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# CHAPTER 4 MONITORING AND EVALUATION

## INTRODUCTION

### Monitoring and Evaluation Purpose

Effective land and resource management plan monitoring and evaluation fosters adaptive management and more informed decisions. It helps identify the need to adjust desired conditions, goals, objectives, standards and guidelines as conditions change. Monitoring and evaluation helps forests, grasslands, the agency and the public determine how a land and resource management plan is being implemented, whether plan implementation is achieving desired outcomes, and whether assumptions made in the planning process are valid.

Monitoring and evaluation are conducted at several scales and for many purposes, each of which has different objectives and requirements. Monitoring requirements and tasks are developed to be responsive to the objectives and scale of the plan, program, or project to be monitored.

Monitoring and evaluation are separate, sequential activities required by NFMA regulations to determine how well objectives have been met and how closely management standards and guidelines have been applied. Monitoring generally includes the collection of data and information, either by observation or measurement. Evaluation is the analysis of the data and information collected during the monitoring phase. The evaluation results are used to answer the monitoring questions, determine the need to revise management plans, change how the plans are implemented, and form a basis for adaptively managing the national grasslands. Monitoring and evaluation keep the Revised Land and Resource Management Plan up-to-date and responsive to changing issues by verifying the effectiveness of management plan standards and guidelines and anticipated program and project effects on resources, and providing information for amendments to the management plan.

Monitoring provides the information necessary to determine whether the Revised Management Plan is sufficient to guide management of the national grasslands for the subsequent year or whether modification of the plan is needed.

## DEFINITIONS

### Monitoring Drivers

The National Forest Management Act (NFMA) requires national forests and grasslands to do specific monitoring tasks. The level and intensity of additional monitoring is dependent on available staffing, funding and grassland priorities.

Following is a list of monitoring drivers:

- Public expectations/issues
- Land and resource management plan desired conditions, goals, objectives, standards and guidelines
- Validation of assumptions/models
- Legal and regulatory requirements and Forest Service Manual direction
- Court rulings

## Monitoring Questions

Specific monitoring questions are developed to provide information essential to measuring land and resource management plan accomplishment and effectiveness. These questions address existing issues and help identify emerging issues. Monitoring questions are constructed to address one or more monitoring drivers.

## Monitoring Priority

After monitoring questions are developed, a screening process sorts the more significant questions from the less significant to ensure efficient use of limited resources—time, money and personnel. The priority of a question may affect the intensity or extent of associated monitoring activities. Following is a list of considerations used in the screening process with a brief explanation or example:

- **Management Assumption with High Uncertainty:** This measures the assumptions used when developing management direction. Examples include: (1) evaluating a new way of doing something where there is limited experience with the new technique and (2) evaluating actions taken in response to an unprecedented situation.
- **Conditions with High Disparity:** The large differences between the current and desired conditions have particular interest. Examples include: (1) a particular habitat component is at a much lower level than desired; (2) the amount of use of a particular resource or use at a particular location is much higher than desired.
- **Likely To Affect:** This monitoring and evaluation strategy will focus on those circumstances where management activities are expected to have a discernable outcome, particularly those that are adverse. There may be other forces affecting a resource much more significantly than anything the Forest Service does. The monitoring action will discern what portion of the effects can be attributed to actions occurring on the National Grasslands.
- **Great Consequences:** Examples: (1) if a species is at risk, consequences could be high, whether or not management activities are likely to affect it; (2) if a relationship with cooperators or local government is at risk due to a management activity, consequences could be high (in this case, a human resource).
- **Key Issue:** The revision topics identified through the scoping process may warrant monitoring even if they are (1) well understood, (2) the existing condition is acceptable and (3) management activities will have little impact. Monitoring may be necessary for educational and/or accountability purposes.
- **Easily and Cost Effectively Answered:** If the cost of obtaining monitoring information is low, it may be included as a monitoring unit of measure even though it is of relatively minor importance. Examples may include information readily available from other units of government, and information already available from other Forest Service sources. If the cost of answering the question heavily outweighs the knowledge benefits, or if an adequate monitoring method cannot be cost effectively developed, the resource in question may be more appropriately deferred to another entity, such as Forest Service research or educational institutions.

## Possible Units of Measure

A unit of measure is a quantitative or qualitative parameter used to answer monitoring questions. One or more units of measure can be associated with each question. Examples include acres of black-tailed prairie dog colonies, miles of impaired streams, number of sage grouse leks, or condition estimates.

## Monitoring Methods

Monitoring methods are displayed in the Monitoring Guide and may change based on changes in technology, staffing, budgets, and issues. Only standardized protocols will be used in collecting monitoring item data. Protocols will be peer-reviewed as appropriate.

The level of precision and reliability that each Grassland program or activity is monitored at depends on the particular program or activity to be monitored. Two classes of precision and reliability are recognized:

- **Class A:** These methods are generally well accepted for modeling or measuring the resource. They produce repeatable results that are statistically valid. Reliability, precision and accuracy are very good. The cost of conducting these measurements is higher than other methods. These methods are often quantitative in nature.
- **Class B:** These methods are based on project records, communications, on-site ocular estimates, or less formal measurements like pace transects, informal visitor surveys, aerial photograph interpretation, and other similar types of assessments. Reliability, accuracy, and precision are good, but usually less than Class A. Class B methods are often qualitative in nature, but still provide valuable information on the status of resource conditions.

## Scale/Frequency of Reporting

Scale describes the level of analysis with respect to land size. This measure is important in describing effects dealing with habitat heterogeneity and viability issues, as well as describing cumulative effects of management actions. Examples include: watershed, geographic area, administrative unit, or district.

Frequency describes the timing of monitoring and evaluation efforts over time. Examples include: annually, every five years, or every ten years.

## **Monitoring Type**

Three types of monitoring activities are included in the Land & Resource Management Plan monitoring strategy:

1. **Effectiveness Monitoring:** evaluates how effective the Land & Resource Management Plan actions are at achieving the desired outcomes. Effectiveness monitoring asks whether the desired outcomes/conditions prescribed in the Land & Resource Management Plan are occurring.
2. **Implementation Monitoring:** evaluates whether the anticipated inputs, anticipated outputs, and actions prescribed by the Land & Resource Management Plan are occurring as planned. Implementation monitoring asks whether the activities called for in the Land & Resource Management Plan are occurring.
3. **Validation Monitoring:** verifies the assumptions and models used in the Land & Resource Management plan.

The monitoring strategy predominantly consists of effectiveness monitoring; however, implementation and validation monitoring are addressed as well.

## MONITORING STRATEGY

The monitoring strategy contains the relevant Land and Resource Management Plan monitoring called for by the monitoring drivers. It may be necessary for Grasslands leadership to assist in prioritizing what will be monitored in any given year. A Monitoring Guide would be developed as part of Land & Resource Management Plan implementation. The guide would describe the process for successful monitoring and would outline monitoring protocols, data storage, and other methodologies used to accomplish monitoring.

<i>Monitoring Driver</i>	<i>Monitoring Question</i>	<i>Monitoring Priority</i>	<i>Possible Units of Measure</i>	<i>Monitoring Method</i>	<i>Scale</i>	<i>Frequency of Reporting</i>
<b>Effectiveness Monitoring</b>						
Goal 1.a Objective 2, 3	<b>Riparian 1:</b> To what extent are perennial streams in proper functioning condition and riparian areas and wooded draws self-perpetuating?	Likely to affect.	Miles & location of perennial streams not meeting, making measurable progress towards, or meeting proper functioning condition. Percent of riparian areas and wooded draws that are regenerating or making measurable progress towards regeneration.	A	Geographic	Ten years
<b>Notes:</b> Livestock grazing, mining, and other ground disturbing activities can affect riparian area recovery and condition. This monitoring item deals primarily with the physical characteristics of drainages and watersheds and the biological characteristics of drainages and watersheds including the extent that shrubs and trees are regenerating and multi-storied woodlands occur.						
Goal 1.a Objective 1	<b>Soil 1:</b> To what extent have soils eroded or disturbed by Forest Service management or permitted activities been restored?	Likely to affect.	Acres & location of soils eroded, disturbed, or restored by Forest Service management or permitted activities.	A	Geographic	Ten years
<b>Notes:</b> It is important that we know the condition of our watersheds and soils located within multiple boundaries and the effect of ground disturbing and other management activities on soil conditions.						

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Goal 1.a Objective 1	<b>Watershed 1:</b> To what extent has water quality condition on watersheds containing National Grasslands been restored, maintained or improved?	Likely to affect.	Inventory and classify all Sixth level watersheds as to Condition Class I, II, & III	A	Geographic	Ten Years
<b>Notes:</b> It is important that we know the condition of our watersheds and soils located within multiple boundaries and the effect of ground disturbing and other management activities on soil conditions.						
Goal 1.a Objective 1	<b>Watershed 2:</b> To what extent have water bodies on the National Grasslands that have been degraded by Forest Service permitted or management actions been restored?	Likely to affect.	Inventory and classify the quality, quantity, and condition of water bodies. Number of degraded versus total water bodies on National Grasslands.	A	Geographic	Ten Years
<b>Notes:</b> It is important that we know the condition of our watersheds and soils located within multiple boundaries and the effect of ground disturbing and other management activities on soil conditions.						
Goal 1.a Objective 4	<b>Watershed 3:</b> To what extent have instream flows been assured to provide adequate water for fisheries and other riverine flora and fauna in streams and rivers with high resource values?	Great Consequences	Name and location of streams & rivers having high resource values and the extent instream flows are maintained or improved, Inflow water rights acquired on those streams & rivers	A	Geographic	Five years
<b>Notes:</b> Fisheries and the ecosystem supporting them can be destroyed if water is not available.						
Goal 1.a Objective 5	<b>Watershed 4:</b> To what extent have surface water, sub-surface flows, and aquifers been protected from contamination by management actions on the	Likely to affect.	Number of abandoned wells properly plugged vs. number not properly plugged, identification of and clean-up actions initiated on hazardous	B	Administrative Unit wide	Annually

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
	Dakota Prairie Grasslands+A22?		material sites			

**Notes:** It is important to prevent contamination of surface water, sub-surface flows, and aquifers from Forest Service management actions.

Legal: 36 CFR 219.19(a)(6); 36 CFR 219.20; 36 CFR 219.27(5 and 6); Goal 1.b Objectives 2, 4, & 6	<b>MIS 1:</b> What is the potential habitat capability for each management indicator species?	High Condition Disparity; Viability, Great Consequences; Key Issue	Acres and Distribution of Potential Habitat	A	Administrative Unit wide	Fifteen Years
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**Notes:** Management indicator species (MIS) for the Dakota Prairie Grasslands are the black-tailed prairie dog, sage grouse, sharp-tailed grouse, greater prairie chicken, and the western prairie fringed orchid. Determining and identifying potential habitat for each management indicator species is a regulatory requirement under NFMA.

Legal: 36 CFR 219.19(a)(6); 36 CFR 219.20; 36 CFR 219.27(5 and 6); Goal 1.b Objectives 2, 4, & 6	<b>MIS 2:</b> What is the current habitat suitability for each management indicator species?	High Condition Disparity; MIS for Key Issue (Grassland Vegetation Conditions)	Current Condition and Trend of Key Habitats for Each Management Indicator Species; Habitat Suitability Evaluation Ratings	A	Administrative Unit wide	Five years
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**Notes:** Evaluating the current condition and trend of key habitats for each management indicator species is a regulatory requirement under NFMA



<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Key Issue; Legal: 36 CFR 219.19(a)(6); 36 CFR 219.20; 36 CFR 219.27(5 and 6); Goal 1.b; Objectives 2, 4, & 6	<b>MIS 3:</b> What are the population trends for western prairie fringed orchid and associated species? How have management activities affected this trend and the species' overall recovery?	High Condition Disparity; Key Issue (Recovery and Viability)	Acres where recovery strategy implemented, population counts, seed set results	A	Geographic Area: Sheyenne National Grassland	Annually

**Notes:**The western prairie fringed orchid (WPFO) is a Management Indicator Species and a species at risk (listed as threatened under the Endangered Species Act). A recovery strategy for the Sheyenne National Grasslands metapopulation has been prepared.

Key Issue; Legal: 36 CFR 219.19(a)(6); 36 CFR 219.20; 36 CFR 219.27(5 and 6); Goal 1.b; Objectives 2, 4, & 6	<b>MIS 4:</b> What are the population trends for black-tailed prairie dogs and associated wildlife species, and how have management activities affected this trend?	High Condition Disparity; Viability, Great Consequences; Key Issue	Total acreage and number of active vs. inactive colonies	A	Geographic Area	Five Years
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**Notes:** The black-tailed prairie dog (BTPD) is a Management Indicator Species and a species at risk. It is assumed that if habitat conditions and populations trends improve for the BTPD, they will also improve for closely associated species, such as burrowing owl.

Key Issue; Legal: 36 CFR 219.19(a)(6); 36 CFR 219.20; 36 CFR 219.27(5 and 6); Goal 1.b; Objectives 2, 4, & 6	<b>MIS 5:</b> What are the population trends for sage and sharp-tailed grouse, and greater prairie chicken, and their associated species? How have management activities affected these trends?	High Condition Disparity; Viability, Great Consequences; Key Issue	Acres of high structure, number of active vs. inactive display grounds, number of males on display grounds	A	Geographic area	5 Years
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<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
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**Notes:** These prairie grouse are MIS and represent biological communities of high structure grassland, sagebrush, and grasslands interspersed with shrubs, respectively. The greater prairie chicken and sage grouse are also species at risk.

USDA Departmental Regulation 9500-4; 36 CFR 219.19 and 219.27(6); Goal 1.b Objective 2	<b>T&amp;E 1:</b> To What Extent is the Dakota Prairie Grasslands and its Management Contributing to the Recovery and Viability of Black-footed Ferrets?	Key Issue (Recovery and viability); Great Consequences	Acres of Black-tailed prairie dog, number of Black-footed ferrets released	A	Administrative unit wide	5 years
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**Notes:** The black-footed ferret (BFFE) is a species at risk and is currently listed as endangered under the Endangered Species Act. Currently the black-footed ferret do not occur on the Dakota Prairie Grasslands. Efforts are being made to improve habitat suitability by increasing the numbers of black-tailed prairie dogs, which the ferrets rely on for food and shelter. If sufficient quantity and quality of black-footed ferret habitat is created, black-footed ferrets may be reintroduced by the USFWS.

Migratory Bird Treaty Act; Bald and Golden Eagle Protection Act; USDA Departmental Regulation 9500-4; 36 CFR 219.19 and 219.27(6); Goal 1.b; Objective 2	<b>T&amp;E 2:</b> To What extent is the Dakota Prairie Grasslands and its Management Contributing to the Recovery and Viability of Bald Eagle?	Key Issue (Recovery and viability); Great Consequences	Number of known nesting attempts, number of winter roosts	A	Administrative Unit wide	Annually
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**Notes:** The bald eagle is a species at risk and is currently listed as threatened under the ESA. Populations are recovering in the Northern Great Plains, with new nest sites being established each year. At the present time (2000), no bald eagle nests or winter roosts are known to occur on the Dakota Prairie Grasslands.

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Migratory Bird Treaty Act; USDA Departmental Regulation 9500-4; 36 CFR 219.19 and 219.27(6); Goal 1.b; Objective 2	<b>T&amp;E 3:</b> To What Extent is the Dakota Prairie Grasslands and its Management Contributing to the Recovery and Viability of Whooping Crane?	Key Issue (Recovery and viability); Great Consequences	Documentation of sightings (Date, Location, Habitat, Type of Activity, Number of Birds)	A	Administrative Unit wide	Annually

**Notes:** The whooping crane is a species at risk and is currently listed as endangered under the ESA. Whooping cranes do not nest or winter on the Dakota Prairie Grasslands but have been noted during migration on rare occasions. Whooping crane use of the DPG is incidental and unpredictable. Management is limited to documenting observations in conjunction with USFWS.

USDA Departmental Regulation 9500-4; 36 CFR 219.19 and 219.27(6); Goal 1.b; Objectives 4, 5, 8, 9	<b>Viability 1:</b> To what extent is the Dakota Prairie Grasslands contributing to the viability of rare plant communities?	Key Issue (Viability); Great Consequences	Results from targeted botanical surveys, implementation of conservation strategies	A	Administrative Unit wide	Five years
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**Notes:** Conservation strategies for rare plant communities must be implemented on National Grasslands to contribute to the viability of these communities.

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Migratory Bird Treaty Act; USDA Departmental Regulation 9500-4; 36 CFR 219.19 and 219.27(6); Goal 1.b; Objectives 2, 3, 8, 9, 10	<b>Viability 2:</b> To what extent is the Dakota Prairie Grasslands contributing to the viability of sensitive plant, animal, and fish species?	Key Issue (Viability); Great Consequences	Implementation of conservation strategies, acres of habitat improvement accomplished, population and distribution information from surveys, number of reintroductions and transplants	A	Administrative Unit wide	Five years
<b>Notes:</b> This includes plant, animal, and fish species. Because of their relatively small size, National Forest System lands cannot in and of themselves provide for viable populations for most of these sensitive species, but they can make significant contributions to the viability of many of them. Monitoring of populations and habitats with viability outcomes of 3 through 6 and/or conservation rankings of G1-3 are a priority.						
36 CFR 219.19 and 219.27(6); Goal 1.b	<b>Viability 3:</b> To what extent has cooperative agreements and the landownership adjustment program been effective in reducing private land conflicts involving prairie dogs and enhancing long-term opportunities for development of prairie dog colony complexes in the priority National Grassland areas.	Key Issue (Viability and Biological Diversity); Legal Issue; Great Consequences	Number of Conflict Situations Resolved; Additional Acres of Potential or Current Prairie Dog Habitat Under Federal Ownership or Cooperative Agreements	A	Geographic Areas	Five years
<b>Notes:</b> Landownership adjustments and cooperative agreements provide the key to long-term opportunities for expanding prairie dog populations and for reducing conflicts over prairie dog management.						
Goal 1.c Objective 4, 5, 6, 7; Goal 4.b Public & Organizational Relations Objective 2	<b>Damage Control 1:</b> To what extent are noxious weeds, invasive species, and animal damage expanding or being reduced?	Likely to affect; Great Consequences; key issue.	Species, location, and acres of noxious weeds, invasive species, and animal damage.	A	Geographic	Five years

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
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**Notes:** Management activities can spread or control noxious weeds and invasive species; management decisions can be instrumental in controlling animal damage; early detection is the most economical and sure way of controlling outbreaks and damage. Noxious weed control is a key issue.

Goal 1.c; Goal 2.c Goal 1.c Objective 1; Goal 2.c Wildlife, Fish, & Plant Use Objective 2	<b>Vegetation 1:</b> To What extent are rangeland vegetation structure objectives being met?	Likely to affect. Great Consequences.	Location & Percent of rangeland area meeting or making measurable progress towards desired vegetation structure	A	Geographic	Five years
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**Notes:** Livestock grazing, grazing by insects and wildlife, fire and other disturbances, and weather can affect grassland structure. If structure is inadequate, many dependent species can decline. This decline would be particularly noticed in huntable populations of upland game birds, the people who hunt them, and impacts in the local economy from hunter expenditures.

Goal 1.c; Goal 2.c Goal 1.c Objective 1; Goal 2.c Wildlife, Fish, & Plant Use Objective 2	<b>Vegetation 2:</b> To What extent are rangeland vegetation composition objectives being met?	Likely to affect. Great Consequences.	Location & Percent of rangeland area meeting or making measurable progress towards desired vegetation composition	A	Geographic	Fifteen years
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**Notes:** Natural disturbance processes such as grazing and fire and management induced disturbances such as road building and mineral development can have either beneficial or adverse effects on vegetation composition. Vegetation composition is directly related to the ability to provide forage, enhance biodiversity, and provide cover for wildlife.

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Goal 1.c Objective 1; Goal 2.c Wildlife, Fish, & Plant Use Objective 2	<b>Vegetation 3:</b> To what extent are desired vegetation conditions in wetlands being met?	Likely to affect. Great Consequences.	Location & Percent of Wetlands Meeting, Making Measurable Progress making measurable progress towards, or Not Meeting Desired Structural Stages	A	Administrative Unit Wide	Five years
<b>Notes:</b> The amount of development of shoreline and emergent vegetation around wetlands helps determine the suitability of these areas as habitat for a variety of wildlife species. The frequency, intensity, timing and duration of livestock grazing are key factors in determining the amount of shoreline and emergent vegetation in many constructed or natural wetlands.						
Goal 2.a Objective 1, 7	<b>Recreation 1:</b> To what extent are trails managed to meet regional standards and to minimize conflicts among users.	Great Consequences	Location, condition, and miles of trails meeting and not meeting regional standards. Reports of conflicts among users.	B	District-wide	Annually
<b>Notes:</b> An understanding of trail conditions is needed in order to obtain funding and schedule the work needed to bring trails up to standard. A trail in poor condition causes erosion and is a safety hazard. Short and long-term planning requires an understanding of public needs and demands, carrying capacity, and potential impact to the resources.						
Goal 2.a Objective 4 & 6	<b>Recreation 2:</b> Where does the demand for recreation opportunities warrant development of additional opportunities such as trails or campgrounds?	Great Consequences	Customer surveys; individual public contacts; location, date, and name of facility where use exceeds capacity.	B	District-wide	Five years
<b>Notes:</b> An understanding of developed site conditions is needed in order to obtain funding and schedule the work needed to bring these sites up to standard and maintain that condition. A developed site in poor condition will cause decreased use, environmental problems, and can create health and safety hazards.						

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Goal 2.a Legal - National Historic Preservation Act; Goal 2.a Objectives 2, 3, & 4, Goal 2b Heritage Objectives 2 & 5, Goal 2c Geologic and Paleontologic Resources Objective 3 & Wildlife, Fish & Plant Use Objective 1, Goal 4a Objective 2	<b>Recreation 3:</b> To what extent are Grassland visitors informed of the recreation opportunities available to them; adequately guided to those recreation opportunities; and receive adequate interpretive information on National Register of Historic Places and other heritage sites, geologic, paleontologic, wildlife, plant, and recreation resources or opportunities?	Key Issue	Customer survey and individual contacts with Grassland visitors, contacts with adjacent landowners.	B	District-wide	Five years

**Notes:** People require maps, brochures, and directional signs to guide them to destinations and interpret the resource. Private landowners appreciate when visitors do not trespass on their land. Interpretive information further enhances National Grassland opportunities and experiences.

Legal - National Historic Preservation Act; Goal 2.b Heritage Objectives 2 & 5	<b>Heritage 1:</b> To what extent are National Register sites and districts being identified, protected, and preserved?	Great Consequences	Condition of each site, incidents of vandalism	A	Site or District	Five years
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**Notes:** An understanding of the condition of cultural sites and heritage districts is necessary in order to obtain funding to locate, protect, and preserve the historic properties. Collective management actions over time may affect historic properties and traditional cultural properties.

Goal 2.b, Objective 3 Goal 4.b.	<b>Heritage 2:</b> To what extent are traditional cultural properties being identified and protected?	Likely to Affect	Condition of each site, incidents of vandalism or disruption, American Indian Tribal consultation	B	Geographic	Five years
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<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
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**Notes:** Management activities may affect traditional cultural properties if not identified and protected.

Goal 2.b; Wilderness - Objective 1	<b>Suitable for Wilderness 1:</b> To what extent are the areas that have Management Area Designation 1.2a (Suitable for Wilderness) conserving, enhancing, or protecting the special features and communities of special concern?	Key Issue, Great Consequences	Condition of area features and communities, acres being maintained as 1.2a designation	B	Area Specific	Five Years
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**Notes:** An understanding of the condition and trend of the Suitable Wilderness features is needed so management action can be taken to preserve the wilderness features.

Goal 2.b; Special Areas - Objective 1	<b>Special Interest Areas 1:</b> To what extent have the special features found Special Interest Areas been conserved or enhanced?	Great Consequences	Condition of features / communities	B	Area Specific	Five years
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**Notes:** An understanding of the condition and trend of the features or communities that lead to protecting Special Interest Areas is needed so management action can be taken to preserve or enhance these areas.

Goal 2.b; Special Areas - Objectives 1, 2	<b>Research Natural Areas 1:</b> To what extent have the unique research features of Research Natural Areas been conserved or enhanced?	Great Consequences	Condition of features / communities	B	Area Specific	Five years
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**Notes:** An understanding of the condition and trend of the features or communities that lead to protecting Research Natural Areas is needed so management action can be taken to preserve or enhance these areas.



<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Goal 2.c; Experimental Forests - Objectives 1, 2	<b>Experimental Forests 1:</b> To what extent have the unique research features of Denbigh and Souris Experimental Forests been conserved or enhanced?	Great Consequences	Condition of features / communities	B	Area Specific	Five years
<b>Notes:</b> An understanding of the condition and trend of the features of Denbigh and Souris Experimental Forests is needed so management action can be taken to preserve or enhance these areas.						
Goal 2.c; Geologic and Paleontologic - Objective 1	<b>Geologic &amp; Paleontologic Resources 1:</b> To what extent are geologic and Paleontologic resources being made available for the education, use or enjoyment of the general public?	Great Consequences	Number of people learning from, using, or enjoying geologic and paleontologic resources; number of sites where interpretation is occurring; types of partnerships fostered	B	District	Five years
<b>Notes:</b> Many geologic and paleontologic resources are non-renewable resources, which provide valuable educational, scientific, and recreational opportunities. These resources require sound management and protection for current and future generations to enjoy.						
Legal 36 CFR 219.7(f); Goal 2.c	<b>Community Relations 1:</b> What are the effects of National Grasslands Management on adjacent communities?	Key Issue; Easily/Cost Effectively Answered	NFS related jobs and income; Community Tourism receipts; Federal receipts, Federal revenue sharing with state and local governments	B	County and community depending on data availability.	Annually
<b>Notes:</b> How NFS management affects local economies is an important public issue. With cooperation from State & Local governments the information can be obtained at a relatively low cost.						
Legal 36 CFR 219.7(f); Goal 2.c	<b>Community Relations 2:</b> What are the effects of National Grasslands Management on local communities?	Key Issue; Easily/Cost Effectively Answered	NFS related Federal revenue sharing with State & Local Governments, Shannon Weaver Index; community economic trade balance.	B	County and community depending on data availability.	Five Years

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
<b>Notes:</b> How NFS management affects local community viability is an important public issue. With cooperation from State & Local governments the information can be obtained at a relatively low cost.						
Legal 36 CFR 219.7(f); Goal 2.c	<b>Community Relations 3:</b> What are the effects of National Grasslands Management on economic conditions of local residents?	Key Issue; Easily/Cost Effectively Answered	NFS related jobs and income; Community Tourism receipts	B	County and community depending on data availability.	Annually
<b>Notes:</b> How NFS management affects local economic viability is an important public issue. With cooperation from State & Local governments the information can be obtained at a relatively low cost.						
Goal 2.c Miscellaneous Products Objective 1	<b>Miscellaneous Products 1:</b> To what extent is the demand for miscellaneous products being met?	Key Issue	Number & kind of miscellaneous permit applications requested versus number denied	B	District	Five years
<b>Notes:</b> The demand for miscellaneous products is increasing.						
Goal 2.c; Objective 1	<b>Scenery 1:</b> To what extent have scenery management objectives been met?	Likely to affect	Acres and location of desired versus actual scenery integrity condition.	B	Geographic	Ten years
<b>Notes:</b> Management activities can alter the scenic integrity of an area either positively or negatively. For many visitors the condition of the grassland is key to enjoying their experience.						
Goal 4.a; Objectives 1, 2, 4	<b>Travel and Access 1:</b> To what extent is off-road vehicle use (permitted and unpermitted) damaging grassland resources and causing erosion, sedimentation, and vegetation loss?	Key Issue	Number of off-road vehicle caused incidents of erosion, number of new unauthorized roads, acres of ineffective wildlife habitat due to off-road vehicle use	B	Geographic	Two Years

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
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**Notes:** The impacts from off-road vehicle use are well documented. Monitoring these impacts will help identify additional management needs. Uncontrolled and unauthorized use results in the creation of more roads and OHV trails.

Goal 4.a; Objectives 1, 2, 3	<b>Travel and Access 2:</b> To what extent are site-specific maps and road closures/restrictions effective in preventing off-road vehicle travel?	Key Issue	Number of off-road vehicle use incidents beyond closed road signs or gates	A	Geographic	Two Years
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**Notes:** Stopping off-road travel is extremely difficult on the National Grasslands. Monitoring the effectiveness of site-specific maps and road closures and regulations signs will help determine which are the most effective and if other means need to be employed.

Legal 36 CFR 219.7(f); Goal 4.b	<b>Community Relations 4:</b> To what extent are noxious weeds, invasive species, and animal damage spreading from the National Grasslands to other ownerships or from lands managed by other government agencies to the National Grasslands?	Key Issue;	Acres of Noxious weeds spreading too or from other ownerships; Acres of prairie dogs spreading to or from other ownerships; Instances of insect infestations spreading to or from other ownerships.	A	Geographic	Annually
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**Notes:** When unwanted plants and animals spread from NFS lands to other lands this places an economic hardship on the landowner to control the spread which can be a key issue with affected land owners.

**Implementation Monitoring**

Endangered Species Act; Goal 4b Public and Organizational Relations Objective 2	<b>T &amp; E 4:</b> Are actions identified in national recovery plans for threatened and endangered species being implemented where opportunities exist on national grasslands?	Key Issue (Recovery and viability); Great Consequences	Type of Actions Identified in Recovery Plans That FS is Implementing and Type of Recovery Plan Actions That Could Be Implemented on national grasslands.	A	T&E recovery areas identified in Recovery Plans.	Annually
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<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
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**Notes:** Recovery plans have been prepared for each of the threatened and endangered species occurring on the national grasslands. The national recovery plans for the black-footed ferret and western prairie fringed orchid have specific action items that could be applied to the national grasslands in the planning area. These lands can play a significant role in the recovery of these species.

Agency Expectations; Public Expectations & Issues, Goal 3 Objectives 1, 2, & 3	<b>Administration 1:</b> Are the action plans identified in the objectives being completed on schedule?	Likely to affect.	Percent compliance; narrative	B	Administrative Unit wide	Annually
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**Notes:** These are administrative activities such as conducting studies, obtaining baseline inventories, completing action plans, or coordinating and developing partnerships with outside groups. The administrative activities are necessary to set the stage for successful Land & Resource Management Plan implementation, and failure to conduct administrative activities would likely affect the ability to meet the goals, objectives, and desired future conditions established in the plan.

Agency Expectations; Public Expectations & Issues, Goal 4 Legal: 36 CFR 219.12 (k)	<b>Implementation Monitoring 1:</b> Have site-specific decisions implemented the Land & Resource Management Plan direction?	Likely to affect.	Percent compliance; narrative; As a minimum review: 2 AMPs per District; and 1% of other NEPA projects completed for compliance with Land & Resource Management Plan direction.	B	Administrative Unit wide	Annually
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**Notes:** The standards and guidelines provide mitigation to help meet the goals and objectives of the Land & Resource Management Plan. Failure to implement the standard and guidelines would likely affect the ability to meet the goals and objectives established in the Plan.

Legal: 36 CFR 219.12 (k)1 & 3	<b>Outputs 1:</b> Are the projected annual outputs and services being met annually and at anticipated costs?	Key Issue; Easily/Cost Effectively Answered	See annual MAR report	A	Administrative Unit wide	Annually
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<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
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**Notes:** Many National Grassland & Forest Users are very interested in projected outputs and services and this is a key issue for them. MAR reporting is required of all National Forest & Grasslands.

**Validation Monitoring**

Validate Models & Assumptions	<b>Composition &amp; Structure 1:</b> How valid are composition and structure in managing for desired vegetation and habitat?	Great Consequences	Correlate composition and structure with species trends	A	Geographic	Five years
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**Notes:** Composition and structure are a tool used to manage habitat for sensitive wildlife species and rare plant communities.

Appendix I; Validate Stocking Rate Guidelines, Goal 2.c. Endangered Species Act; USDA Departmental Regulation 9500-4; 36 CFR 219.19 and 219.20Key Issue; Legal: 36 CFR 219.19(a)(6); 36 CFR 219.20; 36 CFR 219.27(5 and 6); Goal 1.b Objectives 2, 4, & 6	<b>Stocking Rate Guidelines 1:</b> Are the stocking rate guidelines (Appendix I) providing the desired levels of vegetation structure and quality habitat for management indicator species and species at risk?	Great Consequences	Height and Density of Grassland and Sagebrush Understory Vegetation After Livestock Grazing	A	Administrative Unit-wide	5 Years
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**Notes:** As described in Appendix I, stocking rate guidelines for livestock grazing are used to help achieve desired vegetation objectives. These guidelines need to be validated in terms of their ability to provide the desired levels of vegetation structure and quality habitat for management indicator species and species at risk.

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
36 CFR 219.19 and 219.20	<b>Wildlife 1:</b> Are residual cover levels measured in the fall, providing quality levels of nesting cover the following spring for greater prairie chicken, plains sharp-tailed grouse, and sage grouse?	Great Consequences	Height and Density of Grassland and Sagebrush Understory Vegetation After Livestock Grazing; Over-winter VOR Transects.	A	Administrative Unit-wide	5 Years

**Notes:** Visual obstruction readings (VOR) of residual cover are commonly made in the fall and this information is then used to predict the nesting cover suitability. To make reasonably accurate predictions requires the use of over-winter VOR transects measured in the fall and then remeasured in the spring to determine the relative amounts of cover loss over winter due to wind, snowpack, and other natural factors. Over-winter VOR transects are not required when VOR measurements are made in the spring.

Endangered Species Act; Migratory Bird Treaty Act; 36 CFR 219.19; Goal 1.b Objectives 2 & 4	<b>Wildlife 2:</b> Are oil and gas stipulations effective in protecting raptor nests, prairie grouse display grounds and other special wildlife sites?	Key Issue (Viability and Biological Diversity); Legal Issue; Great Consequences	Percentage of protected sites occupied in subsequent years vs. percentage of unaffected sites occupied in subsequent years.	A	Administrative Unit-wide	5 Years
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**Notes:** Development (facilities, infra-structure), management activities and recreational activities can have significant impacts on fish and wildlife. The effects of energy related developments and activities are reduced through the use of stipulations to protect special wildlife sites and fish and wildlife habitats.

<b>Monitoring Driver</b>	<b>Monitoring Question</b>	<b>Monitoring Priority</b>	<b>Possible Units of Measure</b>	<b>Monitoring Method</b>	<b>Scale</b>	<b>Frequency of Reporting</b>
Legal 36 CFR 219.11 (d); Goal 1.b	<b>MIS:</b> Are the selected management indicator species and their response to management activities in habitats on local National Forest System lands adequately representing the management effects on other species in the associated response guilds and is the species membership identified for each response guild reasonably accurate and complete?	Key issue (viability); Legal issue; Great consequences	MIS population and reproduction statistics; Habitat use and availability statistics for MIS and associated species.	A	Administrative unit-wide	Five years

**Notes:** Knopf et al. (1988) and Knopf (1996) are key references that should be consulted to assist in designing validation monitoring for the selected management indicator species and associated response guilds. Habitat use and availability information already exist for some species, and additional monitoring or research may not be needed for some areas