions are broken into eight major categories based on a continuum from least evidence of human disturbance to most. For roadless areas not designated by Congress as Wilderness, management area allocations as outlined in the alternatives may or may not retain undeveloped natural characteristics. Management area allocations by alternative are described in Table 3-196 through Table 3-198. For the most part, management area categories 1 and 2 retain existing undeveloped natural characteristics, while prescription categories 3, 4, 5, and 6 may not. No roadless area acres in any alternative were allocated to categories 7 and 8.

Category 3 management areas 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. However, recreation impacts to roadless characteristics would be expected to be controlled, and limited by management and would have no measurable affect.

Category 4 areas are managed for compatible recreation use well within the levels necessary to maintain overall ecological systems. Motorized transportation is common. In these areas, the existing roadless primitive and semi-primitive character would generally be maintained unless outstanding mineral rights were developed. Recreation impacts to roadless characteristics would be expected to be controlled, and limited by management and would have no measurable effect.

Category 5 areas are managed for a mix of products, forage, and wildlife habitat, while protecting scenery and offering recreation opportunities. Facilities supporting the various resource uses and motorized transportation are common. In roadless area acreages allocated to category 5 management areas, roadless primitive and semi-primitive character could be lost permanently making future wilderness designation unlikely.

Category 6 areas are primarily non-forested ecosystems that are managed to meet a variety of ecological and human needs. These lands often display high levels of investment, use, and activity; density of facilities; and evidence of vegetative manipulation. Facilities supporting the various resource uses are common. Motorized transportation is common. In roadless area acreages allocated to category 6 management areas, roadless primitive and semi-primitive character could be lost permanently making future wilderness designation unlikely.

There area no evaluated roadless acreages allocated to management area categories 7 and 8 in any of the alternatives.

## *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 generally do not restrict motorized use. Alternative FEIS 3, DEIS 3, 4 and 5 restrict motorized traffic to existing routes, a significant new restriction. In addition some

Management areas carry seasonal or yearlong restrictions. Management Areas that carry yearlong restrictions are 1.2, 1.2A, 1.31, 1.31A, 2.2, and some 2.1. Seasonal restrictions are applied in Management Areas 3.51, and some 2.1. Roadless area acreages allocated to these management areas which carry seasonal or year-long travel restrictions are as follows:

**Table 3-204. Roadless Evaluation Acreage with Travel Restrictions by Alternative.**

| Travel Restriction | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3<br>Alt *3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Seasonal*** | 13,390 | 13,390 | 44,240 | 180<br>*0* | 14,590 | 1,760 | 11,150 |
| **Yearlong**** | 57,410 | 57,410 | 26,870 | 252,920<br>*22,350* | 218,740 | 440,540 | 352,810 |

* Acres represent Management Areas 3.51 and Cheyenne Zoological SIA, MA 2.1.

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

In general, in areas allocated to nonmotorized 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 nonmotorized use can be expected. In general, effects from nonmotorized uses are anticipated to be less adverse than the effects from motorized uses.

In areas allocated to motorized management, motorized use of unclassified roads would tend continue. The effect would be to maintain those roads as a landscape element. Gradually they could become more prominent. Roadless area acreages allocated to roaded management areas, could be altered gradually to such an extent that the roadless primitive and semi-primitive character is lost permanently, making future wilderness designation unlikely.

Alternatives 1 and 2 have the fewest restrictions on road construction, travel management and the least amount of roadless acres allocated to nonmotorized management prescriptions. Within these alternatives and outside the areas with travel restrictions, the continued use of unclassified roads could alter the roadless primitive to semi-primitive character of evaluated roadless areas. Alternative 4, with its emphasis on restoration, would have the least effect on roadless acres followed by Alternatives 5, DEIS 3, and FEIS 3.

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, DEIS 3, and FEIS 3 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 FEIS 3, DEIS 3 and 5 (see Table 3-196 through Table 3-198).

Changes to roadless area characteristics from road, facility and range improvement construction, and oil and gas development would be least in Management Areas which preserve roadless characteristics (1.2, Recommended for Wilderness; 1.2A, Suitable for Wilderness; 1.31, Backcountry Recreation Nonmotorized; and 2.1 Special Interest Areas; and 2.2, Research Natural Areas). Alternative 4, followed by Alternatives 5, DEIS 3, and FEIS 3 would have the least adverse impacts to roadless characteristics. Alternative 2, with its emphasis on commodity production, could have the most adverse impact to roadless area character followed by Alternative 2 (see Table 3-200).

A Special Area; Roadless Area Conservation final rule was published in the Federal Register on January 12, 2001. This rule prohibits new road construction projects, including temporary road construction and road reconstruction projects, within inventoried roadless areas except under the limited conditions specified in the rule (36 CFR 294.12(b)). Existing oil and gas leases would be exceptions to this road construction rule. The Special Area; Roadless Area Conservation final rule is in a period in which comments are being received, and is expected to be final before the publication of this EIS. Therefore, under all alternatives, there would be no road construction or reconstruction within the inventoried roadless areas unless already permitted under an existing outstanding right or otherwise excepted under the rule.

# 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.

Prior planning efforts designated no SIAs on the Thunder Basin National Grassland.

A summary of potential SIAs, by administrative unit is in the following table. For location maps of the potential SIAs, refer to Appendix F. Please note: between completion of the DEIS and the FEIS, it was determined that some potential SIAs were improperly identified and fit other designations better and that additional areas should be considered as SIAs. The following table includes both the SIAs considered in the DEIS and new areas for consideration as SIAs.

**Table 3-205. 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 | botanical<br>zoological | 10 |
| | Bog Hole | botanical<br>geological | 30 |
| | Grand River Sand dunes | botanical<br>geological | 70 |
| | White Butte | botanical<br>geological<br>historical<br>prehistoric<br>recreational<br>scenic | 130 |
| **Little Missouri National Grassland/Medora** | Battle of the Badlands | geological<br>historical<br>paleontological<br>zoological | 1,220 |
| | Black Butte | botanical<br>geological<br>historical<br>prehistoric<br>scenic<br>zoological | 720 |
| | Black Cottonwood | botanical<br>historical<br>zoological | 290 |
| | Bullion Creek Formation Type Section | geological,<br>paleontological | 550 |
| | Burning Coal Vein/ Columnar Junipers | botanical<br>geological<br>historical<br>paleontological<br>zoological | 210 |
| | Cannonball/Slope Contact | geologic,<br>paleontological | 60 |
| | Custer Trail-Davis Creek | botanical<br>historical<br>scenic<br>zoological | 700 |

| Planning Unit | SIA Name | Type | Approximate Acres (#s over 10 rounded to nearest 10) |
|---|---|---|---|
| **Little Missouri National Grassland/Medora, cont.** | Ice Caves | botanical<br>geological<br>historical<br>recreational<br>scenic<br>zoological | 240 |
| | Pretty Butte | botanical<br>geological<br>historical<br>paleontological<br>prehistoric<br>scenic<br>zoological | 320 |
| | Riparian Pools | botanical<br>historical<br>zoological | 50 |
| | Roundtop Butte | botanical | 10 |
| | Slope Type Formation | geologic | 190 |
| | Square Butte | botanical<br>geological<br>historical<br>paleontological<br>zoological | 1,600 |
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | | |
| **Thunder Basin National Grassland** | Alkali Divide | paleontological | 5,140 |
| | Cheyenne River Zoological | botanical,<br>zoological | 5,980 |
| | Buffalo Divide | historical | 490 |
| | Cellars | prehistoric<br>historical | 960 |
| | Cow Creek | botanical<br>historical | 14,170 |
| | Lance Geologic | geological<br>paleontological | 40 |

| Planning Unit | SIA Name | Type | Approximate Acres (#s over 10 rounded to nearest 10) |
|---|---|---|---|
| **NEBRASKA NATIONAL FOREST UNITS** | | | |
| **Bessey Ranger District** | Tree Plantations | botanical<br>historical<br>scenic | 19,540 |
| **Samuel R. McKelvie National Forest** | Mallard Exclosure | botanical | 680 |
| | Tree Plantations | botanical<br>historical<br>scenic | 2,170 |
| **Buffalo Gap National Grassland (Fall River RD)** | Edgemont Shark Locality | paleontological | 940 |
| | Wallace Ranch Localities | paleontological | 420 |
| **Buffalo Gap National Grassland (Fall River RD)** | Indian Creek | geological<br>paleontological<br>scenic | 840 |
| | Marietta South | paleontological | 260 |
| | One-Mile Hill | paleontological | 640 |
| | Red Shirt | Scenic | 33,470 |
| | Swift Fox | zoological | 10,070 |
| **Buffalo Gap National Grassland – (Wall RD)** | Kadoka Lake | botanical,<br>zoological | 1,210 |
| | Indian Creek | geological<br>paleontological<br>scenic | 27,600 |
| | Scenic Type Section | geologic,<br>paleontological | 350 |
| | Weta Dam | botanical,<br>zoological | 570 |
| **Oglala National Grassland** | Quaking Aspen Stand | botanical | 8 |
| | Toadstool Park | geological<br>paleontological<br>recreational<br>scenic | 2,000 |
| | 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 one existing SIA on the Nebraska National Forest, Hudson Meng Bison Bonebed, will continue as an SIA in all alternatives. The other existing SIA, Charles E. Bessey Nursery, is considered in the Nursery Management Area 8.5 in all alternatives.

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

**Table 3-206. Special Interest Areas by Alternative.**

| Planning Unit | SIA Name | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | | |
| **Grand River/Cedar River National Grasslands** | Aspen Stand | 0 | 0 | 0 | 0 | 10 | 0 | 10 |
| | Bog Hole | 0 | 0 | 30 | 30 | 30 | 30 | 30 |
| | Grand River Sanddunes | 0 | 0 | 70 | 70 | 70 | 70 | 70 |
| | White Butte | 0 | 0 | 130 | 130 | 130 | 130 | 130 |
| **Little Missouri National Grassland/Medora** | Battle of the Badlands | | 0 | 0 | 1,220 | 1,220 | 1,220 | 1,220 |
| | Black Butte | 0 | 0 | 0 | 720 | 720 | 720 | 0 |
| | Black Cottonwood | 0 | 0 | 290 | 290 | 290 | 0 | 0 |
| | Bullion Creek Type Formation | 0 | 0 | 550 | 550 | 550 | 550 | 550 |
| | Burning Coal Vein/Columnar Junipers | 0 | 0 | 210 | 210 | 210 | 210 | 210 |
| | Cannonball/Slope Contact | 0 | 0 | 60 | 60 | 60 | 10 | 10 |
| | Custer Trail-Davis Creek | 0 | 0 | 0 | 700 | 700 | 700 | 700 |
| | Ice Caves | 0 | 0 | 240 | 240 | 240 | 0 | 0 |
| | Pretty Butte | 0 | 0 | 0 | 320 | 320 | 320 | 0 |
| | Riparian Pools | 0 | 0 | 0 | 50 | 50 | 50 | 50 |
| | Roundtop Butte | 0 | 0 | 0 | 10 | 10 | 10 | 10 |
| | Slope Type Formation | 0 | 0 | 190 | 190 | 190 | 60 | 60 |
| | Square Butte | 0 | 0 | 0 | 1,600 | 1,600 | 1,600 | 1,600 |
| | **Total Acres** | **0** | **0** | **1,770** | **6,390** | **6,400** | **5,680** | **4,650** |

| Planning Unit | SIA Name | Existing Condition | Alt 1 | Alt 2 | DEIS Alt 3 *Alt 3a* | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **MEDICINE BOW-ROUTT NATIONAL FOREST UNIT** | | | | | | | | |
| **Thunder Basin National Grassland** | Alkali Divide | 0 | 0 | 5,140 | 5,140 | 5,140 | 5,140 | 5,140 |
| | Buffalo Divide | 0 | 0 | 490 | 490 | 490 | 490 | 490 |
| | Cellars | 0 | 0 | 960 | 960 | 960 | 960 | 960 |
| | Cheyenne River Zoological | 0 | 0 | 0 | 5,980 | 5,980 | 0 | 0 |
| | Cow Creek | 0 | 0 | 0 | 0 | 14,170 | 0 | 0 |
| | Lance Creek | 0 | 0 | 0 | 40 | 40 | 0 | 0 |
| | **Total Acres** | **0** | **0** | **6,590** | **12,570** | **26,780** | **6,590** | **6,590** |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | | |
| **Bessey Ranger District** | Tree Plantations | 0 | 0 | 10 | 19,540 | 19,540 | 10 | 19,540 |
| **Samuel R. McKelvie National Forest** | Mallard Exclosure | 0 | 0 | 0 | 680 | 680 | 0 | 680 |
| | Tree Plantations | 0 | 0 | 0 | 2,170 | 2,170 | 0 | 2,170 |
| **Buffalo Gap National Grassland (Fall River RD)** | Edgemont Shark Locality | 0 | 0 | 0 | *940* | 940 | 940 | 940 |
| | Indian Creek | 0 | 0 | 0 | 830 *830* | 840 | 0 | 0 |
| | Marietta South | 0 | 0 | 0 | 260 *260* | 260 | 270 | 270 |
| | One-Mile Hill | 0 | 0 | 0 | 630 *630* | 630 | 640 | 640 |
| | Red Shirt[1] | 0 | 0 | 0 | *36,160* | 0 | 0 | 0 |
| | Swift Fox[2] | 0 | 0 | 0 | *11,580* | 0 | 0 | 0 |
| | Wallace Ranch Localities | 0 | 0 | 0 | 420 *420* | 420 | 420 | 420 |
| **Buffalo Gap National Grassland (Wall RD)** | Indian Creek[3] | 0 | 0 | 0 | 27,870 | 0 | 0 | 27,870 |
| | Kadoka Lake[4] | 0 | 0 | 0 | 0 | 0 | 0 | 1,030 |
| | Scenic Type Section[5] | 0 | 0 | 0 | 0 | 0 | 350 | 360 |
| | Weta Dam[6] | 0 | 0 | 0 | 0 | 0 | 0 | 120 |
| **Oglala National Grassland** | Hudson Meng | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | Quaking Aspen Stand | 0 | 0 | 3 | 3 | 8 | 3 | 3 |
| | Toadstool Park | 0 | 0 | 910 | 910 | 2000 | 0 | 910 |
| | Warbonnet/Yellowhand | 0 | 0 | 20 | 20 | 30 | 20 | 20 |
| **Pine Ridge Ranger District** | Bur Oak Enclosure | 0 | 0 | 3 | 3 | 3 | 3 | 3 |
| | Mountain Mahogany Stand | 0 | 0 | 30 | 90 | 90 | 90 | 90 |
| | **Total Acres** | **40** | **40** | **1,016** | **54,406** ***102,146*** | **27,651** | **2,786** | **55,106** |

[1]In Alternative FEIS 3, Red Shirt is Recommended for Wilderness, MA 1.2.

[2]In Alternative FEIS 3, Swift Fox is Special Plant and Wildlife Habitat, MA 3.64.

[3]In Alternative FEIS 3, Indian Creek is Recommended for Wilderness, MA 1.2.

[4]In Alternative FEIS 3, Kadoka Lake is Special Plant and Wildlife Habitat, MA 3.64.

[5]In Alternative FEIS 3, Scenic Type Section is Black-Footed Ferret Reintroduction Habitat, MA 1.2.

[6]In Alternative FEIS 3, Weta Dam is Special Plant and Wildlife Habitat, MA 3.64.

On the Dakota Prairie Grasslands, Alternatives FEIS 3 and DEIS 3 and 3a provide the greatest acreage of SIA designation followed by Alternatives 4, 5, and 2 in that order. Alternative 1, the no-action alternative, would provide no SIA designations.

On the Thunder Basin National Grassland (Medicine Bow-Routt National Forest), Alternative FEIS 3 would provide the greatest acreage of SIA designation followed by Alternatives DEIS 3 and 3a. Alternatives 2, 4, and 5 each would provide fewer acres in that order. Alternative 1, the no-action alternative, would provide no new SIA designations.

On the Nebraska National Forest, the Alternatives DEIS 3a/ DEIS 3 combination would provide the greatest acreage of SIA designations (Alternative DEIS 3a addresses only the Fall River Ranger District of the Buffalo Gap National Grassland), followed by Alternatives 5, DEIS 3, 4, FEIS 3, and 2 in that order. Alternative 1, the no-action alternative, would provide no new SIA designations. Alternative DEIS 3, which addresses SIA allocations differently than Alternative DEIS 3a on the Fall River Ranger District, would provide the third largest amount of 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, requires activities not to 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 Ranger 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 DEIS 3/3a, 4, 5, and FEIS 3. 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 DEIS 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. For a detailed analysis of the effects of oil and gas on SIAs, see the Oil and Gas section in this chapter.

### *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 Alternatives DEIS 3 and FEIS 3.

Hiking, camping, hunting, canoeing, picnicking, horseback riding, nature study, and other associated recreational activities should not 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 DEIS 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.

On the Dakota Prairie Grasslands a travel management analysis (*Off-Highway Vehicle Environmental Impact Statement and Proposed Plan Amendment for Montana, North Dakota and Portions of South Dakota*) and decision were completed in January 2001. That decision amended the Custer National Forest (including the Dakota Prairie Grasslands) plan to restrict yearlong, wheeled motorized cross-country travel. This is a very important change in travel management on the Dakota Prairie Grasslands that affected this analysis. Because the travel management analysis was being conducted concurrently with the analysis in this EIS, the January 2001 decision is reflected in Alternative FEIS 3. For the Dakota Prairie Grasslands, the existing condition and Alternative 1 reflect conditions prior to the January 2001 decision.

Under Alternatives 1 and 2 as described in this EIS, 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 nonmotorized use only. Since none of the potential SIAs would be designated as nonmotorized 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.

Access for the elderly or disabled may be limited in SIAs that have non-motorized restrictions. Other travel, including horseback riding and hiking, could affect those characteristics for which SIAs are designated. Horses, like other animals with hooves, can cause substantial damage to vegetation and soils if use is concentrated.

Under Alternatives DEIS 3, FEIS 3, 4 and 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 DEIS 3, FEIS 3, 4 and 5.

In general, adverse effects from motorized use within SIAs under Alternatives DIES 3, FEIS 3, 4 and 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 "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.
- 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.
- 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 3-207. Wild and Scenic River Inventory.**

| Planning Unit | River | Classification | Miles | Outstandingly Remarkable Features |
|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLAND UNITS** | | | | |
| **Little Missouri National Grassland** | Little Missouri | Wild<br>Scenic<br>Recreational | 3.3<br>88.9<br>13.7 | Scenery, fisheries, wildlife |
| **Sheyenne National Grassland** | Sheyenne | Recreational | 10.2 | Plant species, fisheries, ecologic, archeological, hydrology |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | |
| **Bessey Ranger District** | Middle Loup | Recreational | 0.5 | Bessey Nursery, Bessey recreation complex |
| **Buffalo Gap National Grassland (Fall River Ranger District)** | Cheyenne | Scenic | 8.6 | Fisheries, wildlife, scenic, recreation |
| | Rapid Creek | Scenic | 1.7 | Fisheries, wildlife |

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

**Table 3-208. Theodore Roosevelt National Park Classifications for the Little Missouri River.**

| Planning Unit | River | Classification | Miles | Outstandingly Remarkable Features |
|---|---|---|---|---|
| **South Unit** | Little Missouri | Wild<br>Scenic<br>Recreational | 4.2<br>5.8<br>1.5 | Scenic, recreational, geological, fisheries, historic, cultural, ecological |
| **Elkhorn Unit** | Little Missouri | Scenic | 1.0 | Scenic, recreational, geological, fisheries, historic, cultural, ecological |
| **North Unit** | Little Missouri | Scenic<br>Wild | 4.0<br>10.7 | 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 3-209. Recommendations by Alternative (miles)**

| Planning Unit | River | Designation | Existing Condition | Alt 1 Alt 2 | DEIS Alt 3 | FEIS Alt3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **DAKOTA PRAIRIE GRASSLANDS** | | | | | | | | |
| Little Missouri National Grassland | Little Missouri | Wild | 0 | 0 | 0 | 0 | 3.3 | 0 |
| | | Scenic | 0 | 0 | 0 | 0 | 88.9 | 92.2 |
| | | Recreation | 0 | 0 | 0 | 0 | 13.7 | 13.7 |
| Sheyenne National Grassland | Sheyenne | Recreation | 0 | 0 | 0 | 0 | 0 | 10.2 |
| **NEBRASKA NATIONAL FOREST UNITS** | | | | | | | | |
| Bessey Ranger District | Middle Loup | Recreation | 0 | 0 | 0 | 0 | 0.5 | 0 |
| Buffalo Gap National Grassland (Fall River Ranger District) | Cheyenne | Scenic | 0 | 0 | 0 | 0 | 8.6 | 0 |
| | | Recreation | 0 | 0 | 0 | 0 | 0 | 8.6 |
| | Rapid Creek | Scenic | 0 | 0 | 0 | 0 | 1.7 | 0 |
| | | Recreation | 0 | 0 | 0 | 0 | 0 | 1.7 |

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, DEIS 3, and FEIS 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, DEIS 3, and FEIS 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 are 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 are 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 3 of 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 (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 agreement on a selling price cannot be reached.
- Clearing title to a property is a legal procedure that has nothing to do with government/landowner differences.
- 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 that might be affected by 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 designed to preserve the existing scenic integrity of the area. 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.

However, livestock can adversely affect water quality, fisheries, soils, and vegetation within and outside of riparian and aquatic zones through compaction; alterations to streams, streambeds, 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 designated river segments may be used for camping, canoeing, and hiking, and other anticipated activities, the 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. In fact, designation might 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 recreation users. 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. However, agencies, such as the U.S. Forest Service and the National Park Service, in consultations with state fish and wildlife agencies, may 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 nonmotorized 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 more 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 is 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. There are no designations in Alternatives 1, 2, DEIS 3 and FEIS 3. Therefore, travel management would have no effects on Wild and Scenic River designations.

Alternatives 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 has 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 motor craft 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 federally licensed projects, including dams and hydroelectric projects that would cause significant, adverse impacts to 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 "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 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 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*

*Reviewers wishing to comment on the National Park's recommendations for wild and scenic designations should send their written comments to the Superintendent, Theodore Roosevelt National Park, P.O. Box 7, Medora, North Dakota 58645. Comments must be received by the closing date of the USFS Management Plans Revision.*

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 3-210. National Park Service Recommendations by Alternative (miles).**

| Planning Unit | River | Designation | Existing Condition | Alt 1 Alt 2 | DEIS Alt 3 | FEIS Alt3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|---|
| **Theodore Roosevelt** | Little | Wild | 0 | 0 | 14.9 | 14.9 | 14.9 | 0 |
| **National Park** | Missouri | Scenic | 0 | 0 | 6.8 | 5.8 | 10.8 | 21.7 |
| | | Recreational | 0 | 0 | 0 | 0 | 1.5 | 0 |

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.

The difference between Alternative DEIS 3 and Alternative FEIS 3 is that the 1.0 river mile at the Elkhorn Unit has been removed from any further recommendation for designation as a Scenic segment. Wild designation, in Alternatives DEIS 3, FEIS 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 of the Little Missouri 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.

Miles of eligible scenic river segments for the Little Missouri within Theodore Roosevelt National Park are found in Alternatives DEIS 3, FEIS 3, 4 and 5. Eligible scenic river segments in the FEIS 3 include 5.8 miles in the South Unit from Section 16, T140N, R102W to the confluence with Beef Corral Wash.

In Alternative FEIS 3 no eligible recreational segments are recommended. The reason for this action is that the National Park Service only administers land on one side of the river. Except for three short segments, the river corridor within the North and South 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.

## *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 river 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 Wild and Scenic River designations.

### 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 be 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 mitigated as outlined in specific project plans and environmental documents. 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. The river segment within the Elkhorn Unit is not being recommended for designation. About one-quarter mile of this acreage borders the Little Missouri River. Surface occupancy within the national park would be prohibited. Therefore, the proposed wild and scenic river recommendations 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 and scenic river segments for camping, canoeing, hiking and horseback riding. These recreational users expect to experience primitive conditions within the proposed wild river segments and semi-primitive conditions in the scenic river segments. Because both of these segments are within the park's natural zone, recreational developments are already prohibited.

Wild and Scenic 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. If requested, the park can assist to reduce impacts on private land or national grasslands outside the park's boundaries by using the park's educational programs.

### 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 and scenic 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. Currently snowmobiles are permitted by park regulation on the frozen river surface in all three units.

### Effects on Water-Resource Projects and Water Rights

The entire "Effects on Water-Resource Projects and Water Rights" section for National Forest System Lands above applies equally to the Theodore National Park. In addition a federal reserved water right for purposes of the wild and scenic designation would overlay any reserved water rights that may have been created for previously designated park purposes. Theodore Roosevelt National Memorial Park was established by Public Law 38-80 in 1947 and later designated Theodore Roosevelt National Park in 1978 by Public Law 95-625. Policies and guidelines of the NPS broadly require management to maintain, rehabilitate and perpetuate the inherent integrity of aquatic resources. Because no adjudication of water rights for the park has occurred, reserved water rights have never been described. Therefore, it is uncertain if a new reserved water right would be significantly different than a reserved water right for other park purposes.

Designation of wild and scenic segments within the park would compliment the North Dakota Little Missouri State Scenic River Act (N.D.C.C. ch. 61-29) prohibiting dams and certain other activities on the Little Missouri River. In addition the wild and scenic designation complements the protection of river's water quality that is currently being monitored by the North Dakota State Department of Health, Environmental Health Section and limited water quality

monitoring by the national park. Designation allows Federal protection in addition to the protection provided by the State of North Dakota.

## *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 north central 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 counties or other entities. Such entities include 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, and regional agencies near 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 could be facilitated by national forest and national grassland management.
- 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 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 wanted the Forest Service to 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*, available in the administrative record).

## 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, forest-wide and grassland-wide 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 forest-wide and grassland-wide 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 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 forest-wide and grassland-wide 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 forest-wide and grassland-wide 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, there are differences in the long-term availability or condition of resources among the alternatives. The long-term expenditures necessary to maintain desired conditions may also be different. 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):

- Irreversible. A term that describes the loss of future options. Applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time.
- Irretrievable. A term that applies to the loss of production, harvest, or use of natural resources. For example, some or all of the timber production from an area is lost irretrievably while an area is serving as a winter sports site. The production lost is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume timber production.

Decisions made in these revised management plans generally 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 generally 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.
- When 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.

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 nonmotorized 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.

Any oil and gas leasing lands authorization decision made as a result of this analysis is an exception to the general rule on decisions for this plan. In accordance with the Federal Onshore Oil and Gas Leasing Reform Act of 1987 and its implementing regulations (completed April 20, 1990), the area or forest-wide leasing decision[53] and the specific lands decision[54] were made during the 1990s on all the high and moderate oil and gas potential lands within the analysis area. These decisions, sometimes referred to as the *availability decision* and *authorization decision*, have been implemented continually since their signing and are listed in the Oil and Gas section of Chapter 3. These previous decisions and analyses have been reviewed for new information and changed circumstances. If changes are appropriate, either or both the availability decision and authorization decision will be amended.

The authorization decision (specific lands decision, 36 CFR 228.102(e)) authorizes the BLM to offer specific lands for lease subject to identified conditions of surface occupancy. 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. The issuance of a lease is an irreversible irretrievable commitment of the oil and gas mineral resource.

# Land Ownership

Many of those commenting on the Draft Plans and EIS expressed concern over land acquisition and adjustments on the National Grasslands. Opinions both for and against acquiring or exchanging lands were expressed. Some people were concerned about lands being acquired through the Government's right of eminent domain (condemnation). Direction for land ownership adjustments is found in the law, regulation, and in Grassland-wide Direction. Because the Forest Service conducts lands transactions according to law and regulation, there are no anticipated differences in the lands program or in its environmental effects between alternatives.

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[53] 36 CFR 228.102(d) - Determination of lands administratively available.

[54] 36 CFR 228.102(e) - Authorization of BLM to lease specific lands.

Broad authority for the Forest Service to purchase, exchange, and dispose of lands and interest in lands granted by the various congressional acts is found in Title 7, Code of Federal Regulations, section 2.60 (7 CFR 2.60). Additional direction on land transactions can be found in Forest Service Manual (FSM) 5400 and Forest Service Handbooks (FSH) 5409.12, 5409.13, and 5409.17.

The objectives of Forest Service landownership adjustments are to achieve an optimum landownership pattern for resource uses to meet the needs of the people now and in the future and to settle land title claims equitably and promptly (FSM 5402). The overall Forest Service concept for land exchanges and land purchases is to consolidate federal land ownership into more manageable, larger-sized blocks, and to concurrently reduce the number of scattered, isolated tracts of federal land. Isolated tracts of land are difficult to manage effectively as federal lands for a variety of reasons such as lack of public access.

Each land transaction must go through complete site-specific National Environmental Policy Act compliance including public involvement. The proposed action must be reviewed for compliance with all federal laws, regulations, and executive orders such as the Threatened and Endangered Species Act, the Clean Water Act, the National Historic Preservation Act, and Executive Orders covering wetlands and floodplains. Public benefit associated with land exchanges can include consolidated federal ownership, more manageable landownership pattern, the elimination of the need to acquire access to isolated federal parcels, and a reduced number of survey corners and landlines to maintain. In many cases, the public gains valuable wildlife habitat, improved access to larger blocks of public land, important cultural resources, improved recreation opportunities, and other resource benefits. Before a transaction can be completed, it must be shown to be in the public interest (36 CFR 254.3 [b][1][2][I][ii][3]). Land transactions must support and enhance the Forest Plan and resource management objectives by balancing resource values and emphasizing net public benefits.

Most transactions are conducted on a willing buyer and willing seller basis. However, the federal government is endowed with the power of eminent domain. The Constitution of the United States contains limitations upon this power and requires that the owner whose property is taken receive just compensation. In addition, any taking of private property must be pursuant to and in accordance with legislative authority (FSM 5480.1). In fact, the Forest Service seldom exercises the right of eminent domain and then only when there is a great or significant need for the land and informed negotiations with the landowner have been unproductive.

The history of lands transactions for each administrative unit is described in the following tables:

**Table 3-211. Dakota Prairies—Land Adjustments by Year**

| Year Accomplished | Federal Acres Exchanged | Private Acres Acquired | Corners Eliminated | Landline Eliminated (miles) | Private Inholdings Eliminated Inholdings Eliminated | Isolated Parcels Eliminated | ROWs Acquired |
|---|---|---|---|---|---|---|---|
| **Exchanges** | | | | | | | |
| 1985 | 1,101 | 1,040 | 4 | 3.25 | 2 | | |
| 1986 | 884 | 994 | | | | | |
| 1987 | 1,413 | 1,362 | 6 | 5 | 4 | 2 | |
| 1988 | 80 | 80 | | | | | |
| 1989 | 1,288 | 1,230 | 48 | 18 | 4 | 3 | 2 |
| 1990 | 2,272 | 2,238 | 36 | 11.75 | 3 | 2 | |
| 1991 | 880 | 880 | 15 | 6 | 1 | | 1 |
| 1992 | 642 | 631 | 31 | 8.5 | 3 | 2 | 1 |
| 1993 | 200 | 197 | 14 | 4 | | 2 | |
| 1994 | 1,273 | 1,179 | 21 | 14 | 4 | 6 | 3 |
| 1997 | 639 | 615 | | | | | |
| 1998 | 1,733 | 1,534 | 131 | 22.25 | 6 | 8 | 3 |
| 1998 minerals only | (8,796) | (9,584) | | | | | |
| Total | 12,405 | 11,980 | 306 | 92.75 | 27 | 25 | 10 |
| **Donations** | | | | | | | |
| 1999 | | 16 | | | | | |
| **Purchase** | | | | | | | |
| 1998 | 0 | 47 | | | | | |

**Table 3-212. Nebraska National Forest—Land Adjustments by Year**

| Year Accomplished | Federal Acres Exchanged | Private Acres Acquired | Corners Eliminated | Landline Eliminated (miles) | Private Inholdings Eliminated Inholdings Eliminated | Isolated Parcels Eliminated | ROWs Acquired |
|---|---|---|---|---|---|---|---|
| **Exchanges** | | | | | | | |
| 1985 | 439 | 459 | 11 | 4.00 | 2 | 1 | 1 |
| 1986 | 145 | 280 | 12 | 5.50 | 2 | 1 | 2 |
| 1988 | 6,221 | 6,006 | 187 | 71.25 | 11 | 2 | |
| 1989 | 3,298 | 3,206 | 43 | 35.00 | 7 | | |
| 1990 | 23,932 | 22,544 | 602 | 236.00 | 40 | 8 | 12 |
| 1991 | 6,706 | 6,494 | 184 | 79.25 | 25 | 2 | 5 |
| 1992 | 16,252 | 15,924 | 478 | 195.00 | 22 | 17 | 2 |
| 1993 | 8,552 | 8,553 | 245 | 90.00 | 8 | 10 | 7 |
| 1994 | 620 | 680 | 22 | 9.00 | 4 | | |
| 1995 | 1,120 | 801 | 22 | 13.00 | 3 | | 3 |
| 1996 | 2,840 | 2,795 | 83 | 33.00 | 8 | 3 | 1 |
| 1998 | 3,027 | 2,796 | 14 | 7.00 | 1 | | 1 |

| Year Accomplished | Federal Acres Exchanged | Private Acres Acquired | Corners Eliminated | Landline Eliminated (miles) | Private Inholdings Eliminated Inholdings Eliminated | Isolated Parcels Eliminated | ROWs Acquired |
|---|---|---|---|---|---|---|---|
| **Exchanges, cont.** | | | | | | | |
| 1999 | 1,002 | 994 | 15 | 8.00 | 2 | | |
| 2000 | 3,457 | 3,576 | 83 | 40 | 6 | 2 | 3 |
| Total | 77,611 | 75,108 | 2,001 | 826 | 141 | 46 | 37 |
| **Donations** | | | | | | | |
| 1988 | 0 | 160 | | 1.00 | | | |
| 1999 | 0 | 39 | | | | | |
| Total | 0 | 199 | | 1.00 | | | |
| **Purchases** | | | | | | | |
| 1999 | 0 | 80 | 4 | 2.00 | 1 | | |
| 1999 | 0 | 200 | 6 | 2.75 | 1 | | |
| Total | 0 | 280 | 10 | 4.75 | 2 | | |

**Table 3-213. Thunder Basin National Grassland—Land Adjustments by Year**

| Year Accomplished | Federal Acres Exchanged | Private Acres Acquired | Corners Eliminated | Landline Eliminated (miles) | Private Inholdings Eliminated Inholdings Eliminated | Isolated Parcels Eliminated | ROWs Acquired |
|---|---|---|---|---|---|---|---|
| **Exchanges** | | | | | | | |
| 1993 | 160 | 163 | 1 | 3.00 | | | 1 |
| 1994 | 3,866 | 3,699 | 36 | 83.00 | | 3 | 2 |
| 1995 | 26,559 | 15,339 | 145 | 341.00 | 7 | 18 | 22 |
| 1996 | 640 | 640 | | 7.00 | 1 | | |
| 1997 | 29,468 | 19,068 | 189 | 435.00 | 3 | 40 | 112 |
| 1998 | 4,380 | 2,964 | 55 | 112.00 | | 10 | 13 |
| 1999 | 3,304 | 3,134 | 35 | 46.00 | 1 | 1 | |
| 2000 | 640 | 640 | 1 | 3.00 | | | |
| Total | 69,017 | 45,647 | 462 | 1,030.00 | 12 | 72 | |
| **Donations** | | | | | | | |
| 1995 | | 439 | | | | | |

# 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.

American Indians are the largest minority group on the Northern Great Plains. 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 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 the following:

- Protection of sacred areas.
- Recognition of traditional American Indian values.
- Access to NFS lands in order to practice traditional ceremonies.
- Appropriate reburial of disturbed human remains.
- Greater involvement in land management decisions on NFS lands.
- Employment and training opportunities.

Today, and in 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 flow, 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.

  As provided by the Federal Clean Air Act, all new wilderness areas established after August 7, 1977 are Class II and, as such, do not receive all the special protections provided for Class I wilderness. The Clean Air Act is only a tool that the Forest Service can use to provide comments to Air Quality regulators (the States and EPA). The management goals of all (both Class I and Class II) wildernesses are found in the 1964 Wilderness Act. The Wilderness Act defines wilderness as an area "… which is managed and protected so as to preserve its natural conditions …" Based on this direction, the Forest Service tries to manage and protect all wildernesses to the same degree.

- **The Clean Air Act, cont.**

  While the Forest Service has the responsibility to protect all wildernesses from air pollution impacts, only the States and EPA have the authority to regulate air pollution emissions. States are required to have a new source-permitting program for new air pollution sources over certain levels of air pollution emissions. Before a State issues a permit, they must determine if the source is applying Best Available Control Technology (BACT), which is determined on a case-by-case basis balancing economics, environmental impacts, and energy costs. In the case of Class II wilderness, the States can, at their discretion, require the installation of additional air pollution control equipment if the State determines that the proposed new source were going to cause or contribute to adverse environmental impacts.
- **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 is 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 exceeds the National Ambient Air Quality Standards for PM-10 (particulate matter smaller than 10 micrometers in diameter) (USA Air Quality Nonattainment Areas).

The Forest Service Region 2 Air Group developed a ranking system which 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 for 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 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 January 2001, indicates that the predicted number of wells to be drilled disclosed in the environmental impact statements (EISs) is still valid for conventional wells and was modified to add 60 wells for potential coal bed methane. The air quality effects analysis is 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. comm. 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 No Surface Occupancy stipulations would reduce the RFD projection of wells as follows: Alternative 1, 13 wells; Alternative 2, 14 wells; Alternative DEIS 3, 26 wells; Alternative FEIS 3, 21 wells; Alternative 4, 39 wells; and, Alternative 5, 18 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 final EIS called WYODAK was completed in November 1999 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 was used to determine gas well development effects on air quality for these grasslands. Existing oil and gas leasing environmental documents were also used to determine the effects. According to the revised Reasonably Foreseeable Development Scenario (completed in January 2001), 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 was 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 the Wyoming Air Quality Standards and Regulations regulate hydrogen sulfide emissions.

**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 was covered in an analyses completed February 2000. Road dust particulate emissions were estimated to average 2 tons/year. This is well below the PM-10 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.
- 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. 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 2000 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*

In Wyoming, present monitoring of ambient air quality around the existing coalmines has shown no occurrence of exceeding of state or federal air quality standards (Schick, 1999). This is expected to stay the same through all alternatives.

## Cumulative Effects

The Thunder Basin National Grassland is only a small portion of the Powder River Basin where 70,000 coalbed methane wells are projected in the next 20 years. The proposal is to develop these wells between the outcrop of coal east of Highway 59 and the Bighorn Mountains. The Bureau of Land Management with the Forest Service as a cooperating agency is preparing an EIS to disclose the cumulative effects of these 70,000 wells. The initial development of coalbed methane in the Powder River Basin is the WYODAK project approved in November 1999.

Coalbed methane could affect air quality on Thunder Basin, Buffalo Gap, and Oglala National Grasslands. The Reasonable Foreseeable Development Scenario for the Thunder Basin National Grassland projects a total of 600 coalbed menthane wells on National Forest System lands in the next 10 years. The proposed WYODAK developments are located in central Campbell and northern Converse Counties in Wyoming, on private land and BLM- and Forest Service-administered lands. The WYODAK development involves about 5,000 wells with an increase in gas compression of 177,000 hp. for an estimated project emissions increase of 2800 tons per year $NO_X$. 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 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. Under direct control, the wildfire is immediately and completely extinguished. 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 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.

Initial attack fire suppression response on the Dakota Prairie Grasslands is provided by the local volunteer fire departments, through agreement and coordination with the USDA Forest Service and local grazing associations. If the size of the fire is beyond the scope of control for volunteer fire departments, 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; local departments 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 Ranger District 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 Ranger District and the Oglala National Grassland.

# Wildfire Fire Occurrences

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

**Table 3-214. Wildfire Occurrences on the Planning Units**

| Planning Unit | Fires per Year | Acres per Year |
|---|---|---|
| Little Missouri, Cedar River, Grand River National Grasslands | 12 | 4,480 |
| 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 forest-wide 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 3-215. Acres of Prescribed Burning per Year by Alternative**

| Planning Unit | Total Acre | Alt 1 | Alt 2 | DEIS Alt 3 | FEIS Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| **Dakota Prairie Grasslands** | | | | | | | |
| Grand River/Cedar River National Grassland | 161,800 | 500 | 500 | 500 | 500 | 16,000 | 10,000 |
| Little Missouri National Grassland/McKenzie | 500,800 | 300 | 200 | 2,000 | 1,000 | 15,000 | 5,000 |
| Little Missouri National Grassland/Medora | 525,390 | 300 | 200 | 2,000 | 1,000 | 15,000 | 5,000 |
| Sheyenne National Grassland | 70,270 | 2,500 | 2,000 | 4,000 | 4,000 | 10,000 | 6,000 |
| **Totals** | **1,258,260** | **3,600** | **2,900** | **8,500** | **6,500** | **56,000** | **26,000** |
| **Thunder Basin National Grassland** | 552,900 | 400 | 1,000 | 500 | Variable | 4,500 | 8,000 |
| **Nebraska National Forest Units** | | | | | | | |
| Bessey Ranger District | 90,470 | 0 | 0 | 150 | 300 | 1,500 | 0 |
| Samuel R. McKelvie National Forest | 115,960 | 0 | 0 | 150 | 300 | 1,000 | 0 |
| Buffalo Gap National Grassland (Fall River RD) | 322,720 | 0 | 0 | 450 | 450 | 6,000 | 600 |
| Buffalo Gap National Grassland (Wall RD) | 266,510 | 0 | 0 | 100 | 150 | 2,000 | 500 |
| Ft. Pierre National Grassland | 116,000 | 0 | 0 | 500 | 300 | 6,000 | 0 |
| Pine Ridge Ranger District | 50,570 | 0 | 0 | 200 | 100 | 850 | 200 |
| Oglala National Grassland | 94,170 | 0 | 0 | 250 | 150 | 1,100 | 800 |
| **Totals** | **1,056,400** | **0** | **0** | **1,800** | **1,750** | **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. Alternative 4 would treat the most acres, followed by Alternatives 5, 3, 1, and 2, respectively.

**Table 3-216. 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 Ranger District | 800 | 200 |
| Samuel R. McKelvie National Forest | 500 | 200 |
| Buffalo Gap National Grassland Fall River Ranger District | 2,700 | 950 |
| Buffalo Gap National Grassland (Wall RD) | 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** |

### 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, 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 Nonmotorized), 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 are 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 park-like stand are met, late successional forests would be maintained using 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. On the Thunder Basin National Grassland and the Dakota Prairie Grasslands, Alternatives 3, 4, and 5 would restrict travel to designated routes except for fire suppression activities, on the Nebraska National Forest and Associated Units a travel management plan would be phased in that would take into consideration 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 park-like 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 nonmotorized 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 but could have a potential reduction of human caused fires due to decreased access.

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

# 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 Organic Act of June 4, 1897 authorizes the Secretary of Agriculture to issue rules and regulations for occupancy and use of the National Forests. This is the basic authority for permits for the scientific and educational collections of paleontological resources. The Federal Land Policy and Management Act of 1976 requires public lands to be managed in a manner to protect the quality of scientific values. National Environmental Policy Act of 1970 states to ensure protection of national natural resources. Forest and Rangeland Renewable Resources Planning Act of 1974, as amended authorizes land-use management planning, standards and guidelines, restrictions or special management areas, preservation of important aspects of national heritage. 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(ƒ i), 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 Broad-scale Paleontology Report):

**Table 3-217. 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 |

| Formation | Fossil Types | Recommended Class* |
|---|---|---|
| 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 |
| 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 |

| Formation | Fossil Types | Recommended Class* |
|---|---|---|
| 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 limited 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 fire-line 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. On the Nebraska National Forest and Thunder Basin National Grassland the effects that would be mitigated through a controlled surface use stipulation applied to the lease in Alternatives 2-5. On the Dakota Prairie National Grasslands the effects would be mitigated through a Lease Notice applied to the lease in Alternatives 2-5. Both the stipulation and the lease notice requirea paleontologic survey prior to ground disturbing activities 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 limited 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 nonmotorized, 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 Ranger 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.

**Laws, Policy, and Direction, cont.**

- 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 earthworks. 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 been 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 land use. 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 Places. 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.

Battle sites also have special significance to the tribal groups. These relate primarily to the Sioux Indian Wars of 1860-70s. 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 National Forest 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 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) ranges 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 implemented, additional resources may be located that 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 includes 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 (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), designed to 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 occurs in Alternative 2 requires 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 provides 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 has 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 is 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 could be further enhanced with the presence of bison.

## *Alternative 5*

Alternative 5 also includes lower levels of commodity-driven activities than currently occurs. However, it would offer slightly more motorized travel opportunities than Alternatives 3 and 4 (which also restricts motorized use to designated routes). The motorized access has the potential to adversely impact heritage resources. The recreation emphasis in Alternative 5 encourages 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, and 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 activities 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 nonmotorized 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 backcountry 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 does 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, the Surface Mining Control and Reclamation Act of 1977 (SMCRA), 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). SMCRA and regulations at 43 CFR Subpart 3461 establish that federal lands be reviewed for "unsuitability" for surface coal mining. A coal suitability analysis has been done for the Thunder Basin National Grasslands. Thunder Basin 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.

The Little Missouri National Grassland contains lower grade coal resources than Thunder Basin. No current production exists in the area and previous development has been minimal (McCoy-Brown, 1997). There is no known interest in leasing the coal for mining. A coal suitability study was done for the Little Missouri prior to the 1986 Forest Plan. Unsuitability criteria and the coal resource were reviewed as part of this plan revision but no suitability determination was made because of the low interest in leasing the coal.

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 grasslands 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 et. al., 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 exist 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 et. al., 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 et. al., 1997).

Gold and silver have been reported in coal near the eastern boundary of the Thunder Basin National Grassland (Raymond et. al., 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 et. al., 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 et. al., 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 leaseholders 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 and FEIS 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. Withdrawal from entry under the General Mining Laws would be considered in the following management areas when a history of mineral findings was observed:

- 1.1 Wilderness: Soldier Creek
- 1.2 Recommended for Wilderness
- 1.2A Suitable for Wilderness
- 1.31 Nonmotorized Backcountry Recreation
- 1.31A Backcountry Recreation Nonmotorized: Pine Ridge National Recreation Area
- 1.5 (National River System: Wild Rivers Recommended).

**Designations that may affect mineral removal, cont.**

- Some 2.1 Special Interest Areas
- 2.2 Research Natural Areas
- 2.4 American Indian Traditional Use Areas

**Areas where withdrawal from mineral entry may be considered, cont.**

- 3.51 Bighorn Sheep Habitat
- 3.64 Special Plant and Wildlife Habitat
- 4.22 River and Travel Corridors
- 5.31(A and B) Experimental Forests
- 8.5 Nursery (Charles E. Bessey)
- 8.6 Administrative Sites

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, 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. On the Dakota Prairie and Thunder Basin National Grasslands Alternative 4 would have the most acres on which mineral material removal would be affected followed in descending order by Alternatives 5, 3, FEIS 3, 2 and 1. On the Nebraska National Forest and associated Grasslands Alternative 5 would have the most acres on which minerals material removal would be affected followed in descending order by Alternatives 4, 3, FEIS 3, 1 and 2. Because development potential of mineral material is low, the overall effect of special area designations on mineral material removal is expected to be minimal.

Some people who commented on the DEIS were concerned that special area designations adjacent to the existing coalmines would require the mines to meet higher air quality standards. Presently there are no Class I areas in the planning area and the mines meet Class II standards. As provided by the Federal Clean Air Act, all new wilderness areas established after August 7, 1977 are Class II and, as such, do not receive all the special protections provided for Class I wilderness. Because the mines meet Class II standards, special area designations are not expected to affect the air quality standards for the existing mines.

## 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. Similarly with mineral materials, the development potential 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 suitability 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 3-218. 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 | 161,530 | 1,027,520 | 70,260 | 144,630 | 552,490 |
| Total acres forested | 500 | 117,810 | 5,110 | 48,100 | 30,900 |
| Acres non-forested | 161,030 | 909,710 | 65,150 | 96,530 | 521,590 |
| Forest land withdrawn from timber production | 0 | 0 | 0 | 7860 | 0 |
| Acres not capable of producing crops of industrial wood | 0 | 49,500 | 0 | 440 | 4,385 |
| Acres where irreversible damage is likely to occur due to soils | 0 | 0 | 0 | 0 | 6,515 |
| Acres that cannot be restocked within 5 years | 0 | 0 | 0 | 0 | 5,500 |

| Criteria | Grand River/Cedar River National Grasslands | Little Missouri National Grassland | Sheyenne National Grassland | Pine Ridge District/Oglala National Grassland | Thunder Basin National Grassland |
|---|---|---|---|---|---|
| Acres where inadequate response information is available | 500 | 67,360 | 0 | 0 | 14,500 |
| Tentatively suitable forest land | 0 | 940 | 5,110 | 39,800 | 0 |

The Pine Ridge Ranger District has the greatest amount of tentatively suitable forest land. Based on soils, the evaluation shows approximately 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 Ranger District 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.
- 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 (see Appendix B, Determination of Timber Suitability) on the 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 Ranger District 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 (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 Ranger District, 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 Ranger District only:

**Table 3-219. Average Annual Timber Volume (MMBF) per year by Decade**

| | Existing Condition | Alt 1 | Alt2 | DEIS Alt3 | FEIS Alt3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Decade 1 | 0.2 | 0.2 | 4.412 | 6.119 | 6.119 | 7.614 | 6.303 |
| Decade 2 | 0.2 | 0.2 | 0.845 | 0 | 0 | 0 | 0 |
| Decade 3 | 0.2 | 0.2 | 0.845 | 0 | 0 | 0 | 0 |
| Decade 4 | 0.2 | 0.2 | 0.845 | 2.976 | 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 3-220. Average Annual Timber Volume (MMBF) per year by Decade**

| | Existing Condition | Alt 1 | Alt2 | DEIS Alt3 | FEIS Alt3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|---|---|
| Decade 1 | 0.2 | 0.2 | 1.202 | 0.612 | 0.612 | 0.761 | 0.63 |
| Decade 2 | 0.2 | 0.2 | 1.202 | 0.612 | 0.612 | 0.761 | 0.63 |
| Decade 3 | 0.2 | 0.2 | 1.202 | 0.612 | 0.612 | 0.761 | 0.63 |
| Decade 4 | 0.2 | 0.2 | 1.202 | 0.612 | 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 sustainable forest ecosystems, 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 forest ecosystem 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 park-like 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 park-like 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 would result in a mosaic of dense and open park-like stands. The denser stands would be subject to greater insect and disease loss, whereas the more open, park-like stands would experience a scattered mortality effect which might 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 and Fish

## Introduction

Effects of implementing each of the five alternatives on fish and wildlife are disclosed in several locations in this FEIS. Effects on "species at risk" are presented in the "Rangeland and Forest Health" section of this chapter and in the Biological Assessment and Evaluation (FEIS Appendix H and administrative record). Effects on other fish and wildlife are presented in this section. Effects from the following management activities were the primary considerations:

| | |
|---|---|
| Fire and Fuels Management | Range Management and Livestock Grazing |
| Fish and Wildlife Management | Timber Management |

| | |
|---|---|
| Land Adjustments | Utilities |
| Oil, Gas, Minerals Management | Special Area Designations |
| Plant and Animal Damage Control | Travel Management |

Only potential effects that are considered significant, either individually or cumulatively, are disclosed.

Grasslands and sagebrush are the most extensive terrestrial habitats on the national grasslands and forests in the planning area. Wetlands, riparian, woodland, savannah, badland and aquatic habitats occur as relatively small inclusions within the more extensive habitats. Acreage estimates of these habitats for each national grassland and forest are presented in the following table. Most of the habitat acreages were determined from satellite imagery and are acknowledged to be only coarse approximations. The wetland acreages are from the National Wetlands Inventory and were derived from interpretation of aerial photography. Water area (aquatic habitat) was also determined from aerial photography.

**Table 3-221. Habitat Acreages (thousands)**

| Habitat | National Grassland or Forest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LMNG | GR/CRNG | SNG | FPNG | BGNG | ONG | NNF (PRRD) | NNF (BRD) | SRMNF | TBNG |
| **Grassland** [1] | 661.7 | 153.7 | 51.4 | 110.7 | 475.8 | 83.6 | 23.8 | 76.9 | 110.4 | 67.1 |
| **Big sagebrush** [1] | 8.8 | 0 | 0 | 0 | 15.8 | 1.0 | 0 | 0 | 0 | 438.5 |
| **Other shrubland** [1] | 188.7 | 1.1 | 2.4 | 1.0 | 68.7 | 5.7 | 3.1 | 0.9[3] | 0.8[3] | 31.0 |
| **Forest, woodland and savannah** | 103.5 | 0.1 | 3.7 | <0.1 | 11.8 | 2.1 | 19.8 | 11.9 | 2.9 | 9.3 |
| **Wetland** [2] | 2.4 | 0.7 | 7.9 | 3.0 | 3.9 | 0.6 | <0.1 | 0.2 | 0.4 | NA |
| **Riparian** | 40.1 | 1.7 | 3.8 | 0.2 | 7.6 | 1.2 | 3.7 | 0.1 | 1.2 | 6.7 |
| **Aquatic (reservoirs, ponds, rivers and streams)** | 0.8 | 0.5 | <0.1 | 0.6 | 1.4 | 0.3 | <0.1 | <0.1 | 0.5 [4] | 0.2 |
| **Undetermined** | **20.0** | **3.2** | **1.0** | **0.5** | **4.2** | **0** | **0** | **.1** | **0** | **.5** |

[1] Includes intermingled badland, butte and barren habitat

[2] Includes all wetland types identified by National Wetlands Inventory (NWI)

[3] Sandhill thicket habitat

[4] Merritt Reservoir not included

Natural aquatic habitats consist of the rivers and perennial streams that meander along and through the national grasslands and forests in the planning area. Some of the rivers such as the Cheyenne, Sheyenne, Grand, and Little Missouri are slow-moving and meandering rivers with variable flows and naturally high turbidity levels, especially after runnoff events. The Niobrara, Snake, Middle Loup, and Dismal Rivers that border the Nebraska and Samuel R. McKelvie National Forests in the Nebraska Sandhills have relatively stable flows and clear water. Additional aquatic habitat occurs in numerous small impoundments constructed for livestock water, fish and wildlife habitat, and recreation.

Two approaches were used to develop management direction for wildlife and fish in the revised Land and Resource Management Plans. When planning for the recovery and restoration of species at risk and their habitats, the specific needs of individual species were the primary focus. However, the most logical way to address management of the diverse array of other species was to prescribe a wide range of habitat conditions for an array of animal life. This was accomplished by establishing vegetation objectives for a diverse mosaic of successional stages and vegetation structure levels. These objectives are presented in Chapter 2 of each revised plan. Use of different livestock grazing intensities, rest from annual livestock grazing, uneven livestock grazing distributions, and prescribed burning are prescribed to help achieve these objectives. Use of these strategies to achieve added rangeland diversity is supported and discussed in more detail by Holecheck et al. (1982, 1989), Sousa (1987), Madden et al. (2000), and in several chapters of the book *Rangeland Wildlife* (Krausman 1996) published by the Society for Range Management.

Some prioritization was necessary during the development of the management direction for wildlife and fish. Species at risk received the highest priority. Species that are endemic or

mostly endemic to the Great Plains and to the planning area, rather than on those that are more widely distributed across North America, also received added emphasis, including a priority for monitoring. This approach to prioritization is consistent with recommendations by Johnson (1996) and Knopf (1996a) for Great Plains habitats.

State strategic plans for fish and wildlife were also consulted during the development of management direction for each planning alternative. The goals and objectives identified in the state plans were especially helpful, and the fish and wildlife management direction in each alternative was developed to help support and complement many state priorities. The state plans identified below are maintained as part of the administrative record:

- Focusing on the Future: A Plan for Nebraska's Fish, Wildlife and Parkland Resources, July 1996,
- PAMA: North Dakota Game and Fish Department's Participative Management Process, August 1992,
- Systematic Approach to Management (South Dakota Department of Game, Fish and Parks), April 1994,
- Wyoming Game and Fish Department Strategic Plan, July 1996,
- Wyoming Nongame Bird and Mammal Plan, October 1996.

The USDA Forest Service Strategic Plan (2000 Revision) also provided guidance for developing fish and wildlife management direction for the national grasslands and forests in the planning area. Goals and objectives in the strategic plan addressed numerous aspects of fish and wildlife management and specifically highlighted the black-tailed prairie dog on the northern Great Plains. The strategic plan also provided an overview of habitat and species trends across the United States.

Most of the national grasslands and forests in the planning area are intensively grazed by permitted livestock. Information presented in Table 3-29 through Table 3-40 illustrates this point. When closely managed and coordinated with other resources and uses, livestock grazing helps rejuvenate and maintain productive and diverse grasslands and native grass and forb understories in sagebrush stands, as well as healthy riparian and wetland communities (Severson and Urness 1994). However, even under closely managed grazing, special management emphasis is usually needed to provide interspersed habitat with tall and dense cover for the native wildlife species that tend to be less tolerant of the effects of intensive livestock grazing (Dobkin 1992, Hoekman and Ball 2000). Over the years, rangelands have been incrementally fenced into smaller and smaller units, and a large number of water developments have been constructed. This has been done to access additional livestock forage, encourage more uniform forage utilization, and provide for planned rotational grazing. This has resulted in some habitat improvements but in many cases, at the expense of inaccessible, secondary and late successional rangelands where higher and more diverse grassland structure would be expected. This, in turn, has resulted in more uniform and monotypic vegetation structure and less successional and structural diversity within pastures (Davis 2000, Knopf 1996a). Loss of late successional rangelands after construction of livestock water developments in previously un-watered areas has also been observed on southwestern rangelands (Holechek 1997). The loss of structurally diverse grasslands within pastures that receive uniform grazing was also documented by Mattise et al. (1982) during a study of grassland structure and livestock grazing systems on the Little Missouri National Grassland. The vegetation composition (successional

status) and structure objectives discussed in the previous paragraph are intended to help mitigate some of these losses and to enhance the successional and structural heterogeneity of grasslands and sagebrush understories within and between pastures.

The role that national grasslands and other public lands play in the conservation of native wildlife and biological diversity on the Great Plains is getting more and more attention in the scientific literature and media (Peek and Risser 1979, Bock et al. 1992, Dobkin 1992, Senner and Ladd 1996, Wuerthner 1997, Dolan 1999, National Wildlife Federation 2000). Also, many of the comments received by the Forest Service during this planning process expressed the desire to see the national grasslands and forests play a more active conservation role for wildlife and biological diversity on the Great Plains. Some of the comments indicated that management and monitoring of fish and wildlife on these lands have been minimal in the past. The basis for these concerns is substantiated in a report from the U.S. General Accounting Office (1991) about wildlife management on public lands and in a report on wildlife management on national grasslands (Peek and Risser 1979). Alternatives 2 through 5 and the strengthened monitoring direction were developed and considered partly in response to these issues and concerns.

Many references were consulted to help evaluate the effects of each alternative on wildlife and fish. Two references that were especially helpful and provided the basis for much of the effects analyses were *Prairie Conservation* (Samson and Knopf 1996) and *Rangeland Wildlife* (Krausman 1996). Numerous conservation assessments that address the current status and trend of wildlife and fish and their habitats across the planning area and the Great Plains were also consulted to better understand the cumulative effects of land and water use on wildlife and fish in this region. These assessments included:

- Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000).
- Northern Great Plains Aquatic Assessment (Johnson 1998).
- An Ecological History of the Northern Plains (Forest Service Unpublished Report).
- The Status of Biodiversity in the Great Plains (Ostlie et al. 1997).
- The U.S. Northern Great Plains Steppe Assessment Map (Chuluun et al. 1997).
- America's Northern Plains: An Overview and Assessment of Natural Resources (Natural Resources Conservation Service 1996).
- Our Living Resources: a Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems (LaRoe et al. 1995).
- Status and Trends of the Nation's Biological Resources (Mac et al. 1998).
- Terrestrial Ecoregions of North America: a Conservation Assessment (Ricketts 1999).
- Freshwater Ecoregions of North America: a Conservation Assessment (Abell et al. 2000).
- Recent Biodiversity Patterns in the Great Plains (Sieg et al. 1999).
- Northern Great Plains (Pederson et al. 1989).
- Nebraska Sandhills Cooperative River Basin Study (USDA Soil Conservation Service and Forest Service 1989).
- Environmental Evaluation for Sandhills Cooperative River Basin Study (Bio/West, Inc. 1986).
- Invasive Plants: Changing the Landscape of America (Westbrooks 1998).

Additional information to assist in this evaluation was obtained from the following websites:

- Northern Plains Wildlife Research Center (www.npwrc.usgs.gov).
- Association for Biodiversity Information (www.natureserve.org).
- Partners in Flight (www.partnersinflight.org).

Four biologists with over 50 years of combined experience in fish and wildlife management on the national grasslands and forests in the planning area conducted this effects analysis. Much of the information for neotropical migratory birds was provided by an ornithologist with over 25 years of birding experience in the Northern Great Plains.

## Laws, Policy, and Direction

The National Forest Management Act (NFMA) of 1976 (16 U.S.C. 472a) sets forth requirements for land and resource management plans for the National Forest System. Implementation regulations for NFMA (36 CFR Part 219, 9/30/82) require planning to provide for a diversity of plant and animal communities. The species addressed in this section contribute to the biological diversity found on the national grasslands and forests on the northern Great Plains.

Many other laws, regulations and executive orders, including those listed below, mandate wildlife and fish conservation on national grasslands, national forests and other federal lands:

- The Endangered Species Act of 1973 (discussed in the Rangeland and Forest Health section).
- The Sikes Act of 1974 carries 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, protects fish and wildlife on those areas that are now national grasslands.
- Protection of Bald and Golden Eagles Act.
- Migratory Bird Treaty Act.
- Executive Order – Responsibilities of Federal Agencies To Protect Migratory Birds (January 10, 2001).

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 wildlife and fish species in demand for hunting, fishing and trapping and those with special habitat needs.

# Affected Environment

## Invertebrates

Invertebrate animals may be relatively small in stature but not in diversity or ecological and biological significance (Arenz and Joern 1996). Some of the major invertebrate groups include the protozoans, nematodes, earthworms, mollusks, mites, spiders, insects, isopods, millipedes, and centipedes. The long list of species includes herbivores, scavengers, predators, and pollinators. They occupy subterranean, terrestrial and aquatic habitats and play vital ecological roles in nutrient cycling and energy flow. Some are key to the development of grassland soil fertility, and their biomass below ground is often similar or greater per unit area than the animal biomass above ground. Others are critical in the diet of many grassland birds (Robel et al. 1998, Bousquet et al. 1999), other birds, fish, and wildlife.

Effects on invertebrate species at risk including the American burying beetle and several butterfly and skipper species were addressed in the Biological Assessment and Evaluation. The same land uses identified as threats to those species are commonly threats to other invertebrates and their habitats. These threats can include vegetation management activities and pesticides. Long-term cultivation reduces most soil microfauna as demonstrated by Olfert et al. (1998), but this activity is not prescribed for the national grasslands and forests.

## Reptiles and Amphibians

Reptiles and amphibians are ecologically and biologically important parts of prairie environments. This group includes the frogs, toads, salamanders, lizards, turtles and snakes. They often form a significant portion of the biomass in a system and appear to be especially important in transporting nutrients between terrestrial and aquatic systems (Corn and Peterson 1996). They function both as predators of invertebrates as well as prey for other wildlife. The only species currently known to be mostly endemic to the Great Plains and that occur on the national grasslands and forests in the planning area include the ornate box turtle, prairie skink, plains garter snake, and plains spadefoot.

This is a diverse group of animals, with some species being primarily aquatic or terrestrial. Threats to many reptiles and amphibians can include draining of wetlands and plowing native prairie but such activities are not part of the planned and authorized activities under any of the alternatives. Commercial collection may be a threat to some species, but collection is primarily regulated under state laws and regulations. Management activities such as livestock grazing and prescribed burning may benefit those species that use upland habitats because of the creation of suitable micro-habitats needed by many of these species (Corn and Peterson 1996). Grazing in wetlands habitats could be detrimental to wetland and aquatic species if grazing removes significant amounts of the emergent and submerged vegetation. Also, stocking of non-native bullfrogs and predatory fish species like largemouth bass and northern pike can result in substantial reductions in amphibian populations, but stocking is not addressed under any of the alternatives so effects are not addressed. Also, most fish stocking on the national grasslands is done by state fish and wildlife agencies and not the Forest Service. State fish and wildlife agencies are no longer stocking bullfrogs into ponds.

## Native and Recreational Fisheries

Native fish species are primarily found in streams and rivers on or near the national grasslands and forests in the planning area. There are few natural lakes, ponds or marshes with sufficient water depth to maintain fish. Some of the more abundant native fish species include long-nose dace, pearl dace, finescale dace, white sucker, creek chub, sand shiner, bigmouth shiner, red shiner, shorthead redhorse, fathead minnow, stonecat, black bullhead, and channel catfish. Some of the primary threats to these species include alteration of flows and and turbidity levels due to large impoundments, reduced flows from diversions, fish barriers, channelization for flood and erosion control, pollution, and competition and predation by introduced fish species (Johnson 1998, Rabeni 1996, Ostlie et al. 1997, Abell et al. 2000). However, these threats are not from Forest Service management activities on the national grasslands or forests in the planning area. One concern about the effects on native fish from management activities on the national grasslands and forests is the possible incremental impacts on downstream hydrology from small impoundment construction in uplands.

Recreational fisheries are limited primarily to portions of the Cheyenne River where there's good numbers of channel catfish and numerous ponds where largemouth bass, bluegill, yellow perch, and bullhead commonly make up most of the recreational fishery. The Little Missouri and Grand Rivers also support recreational fisheries. A few ponds are stocked with trout where water conditions are suitable. Fishing is a popular activity and contributes significantly to the recreational opportunities in the planning area. The overall trend for recreational fisheries on these areas is down as many existing ponds are aging and filling with silt.

## Mammals

The large mammals addressed in this section include mule deer, white-tailed deer, pronghorn, elk, and bighorn sheep. Information on the California bighorn sheep populations on the Little Missouri National Grassland are presented in the Biological Assessment and Evaluation and is not repeated here. However, Rocky Mountain bighorn sheep on the Nebraska National Forest are addressed in this section. Moose are occasional visitors to the Sheyenne National Grassland, but because their occurrence is so incidental, information on moose was not presented. Bison were major herbivores in this region, but free-ranging and nomadic herds have been gone for over a century. The few confined herds that now graze NFS lands in the planning area are considered administratively as permitted livestock, and as a result, bison are not addressed as wildlife in this section.

### *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, and woodlands. Wooded draws, riparian habitats, brushy arroyos, and Rocky Mountain juniper woodlands are particularly important deer habitats in the planning area (Severson 1981, Severson and Carter 1978, Jensen 1992, Johnson and Stricklan 1996). Mule deer 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. Both mule and white-tailed deer are game species and contribute significantly to recreational opportunity. Concern over the continued downward trend for mule deer across much of the western United States was specifically highlighted in the USDA Forest Service Strategic Plan (2000 Revision).

Livestock grazing that reduces understory and midstory vegetation in riparian and other woodland habitats reduces habitat suitability for deer (Johnson and Stricklan 1996). Based on information collected by the North Dakota Game and Fish Department (Jensen 1992), 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. 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, reducing habitat quality for mule and white-tailed deer.

Fences can have positive or negative impacts on deer (Kindschy 1996). Both fence specifications and fence densities are factors that impact deer and other wildlife including pronghorn. Threats to deer include poorly designed fences that pose unnecessary risks of entanglement and impede movement of deer, especially fawns, between important habitats. If fawns cannot travel freely with the doe, the doe's movements are also restricted. Fences may also influence predation rates on young deer by reducing escape opportunity. The number of fences that deer, including fawns, have to negotiate is determined by pasture size. As pasture sizes decrease, fence densities increase.

Road development to facilitate oil and gas production and other activities also reduces habitat suitability and effectiveness for deer. Risk of vehicle strikes also increases with additional roadways. Deer that are not habituated to regular and routine human activity or noise can be displaced from important habitats and subjected to added stress with potential physiological implications (Joslin and Youmans 1999, Freddy et al. 1986, Kie and Czech 2000, Kufeld and Bowden 1995, Ward 1981, Parker and Gillingham 1990, Peek et al. 1982, Rost and Bailey 1979, Swenson 1982, Wood 1988). Responses to disturbances and noise appear to be based on many factors including but not limited to type of activity, predictability of the activity, frequency, magnitude, and time of year (Joslin and Youmans 1999).

### *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). The pronghorn is classified as a game species, and pronghorn hunting is a popular activity that contributes to recreation opportunity in much of the planning area.

Pronghorn inhabit open rangelands primarily 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 NFS 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 (Kindschy et al. 1983, Kindschy 1996, O'Gara and Yoakum 1992, Lee et al. 1998, Yoakum et al.

1996). It is important to have properly designed fences, but even well-designed fences contribute to physiological stress and major winter die-offs of herds 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, and this is especially problematic when herds are pushed during winter storms.

Coyote predation on fawns has been identified as a significant factor influencing pronghorn productivity and populations in northwest Nebraska (Grier 1989, Menzel 1991). It is believed that coyote predation may have played a key role in the very slow recovery of pronghorn herds following the deadly 1978-79 winter that wiped out many of the herds in and near the Oglala National Grassland. Decisions to manage predator populations to augment pronghorn productivity are primarily under the authority and responsibility of the state fish and wildlife agencies. Coyotes and other predators are also managed under authorities and responsibilities assigned to USDA Animal Plant Health Inspection Service (APHIS). Because of these reasons, the effects analysis for pronghorn does not address the effects of coyote and predator management on pronghorn.

Pronghorn that are not habituated to regular and routine human activity or noise can be displaced from important habitats (O'Gara and Yoakum 1992, Yoakum and O'Gara 2000, Joslin and Youmans 1999).

### *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 and Little Missouri National Grasslands and Nebraska National Forest (Pine Ridge Ranger District). Elk are occasionally found on or near the Oglala National Grassland. Reintroduction programs by state wildlife agencies have augmented their return to the prairie. Recent surveys in the vicinity of the Thunder Basin National Grassland indicate an elk population of approximately 400. Elk populations on the Nebraska National Forest (Pine Ridge Ranger District) are estimated at over 150 animals. Population estimates for elk on the Little Missouri National Grassland are not available.

Elk use a variety of habitat types on NFS lands, including open rangelands and forested areas, and they commonly forage on adjoining private croplands and haylands.

Elk that are not habituated to regular and routine human activity or noise can be displaced from important habitats and/or stressed causing physiological complications (Ward 1981, Lyon and Ward 1982, Lyon 1983, Rost and Bailey 1979, Stillings 1999, Wisdom and Thomas 1996, Wisdom and Cook 2000, Joslin and Youmans 1999).

### *Bighorn Sheep*

Bighorn sheep have been re-established on the Little Missouri National Grassland, and reintroduced populations on adjoining public lands occasionally use habitats on the Buffalo Gap National Grassland and Nebraska National Forest (Pine Ridge Ranger District). The Nebraska Game and Parks Commission is planning to establish additional restoration herds on the Nebraska National Forest.

Bighorn sheep habitat on the Little Missouri and Buffalo Gap National Grassland consists primarily of rough badlands interspersed with grasslands and some Rocky Mountain juniper woodland. Habitat on the Nebraska National Forest consists primarily of rough escarpment terrain within ponderosa pine woodlands.

Bighorn sheep are susceptible to mortality resulting from diseases like lungworm, pneumonia, and *Pasteurella* bacteria, and domestic sheep are implicated in the transmission of these diseases (Krausman and Shackleton 2000). Bighorn sheep are also vulnerable to predation where the amount of escape cover is limited.

Human disturbances can cause reductions in bighorn sheep productivity and can also result in displacing sheep from important habitats (O'Gara and Yoakum 1992, Feist 1997, Joslin and Youmans 1999, Knue 1988, Krausman and Shackleton 2000).

### *Small Mammals*

Small mammals classified as game species include cottontail, gray squirrel and fox squirrel. 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 woodlands. The amount of rabbit and squirrel hunting that occurs on the national grasslands and forests is minimal.

Species typically referred to as furbearers include beaver, muskrat, mink, raccoon, coyote, badger, red fox, gray fox, striped skunk, and bobcat. Fur prices have been down for an extended period so the amount of fur-harvest occurring is considerably reduced from the levels that occurred in the 1970s and earlier. Most of these species occur on most of the planning units with the exception of the gray fox that is only found in the vicinity of the Sheyenne National Grassland. The beaver, muskrat, mink, and raccoon are typically found in wetlands, riparian habitats and other woodlands. Badgers are commonly found in grassland and shrubland habitats and are especially attracted to prairie dog colonies.

There is a large number of other small mammal species found in a wide variety of habitats. Many are herbivores while a few are insectivores. Many of these species, through their digging, burrowing, or foraging, create disturbances that greatly impact diversity of prairie ecosystems, and in the case of the porcupine, forested ecosystems. The significance of black-tailed prairie dog colonies in terms of biological diversity on grasslands has already been discussed. Steuter et al. (1990) discuss the role that the plains pocket gopher plays as disturbance agents to maintain diverse sandhills prairie. The role that beaver play in wetland and aquatic systems is also well known. Porcupine through their girdling can substantially modify characteristics of ponderosa pine woodlands. The importance of small mammals as prey is illustrated by the heavy dependence of short-eared owls on prairie vole populations (Clark 1975).

Only 16 mammal species have their distribution centered or nearly centered on the Great Plains (Armstrong et al. 1986 and Jones et al. 1983 cited in Benedict et al. 1996). These species include:

| | | |
|---|---|---|
| White-tailed jackrabbit | Plains pocket mouse | Prairie vole |
| Franklin's ground squirrel | Olive-backed pocket mouse | Swift fox |
| Richardson's ground squirrel | Hispid pocket mouse | Black-footed ferret |
| Thirteen-lined ground squirrel | Plains harvest mouse | Spotted skunk |
| Black-tailed prairie dog | Northern grasshopper mouse | Pronghorn |

Detailed discussions on swift fox, black-tailed prairie dogs, black-footed ferrets, fringe-tailed myotis, and several other mammals and their habitats are presented in the Biological Assessment and Evaluation.

## Birds

There are many bird species on rangelands in the Great Plains but surprisingly few are endemic or near endemic to this region (Bolen and Crawford 1996). Woodland, riparian and wetland inclusions interspersed throughout the grasslands of the northern plains attract many bird species that are more characteristic of eastern forests and woodlots. The extension of sagebrush communities into the planning area from the west brings species more characteristic of the Rocky Mountain and Intermountain West. Those species considered endemic or mostly endemic to the grassland habitats of the Great Plains according to Knopf (1996) and Mengel (1970) are:

| | |
|---|---|
| Ferruginous hawk | Baird's sparrow |
| Mountain plover | Lark bunting |
| Long-billed curlew | McCown's longspur |
| Sprague's pipit | Chestnut-collared longspur |

These authors also listed numerous other grassland birds with more widespread distributions outside the Great Plains. This list includes species like the burrowing owl, greater prairie chicken, sharp-tailed grouse, upland sandpiper, short-eared owl, dickcissel, grasshopper sparrow, horned lark, vesper sparrow, prairie falcon, and Swainson's hawk.

The species most closely associated with the sagebrush communities include but are not limited to sage grouse, sage thrasher, sage sparrow, and Brewer's sparrow.

Most bird species breed in the planning area and then migrate out of the area to return the following year. However, there are numerous species that are yearlong residents. This includes species like the greater prairie chicken, plains sharp-tailed grouse, sage grouse, golden eagle, prairie falcon, great-horned owl, black-billed magpie, American crow, American goldfinch, downy woodpecker, hairy woodpecker, black-billed magpie, American crow, black-capped chickadee, and the red-breasted and white-breasted nuthatches. Management for these species needs to take into account yearlong habitat needs.

Numerous species of raptors occur across the planning area. Several of those that are migratory were also identified as species at risk and are addressed in the Biological Assessment

and Evaluation. Three species that are non-migratory and yearlong residents within the planning area include the great-horned owl, golden eagle and prairie falcon. They inhabit a variety of habitats within the planning area and all utilize grasslands and shrublands throughout the year for hunting.

Many prairie bird species are "area sensitive" meaning they are usually absent from smaller patches of suitable habitat (Johnson and Winter 1999). Johnson and Winter (1999) recommend that grassland habitat should be maintained in blocks of 250 acres or more and most individual parcels of national grassland and forest exceed that minimum, even without considering adjoining private or state rangelands. Also, the landownership adjustment program of the Forest Service continues to increase the average size of grassland parcels under federal ownership and management. In addition to maintaining these parcels as grasslands, management to maintain these grassland parcels as quality habitat is also a consideration, and for some of the larger species like the greater prairie chicken and sharp-tailed grouse, relatively large expanses of native prairie are needed to sustain populations. Kirsch (1974) recommended that within prairie chicken habitat at least 25% of every 5,700 acres be managed and maintained as quality prairie chicken habitat. This guideline is probably appropriate for other large species like sharp-tailed grouse. Managing grassland habitats for the species with larger area requirements automatically provides for the species that utilize similar habitats but don't need the larger blocks of suitable habitat.

The Forest Service recently prepared "*The Land Bird Strategic Plan*". The strategic plan lays out a course of action for conserving habitats on the national grasslands and forests for sustainable resident and migratory land bird populations. Alternatives 2 through 5 provide management direction to help implement the strategic plan on the national grasslands and forests in the planning area.

Bird conservation plans are also being prepared for several physiographic areas across the northern Great Plains through the Partners in Flight program. Partners in Flight is an international coalition of government agencies, conservation groups, academic institutions, private businesses, and citizens. Conservation plans have been prepared for the Northern Mixed-grass Prairie physiographic area and for the eastern Montana portion of the Northern Shortgrass Prairie area. The plan for the eastern Wyoming portion of the Northern Shortgrass Prairie physiographic area and the plans for the West River and Central Mixed-grass Prairie physiographic areas are yet to be completed. Maps of these bird conservation areas and information on the plans are available on the Parners in Flight website. As the plans become available, they will be consulted to help guide implementation of management direction in the revised Land and Resource Management Plans for the national grasslands and forests in the planning area.

The North American Waterfowl Management Plan (NAWMP) was initiated in 1986 between the United States, Canada and Mexico to find and implement solutions to problems faced by migratory waterfowl. The Forest Service is signatory to this international conservation effort and has developed its own strategic plan (Taking Wing) that tiers to NAWMP as well as the Western Hemisphere Shorebird Reserve Network. Under NAWMP, joint ventures involving diverse groups of partners are formed for specific geographic areas to initiate grass-roots partnerships to conserve and create habitat for waterfowl, water birds and other wildlife. Several waterfowl habitat areas of major concern were identified in NAWMP occur within the planning area. The Prairie Potholes and Parkland area includes the Sheyenne National

Grassland. The Northern Great Plains area includes the Little Missouri, Grand River/Cedar River, Fort Pierre, Buffalo Gap, Oglala, and Thunder Basin National Grasslands. The Nebraska National Forest (Bessey Ranger District) and Samuel R. McKelvie National Forests are located in Sandhills waterfowl habitat area. The plan for the Prairie Potholes and Parklands has been developed and is being implemented. A draft concept plan has recently been prepared for the Northern Plains area. Plans for the remaining areas of concern have not been developed at this time. Management direction in the revised Land and Resource Management Plans complements and supports waterfowl and water bird conservation efforts outlined in NAWMP, Taking Wing Strategic Plan and the individual joint venture plans.

### *Gallinaceous Birds*

These species are mostly non-migratory yearlong inhabitants of the national grasslands and forests in the planning area. Gallinaceous species native to the planning area include the greater prairie chicken, plains sharp-tailed grouse, and sage grouse. Hunting and viewing these natives are popular recreational pursuits in the planning area. Hunting seasons are closed year-long for greater prairie chicken and sharp-tailed grouse on the Sheyenne National Grassland and for sage grouse on the Buffalo Gap National Grassland. The habitat preferences of these species are discussed in the Biological Assessment and Evaluation.

The ring-necked pheasant is a 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.

The gray partridge is another non-native species that has been successfully introduced to the northern part of the planning area. This species is found on the Grand River/Cedar River, Sheyenne, and Little Missouri National Grasslands. They are most often found on these areas near private croplands.

Wild turkeys have been introduced into suitable habitats across the planning area and now occur on each planning unit except the Ft. Pierre National Grassland. 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 common in the planning area.

### *Migratory Birds*

The national grasslands and forests on the Northern Great Plains provide important seasonal habitats for many migratory bird species. Practically every acre of NFS land and water is habitat for one or more species of migratory birds. This includes numerous species of songbirds, migratory raptors, shorebirds, waterfowl, and other water birds. Migratory birds are of high public interest and recent cooperative conservation initiatives demonstrate this concern and interest. For example, the North American Waterfowl Management Plan is an international conservation initiative that emphasizes conservation and habitat protection and development for waterfowl. The Partners in Flight Program is another international initiative that focuses attention on the need to conserve migratory 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 on National Forest System lands. A recent cooperative publication

on shorebirds by Duck's Unlimited, USDA Forest Service and the Manomet Center for Conservation Sciences also demonstrates this growing interest in migratory birds. Viewing shorebirds on the national grasslands and forests in the planning area is a popular outdoor recreation activity. Hunting mourning doves, Canada geese, and several species of ducks is also a popular recreation activity on these lands.

The following discussion focuses on waterfowl and neotropical migratory land bird species that are identified as conservation priorities in the Partners in Flight program. Discussions on migratory bird species addressed in the Biological Assessment and Evaluation are not repeated here.

The national grasslands and forests in the planning area provide substantial amounts of uplands and wetlands habitat for waterfowl (see Table 3-221). 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 importance of natural wetlands to waterfowl is well known, as is the contribution of constructed ponds (Flake et al. 1977, Lokemoen 1973, Rumble and Flake 1983, Svingen and Anderson 1998, Uresk and Severson 1988). The total acres of seasonal and permanent wetlands, including natural and constructed wetlands, on each planning unit is presented in Table 3-221. The acres of potential nesting habitat for upland nesting waterfowl species are also significant because most grasslands within a half-mile or more of many of the natural and constructed wetlands are potential waterfowl nesting habitat.

Some of the more common waterfowl species that breed on the national grasslands and forests in the planning area include Canada goose, mallard, gadwall, blue-winged teal, green-winged teal, northern pintail, American wigeon, and northern shoveler. Most of the waterfowl are migratory but there are some mallards and Canada geese that remain in the planning area yearlong. The resident Canada goose flocks are primarily from earlier restoration programs. 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 dabbling ducks nest in uplands and then move their broods after hatching to ponds and other wetland habitats. Trumpeter swans are the largest of North American waterfowl species and were once on the endangered species list. A small number of swans nest each year on and near the Buffalo Gap National Grassland, and non-breeding sub-adult swans can commonly be seen feeding or resting on ponds on the national grassland. Effects of each alternative on trumpeter swans are presented in the Biological Assessment and Evaluation and are not discussed in this section.

The national grasslands and forests also provide important seasonal habitats for a large number of neotropical migratory bird species. Priority neotropical species were identified for each planning unit using a protocol endorsed by the national Partners in Flight program (Carter et al. 1992). 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. This protocol was modified slightly to provide for prioritization at the scale of the individual national grassland or forest. For the purposes of this planning effort and evaluation, species with a composite score of 3 or greater, using the ranking process described by Carter and Barker (1992) were considered high priority. The complete species list for each planning unit and more detailed information on the prioritization process for neotropical migratory birds are maintained in the administrative record.

The priority neotropical bird species (land birds only) for each national grassland and forest are identified in Table 3-222 through Table 3-224. These species are further grouped by preferred habitats in Table 3-225. These tables are not intended to indicate the presence or absence of species on individual national grasslands or forests.

**Table 3-222. Priority Neotropical Migratory Land Birds on the Dakota Prairie Grasslands.**

| Species | LMNG | GR/CRNG | SNG |
|---|---|---|---|
| Burrowing owl | X | X | |
| Ferruginous hawk | X | X | |
| Chestnut-collared longspur | X | | |
| Prairie falcon | X | X | |
| Upland sandpiper | X | X | X |
| Long-billed curlew | X | X | |
| Grasshopper sparrow | X | X | X |
| Marbled godwit | X | X | X |
| Northern harrier | X | X | X |
| Baird's sparrow | X | X | X |
| Bobolink | X | X | X |
| Clay-colored sparrow | X | X | X |
| Short-eared owl | X | X | X |
| Dickcissel | X | X | X |
| Loggerhead shrike | X | X | X |
| Yellow-headed blackbird | X | X | X |
| Sedge wren | | | X |
| Willow flycatcher | X | X | X |
| Lazuli bunting | X | X | |
| Marsh wren | X | X | X |
| Ovenbird | X | | X |
| Scarlet tanager | | | X |
| Least flycatcher | X | X | X |
| Yellow-billed cuckoo | X | | X |
| Yellow-throated vireo | | | X |
| Warbling vireo | X | X | X |
| Orchard oriole | X | X | X |
| Brewer's sparrow | X | | |
| Black-billed cuckoo | X | X | X |

**Table 3-223. Priority Neotropical Migratory Land Birds on the Nebraska National Forest and Associated Units.**

| Species | FPNG | BGNG | ONG | NNF PRRD | NNF (BRD) and SRMNF |
|---|---|---|---|---|---|
| Burrowing owl | X | X | X | | |
| Ferruginous hawk | X | X | X | | |
| Chestnut-collared longspur | X | X | X | | |
| Prairie falcon | | X | X | X | |
| Upland sandpiper | X | | | | X |
| Long-billed curlew | | X | X | | |
| Mountain bluebird | | | | X | |
| Swainson's hawk | | | | | X |
| Northern harrier | X | | | | X |
| Bobolink | X | | | | |
| Dickcissel | X | | | | X |
| Loggerhead shrike | X | X | X | X | |
| Lewis woodpecker | | | | X | |
| Willow flycatcher | | | | | X |
| Lazuli bunting | | | | X | |
| Ovenbird | | | | X | |
| Bell's vireo | | X | | | X |
| Great-crested flycatcher | | | | | X |
| Blue grosbeak | | | | | X |
| Lark bunting | X | X | X | | X |
| Brewer's sparrow | | X | | | |
| Black-billed cuckoo | X | X | X | X | X |

**Table 3-224. Priority Neotropical Migratory Land Birds on the Thunder Basin National Grassland.**

| | |
|---|---|
| Mountain plover | Loggerhead Shrike |
| Burrowing owl | Lewis Woodpecker |
| Ferruginous hawk | Western Tanager |
| McCown's Longspur | Yellow-Headed Blackbird |
| Prairie falcon | Lark Bunting |
| Swainson's hawk | Brewer's Sparrow |
| Northern Harrier | |

The following table identifies the primary summer habitats for the priority neotropical species.

**Table 3-225. Primary Summer Habitats of Priority Neotropical Migratory Land Birds.**

| Species | Prairie Dog Colony | Grassland [1] | | | Riparian, Deciduous Forests or Wetlands [2] | Sagebrush or Other Shrublands | Coniferous Woodlands |
|---|---|---|---|---|---|---|---|
| | | L | M | H | | | |
| Mountain plover | X | X | | | | | |
| Burrowing owl | X | X | | | | | |
| Ferruginous hawk | X | X | | | | X | |
| McCown's longspur | | X | | | | | |
| Chestnut-collared longspur | | | X | | | | |
| Prairie falcon | | | X | | | X | |
| Upland sandpiper | | | X | | | | |
| Long-billed curlew | | | X | | | | |
| Grasshopper sparrow | | | X | | | | |
| Sprague's pipit | | | X | | | | |
| Marbled godwit | | | X | | X | | |
| Mountain bluebird | | | X | | X | | X |
| Swainson's hawk | | | X | | | X | X |
| Northern harrier | | | | X | X | | |
| Baird's sparrow | | | | X | | X | |
| Bobolink | | | | 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 | | |
| Least flycatcher | | | | | X | | |
| Yellow-billed cuckoo | | | | | X | | |
| Eastern wood-pewee | | | | | X | | |
| Yellow-throated vireo | | | | | X | | |
| Warbling vireo | | | | | X | | |
| Orchard oriole | | | | | X | | |
| Bell's vireo | | | | | X | | |
| Great-crested flycatcher | | | | | X | | |
| Blue grosbeak | | | | | X | | |

| Species | Prairie Dog Colony | Grassland [1] | | | Riparian, Deciduous Forests or Wetlands [2] | Sagebrush or Other Shrublands | Coniferous Woodlands |
|---|---|---|---|---|---|---|---|
| | | L | M | H | | | |
| Lark bunting | | X | X | | | X | |
| Brewer's sparrow | | | | | | X | |
| Black-billed cuckoo | | | | | X | | |
| Total | 3 | 4 | 9 | 6 | 23 | 11 | 4 |

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. 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.

This list of species included in Table 3-225 can be further prioritized by following recommendations from Johnson (1996) and Knopf (1996). Both authors suggested that grassland birds be the highest management priority in this region. Knopf further suggested that endemic and near-endemic grassland species should be the focus for conservation efforts in this area. Most species listed in Table 3-225 for grassland habitats are endemic or near-endemic to this region. Johnson recommended prioritizing grassland species that are restricted to a narrow range of habitats and have small populations, downward population trends, and small breeding ranges. The grassland species in Table 3-225 that meet these criteria, including significant downward trends (Peterjohn et al. 1995, U.S. Fish and Wildlife Service 1999), are mountain plover, Sprague's pipit, and clay-colored sparrow. The list of priority species in Table 3-225 and the priority species resulting from the recommendations of Johnson (1996) and Knopf (1996) illustrate the need to provide grasslands with diverse structural characteristics across the public and private prairies in the planning area and across the individual national grasslands and forests.

# Environmental Consequences

## Direct and Indirect Effects

None of the management direction or allocations under any of the alternatives would significantly change the acreages of habitats presented in Table 3-221 over the next 10 to 15 years. However, the suitability and quality of these habitats for wildlife would be effected by the different alternatives. These effects are disclosed in this section for those species not already addressed in the "Rangeland and Forest Health" section of this chapter and Biological Assessment and Evaluation. Land use effects are first disclosed for individual species or groups of species. These discussions are then followed by disclosure of more general effects from land management activities.

Threats such as drainage of wetlands and long-term cultivation of significant rangeland acreages would not occur on the national grasslands and forests in the planning area under any of the alternatives, so these types of threats and their effects on fish and wildlife are not addressed. Projects resulting in short-term soil disturbances during construction projects will

undoubtedly occur, but effects from these activities are evaluated and disclosed at the site-specific project level. Some temporary cultivation may also occur for purposes of restoring native rangelands and prairies under Alternative 3 (Proposed Alternative) on the Sheyenne National Grassland.

## Invertebrates

Arenz and Joern (1996) served as a key reference for helping evaluate effects on this diverse group of animals. Invertebrates are poorly studied and understood, but these authors were still able to provide some overviews that were very helpful in predicting effects.

Grazing, mowing and prescribed burning are the primary tools for implementing vegetation management under each of the alternatives, and using these tools to maintain a heterogeneous mosaic of successional stages and vegetation structure levels appears to maximize invertebrate diversity (Samways 1994 cited in Arenz and Joern 1996). In terms of prescribed burning and grazing, invertebrate populations in this region evolved with a grazing and fire system, and although sensitive to fire, fire return intervals of 3 or more years are usually sufficient for most species to re-populate burned prairie. Therefore, if prescribed burning is conducted in a proper manner with appropriate local precautions for invertebrate species that are at risk, prescribed burning can be beneficial in helping maintain diverse vegetation mosaics and invertebrate populations. The largest prescribed burning programs expected on the national grasslands and forests occur under Alternatives 4 and 5 while the smallest programs are expected to occur under Alternatives 1 and 2 (Table 3-215 and Table 3-216). Alternative 3 calls for an intermediate level of burning.

Livestock grazing, as long as it does not result in a drastic change in soil temperature, soil moisture, or compaction, may promote invertebrate diversity. Grazing that is selective and patchy may also benefit most invertebrates. Livestock grazing is the primary method for achieving the desired vegetation conditions prescribed through the vegetation composition (successional stages) and structure objectives. It is assumed that the maximum invertebrate diversity occurs with the greatest levels of vegetation structural diversity, and this is expected to occur where acreages of low, moderate and high structure are the most similar and balanced. This is expected to occur under Alternative 4 while the least diverse vegetation structure are expected under Alternatives 1 and 2 (Table 3-103 to Table 3-111 and Table 3-121). Alternatives 3 and 5 are expected to provide intermediate levels of vegetation diversity.

Mowing can reduce invertebrate diversity locally because it reduces vegetation to a uniform height. Most of the mowing on NFS lands in the planning area occurs on the Sheyenne National Grassland, and since the acres are not prescribed by alternative, an effects comparison is not presented for this area.

It is assumed that loss of native plant communities to noxious weeds and other non-native and invasive plants alters the natural biological diversity (Johnson et al. 1999, Westbrooks 1998), including the diversity of invertebrates. Therefore, the most aggressive noxious weed control programs would be most beneficial for invertebrates, and this would be expected to occur under Alternative 4. The least aggressive program would likely occur under Alternative 1 while Alternatives 3 and 5 are expected to result in programs of an intermediate level (Table 3-80).

Spray applications of insecticides, primarily for grasshopper damage control, have occurred over large acreages of some of the national grasslands in the past. These types of insecticide projects, although targeted for grasshoppers, also have the potential to directly impact butterflys, skippers and other insects. Program levels for grasshopper spraying are not addressed under the different alternatives, and under existing policy, APHIS is responsible for addressing the effects of pesticide applications on non-target species and on species protected under the Endangered Species Act. The Forest Service is responsible for ensuring that potential effects on sensitive species are evaluated and disclosed.

None of the management activities prescribed under any of the alternatives are expected to significantly impact aquatic invertebrates.

Effects on invertebrates, including some butterfly and skipper species, that are classified as species at risk are disclosed in the Biological Assessment and Evaluation.

## Reptiles and Amphibians

Corn and Peterson (1996) was a key reference consulted for the evaluation of expected effects on reptiles and amphibians.

It is assumed that the attainment of the vegetation objectives and management direction for maintaining the health of aquatic and wetland systems, including management of emergent vegetation, under Alternatives 2 through 5 would help provide sufficient amounts of suitable habitat for these species. Management under Alternative 1 would result in more negative impacts due to less emphasis on riparian and wetland management. Under Alternatives 2 through 5, at least 80 percent of riparian habitats are to be managed for regeneration and maintenance of healthy riparian systems. Specific direction for maintaining wetlands with developed emergent zones is also included under Alternatives 2 through 5. Alternative 1 would result in less protection for riparian areas than would occur under the other alternatives and does not include specific direction for management of emergent vegetation.

Effects of each alternative on the northern leopard frog and Blanding's turtle were addressed in the Biological Assessment and Evaluation.

## Native and Recreational Fisheries

Impacts to native fisheries on the national grasslands and forests as a result of land uses on these areas under each of the alternatives are believed to be insignificant. Under Alternatives 2 through 5, a study of the downstream hydrologic effects of small impoundment construction on upper watersheds of the national grasslands and forests would be conducted. Management direction is also provided under those alternatives to insure that Forest Service authorized activities on these lands do not reduce stream flows below levels needed to sustain native fish.

Effects on recreational fisheries in the Cheyenne, Sheyenne, Little Missouri and Grand Rivers from land uses on the national grasslands under each alternative are believed to be insignificant. It is possible that the life of recreational fisheries in ponds on the national grasslands and forests could be shortened by accelerated soil erosion into the impoundments from livestock grazing. Increased runoff has been demonstrated near the Buffalo Gap National Grassland under heavier livestock grazing rates (Hanson et al. 1970, 1978). This suggests that the anticipated higher stocking for livestock under Alternatives 1 and 2 could shorten the life of

impoundments through accelerated siltation. The lightest livestock grazing levels are expected under Alternative 4 while intermediate levels are expected under Alternatives 3 and 5 (Table 3-37).

# Mammals

## *Deer*

Severson (1981), Johnson and Stricklan (1996), Joslin and Youmans (1999), and Kufeld and Bowden (1995) were key references for helping evaluate the effects of implementing the different alternatives on deer. Some of the most significant direction in the revised plans for mule and white-tailed deer on the national grasslands and forests in the planning area relates to the management and condition of riparian habitats, wooded draws and other prairie woodlands. The importance of these habitats in providing cover and shelter as well as forage for prairie deer is well substantiated. Many woodland areas that are currently not regenerating and are providing low levels of habitat suitability for deer.

Alternative 1 would result in less protection for riparian areas than would the other alternatives. Under Alternatives 2 through 5, at least 80 percent of riparian habitats are to be managed for regeneration and thick and brushy understories and midstories. Management direction in Alternatives 2 through 5 for sagebrush communities would enhance and/or protect this habitat for deer and other wildlife. This direction calls for management programs that promote productive sagebrush communities, including enhanced productivity and diversity of the herbaceous vegetation within the community. This type of direction is lacking under Alternative 1.

Under the current management direction (Alternative 1) for the Thunder Basin National Grassland, a 4,270-acre big game range (MA 3.68) is allocated for big game management emphasis in the Osage Upton Geographic Area. Under Alternative 3 only, this area is increased in size by over 9,800 acres. Also under Alternative 3, a new big game range of approximately 19,800 acres is allocated in the central part of the Thunder Basin National Grassland. This addition does not occur under the other alternatives.

Management direction is provided under Alternatives 2 through 5 to reduce disturbances to elk and to maintain and enhance thermal, foraging and security cover on the Pine Ridge Geographic Area (Nebraska National Forest) during timber management activities. This direction does not occur under Alternative 1.

Effects of travel management direction on deer can be evaluated by comparing the amounts of MA 1.2, 1.2a, 1.31 and 1.31a that eliminate or restrict motorized travel under each alternative (Table 3-226). The acreages shown for Alternative 3 also include additional areas where new road construction is prohibited. In addition to the acreages listed in the following table, other areas are seasonally closed to off-road motorized travel under special orders. It is assumed that the limitations on travel in these areas reduces disturbance to deer and other big game species or helps maintain it at existing levels. Although there are some differences between planning units, Alternatives 1 and 2 provide the least amount of motorized vehicle restrictions while Alternative 4 generally includes the largest restricted areas. Alternatives 3 and 5 provide intermediate levels of restricted areas. The motorized vehicle restrictions apply to snowmobiles.

**Table 3-226. Acreages with restricted or no motorized travel**

| National Grassland or Forest | Alt 1 | Alt 2 | Alt 3 | Alt 4 | Alt 5 |
|---|---|---|---|---|---|
| LMNG | 43,000 | 0 | 111,900 | 189,800 | 107,600 |
| GR/CRNG | 0 | 0 | 0 | 0 | 0 |
| SNG | 0 | 0 | 4,200 | 0 | 46,600 |
| FPNG | 0 | 0 | 0 | 0 | 0 |
| BGNG | 0 | 9,200 | 52,000 | 77,100 | 37,900 |
| ONG | 2,000 | 0 | 2,000 | 13,900 | 12,900 |
| NNF(PRRD) | 14,200 | 14,400 | 16,200 | 16,200 | 16,200 |
| NNF(BRD) | 0 | 0 | 0 | 0 | 0 |
| SRMNF | 0 | 0 | 26,200 | 84,500 | 81,900 |
| TBNG | 0 | 0 | 65,200 | 62,800 | 37,300 |

To reduce impacts to deer from fences, management direction to construct new fences and modify existing fences to improved specifications (Appendix B of the revised plans) is provided under Alternatives 2 through 5. This direction is not included under Alternative 1.

Management direction to maintain or increase average pasture sizes in several areas is included under Alternatives 3 through 5 but not under Alternatives 1 and 2 (Table 3-40). The management direction on pasture sizes for Alternatives 3, 4 and 5 is not consistent across the planning units. On the Thunder Basin National Grassland, Alternatives 3, 4 and 5 each show a 5% increase in average pasture size over the next 10 to 15 years. For those areas managed as part of the Nebraska National Forest administrative unit, pasture sizes would be expected to increase a similar amount under Alternatives 4 and 5 while a smaller amount of increase would be expected under Alternative 3. Average pasture sizes on the Little Missouri, Grand River, and Cedar River National Grasslands would be expected to increase the most under Alternative 4 and to a lesser but similar amount under Alternatives 3 and 5. Pasture sizes on the Sheyenne National Grassland are predicted to remain at current levels under Alternatives 3 through 5. It is not the intent of this analysis to suggest that all effects of fencing on deer and other big game are negative. Habitat improvements can result from more intensive range management that commonly requires additional fencing, but the benefits must be weighed against the risks and potential to restrict daily as well as seasonal movements of these animals.

### *Pronghorn*

O'Gara and Yoakum (1992), Yoakum et al. (1996), and Yoakum and O'Gara (1999) were key references for helping evaluate the effects of management direction and allocations on pronghorn.

Energy development and fencing are the management activities most likely to effect pronghorn and their habitat. Energy development impacts include loss of habitat and displacing animals from important habitats, seasonal movement corridors, or fawning areas (O'Gara and Yoakum 1992, Lee et al. 1998, Kindschy et al. 1983, Kindschy 1996). Energy development and traditional pronghorn winter range coincide on the Little Missouri National Grassland. Under Alternative 3, a timing limitation prevents oil and gas exploration and drilling during the winter (Appendix

D of the revised plans) on approximately 21,800 acres of national grassland in this area. Another 3,300 acres of federal minerals but with other surface ownership are also covered by this limitation. Other alternatives do not include this stipulation.

A new 19,790-acre big game range (MA 3.68) is allocated on the Thunder Basin National Grassland under Alternative 3. Numerous standards and guidelines for this area prioritize maintaining and enhancing habitat suitability and effectiveness for big game in this area. This allocation does not occur under any other alternative.

Effects on pronghorn from fences, motorized travel and road construction are the same as those described for deer. The acreages listed in Table 3-226 for the Sheyenne National Grassland and Nebraska National Forest (Pine Ridge Ranger District) are irrelevant since pronghorn do not occur on those areas.

### *Elk*

A new 19,790-acre big game range (MA 3.68) primarily for elk management is allocated on the Thunder Basin National Grassland under Alternative 3. Numerous standards and guidelines for MA 3.68 prioritize maintaining and enhancing habitat suitability and effectiveness for elk and other big game species in this area. This allocation does not occur under any other alternatives.

Management direction is provided under Alternatives 2 through 5 to reduce disturbances to elk and to maintain and enhance thermal, foraging and security cover on the Pine Ridge Geographic Area (Nebraska National Forest) during timber management activities. This direction does not occur under Alternative 1.

### *Bighorn Sheep*

Bighorn sheep habitat to support expansion of sheep populations is allocated 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 the Biological Assessment and Evaluation. The acreages of NFS lands identified under each alternative to support expansion of the Rocky Mountain bighorn sheep population on the Pine Ridge Ranger District are presented in Table 3-227. To summarize, similar amounts of bighorn sheep habitat are designated on the Nebraska National Forest under Alternatives 3, 4 and 5, and no bighorn sheep habitat is identified under Alternatives 1 and 2.

**Table 3-227. Acreages Identified as Bighorn Sheep Habitat on the Nebraska National Forest (Pine Ridge Ranger District).**

| Alternative | Acres |
|---|---|
| 1 | 0 |
| 2 | 0 |
| DEIS 3 | 6,590 |
| FEIS 3 | 5,650 |
| 4 | 5,950 |
| 5 | 5,950 |

It is estimated that there is 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 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 bighorn sheep movement (Appendix B in the revised plans). These specifications would reduce entanglement risks and also allow less restricted movement between important foraging and cover areas.

Alternatives 2 through 5 also provide direction to maintain specified distances between bighorn sheep and domestic sheep. Alternative 1 does not include this direction.

### *Small Mammals*

Key references for helping evaluate alternative effects on small mammals were Jones and Manning (1996), Benedict et al. (1996), and Fritcher (1998).

Several furbearer species frequently hunt prey in prairie dog colonies. These include badger, coyote, long-tailed weasel 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 the Biological Assessment and Evaluation and is not repeated here. However, to summarize, direction in Alternatives 1 and 2 would result in the smallest prairie dog colony acreages, while Alternatives 3 and 4 would result in the largest acreages. Alternative 5 would provide intermediate levels of prairie dog colonies and preferred habitat for these species.

Small mammals like the prairie vole that thrive where grassland vegetation is dense would benefit from the increased levels of grassland structure that would occur under Alternatives 3 through 5 (Table 3-121). Generally, Alternative 4 would provide the largest acreages of high grassland structure while Alternatives 1 and 2 would provide the least. Alternatives 3 and 5 generally prescribe intermediate amounts.

Management direction under Alternatives 2 through 5 for maintaining self-sustaining riparian habitat and wooded draw habitats would benefit the mammalian species like tree squirrels, raccoon, mink as well as numerous smaller species that utilize heavier herbaceous vegetation. 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.

Several of the furbearers, such as beaver, muskrat, raccoon, 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 Alternative 1.

It is assumed that all of the predatory species, including mink, raccoon, long-tailed weasel, coyote, badger, red and gray fox, striped skunk, and bobcat would benefit from the enhanced habitat diversity that would occur under Alternatives 2 through 5, compared to Alternative 1.

## Birds

Key references for helping evaluate effects of implementing each management plan on birds and avian diversity included Johnson and Winter (1999), Knopf (1996a, 1996b), Bolen and Crawford (1996), Guthery (1996), Dobkin (1992), Kantrud (1981, 1990), Kruse and Bowen (1996), Messmer (1990), Kirsch et al. (1978), Rumble and Anderson (1995), and Hoffman et al. (1993).

### *Gallinaceous Birds*

Habitat suitability for these species is generally enhanced by providing diverse high structure grasslands and sagebrush understories. Effects of achieving the vegetation structure objectives under each alternative on greater prairie chicken and sage grouse are disclosed in the Biological Assessment and Evaluation and under "Management Indicator Species" in the Rangeland and Forest Health section of this chapter and are not repeated here. Effects on plains sharp-tailed grouse are also disclosed in the Management Indicator Species discussion. Effects on ring-necked pheasant and gray partridge would be very similar.

Wild turkey populations that rely primarily on riparian zones in grassland areas 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 herbaceous understory increases in many areas. Alternative 1 would result in less protection for riparian areas than would occur under the other alternatives.

Management direction is provided under Alternatives 2 through 5 for the Nebraska National Forest (Pine Ridge Ranger District) and Thunder Basin National Grassland to coordinate timber and range management activities to maintain and enhance habitat suitability for wild turkeys in ponderosa pine woodlands. This type of specific direction does not occur under Alternative 1.

### *Migratory Birds*

Habitat management that enhances habitat suitability for selected wildlife species or guilds may occur at the expense of other species. For example, this is a consideration when trying to determine whether 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 lower suitability for the chestnut-collared longspur. If structurally diverse grasslands are maintained across broader landscapes, large blocks of quality habitat can be provided for a diverse array of grassland birds. Another example involves enhancing riparian habitats and other woody habitats for cavity nesters and other woodland species. By perpetuating or enhancing development of woody inclusions in grasslands, the probability increases that birds nesting in adjoining grasslands will be parasitized by brown-headed cowbirds. Also, riparian enhancement projects likely result in increased interactions between woodland and grassland birds, generally at the expense of the latter. Enhancing and increasing woodland inclusions within prairie habitats can have adverse impacts on the natural diversity of endemic grassland species (Knopf 1996a, 1996b).

Conflicting habitat preferences can also be an issue with management of black-tailed prairie dogs and the wildlife species that are commonly found on 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 of the larger ground-nesting birds, including gallinaceous birds, while simultaneously improving habitat for others, such as McCown's longspur. However, if a reasonable balance and mosaic of colonized and un-colonized areas can be attained and achieved across the broader landscape, the presence of prairie dog colonies enhances grassland diversity for a broad array of avian species. The vegetation objectives established under Alternatives 2 through 5 (FEIS Appendix D) prescribe grassland and shrubland (sagebrush) mosaics with different mixes of successional and structural characteristics.

The structural diversity of grasslands and shrublands (sagebrush) is a primary consideration when managing landscapes to support diverse avian communities, including endemic prairie birds. More and more conservationists are recommending that prairies be managed to represent a full range of successional and structural diversity and to provide quality habitats in block sizes that meet the minimum area requirements of native birds (Paige and Ritter 1999, Gillihan and Hutchings 2000, Hoekman and Ball 2000, Johnson 1996). This strategy is also recommended in the Northern Mixed-grass Prairie Bird Conservation Plan (Fitzgerald et al. 1999) and in the Montana draft of the Northern Shortgrass Prairie Bird Conservation Plan (Casey 2000). The vegetation objectives for successional and structural stages under Alternatives 2 through 5 prescribe different grassland and shrubland mosaics. However, a common feature across these alternatives is that more emphasis is put on high structure grasslands in the eastern part of the planning area, while low structure habitats receive added emphasis in the western part of the planning area. This approach helps ensure quality habitats for the endemic species that evolved with the larger bison herds in the western part of the planning area (Knopf 1996a). The higher and more structurally diverse grasslands in the eastern portion of the planning area provide quality habitat for the native species more characteristic of the mixed and tallgrass prairies.

Several species of upland nesting waterfowl (Ringelman 1991, Kruse and Bowen 1996, Duebbert et al. 1986, Hertel 1987, Hoekman and Ball 2000), gallinaceous birds (see Appendix H in the revised plans), and other ground-nesting birds (Kantrud and Kologiski 1982, Duebbert and Lokemoen 1977, Messmer 1985, Messmer 1990, Fritzer 1998) are more productive where structurally diverse grasslands with larger blocks of tall and dense undisturbed cover are available. Some of the species that utilize the more structurally diverse grasslands are the priority species identified in Table 3-225 and some of these are endemic or near endemic species. The largest acreages of diverse and high structure grasslands are prescribed under Alternative 4 while the smallest acreages would occur under Alternatives 1 and 2 (Table 3-121). Alternatives 3 and 5 prescribe intermediate amounts of quality habitat for these species.

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, (3) periodic annual rest from livestock grazing or (4) light grazing intensities that result in patchy grazing (see Appendix I in the revised plans). In terms of deferment, Sedivec et al. (1994) recommended that livestock not be turned into native pastures in rotational grazing systems until late May or early June in North Dakota to provide undisturbed cover for upland-nesting birds. The percent of area on each national grassland and forest managed under deferred

rotational and other planned grazing systems is displayed in Table 3-31. Management direction prescribing grazing systems is not included under Alternatives 2 through 5 and is minimal under Alternative 1. Therefore, no additional alternative comparisons based on grazing systems are presented. It is important to note that most areas are grazed under deferred rotation (Table 3-31) that allows a large number of pastures to be deferred at least during all or part of the early nesting season.

Tall and dense undisturbed cover for upland-nesting birds can also be provided in areas where little or no inaccessible or secondary range remains (Table 3-30) by prescribing periodic rest from livestock grazing. Although resting an area for a 12-month period is beneficial, resting an area for a couple to several consecutive years is generally recommended. Long-term rest is not recommended because periodic grazing or fire is needed to prevent excessive litter build up and to rejuvenate herbaceous vegetation. The amount of rest expected under each alternative is presented in Table 3-38 and Table 3-145. 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 rest. Fencing can also influence habitat suitability for many wildlife species.

The priority species that prefer low structure grasslands (Table 3-225), like the McCown's and chestnut-collared longspurs, would generally benefit the most under Alternatives 1 and 2, where the largest acreages of more intensively grazed grasslands are expected (Table 3-121). These same species would benefit the least under Alternative 4. Alternatives 3 and 5 would generally provide intermediate levels of low structure grasslands. Low structure grasslands for these species are also available in active prairie dog colonies. Those species that make seasonal use of prairie dog colonies (Table 3-225) would benefit the least under Alternatives 1 and 2 where direction results in maintaining or further reducing existing prairie dog populations using rodenticides (Table 3-140). Management direction under Alternatives 3 and 4 would provide the largest acreages of black-tailed prairie dog colonies because of very limited criteria for rodenticide use or no rodenticide use. Alternative 5 provides an intermediate level of active prairie dog colonies. Prairie dogs also serve as important prey that is available yearlong for avian and mammalian predators, including ferruginous hawk, badger and swift fox. Their burrows also provide shelter for other wildlife species including burrowing owls. Effects under each of the alternatives for the species that prey on prairie dogs would be the same as those described above for the species that use prairie dog colonies because of the low vegetation structure.

A relatively large number of neotropical migrants use riparian habitats extensively (Table 3-225). Some are canopy species while others mostly use the midstory shrubs and tree saplings. Some are cavity nesters. The key to management for these areas is to ensure adequate regeneration. This further translates to maintaining a midstory, as well as an overstory. Livestock grazing can have significant impacts on woody vegetation in riparian habitats and other deciduous 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 (Rumble and Gobeille 1998, Hodorff et al. 1988). This would result in habitat loss and degradation for those priority species identified in Table 3-225. Under Alternatives 2 through 5, at least 80%of the riparian areas are to be managed to encourage regeneration and thick and brushy understories and midstories. This level exceeds that occurring under Alternative 1 (Table 3-142).

Several of the priority neotropical species are inhabitants of coniferous forests (Table 3-225). Ponderosa pine, Rocky Mountain juniper and limber pine forests occur naturally on several 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 this could result in more savannah. The desired mix of structural stages in ponderosa pine forest is specified for the Nebraska National Forest (Pine Ridge Range District) and Thunder Basin National Grassland. The long-term objectives (100 years) for these areas are to have approximately 40% and 20% of the forests in structural stages 4 (mature open) and 5 (late successional), respectively, and silvicultural treatments would be designed to achieve these objectives. Under this direction, the most savannah and late successional forests would occur under Alternatives 2 through 5, while the least would occur under Alternative 1.

Construction of ponds on the national grasslands and forests creates new wetlands habitat for a variety of bird species. Some of these species are priority species identified in Table 3-225 and in the North American Waterfowl Management Plan. However, new water sources can change livestock grazing distributions resulting in reductions in the amount of tall and dense undisturbed cover for several upland nesting species. Limits on additional water developments are established under some alternatives for some areas (Table 3-39). Where limits apply, Alternative 4 would usually result in a decrease in the density of water developments over time, while Alternatives 3 and 5 usually maintain the existing density. Limits are not applied under Alternatives 1 and 2.

### *Resident Birds*

There are numerous species, in addition to the gallinaceous birds, that remain in the planning area yearlong. Some of these species include the golden eagle, prairie falcon, horned lark, American crow, black-billed magpie, short-eared owl, black-capped chickadee, white-breasted and red-breasted nuthatches, hairy and downy woodpeckers, American goldfinch, and red crossbill. Land use effects on these species are similar to those described above for migratory species.

## Direct and Indirect Effects

### *General*

Effects not addressed in the preceding paragraphs or needing additional evaluation are disclosed in the following discussions.

### *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 (Higgins et al. 1989, Sieg 1997). Fire can cause direct mortality of wildlife including invertebrates and destroy nests of birds and small mammals. However, if properly timed and designed it can help control exotic vegetation and enhance the diversity of native plant species and habitat suitability for many wildlife species. Fire in sagebrush habitats, especially Wyoming sagebrush, is not recommended. Fire in sagebrush stands where cheatgrass invasion is occurring is also not recommended (Connelly et al. 2001, Paige and Ritter 1999). Management direction under

Alternatives 2 through 5 limits prescribed burning in sagebrush only to situations where it would enhance habitat for sage grouse and other wildlife in sagebrush habitats. The minimum amount of prescribed burning expected under each alternative for the planning units is presented in Table 3-215 and Table 3-216 in this chapter. The impacts of burning on threatened, endangered, proposed, and sensitive species are presented in the Biological Assessment and Evaluation.

### *Effects from Utilities*

Management direction to bury utility lines of 33 KV or less would be applied under Alternatives 2 through 5. New construction and retrofit specifications are also provided under these alternatives to further reduce electrocution risks to raptors. This direction reduces risks beyond what is occurring under Alternative 1.

### *Effects from Land Adjustments*

Direction under Alternatives 2 through 5 identifies criteria for prioritizing land exchanges. Lands with high values for wildlife habitat, including big game winter range, and lands with important outdoor recreational opportunities, many of which are probably wildlife and fish related recreation activities, are prioritized for acquisition

### *Effects from Oil, Gas, Minerals Management*

Oil, gas, and minerals development can impact wildlife primarily through alteration or destruction of habitat and disturbance (noise and human activity). Disturbance and activity can can cause displacement, abandonment, increased mortality and reduced reproductive success of some wildlife species (Joslin and Youmans 1999). Effects are mitigated through land reclamation and through standard lease terms, stipulations on oil and gas development (Appendix D in the revised plans), and standards and guidelines in the revised plans. Land reclamation is primarily regulated by state and other federal agencies. Oil and gas stipulations have already been addressed for species at risk and management indicator species. Other species protected by stipulations include prairie falcon, Swainson's hawk and golden eagle. The primary references utilized to help establish the stipulations for these species included U.S. Fish and Wildlife Service (1999), Richardson and Miller (1997), Holmes et al. (1993). Stipulations for these species were identical under Alternatives 2 through 5. The stipulations for these species on the Thunder Basin, Buffalo Gap, Oglala and Little Missouri National Grasslands (McKenzie Ranger District) became more protective under Alternatives 2 through 5 when compared to Alternative 1 (FEIS Appendix B, Table B-6). They were similar in level of protection across all alternatives on the Little Missouri National Grassland (Medora Ranger District).

Effects of oil and gas stipulations on these wildlife species under Alternative 1 were already evaluated and disclosed in the existing oil and gas leasing decisions for the Little Missouri, Cedar River, Thunder Basin, Buffalo Gap and Oglala National Grasslands.

The stipulations for these species under Alternatives 2 through 5 would not be applied to existing leases and would only be applied to new leases.

### *Effects from Plant and Animal Damage Control*

If carefully implemented, noxious weed control helps maintain native vegetation and native habitats (Westbrooks 1998). 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 many migratory birds. Under existing Forest Service policy, the effects of grasshopper spraying on species at risk and management indicator species have to be evaluated and considered in project design and approval. Management direction under Alternatives 2 through 5 extends this need to other wildlife species.

### *Effects from Special Area Designations*

Special area designations (research natural areas, proposed wilderness, special interest areas, special plant and animal habitats) would be compatible or beneficial for management of wildlife species that might be featured in a particular area. Special area allocations are summarized in FEIS Tables 2-4, 2-6, and 2-8. 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.

## Cumulative Effects

Numerous broad-scale conservation assessments of the status and trend of wildlife and fish and their habitats were consulted to better understand the cumulative effects of land use across the planning area. These assessments were listed at the beginning of this section. Some of the major findings are that the northern Great Plains, although not heavily populated, has undergone considerable alteration of terrestrial and aquatic habitats. Quantitative information on the loss of native terrestrial habitats across the planning area is presented in Section 1 of the Biological Assessment and Evaluation. Loss and degradation of these habitats have largely occurred as a result of cultivation and encroachment of non-native and invasive plants. The Conservation Reserve Program (CRP) has undoubtedly helped compensate for some of these losses with over 14.7 million acres being initially enrolled. However, over 130,000 acres of CRP lands were released in 1995, and a downward trend in enrolled acres may be expected for the long-term. With the continuing research to develop alternative dryland crops, one cannot discount the future possibility that new crops on the horizon may help reduce agricultural demands for water while encouraging additional cultivation of native grasslands and rangelands. Perhaps the marketing of carbon credits to encourage carbon sequestration will also be a factor to reduce additional rangeland cultivation in the future, but its potential effects are too early to predict at this time. Some of the most contentious non-native plant species invading large areas of the grasslands within the planning area include leafy spurge, spotted knapweed, Canada thistle, cheatgrass, smooth bromegrass, red cedar and bluegrass. Sweetclover has become so widespread in some grassland areas that many people see it as part of the natural flora. Given the loss of native rangelands and the onslaught by the non-natives, it is understandable that grassland birds show some of the most consistent and significant downward trends in North America.

One area in the planning area where large extensive grasslands continue to remain basically intact is the Nebraska Sandhills. Because of the fragile nature of the soils and vegetative cover, cultivation and crop production are largely recognized as risky business across much of this 19,000 square mile area. Although some non-native plants are present, in most areas the native

grasses and forbs are still dominate. The status and trend of terrestrial and aquatic habitats in the sandhills are favorable when compared to many other parts of the planning area.

Quantitative information on the status and trend of sagebrush communities in the planning area is not available. However, aerial views of sagebrush country in western South Dakota and eastern Wyoming show large spray blocks within larger sagebrush complexes. Many areas sprayed in the late 1960s and early 1970s still remain largely devoid of sagebrush. Non-native invasive plants, especially cheatgrass, appear to have become a major understory component in many sagebrush stands in the planning area.

One of the most significant changes across the face of the northern plains has been incremental but massive reduction in prairie dog populations. From one of the dominant herbivores alongside the bison, prairie dog populations are thought to be at less than 95% of their former number. Species closely associated with black-tailed prairie dogs and the species itself will be increasingly viewed as species at risk. A multi-state planning effort to help stabilize the species and possibly increase populations to a level equal to or greater than 1% of historical populations is currently underway. Even with the strategic conservation planning and the resiliency of prairie dogs, the potential for plague expansion across the planning area clouds the outlook for this species and others like the burrowing owl and black-footed ferret. Although it appears that poisoning of prairie dogs on public lands within the planning area will be substantially curtailed, prairie dog poisoning on private lands will likely continue.

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 the more open forests. The more open and savannah-like ponderosa pine habitats are probably more characteristic of pre-European settlement conditions.

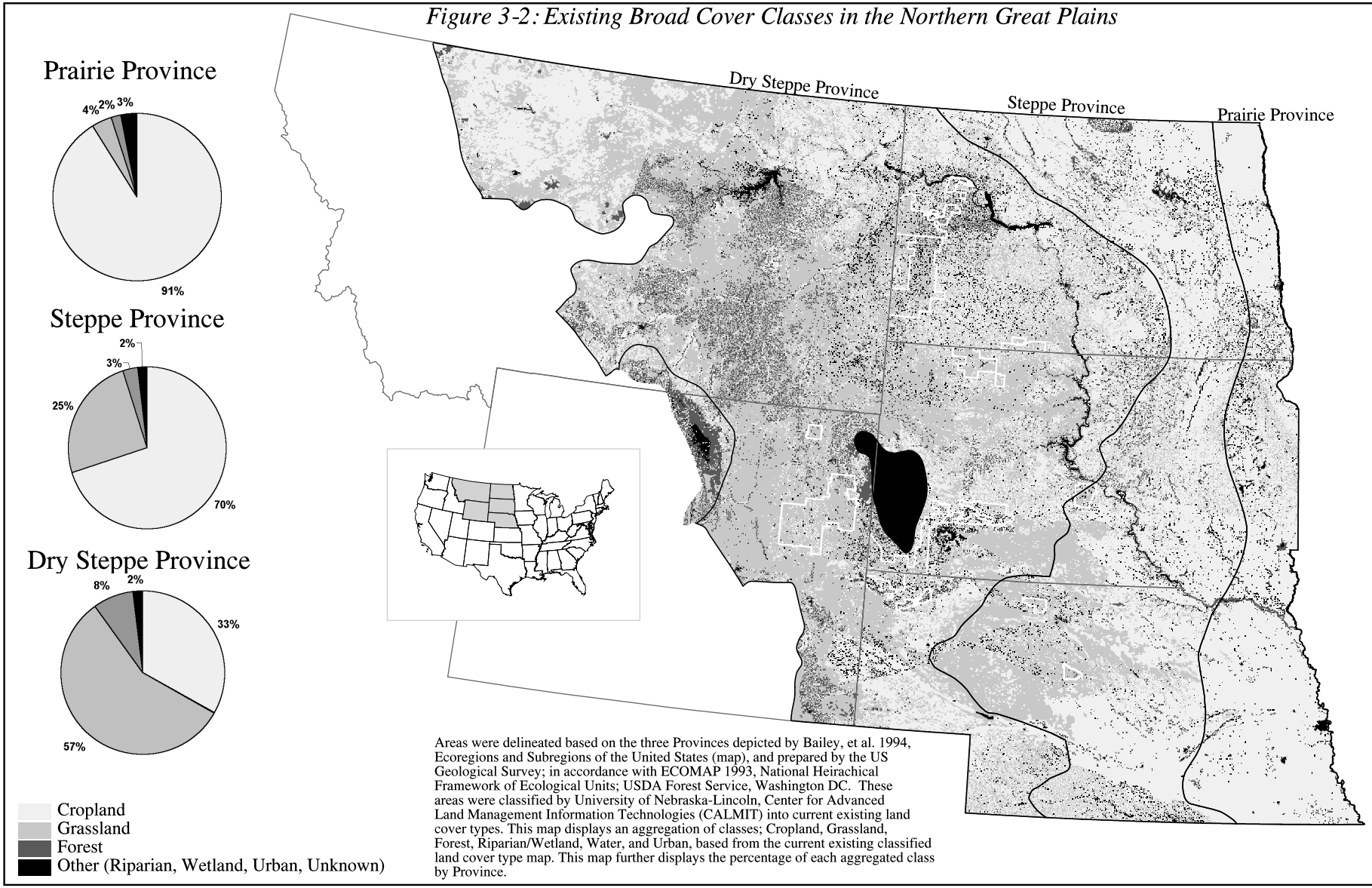
Significant progress has been made in stabilizing losses of wetland habitats in the planning area. In fact, a recent net increase in wetlands is encouraging given the loss of 30 to 50% of the wetlands in this region prior to the 1980s.

Aquatic habitats in the planning area have been heavily impacted from large impoundments, irrigation diversions, and pollution and pathogens from agricultural and urban areas. The probable trend for these habitats does not look favorable, and it is highly probable that additional fish species native to these waters will soon be considered for protection under the Endangered Species Act.

Oil and gas development activity, including coalbed methane, in the northern Great Plains is expected to increase. The expected levels of activity in the vicinity of the Little Missouri, Thunder Basin, Buffalo Gap and Oglala National Grasslands are discussed in the Demand Assessment in the Oil and Gas section of this chapter.

The cumulative effects on wildlife and fish of increasing demands for development and commodity production across the Northern Great Plains will elevate the importance and value of the terrestrial wildlife habitats on the national grasslands and forests. These areas will increasingly be viewed as lands for helping sustain and restore species at risk and the native and endemic biological diversity of the northern plains. Opportunities for the national grasslands and forests to make significant contributions to maintain healthy aquatic ecosystems across this region will remain limited.

*Figure 3-2: Existing Broad Cover Classes in the Northern Great Plains*




Areas were delineated based on the three Provinces depicted by Bailey, et al. 1994, Ecoregions and Subregions of the United States (map), and prepared by the US Geological Survey; in accordance with ECOMAP 1993, National Heirachical Framework of Ecological Units; USDA Forest Service, Washington DC. These areas were classified by University of Nebraska-Lincoln, Center for Advanced Land Management Information Technologies (CALMIT) into current existing land cover types. This map displays an aggregation of classes; Cropland, Grassland, Forest, Riparian/Wetland, Water, and Urban, based from the current existing classified land cover type map. This map further displays the percentage of each aggregated class by Province.

# Chapter 4 List of Preparers

## Core Planning Team

The following people were major contributors in the preparation of the final environmental impact statement:

| **Name** | **Bob Sprentall** |
|---|---|
| Team Title | Planning Team Leader |
| Education | BS, Range and Forest Management, Colorado State University. |
| Forest Service Experience | 23 years, including range conservationist / wildlife biologist on the Holy Cross Ranger District, White River National Forest, range / wildlife / special uses staff on the Yampa Ranger District, Routt National Forest, and range / wildlife / fire staff on the Pine Ridge Ranger District, Nebraska National Forest, rangeland resource staff on Nebraska National Forest. |
| Major Contributions | Conducted forage production analysis, developed desired upland vegetation condition matrices, and coordinated the Research Natural Areas field evaluations. Completed effects analyses for livestock grazing, Research Natural Areas, vegetation composition, and ecosystem processes and function. |
| **Name** | **Greg Schenbeck** |
| Team Title | Fish and Wildlife Coordinator |
| Education | BS, MS Wildlife Biology, Colorado State University. |
| Forest Service Experience | 26 years, including Fish and Wildlife Staff Officer for Nebraska National Forest. Prior fish and wildlife experience with Bureau of Land Management, Colorado Division of Wildlife, Nebraska Game and Parks Commission, and Rachelwood Wildlife Research Foundation. |
| Major Contributions | Coordinated and assisted in development of management direction and effect analyses for fish, wildlife, and rare plants and prepared Biological Assessment and Evaluation for species at risk and species of concern. |

| | |
|---|---|
| **Name** | **Jeff Ulrich** |
| Team Title | Systems Analyst |
| Education | BS Biochemistry, Michigan State University; MS Parks and Recreation Resources, Michigan State University; MS Forest Management, Oregon State University. |
| Forest Service Experience | 24 years, including 3 years experience on a district working in every aspect of on-the-ground management and 17 years experience in forest planning and preparing environmental analysis and documents. Worked on three different forest planning teams and numerous environmental project teams. Also active member of interagency fire fighting organization and works in both fire suppression and planning positions on large fires. |
| Major Contributions | Supervised GIS team. Conducted range capability, primary and secondary range, black-tailed prairie dog habitat potential, and oil and gas analyses. Aided in numerous other GIS projects and analyses, such as the development of GIS coverages for alternatives. |
| **Name** | **Terry Dilts** |
| Team Title | Resources Coordinator (representing recreation, wilderness / roadless, heritage / paleontological resources, wild / scenic rivers, minerals / oil / gas resources, travel management, lands, and air quality). |
| Education | BS Forest Management, Colorado State University |
| Forest Service Experience | 29 years, experience in recreation, landownership, timber management, and minerals, including interdisciplinary team leader for two environmental impact statements. |
| Major Contributions | Coordinated and assisted in preparing effects analyses for recreation, roadless, special interest areas, heritage, paleontology, wild and scenic rivers, travel management, oil and gas and air quality. |
| **Name** | **Virginia Emly** |
| Team Title | Geographic Information System Coordinator |
| Education | BS Range Science, South Dakota State University, MS Range Science, North Dakota State University. |
| Forest Service Experience | 17 years, including range management specialist on Little Missouri National Grassland and Nebraska National Forest. |
| Major Contributions | Responsible for completing the range benchmark analysis. Assisted in alternative development and maps, mineral ownership, and numerous other GIS projects and analyses. |

| | |
|---|---|
| **Name** | **Carla Loop** |
| Team Title | Planning Assistant |
| Education | BA Agricultural Business, Chadron State College. |
| Forest Service Experience | 13 years, including personnel clerk, geographic information systems technician, and planning assistant on Nebraska National Forest; 5 years with the Soil Conservation Service as conservation technician. |
| Major Contributions | Provided administrative support to planning team, maintained administrative records and public contact list, and coordinated public comment content analysis data process. Designed and surveyed several different conservation practices while with the Soil Conservation Service. |
| **Name** | **Jerry Schumacher** |
| Team Title | Public Affairs Officer |
| Education | BA, Social Science, Chadron State College |
| Forest Service Experience | Public Affairs Specialist, 1988-present, NEPA / Appeals Coordinator, 1992-present. |
| Major Contributions | Revised and participated in implementing communication plan following DEIS release; prepared recreation assessment; document reviews and editing. |

The following people were major contributors in the preparation of the draft environmental impact statement:

| | |
|---|---|
| **Name** | **David Cawrse** |
| Team Title | Planning Team Leader |
| Education | BS Forest Resource Management, Ohio State University; MS Forest Economics, Colorado State University; MF Silviculture, University of Montana. |
| Forest Service Experience | 19 years experience, including planning team leader, District Ranger, and ecosystem management specialist for a tri-state project in southeast US. |
| Major Contributions | Planning team leader; helped prepared economic analysis. |

| | |
|---|---|
| **Name** | **Tom Domek** |
| Team Title | Writer/Editor |
| Education | BA Print Journalism, MA Creative Writing, University of North Dakota. |
| Forest Service Experience | 6 years as writer/editor on Black Hills and Nebraska National Forests. |
| Major Contributions | Conducted and assisted in the writing of roadless area and wild and scenic rivers appendices and effects analyses. Assisted in writing recreation, special interest area, and travel management effects analyses, as well as other sections and assisted in the writing and editing of planning documents. Published numerous Forest Service-related magazine articles. |
| **Name** | **Virginia Emly** |
| Team Title | Geographic Information System Coordinator |
| Education | BS Range Science, South Dakota State University, MS Range Science, North Dakota State University. |
| Forest Service Experience | 13 years, including range management specialist on Little Missouri National Grassland and Nebraska National Forest. |
| Major Contributions | Responsible for completing the range benchmark analysis. Assisted in alternative development and maps, mineral ownership, and numerous other GIS projects and analyses. |
| **Name** | **Pam Gardner** |
| Team Title | Public Affairs Officer |
| Education | BA Communication, Boise State University. |
| Forest Service Experience | 15 years, including public affairs specialist and writer/editor on Payette National Forest. |
| Major Contributions | Coordinated communication and public outreach. Conducted social assessment and effects analysis. Assisted in writing special area, recreation and travel management effects analysis. Served as lead writer/editor on planning documents. |
| **Name** | **Carla Loop** |
| Team Title | Planning Assistant |
| Education | BA Agricultural Business, Chadron State College. |
| Forest Service Experience | 9 years, including personnel clerk, geographic information systems technician, and planning assistant on Nebraska National Forest; 5 years with the Soil Conservation Service as conservation technician. |
| Major Contributions | Provided administrative support to planning team, maintained administrative records and public contact list, and coordinated public comment content analysis data process. |

| | |
|---|---|
| **Name** | **Liz Ohlrogge** |
| Team Title | Resources Coordinator (representing recreation, wilderness / roadless, heritage / paleontological resources, wild / scenic rivers, minerals / oil / gas resources, travel management, lands, and air quality). |
| Education | BS Forest Management, Michigan Technological University. |
| Forest Service Experience | 24 years, including District Ranger on Chequamegon National Forest and recreation / lands / minerals staff officer on Nebraska National Forest. |
| Major Contributions | Coordinated and assisted in preparing effects analyses for recreation, roadless, special interest areas, heritage, paleontology, wild and scenic rivers, travel management, oil and gas and air quality. |
| **Name** | **Greg Schenbeck** |
| Team Title | Fish and Wildlife Coordinator |
| Education | BS, MS Wildlife Biology, Colorado State University. |
| Forest Service Experience | 22 years, including Fish and Wildlife Staff Officer for Nebraska National Forest. Prior fish and wildlife experience with Bureau of Land Management, Colorado Division of Wildlife, Nebraska Game and Parks Commission, and Rachelwood Wildlife Research Foundation. |
| Major Contributions | Coordinated and assisted in development of management direction and effect analyses for fish, wildlife, and rare plants and prepared Biological Assessment and Evaluation for species at risk and species of concern. |
| **Name** | **Tony Smith** |
| Team Title | Database Manager |
| Education | BS Forest Management, Colorado State University. |
| Forest Service Experience | 5 years experience in data management / collection and analysis as forester / planning analyst trainee / database manager on the Routt and Nebraska National Forests. 7 years, seasonal and long-term temporary experience in timber management-related activities on the Routt, Shoshone, and San Isabel National Forests. 2 years seasonal experience in timber management on two Bureau of Land Management Resource Areas in Colorado and Wyoming. |
| Major Contributions | Coordinated integrated resource inventories, prepared GIS products for roadless area, wildlife, recreation, scenery management, and oil and gas analyses. Assisted in development of alternative maps and numerous other GIS products and analyses. |

| **Name** | **Bob Sprentall** |
|---|---|
| Team Title | Rangeland Ecosystem Coordinator |
| Education | BS, Range and Forest Management, Colorado State University. |
| Forest Service Experience | 19 years, including range conservationist / wildlife biologist on the Holy Cross Ranger District, White River National Forest, range / wildlife / special uses staff on the Yampa Ranger District, Routt National Forest, and range / wildlife / fire staff on the Pine Ridge Ranger District, Nebraska National Forest, rangeland resource staff on Nebraska National Forest. |
| Major Contributions | Conducted forage production analysis, developed desired upland vegetation condition matrices, and coordinated the Research Natural Areas field evaluations. Completed effects analyses for livestock grazing, Research Natural Areas, vegetation composition, and ecosystem processes and function. |
| **Name** | **Jeff Ulrich** |
| Team Title | Systems Analyst |
| Education | BS Biochemistry, Michigan State University; MS Parks and Recreation Resources, Michigan State University; MS Forest Management, Oregon State University. |
| Forest Service Experience | 20 years, including 3 years experience on a district working in every aspect of on-the-ground management and 17 years experience in forest planning and preparing environmental analysis and documents. Worked on three different forest planning teams and numerous environmental project teams. Also active member of interagency fire fighting organization and works in both fire suppression and planning positions on large fires. |
| Major Contributions | Supervised GIS team. Conducted range capability, primary and secondary range, black-tailed prairie dog habitat potential, and oil and gas analyses. Aided in numerous other GIS projects and analyses, such as the development of GIS coverages for alternatives. |

# Contributors

The following people also made important contributions to the preparation of this environmental impact statement:

- Jeff Adams, Environmental Coordinator, Dakota Prairie Grasslands
- Doug Alexander, Fire Staff, Nebraska National Forest
- Joe Alexander, Rangeland Management Specialist, Dakota Prairie Grasslands
- Jeff Abegglen, Wildlife Biologist, Nebraska National Forest
- James Albano, Minerals Resource Specialist, BLM
- Tom Andrews, Region 1/2 Research Natural Area Coordinator
- Kari Bartosiak, Biological Technician, Douglas Ranger District, Medicine-Bow Routt National Forest
- Cheri Bashor, Resource Staff, Custer National Forest
- Barb Beasley, Paleontologist, Nebraska National Forest
- Paul Beckley, Economist, Region 1, Missoula, MT
- Frank Beum, Public Affairs Specialist, Medicine-Bow Routt National Forest
- Norman Bishop, Supervisory Forestry Technician, Dakota Prairie Grasslands
- Tamara Blett, Ecologist, Region 2
- Will Boyer, District Manager, Upper Loup Natural Resources District
- Bernie Braun, Range Management Specialist, Sheyenne National Grassland
- Gary Bronco, Economist, Pike San Isabel National Forest
- Charlene Bucha Gentry, NEPA Coordinator, Dakota Prairie Grasslands
- Connie Buford, Geographic Information System Specialist, Dakota Prairie Grasslands
- Tim Byers, Wildlife Biologist, Thunder Basin National Grasslands
- Bridget Colgate, Geographic Information System Technician, Nebraska National Forest
- Don Carpenter, Bessey District Ranger, Nebraska National Forest
- Lindsey Cawthra, Biological Technician, Nebraska National Forest
- John Clark, Timber Staff, Custer National Forest
- Ralph Cockrell, Fire Management Staff, Thunder Basin National Grassland
- Dave Coe, Engineer, Nebraska National Forest
- Nancy Curriden, Custer National Forest Supervisor
- Jane Darnell, Grand River District Ranger
- Larry Dawson, Dakota Prairie Grasslands Supervisor
- Tony DeToy, Fort Pierre District Ranger/South Dakota Legislative Coordinator
- Jeff DiBenedetto, Ecologist, Custer National Forest

- Rusty Dersch, Geologist, Region 2
- Malcolm Edwards, Douglas District Ranger
- Butch Ellis, Resource Staff Officer, Nebraska National Forest
- Tony Erba, Environmental Coordinator, Dakota Prairie Grasslands
- Mike Erk, Range Management Specialist and Minerals Program Manager, Nebraska National Forest
- Hank Finch, Lands / Recreation Staff Officer, Custer National Forest
- Scott Fitzwilliams, Medora District Ranger
- Cameo Flood, Writer / editor (Detail), Idaho Panhandle National Forest
- Gary Foli, Wildlife Biologist, McKenzie Ranger District
- David Freed, Biological Technician, Dakota Prairie Grasslands
- Jerry Greenwood, Budget and Finance Officer, Nebraska National Forest
- Marvin Giese, Realty Specialist, McKenzie Ranger District
- Mark Hale, Geographic Information System Technician, Nebraska National Forest
- Kurt Hansen, Rangeland Management Specialist, Little Missouri NG / Sheyenne Ranger District
- Misty Hays, Range Management Specialist, Nebraska National Forest
- Bob Hodorff, Wildlife Biologist, Nebraska National Forest
- Melody Holm, Leasable Minerals Specialist, Region 2
- Mick Hood, Forester, Thunder Basin National Grassland
- Leslie Horsch, Writer / editor, Medicine Bow-Routt National Forest
- Pat Irwin, Pine Ridge District Ranger, Nebraska National Forest
- Jack Isaacs, Range Management Specialist, Nebraska National Forest
- Tom Johnson, Environmental Scientist, Environmental Protection Agency
- Roger Keepers, Recreation Specialist, Nebraska National Forest
- Gary Kiramidjian, Theodore Roosevelt National Park
- Lee Kramer, Planning Staff, Medicine Bow-Routt National Forest
- Clint Kyhl, Fall River District Ranger, Nebraska National Forest
- John Lane, GIS Specialist, Custer National Forest
- Tina Lanier, Wildlife Biologist, Region 2, Lakewood Colorado
- Halcyon LaPoint, Archaeologist, Custer National Forest
- Darla Lenz, Botanist, Dakota Prairie Grasslands
- Chris Liggett, Region 2 Planner
- James Lowe, Geographic Information System Specialist, Dakota Prairie Grasslands
- Mary Bell Lunsford, Public Affairs Specialist, Custer National Forest
- Richard Marshall, Region 1 Mineral Economist

- Jim Maxwell, Region 2 Hydrologist
- Clint McCarthy, Wildlife Biologist, Custer National Forest
- Carol McCoy-Brown, Geologist, Custer National Forest
- Clark McClung, Range Management Specialist, Thunder Basin National Grassland
- Peter McDonald, Wildlife Biologist, Nebraska National Forest
- Mike McNeill, Range Program Manager, Dakota Prairie Grasslands
- Marnie McWilliams, Range Management Specialist, Thunder Basin National Grassland
- Paul Mock, Fire Management Staff, Custer National Forest
- Glen Moravek, Wildlife Biologist, Nebraska National Forest
- Geri Morris, Geographic Information System Technician, Nebraska National Forest
- Glen Nebeker, Planning / Environmental Coordinator, BLM
- Bob Novotny, Range Management Specialist, Nebraska National Forest
- Lora Hawkins O'Rourke, Range Management Specialist, Nebraska National Forest
- Bill Perry, Wall District Ranger, Nebraska National Forest
- Mary Peterson, Nebraska National Forest Supervisor
- Noel Poe, Superintendent, Theodore Roosevelt National Park
- John Prochazka, Lands Specialist, Nebraska National Forest
- Joe Reddick, Environmental Coordinator, Thunder Basin National Grassland
- Kim Reid, Range Management Staff, Custer National Forest
- Susan Rinehart, Botanist, Little Missouri National Grassland
- Tom Rhode, Regional Planning Specialist, Region 1
- Ian Ritchie, Archaeologist, Thunder Basin National Grassland
- Kathy Rodriguez, Wildlife Biologist, Medicine Bow-Routt National Forest
- Sharon Ross, Soil Scientist / Hydrologist, Dakota Prairie Grasslands
- Dr. Mark Rumble, Forest Service Research, Rapid City, South Dakota
- Dr. Fred Samson, Wildlife Ecologist, Region 1
- Maure Sand, Fire Management Officer, Dakota Prairie Grasslands
- Dave Saunders, Engineering Technician, Nebraska National Forest
- Jerry Schmidt, Medicine Bow / Routt National Forest Supervisor
- Frank Schmitzer, Forester, Thunder Basin National Grassland
- Jerry Schumacher, Public Affairs Specialist, Nebraska National Forest
- Dr. Carolyn Seig, Forest Service Research, Rapid City, South Dakota
- John Sidle, Wildlife Biologist, Nebraska National Forest
- Phil Sjursen, Geographic Information Specialist, Dakota Prairie Grasslands
- Todd Solem, Range Management Specialist, McKenzie Ranger District

- Doug Stephens, Archaeologist, Nebraska National Forest
- Bryan Stotts, Sheyenne District Ranger
- Tamara Steeks, Biological Technician, Nebraska National Forest
- Dan Svingen, Wildlife Biologist, Dakota Prairie National Grasslands
- David T. Taylor, University of Wyoming, Dept. of Ag and Applied Economics
- Spike Thompson, McKenzie District Ranger
- Jeff Tomac, Range Management Specialist, Thunder Basin National Grassland
- Marcus Tooze, Research Coordinator, University of Nebraska
- Jeff Tupala, Landscape Architect, Medicine Bow-Routt National Forest
- Dr. Dan Uresk, Forest Service Research, Rapid City, South Dakota
- Leslie Vaculik, Leasable Minerals Specialist, Region 1
- Arden Warm, Wildlife Biologist, Medora Ranger District, Dakota Prairie Grasslands
- Jim Wickel, Resource Staff, Dakota Prairie Grasslands
- George Wiggins, Range Management Specialist, Thunder Basin National Grassland
- Steve Williams, Dakota Prairie Grasslands Coordinator
- MaryLou Zimmerman, Geographic Information System Specialist, Thunder Basin National Grassland
- DeAnn Zwight, Regional Planning Director

Many other people from the Rocky Mountain and Northern regional offices, Custer National Forest, Dakota Prairie Grasslands, Medicine Bow-Routt National Forest, Nebraska National Forest Supervisor's offices and District offices have provided support and made contributions in many ways to this planning effort.

# Chapter 5 Document Recipients

Copies of this Final Environmental Impact Statement (FEIS) and proposed Revised Management Plans were either sent or made available to the following government, state and local agencies, tribal governments, and libraries.

## Elected Federal Officials

Max Baucus
Douglas Bereuter
Conrad Burns
Kent Conrad
Barbara Cubin
Tom Daschle
Ross Diercks
Byron Dorgan
Mike Enzi
Chuck Hagel
Tim Johnson
Robert Kerrey
Ben Nelson
Tom Osborne
Earl Pomeroy
Don Stenberg
Craig Thomas
John Thune

## Elected State Officials

Rodney Anderson
Rick Badgett
Mike Baker
Bill Barton
Chris Beutler
Eric Bogue
Christopher Boswell
Bill Bowman
Cale Case
Dave Drovdal
Patricia de Hueck
Cooper Garnos
Jim Geringer
Larry Gilbertz
Keith Goodenough
John Hanes
Mark Harris
John Hoeven
Roger Huckfeldt
William Janklow
Barry Jesen
Mike Johanns
Wayne Johnson
Jim Jones
Kent Juhnke
Keith Kempenich
Tom Kinnison
Ted Klaudt
John Koskan
George McMurtrey
Mike Massie
Jeff Monroe
Patricia Nagel
Gordon Park
Carolyn Paseneaux
Robert Peck
Louise Ryckman
Edward Schafer
Marlene Simons
Rich Tempest
Lee Terry
Harry Tipton
Jim Twiford
Thomas van Norman
Bill Vasey
Jeff Wasserburger
Bob Wickersham

# Elected Local Officials

Adams County Courthouse
Albany County Commissioners
Albany County Planner
Billings County Auditor
Billings County Courthouse
Blaine County Courthouse
Bowman County Courthouse
Campbell County Commissioners
Carbon County Commissioners
Carbon County Planning Commission
Cherry County Commissioners
Cherry County Planning Commission
Converse County Commissioners
Converse County Planner
Corson County Commissioners
Corson County Courthouse
Crook County Commissioners
Custer County Planning Office
Dawes County Commissioners
Dunn County Courthouse
Fall River County Commissioners
Fallon County Courthouse
Golden Valley County commission
Golden Valley County Courthouse
Grant County Courthouse
Jackson County Commissioners
Jones County Commissioners
Lyman County Commissioners
McHenry County Auditors Office
McHenry County Courthouse
McKenzie County Auditor
McKenzie County Commissioners
Moffat County Commissioners
Mountrail County Courthouse
Natrona County Commissioners
Niobrara County Commissioners
Pennington County Commissioners
Pennington County Planning Commission
Perkins County Commissioners
Platte County Commissioners
Platte County Planner
Ransom County Courthouse
Richland County Commissioners
Richland County Courthouse
Shannon County Commissioners
Sioux County Commissioners
Sioux County Courthouse
Slope County Courthouse
Stanley County Commissioners
Stark County Courthouse
Thomas County Commissioners
Weston County Commissioners
Wibaux County Courthouse
Williams County Courthouse

# Tribal Agencies

Arapaho Tribal Council
Cheyenne River Sioux Tribe
Cheyenne / Arapaho Business Council
Commanche Tribal Business Committee
Crow Creek Sioux Tribe
Crow Tribe
Devils Lake Sioux Tribe
Eastern Shoshone Tribe
Flandreau Santee Sioux Tribe
Fort Peck Reservation
Fort Peck Sioux Tribe
Inter-Tribal Bison Cooperative
Iowa Tribe of Kansas & Nebraska
Jicarilla Apache Tribe
Kickapoo Tribe in Kansas
Lower Brule Sioux Tribe
Medicine Wheel Alliance
Native American Fish & Wildlife Society
Northern Arapaho Tribe
Northern Cheyenne Cultural Commission
Northern Cheyenne Tribe
Oglala Sioux Tribe
Omaha Tribe of Nebraska
Ponca Tribe of Nebraska
Rosebud Sioux Tribe
SAC & FOX Tribe of Missouri
Santee Sioux Tribe of Nebraska
Shoshone Tribe
Shoshoni Tribe Business Council
Sisseton-Wahpeton Sioux Tribe

**Tribal Agencies, cont.**

Southern Ute Tribe
Standing Rock Sioux Tribe
Three Affiliated Tribes
Turtle Mountain Band of Chippewa
Winnebago Tribe of Nebraska
Yankton Sioux Tribe

# Federal Agencies

| | |
|---|---|
| Advisory Council on Historic Preservation (ACHP) | Washington, DC |
| Agate Fossil Beds National Monument | Harrison, NE |
| Arapaho Roosevelt National Forest | Ft Collins, CO |
| Badlands National Park | Interior, SD |
| Beaverhead-Deerlodge National Forest | Dillon, MT |
| Bighorn National Forest | Sheridan, WY |
| Black Hills National Forest | Custer, SD |
| Black Kettle National Grassland | Cheyenne, OK |
| Bureau of Indian Affairs | Aberdeen, SD |
| Caddo-Lyndon Johnson National Forest | Decatur, TX |
| Center for Marine Conservation | Washington, DC |
| Center for Semi-Arid Agroforestry | Lincoln, NE |
| Cibola National Forest | Albuquerque, NM |

**Federal Agencies, cont.**

| | |
|---|---|
| Cimmaron National Grassland | Elkhart, KS |
| Clearwater National Forest | Orofine, ID |
| Comanche National Grassland | Springfield, CO |
| Corps of Engineers | Omaha, NE |
| Corps of Engineers | Pierre, SD |
| Custer National Forest | Camp Crook, SD |
| Defense U.S. Department of (DOD) | Arlington, VA |
| Defense U.S. Department of (DOD) | Washington, DC |
| Department of Commerce | Cheyenne, WY |
| Department of the Army | Bismarck, ND |
| Department of the Army | Omaha, NE |
| Dinosaur National Monument | Dinosaur, CO |
| Douglas Ranger District | Douglas, WY |
| Environmental Protection Agency | Denver, CO |
| Environmental Protection Agency | Helena, MT |
| Environmental Protection Agency | Kansas City, KS |
| Environmental Protection Agency | Washington, DC |
| Federal Aviation Administration | Atlanta, GA |
| Federal Aviation Administration | Des Plaines, IL |
| Federal Aviation Administration | Renton, WA |
| Federal Aviation Administration | Washington, DC |
| Federal Energy Regulation Commission | Washington, DC |
| Federal Highway Administration | Bismarck, ND |
| Federal Highway Administration | Denver, CO |
| Federal Highway Administration | San Francisco, CA |
| Federal Railroad Administration | Washington, DC |
| Flathead National Forest | Kalispell, MT |
| Gallatin National Forest | Bozeman, MT |
| General Service Administration | Washington, DC |
| Grand Mesa, Uncompahgre, and Gunnison | Delta, CO |
| Grand River / Cedar River National Grasslands | Lemmon, SD |
| Helena National Forest | Helena, MT |
| Homestead National Monument of America | Beatrice, NE |
| Interstate Commerce | Washington, DC |
| Interstate Commerce Commission | Washington, DC |
| Jefferson Ranger District | Whitehall, MT |
| Kiowa / Rita Blanca National Forest | Clayton, NM |
| Kisatchie National Forest | Pineville, LA |
| Kootenai National Forest | Libby, MT |
| LaCreek National Wildlife Refuge | Martin, SD |

**Federal Agencies, cont.**

| | |
|---|---|
| Lewis & Clark National Forest | Great Falls, MT |
| Library | Fort Collins, CO |
| Little Missouri National Grassland | Dickinson, ND |
| Lolo National Forest | Missoula, MT |
| McKenzie County FSA Office | Watford City, ND |
| McKenzie Ranger District | Watford City, ND |
| Medicine Bow / Routt National Forest | Laramie, WY |
| Medicine Bow-Routt National Forest | Steamboat Springs, CO |
| National Park Service | Denver, CO |
| National Park Service | Dinosaur, CO |
| National Park Service | Hot Springs, SD |
| National Park Service | Lakewood, CO |
| National Park Service | Madison, WI |
| National Park Service | Omaha, NE |
| National Park Service | O'Neill, NE |
| Nez Pierce National Forest | Grangeville, ID |
| North Central RC&D Office | Bassett, NE |
| Office of Archeology & Environmental Preservation | Washington, DC |
| Office of Federal Register | Washington, DC |
| Office of Indian Affairs | Pierre, SD |
| Oglala Natural Resource Regulatory Agency | Pine Ridge, SD |
| Pawnee National Grassland | Greeley, CO |
| Pike San Isabel National Forest | Pueblo, CO |
| Pine Ridge Ranger District | Chadron, NE |
| Prescott National Forest | Prescott, AZ |
| Public Lands Advocacy | Denver, CO |
| Rio Grande National Forest | Monte Vista, CO |
| Rocky Mountain Forest & Range Experiment Station | Rapid City, SD |
| Rocky Mountain Research Station | Fort Collins, CO |
| San Juan National Forest | Durango, CO |
| Sheyenne National Grassland | Lisbon, ND |
| Shoshone National Forest | Cody, WY |
| South Dakota Department of Agriculture | Pierre, SD |
| Theodore Roosevelt National Park | Medora, ND |
| Theodore Roosevelt National Park | Watford City, ND |
| Trish Apland | Washington, DC |
| US Army Corps of Engineers | Bismarck, ND |
| US Army Corps of Engineers | Omaha, NE |
| US Army Corps of Engineers | Pierre, SD |
| US Coast Guard | Washington, DC |

**Federal Agencies, cont.**

| | |
|---|---|
| US Department of Energy | Washington, DC |
| US Department of Housing & Urban Development | Denver, CO |
| US Department of Housing & Urban Development | Kansas City, MO |
| US Department of Labor | Arlington, VA |
| US Department of Labor | Washington, DC |
| US Department of Transportation | Pierre, SD |
| US Department of Transportation | Washington, DC |
| US Department of Transportation | Washington, DC |
| US Environmental Protection Agency | Denver, CO |
| US Geological Survey | Jamestown, ND |
| USDA Agricultural Service | Sidney, MT |
| USDA APHIS | Casper, WY |
| USDA APHIS | Pierre, SD |
| USDA APHIS PPD/EAD | Riverdale, MD |
| USDA APHIS WC | Lincoln, NE |
| USDA Farm Service Agency | Chadron, NE |
| USDA Farm Service Agency | Valentine, NE |
| USDA Forest Service | Atlanta, GA |
| USDA Forest Service | Billings, MT |
| USDA Forest Service | Flagstaff, AZ |
| USDA Forest Service | Ogden, UT |
| USDA Forest Service | Washburn, WI |
| USDA Forest Service | Washington, DC |
| USDA Forest Service Northern Region | Missoula, MT |
| USDA Forest Service Region 1 | Missoula, MT |
| USDA Forest Service Region 2 | Golden, CO |
| USDA Forest Service Region 2 | Lakewood, CO |
| USDA Forest Service Region 3 | Albuquerque, NM |
| USDA Forest Service Region 6 | Portland, OR |
| USDA Forest Service Region 9 | Milwaukee, WI |
| USDA National Agricultural Library | Beltsville, MD |
| USDA Natural Resource Conservation Service | Bozeman, MT |
| USDA Natural Resource Conservation Service | Dickinson, ND |
| USDA Natural Resource Conservation Service | Kennebec, SD |
| USDA Natural Resource Conservation Service | Lakewood, CO |
| USDA Natural Resource Conservation Service | Lincoln, NE |
| USDA Natural Resource Conservation Service | Mullen, NE |
| USDA Natural Resource Conservation Service | Pierre, SD |
| USDA Natural Resource Conservation Service | Rapid City, SD |
| USDA Natural Resource Conservation Service | Salina, KS |

**Federal Agencies, cont.**

| | |
|---|---|
| USDA Natural Resource Conservation Service | Valentine, NE |
| USDA Natural Resource Conservation Service | Watford City, ND |
| USDA Natural Resources Conservation Service | Bismarck, ND |
| USDA Natural Resources Conservation Service | Bison, SD |
| USDA Natural Resources Conservation Service | Casper, WY |
| USDA Natural Resources Conservation Service | Chadron, NE |
| USDA Natural Resources Conservation Service | Hot Springs, SD |
| USDA Natural Resources Conservation Service | Huron, SD |
| USDA Natural Resources Conservation Service | Jamestown, ND |
| USDA Natural Resources Conservation Service | Kadoka, SD |
| USDA Natural Resources Conservation Service | Lisbon, ND |
| USDA Natural Resources Conservation Service | Murdo, SD |
| USDA Natural Resources Conservation Service | Rapid City, SD |
| USDA Natural Resources Conservation Service | Rushville, NE |
| USDA Natural Resources Conservation Service | Sundance, WY |
| USDA Natural Resources Conservation Service | Wall, SD |
| USDA Natural Resources Conservation Service | Washington, DC |
| USDA Office of Civil Rights | Washington, DC |
| USDA Rural Utilities Service | Washington, DC |
| USDA / APHIS | Bismarck, ND |
| USDA / APHIS | Pierre, SD |
| USDA / APHIS / ADC | Lisbon, ND |
| USDA / APHIS / Wildlife Section | Billings, MT |
| USDD Army Corps of Engineers | Omaha, NE |
| USDI Bureau of Indian Affairs | Fort Totten, ND |
| USDI Bureau of Indian Affairs | Gallup, NM |
| USDI Bureau of Indian Affairs | Pine Ridge, SD |
| USDI Bureau of Land Management | Belle Fourche, SD |
| USDI Bureau of Land Management | Billings, MT |
| USDI Bureau of Land Management | Buffalo, WY |
| USDI Bureau of Land Management | Casper, WY |
| USDI Bureau of Land Management | Cheyenne, WY |
| USDI Bureau of Land Management | Dickinson, ND |
| USDI Bureau of Land Management | Miles City, MT |
| USDI Bureau of Land Management | Newcastle, WY |
| USDI Bureau of Land Management | Rawlins, WY |
| USDI Bureau of Land Management | Washington, DC |
| USDI Bureau of Mines | Denver, CO |
| USDI Bureau of Reclamation | Billings, MT |
| USDI Bureau of Reclamation | Bismarck, ND |

**Federal Agencies, cont.**

| | |
|---|---|
| USDI Bureau of Reclamation | Mills, WY |
| USDI Bureau of Reclamation | Rapid City, SD |
| USDI Environmental Protection Rev | Denver, CO |
| USDI Fish & Wildlife Service | Bismarck, ND |
| USDI Fish & Wildlife Service | Cheyenne, WY |
| USDI Fish & Wildlife Service | Denver, CO |
| USDI Fish & Wildlife Service | Grand Island, NE |
| USDI Fish & Wildlife Service | Helena, MT |
| USDI Fish & Wildlife Service | Kearney, NE |
| USDI Fish & Wildlife Service | Kulm, ND |
| USDI Fish & Wildlife Service | Lakewood, CO |
| USDI Fish & Wildlife Service | Pierre, SD |
| USDI Fish & Wildlife Service | Tulsa, OK |
| USDI Fish & Wildlife Service | Valentine, NE |
| USDI Fish and Wildlife Service | Brookings, SD |
| USDI Office of Enviromental Policy & Compliance | Washington, DC |
| USDI Office of Environmental Affairs | Washington, DC |
| Valentine National Wildlife Refuge | Valentine, NE |
| White River National Forest | Glenwood Springs, CO |
| Wildlife Fish & Rare Plants | Washington, DC |
| Wildlife Services | Chadron, NE |

# State Agencies

| | |
|---|---|
| Agricultural Extension Agent | Chadron, NE |
| Assistant Attorney General | Cheyenne, WY |
| Butte Conservation District | Belle Fourche, SD |
| Central Platte Natural Resources District | Grand Island, NE |
| Chadron State Park | Chadron, NE |
| Colorado River Commission of Nevada | Las Vegas, NV |
| Consolidate Farm Service Agency | Huron, SD |
| Consolidated Farm Service Agency | Miller, SD |
| Converse County Conservation District | Douglas, WY |
| Cooperative Extension Service | Lincoln, NE |
| Crescent Lake National Wildlife Refuge | Ellsworth, NE |
| Custer State Park | Custer, SD |
| Department of Environmental Quality | Cheyenne, WY |
| Department of Health & Social Services | Cheyenne, WY |
| Department of Natural Resources | Gladstone, MI |
| Devils Tower Conservation District | Sundance, WY |
| Division of Emergency Management | Pierre, SD |
| Economic Development & Stabilization Board | Cheyenne, WY |
| Elk Creek Conservation District | Sturgis, SD |
| Fort Ransom State Park | Fort Ransom, ND |

**State Agencies, cont.**

| | |
|---|---|
| Glendo State Park | Glendo, WY |
| Governors Office of Economic Development | Pierre, SD |
| Industrial Siting Administration | Cheyenne, WY |
| Land Use Planning Committee / Intermountain Conservation Dist. | Gillette, WY |
| Laramie River Conservation District | Laramie, WY |
| Lewis & Clark Natural Resources District | Hartington, NE |
| Little Blue Natural Resources District | Davenport, NE |
| Lower Big Blue Natural Resources District | Beatrice, NE |
| Lower Elkhorn Natural Resources District | Norfolk, NE |
| Lower Loup Natural Resources District | Ord, NE |
| Lower Niobrara Natural Resources District | Butte, NE |
| Lower Platte North Natural Resources District | Wahoo, NE |
| Lower Platte South Natural Resources District | Lincoln, NE |
| Lower Republican Natural Resources District | Alma, NE |
| Middle Niobrara Natural Resources District | Valentine, NE |
| Middle Republican Natural Resources District | Curtis, NE |
| Montana State Clearing House / Office of Lt. Governor | Helena, MT |
| Montana State Lands Department | Helena, MT |
| Natrona County Conservation District | Casper, WY |
| Nebraska Department of Environmental Quality | Chadron, NE |
| Nebraska Department of Environmental Quality | Lincoln, NE |
| Nebraska Department of Natural Resources | Lincoln, NE |
| Nebraska Game and Parks Commission | Lincoln, NE |
| Nebraska Game and Parks Commission / District 1 | Alliance, NE |
| Nebraska Game and Parks Commission | Bassett, NE |
| Nebraska Game and Parks Commission | Crawford, NE |
| Nebraska Game and Parks Commission | North Platte, NE |
| Nebraska Statewide Arboretum | Lincoln, NE |
| Nemaha Natural Resources District | Tecumseh, NE |
| Niobrara Conservation District | Lusk, WY |
| North Dakota Department Fish & Game | Bismarck, ND |
| North Dakota Department of Agriculture | Bismarck, ND |
| North Dakota Department of Health / Jim Collins | Bismarck, ND |
| North Dakota Forest Service | Bottineau, ND |
| North Dakota Forest Service | Dickinson, ND |
| North Dakota Forest Service | Fargo, ND |
| North Dakota Game and Fish Department | Jamestown, ND |
| North Dakota Game and Fish Department | Devils Lake, ND |
| North Dakota Game and Fish Department | Dickinson, ND |
| North Dakota Game and Fish Department | Jamestown, ND |
| North Dakota Geological Survey | Bismarck, ND |
| North Dakota Parks & Recreation Department | Bismarck, ND |
| North Dakota State Department of Health | Bismarck, ND |
| North Dakota State Forest Service | Bismarck, ND |
| North Dakota State Forest Service | Lisbon, ND |
| North Dakota State Historical Society | Bismarck, ND |

**State Agencies, cont.**

| | |
|---|---|
| North Dakota State Land Department | Bismarck, ND |
| North Dakota State Water Commission | Bismarck, ND |
| North Dakota Tourism Department | Bismarck, ND |
| Office of Surface Mining / Casper Field Office | Casper, WY |
| Papio-Missouri River Natural Resources District | Omaha, NE |
| Perkins County Conservation District | Bison, SD |
| Platte County Resource District | Wheatland, WY |
| South Dakota Association of Conservation Districts | Belle Fourche, SD |
| South Dakota Association of Conservation Districts | Interior, SD |
| South Dakota Association of Conservation Districts | Pierre, SD |
| South Dakota Department Game Fish & Parks | Lemmon, SD |
| South Dakota Department of Economic & Tourism | Pierre, SD |
| South Dakota Department of Environment & Natural Resources | Pierre, SD |
| South Dakota Game Fish & Parks | Britton, SD |
| South Dakota Game Fish & Parks | Hot Springs, SD |
| South Dakota Game Fish & Parks | Philip, SD |
| South Dakota Game Fish & Parks | Pierre, SD |
| South Dakota Game Fish & Parks | Rapid City, SD |
| South Dakota Game Fish & Parks | Wall, SD |
| South Dakota Office School & Public Lands | Pierre, SD |
| South Dakota Rural Development | Huron, SD |
| South Dakota Rural Development Council | Pierre, SD |
| South Dakota State Clearinghouse | Pierre, SD |
| South Dakota Wildlife Federation | Garretson, SD |
| State Engineers Office | Cheyenne, WY |
| State Forest Division | Cheyenne, WY |
| State Historical Preservation | Cheyenne, WY |
| State Planning Coordinator | Cheyenne, WY |
| State of North Dakota / Office of the Governor | Bismarck, ND |
| State of Wyoming / Public Service Commission | Cheyenne, WY |
| Tri-Basin Natural Resources District | Holdrege, NE |
| Twin Platte Natural Resources District | North Platte, NE |
| University of Nebraska / Lincoln Forest Service | Chadron, NE |
| University of Nebraska Panhandle Research & Evaluation | Scottsbluff, NE |
| Upper Big Blue Natural Resources District | York, NE |
| Upper Elkhorn Natural Resources District | O'Neill, NE |
| Upper Loup Natural Resources District | Thedford, NE |
| Upper Niobrara White Natural Resources District | Chadron, NE |
| Upper Republican Natural Resources District | Imperial, NE |
| West Central Research & Extension Center | North Platte, NE |
| Weston County Natural Resource District | Newcastle, WY |
| Wisconsin Department of Natural Resources | Spooner, WI |
| Wyoming Assistant State Forester | Cheyenne, WY |
| Wyoming Association of Conservation Districts | Cheyenne, WY |
| Wyoming Department of Agriculture | Cheyenne, WY |
| Wyoming Department of Commerce | Cheyenne, WY |

**State Agencies, cont.**

| | |
|---|---|
| Wyoming Department of Environmental Quality | Cheyenne, WY |
| Wyoming Game & Fish Department | Casper, WY |
| Wyoming Game & Fish Department | Cheyenne, WY |
| Wyoming Game & Fish Department | Gillette, WY |
| Wyoming Game & Fish Department | Lander, WY |
| Wyoming Game & Fish Department | Laramie, WY |
| Wyoming Game & Fish Department | Lusk, WY |
| Wyoming Game & Fish Department | Moorcraft, WY |
| Wyoming Game & Fish Department | Sheridan, WY |
| Wyoming Game & Fish Department | Wheatland, WY |
| Wyoming Legislative Service Office | Cheyenne, WY |
| Wyoming Oil & Gas Commission | Casper, WY |
| Wyoming Public Lands Council | Casper, WY |
| Wyoming State Clearinghouse | Cheyenne, WY |
| Wyoming State Engineer | Cheyenne, WY |
| Wyoming State Forestry | Cheyenne, WY |
| Wyoming State Forestry | Newcastle, WWY |
| Wyoming State Geological Survey | Laramie, WY |
| Wyoming State Highway Department | Cheyenne, WY |
| Wyoming State Highway Department | Casper, WY |
| Wyoming State Highway Department / District 1 | Laramie, WY |
| Wyoming State Highway Department | Rawlins, WY |
| Wyoming State Parks & Historic Sites | Cheyenne, WY |
| Wyoming Travel Commission | Cheyenne, WY |
| Wyoming Water Development Commission | Cheyenne, WY |
| Wyoming Water Research Center | Laramie, WY |

# Local Agencies

| | |
|---|---|
| Albany County Fire Warden | Laramie, WY |
| Albany County Predator Control Board | Rock River, WY |
| Albany Peak Zone Fire Warden | Wheatland, WY |
| American Creek Conservation District | Kennebec, SD |
| Billings County Water Management District | Medora, ND |
| Campbell County Engineering | Gillette, WY |
| Campbell County Predator Control Board | Gillette, WY |
| Campbell County Weed & Pest | Gillette, WY |
| Carbon County Weed & Pest Control | Rawlins, WY |
| Cherry County Extension Office | Valentine, NE |
| City of Douglas | Douglas, WY |
| City of Watford City | Watford City, ND |
| Converse County PAC Board | Douglas, WY |
| Converse County Predator Control Board | Douglas, WY |
| Converse County Rural Fire Association | Lost Springs, WY |
| Converse County Weed & Pest | Douglas, WY |
| Converse County Zone Fire Warden | Douglas, WY |
| Crook County Farm Bureau | Sundance, WY |

**Local Agencies, cont.**

| | |
|---|---|
| Crook County Weed & Pest | Sundance, WY |
| Custer County Weed & Pest Board | Custer, SD |
| Douglas County Extension Office | Omaha, NE |
| Dundy County Extension Office | Benkelman, NE |
| Dunn County Water Resource District | Manning, ND |
| East Pennington Conservation District | Wall, SD |
| Fall River Weed & Pest Board | Hot Springs, SD |
| Jackson County Conservation District | Kadoka, SD |
| Jackson County Weed & Pest Board | Kadoka, SD |
| Jones County Conservation District | Murdo, SD |
| Jones County Weed & Pest Board | Murdo, SD |
| Lower Brule Agency | Lower Brule, SD |
| Lyman County Weed & Pest Board | Kennebec, SD |
| McKenzie County Extension Agent | Watford City, ND |
| McKenzie County Water Resources Board | Watford City, ND |
| Minnehaha Conservation District | Sioux Falls, SD |
| Natrona County Fire Warden | Mills, WY |
| Natrona County Weed & Pest | Mills, WY |
| Niobrara County Fire Chief | Lusk, WY |
| Niobrara County Weed & Pest | Lusk, WY |
| Nuckolls County Extension Agent | Nelson, NE |
| Pennington County Weed & Pest Board | Rapid City, SD |
| Perkins County Weed Board | Bison, SD |
| Platte County Assistant Fire Warden | Wheatland, WY |
| Platte County Fire Warden | Wheatland, WY |
| Platte County Predator Control Board | Wheatland, WY |
| Ransom County Extension Office | Lisbon, ND |
| Ransom County Farm Services Agency | Lisbon, ND |
| Sioux County Extension Office | Harrison, NE |
| Southeast Research & Extension Center | Lincoln, NE |
| Stanley County Weed & Pest Board | Ft. Pierre, SD |
| Thomas County Extension Office | Thedford, NE |
| UNL Cooperative Extension Office | Syracuse, NE |
| Weston County Sheriff | Newcastle, WY |
| Weston County Weed & Pest | Newcastle, WY |
| Williston City Mayor | Williston, ND |
| Wyoming Agriculture Extension Service | Douglas, WY |

# Libraries

Albany County Public Library
Bismarck Public Library
Bowman Public Library
Broken Bow Public Library
Campbell County Library
Carbon County Public Library
Chadron Public Library
Coe Library
Colorado State University Library
Converse County Library
Converse County Library - Glenrock
Crawford Public Library
Custer County Library
Dickinson Public Library
E Y Berry Library
Edgemont Public Library
Fargo Public Library
Fort Berthold Community College Library
Golden Valley Library
Grand Forks Public Library
Hot Springs Library
Kip Qualc Library
LCCC Library
Laramie County Library
Lemmon Public Library
Library of Congress
Lincoln City Libraries
Lisbon Public Library
McKenzie County Public Library
Minot Public Library
Moorcroft Public Library
Natrona County Library
Nebraska Department of Roads Library
New England Public Library
New Town City Library
Niobrara County Library
North Dakota State University Library
North Platte Public Library
Pierre Public Library
Platte County Public Library
Rapid City Public Library
Rushville Public Library
Saratoga Public Library
Scottsbluff Public Library
Sidney Public Library
S.J. and Jessie E. Quinney Library
South Dakota State Library
URS Greiner Woodward Clyde Library
Upton Branch Library
Valentine Public Library
Weston County Library
Williston Community Library
Wright Branch Library

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# Common/Scientific Names

## Plants

| | |
|---|---|
| Adder's tongue | *Ophioglossum vulgatum* |
| Alfalfa | *Medicago sativa* |
| Alkali cordgrass | *Spartina gracilis* |
| Alkali grass | *Puccinellia nuttaliana* |
| Alkali sacton | *Sporobolus airoides* |
| Alyssum-leaf phlox | *Phlox alyssifolia* |
| American elm | *Ulmus americana* |
| American plum | *Prunus americana* |
| American sea blite | *Suaeda caleoliformis* |
| Annual ragweed | *Ambrosia artemisiifolia* |
| Arrowhead | *Sagittaria spp* |
| Aspen | *Populus spp* |
| Austrian pine | *Pinus balfouriana austrina* |
| Baltic rush | *Juncus balticus* |
| Barr's milkvetch | *Astragalus barii* |
| Basin wild rye | *Leymus cinerus* |
| Basswood | *Tilia americana* |
| Beach heather | *Hudsonia tomentosa* |
| Beaked willow | *Salix bebbiana* |
| Bearded wheatgrass | *Agropyron subsecundum* |
| Beebalm | *Monarda spp* |
| Big bluestem | *Andropogon gerardii* |
| Birdfoot sagebrush | *Artemisia pedatifida* |
| Black greasewood | *Sarcobatus vermiculatus* |
| Black-eyed Susan | *Rudbeckia hirta* |
| Blanket flower | *Gaillardia spp* |
| Blowout grass | *Redfieldia flexuosa* |
| Blowout penstemon | *Penstemon haydenii* |
| Blue grama | *Bouteloua gracilis* |
| Blue lips | *Collinsia parviflora* |
| Bluebunch wheatgrass | *Agropyron spicatum* |
| Bluejoint | *Calamagrostis canadensis* |
| Bog willow | *Salix pedicellaris* |
| Boston ivy | *Parthenocissus tricuspidata* |
| Boxelder | *Acer negundo* |
| Broad-leaved goldenrod | *Solidago flexcaulis* |
| Broom snakeweed | *Gutierrezia dracunculoides* |
| Buckbean | *Menyanthes trifoliata* |
| Buffaloberry | *Shepherdia spp* |
| Buffalograss | *Buchloe dactyloides* |
| Bulrush | *Scirpus spp* |
| Bur oak | *Quercus macrocarpa* |
| Canada anemone | *Anemone candensis* |
| Canada goldenrod | *Solidago canadensis* |
| Canada thistle | *Cirsium canadensis* |
| Canada wild rye | *Elymus canadensis* |
| Cattail | *Typha spp* |
| Cheatgrass | *Calamagrostis spp* |
| Chokecherry | *Prunus virginiana* |
| Club moss | *Lycopodium spp* |
| Common rabbitbrush | *Chrysothamnus nauseosus* |
| Common scouring rush | *Equisetum hyemale* |
| Common spikesedge | *Carex spp* |
| Coneflower | *Rudbeckia spp* |
| Corn | *Zea mays* |
| Cottonwood | *Populus deltoides* |
| Creeping cedar | *Juniperus horizontalis* |
| Crested shield fern | *Dryopteris cristata* |
| Crested wheatgrass | *Agropyron cristatum* |
| Crested woodfern | *Dryopteris cristata* |
| Dakota buckwheat | *Eriogonum visheri* |
| Delicate sedge | *Carex leptalea* |
| Dogberry | *Ribes cynosbati* |
| Dotted gayfeather | *Liatris punctata* |
| Douglas knotweed | *Polygonum douglasii* |
| Downy brome | *Bromus tectorum* |
| Dwarf juniper | *Juniperus communis* |
| Eastern red cedar | *Juniperus virginiana* |
| Fescue sedge | *Carex alopecoidea* |
| Fleabane | *Erigeron spp* |
| Four-wing saltbush | *Atriplex canescens* |
| Fowl bluegrass | *Poa palustris* |
| Foxtail barley | *Hordeum jubatum* |
| Foxtail sedge | *Carex alopecoidea* |

| | |
|---|---|
| Fringed sage | *Artemisia frigida* |
| Frostweed | *Helianthemum bicknelli* |
| Gardner's saltbush | *Atriplex gardneri* |
| Gayfeather | *Liatris spp* |
| Golden stickleaf | *Mentzelia pumila* |
| Goldenrod | *Solidago spp* |
| Grass-leaved goldenrod | *Euthamia graminifolia* |
| Gray sagewort | *Artemisia ludoviciana* |
| Greasewood | *Sarcobatus vermiculatus* |
| Green ash | *Fraxinus pennsylvanica* |
| Green needlegrass | *Stipa viridula* |
| Green sagewort | *Artemisia dracunculus* |
| Gumbo lily | *Oenothera caespitosa* |
| Hackberry | *Celtis occidentalis* |
| Hairy grama | *Bouteloua hirsuta* |
| Handsome sedge | *Carex formosa* |
| Hardstem bulrush | *Scripus acutus* |
| Harebell | *Campanula rotundifolia* |
| Hawthorn | *Crataegus spp* |
| Hedge-nettle | *Stachys palustris* |
| Hoary cress | *Cardaria draba* |
| Hoary vervain | *Verbena stricta* |
| Hooker's townsendia | *Townsendia hookeri* |
| Ill scented sumac | *Rhus trilobata* |
| Indian grass | *Sorghastrum nutans* |
| Inland saltgrass | *Distichlis spicata spicata* |
| Ironwood | *Ostrya virginiana* |
| Jack pine | *Pinus bansian* |
| Japanese brome | *Bromus japonicus* |
| Joe Pye weed | *Eupatorium macutatum bruneri* |
| Junegrass | *Koeleria pyramidata* |
| Juniper | *Juniperus spp* |
| Kentucky bluegrass | *Poa pratensis* |
| Kochia | *Kochia scoparia* |
| Labrador bedstraw | *Galium labradoricum* |
| Lady fern | *Athyrium filix-femina* |
| Lancefeaf cottonwood | *Populus x acuminata* |
| Large gayfeather | *Liatris spp* |
| Lead plant | *Amorpha canescens* |
| Leafy bulrush | *Scirpus polyphyllus* |
| Leafy spruge | *Euphorbia esula* |
| Leathery grapefern | *Botrychium multifidum* |
| Limber pine | *Pinus flexilis* |
| Little bluestem | *Andropogon scoparius* |
| Little bluestem | *Schizachyrium scoparium* |
| Little grapefern | *Botrychium simplex* |
| Little-seed ricegrass | *Oryzopsis micrantha* |
| Locust | *Robina pseudo-acacia* |
| Loesels twayblade | *Liparis loeselii* |
| Long-headed coneflower | *Rudbeckia spp* |
| Lupine | *Lupinus spp* |
| Marsh bellflower | *Campanula aparinoides* |
| Marsh fern | *Thelypteris palustris* |
| Marsh horsetail | *Equisetum palustre* |
| Mat muhly | *Muhlenbergia richardsonis* |
| Meadow brome | *Bromus erectus* |
| Meadow horsetail | *Equisetum pratense* |
| Meadow Willow | *Salix petiolaris* |
| Milkweed | *Asclepias spp* |
| Mountain brome | *Bromus marginatus* |
| Mountain mahogany | *Cercocarpus montanus* |
| Musk thistle | *Carduus nutans* |
| Narrow-leaved purple coneflower | *Echinacea angustifolia* |
| Needle-and-thread | *Stipa comata* |
| Needleleaf sedge | *Carex duriuscula* |
| Nodding buckwheat | *Eriogonum cernuum* |
| Northern green orchid | *Platanthera hyperborea* |
| Northern pin oak | *Quercus ellipsoidalis* |
| Northern reedgrass | *Calamagrostis stricta* |
| Nuttall alkali grass | *Puccinellia nuttaliana* |
| Oakfern | *Gymnocarpium dryopteris* |
| Oregon grape | *Berberis repens* |
| Pale echinacea | *Echinacea pallida* |
| Panicled aster | *Aster simplex* |
| Paper birch | *Betula papyrifera* |
| Peachleaf willow | *Salix amygdaloides* |
| Penstemon | *Penstemon spp* |
| Plains cactus | *Opuntia spp* |
| Plains muhly | *Muhlenbergia cuspidata* |
| Poison ivy | *Toxicodendron spp* |
| Ponderosa pine | *Pinus ponderosa* |
| Porcupine-grass | *Stipa spartea* |
| Prairie cordgrass | *Spartina pectinata* |
| Prairie dropseed | *Sporobolus heterolepsis* |
| Prairie rose | *Rosa arkansana* |
| Prairie sandreed | *Calamovilfa longifolia* |
| Prairie spiderwort | *Trandescantia spp* |
| Prickly pear | *Opuntia polyacantha* |
| Purple prairie clover | *Dalea purpurea* |
| Pussy willow | *Salix discolor* |
| Quaking aspen | *Populus tremuloides* |
| Red clover | *Trifolium pratense* |

| | |
|---|---|
| Red osier dogwood | *Cornus sericea* |
| Red threeawn | *Aristida purpurea robusta* |
| Redtop | *Agrostis stolonifera* |
| Ricegrass | *Oryzopsis spp* |
| Rocky Mountain juniper | *Juniperus scopulorum* |
| Rose | *Rosa spp* |
| Rubber rabbitbrush | *Chrysothamnus nauseosus* |
| Rush | *Juncus spp* |
| Russian knapweed | *Centaurea repens* |
| Rydberg's sunflower | *Helianthus spp* |
| Salsify | *Tragopogon spp* |
| Sand bluestem | *Andropogon hallii* |
| Sand dropseed | *Sporobolus cryptandrius* |
| Sand lily | *Leucocrinum montanum* |
| Sand lovegrass | *Eragrostis trichodes* |
| Sand muhly | *Muhlenbergia arenicola* |
| Sand sagebrush | *Artemisia filifolia* |
| Sandbar willow | *Salix exigua* |
| Sandberg bluegrass | *Poa sandbergii* |
| Sandgrass | *Triplasis purpurea* |
| Scotch pine | *Pinus sylvestris* |
| Sensitive fern | *Onoclea sensibilis* |
| Serviceberry | *Amelanchier spp* |
| Shadscale | *Atriplex spp* |
| Shadscale saltbrush | *Atriplex confertifolia* |
| Shining flatsedge | *Cyperus bipartitus* |
| Showy lady's slipper | *Cypridpedium reginae* |
| Shrubby cinquefoil | *Pentaphylloides floribunda* |
| Sideoats grama | *Bouteloua curtipendula* |
| Silky prairie clover | *Dalea villosa* |
| Silver buffaloberry | *Shepherdia argentea* |
| Silver sage | *Artemisia cana* |
| Silver sagebrush | *Artemisia cana* |
| Silverberry | *Elaegnus commutata* |
| Silverweed cinquefoil | *Potenilla argentea* |
| Skunkbrush | *Rhus aromatica* |
| Skunkbrush sumac | *Rhus aromatica* |
| Slendar cottongrass | *Eriphorum gracile* |
| Slendar wheatgrass | *Agropyron trachycaulum* |
| Small white lady's slipper | *Cypripedium candidum* |
| Smartweed | *Polygonum spp* |
| Smooth brome | *Bromus inermis* |
| Smooth goosefoot | *Chenopodium subglabrum* |
| Smooth scouring rush | *Equisetum laevigatum* |
| Smooth sumac | *Rhus glabra* |
| Smoothbark cottonwood | *Populus x acuminata* |
| Snowberry | *Symphoricarpos occidentalis* |
| Soft-leaf muhly | *Muhlenbergia richardsonis* |
| Softstem bulrush | *Scripus tabernaemontani* |
| Sorghum | *Sorghum halepense* |
| Soybean | *Glycine max* |
| Spikerush | *Eleocharis spp* |
| Spinulose woodfern | *Dryopteris spinulosa* |
| Spotted evening primrose | *Oenothera canescens* |
| Spotted knapweed | *Centaurea maculosa* |
| Squaw currant | *Ribes cereum colubrinum* |
| Stiff sunflower | *Helianthus rigidus* |
| Sumac | *Rhus spp* |
| Sun sedge | *Carex inops heliophila* |
| Sunflower | *Helianthus spp* |
| Sweetclover | *Melilotus spp* |
| Switchgrass | *Panicum virgatum* |
| Tall goldenrod | *Solidago gigantea* |
| Tall white aster | *Aster ericoides* |
| Tawny crescent | *Phyciodes batesii* |
| Thickspike wheatgrass | *Agropyron dasystachyum* |
| Thistle | *Cirsium spp* |
| Threadleaf sedge | *Carex filifolia* |
| Three-square bulrush | *Scirpus pungens* |
| Timothy | *Phleum pratense* |
| Torrey's cryptantha | *Cryptantha torreyana* |
| Umbrella flatsedge | *Cyperus diandrus* |
| Upright pinweed | *Lechea stricta* |
| Ute ladies'-tresses | *Spiranthes diluvialis* |
| Violet | *Viola spp* |
| Wahoo spindle-tree | *Euonymus atropurpureus* |
| Wedge-leaf frog-fruit | *Phyla cuneifolia* |
| Western prairie fringed orchid | *Platanthera praeclara* |
| Western ragweed | *Ambrosia psilostachya* |
| Western snowberry | *Symphoricarpos occidentalis* |
| Western wheatgrass | *Agropyron smithii* |
| Western wheatgrass | *Pascopyrum smithii* |
| Western yarrow | *Achillea millefolium* |
| Wheat | *Triticum aestivum* |
| White prairie clover | *Dalea candida* |
| White prairie clover | *Petalostemum candidum* |
| White sweetclover | *Melilotus alba* |
| Wilcox dicanthelium | *Dicanthelium wilcoxianum* |
| Wild plum | *Prunus americana* |
| Wild strawberry | *Fragaria virginiana* |
| Wildrose | *Rosa spp* |
| Willow | *Salix spp* |

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|---|---|
| Willow buckbrush | *Symphoricarpos occidentalis* |
| Wolfberry | *Symphoricarpos occidentalis* |
| Wood lily | *Lilium philadelphicum* |
| Woolly sedge | *Carex lanuginosa* |
| Wyoming big sagebrush | *Artemisia tridentata wyomingensis* |
| Yellow alyssum | *Alyssum desertorum* |
| Yucca | *Yucca glauca* |

# Animals

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|---|---|---|---|
| Alkali fairy shrimp | *Branchinecta spp* | Bull snake | *Pituophis melanoleucus sayi* |
| American bittern | *Botaurus lentiginousus* | Bullfrog | *Rana catesbeiana* |
| American burying beetle | *Nicrophorus americanus* | Bullock's oriole | *Icterus bullocki* |
| American crow | *Corvus brachyrhynchos* | Bumble bees | *Bombus spp* |
| American goldfinch | *Carduelis tristis* | Burrowing owl | *Speotyto cunicularia* |
| American peregrine falcon | *Falco peregrinus* | California bighorn sheep | *Ovis canadensis californiana* |
| American wigeon | *Anas americana* | Canada goose | *Branta canadensis* |
| Argos skipper | *Atrytone arogos* | Cardinal | *Cardinalis cardinalis* |
| Badger | *Taxidea taxus* | Channel catfish | *Ictalurus punctatus* |
| Baird's sparrow | *Ammodramus bairdii* | Chestnut-collared longspur | *Calcrius ornatus* |
| Bald eagle | *Haliaeetus leucocephalus* | Chorus frog | *Pseudacris spp* |
| Beaver | *Castor canadensis* | Clark's nutcracker | *Nucifraga columbiana* |
| Belfragii's bug | *Chlorochroa belfragii* | Clay-colored sparrow | *Spizella pallida* |
| Bell's vireo | *Vireo bellii* | Common loon | *Gavia immer* |
| Belted kingfisher | *Ceryle alcyon* | Cooper's hawk | *Accipiter cooperii* |
| Bison | *Bison bison* | Cottontail | *Sylvilagus spp* |
| Black bullhead | *Ameiurus melas* | Coyote | *Canis latrans* |
| Black tern | *Chlidonias niger* | Crappie | *Pomoxis spp* |
| Black-backed woodpecker | *Picoides arcticus* | Dakota skipper | *Hesperia dacotae* |
| Black-billed cuckoo | *Cuccyzus erythropthalmus* | Dickcissel | *Spiza americana* |
| Black-billed magpie | *Pica hudsonia* | Downy woodpecker | *Picoides pubescens* |
| Black-capped chickadee | *Poecile atricapilla* | Dwarf shrew | *Sorex nanus* |
| Black-footed ferret | *Mustela nigripes* | Eastern bluebird | *Sialia sialis* |
| Black-tailed prairie dog | *Cynomys ludovicianus* | Eastern screech-owl | *Otus asio* |
| Blanding's turtle | *Emydoidea blandingii* | Eastern wood-pewee | *Contopus virens* |
| Blue grosbeak | *Guiraca caerulea* | Elk | *Cervus elaphus* |
| Blue jay | *Cyanocitta cristata* | Fathead minnow | *Pimephales promelas* |
| Bluegill | *Lepomis macrochirus* | Ferruginous hawk | *Buteo regalis* |
| Blue-winged teal | *Anas discors* | field sparrow | *Spizella pusilla* |
| Bobcat | *Felis rufus* | Finscale dace | *Phoxinus neogaeus* |
| Bobolink | *Dolichonys oryzivorus* | Flathead chub | *Platygobio gracilis* |
| Box turtle | *Terrapene ornata* | Fox sparrow | *Passerella iliaca* |
| Brewer's sparrow | *Spizella brewi* | Fox squirrel | *Sciurus niger* |
| Brook trout | *Salvelinus fontinalis* | Franklin's ground squirrel | *Spermophilus franklinii* |
| Brown trout | *Salmo trutta* | Fringed-tailed myotis | *Myotis thysanodes* |

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|---|---|
| Gadwall | *Anas strepera* |
| Garter snake | *Thamnophis radix* |
| Golden eagle | *Aquila chrysaetos* |
| Goshawk | *Accipiter gentilis* |
| Grasshopper sparrow | *Ammodramus savannarum* |
| Gray catbird | *Dumetella carolinensis* |
| Gray fox | *Urocyon cinereoargenteus* |
| Gray partridge | *Perdix perdix* |
| Gray squirrel | *Sciurus carolinensis* |
| Great blue heron | *Ardea herodias* |
| Great horned owl | *Bubo virginianus* |
| Great-crested flycatcher | *Myiarchus crinitus* |
| Greater prairie chicken | *Tympanuchus cupido pinnatus* |
| Green-winged teal | *Anas crecca* |
| Ground squirrel | *Spermophilus sp* |
| Hairy woodpecker | *Picoides villosus* |
| Hispid pocket mouse | *Chaetodipus hispidus* |
| Hog-nose snake | *Heterodon nasicus* |
| Horned lark | *Eremophila alpestris* |
| Horse | *Equus caballus* |
| House wren | *Troglodytes aedon* |
| Iowa darter | *Etheostama exile* |
| Jack rabbit | *Lepus townsendii* |
| Large-mouthed bass | *Micropterus salmoides* |
| Lark bunting | *Calamospiza melanocorys* |
| Lark sparrow | *Chondestes grammacus* |
| Lazuli bunting | *Passerina amoena* |
| Least flycatcher | *Empidonax minimus* |
| Least weasel | *Mustela nivalis* |
| LeConte's sparrow | *Ammodramus belconteii* |
| Lewis woodpecker | *Melanerpes lewis* |
| Loggerhead shrike | *Lanius ludovicianus* |
| Long-billed curlew | *Numenius americanus* |
| Long-eared owl | *Asio otus* |
| Longnose dace | *Rhinichthys cataractae* |
| Longnose sucker | *Catostomus catostomus* |
| Long-tailed weasel | *Mustela frenata* |
| Mallard | *Anas platyrhyncos* |
| Marbled godwit | *Limosa fedoa* |
| Marmot | *Marmota spp* |
| Marsh wren | *Cistothorus palustris* |
| McCown's longspur | *Calcarius mccownii* |
| Meadowlark | *Sturnella spp* |
| Merlin | *Falco columbarius* |
| Milk snake | *Lampropeltis triangulum* |
| Mink | *Mustela vison* |
| Moose | *Alces alces* |
| Mountain bluebird | *Sialia cursucoides* |
| Mountain lion | *Puma concolor* |
| Mountain plover | *Charadrius montanus* |
| Mourning dove | *Zenaida macroura* |
| Mule deer | *Odocoileus hemionus* |
| Muskrat | *Ondatra zibethicus* |
| Northern bald eagle | *Haliaeetus leucephalus alascanus* |
| Northern flicker | *Colaptes auratus* |
| Northern goshawk | *Accipiter gentilius* |
| Northern grasshopper mouse | *Onychomys leucogaster* |
| Northern harrier | *Circus cyaneus* |
| Northern leopard frog | *Rana pipiens* |
| Northern oriole | *Icterus bullocki* |
| Northern pike | *Esox lucius* |
| Northern pocket gopher | *Thomomys talpoides* |
| Northern short-horned lizard | *Phrynosoma douglasii douglasii* |
| Olive-backed pocket mouse | *Perognathus fasciatus* |
| Orchard oriole | *Icterus spurius* |
| Osprey | *Pandion haliaetus* |
| Ottoe skipper | *Hesperia ottoe* |
| Ovenbird | *Sciurus aurocapiilus* |
| Pale milk snake | *Lampropeltis triangulum* |
| Pallid sturgeon | *Scaphirhynchus albus* |
| Pearl dace | *Semotilus margarita* |
| Peregrine falcon | *Falco peregrinus* |
| Pintail | *Anas acuta* |
| Plains harvest mouse | *Reithrodeontomys montanus* |
| Plains pocket mouse | *Perognathus flavescens* |
| Plains spadefoot | *Spea bombifrons* |
| Plains spotted skunk | *Spilogale putorius interrupta* |
| Plains topminnow | *Fundulus sciadicus* |
| Porcupine | *Erithizon dorsalis* |
| Powesheik skipper | *Oarisma powesheik* |
| Prairie falcon | *Falco mexicanus* |
| Prairie rattlesnake | *Crotalus viridis viridis* |
| Prairie skink | *Eumeces septentrionalis* |
| Prairie vole | *Microtus ochrogaster* |
| Pronghorn | *Antilocapra americana* |
| Pygmy nuthatch | *Sitta pygmaea* |
| Raccoon | *Procyon lotor* |
| Red crossbill | *Loxia curvirostra* |
| Red fox | *Vulpes vulpes* |
| Red shiner | *Notropis lutrensis* |
| Red-breasted nuthatch | *Sitta canadensis* |
| Red-headed woodpecker | *Melanerpes erythrocephalus* |

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|---|---|
| Red-tailed hawk | *Buteo jamaiicensis* |
| Regal fritillary | *Spyeria idalia* |
| Richardson's ground squirrel | *Spermophilus richardsonii* |
| Ring-necked pheasant | *Phasianus colchicus* |
| River otter | *Lantra canadensis* |
| Rocky Mountain bighorn sheep | *Ovis canadensis canadensis* |
| Ruby-throated hummingbird | *Archilochus colubris* |
| Rufous-sided towhee | *Pipilo erythrophthalmus* |
| Sage grouse | *Centrocerus urophasianus* |
| Sage sparrow | *Amphispiza belli* |
| Sage thrasher | *Oreoscoptes montanus* |
| Sage vole | *Lagurus curtatus* |
| Sand shiner | *Notropis stramineus* |
| savannah sparrow | *Passerculus sandwichensis* |
| Scarlet tanager | *Piranga ludoviciana* |
| Sedge wren | *Cistothorus platensis* |
| Sharp-shinned hawk | *Accipiter striatus* |
| Sharp-tailed grouse | *Tympanuchus phasianellus jamesi* |
| sharp-tailed sparrow | *Ammodramus nelsoni* |
| Short-eared owl | *Asio flammeus* |
| Shorthead redhorse | *Maxostoma macrolepidotum* |
| Shoveler | *Anas clypeata* |
| Skunk | *Spilogale spp* |
| Spiny softshell turtle | *Trionyx spinifer* |
| Spotted bat | *Euderma maculatum* |
| Sprague's pipit | *Anthus spragueii* |
| Stonecat | *Noturus flavus* |
| Striped skunk | *Mephitus mephitus* |
| Sturgeon chub | *Macrohybopsis gelida* |
| Summer tanager | *Piranga rubra* |
| Swainson's hawk | *Buteo swainsoni* |
| Swift fox | *Vulpes velox* |
| Thirteen-lined ground squirrel | *Spermophilus tridecemlineatus* |
| Tiger salamander | *Ambrystoma tigrinum* |
| Topeka shiner | *Notropis topeka* |
| Townsend's big-eared bat | *Corynorhinus townsendii* |
| Trumpeter swan | *Cygnus buccinator* |
| Turkey vulture | *Cathartes aura* |
| Upland sandpiper | *Bartramia longicauda* |
| Vesper sparrow | *Pooecetes gramineus* |
| Warbling vireo | *Vireo gilous* |
| Western big-eared bat | *Plecotus townsendii* |
| Western burrowing owl | *Speotyto cunicularia* |
| Western screech-owl | *Otus kennicottii* |
| Western smooth green snake | *Liochlorophis vernalis* |
| Western tanager | *Piranga ludoviciana* |
| White sucker | *Catostomus commersoni* |
| White-breasted nuthatch | *Sitta carolinensis* |
| White-faced ibis | *Plegadis chihi* |
| White-footed mouse | *Arborimus albipes* |
| White-tailed deer | *Odocoileus virginianus* |
| White-tailed jackrabbit | *Lepus townsendii* |
| Whooping crane | *Grus americana* |
| Wild turkey | *Meleagris gallopavo* |
| Willow flycatcher | *Empidonax trailii* |
| Wood duck | *Aix sponsa* |
| Woodhouse's toad | *Bufo woodhousii* |
| Yellow perch | *Perca flavescens* |
| yellow warbler | *Dendroica petechia* |
| Yellow-billed cuckoo | *Coccyzus americanus* |
| Yellow-breasted chat | *Icteria virens* |
| Yellow-headed blackbird | *Xanthocephalus xanthocephalus* |
| Yellow-throated vireo | *Vireo flavifrons* |