Thunder Basin National Grassland
2007 Monitoring Report
Five Year Review

Fiscal Years 2003 to 2007

October 1, 2002 through September 30, 2007

United States Forest Service
Rocky Mountain Region

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Cover Photo: View from the Spring Creek Unit.

Forest Certification

The Thunder Basin National Grassland Land and Resource Management Plan (Grassland Plan) was approved on July 31, 2002. The Plan is a dynamic document, subject to change based on annual monitoring and evaluation as we implement. Monitoring is intended to provide the information necessary to determine whether the Plan is sufficient to guide management of the Thunder Basin National Grassland (TBNG) for the subsequent year or whether modification of the plan or modifications of management actions are necessary.

I have reviewed the Five Year Review and 2007 Annual Implementation and Monitoring Report for the Thunder Basin National Grassland that was prepared by the Forest Interdisciplinary Team and the Douglas District Staff. I believe that the results of monitoring and evaluation for both FY 2007 and the five year review meet the intent of Chapter 4 of the Grassland Plan and of 36 CFR 219.10(g). I also believe that the monitoring and evaluation requirements displayed in Chapter 4 of the Grassland Plan have been met, and that the decisions made in the Grassland Plan are still valid.

The *Conclusions and Recommendations* section below proposes minor changes to the Grassland Plan's objectives and monitoring items to better reflect current conditions found on the grassland. Completing the necessary environmental documentation to allow aerial treatment of cheatgrass is also recommended to limit the spread of this invasive annual.

The Forest ID Team has not identified any major changes in conditions or demands of the public that would significantly change the goals, objectives, or outputs of the Grassland Plan. The Land and Resource Management Plan for the Thunder Basin National Grassland, with the above mentioned plan modifications and administrative emphasis is sufficient to continue to guide management of the Forest.

Therefore, I concur with the findings of the Five Year Review and 2007 Annual Implementation and Monitoring Report for the Thunder Basin National Grassland.

Please contact Frank Romero at the Medicine Bow-Routt National Forests and Thunder Basin National Grassland, 2468 Jackson Street, Laramie, Wyoming, 82070, or call 307-745-2300, if you have any specific concerns, questions, or comments about this report.

/s/Mary H. Peterson
MARY H. PETERSON
Forest Supervisor

September 8, 2008
Date

Conclusions and Recommendations

Based on the information gained through the annual monitoring efforts, described in this report, the Interdisciplinary Team (IDT) arrived at the following conclusions and has recommended the following actions.

Cheatgrass

Annual bromes, especially cheatgrass, have expanded their populations substantially during the ongoing 8-year severe drought. Our predictive model indicates the entire 553,000 acres of Grassland are potentially capable of being infested. Cheatgrass has a high potential for adversely modifying wildlife habitat. It has specifically been identified in both the Statewide and local working group Sage Grouse Conservation Plans for its potential to replace native, desirable vegetation. It also can noticeably increase fire danger. In many cases, uncontrolled fire can adversely modify many wildlife habitats and reduce or eliminate its effectiveness

Recommendation

Complete needed environmental analysis as soon as practicable to implement aerial application of approved herbicides for the control of invasive annual bromes.

Sage Grouse

Overall, within the Hilight Bill Geographic Area, based on population data and impacts to the quality and quantity of habitat, it appears that population is declining. With continuing coal mine expansion and energy development, three of the Hilight Bill Geographic Area Objectives are likely not attainable.

Figure 1. Sage Grouse on lek on TBNG.

Recommendation

Revise the Hilight Bill geographic area objectives as follows:

Sage Grouse (MIS) Objective 1

Current LRMP direction:

Provide diverse and quality sagebrush habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sage-grouse and other wildlife with similar habitat needs.

Recommended modifications:

Provide diverse and quality habitat where existing and possible, and encourage mine reclamation to reestablish this habitat type in order to provide habitat for the reestablishment of greater sage-grouse after mining operations are completed.

Sage Grouse (MIS) Objective 2

Current LRMP direction:

As a part of reclamation efforts establish and maintain quality nesting habitat for sage-grouse (see Appendix H) and associated wildlife by meeting vegetation objectives for high structure sagebrush under-stories in areas identified as historical sage brush habitat.

Recommended modifications:

Outside of active mineral development areas, establish and maintain quality nesting habitat for sage-grouse (see Appendix H) and associated wildlife by meeting vegetation objectives for high structure sagebrush under-stories within 10 years

Sage Grouse (MIS) Objective 3

Current LRMP direction:

Reduce the impacts of extended droughts on sage-grouse populations and their recovery after droughts by managing land uses in sage-grouse habitat in a manner that does not significantly magnify the adverse effects of drought on grouse nesting, brooding and foraging habitats.

Recommended modifications:

Within occupied habitat, reduce the impacts of extended droughts on sage-grouse populations and their recovery after droughts by managing land uses in sage-grouse habitat in a manner that does not significantly magnify the adverse effects of drought on grouse nesting, brooding and foraging habitats.

Soils Objective

Goal 1a, Objective 1b: ***Achieve a 20 percent reduction in acres of eroded or disturbed soils by Forest Service permitted or management actions.***

This objective appears unattainable in light of the increasing permitted actions on the Grassland, primarily due to minerals development.

Recommendation:

Work with forest and regional soils staff to revise this objective through a grassland plan amendment to incorporate the original intent of reducing soil disturbance while acknowledging that it is likely that disturbance area will increase from increasing permitted actions.

Upton Osage MIS Species:

During 5 years of survey, no sage-grouse lek and one sharptail grouse lek have been observed. With the apparent limited populations in this GA, these grouse do not appear to be suitable MIS species for this GA.

Recommendation:

Evaluate whether different MIS species should be chosen for the Upton Osage Geographic Area.

Proposed Revisions of monitoring Items in Chapter 4 of the Grassland Plan:

Incorporate Bald Eagle under Viability 2 Monitoring Item since the Bald Eagle has been delisted and remove the **T&E 2** (Bald Eagle) monitoring item.

Incorporate mountain plovers into the Viability 4 Monitoring Item (prairie dog colony habitat), which includes reporting on sensitive species (reported every 5 years), and remove **T & E 3** Monitoring Item since mountain plovers are no longer being considered for ESA listing.

Revise the **Watershed 1 Monitoring Item** to better indicate that the monitoring item is evaluating watershed conditions. The revised monitoring item would read:

To what extend has ~~water quality~~ watershed condition on watersheds containing National Forest System Lands been restored, maintained or improved?

Revise the **Watershed 2 Monitoring item** to better evaluate changes in water quality. Revised wording would be modified as follows:

Existing wording:
To what extent have water bodies on National Forest System lands that have been degraded by Forest Service permitted or management actions been restored?

Proposed wording:
Are management activities meeting state water quality standards and to what extent has water quality been restored, maintained or improved?

Revise the **Wildlife Monitoring Item** (Oil and Gas Stipulations) to delete bighorn sheep as they are not present on the TBNG. The change in wording would be:
Are oil and gas stipulations effective, inadequate, or excessive in protecting and conserving raptors, prairie grouse, mountain plover, black-footed ferrets, ~~bighorn sheep,~~ and other wildlife species and their habitats?

Consider revising the **Damage Control 1 Monitoring Item** (Insect and Disease) to better reflect the current management of forested areas on the Thunder Basin National Grassland.

Progress Made towards FY06 Recommendations:

Continue work with the U.S. Fish and Wildlife Service (USFWS) to finalize the experimental/non-essential designation (10j Rule) to facilitate the reintroduction of ferrets on TBNG. In partnership with Wyoming Game and Fish Department (WGFD), apply for an allocation of black-footed ferrets from the USFWS for reintroduction on Thunder Basin National Grassland in fiscal year 2008/2009.

> To date no black-footed ferrets have been released on TBNG. Due to a sylvatic plague epizootic in black-tailed prairie dog colonies, allocation of ferrets to TBNG has been delayed. Efforts such as a plan amendment, coordination meetings with partners, and habitat mapping are occurring to keep TBNG as a part of the overall ferret recovery effort and become a site when prairie dog numbers reach a level where USFWS will support and allocation.

Develop a prairie dog management strategy in cooperation with the Thunder Basin Prairie Ecosystem Association, WGFD, USFWS, Biodiversity Conservation Alliance and other partners. This strategy may involve an adjustment of the 3.63 Black-Footed Ferret Reintroduction Habitat Management Area boundary, in addition to modifications to the standards relating to the use of rodenticides. This may require a Grassland Plan amendment.

> This amendment (currently in progress) would approve a full suite of tools to manage prairie dogs, modify the area of black-footed ferret reintroduction, and adjust the shooting restriction boundary on the Thunder Basin National Grassland (TBNG), Wyoming. A draft EIS was released to the public in December, 2007
>
> More information concerning this proposed amendment, including the draft EIS can be found on the following website:
>
> http://www.fs.fed.us/r2/mbr/projects/forestplans/in_progress/index.shtml

The Douglas District IDT recommends that the project list for the District should be reviewed annually, at which time monitoring tasks can be prioritized and assigned. This arises from the IDT noting during field project reviews that monitoring items included in decisions have not always been completed. The monitoring project list will be developed during a winter Douglas District Leadership Team meeting from projects that occurred the previous year.

> The Douglas district is continuing to set priorities for monitoring based on funding and available personnel.

Continue to monitor sage-grouse populations, especially in the Hilight Bill Geographic Area.

> Sage grouse and sharptail grouse populations are being monitored annually. Refer to the monitoring items below and the grouse assessment for more detail.

Introduction

The Thunder Basin National Grassland (TBNG) is located in northeastern Wyoming in the Cheyenne and Powder River Basins between the Big Horn Mountains and the Black Hills. The Grassland ranges in elevation from 3600 feet to 5200 feet and the climate is semi-arid. Land patterns are very complex because of the intermingled federal, state and private lands. The Grassland abounds with wildlife year-round, provides forage for livestock and is underlain with vast mineral resources. There are opportunities for recreation including hiking, sightseeing, hunting and fishing.

The Thunder Basin National Grassland Plan was revised as part of the Northern Great Plains Management Plans Revision process. The revision issued a combined EIS for the revision of eight national grasslands and two national forests in the northern Great Plains. Separate Records of Decision (ROD) were then signed for each unit, with the TBNG ROD being issued in July, 2002. The documents associated with the plan revision and ROD can be viewed at: http://www.fs.fed.us/ngp/docs.html

This Monitoring Report is organized according to the *USDA Forest Service Government Performance and Results Act Strategic Plan: 2000 Revision* goals where practicable. These goals are: Ecosystem Health, Multiple Benefits to People, Scientific and Technical Assistance, and Effective Public Service.

This document contains the results of the five year review (2002-2007) of the Grassland Plan. In addition, the Fiscal Year 2007 annual monitoring items are included in this report. Five year reviews of forest and grassland plans are required by 36 CFR 219.10(g), which states:

> *"In the monitoring and evaluation process, the interdisciplinary team may recommend 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 Plan. The Forest Supervisor shall review the conditions on the land covered by the plan at least every five years to determine whether conditions or demands of the public have changed significantly."*

The results of this review and the 2007 annual monitoring items, are discussed in this document, in addition to changes in laws and policies in the past five years.

Scientific Technical Review Committee

As outlined in the Record of Decision, dated July 31, 2002, the Regional Forester realized that there are still concerns by some that the projected effects in the EIS underestimate what the real effects will be and that there is uncertainty about the effects of implementing the revised standards and guidelines. In an attempt to address this concern, the Regional Forester directed the Forest Supervisor to establish a scientific technical review committee composed of representatives from Wyoming Game and Fish Commission, University of Wyoming, Office of the Governor, USDA Forest Service, and Wyoming Department of Agriculture and Oil and Gas Conservation Commission.

The purpose of the committee is to develop a monitoring implementation plan that will describe the methods of monitoring needed to determine how well we are implementing the direction in the Grassland Plan, to determine how effective implementation of Grassland Plan direction is in meeting desired conditions, and to help us validate assumptions and direction used in the Grassland Plan.

On May 21, 2004, individuals from the participating agencies met at the Medicine Bow – Routt National Forests and Thunder Basin National Grassland Supervisor's Office in Laramie, WY (see box):

The purpose of this meeting was to establish the need, purpose and interest of agency representatives to serve on the committee, and to discuss the expectations of what the product outcome would be.

Scientific Technical Review Committee Participating Agencies

- University of Wyoming:
  - College of Agriculture
    - Dept. of Agriculture and Applied Economics
    - Dept. of Renewable Resources
    - Wyoming Natural Diversity Database
- Office of Governor:
  - Planning and Policy
  - Endangered Species Coordinator
- State of Wyoming:
  - Wyoming Dept. of Agriculture
  - Wyoming Game and Fish Department
  - Department of Environmental Quality
    - Water Quality Division
    - Air Quality Division
  - Oil and Gas Conservation Commission
- USDA Forest Service
  - Medicine Bow – Routt NFs and TBNG
  - US Forest Service Research

An example of a Monitoring and Implementation Guide was presented that displayed the monitoring questions, measures and protocols. The group also reviewed Chapter 4 of the Grassland Plan - Monitoring and Evaluation.

From this chapter, the group decided to use a format for their Monitoring and Implementation Guide that displays the Monitoring Question, Monitoring Items, Protocols, Frequency of measure, Cost and Responsibility.

On August 5, 2004, a Memorandum of Understanding (MOU) was signed between the Medicine Bow – Routt National Forests and Thunder Basin National Grassland and the State of Wyoming to formalize the Scientific Technical Review Committee.

During calendar year 2005 the Scientific Technical Review Committee developed the Monitoring and Implementation Guide with final review concluding in calendar year 2006. During the fall of 2006 guidance on format for Monitoring and Implementation Guides to standardize this process at the National level was released. The Monitoring and Implementation Guide developed by the Scientific Technical Review Committee is undergoing this format change.

The Scientific Technical Review Committee will work with the Grassland Plan Monitoring and Evaluation Interdisciplinary Team to finalize the monitoring methods to provide an adaptive management approach to make changes and/or evaluate the effectiveness of changes made to the 2002 Revised Plan.

Goals and Objectives

Chapter 1 of the Grassland Plan lists goals and objectives to be accomplished through grassland management. Goals and objectives provide broad, overall direction regarding the type and amount of goods and services the national grasslands and national forests provide and focus on achieving ecosystem health and ecological integrity.

Goals are concise statements that describe desired conditions, and expected to be achieved sometime in the future. They are generally timeless and difficult to measure. Goals describe the ends to be achieved, rather than the means of doing so.

Objectives are concise, time-specific statements of measurable planned steps taken to accomplish a goal. They are generally achieved by implementing a project or activity.

The Grassland Plan lists objectives in Chapter 1, for each goal, and additional objectives are contained in Chapter 2 which are specific to the Geographic Areas. Many of the objectives are due to be accomplished over the life of the plan, usually considered to be 15 years. However, some objectives have earlier due dates, or are annual objectives. Progress made towards these objectives is listed in the Appendices.

The goals and objectives in the Grassland Plan are tiered to the *USDA Forest Service Government Performance and Results Act Strategic Plan: 2000 Revision*. This strategic plan presents the goals, objectives and activities that reflect the Forest Service's commitment to a sustainable natural resource base for the American people. All goals and objectives fall under the overall mission of the Forest Service, which is to sustain the health, productivity, and diversity of the land to meet the needs of present and future generations. "Caring for the Land and Serving People" expresses the spirit of this mission. Implicit in this statement is the agency's collaboration with people as partners in caring for the nation's forests and rangelands.

The Forest Service's mission and strategic goals and objectives are derived from the laws defining and regulating the agency's activities. Goals and objectives describe tangible progress toward achieving the agency's mission through implementing land and resource management plans. These plans guide on-the-ground natural resource management to ensure sustainable ecosystems and to provide multiple benefits. The Forest Service is committed to these goals and objectives:

Projects Completed During FY07

Table 1 gives the decisions made for projects on the TBNG during FY07. The list of projects was generated from the database that produces the Schedule of Proposed Actions (SOPA). This quarterly report is available at the following internet website: http://www.fs.fed.us/sopa/forest-level.php?110206

During the period spanning October 1, 2004 to Sept. 30 2007, 62 decisions were signed relating to the Thunder Basin National Grassland. These decisions included 5 Record of Decisions (ROD), 16 Decision Notices (DN) and 42 Decision Memos (DM).

Table 1. Projects Completed in FY07

Name	Decision Type	Date Signed	Primary Purpose
Inyan Kara Analysis Area Vegetation Management, Phase I	DM	9/27/07	Rangeland Management
Thunder Basin Analysis Area Vegetation Management	ROD	10/5/2007	Rangeland Management
Inyan Kara Community Pasture Pipeline Proposal	DN	3/5/07	Rangeland Management
Rankin-Brown Project	DN	3/9/07	Rangeland Management
Ballard Wildhorse Creek Oil Field Development	DN	10/27/06	Minerals
Ballards Cabin Draw Unit Well #31-29	DM	7/2/07	Minerals
Rock Well Federal #24-13H	DM	9/20/07	Minerals
Trend Exploration I, LLC-Flat Creek Federal Well #44-6	DM	12/8/06	Minerals
WYDOT Mineral Material SUP	DM	6/28/07	Special Use Authorization
Powder River Energy Corporation, Trend Exploration	DM	8/9/07	Special Use Authorization
PreCorp, Coleman Oil and Gas 14.4/24.9KV powerline, section 15	DM	1/24/07	Special Use Authorization
RT Communications, Phase 2	DM	2/9/07	Special Use Authorization

Grassland Plan Appeals

Sixteen appeals were filed by a variety of groups and individuals who disagreed with the decisions made as a result of the Northern Great Plains Management Plan Revision Process. The Thunder Basin National Grassland Land and Resource Management Plan Revision was upheld in a decision by the Chief of the Forest Service on February 6, 2004. This appeal decision can be viewed at:

http://www.fs.fed.us/ngp/plan/appeals/appeals.html

Administrative Changes to the Grassland Plan

Two amendments to the Grassland Plan have been completed to date.

Amendment 1: Dakota, Minnesota, and Eastern Railroad Corporation (DM&E)

This amendment was signed on September 4, 2003 by the Regional Forester and authorizes rail line construction, operation and maintenance on the Thunder Basin National Grassland, Wyoming. The amendment is in response to a proposal from the DM&E railroad to expand rail operations into the Powder River Basin. The USFS

participated as a Cooperating Agency with the Surface Transportation Board in the analysis and preparation of the final Environmental Impact Statement (EIS) for the DM&E proposal.

The EIS concluded that there was a need for the DM&E to construct and operate a rail line across portions of the TBNG. It also concluded that approval of the project on National Forest System (NFS) lands would be inconsistent, in some instances, with the standards and guidelines in the revised Land and Resource Management Plans (LRMP).

This amendment modifies specific standards and guidelines for the railroad corridor and adjacent areas. The amendment can be found on the Forest website:

http://www.fs.fed.us/r2/mbr/projects/specper/adobepdf/appxEdoc.pdf

Amendment 2: Teckla to Antelope Coal Mine 69kV Power Line

This amendment was signed on June 26, 2006 by the Forest Supervisor and authorizes power line construction, operation and maintenance on the Thunder Basin National Grassland, Wyoming. The amendment is in response to a proposal from the Powder River Energy Corporation (PRECorp) to provide electrical service from the Teckla Substation to Antelope Coal Mine. The USFS prepared an Environmental Assessment (EA) to analyze the impacts of this proposal.

The EA concluded that there was a need for PRECorp to construct and operate a power line across portions of the Thunder Basin National Grassland. It also concluded that approval of the project on NFS lands would be inconsistent, in some instances, with the standards and guidelines in the Grassland Plan.

This amendment modifies specific standards and guidelines for the power line corridor and adjacent areas.

Proposed Amendment 3: Thunder Basin National Grassland Prairie Dog Strategy

This amendment (currently in progress) would approve a full suite of tools to manage prairie dogs, modify the area of black-footed ferret reintroduction, and adjust the shooting restriction boundary on the Thunder Basin National Grassland (TBNG), Wyoming.

More information concerning this proposed amendment, including the draft EIS can be found on the following website:

http://www.fs.fed.us/r2/mbr/projects/forestplans/in_progress/index.shtml

New Laws, Regulations and Policies

Planning Rule Suspended

Because of the U.S. District Court, Northern District of California (9th Circuit) final decision in Citizens for Better Forestry v USDA; Defenders of Wildlife v Johanns (case 3:04-cv-04512-PJH; filed 03/30/2007), with respect to the 2005 National Forest System Land Management Planning Rule, implementation and utilization of the 2005 Planning Rule has been enjoined until the "USDA has fully complied with pertinent statutes". To

be in compliance with this decision, all land management plan revision processes associated with the 2005 Planning Rule have been suspended until further notice.

Travel management

The Travel Management Rule (the Rule) announced in 2005 requires each National Forest and Grassland to identify and designate those roads, trails, and areas that are open to motor vehicle use. Forests and Grasslands in the Rocky Mountain Region are seeking public input and coordinating with federal, state, county, and other local governmental entities as well as tribal governments to implement the Rule.

Travel management planning is one of the objectives listed in Chapter 1 of the Grassland plan. Goal 4a, Objective 1 states:

> *Within 5 years, identify travel opportunities and restrictions, including designating motorized travel-ways and areas, to meet land management objectives. Provide reasonable access for use of the national grasslands and national forests*

Travel management planning on the Thunder Basin National Grassland is scheduled to be completed by 2009 with the environmental analysis currently in progress. The Douglas District is seeking public input and coordinating with federal, state, county and other local governmental entities as well as tribal governments before any decision is made on a particular road, trail or area. Unplanned, user-created routes will be considered at the local level during the designation process. Travel management will designate routes (with maps and signs on the ground) and travel will then be restricted to "designated routes. The Motor Vehicle Use Map is scheduled to be completed in FY2009.

More information included a link to the new regulation can be found at the following website:

http://www.fs.fed.us/r2/mbr/recreation/travel_management/

Roadless Area Conservation

Wyoming Roadless Status
In 2001, the Forest Service enacted the Roadless Rule, which essentially prohibited road construction and reconstruction and timber harvesting, subject to certain limited exceptions, in inventoried roadless areas on a uniform nationwide basis.

In July 2003 the Wyoming District Court issued a nationwide permanent injunction against the Roadless Rule.

On May 5, 2005, the Forest Service adopted the State Petitions Rule, which is a process to provide Governors an opportunity to establish or adjust management requirements for National Forest System inventoried roadless areas within their States.

In September, 2006, a U.S. District Court in California reinstated the 2001 Rule and set aside the State Petitions Rule.

In August 2008, the U.S. District Court for the District of Wyoming issued a permanent injunction and set aside the 2001 Rule.

Information regarding roadless can be found at the following website:

http://www.roadless.fs.fed.us/

Assessments

The Forest Supervisor directed that the following assessments be completed for this five year review: a Black-Tailed Prairie Dogs and Black-Footed Ferret Assessment and a Sage-Grouse and Sharp-Tailed Grouse Assessment. These assessments provide the information to determine whether conditions or demand of the public have changed significantly.

These assessments are briefly summarized below, with more detail located in the relevant monitoring items. The assessments can be found in their entirety in the project record for the Thunder Basin NG Revised Plan 5-year Review, located at the Supervisors Office.

Black-Tailed Prairie Dogs and Black-Footed Ferret Assessment

Prairie dogs are important to the prairie ecosystem. They provide habitat and serve as a food source to many species that inhabit the prairie. They are also the key species to the survival of black-footed ferrets, the most endangered mammal in North America. In 1998 the black-tailed prairie dog was listed as a candidate species under the Endangered Species Act. In August of 2004 it was removed as a candidate species, but is still considered sensitive by the USFS, Region 2. Monitoring black-tailed prairie dog populations is essential in managing for other sensitive species that rely on them for habitat and/or food, and for the re-introduction and recovery of black-footed ferrets on Thunder Basin National Grassland.

The monitoring data used for this assessment is found on pages 29-38, page 86 and 99-100 of this report.

Because the black-footed ferret (Mustela nigripes) is considered the most endangered mammal in North America, the United States Forest Service is committed to recovering this species on National Forest system land. The Land and Resource Management Plan for the Thunder Basin National Grassland allocated MA 3.63 as a black-footed ferret reintroduction habitat.

A plague epizootic that began in 2001 has delayed reintroduction efforts, but it is still the goal of the Forest Service to reintroduce ferrets on TBNG, and manage prairie dogs for increasing populations. Numbers of prairie dogs on TBNG are still at low levels, but show some level of recovery in towns previously affected by plague. Plague eppizootic events can take years to go through an area, and eventually reach a level of population stability if the complex is large enough as demonstrated in Shirley Basin in Wyoming. It is assumed that TBNG could reach a more stable prairie dog population and begin ferret releases. Because plague is so dynamic and still poorly understood and unpredictable, there is no estimate as to when the epizootic will move in to a enzootic phase, where only some towns may be affected from time to time, but not large scale die offs.

It is the recommendation of the Douglas Ranger District that continued monitoring of prairie dog populations occur, as well as annual mapping of any current active acres.

Participation in the Black-footed Ferret Recovery and Implementation Team (BFRIT), coordination with the Wyoming Game and Fish Department and USFWS, completion of a 10j rule, and completion of a plan amendment to implement the proposed Prairie Dog Conservation Strategy are also recommended.

Sage-Grouse and Sharp-Tailed Grouse Assessment

The greater sage-grouse (*Centrocercus urophasianus*) is the largest grouse in North America. It is dependent on sagebrush (*Artemisia* spp.) habitats in western North America. The greater sage-grouse is a Management Indicator Species for all six Geographic Areas across Thunder Basin National Grassland (TBNG). It was selected as a MIS for sagebrush habitats that have tall, dense and diverse herbaceous under stories. The Sharp-tailed grouse (*Tympanuchus phasianellus*) is a MIS for TBNG. Its habitat requirements are the open-lands of grassland and prairies. Sagebrush, and other shrub/brush species, provides critical winter shelter and food source.

Monitoring data used for this assessment are found on pages 44-45 and pages 98-100 of this report. This 5 year assessment is split into two sections; the first section focused on specific monitoring questions. The second section focused on the Hilight Bill Geographic Area. The Hilight Bill Geographic Area was selected because it currently has and is predicted to have a large amount of mineral related development activities.

Currently, the sage-grouse population in the Hilight Bill Geographic Area appears to be in decline and exists at very low levels. Overall, based on population data and impacts to the quality and quantity of habitat within the Geographic Area, it appears that Grassland Plan - Sage-grouse Objective 1 (LRMP page 2-23), which states: "*Provide diverse and quality sagebrush habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sage grouse and other wildlife with similar habitat needs.*", may not be met for this Geographic Area. This concern is further corroborated in information provided in the Powder River Basin (PRB) EIS. This EIS was completed for all land ownerships. It indicates that, within the EIS analysis area; some "local populations may be extirpated in areas of concentrated development" (PBR EIS Vol. 2 of 4, pg 4-270). This currently describes activities on private lands adjoining TBNG.

Additionally, the current and ongoing effects to sage-grouse habitat within this Geographic Area appear to be counter to Objectives 2 and 3 under the Geographic Area Direction (LRMP page 2-23) for sage-grouse as an MIS. Much of the remaining habitat continues to be physically fragmented. Human and mechanical disturbance in the area may also be having an effect on nesting and breeding behavior. These impacts serve to magnify the adverse effects of drought. In addition, nesting habitat is reduced through the loss of high vegetation structure due to roads, developments and pipelines.

The outcome of this assessment resulted in recommendations for changes in Objectives 1, 2 and 3 for the Hilight Bill Geographic Area for Greater Sage-grouse found later in this report.

Monitoring items

The National Forest Management Act (NFMA) requires specific legally required monitoring items for forest and grassland plan implementation as well as additional monitoring that will be conducted based on the availability of funding and personnel. The discussion and results of the monitoring items are given below. These items are listed in Chapter 4 in the Grassland Plan.

The following monitoring items were not addressed in this 5 year review. The rationale for not addressing these items, and the plans to address them in the next five year evaluation is given in the table below.

Table 2. Monitoring Items not addressed in this report.

Monitoring Item	
Suggested Stocking Rates: Are the suggested stocking rate guidelines (Appendix I) providing the desired levels of vegetation structure and quality habitat for management indicator species and species at risk?	The TBNG has completed updated AMPs for the Spring Creek and Thunder Basin Grazing Association areas. As a result, stocking rate guidelines are just starting to be implemented. The district will be looking for opportunities to collaborate with researchers to be able to address this question.
Wildlife: How do residual cover levels measured in the fall relate to nesting cover levels the following spring?	This monitoring item is best addressed through a research project. The district is planning to develop a research study related to this monitoring item.
MIS 1: What is the potential habitat capability for each management indicator species?	The Grassland will be evaluating whether the habitat capability and suitability models are the most effective measure of habitat quality for MIS species or if another protocol should be used. Habitat quality for MIS will be assessed for the next 5 year evaluation.
MIS 2: What is the current habitat suitability for each management indicator species?	

Ensure Sustainable Ecosystems

Riparian 1 - Stream and Riparian Condition

Goal 1.a, Objectives 2,3
Frequency of Measurement: Five Years
Reporting Period: 2003-2007

This monitoring item asks the question:

> ***To what extent are perennial streams in proper functioning condition and riparian areas and wooded draws regenerating?***

Monitoring protocol/data collected: Stream and riparian conditions are evaluated using a number of methods. Interdisciplinary Proper Functioning Condition (PFC) surveys (BLM, 1998) have been completed on 24 miles of stream (Table 3). Permanent riparian photo points (e.g. Hall, 2002) have been established and/or repeated at many sites on the Thunder Basin National Grassland.

For the Thunder Basin Analysis Area Vegetation Management EIS, cover-frequency data was collected on several sites on ephemeral and perennial stream reaches. A Daubenmire frame (20 cm by 50 cm, code 6 cover class) was used to measure vegetation species cover and frequency.

Production of riparian transects was also recorded in 2004 and 2005 by clipping 10 Dabuenmire plots/transect. Eighteen transects were sampled each year but in different locations throughout the area. Measurements were calibrated through a formula in a Personal Data Recorder to account for moisture content and plant phenology. Both grazed and ungrazed pastures were sampled.

In addition, six cottonwood plots were also established in 2006 to measure changes in seral stages within different cottonwood galleries. These plots are designed for long-term trend monitoring. Five transects were established on Antelope Creek and one transect was established on the Cheyenne River.

In the Thunder Basin Analysis Area, small shrub inclusions (chokecherry, snowberry) were found during field data collection. Most of these small shrub communities were taking advantage of small microclimates which contained additional moisture and had favorable aspects.

Most riparian areas in the Spring Creek Geographic Area are ephemeral in nature, with the exception of the Little Powder River. Most drainages are more representative of woody draws rather than a riparian system. Monitoring of these ecosystems in this Geographic Area consists of photo points.

Currently, data analysis is underway in the Inyan Kara Grazing Association, which includes the Fairview Clareton, Upton Osage, and a portion of the Cellars Rosecrans Geographic Area. Most streams are ephemeral, and photo points have been established on some stream reaches. The Upton Osage Geographic Area also contains some shrub inclusions with woody draw characteristics. Monitoring data is scheduled to be summarized in mid 2008.

Results / Evaluation:
PFC Surveys: Interdisciplinary PFC surveys have been completed on 24 miles of stream (Table 3).

Table 3. 2003-2007 Proper Function Condition Assessments for TBNG.

Water Body Name	Assessment Year	Determination	Length (miles)
Cheyenne River	2006	Functional At Risk	11
Antelope Creek	2006	Proper Functioning Condition	12
Turner Creek	2007	Proper Functioning Condition	1

Riparian Photo Points: Repeat photo points can be an excellent source of information to supplement quantitative data related to riparian and stream conditions. Examples of repeat photo points for the Cheyenne River and Antelope Creek are shown in the Figures below.

Figure 2. Cheyenne River 1975 (left) and 2006 (right) (T40N, R68W, Sec 20).

High terrace in top center of photo serves as reference point. Note change from wide sandy active channel with limited vegetation in 1975 to narrower channel with well vegetated floodplain in 2006 (Gloss, 2007).

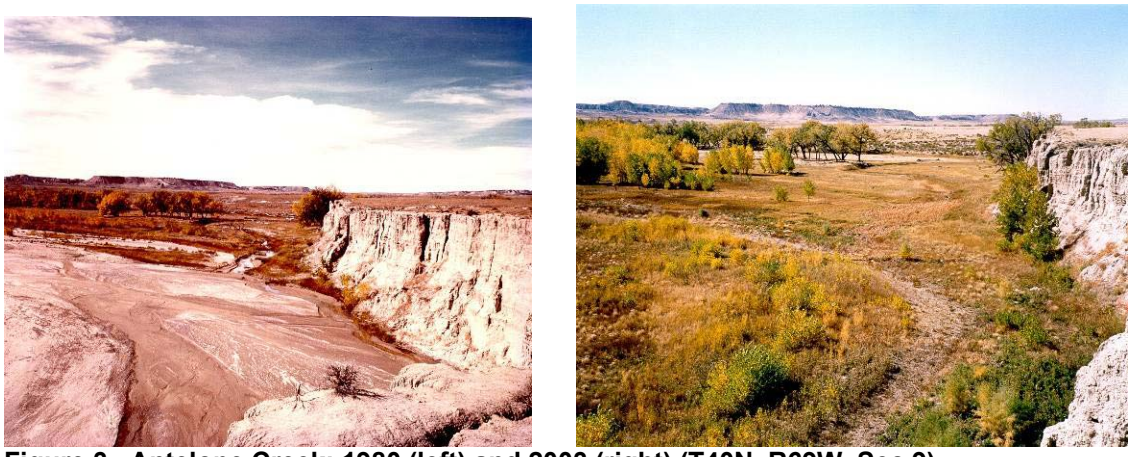


Figure 3. Antelope Creek: 1980 (left) and 2003 (right) (T40N, R69W, Sec 9).

High terrace on right of photo serves as reference point. Note change from wide sandy active channel with young cottonwood vegetation in 1980 to narrower well-defined channel with vigorous herbaceous vegetation and larger cottonwoods in 2003 (Schmitt, 2007).

The changes in stream and riparian condition shown in these photos are likely due primarily to the high magnitude of peak stream flows experienced in the 1960s and 1970s, followed by very small peak stream flows in the past two decades (Gloss, 2007). While these repeat photos can be invaluable to assist with understanding riparian and stream conditions over time, changes as a result of implementation of management actions under the Grassland Plan are difficult to distinguish with many of the available

repeat photos. Recommendations are presented below to improve the usability of riparian photo points in relation to the Grassland Plan.

Cover/Frequency and Production Data for the Thunder Basin Analysis Area (2007):
Cover/frequency data is summarized and can be found in Appendix 8 of Thunder Basin Analysis Area Vegetation Management Specialist Report (Schmitt, 2007).

Production for riparian areas in 2004, a very dry year, averaged 415 pounds for 18 transects. Maximum riparian production was 795 pounds of forage in 2004. In 2005, which experienced an average growing season, riparian areas averaged 726 pounds of production across 18 site. Maximum production was approximately 1500 lbs/acre on ungrazed sites.

Grassland Plan Goal 1.a, Objective 2 states, *"Implement management practices that will move at least 80% of riparian areas and woody draws toward self-perpetuating tree and shrub communities within site capability."* Riparian and woody draws within the Grassland have been affected by severe to extreme drought conditions over the past seven years. Conditions have been stable for most riparian and woody plant communities. Due to a lack of moisture and loss of water in the stream channel, the frequency of cottonwood saplings may have declined prior to 2001 levels. Many cottonwood saplings also failed to grow above the browse zone due to a lack of moisture combined with browsing events. This is based on photo point comparisons. However, 2007 appears to be a good recruitment year on the lower stream reaches of the Cheyenne River from observations during late September.

Allotments and pastures containing viable cottonwood communities had livestock management practices in place to minimized predation of cottonwood saplings and livestock congregation in riparian areas. These practices included season of use and incorporating pasture rotations focusing on plant health. Overall, management practices maintained riparian areas and cottonwood communities, but drought conditions were the overriding factor which held cottonwood regeneration at a static level.

Grassland Plan Goal 1.a, Objective 3 states, *"At least 80% of the perennial streams will meet or move toward Proper Functioning Condition (PFC)."* Of the 24 miles of streams assessed with PFC, 54% were rated as Proper Functioning Condition and 46% were rated as Functional At-Risk. The Cheyenne River rated Functional At-Risk, but was noted to be "close to PFC"; the trend was not apparent.

Recommendations:
The following recommendations are suggested to continue and improve inventory and monitoring of stream and riparian conditions as time and funding allows.

Proper Functioning Condition Surveys:

1. Continue interdisciplinary PFC surveys on additional streams.
2. Continue to utilize additional more quantitative monitoring techniques to supplement PFC surveys.
3. Monitor riparian conditions on the Cheyenne River to detemine if riparian conditions improve.

Riparian Photo Points:

1. Repeat photos at a set minimum interval to improve link to Grassland Plan implementation (2008, 2012 (10 year repeat), 2017 (15 year repeat)).
2. Improve quality of riparian photo points by more closely following guidelines established by Hall (2002).
3. Compile and store repeat riparian photo point photographs and associated information in a central corporate location which is easily accessible to all agency personnel and the public.

Soil 1 – Soil Disturbance

Goal 1.a, Objective 1
Frequency of Measurement: Five Years
Reporting Period: 2003-2007

This monitoring item asks the question:

> ***To what extent have soils eroded or disturbed by Forest Service management or permitted activities been restored?***

Monitoring protocol/data collected: As of 2002, no baseline data for the extent of eroded or disturbed soils by Forest Service permitted or management action had been collected. This serious data gap represented an obvious obstacle to meeting the specified objective. Since 2005, opportunities to collect this type of data have been utilized to incrementally fill the gap. Notable projects in this effort include the Thunder Basin Analysis Area and Inyan Kara Analysis Area Vegetation Management projects representing approximately 504,805 acres (91%) of the Forest Service administered lands within the Thunder Basin National Grassland (TBNG). As of 2007, baseline data from the Spring Creek geographic area (approximately 48,472 acres) has not been collected. Some level of data collection in this geographic area will take place in 2008 or 2009.

Results/Evaluation

Soil Quality Monitoring

Since 2005, soil quality field evaluations representing 1,659 unique observations of soil condition were conducted in areas of past and ongoing management activities. Observations are classified in the following soil condition categories:

> Satisfactory - Indicators signify that soil quality is being sustained and soil is functioning properly and normally. The ability of soil to maintain resource values and sustain outputs is high.
>
> Impaired - Indicators signify a reduction in soil quality. The ability of soil to function properly has been reduced and/or there exists an increased vulnerability to exceed detrimental soil quality standards. An impaired category signals land managers that there is a need for further investigation of the activity area to determine causes and degrees of decline in soil quality. This impaired condition can be a result of inherent and natural site conditions such as: steep slopes, aspects, parent material or past activities. Changes in management practices or other preventative actions might be appropriate.

Unsatisfactory - Indicators signify that loss of soil quality has occurred and soil condition has been detrimentally impacted according to Region 2 and TBNG LRMP soil quality standards (FSH 2509.18-92-1). Soils rated in the unsatisfactory category are candidates for improved management practices or restoration designed to recover soil quality. Detrimental soil impacts result in the inability of soil to maintain resource values, sustain outputs, and recover from impacts.

Results

Estimated acres and percent of total area by soil condition class are presented in Table 4. These total were extrapolated from 1,659 representative soil quality evaluation sampling observations.

Table 4. TBNG sampled soil condition class summary.

Condition	Acres	Percent
Satisfactory	185,917	34%
Impaired	149,707	27%
Unsatisfactory	169,181	31%
Unclassified	48,471	8%

TBNG sampled soil condition class summary

High levels of unsatisfactory and impaired soil conditions (58%) in the sampled areas are due almost exclusively to active soil erosion. The dominant soil erosion hazard rating in the TBNG is severe. Severe erosion hazard rating is defined as follows:

Erosion is very likely; control measures for vegetation re-establishment on bare areas and structural measures are advised (USDA NRCS 1998).

Recommendations

- Perform some level of soil quality monitoring in the Spring Creek geographic area in 2008 or 2009.
- Revisit as many previously sampled sites as possible over the next five years to gauge trend in acres of eroded or disturbed soils by Forest Service permitted or management actions. Ongoing monitoring requirements in adaptive management projects on the TBNG will ensure and adequate level of trend monitoring occurring before 2012.

Watershed 1 - Water Quality

Goal 1.a, Objective 1
Frequency of Measurement: Five Years
Reporting Period: 2003-2007

This monitoring item asks the question:

To what extent has water quality condition on watersheds containing National Forest System lands been restored, maintained or improved?

Monitoring protocol/data collected: Water quality data on the Grassland are collected by various Federal, State and local governments as well as non-governmental entities and individuals. The States of Wyoming produces a biennial comprehensive summary of water quality conditions in Wyoming.

Results / Evaluation: Most surface waters on the Grassland are believed to be meeting all designated water quality uses, but due to the sampling requirements only a small subset of the waters have recent comprehensive data to support this conclusion (Table 5).

Table 5. 2007 Summary of Grassland Water Quality Assessments.

Water Body Name	HUC	Determination	Source
Antelope Creek	1012010102 1012010103	Fully supports all designated uses, except insufficient data to determine if fish consumption and contact recreation uses are supported.	WYDEQ, 2007
Black Thunder Creek	1012010302	Fully supports all designated uses, except insufficient data to determine if fish consumption and contact recreation uses are supported.	WYDEQ, 2007
Cheyenne River	1012010301 1012010304	Fully supports all designated uses, except insufficient data to determine if fish consumption and contact recreation uses are supported.	WYDEQ, 2007

There are no known water bodies with water quality impairments on the Thunder Basin National Grassland. A small portion of the Spring Creek unit of the Grassland drains to the Little Powder River above a reach which has been determined not to be meeting contact recreation uses due to elevated levels of bacteria (Table 6).

Table 6. Water Quality Impairments on or immediately downstream of Grassland.

Water Body Name	Year first identified as T or I	Impaired Designated Use	Cause of Impairment
Little Powder River	2004	Contact Recreation	Fecal Coliform

Little Powder River: U.S. Geologic Survey data collected from the Little Powder River, near the Montana line, shows occasional exceedances of the fecal coliform criteria, and the Little Powder River was on Table C of the [2004] 303(d) List ["Waterbodies with Water Quality Threats"] (WYDEQ 2006 page 58). The Campbell County Conservation District monitored in the Little Powder River Drainage. Their data indicate that the lower reach of the Little Powder River does not support its contact recreation uses from the Montana line upstream to an undetermined distance above Olmstead Creek. This reach of the Little Powder River has been moved from Table C to Table A of the [2006] 303(d) List [Waters with Water Quality Impairments]. DEQ monitored the Little Powder River in 1999 and 2005, and the data are being evaluated to determine if aquatic life uses are supported.

The USGS has collected bacteria data in the Little Powder River drainage at a sample location over 10 miles downstream of the Grassland. The Wyoming Department of Environmental Quality collected one bacteria sample on the Little Powder River (approximately 10 miles above the Spring Creek Unit of the Grassland) on September 7, 2004 and found an e coli level of 1,986 cfu[1]/100 ml. There was no grazing in the vicinity of the sample at the time of the sample, and the high reading is hypothesized to be from housing developments in the area (D.Gloss, USFS personal communication w/ Scott Collyard, WYDEQ - Sheridan, 2/17/05).

[1] cfu – colony forming unit, a common unit of measure for water borne bacteria.

The Campbell County Conservation District has collected bacteria water quality data in (Little Powder River, near Soda Well) and downstream (Little Powder River, above Olmstead Creek) of the Grassland (CCCD, 2006). Results vary by season and year. Elevated levels of bacteria have been found in the Little Powder River near Soda Wells adjacent to the Grassland during some sampling periods in recent years (D.Gloss, USFS personal communication with Michelle Cook, CCCD on 4/9/07). Potential sources of bacteria include leaking septic systems, corrals and other confined livestock operations, livestock grazing in upland areas and wildlife in the Little Powder River drainage (CCCD, 2006). The relative contributions of these sources are not well understood at this time, but activities in the immediate vicinity of the Little Powder River are likely the primary sources of bacteria (D.Gloss, USFS personal communication with Michelle Cook, CCCD and Jack Smith, DEQ on 4/9/07).

Grassland Plan Goal 1.a, Objective 1c states, *"Achieve a 20 percent reduction in the amount of degraded water bodies, such as dam impoundments by Forest Service permitted or management actions."* The Final Environmental Impact Statement for the Grassland Plan (USDA Forest Service, 2001) indicated that the Thunder Basin National Grassland had an impaired water body in the Upper Little Missouri River watershed. While there were and still are degraded water bodies in the Upper Little Missouri River watershed when the Grassland Plan was completed, none of the degraded water bodies are on or near the Grassland. The intent of this objective has been achieved in the first five years of Grassland Plan implementation, since the State of Wyoming has not identified any impaired or degraded water bodies on the Grassland (WYDEQ 2006).

Recommendations:
As time and funding allow, consider:

1. Replace Grassland Plan Goal 1.a, Objective 1c with the following: *"Maintain fully supporting designated water quality uses on all water bodies on the Grassland. When designated uses are determined to be not fully supporting, improve water quality to fully support designated uses within six years."*
2. Conduct a visual inventory of potential sources of bacteria in Little Powder River watershed on NFS lands, with emphasis on areas nearest to the Little Powder River.
3. Cooperate with other entities, such as the Conservation Districts, Wyoming Department of Environmental Quality and the USGS to continue water quality monitoring on and near the Grassland.

Watershed 2 - Watershed and Stream Restoration

Goal 1.a, Objective 1
Frequency of Measurement: Five Years
Reporting Period: 2003-2007

This monitoring item asks the question:

To what extent have water bodies on National Forest System lands that have been degraded by Forest Service permitted or management actions been restored?

Monitoring protocol/data collected: A Watershed Condition Assessment was completed for watersheds on the Grassland in 2003 (Gloss et al, 2003) to provide a baseline assessment of physical, chemical and biotic watershed conditions on the Grassland.

Soil, watershed and stream restoration projects can be used to restore degraded lands and water bodies. Soil, watershed and stream restoration projects are tracked and summarized annually on the Forest and Grassland.

Administrative or permitted management activities have the potential to degrade soils and water bodies. Design criteria are used to minimize the potential soil and watershed impacts during project planning and Best Management Practices are include with project implementation. Information on the type, location and magnitude of activities is available in project files, but is not readily available for multiple projects over a larger scale.

Results / Evaluation:

Watershed Condition Assessment: Results from the Watershed Condition Assessment are shown in Table 7. Results indicate the majority of the watersheds on the Thunder Basin National Grassland have been modified from their natural potential condition in terms of physical, biotic and/or chemical conditions with 28 of the Grassland watersheds rated as Class II, 4 rated as Class III and none of the watersheds rated as Class I. Given the human modifications to the Thunder Basin National Grassland, these results are not surprising. At the 5th level scale, most watersheds appear "moderate" in condition, but it is important to note that at finer scales and site specific locations, wide variety of conditions from "functional" to "non-functional" exist.

Table 7. Watershed Condition Class for Thunder Basin National Grassland Watersheds

Watershed Condition Class	Number of Watersheds	Assessment Area (watershed acres)	Assessment Area (% of total area)
Class I (Functional)	0	0	0
Class II (At Risk)	28	5,525,996	87
Class III (Non-functional)	4	800,095	13
Totals:	32	6,326,091	100

There are areas on the Grassland that are assumed to be functional (Watershed Condition Class I). However, since this assessment was conducted with 5th level watersheds, and most of the Class I areas are small, isolated portions of larger watersheds, they are not represented in the results. The results are believed to be accurate in showing that there are no large watersheds on the Grassland that have not been altered to some degree from natural potential. Many of the most functional areas also tend to be located in roadless areas, which span headwaters, rather than entire watersheds, even when evaluated at the smaller sixth level watershed scale.

Soil, Watershed and Stream Restoration Projects: Protection and mitigation of soil, watershed and stream resources from potential detrimental impacts of administrative and permitted actions has taken priority over implementation of soil, watershed and stream improvement projects during the first five years of Grassland Plan

implementation. There have only been a few soil, watershed or stream restoration projects completed on the Grassland since the Plan was implemented. Riparian and stream restoration efforts have focused on removal of non-native, invasive species such as tamarisk in the Antelope and Cheyenne River basins. Rehabilitation of road stream crossings have occurred on National Forest System Road (NFSR) 938 (Frog Creek Road) and NFSR 942 (Steckley Road).

Ground Disturbing Activities and BMP Implementation and Effectiveness: Ground disturbing activities have occurred throughout most of the Grassland during the first five years of Plan implementation. However the majority of significant ground disturbing activities that have occurred during the first five years of Plan implementation are associated with oil and gas development in the Hilight Bill Geographic Area. Monitoring results related to the implementation and effectiveness of Best Management Practices to protect soil and water resources is presented in the Implementation Monitoring section of the Annual Monitoring and Evaluation Reports.

Grassland Plan Goal 1.a, Objective 1c states, "Within 10 years, identify watershed conditions to provide baseline data sufficient to meet the following objectives: Improve 20 percent of 6th level Hydrologic Unit Code (sub-watershed) level watersheds from Class II to Class I, or from Class III to Class II. Maintenance of unimpaired watersheds and restoration of impaired watershed are high priorities." Progress toward this objective during the first five years of Grassland Plan implementation has been primarily focused on improving existing management activities and mitigating the effects of new management activities, rather than active restoration projects. An assessment of watershed conditions has not been completed since 2003, but a cursory review by soils and watershed staff suggests there has been little change in overall watershed conditions during the first five years of Grassland Plan implementation.

Recommendations: Using the Watershed Condition Assessment (Gloss et al, 2003) as a starting point, develop more specific watershed protection and restoration plans for individual priority watersheds on the Grassland.

As time and funding allow, consider:

1. Identify the specific watershed(s) targeted for improvement in the next five years of Plan implementation and identify specific actions and/or projects necessary to improve watershed conditions in those watersheds. Specific actions and/or projects may include removal of non-native vegetation (e.g. tamarisk), road decommissioning, removal of unnecessary impoundments, stream channel restoration, changes in existing management and/or mitigation of new management activities.
2. Utlize progress on implementation of specific watershed plans as one indirect means to determine if actions necessary to achieve an improvement in watershed conditions have occurred.

Watershed 3 - Water Quantity – Stream flow

Goal 1.a, Objective 4
Frequency of Measurement: Five Years
Reporting Period: 2003-2007

This monitoring item asks the question:

> ***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 value?***

Monitoring protocol/data collected: There are no major perennial streams on the Grassland, although many streams contain perennial pockets of water. Streams and rivers on the Grassland that have the highest resource values which are dependant on stream flow are those that contain perennial pockets of water and therefore support some form of aquatic or amphibian species. These streams include: Cheyenne River, Antelope Creek, Porcupine Creek, Little Thunder Creek, Black Thunder Creek, School Creek, Turner Creek, Beaver Creek and the Little Powder River.

There are limited management activities that have the potential to affect stream flows on the Grassland. Administrative and permitted water developments have the potential to reduce stream flows (e.g. on-channel reservoirs, diversions) while discharge from mineral development (coal bed methane water discharge or coal mine discharges) have the potential to increase stream flow.

The number and magnitude administrative and permitted water developments can be tracked over time, along with a review of whether any provisions are made with the project to provide adequate water for high resource values in streams. Produced water discharged from mineral activities is permitted by the Wyoming Department of Environmental Quality and tracked by the Wyoming Oil and Gas Commission.

Results / Evaluation: There have been no new permitted or administrative water developments (diversions or on-channel reservoirs) constructed since the Grassland Plan was revised. Some existing on-channel stock reservoirs have been reconstructed (either as a result of necessary maintenance and/or upgraded to provide for the disposal of coal bed methane water); one small earthen dam was removed. All reconstructed reservoirs have either maintained or improved the existing stream flow conditions below the reservoir; improvements have occurred primarily by construction of outlet structures on reservoirs that previously only had spillways.

Produced water from coal-bed methane development has increased dramatically in the Powder River structural basin (Clark and Mason, 2007) during the first five years of Grassland Plan implementation, although the number of discharge points and quantity of produced water affecting the Grassland is relatively low (WYDEQ, 2007). Produced water from coal bed methane has provided sustained low flows (generally less than 0.5 cfs[2]) to several ephemeral streams on the Grassland, primarily in the Antelope Creek drainage.

[2] cfs cubic feet per second, a common measurement of streamflow.

Grassland Plan Goal 1.a, Objective 4 states, *"Within 15 years, identify, maintain, and/or improve stream flows for at least 10 percent of stream segments having high resource values within watersheds."* Streams with high resource values that are dependant on stream flow are listed above; quantification of stream flows necessary to protect these values has not occurred due to limited potential for water development projects affecting stream flow. Since there have been no water development projects affecting stream flow since the Grassland Plan was revised, stream flows on all high value segments have been maintained. Therefore, the intent of this objective has been achieved in the first five years of Grassland Plan implementation.

Recommendations: Due to the ephemeral nature of most streams with limited high value perennial pockets of water on the Grassland and limited potential for new diversions and in-channel reservoirs, providing and protecting stream flow is not expected to be a major issue during the next five years of Grassland Plan implementation.

1. Provide for maintenance and protection of stream flows on streams with high resource values that are dependant on stream flow with any future administrative or permitted water uses.
2. Determine if existing in-channel reservoirs on the Grassland are properly permitted through the Wyoming State Engineer's Office. Obtain valid water rights for existing reservoirs that are determined to be necessary for management of the Grassland; breach and rehabilitate unpermitted reservoirs determined not to be necessary for management of the Grassland.

Watershed 4 - Aquifer Protection

Goal 1.a, Objective 5
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***To what extent have aquifers been protected from contamination from abandoned wells?***

Monitoring protocol/ data collected: Compliance monitoring is conducted to determine if wells currently being abandoned are plugged properly. Monitoring to determine if past abandoned wells have been plugged occurs infrequently.

Results / Evaluation: Groundwater aquifers on the Grassland provide water for domestic and livestock uses. Abandoned wells, if not properly sealed, can provide a direct conduit for surface water carrying pollutants to groundwater. Groundwater contamination could limit or increase the costs of water use for domestic or livestock purposes.

Oil and Gas Wells: There are an estimated 848 abandoned and plugged oil and gas wells on the Grassland. Oil and gas wells abandoned in 2007 are shown in Table 8. Monitoring conducted by BLM and Douglas Ranger District Minerals Staff indicate that

all wells were properly plugged in 2007. The Bureau of Land Management (BLM) and Wyoming Oil and Gas Conservation Commission regulate plugging of oil and gas wells in part to prevent pollution of freshwater supplies. BLM policy requires a qualified BLM employee to witness the entire cementing portion of the plugging process. Since standard procedures are in place to ensure oil wells are plugged before they are abandoned, it is assumed that most of the 848 abandoned oil and gas wells have been properly plugged.

Table 8. Oil and Gas Wells Plugged in 2007.

Well Name	Date Plugged	Qtr-Qtr	Section	T	R
Thompson #2-33	3/9/2007	NESW	33	40N	69W
Porcupine #30-8	12/1/2007	SENE	30	42N	70W
Harrier Federal #1	5/24/2007	NENE	19	41N	69W
Wildhorse Creek Federal #42-19	9/10/2007	SENE	19	54N	69W
Federal Ban-Nor #1-27	2/1/2007	NWSW	27	45N	67W
Wildhorse Creek Federal #44-18	9/1/2007	SESE	18	54N	69W
Pork S Federal #21-1	1/1/2007	NENW	1	41N	71W

Water Wells: The number of abandoned domestic and livestock water wells has not been summarized, but efforts are underway to update this information. WYDEQ regulations require the plugging of abandoned stock and municipal wells, but it is unknown to what extent these regulations have been followed on the Grassland. There are no known incidents of aquifer cross contamination on the Grassland.

Grassland Plan Goal 1.a, Objective 5 states, "*Throughout the life of the Plan, ensure proper plugging of abandoned wells to prevent cross contamination of aquifers (e.g., seismograph holes, water wells, etc.).*" Procedures are in place to ensure proper plugging of any newly abandoned oil and gas wells and monitoring has shown that these procedures are being implemented. An evaluation of whether abandoned stock and water wells have been properly plugged has not been a priority during the first five years of Grassland Plan implementation.

Recommendations: Continue efforts to monitor oil and gas wells currently being closed to ensure they are properly plugged to prevent contamination of freshwater supplies. A comprehensive effort to determine if historic abandoned wells have been properly plugged could be adopted when funding allows. Efforts should continue to update information related to abandoned stock and domestic water wells on the Grassland.

1. Confirm the number, location and status of abandoned oil and gas wells.
2. Determine the number of abandoned domestic and stock wells on the Grassland (i.e. query files, NFS databases, State Engineer Database),
3. Determine whether the abandoned domestic and stock wells on the Grassland have been properly plugged (i.e. query State Engineer Database and Water Rights Records),

4. Determine whether oil and gas wells abandoned on the Grassland before 2003 have been properly plugged (i.e. query Wyoming Oil and Gas Conservation Commission Records),
5. Develop and implement a field sampling protocol to validate the results of recommendations #1-3.

MIS 3 – Population Trends

Legal: 36 CFR 219.19, 20, 27
Goal 1.b, Objective 2, 4, & 6
Frequency of Measurement: Annual
Reporting Period: 5 years

This monitoring item asks the question:

> ***What are the long-term population trends for each management indicator species and the relationships between long-term population trends and the effects of management activities on NFS lands?***

Each geographic area has designated MIS species. The following table gives the MIS for each geographic area.

Table 9 . MIS species by Geographic Area.

Geographic Area	Management Indicator Species
Broken Hills	Black Tailed Prairie Dogs, Sage Grouse
Cellars Rosecrans	Black Tailed Prairie Dogs, Sage Grouse
Fairview Clareton	Sage-Grouse
Hilight Bill	Sage-Grouse
Spring Creek	Sage-Grouse, Plains Sharp Tailed Grouse
Upton Osage	Sage-Grouse, Plains Sharp Tailed Grouse

Black-tailed prairie dog

Over the past seven years prairie dog populations on TBNG have been affected by sylvatic plague. In 2001 there were 21,456 acres of active black-tailed prairie dog colonies and this dropped to 4324 acres in 2002 (80% decrease). Surveys of active acres of prairie dog colonies have occurred every year since plague was detected in 2001. After the initial decline in population in 2002, the active acres of prairie dogs increased until 2005 when 15,531 acres were mapped. Since then the active acres of prairie dogs has decreased to 3,243 acres mapped in 2007.

The current population of black-tailed prairie dogs on TBNG is considered viable. There is enough evidence from previous year's surveys to suggest that the population is large enough to be able to increase in population. Current management activities in the Cellars Rosecrans and Broken Hills Geographic Areas are primarily livestock grazing and smaller amounts of minerals development. Prairie dog declines in these Geographic Areas are attributed to sylvatic plague and not current management activities. Research in other areas shows that plague causes population fluctuations and that once it moves from an epizootic to enzootic, the population will stabilize.

Currently there is a shooting closure protecting prairie dogs for a large portion of the Thunder Basin National Grassland, and it minimizes the impacts from plague.

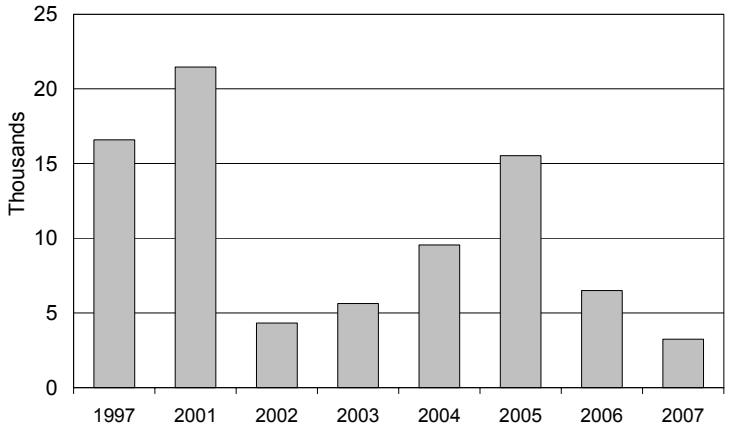


Figure 4. Active Black-Tailed Prairie Dog Colonies on TBNG 2001-2007.

Greater Sage-grouse Populations

Population trend estimates for greater sage-grouse are based upon using the average number of males attending leks per year as an index to calculating a minimum population estimate (see Appendix A for an explanation of how this index is used). Based on this measure, the *minimum* estimated population of greater sage-grouse on the TBNG in 2007 was 2749 birds which is an 11% increase from 2006. Since the 10-year low in 2004 the minimum greater sage-grouse population estimate on TBNG has increased from 1027 to 2749 individuals. Sage-grouse experience natural fluctuations in population levels from year to year. However, based upon the population estimates derived from annual lek surveys over the past ten years, the greater sage-grouse population trend on the TBNG appears to be relatively stable (See Figure 5) over that period of time.

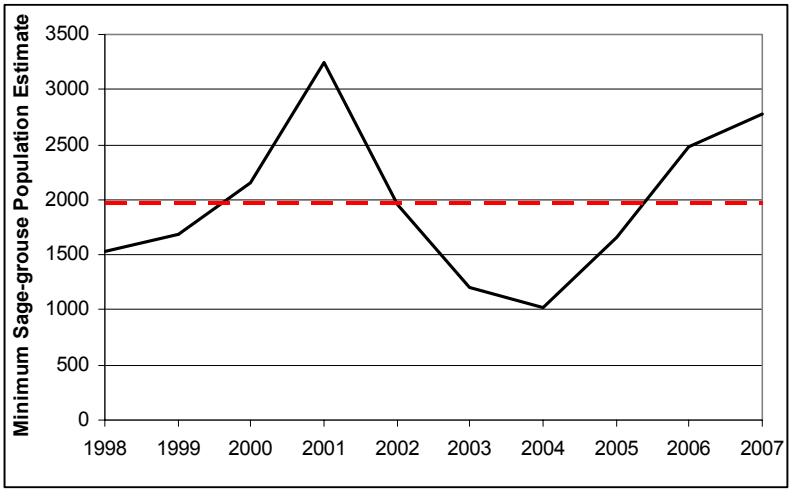


Figure 5. Minimum Estimated Sage-grouse Population and 10-Year Average

The two management activities on the TBNG that have the greatest potential for affecting sage-grouse habitat and populations are livestock grazing and mineral development. Livestock grazing alters vegetation structure patterns, which can influence the availability of suitable lek sites and the availability of adequate nesting

and brood-rearing habitat. It can also affect plant species composition, which again can influence habitat quality for sage-grouse. Livestock grazing has had more localized affects as range conditions surrounding individual leks differ considerably across TBNG. In some cases livestock grazing can be beneficial, such as to provide open, low vegetation conditions for lek sites. While in other circumstances, grazing can reduce residual vegetation in shrub areas, reducing the nesting habitat effectiveness.

Mineral development activities can have direct affects on sage-grouse through the loss and fragmentation of sagebrush habitat due to coal mine expansion, oil and gas well sites, and the road infrastructure necessary to access mineral development sites. Additionally, the human and mechanical disturbance associated with this mineral development may have an affect on sage-grouse behavior at the lek sites.

Mineral development activities may be having a greater affect on sage-grouse in the Spring Creek and Hilight Bill Geographic Areas, both now and in the future. Both Geographic Areas have seen a marked increase in oil and gas development over the last 5 years. Additionally, the Hilight Bill Geographic Area has experienced extensive coal mine expansion.

Geographic Area Males/Lek

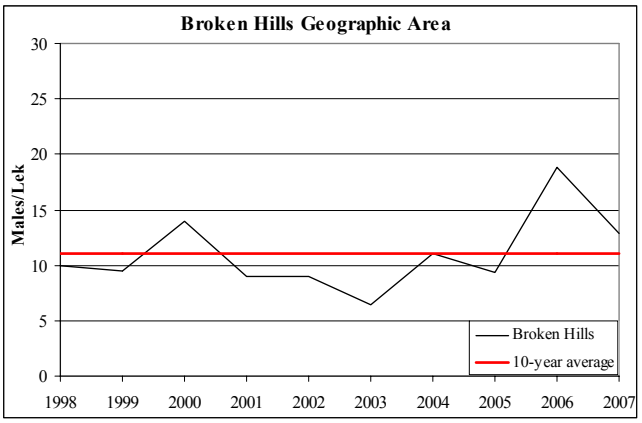
The average number of sage-grouse males/lek analysis was performed for all Geographic Areas that currently hold sage-grouse. It is important to remember that annual variation in each Geographic Area can be substantial due to the small sample size. Average males/lek calculations are only for leks on USFS lands and not those leks on other surfaces. This information provides some insights into lek availability and breeding ground conditions. It is also used, along with similar information from leks on non-Forest Service lands, to calculate the mean population estimates for the TBNG and northeast Wyoming. For comparison purposes annual males/lek calculation was compared to the ten-year mean for each Geographic Area.

Within individual Geographic Areas, the average number of males per lek is currently above the long-term (7-10 years) averages in the Hilight Bill (with a very small population), Cellars Rosecrans and Broken Hills Geographic Areas; and below the long-term averages in the Spring Creek and Fairview Clareton Geographic Areas. No greater sage-grouse leks have been identified on NFS lands in the Upton Osage Geographic Area through 2007. One lek was identified in 2008, but is not included in population calculations since the 2008 data is still incomplete.

Table 10. 2007 Greater sage-grouse lek statistics by Geographic Area.

Geographic Area	Total Leks	Abandoned Leks	Leks Checked	Active Leks
Broken Hills	6	0	6	4
Cellar Rosecrans	13	0	10	10
Fairview Clareton	7	1	6	2
Hilight Bill	7	3	4	2
Upton Osage	0	0	0	0
Spring Creek	5	1	4	2

Broken Hills



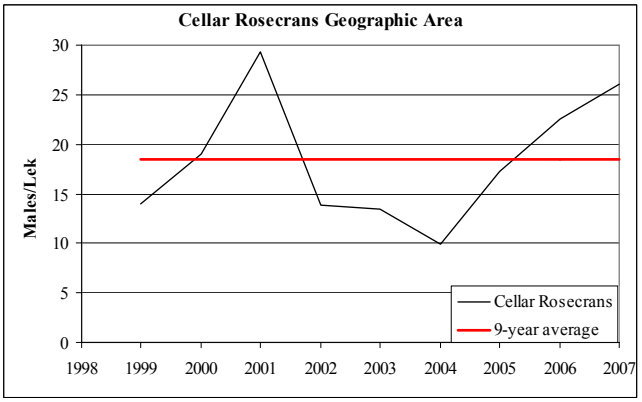
The Broken Hills Geographic Area has a good population of sage-grouse with relatively high average numbers of males/lek. The average number of males/lek has been stable to slightly increasing over long term (Figure 6). Much of the increase in population appears to be occurring over the past five years. Table 11 displays the lek survey results over the past five years.

Figure 6. Sage-grouse Males/lek for the Broken Hills Geographic Area (1998-2007).

Table 11. Broken Hills Sage-grouse Lek Survey Results for 2003-2007

	2003	2004	2005	2006	2007
Males/Lek Checked	6.4	11.0	9.4	18.8	12.8
Leks Checked	5	5	5	5	6
10-year average	11.0	11.0	11.0	11.0	11.0
Total Males	32	55	47	94	77

Cellar Rosecrans



The Cellars Rosecrans Geographic Area has the largest population of sage-grouse for any of the Geographic Areas in the TBNG, with relatively high average numbers of males/lek. The average number of males/lek has been relatively stable over long term (Figure 7). Table 12 displays the lek survey results over the past five years.

Figure 7. Sage-grouse Males/lek for the Cellar Rosecrans Geographic Area (1999-2007).

Table 12. Cellar Rosecrans Sage-grouse Lek Survey Results for 2003-2007

	2003	2004	2005	2006	2007
Males/Lek Checked	13.5	9.9	17.2	22.6	26.0
Leks Checked	4	6	5	8	10
9-year average	18.4	18.4	18.4	18.4	18.4
Total Males	54	69	86	181	286

Fairview Clareton

The Fairview Clareton Geographic Area also has relatively small sage-grouse population with low average numbers of males/lek. The average number of males/lek has been declining over long term (Figure 8), although it appears to have stabilized somewhat in the past 5 years. Still, the average number of males/lek has been below the 10-year average in four out of the last five years. The highest males/lek for this Geographic Area was in 1998 and 1999 with 16 sage-grouse males/lek. Table 13 displays the lek survey results over the past five years.

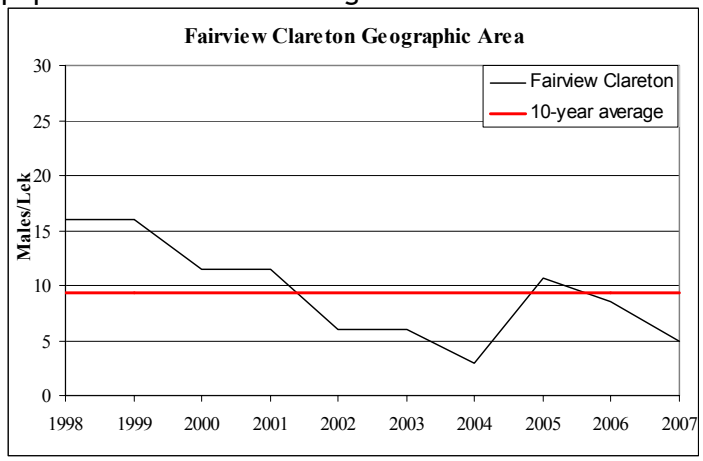
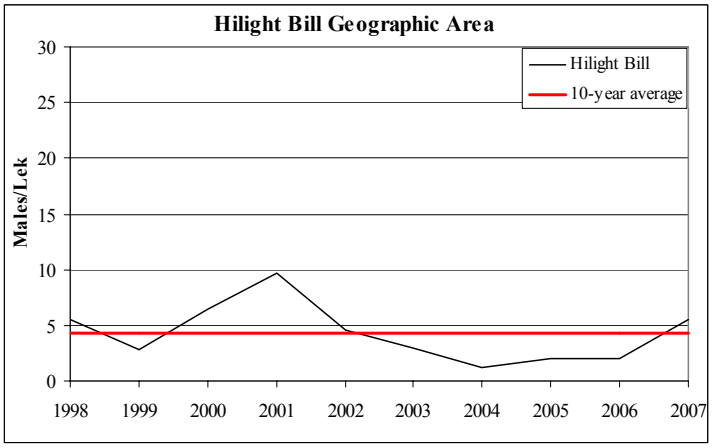


Figure 8. Sage-grouse Males/lek for the Fairview Clareton Geographic Area (1998-2007).

Table 13. Fairview Clareton Sage-grouse Lek Survey Results for 2003-2007

	2003	2004	2005	2006	2007
Males/Lek Checked	6.0	3.0	10.7	8.6	5.0
Leks Checked	2	3	3	5	6
10-year average	9.4	9.4	9.4	9.4	9.4
Total Males	12	9	32	43	30

Hilight Bill



The Hilight Bill Geographic Area has very small sage-grouse population with low average numbers of males/lek. The average number of males/lek has been relatively stable over long term (Figure 9). However, this value has been below the 10-year average in four out of the last 5 years. Table 14 displays the lek survey results over the past five years.

Figure 9. Sage-grouse Males/lek for the Hilight Bill Geographic Area (1998-2007).

Table 14. Hilight Bill Sage-grouse Lek Survey Results for 2003-2007

	2003	2004	2005	2006	2007
Males/Lek Checked	3.0	1.2	2.0	2.0	5.5
Leks Checked	4	5	6	5	4
10-year average	4.3	4.3	4.3	4.3	4.3
Total Males	12	6	12	10	22

Within this Geographic Area, significant mineral development has occurred and, due to existing permits, is expected to continue well into the future. This area is a major contributor to the nation's coal production. In addition, this area has experienced an increase in oil and gas development. All of this mineral development is consistence with the desired conditions of this Geographic Area.

Sage-grouse have been identified as the Management Indicator for this Geographic Area. This continues to be an appropriate designation, as sage-grouse populations are sensitive to human disturbance, and especially mineral development. According to Braun (as cited in Rowland, 2004), impacts of oil and gas development on sage-grouse are both short- and long-term (Braun 1987, 1998; Braun et al. 2002). He indicates that while field development can be considered a short term impact, the development and operations of the infrastructure and facilities can be a long term impact to sage-grouse habitat. This development fragments the habitat, encourages predators, and increases human disturbance in nesting and/or winter habitats. These impacts are also documented by Lyons and Anderson (2003) in a study on the Pinedale Mesa in western Wyoming where successful hens in a natural gas field nested farther from roads than did unsuccessful hens (Lyon and Anderson 2003). Rowland (2004) also cites a study by Wisdom et al. (2002*b*) that found that road densities in the interior Columbia Basin were higher in extirpated habitat of sage-grouse than in occupied range.

In addition to impacts from oil and gas development, this area also is the location of six (6) open pit coal mines. These mines provide a significant amount (approximately 22%) of the nation's coal. Like oil and gas development, there are numerous roads, powerlines and other infrastructure that support these mines. This is in addition to the physical ground disturbance and vegetation removal required to recover the coal.

Currently, within the Geographic Area, active sage-grouse leks are protected with a ¼ mile "no surface occupancy" buffer during development, and nesting birds are protected with a timing stipulation that prevents development within 2 miles of an active lek from March 1 to June 15. The area within 2 miles of an active lek is the area most commonly identified as supporting 65% - 75% of non-migratory nesting sage-grouse. These measures are designed to protect the habitat during the short term development stage. However, roads, pipelines, powerlines, collection facilities and other structures can be located and built within 2 miles of a lek after the nesting season has concluded. These sites can, and have been built within sagebrush stands.

The Grassland Plan (LRMP page 1-13) also provides the following directions to allow operations, primarily coal mines, to continue to operate where it could otherwise conflict with the Plan:

> *The following Directions (Standard or Guideline) are subject to the permitting processes of the U.S. Fish and Wildlife Service and/or the State wildlife agency. Where a specific wildlife agency permit has been issued, and it does not conflict with, or violate other laws, the Forest Service may waive the specific direction on a site-specific basis.*

With the current, permitted use within the northern portion of this Geographic Area, the sage-grouse population appears to be declining, based upon lek activity over time, as illustrated in Table 15.

Table 15. Sage-grouse Leks within the Hilight Bill Geographic Area

	Wilson		Rochelle		Kort		Payne		Black Thunder		59		Stuart 1		Stuart 2		Hanson Lake	
Year	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
													0					
1985	10	15							10	4					0			
86	12	12							11	8								
87	13	4							8	10								
88	16	12							14	6	1		0		0			
89	32	14							9	3								
1990	35	23	21	0					9	4								
91	25	11	10	2					8	3	0		0		7			
92	15	10	13	0					4	0								
93	9	34	1	3					1	0								
94	5	2	0	0					0	0	0		0		0			
95	3	2	0	0					0	0							12	2
96	1	1	1	0					0	0							14	3
97	3	0	0	0					0	0	0		0		0		21	2
98	0	0	0	0	11	5			0	0							15	3
99	0	0	5	2	9	11			0	0	0		0		0		27	16
2000	0	0	0	0	13	4			0	0							16	3
01	0	0	0	0	8	2	21	8	0	0							4	
02	0	0	0	0	5	5	18	5	0	0	0						10	11
03	0	0	0	0	4	5	7	9	0	0							2	
04	0	0	0	0	3	3	3	2									0	
05	0	0	0	0	1		7		0	0	0		0	0	0	0	0	
06	0	0	0	0	0	0	10		0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	14	4	0	0	0	0	0	0	0	0	0	0

It also should be noted that while drought may have adverse impacts to sage-grouse habitat, it may not necessarily cause a decline in populations. Monitoring of sage-grouse in the Bates Hole area of south central Wyoming indicates that, while that area has suffered from a prolonged, extreme drought, the sage-grouse population is increasing.

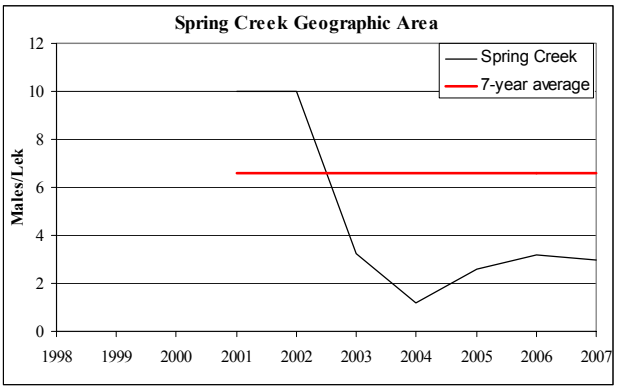
While these impacts can, and have occurred in many places across the Grassland, several areas continue to provide suitable, occupied sage-grouse habitat. These areas provide a stronghold of habitat distributed in many areas across the Grassland. If the Hilight Bill Geographic Area population does blink out, it will represent an approximate loss of only 17.5% of the total TBNG population. Due to mineral development activities and especially the continued coal mine operations in the Hilight Bill Geographic Area, sage-grouse habitat has been, and currently continues to be reduced. However, several Geographic Areas still provide enough suitable, occupied habitat to maintain a well-distributed population across the Thunder Basin National Grassland.

In response to concerns over sage-grouse nationally, the Wyoming Game and Fish Department has developed a proposed management strategy for managing sage-grouse in Wyoming. This strategy involves managing around core breeding areas. As Map 1 in Appendix 1 illustrates, there is a limited amount of core area involved with the Hilight Bill Geographic Area. This Core Area is in the far southeast portion of the Geographic Area current mineral impacts are located in the northern most portion of this Geographic Area. Management in the southern portion of the Geographic Area tends to be more conducive to habitat management.

Currently, the sage-grouse population in the Hilight Bill Geographic Area appears to be in decline and exists at very low levels. Overall, based on population data and impacts to the quality and quantity of habitat within the Geographic Area, it appears that Grassland Plan - Sage-grouse Objective 1 (LRMP page 2-23), which states: "*Provide diverse and quality sagebrush habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sage grouse and other wildlife with similar habitat needs.*", may not be met for this Geographic Area. This concern is further corroborated in information provided in the Powder River Basin (PRB) EIS. This EIS was completed for all land ownerships, including non-Forest Service. It indicates that, within the EIS analysis area some "local populations may be extirpated in areas of concentrated development" (PBR EIS Vol. 2 of 4, pg 4-270). This currently describes activities on private lands adjoining TBNG.

Additionally, the current and ongoing effects to sage-grouse habitat within this Geographic Area appear to be counter to Objectives 2 and 3 under the Geographic Area Direction (LRMP page 2-23) for sage-grouse as an MIS. Much of the remaining habitat continues to be physically fragmented. Human and mechanical disturbance in the area may also be having an effect on nesting and breeding behavior. These impacts serve to magnify the adverse effects of drought. In addition, nesting habitat is reduced through the loss of high vegetation structure due to roads, developments and pipelines.

Spring Creek



The Spring Creek Geographic Area also has very small sage-grouse population with low average numbers of males/lek. The average number of males/lek took a precipitous decline from 2002 to 2003 (Figure 10). However, this value has stabilized somewhat over the last 5 years. Table 16 displays the lek survey results over the past five years.

Figure 10. Sage-grouse Males/lek for the Spring Creek Geographic Area (2001-2007).

Table 16. Spring Creek Sage-grouse Lek Survey Results for 2003-2007

	2003	2004	2005	2006	2007
Males/Lek Checked	3.3	1.2	2.6	3.2	3.0
Leks Checked	4	5	5	5	4
7-year average	6.6	6.6	6.6	6.6	6.6
Total Males	13	6	13	16	12

Discussion

The 2007 greater sage-grouse job completion reports are not currently available from the WGFD at this time, therefore comparison of TBNG with local working group and statewide information is not possible and therefore discussion will be restricted to TBNG.

Minimum Population Estimate
Although the 2007 minimum population estimate is higher than it has been in a while, there are cautions when interpreting this information. Because of inconsistent survey effort these estimates are useful in looking at long-term (10-20 year) trends. Not much can be interpreted from annual variation because slight increases in effort can skew estimates. At this time the sage-grouse population appears to be increasing on TBNG.

TBNG Males/Lek
Sage-grouse males/lek for TBNG was the second highest in ten-years. This also indicates and increasing population, but it has only been in the past five years that lek survey efforts are monitoring enough leks to get an accurate picture.

Geographic Areas
It is hard to interpret the sage-grouse males/lek for each Geographic Area because some of the areas have very small sample sizes (5 leks). The exclusion of private lands leks also skews the calculations. Given the proximity of some of those private leks to USFS land, the public land is supplying nesting and brood rearing habitat that is supporting those private leks.

There are three geographic areas above the ten-year mean of sage-grouse males/lek and two below. The Broken Hills, Cellar Rosecrans and Hilight Bill are above while the Fairview Clareton and Spring Creek Geographic Areas are below ten-year mean.

Sharp-tailed grouse
The sharp-tailed grouse is a MIS for the Spring Creek and Upton Osage Geographic Areas. Five years of monitoring sharp-tailed grouse has resulted in a high of 12 leks being identified on or immediately adjacent to NFS lands in TBNG (see Table 17). Currently, there is only one known sharp-tailed grouse lek in the Upton Osage Geographic Area. The Wyoming Game and Fish Department does not monitor sharp-tailed grouse leks in the northeast Wyoming. Currently, the number of leks surveyed each year and the number of years that surveys have been conducted are too small to make an accurate assessment of sharp-tailed grouse populations on the TBNG. Lek surveys in 2007 were impeded by poor weather and one large lek was not accessible. So the decrease in total male grouse observed on leks in that year may not be reflecting a considerable decrease from the previous year.

Table 17. Sharp-tailed Grouse Lek Surveys from 2003 - 2007

Count Year	2003	2004	2005	2006	2007
Leks Counted	2	5	10	12	10
Leks Active	2	5	6	6	2
Males Counted	9	30	30	64	11
Males/Lek Counted	4.5	5.0	3.0	5.3	1.1

Management activities in the Spring Creek Geographic Area have been dominated by mineral development with some increased motorized recreation. Much of the mineral development is near sharp-tailed grouse leks, while recreation activities are concentrated away from known leks. Management activities in the Upton Osage Geographic Area are limited to conventional oil well maintenance and motorized recreation. Because of the increased minerals development in the Spring Creek

Geographic Area, survey efforts in 2008 were increased in an attempt to identify all leks within the area. Additional lek information may assist assessing the impacts of management activities on sharp-tailed grouse.

T & E 1 - Black Footed Ferrets

Goal 1.b, Objective 2
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***To what extend are NFS lands and their management contributing to the recovery and viability of black-footed ferrets?***

To date no black-footed ferrets have been released on TBNG. Due to a sylvatic plague epizootic in black-tailed prairie dog colonies, allocation of ferrets to TBNG has been delayed. Current total acreage and distribution of black-tailed prairie dogs is not likely to support a ferret reintroduction at this time. Efforts such as a plan amendment, coordination meetings with partners, and habitat mapping are occurring to keep TBNG as a part of the overall ferret recovery effort and become a site when prairie dog numbers reach a level where USFWS will support and allocation.

This effort includes a plan amendment that is currently in development. The amendment is proposing to change the ferret re-introduction area (3.63) to shift management of ferret habitat to where there is more habitat (prairie dog colonies) available, and to provide for long-term management of prairie dogs in support of ferret reintroduction. Once the plan amendment is completed, the Grassland can move forward with a 10(j) designation (non-essential, experimental) from USFWS, which would allow for the re-introduction of ferrets to the Grassland. Acres of active prairie dog colonies will continue to be mapped in order to monitor habitat conditions prior to the release of ferrets.

T & E 2 - Bald Eagle

Goal 1.b, Objective 2
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***To what extent are NFS lands and their management contributing to the recovery and viability of bald eagle?***

Monitoring Protocol/Data Collected: Number of winter-roost and nest sites of bald eagles.

Results/Evaluation: In 2007, Thunder Basin monitored four winter roosting areas, and six known bald eagle nest sites (three on NFS surface and three on private surface). One nest site was active this year, but failed to produce young, apparently due to adverse weather conditions. In addition, two other sites were attended during the breeding season, but the birds did not develop nest structures. Habitat management was also continued around 12 winter-roost sites.

Bald eagle observations have increased over the past five years, as has the occurrence of nesting. In 2003-2004 only one nest site was known on NFS lands and 2 on associated private lands. Since then two additional nest sites have been constructed on NFS surface and one additional nest on private lands near the National Grassland. During this same period, all winter roost sites have remained active; although some local shifting in specific timber stands has occurred. The private land sites were not monitored for productivity.

Powerline construction continues to create a potential adverse affect on bald eagle and other avian species at risk.

Recommendations: The bald eagle was de-listed from protection under the Endangered Species Act in 2007. By policy the U.S. Forest Service will move it to the Regional Forester Sensitive Species list. In response to that, the monitoring items found in Chapter 4 of the LRMP related to the bald eagle should be moved from the T&E sections to the appropriate Viability Monitoring Item.

Implementation of the TBNG LRMP management directions contributed to the recovery of the bald eagle. Continued implementation of these standards and guidelines, including burying powerlines, are needed to contribute to the maintenance of this trend. The Grassland Plan Special Use Guideline P3 directs burial of all electrical utility lines of 33 kV or less in most areas. Exceptions may occur where the protection of human health or safety would be better accomplished with an above ground line due to ongoing development in the area, where the line would be in existence for less than 5 years, or where the line is within 5 miles of an active coal mine and is in the direction of mine development.

T & E 3 - Mountain Plover

Goal 1.b, Objective 2
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***To what extent are NFS lands and their management contributing to the recovery and viability of mountain plovers?***

Results/Evaluation: Due to the USFWS determination that the mountain plover was "not warranted" for listing under the ESA, the mountain plover is no longer a proposed ESA-listed species, however the plover continues to be a R2 Regional Forester Sensitive Species and so is included under the Viability 4 monitoring item below.

Projects continued to incorporate considerations for mountain plover as appropriate as a Sensitive Species.

Recommendations: Revise the monitoring items in the Thunder Basin National Grassland Plan to include the mountain plover under Viability 5 and so eliminate T & E 3 - Mountain Plover as redundant.

Viability Monitoring Items

There are six monitoring questions in the TBNG Land and Resource Management Plan associated with how the TBNG contributes to maintaining viable populations of sensitive plant and animal species in northeastern Wyoming.

The Rocky Mountain Region (R2) of the Forest Service maintains a Regional Forester's Sensitive Species (SS) list of animals and plants for which population viability is a concern across the Region. This concern is based upon a significant current or predicted downward trend in population numbers or density or in habitat capability that would reduce a species' existing distribution. The SS list is periodically (2003, 2007) updated to reflect the best available information on rare species throughout their range in R2.

The TBNG provides the basic habitat for a wide variety of sensitive plant and animal species known to occur in northeastern Wyoming. Appendix 3 provides a list of the sensitive species that are considered for inventory and monitoring, project level effects analysis, and habitat improvement projects. It also identifies these species with the habitats that they are most commonly associated with, along with other habitats where they are known or suspected to occur on the TBNG.

Sensitive species surveys are conducted in support of project level analyses and biological evaluations that are completed for a variety of planned management activities. These surveys are performed for those species with potentially suitable habitat within the project area. Sensitive species survey protocols have been established for most species in "*Wildlife Survey Protocol for Coal Bed Natural Gas Development Powder River Basin Wildlife Taskforce*". In addition, training for third party consultant contractors was conducted in March of 2006 on the process for evaluating and documenting impacts to wildlife sensitive species associated with the Thunder Basin National Grassland. This training is expected to continue as needed over the next few years.

Sensitive plant species survey training for consultant contractors was also conducted in March of 2006 and is expected to be conducted periodically in the future. Quality sensitive species surveys for the appropriate target species within a project area are necessary to insure that management actions do not reduce viability of rare species.

A variety of management actions are documented in project level biological evaluations (>20) to adversely impact individuals but not lead to a trend towards Federal listing or where management actions are not located in sensitive plant habitat to have no impact. Where sensitive species are known to occur within a project area, measures are taken when necessary to avoid those areas or implement measures to minimize impacts to populations or habitats. This avoidance reduces effects but generally not to the no-impact level. There were a few instance of "no-impact" made

in project analysis. Management actions that temporarily change vegetation conditions are documented to maintain habitat in some instances. Development actions where wells, roads, railroads etc. are constructed are documented to have long-term effects on a minimal amount of habitat. The number of project level analyses with potential impacts to sensitive species has been rising each year since the TBNG LRMP was completed.

The effects to SS and their habitats from a variety of management actions are analyzed and documented in project level biological evaluations (BE). For those sensitive species that are known to occur or have suitable habitat within the project area, the large majority of biological determinations for a particular species is "may impact individuals or habitat, but will not likely contribute to a trend towards federally listing or cause a loss of viability to the population or species". Management actions have been adjusted in some projects to avoid sensitive species populations or habitats. This avoidance reduces effects but generally not to the "no impact" level. Management actions that temporarily change vegetation conditions are documented to maintain habitat in some instances. Development actions where wells, roads, railroads etc. are constructed are documented to have long-term effects on a minimal amount of habitat.

Viability 1 – Grassland and Sagebrush Habitats

Goal 1.b, Objective 2, 3, 4, 7, 8 & 9
Frequency of Measurement: Annual
Reporting Period: 5 years

This monitoring item asks the question:

> ***To what extent are National Forest System lands and their management contributing to the viability of sensitive plant and animal species that are commonly found in grassland and sagebrush habitats*?**

R2 Regional Forester's Sensitive Species commonly associated or suspected to occur with these habitats include:

PLANTS	ANIMALS
Iowa moonwort	Swift fox
Narrowleaf moonwort	Ferruginous hawk
Large flower triteleia	Northern harrier
Barr's milkvetch	Greater sage-grouse
Dakota buckwheat	Long-billed curlew
Common twinpod	Loggerhead shrike
	Grasshopper sparrow
	Sage sparrow
	Brewer's sparrow

Sensitive Plant Species

Monitoring Protocol/Data Collected
Project level botanical surveys, WYNDD botanical surveys and data.

Results/Evaluation
There are three R2-sensitive plant species (Barr's milkvetch, Dakota buckwheat and Common twinpod) that occur in sagebrush and grassland areas and that are documented to occur on the TBNG.

There are an additional three R2-sensitive plant species suspected to occur in sagebrush and grassland habitats (Iowa moonwort, Narrowleaf moonwort and Large flower triteleia). These three species are identified as target species for botanical surveys for project effects analysis. However, to date, these three species have not been located in botanical surveys or in general floristic surveys conducted in 2002-2007.

There were not any habitat improvement projects implemented for sensitive plant species found in grassland and sagebrush habitats. There was one reclamation plan completed for a closure of a conventional oil well. Implementation of this plan will eventually result in less impact to sensitive plant habitat and possible recovery of habitat in the long-term. There is not any population monitoring occurring for any of the sensitive plant species known to occur in sagebrush and grassland habitat. Several Barr's milkvetch occurrences have been revisited over the past several years.

Conclusions
The continued viability of sensitive species in sagebrush and grassland habitats is being maintained through project level surveys to detect occurrences, avoidance of sensitive species occurrences in project implementation, implementing conservation measures to minimize impacts to populations or habitats, and through reclamation of disturbed habitats.

Recommendations
Continue to monitor sensitive species in sagebrush and grassland habitats. Implement projects, such as prescribed burning and treatment of cheatgrass and other annual bromes, to improve habitat conditions for sensitive species and other wildlife and plant life inhabiting these ecosystems. Continue to strive for meeting the structural and seral stage objectives outlined in the TBNG Plan. There were no changes to the plan identified as needed.

Terrestrial Wildlife
Swift fox: TBNG District personnel have conducted specified survey routes for the past three years. Spot-light surveys during night-time hours are performed on five routes, with each route being 15-25 miles in length. Prior to this, two years of track-plate surveys were conducted. However, the cost and results of this survey methodology were not providing the needed results and the survey methodology was changed to spot-lighting.

Additionally, District personnel have performed spot-light surveys in support of project-level biological evaluations. The primary objective of these surveys is to locate any Swift fox occurrences or den sites within the area being analyzed for potential effects due to proposed management activities.

Spot-light surveys on specified routes have yielded an average of two Swift fox detections per year over the past three years. Most of these detections have occurred

within the Hilight Bill geographic area. Additional data is needed to assist in determining why this distribution appears to be found primarily in the western-most geographic area.

Raptors: Over the last 5 years the TBNG has cooperated with the Wyoming Game and Fish Department, Non-Game Program, and the Buffalo, Casper, and Newcastle offices the Bureau of Land Management in the surveying and monitoring of nesting raptors in and around the TBNG. Aerial surveys are conducted throughout the TBNG and surrounding area. Species monitored include; Bald eagle, Golden eagle, Ferruginous hawk, Swainson's hawk, Red-tailed hawk, Great horned owl, Long-eared owl, Short-eared owl and Prairie falcon. This database includes information on over 1,000 nest sites (not all of which are active at any one time).

The raptor monitoring program provides basic information on nesting habitat as well as nesting activity. This information is used in support of a variety of land management activities. Based on these annual surveys, active raptor nesting, including the Ferruginous hawk, has increased over the last five years. In several cases there have been notable increases in the number of eggs laid, eggs hatched and young fledged. This increase is attributed to a significant increase in the rabbit and hare population associated with eastern Wyoming.

Northern harrier nests are generally located in tall grass, often times within riparian or wetland vegetation. Because these nests are usually obscured from view, aerial identification of Northern harrier nests is difficult. There are only two known locations of harrier nests on the TBNG even though these raptors are regularly seen hunting throughout the Grassland.

Over the last 5 years aerial and ground surveys have been conducted for nesting raptors on portions of the TBNG. The extent of the survey varied based on available funding, and at no time has the entire TBNG been surveyed completely. Illustrated below are the results of each years surveying of a portion of the Grassland.

Table 18. Raptor Nests Monitored on TBNG 2003-2007

Year	Total Inventoried	Number Active	Percent Active
2003	208	37	18
2004	155	62	40
2005	104	64	61
2006	337	152	49
2007	151	76	50

The number of Ferruginous hawk nests monitored by year is listed in Table 19. However, it does not represent a totally accurate percent of active nests. Each year, specific areas are targeted for survey, leaving other areas with an undetermined status for many nests. Depending on the habitats available, the raptor species using it will vary. The active category only represents the least amount of active nests found in one year.

Table 19. Ferruginous Hawk Nests Monitored 2003-2007

Year	Total Inventoried	Number Active
2003	146	17
2004	41	12
2005	45	19
2006	144	46
2007	46	14

Greater sage-grouse

In 2007 the average number of sage-grouse males per lek was 14.2 sage-grouse males/lek which was a 15% increase from 2006 (12.3 sage-grouse males/lek) (Figure below). The 10-year high for TBNG was 16.4 sage-grouse males/lek in 2001. The average number of males per lek site and the fluctuations in sage-grouse populations on the Thunder Basin National Grassland have been similar to those displayed throughout northeast Wyoming (see Figure 11).

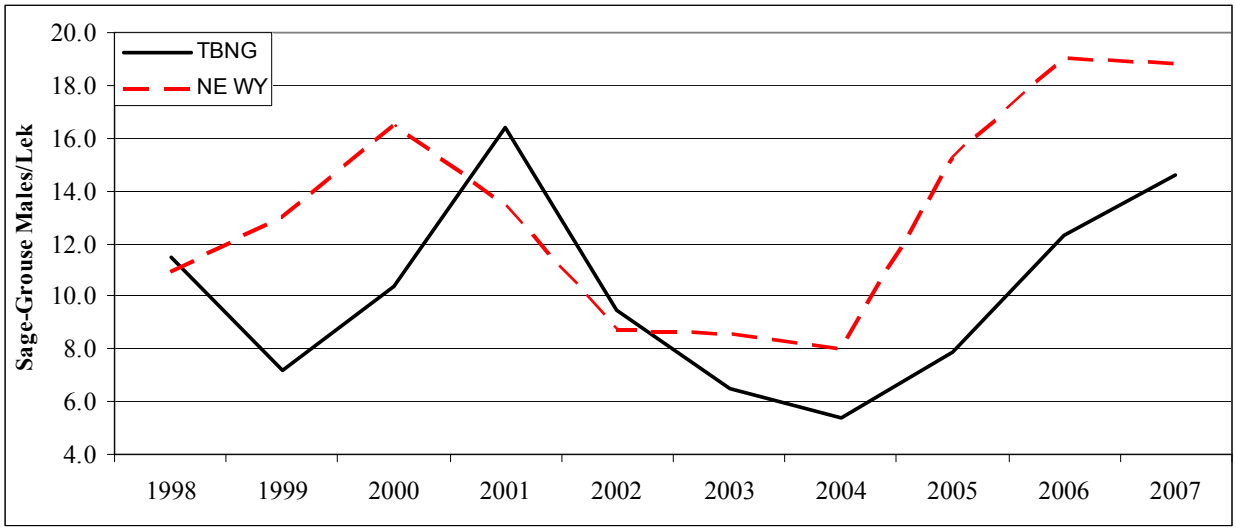
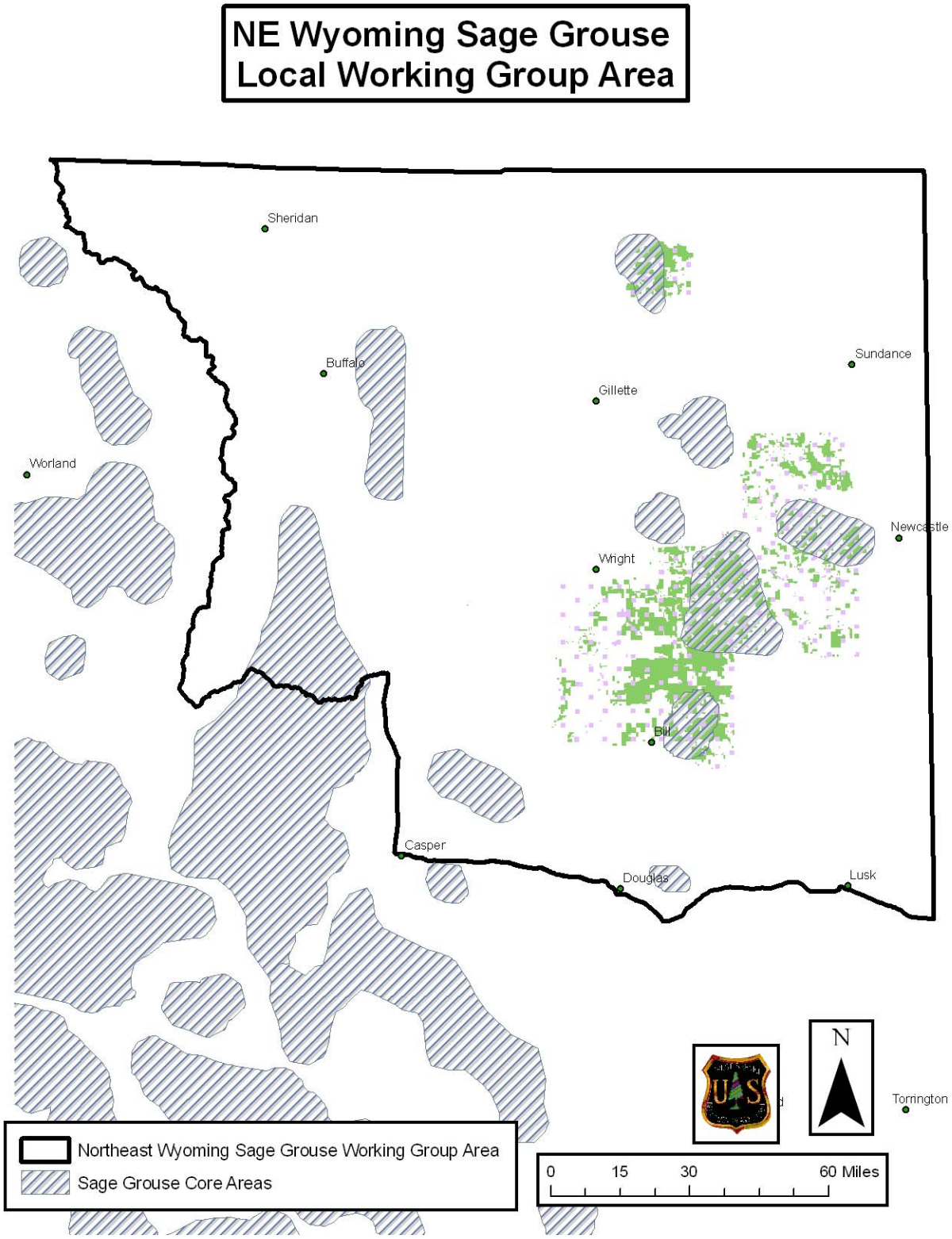


Figure 11. Average Male Sage-grouse/lek for TBNG and Northeast Wyoming (1998-2007)

In response to concerns over sage-grouse nationally, the Wyoming Game and Fish Department has developed a proposed management strategy for managing sage-grouse in Wyoming. This strategy involves managing around core breeding areas. Map 1 illustrates the core breeding areas in northeast Wyoming and the role the Thunder Basin National Grassland demonstrates in the overall viability of sage-grouse in the Northeast Wyoming Sage Grouse Local Working Group Area (NEWY LWG).

Map 1 – TBNG and the Northeast Wyoming Sage-grouse Working Group Area with Sage-grouse Core Management Areas



Grassland Birds: In 2002, members of the Wyoming Partners in Flight (PIF), including a representative from the TBNG, initiated the Monitoring Wyoming Birds Program. Monitoring Wyoming Birds is a state-wide, habitat-based monitoring effort that tracks a variety of bird species within 6 habitat types. Working with the Rocky Mountain Bird Observatory, the Wyoming PIF selected aspen, grassland, juniper woodland, mid-elevation conifer, montane riparian and shrub-steppe habitat types to monitor. These habitats are annually surveyed using point-count transects, and the data is provided to PIF members, as well as being available on the internet at the following Wyoming Game and Fish Department Website:

http://gf.state.wy.us/downloads/pdf/AR_MWB05.pdf

The specific objectives of the monitoring program are:

1. To integrate existing bird-monitoring efforts in the region to provide better information on distribution and abundance of all breeding-bird species, especially for priority species.
2. To provide basic habitat-association data for most bird species to address habitat-management issues.
3. To provide long-term trend or status data on most regularly occurring breeding species in the region, with a target of detecting a minimum rate of population change of ±3.0% per year over a maximum time period of 30 years with a statistical significance of p=0.1 and power of 0.8.
4. To maintain a high-quality database that is accessible to all of our collaborators as well as the public on the Web in the form of raw and summarized data.
5. To generate decision-support tools such as population-estimate models that help guide conservation efforts and provide a better measure of conservation success.

The dominant habitat types occurring on the TBNG being monitored under this program are grassland and shrub steppe. The large majority of transects in grassland habitats are located in northeast Wyoming in the area of the TBNG. The shrub steppe transects are predominantly located just west of the TBNG in central Wyoming. Sensitive Species which are capable of being monitored under this program include: Grasshopper sparrow, Brewer's sparrow, Chestnut-collared longspur, McCown's longspur, and Sage sparrow. Other sensitive bird species that are detected in these habitats under this program include: Long-billed curlew and Loggerhead shrike. However, these species are not detected in sufficient numbers to monitor their populations.

Table 20 provides detection numbers of the sensitive bird species associated with these habitats on the TBNG. These are statewide numbers; but with the exception of the Sage sparrow and Loggerhead shrike, these are species that are closely associated with the grassland habitat type whose transects are predominantly located in the TBNG area of Wyoming.

Table 20. Statewide Sensitive Bird Species Detections 2002-2007

SPECIES	2002	2003	2004	2005	2006	2007
Grasshopper sparrow	20	42	35	37	87	57
Brewers sparrow	478	770	1262	1179	1572	967
Sage sparrow	86	107	110	128	232	127
Long-billed curlew	0	0	1	1	4	4
Loggerhead shrike	5	6	28	19	19	2

While most of the individual bird species detections portrayed above appear to indicate relatively stable populations, it would be premature to estimate a population trend based on this timeframe.

Additionally, District personnel have performed general sensitive animal surveys in support project-level biological evaluations. These are meandering visual transects conducted in potentially suitable habitat targeted at detecting those sensitive species that may occur in these habitats.

Viability 2 – Riparian and Wetland Habitats

Goal 1.b, Objective 2, 3, 4, 7, 8 & 9
Frequency of Measurement: Annual
Reporting Period: 5 years

This monitoring item asks the question:

> ***To what extent are National Forest System lands and their management contributing to the viability of sensitive plant and animal species that are commonly found in riparian and wetland habitats?***

R2 Regional Forester's Sensitive Species commonly associated or suspected to occur with these habitats include:

PLANTS	ANIMALS
Foxtail sedge	American bittern
Boreal spikerush	Black tern
Highbush cranberry	Yellow-billed cuckoo
	Bald eagle
	Northern leopard frog

Sensitive Plant Species
There are 3 R2 sensitive plant species (Foxtail sedge, Boreal spikerush and Highbush cranberry) that occur in riparian and wetland areas and that are suspected occur on the TBNG. These species are identified as target species for botanical surveys for project effects analysis. None of these species have been located in botanical surveys or in general floristic surveys conducted in 2002-2007.

Below average precipitation, which is less than 75% of the average amount of precipitation as defined by the Society for Range Management, or rainfall outside of

the growing season has been recorded in the western portion of TBNG over most of the past six years. During years of below average growing season precipitation, the area experienced an agricultural drought (below average plant production). A hydrologic drought (depleted surface and subsurface water sources) in this portion of the TBNG has also resulted from the lack of and timing of precipitation events. This drought has affected the amount and extent of sensitive plant habitat provided by wetlands.

There were not any habitat improvement projects implemented for sensitive plant species found in riparian and wetland habitats, however sensitive plant species will benefit from wildlife improvement projects such as the fencing for Weston Reservoir.

Aquatic Wildlife

Amphibians: Visual, sinuous-transverse methods were used to observe and evaluate northern leopard frog and tiger salamander populations in the TBNG between 2002 and 2007. In addition, amphibians are observed as incidental catches when crews seine for fish. Simple counts or count estimates are used to report the total numbers observed for three life stages: adults; juveniles; and eggs. Habitat (riparian and wetland) and population-trend data are evaluated and reported every five years. Amphibian surveys, however, are conducted annually and serve as the foundation of the five-year trend reporting results. Finally, amphibian-population data are descriptive; the presence of all amphibian life-history stages will be used as a proxy to indicate habitat quality; this use of a habitat proxy is necessary because of the confounding factor – in evaluating the abundance, distribution, and quality of riparian and wetland habitats – and of water availability in the Grassland.

Table 21. Amphibian Sensitive Species and Species at Risk found on the TBNG.

Common Name	Scientific Name	Species at Risk	R2 Sensitive
Northern leopard frog	*Rana pipiens*	Yes	Yes
Tiger salamander*	*Ambystoma tigrinum*	Yes	No

* the Tiger salamander was removed from the RFSS list in 2002, but will be monitored coincidently with Northern leopard frog.

Amphibian surveys conducted in 2002-2004 and in 2007 suggest that all of the Grassland amphibians are reproducing and surviving (see Figure below), limited riparian and wetland habitats notwithstanding. Northern leopard frogs, boreal chorus frogs, and Woodhouse's toad appear to be the most common Grassland amphibians observed during the last five years of surveys and these species appear to be thriving in this semi-arid environment. Water development associated with coalbed methane production has, to some extent, increased the available surface water in the Grassland, some of which has increased the abundance and distribution of riparian and wetland habitats. Consequently, increases in riparian and wetland habitats in the Grassland have provided amphibians with an increased number of habitats in which to live.

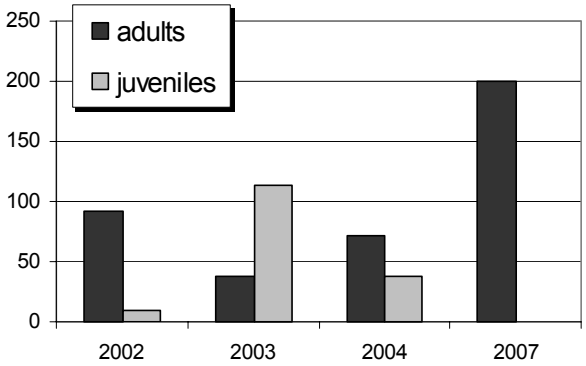


Figure 12. Northern Leopard Frog surveys on TBNG 2002-2007.

In 2007, the Weston Reservoir was fenced to protect the aquatic and wetland vegetation associated with this reservoir. District staff, with the assistance of members of the public and BLM Buffalo Field Office staff, constructed a 3-wire barbed wire fence. This project will improve habitat for sensitive species associated with these habitats.

Terrestrial Wildlife

Grassland Birds: The American bittern, Black tern and Yellow-billed cuckoo occur or are suspected to occur in habitats on the TBNG that are not included in the Monitoring Wyoming Birds program. Because these species occur at very low population levels on the TBNG, they are only surveyed at the project level. Meandering visual transect surveys for these species are conducted by District personnel in support of project-level biological evaluations.

There are only two known locations of Black tern within the TBNG. There are no know occurrences of American bittern or Yellow-billed cuckoo on the TBNG.

Bald eagle: Bald eagles are monitored through the annual aerial surveys for raptors described under Viability 1 above.

Over the past five years of raptor monitoring, the number of known Bald eagle nesting locations has increased by two sites.

Table 22. Bald Eagle Nests Monitored 2003-2007

Year	Total Inventoried	Number Active
2003	5	1
2004	5	1
2005	6	1
2006	7	2
2007	7	1

Conclusions

The continued viability of sensitive plant and animal species in riparian and wetland habitats is being maintained through project level surveys to detect occurrences, avoidance of sensitive species occurrences in project implementation, and implementing conservation measures to minimize impacts to populations or habitats.

Amphibians: Because compliance with the pertinent monitoring objectives, for the most part, is confounded by environmental conditions on the Grassland, most, but not all of the objectives are being met in this reporting interval.

Recommendations

Continue to monitor sensitive plant and animal species in riparian and wetland habitats. Continue amphibian surveys in the TBNG to monitor and evaluate the abundance, distribution, and diversity of amphibian populations and their associated riparian and wetland habitats. Continue to strive for meeting the structural and seral stage objectives outlined in the TBNG Plan. There were no changes to the plan identified as needed.

Viability 3 – Forested Habitats

Goal 1.b, Objective 2, 3, 4, 7, 8 & 9
Frequency of Measurement:
Reporting Period: 5 years

This monitoring item asks the question:

> ***To what extent are NFS lands and their management contributing to the viability of sensitive plant and animal species that are commonly found in forested habitats?***

R2 Regional Forester's Sensitive Species commonly associated or suspected to occur with these habitats include:

PLANTS	ANIMALS
Hall fescue	Northern goshawk
	Olive-sided flycatcher
	Lewis's woodpecker

Sensitive Plant Species
There is one R2-sensitive plant species (Hall Fescue) that is suspected to occur at the edges of forested areas of the TBNG. Hall Fescue is most commonly associated with aspen and pine forest. This species is identified as the target species for botanical surveys for project effects analysis. It has not been located in botanical surveys or in general floristic surveys conducted in 2002-2007.

There were not any habitat improvement projects implemented for sensitive plant species found in forested habitats. There is not any population monitoring occurring for any of the sensitive plant species suspected to occur in this habitat.

Terrestrial Wildlife
Forested habitats on the TBNG are primarily limited to the Spring Creek and Upton-Osage geographic areas, with some forested areas also found in the Broken Hills GA. These are coniferous forests and form the transition habitats between the ponderosa pine forests of the Black Hills to the east and the grassland and sagebrush habitats to the west. Due to the limited amounts of this habitat, past surveys for Northern Goshawk, Olive-sided flycatcher and Lewis's woodpecker have been general sensitive species surveys at the project level. Some call-playback surveys are conducted in potentially suitable habitat for the Northern goshawk. These surveys are conducted in support of biological evaluations for proposed activities.

During the past five years of monitoring, there have been no detections made for either the Northern goshawk or the Olive-sided flycatcher. Lewis's woodpeckers have been detected on an occasionally basis.

Conclusions
The continued viability of sensitive species in forested habitats is being maintained through project level surveys to detect occurrences, avoidance of sensitive species

occurrences in project implementation, and implementing conservation measures to minimize impacts to populations or habitats.

Recommendations
Continue to monitor sensitive species in forested habitats. There were no changes to the plan identified as needed. Implement prescribed burning projects whose objectives include habitat improvement for sensitive species, especially for Lewis's woodpecker.

Viability 4 – Prairie Dog Colony Habitats

Goal 1.b, Objective 2, 3, 4, 7, 8 & 9
Frequency of Measurement: Annual
Reporting Period: 5 years

This monitoring item asks the question:

> ***To what extent are the National Forest System lands and their management contributing to the viability of sensitive animal species that are heavily dependent on prairie dog colony habitat*?**

R2 Regional Forester's Sensitive Species commonly associated or suspected to occur with these habitats include:

ANIMALS
Black-tailed prairie dog
Burrowing owl
McCown's longspur
Chestnut-collared longspur
Mountain plover

Sensitive Plant Species
There are no sensitive plant species commonly associated with this habitat.

Terrestrial Wildlife
The current amount and distribution of prairie dog colonies in Thunder Basin does provide habitat for all these species. Some of the habitat features associated with prairie dog towns (burrows and bare ground) can persist for a few years after a prairie dog colony is affected by plague.

Black-tailed prairie dog**:** Black-tailed prairie dog is a MIS species in addition to being on the R2 Sensitive Species list and so it is evaluated under the MIS 3 monitoring item above.

Burrowing owl and Mountain plover: Surveys for these species have been general sensitive species surveys at the project level along with incidental detections made during the mapping and monitoring of occupied prairie dog colonies.

Although these species are detected on a regular basis, their population numbers tend to fluctuate with acres of occupied prairie dog habitat. These acres change drastically with the periodic occurrence of sylvatic plague. As plague moves through the black-tailed prairie dog population on the TBNG, mountain plover and burrowing owl habitat tends to persist for approximately 3 years after the prairie dogs die out. This often allows time for re-establishment of the prairie dog colony, and continuation of suitable habitat conditions over time. Over the last 5 years, the TBNG prairie dog trend has decreased. The TBNG will continue to manage for increased acres of prairie dog colonies, which provide suitable habitat for sensitive species associated with this habitat.

McCown's and Chestnut-collared longspur:
These species are monitored through the Monitoring Wyoming Birds program as previously described under Viability 1.

The table below provides detection numbers of these species. Again, these are statewide numbers; but these are species that are closely associated with the grassland habitat type whose transects are predominantly located in the TBNG area of Wyoming.

Table 23. Statewide Sensitive Bird Species Detections by Year.

SPECIES	2002	2003	2004	2005	2006	2007
Chestnut-collared longspur	74	132	48	97	112	17
McCown's longspur	71	81	138	236	270	125

While most of the individual bird species detections portrayed above appear to indicate relatively stable populations, it would be premature to estimate a population trend based on this timeframe.

Conclusions
The continued viability of sensitive species in prairie dog colony habitat is being maintained through project level surveys to detect occurrences, avoidance of sensitive species occurrences in project implementation, and implementing conservation measures to minimize impacts to populations or habitats. Acres of suitable habitat for these species are largely impacted by the effects to prairie dog populations due to periodic sylvatic plague.

Recommendations
Continue to monitor sensitive species in prairie dog colony habitat. Continue to strive for meeting the structural and seral stage objectives outlined in the TBNG Plan, and for meeting occupied prairie dog habitat objectives. Use prescribed fire to improve habitat suitability for Black-tailed prairie dog, Burrowing owl, Mountain plover and other species associated with these habitat conditions. There were no changes to the plan identified as needed.

Viability 5 – Caves, Cliffs, Buttes, Blowouts and Barren Habitats

Goal 1.b, Objective 2, 3, 4, 7, 8 & 9
Frequency of Measurement: Annual
Reporting Period: 5 years

This monitoring item asks the question:

> ***To what extent are National Forest System lands and their management contributing to the viability of sensitive plant and animal species that are commonly found in special habitats like caves, cliffs, buttes, blowouts and barren habitats?***

R2 Regional Forester's Sensitive Species commonly associated or suspected to occur with these habitats include:

ANIMALS
Fringed myotis
Spotted bat
Townsend's big-eared bat
American peregrine falcon

Sensitive Plant Species
There are no sensitive plant species commonly associated with this habitat.

Terrestrial Wildlife
Bats: Currently very little is known about bats on the TBNG and how current and past management activities may be positively or negatively affecting these mammals and the habitat which they depend on. Bats in Wyoming comprise approximately 20% of the mammalian community, with many believed to be declining. For most bat species, the current range is incompletely mapped; therefore, a major objective for each species is to sample areas where occurrence is suspected but not verified. The Land and Resource Management Plan for the TBNG identifies bats and their roosts as being warranted for protection, as well as identifying three species as being sensitive.

Figure 13. Western long eared myotis bat captured during a bat survey.

Bats were surveyed on the TBNG in 2007 using two bat identification techniques (mist netting and Anabat ultrasonic detection). Mist nets may be used to assess the presence or absence of bat species, determine the species composition of bat communities, and/or determine the relative abundance of bat species. Mist nets are deployed ½ hour prior to sundown and monitored continuously for a minimum of 2.5 hours. All bats are removed as soon as possible after capture, identified and released. Not all bat species have the same capture probabilities and some may go undetected

even though they are present at the survey site. Also, some less abundant species may successfully avoid capture during a single sample period.

To effectively detect the full suite of species present at a given site, an AnaBat Ultrasonic Bat Detector is utilized in conjunction with mist nets. This type of survey is used to document presence/absence and species composition of bat communities. It provides the ability to detect all species, including those not easily mist netted. AnaBat uses a zero-crossing continuous recording interface to record bat calls while they are foraging in a given habitat. These calls are then run through a computer program to identify the particular bat species making the call.

Survey locations were chosen based on the likelihood of encountering several species of bats and to survey in areas infrequently sampled during the 1994 – 1996 statewide bat survey of caves and abandoned mines. All summer bat surveys were conducted between June and October of 2007. These surveys are consistent with objectives and management goals developed in the Land and Resource Management Plan for the TBNG, the Wyoming Bat Conservation Plan, Wyoming Game and Fish Department, Wyoming Bat Working Group, Western Bat Working Group and Bat Conservation International.

Bats have been monitored at 17 sites on the TBNG over the last 3 years. Nine different species have been identified, including the fringed myotis (a sensitive species). To date, there have been no detections of the Spotted or Townsend's big-eared bat. In addition, bat surveys have increased the known range of the Red bat to include areas near the Cheyenne River. Species identified to date include:

Table 24. TBNG Bat Survey Results 2005-2007.

COMMON NAME	SCIENTIFIC NAME	2005	2006	2007
Little brown bat	*Myotis lucifugus*	Y	Y	Y
Western big brown bat	*Eptesicus fuscus*	Y	Y	Y
Long-eared myotis	*Myotis evotis*	Y	Y	N
Long-legged myotis	*Myotis volans*	Y	Y	N
Fringed myotis	*Myotis thysanodes*	Y	Y	N
Western small-footed myotis	*Myotis ciliolabrum*	Y	Y	Y
Red bat	*Lasiurus borealis*	Y	N	N
Hoary bat	*Lasiurus cinereus*	N	Y	Y
Northern long-legged myotis	*Myotis septentrionalis*	N	Y	N

Results of these surveys have helped identify species composition as well as important habitats for bats on the TBNG, and also help planning efforts to minimize impacts to bats. Additionally, information collected has contributed significantly to the knowledge of bats and habitat use on the TBNG and throughout northeast Wyoming.

Peregrine falcon: Cliff faces within the TBNG are potential nesting locations for Peregrine falcons. District personnel have performed surveys in these areas to attempt to detect active falcon eyries.

Although there have been incidental sightings of Peregrine falcons on the TBNG, there are no known nest site locations on the Grassland.

Conclusions
The presence of bat feeding and breeding activity within the administrative boundary of the TBNG reveals the importance and need for additional surveys. Anabat has proven to be an accurate and time efficient method of sampling for bats to establish presence/absence of individual species. Anabat will be used at selected locations in 2008 and subsequent years to document the bat species present. The data will be used to establish current distribution, and will also be used by the Wyoming Game and Fish Department to address range and distribution objectives for the 18 bat species that are known to occur in Wyoming as listed in the 1996 Nongame Bird and Mammal Plan.

Recommendations
Continue to monitor sensitive species in these habitats. There were no changes to the plan identified as needed.

Viability 6 – Aquatic Habitats

USDA Dept. Regulation 9500-4
36 CFS 219. 19 & 219.27
Frequency of Measurement: Annual
Reporting Period: 5 years

This monitoring item asks the question:

To what extent are National Forest System Lands and their management contributing to the viability of sensitive plant and animal species that are found in aquatic habitats?

Aquatic Animals
Mountain sucker
Plains minnow
Flathead chub
Sturgeon chub

Sensitive Plant Species
There are no sensitive plant species commonly associated with this habitat.

Aquatic Wildlife
Fish: In some streams, three-pass depletion, electrofishing methods were used to collect fish-population and habitat during this five-year reporting period. But most of the data were collected using seining techniques because of the turbid nature of grassland ephemeral streams and reservoirs. All fish, both native and non-native species, collected during sampling are identified by species, counted, measured and weighed. The numbers of fish, by species, collected from each water body sampled are tabulated and in some cases these data were used to estimate populations. Because of the discontinuous, ephemeral nature of most of the grassland streams,

reliable population estimates are problematic. Typically, no population estimates are modeled for grassland reservoirs.

During 1993 through 1995, Tim Patton, a PhD candidate at the University of Wyoming conducted surveys for warm water fishes extant in the Missouri River basin to evaluate potential native-fish conservation areas (Patton, 1997). Three of Tim's survey sites were located in the Cheyenne River basin in Wyoming, although the sites are located outside of the TBGA analysis area. The species collected at these sites, however, are for the most part, typical of the species that occur within the TBGA analysis area. Although there appears to be some variation among the kinds and numbers of species collected among the three sites, there are similarities: flathead chubs, fathead minnows, plains killifish; and sand shiners were the most common and abundant species collected.

Table 25. Fishes known to occur or likely to occur on the TBNG.

Common Name	Scientific Name	Native to Cheyenne River Basin (WY)
Common carp	*Cyprinus carpio*	No
Plains minnow	*Hybognathus placitus*	**Yes**
Golden shiner	*Notemigonus crysoleucas*	No
Sand shiner	*Notropis stramineus*	**Yes**
Fathead minnow	*Pimephales promelas*	**Yes**
Flathead chub	*Platygobio gracilis*	**Yes**
Longnose dace	*Rhinichthys cataractae*	**Yes**
River carpsucker	*Carpiodes carpio*	**Yes**
White sucker	*Catostomus commersoni*	**Yes**
Mountain sucker	*Catostomus platyrhynchus*	**Yes**
Black bullhead	*Ameiurus melas*	**Yes**
Channel catfish	*Ictalurus punctatus*	**Yes**
Plains topminnow	*Fundulus sciadicus*	**Yes**
Plains killifish	*Fundulus zebrinus*	**Yes (?)**
Green sunfish	*Lepomis cyanellus*	No
Bluegill	*Lepomis macrochirus*	No
Largemouth bass	*Micropterus salmoides*	No
Black crappie	*Pomoxis nigro maculatus*	No
Yellow perch	*Perca flavescens*	No
Brook trout	*Salvelinus fontinalis*	No
Brown trout	*Salmo trutta*	No
Rainbow trout	*Oncorhynchus mykiss*	No
Brook stickleback	*Culaea inconstans*	No

Despite the paucity of "natural" perennial water sources in the TBNG, the diversity of native and desired non-native fishes appear to be robust and stable. During four years of surveys (see tables below), only one undesired non-native fish (brook stickleback) has been observed in the TBNG; it was found in Turner Reservoir. The fish was likely introduced into the reservoir as a baitfish by anglers. Also, eight or so years of continuous drought in addition to the typical semiarid climate in the TBNG doesn't appear to have materially affected the fishes observed during the surveys. Somehow, these species are surviving and reproducing under difficult environmental conditions.

Table 26. Native and non-native fish species collected on the TBNG.

Fish Species	1993-1995 Survey No. of locations found	2003-2006 Sampling No. of locations found
Flathead chub	3	2
Fathead minnow	3	7
Plains killifish	3	2
Longnose dace	3	3
Plains minnow	3	4
Plains topminnow		2
Sand shiner	3	4
Green sunfish	2	8
River Carpsucker	1	0
Black Bullhead	1	5
Longnose sucker		4
Brassy minnow		2
Common carp		3
White sucker		2
Emerald shiner		2
Bluegill sunfish		3
Finescale dace		1
Stonecat		2
Yellow perch		1
Largemouth Bass		1
Spottail shiner		1
Rainbow trout		1
Brook stickleback		1

Conclusions

Clearly, water availability and, to some extent, water quality are the predominant limiting factors that affect the diversity, abundance, and distribution of fishes in the TBNG. All of the streams (discontinuous, ephemeral) and reservoirs surveyed during this reporting period contain sympatric populations of native and desired non-native fishes. The majority of these species appear to be persisting in very difficult environmental conditions.

Recommendations
Continue to survey TBNG streams and reservoirs to monitor and evaluate the populations and habitats of native and desired non-native fishes.

Wildlife 1 – Big Game Habitat

Management Area 3.68
Frequency of Measurement:
Reporting Period: 5 years

This monitoring item asks the question:

> ***Is habitat effectiveness on designated big game ranges being maintained or enhanced?***

Monitoring Protocol/Data Collected
The Wyoming Game and Fish Department monitor the big game populations within the Thunder Basin National Grassland. All population information and trends are based on this monitoring. The information provided by the Wyoming Game and Fish Department is provided in the form of a Job Completion Report (JCR). These reports are made available after the completion of their monitoring year. The most current information available at the time this report was prepared was the 2005 JCR.

Results/Evaluation
Antelope The antelope using the National Grassland area consist primarily of individuals classified as part of the Cheyenne River Herd Unit. In 1997, the Cheyenne River Herd Unit was combined with the Lance Creek and Black Hills Herd Units. Since that time this area has been evaluated as one population. This is reflected in Figure 14 below where the population makes a significant increase from 1997 to 1998.

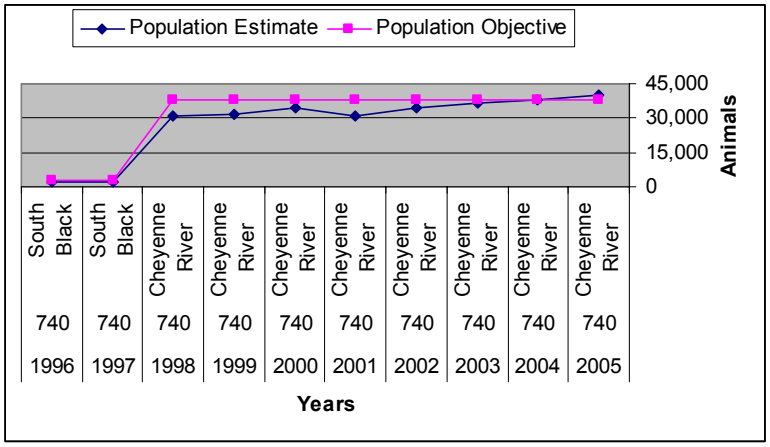


Figure 14. Cheyenne River Antelope Herd Unit (WFGD, 2005 JCR)

The Wyoming Game and Fish Department (2005 JCR) indicated that the antelope population found within the Cheyenne River Herd Unit remained reasonably stable through 2000, at approximately 15% below the established herd objective of 38,000 animals. A population drop in 2001 was noted, and was attributed to drought and

severe winter conditions which reduced productivity and survival. The following, mild winter allowed for an increase in antelope survival and started the recovery process. The population has increased since then, and currently is estimated to be above the population objective. Population estimates from the 2005 Wyoming Game and Fish Job Completion Report (JCR) estimate the population at 39,752 animals. Observations during the winter of 2006 indicated that there may have been a noteworthy die off of antelope. The winter of 2006/2007 was not a particularly harsh winter; however habitat conditions where these animals were noted appeared to be in very poor condition.

Mule Deer The mule deer population associated with the National Grassland emphasizing big game habitat (MA 3.68) occurs within the Thunder Basin Herd Unit. The population objective for this herd unit is currently 20,000 animals. This was increased in 2001 from 13,000. Since 1996 the population has fluctuated between approximately 14,000 and 21,700 animals. Currently (2005 data) the population is below objective by about 2,200 animals, at 17,806 animals.

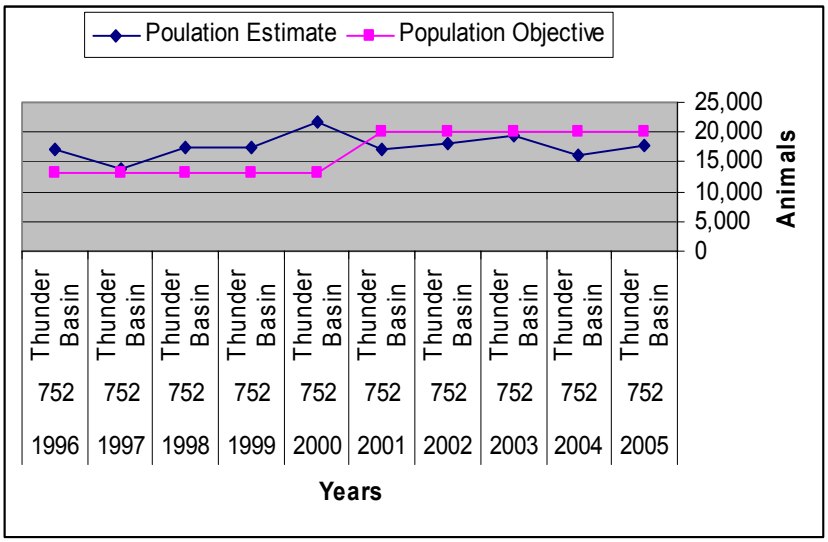


Figure 15. Thunder Basin Mule Deer Herd Unit (WFGD, 2005 JCR)

The decline in the population has been documented for several years. According to an additional memorandum included in the 2005 JCR from May 12, 2005, "Mule deer numbers on TBNG have declined significantly over the past several years, especially in area 167. This decline is primarily attributed to the onset of severe drought in the 2000 biological year and the liberal seasons necessitated by the drought." This hunt area is classified as general hunt area with an unrestricted number of in-state hunting licenses available. In addition, the Wyoming Game and Fish have, and continue to propose the issuance of increased numbers of out-of-state hunting licenses in response to these poor habitat conditions associated with the drought.

Elk The entire Management Area falls into one elk herd unit, the Rochelle Hills Elk Herd Unit. The current population is approximately 600 animals, which is above the desired objective of 400 animals. In 2002 the population exceeded the population objective and has continued to increase until 2004 when it reached 692 animals. In 2005 the population dropped back to 600, still 200 above the desired objective.

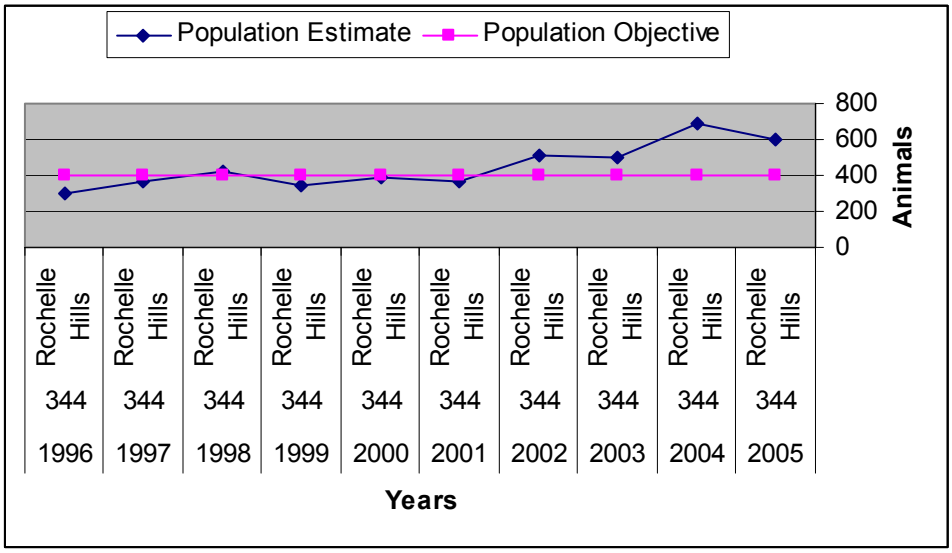


Figure 16. Rochelle Hills Elk Herd Unit (WFGD, 2005 JCR)

Community Relations 1

Goal 1.c, Objective 5
Goal 4. b Public and Org. Relations Obj. 2
Frequency of Measurement: 5 year
Reporting Period: 5 year

This monitoring item asks the question:

> ***To what extent are noxious weeds, invasive species, and animal damage spreading from National Forest System lands to other ownerships or from lands managed by other government agencies to National Forest System lands?***

Noxious Weeds / Invasive Plant Species

Figure 17. Saltcedar (light colored shrub) on TBNG.

A grassland-wide update of the GIS spatial layer for acres infested by noxious and/or invasive weed species has not been completed since 1994, and will likely not be completed because the costs to do so are prohibitive. However, as acreages are treated and monitored, GPS data (for expanded, reduced, eliminated, or new acres) are added to the GIS layer.

We believe that saltcedar (tamarisk) may have originally spread onto National Grassland acres from ornamental plantings on adjacent private lands. We, and cooperating partners, are aggressively treating all known populations of the species on all land ownerships, and still believe eradication of the species across the Grassland is possible.

We have in place cooperating agreements for noxious weed treatment with the Weed and Pest Control Districts of both Converse and Campbell counties. Weston and Niobrara counties also cooperate in on-the-ground treatment efforts.

All three Grazing Associations on the Grassland – Spring Creek, Inyan Kara, and Thunder Basin – are also cooperating partners and contribute funds and/or staff to control efforts. The Thunder Basin Grasslands Prairie Ecosystem Association has been an instrumental financial contributor to noxious weed control efforts across much of the National Grassland.

Prairie Dog Management

Prairie dog management continues to be an important and controversial subject on the Thunder Basin National Grassland. The Forest Service has an obligation to provide habitat to enhance the recovery of endangered species like the black-footed ferret and maintain viable populations of sensitive species and species that may be impacted by Forest Service management. Many of these species are associated with prairie dog colonies, including the prairie dog itself. However, prairie dogs also remove forage that would otherwise be available for livestock consumption whether it is on National Grasslands through livestock grazing permits or on adjoining private lands. The FS understands the need to control the spread of prairie dog communities onto private land This creates problems with livestock producers, as prairie dogs compete with cattle for forage. With continued conflict, there is very limited potential for the TBNG to reintroduce black-footed ferrets.

As a result, conflicts commonly arise over how many prairie dog colonies and the locations and sizes of these colonies located on National Grasslands. Intermingled private lands adjacent to National Grasslands elevate these conflicts, as expanding prairie dog populations create unwanted colonization on private lands. The FS recognizes the need to manage these prairie dog colonies in a more holistic way, looking beyond legal boundaries to manage for prairie dog colonies on an ecosystem basis. To further this effort, the Forest Service has been collaborating on an ecosystem based management strategy with neighboring private landowners. This strategy would provide for prairie dog colonies over all ownerships that would provide for faster recovery following plague events. This collaboration has resulted in the proposed amendment #3 to the Grassland Plan. More information on this amendment in progress can be found at the following website:

http://www.fs.fed.us/r2/mbr/projects/forestplans/in_progress/index.shtml

Proactive management actions for TBNG include developing a prairie dog strategy involving partners, pursuing an experimental/non-essential 10(j) designation, and continually monitoring prairie dog populations. These actions are expected to provide long term conservation of prairie dogs, and contribute to a future ferret reintroduction.

Damage Control 1

Goal 1.c, Objective 5
Goal 4. b Public and Org. Relations Obj. 2
Frequency of Measurement: 5 year
Reporting Period: 5 year

This monitoring item asks the question:

To what extent are destructive insect and disease outbreaks prevented following management activities?

Timber management has only occurred as a result of one fuel reduction project in the Upton Osage area. In general, natural ecosystem processes are allowed to occur in the forested areas of TBNG. Bark beetle outbreaks are quite extensive on the adjacent Black Hills National forest, but infestations in Ponderosa Pine on the Grassland have not yet been documented.

Damage Control 2

Goal 1.c, Objective 5
Goal 4. b Public and Org. Relations Obj. 2
Frequency of Measurement: 5 year
Reporting Period: 5 year

This monitoring item asks the question:

To what extent are noxious weeds, invasive species, and animal damage expanding or being reduced?

Noxious Weeds

Based upon our 1994 inventory layer of noxious weed species, updated by acres treated and new populations located since that time, there are 7,117 National Grassland acres infested (population densities vary greatly) with the following State designated noxious weed species:

1. 4,012 acres of Canada thistle
2. 2,420 acres of leafy spurge
3. 600 acres of spotted knapweed
4. 80 acres of Russian knapweed
5. 5 acres of saltcedar (tamarisk)

Table 27. Noxious weed treatment on TBNG.

2004	2005	2006	2007
327	430	580	853

Invasive Annual Species

Populations of invasive annual brome species, primarily cheatgrass, continue to increase over time. Early rangeland analysis efforts – primarily through the use of Parker 3-Step permanent transects and paced transects – showed very little presence

of cheatgrass on the Grassland. Of 906 transects installed and read on 42 allotments from 1957 to 1960, only 34 transects (5%) on 5 allotments recorded one hit or more on the species.

By the mid-1980s, a few transect readings were showing as much as 12-15% canopy cover of annual bromes. Readings in the late 1990s and early 2000s showed nearly 40% of all transects recorded at least one hit on cheatgrass or other annual brome species.

The following table illustrates invasive annual brome species (cheatgrass, Japanese brome, and rattlesnake brome) densities by ecological site within the Thunder Basin National Grassland. These data are the results of rangeland analysis efforts conducted over the last four years, re-reading Parker 3-Steps and installing Cover-Frequency transects, to determine species composition:

Table 28. Invasive annual brome species by ecological site in TBNG.

Ecological Site	Average canopy cover
Saline Upland	19%
Sandy	13%
Clayey	8%
Loamy	16%
Shallow Loamy	12%
Shallow Clayey	6%
Shallow Sandy	1.4%
Very Shallow	<1%

Based upon transect results and continued and extensive visual observations over the last several years, most pastures in the grassland have some level of invasive annual brome infestation present. The majority of pastures have approximately 5% canopy cover of invasive annuals in some part of the pasture. There are some, but not numerous, monoculture stands of a few to as many as tens of acres, but virtually every section of land contains one or more areas with annual brome plants. An estimate of the area that is significantly affected by invasive annuals is approximately 10 % across the grassland with an approximate average canopy cover of about 9 percent. Results also indicate that pastures/allotments in late-intermediate and late seral condition tend to show the greatest densities of annual bromes.

Visual observations and ocular estimates indicate infested acres seem to be increasing rapidly, especially during the last five to six years of severe and prolonged drought. Our predictive model indicates the entire 553,000 acres of Grassland are potentially capable of being infested.

The largest and most dense infestations of cheatgrass and Japanese brome are often where wildfires or prescribed burns occurred, and the Grassland would appear to demonstrate similar tendencies. Post-burn treatment was applied in the fall of 2007 after the Upton-Osage urban-interface prescribed fire in an effort to retard or eliminate annual brome infestations in the burn area, allowing the native species present to revegetate those acres. Early spring inspections of the area indicate the treatment appears effective.

Conclusions:

1. Based upon long-term composition and trend readings over the last fifty years, annual bromes, especially cheatgrass, have expanded their populations over time on the Grassland. Recent transect readings and extensive visual observations indicate they have expanded substantially during the ongoing 8-year severe drought.
2. Very little of the Grassland is located above 9,500 feet elevation – the level at which our predictive model indicates it is more difficult for cheatgrass to successfully establish. Based upon our inventories to date, annual bromes exist in varying populations in most areas of the Grassland.
3. A few experts believe that cheatgrass has been present in Wyoming for several decades and, at our elevations and in our native plant communities, will decrease during periods of average and above-average precipitation. Nor will it be able to establish to the point of influencing fire frequency and intensity like in the Great Basin. Members of several ranching families who have lived in the vicinity of the Thunder Basin their entire lives have likewise seen this trend – cheatgrass populations expand in periods of very dry conditions and reduce or disappear in above-average precipitation years.
4. Far more experts believe, even in Wyoming, that once cheatgrass is established, it is here to stay – even <u>if</u> populations may "ebb and flow" according to moisture cycles. They are fearful that fire regimes and native plant communities <u>will</u> be forever changed in the Rocky Mountain Region. Long-term transect results would seem to indicate infestations have not yet shown a decrease back to prior low levels.

Current situation:

1. The Director of the Wyoming Game & Fish Department has publicly challenged both the BLM and the Forest Service throughout the state to stop the invasion into critical big game habitats – especially deer and antelope winter ranges – before populations are more severely affected than at current.
2. The Southeast Wyoming Cheatgrass Partnership is securing grant and partnership monies for cooperative cheatgrass control – and has repeatedly requested that the Forest Service become an active partner in planning and control efforts. Forest Service employees are members of this task force and are actively involved in inventory and planning efforts; however, the agency has not yet participated in any extensive or intermingled-ownership control efforts, due in large part to lack of available financing and employees' time to complete the planning efforts necessary to conduct treatment on NFS lands.
3. The Thunder Basin Grasslands Prairie Ecosystem Association currently has about 7,000 acres of private lands owned by their members signed up for cooperative control efforts for cheatgrass. They repeatedly request USFS involvement. Due to the intermingled ownership of all lands in and adjacent to the Grasslands, control is not possible without <u>all</u> land ownerships being treated in blocks. Again, the Forest Service is very actively involved with this group, but general lack of control efforts on the agency's part has restricted the Association to conducting control efforts only on larger blocks of consolidated

private lands. The continued reduced budgets and higher priorities for rangeland vegetation management and fuels management have prevented the USFS from being able to complete an EIS for aerial application of approved herbicides necessary for treatment across large acreages.

Recommendations:

1. An EIS needs to be completed that will provide for aerial application of approved herbicides for the control of invasive annual bromes. Aerial application is absolutely mandatory in order to safely and effectively apply herbicide on steeper slopes, especially those characteristic of many big game winter ranges.
2. The Forest Supervisor will continue to discuss this issue with the Regional Leadership Team. Since annual brome infestations and expansions affect virtually all Forests and Grasslands in the Rocky Mountain Region (as well as the West as a whole), perhaps the preparation of an EIS can be undertaken by the Region rather than by individual Forests. Treatment across landscapes can only be successful when all landowners in an area are willing to proceed with the effort and expense. The cost of EIS preparation is minor compared to the actual costs of treatment, which can run from $25-40 per acre. Some acreages might also need follow-up seeding. But based upon treatments in other areas, a majority of sites can successfully reestablish when the native species are present but are overshadowed by annual bromes when it comes to competition for available moisture.

Animal Damage

Animal damage, as referenced here, does not and should not apply to predator management carried out by the state for domestic sheep allotments and/or big game herd management.

Animal damage, as it relates to the effects of prairie dogs is being addressed through the development of a prairie dog strategy, which is discussed elsewhere in this report.

Vegetation 1

Goal 1.c, Objective 1
Goal 2.c Wildlife, Fish & Plant Use Obj. 2
Frequency of Measurement: Annual
Reporting Period: 5 year

This monitoring item asks the question:

To what extent are rangeland vegetation structure objectives being met?

Monitoring Protocol/Data Collected

Rangeland analysis efforts have been conducted across the entire Grassland over the last four years (Spring Creek unit in 2004, Thunder Basin area in 2005-2006, and Inyan Kara area in 2007). Cover-Frequency transects were read on most allotments, with resultant photopoints and Robel pole readings taken at established transect intervals to measure vegetation height. Visual inspections of nearly all pastures were made to

verify and extrapolate transect results. Parker 3-Step permanent transects were re-read in many locations as well.

Each Geographic Area has desired vegetation structure conditions set forth in the Grassland Plan (Chapter 2). As defined in the Plan (Appendix H), High structure is 7 inches or greater, Low structure is 2 inches or less, and Moderate is 2 ½ to 6 ½ inches in height. Measurements are generally taken after grazing is completed in a pasture/allotment for that year. Vegetation structure inventory data are summarized and compared to desired conditions below.

In cases where the desired range of vegetation structure is not currently being met, and acreages need to be moved upward or downward to achieve desired conditions, any or all of the following livestock adaptive management options may be used to alter grazing intensity: 1)adjust seasons of use, 2)adjust numbers, 3)change kind or class of livestock, 4)use herding/riding or livestock supplements or attractants, 5)adjust management unit boundaries, 6)incorporate vegetation treatments such as prescribed fire or chemical/mechanical treatment, and 7)incorporate rangeland improvements such as water developments or temporary or permanent fencing.

Broken Hills Geographic Area (157,440 acres)

Table 29. Vegetation Structure in Broken Hills GA.

Vegetation Structure	High	Moderate	Low
Grassland Plan Desired Condition	30% - 40%	40% - 50%	15% - 25%
Existing Condition as of 2007:			
Percent	13%	73%	14%
Acres	20,352	114,349	22,739

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

There are too many acres in the Moderate structure category and not enough in either end (high and low).

1. Move about 34,750 acres from Moderate up to High structure.
2. Move 8,750 acres from Moderate down into Low structure.

Cellars Rosecrans Geographic Area (121,080 acres)

Table 30. Vegetation Structure in Cellars Rosecrans GA.

Vegetation Structure	High	Moderate	Low
Grassland Plan Desired Condition	30% - 40%	25% - 35%	30% - 40%
Existing Condition as of 2007:			
Percent	21%	54%	25%
Acres	25,494	66,294	30,713

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:
There are nearly twice as many acres in the Moderate structure category as desired and not enough in either end (high and low).

1. Move at least 6,000 – 9,000 acres from Moderate into Low structure.
2. Move at least 12,000 – 15,000 acres from Moderate into High structure.

Fairview Clareton Geographic Area (92,130 acres)

Table 31. Vegetation Structure in Fairview Clareton GA.

Vegetation Structure	High	Moderate	Low
Grassland Plan Desired Condition	25% - 35%	45% - 55%	15% - 25%
Existing Condition as of 2007:			
Percent	48%	34%	18%
Acres	44,646	30,917	16,567

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:
There are too many acres in high structure and not enough in Moderate; Low structure is within the desired range.

1. To meet the desired condition, about 12,000 – 15,000 acres need to be moved downward from High structure to Moderate structure.

Hilight Bill Geographic Area (100,780 acres)

Table 32. Vegetation Structure in Hilight Bill GA.

Vegetation Structure	High	Moderate	Low
Grassland Plan Desired Condition	25% - 35%	45% - 55%	15% - 25%
Existing Condition as of 2007:			
Percent	29%	53%	18%
Acres	23,349	44,610	15,029

Acres for the G.A. only add to 82,988 because 17,792 acres are within the permit boundaries of active coal mines.

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:
All structural classes are currently within the desired range of acres.

1. Move about another 1,550 acres from Moderate up to High structure.
2. Move about another 3,100 acres from Moderate down to Low structure.

Spring Creek Geographic Area (48,740 acres)

Table 33. Vegetation Structure in Spring Creek GA.

Vegetation Structure	High	Moderate	Low
Grassland Plan Desired Condition	35% - 45%	35% - 45%	15% - 25%
Existing Condition as of 2007:			
Percent	42%	40%	18%
Acres	20,471	19,496	8,773

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

None needed; current structure is meeting all desired structural ranges across the entire Geographic area.

Upton Osage Geographic Area (32,310 acres)

Table 34. Vegetation Structure in Upton Osage GA.

Vegetation Structure	High	Moderate	Low
Grassland Plan Desired Condition	30% - 40%	45% - 55%	10% - 20%
Existing Condition as of 2007:			
Percent	55%	41%	4%
Acres	17,845	13,064	1,401

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

Rangeland vegetation structure needs to be moved downward across the Geographic Area; far too many acres are in High structure and not nearly enough in Low structure.

1. About 5,000 – 8,000 acres need to be moved from Late structure to Moderate – or all the way down to Low structure.
2. At least 2,000 acres need to be moved to Low structure – from either of the other categories.

Summary of Rangeland Vegetation Structure for the Thunder Basin National Grassland (552,480 acres)

The percentage across the entire Grassland is computed by using a weighted average for all the acres across all six Geographic Areas[3].

Actions needed in the next 5-10 years to meet ***overall*** Grassland Plan Desired Condition:

1. Conditions are rightly measured by Geographic Area because the different Areas have different management objectives and desired vegetative conditions.
2. However, measured at the greater landscape scale across all 550,000+ Thunder Basin National Grassland acres, current management is within 1-4% of meeting desired vegetative structure. All categories have a 10% range of acceptable levels.
3. Move about 5,000 – 10,000 acres from Moderate structure to Low structure.
4. Move about 10,000 – 20,000 acres from Moderate structure to High structure.
5. For the most part, across most allotments, maintain existing vegetative structure. Slight modifications of use in some pastures of some allotments will generally be adequate to accomplish the above changes in categories.

[3] Note: 3% of the Grassland acres are within the permit boundaries of active coal mines.

In cases where the desired range of vegetation structure is not currently being met, and acreages need to be moved upward or downward to achieve desired conditions, any or all of the following livestock adaptive management options may be used to alter grazing intensity: 1)adjust seasons of use, 2)adjust numbers, 3)change kind or class of livestock, 4)use herding/riding or livestock supplements or attractants, 5)adjust management unit boundaries, 6)incorporate vegetation treatments such as prescribed fire or chemical/mechanical treatment, and 7)incorporate rangeland improvements such as water developments or temporary or permanent fencing.

Vegetation 2

Goal 1.c, Objective 1
Goal 2.c Wildlife, Fish & Plant Use Obj. 2
Frequency of Measurement: Annual
Reporting Period: 5 year

This monitoring item asks the question:

> ***To what extent are rangeland vegetation composition objectives being met?***

Monitoring Protocol/Data Collected

Rangeland analysis efforts have been conducted across the entire Grassland over the last four years (Spring Creek unit in 2004, Thunder Basin area in 2005-2006, and Inyan Kara area in 2007). Parker 3-Step permanent condition and trend transects were re-read in many locations. Cover-Frequency transects were installed on most allotments, with readings recorded for all perennial grasses, forbs, and shrubs, as well as tree species. Visual inspections of nearly all pastures were made to verify and extrapolate transect results.

Results were evaluated using the following Ecological Classification Types developed by rangeland research scientist Dr. Daniel Uresk of the Forestry Sciences Laboratory at Rapid City, South Dakota:

- Wyoming big sagebrush – western wheatgrass – blue grama
- Greasewood – western wheatgrass
- Needleandthread – western wheatgrass – blue grama
- Plains cottonwood

Annual species, including annual bromes, were not used in computations; however, greater presence of those species usually decreases the numbers of perennial plants, thereby generally lowering the vegetation composition stage.

Generally, big sagebrush is dominant in the Late seral stage, western wheatgrass in Late Intermediate, and blue grama in Early Intermediate. Early stages are often associated with pioneer plant communities that follow behind disturbance processes, and generally display higher percentages of annual forbs, annual grasses, and base soil.

Each Geographic Area has desired vegetation composition objectives set forth in the Grassland Plan for each of the four seral stages. Vegetation composition inventory data are summarized and compared to desired conditions below.

In cases where the desired vegetation composition is not currently being met, and acreages need to be moved upward or downward to achieve desired conditions, any or all of the following livestock adaptive management options may be used to alter grazing intensity: 1)adjust seasons of use, 2)adjust numbers, 3)change kind or class of livestock, 4)use herding/riding or livestock supplements or attractants, 5)adjust management unit boundaries, 6)incorporate vegetation treatments such as prescribed fire or chemical/mechanical treatment, and 7)incorporate rangeland improvements such as water developments or temporary or permanent fencing.

Broken Hills Geographic Area (157,440 acres)

Table 35. Vegetation composition in Broken Hills GA.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition	15% - 25%	30% - 40%	25% - 35%	10% - 20%
Existing Condition as of 2007:				
Percent	11%	40%	33%	16%
Acres	17,337	62,505	52,439	25,159

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

There are not enough acres in Late seral condition, and too many in Late Intermediate.

1. Move about 7,400 acres from Late Intermediate up to Late.

Cellars Rosecrans Geographic Area (121,080 acres)

Table 36. Vegetation composition in Cellars Rosecrans GA.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition	10% - 20%	20% - 30%	25% - 35%	25% - 35%
Existing Condition as of 2007:				
Percent	3%	41%	29%	27%
Acres	3,948	50,097	34,692	32,343

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

There are not enough acres in Late seral condition, and too many in Late Intermediate; the two earlier stages are adequately represented.

1. Move approximately 10,000 – 14,000 acres from Late Intermediate to Late status.

Fairview Clareton Geographic Area (92,130 acres)

Table 37. Vegetation composition in Fairview Clareton GA.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition	10% - 20%	30% - 40%	30% - 40%	10% - 20%
Existing Condition as of 2007:				
Percent	27%	28%	13%	32%
Acres	24,363	25,632	12,369	29,766

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

Too many acres are in Late seral condition and need to be moved downward and too many acres are in Early seral condition and need to be moved upward.

1. Move about 6,000 – 8,000 acres from Late condition to meet the Late Intermediate seral stage guidelines.
2. Move about 11,000 – 15,000 acres from Early condition up to Early Intermediate seral stage guidelines.

Hilight Bill Geographic Area (100,780 acres)**

Table 38. Vegetation composition in Hilight Bill GA.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition	10% - 20%	30% - 40%	30% - 40%	10% - 20%
Existing Condition as of 2007:				
Percent	12%	33%	42%	13%
Acres	10,173	27,513	34,269	11,033

**** Acres for the G.A. only add to 82,988 because 17,792 acres are within the permit boundaries of active coal mines.

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition: Just over 1,000 too many acres are in Early Intermediate; all other classes are within the desirable ranges.

1. Move about 2,300 acres from Late Intermediate to Late.
2. Move about 5,200 acres from Early Intermediate to Late Intermediate.
3. Move about 1,400 acres from Early Intermediate down to Early.

Spring Creek Geographic Area (48,740 acres)

Table 39. Vegetation composition in Spring Creek GA.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition	10% - 20%	30% - 40%	30% - 40%	10% - 20%
Existing Condition as of 2007:				
Percent	11%	31%	40%	18%
Acres	5,361	15,110	19,496	8,773

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

No action needed; current seral stages are being met for all desired ranges across the entire Geographic area.

1. There is a need to maintain or achieve an upward trend in the Late and Late Intermediate classes since both of them are currently at the lower end of their ranges.

Upton Osage Geographic Area (32,310 acres)

Table 40. Vegetation composition in Upton Osage GA.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition	15% - 25%	30% - 40%	25% - 35%	10% - 20%
Existing Condition as of 2007:				
Percent	6%	79%	9%	6%
Acres	2,086	25,411	3,008	1,805

Actions needed in the next 5-10 years to meet Geographic Area Desired Condition:

The vast majority of the acres are in Late Intermediate, and none of the other stages are within the range of desired conditions.

1. Move at least 3,000 acres from Late Intermediate up to Late condition.
2. About 10,000 – 12,000 acres need to be moved downward from Late Intermediate to at least Early Intermediate. At least 2,000 of these acres need to be moved all the way to Early condition – from either of the other two categories.

Summary of Rangeland Vegetation Seral Stages for the entire Thunder Basin National Grassland (552,480 acres)

Table 41. Summary of Vegetation composition for TBNG.

Vegetation Seral Stage	Late	Late Intermediate	Early Intermediate	Early
Grassland Plan Desired Condition*	12% - 22%	28% - 38%	28% - 38%	14% - 24%
Existing Condition as of 2007:				
Percent	12%	37%	28%	20%
Acres	63,268	206,268	153,924	108,879

* The percentage across the entire Grassland is computed by using a weighted average for all the acres across all six Geographic Areas.

Actions needed in the next 5-10 years to meet ***overall*** Grassland Plan Desired Condition:

Conditions are rightly measured by Geographic Area because the different Areas have different management objectives and desired vegetative conditions.

However, measured at the greater landscape scale across all 550,000+ Thunder Basin National Grassland acres, current management is already meeting desired vegetative seral stages in all four categories.

1. Since 3 of the 4 categories are near the outside of their ranges, efforts should continue to move toward the middle of those ranges.
2. For example, management of 10,000 – 20,000 allotment/pasture acres could be slightly adjusted to move them from Late Intermediate up into Late, and a similar amount could be moved downward into Early Intermediate.

In cases where the desired vegetation composition is not currently being met, and acreages need to be moved upward or downward to achieve desired conditions, any or all of the following livestock adaptive management options may be used to alter grazing intensity: 1)adjust seasons of use, 2)adjust numbers, 3)change kind or class of livestock, 4)use herding/riding or livestock supplements or attractants, 5)adjust management unit boundaries, 6)incorporate vegetation treatments such as prescribed fire or chemical/mechanical treatment, and 7)incorporate rangeland improvements such as water developments or temporary or permanent fencing.

Vegetation 3

Goal 1.c, Objective 1
Goal 2.c Wildlife, Fish & Plant Use Obj. 2
Frequency of Measurement: Annual
Reporting Period: 5 year

This monitoring item asks the question:

To what extent are desired vegetation conditions in forested areas being met?

The Upton/Osage Geographic Area contains 32,310 acres, of which approximately 12,000 acres are Ponderosa Pine and/or Rocky Mountain Juniper community types with

a foliar canopy of sufficient level to influence the understory production or composition. Normally found on moderate to steep slopes, these sites generally display potential native understory vegetation of approximately 80% perennial grasses, 15% perennial forbs, and 5% shrubs.

Understory rangeland vegetation was inventoried for structure and composition in all forested stands and the results are included in the ***Vegetation 1*** and ***Vegetation 2*** monitoring items above.

Silvicultural Structural Stages are defined as follows:

1. Structural Stage 1 (Grass/Forb): Forested openings created by disturbances such as fire or windthrow. Meadows and prairies are also included as grass/forb. Those data are already detailed in above discussions.
2. Structural Stage 2 (Shrubs/Seedlings): Developmental stage dominated by tree seedlings (less than one-inch diameter breast height) and shrub species.
3. Structural Stage 3 (Sapling/Pole): Developmental stage dominated by young trees up to seven inches diameter breast height, 10-50 feet tall, and usually less than 50 years old.
4. Structural Stage 4 (Mature): Consists of trees larger and older than Stage 3.
5. Structural Stage 5 (Old Growth): Characterized by trees 160 years of age or older.

The forested community types are estimated to have 60-75% of the acres in structural stage 4 and/or 5 with the remaining 40-25% in structural stages 2 and 3. Structural stages 2 and 3 produce more understory vegetation/forage than structural stages 4 and 5. These estimates indicate the forested stands are already meeting desired conditions. However, the acreages in structural stages 4 and 5 are already at the high end of the desired range; plans are underway for continued use of prescribed fire to keep adequate representation for all 4 structural stages across the Grassland.

Vegetation 4

Goal 1.c, Objective 1
Goal 2.c Wildlife, Fish & Plant Use Obj. 2
Frequency of Measurement: Annual
Reporting Period: 5 year

This monitoring item asks the question:

To what extent are desired vegetation conditions in wetlands being met?

In the 48,740-acre Spring Creek area there are very few riparian and wetland acres. Most streams are shallow and go intermittent during summer months; a few remnant pothole ponds and oxbows do provide limited habitat for aquatic species. Some of these wetlands are very seasonal in nature, and may only exhibit obvious wetland characteristics during wetter weather cycles or following precipitation events. Most drainages on private and NFS lands have some sort of water catchments to retain snowmelt and rain event runoff for livestock and wildlife watering facilities; a by-

product of these reservoirs is riparian and wetland areas suitable for amphibian habitat.

Riparian condition was not extensively surveyed using standard protocols (PFC or similar). However, observations during fish sampling, amphibian surveys, and rangeland vegetation inventories indicate riparian and wetland resource conditions are generally quite good.

In the main body of the Thunder Basin Grassland (the other five geographic areas), riparian areas are limited to about 11,000 acres – or about two percent of the area. The majority of these areas are associated with the broad floodplains along the major intermittent streams (Cheyenne River and Antelope Creek). A variety of age classes exist in the Grassland's woody draws – of the acres of plains cottonwood and willow bottomlands, 66% are in late seral condition, 11% in mid-seral, and 23% in early seral. While the vigor and age class distribution can be influenced by a variety of factors, existing conditions are conducive to establishment of cottonwood trees.

In the main body of the Grassland, only 2,644 acres have been mapped as wetlands (about ½ of one percent). Most of these are associated with stock reservoirs and spreader dikes, with a few located along the many small intermittent and ephemeral drainages.

Analysis indicates most of these wetland and riparian areas are in stable or improving condition. A few (such as Buck, Prairie, and Sage Creeks) evidence isolated areas of overgrazing. Beaver Creek (above Highway 450) is an unstable watershed due to headcutting from past highway reconstruction. A few areas in the northeastern portion of the Grassland have been impacted by oil and gas activity (and roads) and by past bentonite mining.

Multiple Benefits to People

Recreation 1 - Trails

Goal 2.a Objectives 1 and 7
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***To what extent are trails managed to meet regional standards and to minimize conflicts among users?***

Monitoring protocol/data collected: Miles of trail maintained to standard, reports of conflicts among trail users.

Results/Evaluation: The Thunder Basin National Grassland has 20 miles of single track motorized trail. All of the maintenance work done on the Upton/Osage trails is done by volunteers from the Inyan Kara Riders.

This trail system is used by the Inyan Kara Riders for a motorcycle enduro event one day each year. This is part of a larger enduro circuit, and has been deemed one of the best in the Rocky Mountain circuit.

Table 42. FY06 Trails Meeting Agency Standards.

Trails on District (miles)	Trails meeting agency standards (miles)	Percent (%)
20	20	100%

All of these trails are single-track motorized (designated motorcycle trails), and there has been an upsurge in ATV use on these trails, which has affected the trail quality for motorcycle users.

Recommendations:

- Provide on-site training to the volunteer group for trail maintenance, reconstruction and construction techniques.
- Secure funding to purchase one or two dirt bikes so the trails can be patrolled regularly and checked for maintenance needs.

Recreation 2 - Recreation Opportunities

Goal 2.a Objectives 4 and 6
Frequency of Measurement: 5 years
Reporting Period: 5 years

This monitoring item asks the question:

> ***Where does the demand for recreation opportunities warrant development of additional opportunities such as trails or campgrounds?***

The Recreation Site Facility Master Plan (RSFMP) was conducted in 2006 for the forest and grassland, which emphasized dispersed recreation and discouraged development of any new developed recreation sites. This coincides with a better understanding of the recreation use on the grassland, which is almost entirely day-use motorized.

Recommendations:

- Once travel analysis is complete in 2009, implement decisions on the ground for greater clarity and opportunities for the public.
- Complete recreation, vegetation and rehabilitation plans for key recreation areas for 2012.
- Conduct visitor surveys in key areas to broaden understanding of the recreation use on the grassland.
- Create strategies in with cooperation with research and development on providing appropriate developed recreation with minimal operation and maintenance so demand is met for both the public and federal policies (administrate to standard) and budgets.

Recreation 3 - Interpretation

Goal 2.a Objectives 2, 3 and 4
Goal 2b Heritage Objectives 2 & 5
Goal 2c Geologic and Paleontologic Res. Obj. 3
Wildlife, Fish & Plant Use Obj. 1, Goal 4a Obj. 2
National Historic Preservation Act
Frequency of Measurement: 5 years
Reporting Period: 5 years

This monitoring item asks the question:

> ***To what extent are grassland and forest visitors informed of the recreation opportunities available to them; are they adequately guided to those recreation opportunities; and do they receive adequate interpretive information on National Register of Historic Places and other heritage sites, geologic, paleontologic, wildlife, plant, and recreation resources or opportunities?***

Thunder Basin National Grassland was included in the forest interpretive plan which was updated and finalized in 2005.

Grant money was secured from the Wyoming State Trails program in FY08 to create a "media blitz". The message will be "responsible riding on national forests and grasslands" to discourage off-road use by ATV riders. This effort is in partnership with the Bighorn National Forest, Black Hills National Forest, and the Buffalo Field Office BLM, as all of these areas, as well as the grassland. The messages will be conveyed through print and radio media.

Public interpretation, in the form of physical signs and/or road stops, has not been provided for heritage, geological and paleontological sites to date. This is largely due to the remoteness of the areas and lack of regular LEO patrol capabilities in these areas; these factors combine to result in a high risk of site vandalism and/or illegal collection of irreplaceable resources if their locations become common knowledge.

Recommendations:

- Identify similar message needs as warranted.
- Use 2008 media blitz as a pilot and modify for use in other communities as needed.

Travel and Access 1 - Effects of Off Road Vehicles

Legally Required Monitoring Item
Goal 2.a and 4.a
Frequency of Measurement: Two Year
Reporting Period: Two Year

This monitoring item asks the question:

What are the effects of vehicle use off roads?

Monitoring protocol/data collected: This item is assessed using field observations, Forest patrol responses, and official law enforcement statistics.

Results/Evaluation: In 2003, a Special Order was signed by Forest Supervisor, Mary Peterson, that restricted motorized travel to existing roads and trails. Law Enforcement statistics for the past five years (Table 43) are of limited value in evaluating the trend of off-road use. There is no dedicated law enforcement officer for Thunder Basin National Grassland, and no consistent patrolling conducted year-round. Also, since much of the off-road use occurs out of sight of legal roads where patrollers are, it isn't observed, so much goes undetected. However, the statistics do reflect some of the effects of dedicated patrolling during hunting season, which historically had been the largest impact. In October of 2002 (FY2003), October being hunting season on the grassland, very little patrolling occurred because of changes in personnel. The following year a large emphasis was placed on off-road issues during hunting season; especially closing any illegally-created trails, which is reflected in the larger number of incident reports and violation notices. The result is a downturn in off-road incidents during hunting season in subsequent years. Between active patrolling, and enforcement, the message had gotten through and incidents markedly dropped off.

The more recent statistics (2007) reflects mostly spring patrolling efforts in the Weston portion of the grassland. It was discovered that this area sees a marked upsurge in use from March 1 through May 31. It is believed this is due to several factors; a nearby popular reservoir and other public lands are still under snow and inaccessible, sage-grouse timing restrictions are in effect during these dates, shutting down oil and gas operations and leaving these employees with more free time, and the weather is generally pleasant and the ground usually dry during this time. In a study conducted in the summer of 2004 (Weston Recreation Use Survey, October 2004), the average number of vehicles counted in Weston per day was 27. This contrasts with the 50 to 100 vehicles observed at a time this spring. It was reported by the BLM Ranger, John Weiner, who patrols the area regularly (as it abuts BLM land), that's he's seen as many as 200 vehicles at a time.

Everywhere on the grassland, year-round recreational ATV use has increased, with hunting use of ATVs decreasing. Travel management is scheduled to be completed in 2009 which will designate roads and trails open to motorized use.

Table 43. Off Road Vehicle Violations on TBNG from 2003 thru 2007.

Fiscal Year	Warnings	Incidents	Violations/ Tickets	Total
2003	1	1	0	2
2004	0	18	3	21
2005	5	1	4	10
2006	2	9	1	12
2007	1	6	2	9

The grassland is a unique area in that it is generally open for use the entire year, with just a few areas and times that it is inaccessible to motorized use. The Upton/Osage area, and parts of the Spring Creek unit can become snowed in, but the heart of the grassland is generally open and dry year-round. In studying the use pattern, it is scattered throughout; however, the hardest hit area is the Weston portion of Spring Creek. Other hot spots are the Rochelle Hills and the Upton Osage area which also has towns nearby for easy access to public lands. Also, because of the minerals industry being the predominant employer, the schedules for use are related to the work schedules, which are 12 hours on, 12 hours off per day, with rotating schedules around the week, making for week-long recreation with no obvious high/medium/or low use during the week, nor during the day.

Effects of Off Road Use
Although the law enforcement statistics do not reflect an increase in off-road use, it has been observed that there has been a marked increase with a subsequent increase in the disturbance of vegetation and soils.

Effectiveness of Past Actions to Reduce OHV Use:
Physical barriers do not work on the open grassland. Users just go around the barrier. Signing efforts have been increased to notify users to keep on routes. We are also working effectively with the local Wyoming State Game and Fish Department wardens and biologists to get information on OHV users as they find them.

Education and enforcement efforts during hunting seasons these past years have proven very effective. As stated previously, off-roading has decreased during hunting season.

FY06 Actions taken to address this problem:
The district hired a dedicated Forest Protection Officer (FPO) to patrol the grassland this past year, and he was able to patrol steadily from mid-May to the end of October. However, one person trying to cover 556,000 acres within the 1.8 million acre landscape is difficult at best.

Hunting season was patrolled fairly well with three pairs every weekend and one to two pairs during the week, which covered the heart of the grassland (Cow Creek Buttes, Fiddleback and Rochelle Hills).

Recommendations: Beginning in 2007, to be completed by 2009, a site specific analysis of existing roads will be completed for the Thunder Basin National Grassland to determine which roads will be designated for motorized use. All other roads will

then be closed to motorized use. Once this designation is completed, enforcement of illegal vehicle use off roads should be improved.

- Continue to seek funding to support having trained Forest Protection Officers in the field.

Heritage 1 - National Register Sites

Goal 2.b Heritage Objectives 2 and 5
Frequency of Measurement: Five Year
Reporting Period: Five Year

This monitoring item asks the question:

To what extent are National Register sites and districts being protected and preserved?

Effects to sites eligible for the National Register Historic Preservation are considered through the 106 process in coordination with NEPA assessments. Project inventories are conducted and sites are evaluated. For situations in which sites cannot be preserved, appropriate treatment is developed in consultation with the State Historic Preservation Officer (SHPO) and other parties when appropriate. Priority Heritage Assets are monitored regularly and for the Dorr Place, limited stabilization work has been undertaken to preserve historic values. Only a limited portion of TBNG has been inventoried for cultural resources and it is anticipated that there are more national register sites not yet recorded. Some limited inventory is conducted to attempt to comply with Section 110 of the National Historic Preservation Act.

Heritage 2 - Traditional Cultural Sites

Goal 2.b Heritage Objectives 3
Frequency of Measurement: Five Year
Reporting Period: Five Year

This monitoring item asks the question:

To what extent are traditional cultural properties being preserved?

There are two known Traditional Cultural Properties (TCPs) on TBNG. For one site, the portion of the site on NFS lands is wholly within the Buffalo Divide Special Interest Area (SIA). The second site is partially covered by the Cellers SIA. The sites are also identified as priority heritage assets and are monitored regularly. However the Cellers SIA does not cover the entire site as has been found in recent project inventory. It is recommended that consideration of expanding the SIA boundary to cover the entire site be undertaken.

During new oil and gas leases the proposed leases are reviewed to see if they overlap the sites and need stipulations to protect the sites. However most or all of the land in the TCPs is covered by existing oil and gas leases. Fire fighting agreements with the county in which the sites lie specify no off-road fire-fighting impacts. No new range improvements are allowed by Standard. Motorized off road use has been restricted to

existing roads in trails through the 2003 Special order and designation of roads and trails open to motorized use that will be designated in the currently ongoing Travel Management for TBNG but has not yet been implemented.

It is anticipated that other TCPs exist on TBNG. For projects we conduct cultural resource inventories and consult tribes on findings. We also continue to develop relationships with tribes to identify TCPs so they can be protected.

Recommendations
Expand the Cellers SIA boundary through a Grassland Plan Amendment to include the entire site as well as expand the special order to include the newly discovered areas. (Proposed Wording)

Expand the Cellers SIA to cover the entire TCP site. (Original Wording)

Special Interest Areas

Goal 2.b
Frequency of Measurement: Five Year
Reporting Period: Five Year

This monitoring item asks the question:

> ***To what extent have the special features found Special Interest Areas been conserved or enhanced?***

Monitoring Protocol/Data Collected
Project level analysis.

Table 44. SIAs on the Thunder Basin National Grassland

Name	Unique feature	Acres
Alkali Divide	paleontological	5,140
Cheyenne River Zoological	botanical, zoological	5,980
Buffalo Divide	historical	490
Cellers	Prehistoric historical	960
Cow Creek	Botanical historical	14,170
Lance Geologic	Geological paleontological	40

Results/Evaluation
There are no plans currently completed for the management of any of the SIAs.

There were several grazing analysis projects that will continue livestock grazing within the SIAs. Livestock grazing in the SIAs is permitted by the LRMP.

Conclusions
The special features and conditions that were present at the time of the LRMP completion are still present and relatively unchanged from that time.

Recommendations
Continue to monitor this item for SIA condition. There has been a recommendation to expand the Cellers SIA through Grassland Plan Amendment.

Research Natural Areas

Goal 2.b
Frequency of Measurement: Five Year
Reporting Period: Five Year

This monitoring item asks the question:

> ***To what extent have the unique research features of Research Natural Areas been conserved or enhanced?***

Table 45. Research Natural Areas (RNAs) on the Thunder Basin National Grassland.

Name	Acres	Ecoregion
Rock Creek	590	Great Plains-Palouse Dry Steppe Province, Powder River Basin Section, Southern Powder River Basin-Scoria Hills Subsection.
Wildlife Draw	630	Great Plains-Palouse Dry Steppe Province, Powder River Basin Section, Scoria Hills Subsection.

Results/Evaluation
There are no establishment reports currently completed for any of the RNAs.

There were several grazing analysis projects that will continue livestock grazing within the RNAs. Livestock grazing in the RNAs is not excluded by the LRMP because the ecological communities represented by these RNAs were in part created by large grazing animals.

There were not any research projects initiated in either RNA during this period.

Conclusions
The unique research features that were present at the time of the LRMP completion are still present and relatively unchanged from that time.

Recommendations
Continue to monitor this item for RNA condition. There were no changes to the plan identified as needed. Develop establishment records for each of the RNAs.

Community Relations 2

Goal 2.c
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

What are the effects of National Forest System Management on adjacent communities?

Monitoring protocol/ data collected: This monitoring item is answered using National Grasslands 25% payments to counties from the National Grassland.

Table 46. 25% Payments to Counties for Thunder Basin National Grassland (in dollars).

County	TBNG Acres	2004 Payment	2005 Payment	2006 Payment	2007 Payment
Campbell	145,654	287,141	215,602	288,676	140,987
Converse	175,798	346,567	267,680	376,449	183,354
Crook	302	595	453	624	305
Niobrara	840	1,656	1,260	1,735	847
Weston	226,625	446,767	336,599	463,511	226,374
Total	549,219	1,082,726	821,594	1,130,995	552,367

Results/Evaluation: The 25% payment to counties for National Grasslands (7 U.S.C. 1012) provides 25% of net (rather than gross) receipts from grazing, minerals (excluding royalties from coal) and other uses of the national grasslands directly to counties where the grasslands are located. These funds are to be used for roads and schools. These funds are calculated on a calendar year basis. In 2005, the Minerals Management Service withdrew funds to cover a large royalty overpayment from previous years, which accounts for the drop in payments from 2004 to 2005.

Outdoor recreation type tourism in these counties is largely centered around the grasslands as TBNG is the only major public lands in these counties. A measure of tourism is to look at the money spent by travelers. Travel generated employment ranges from 4 to 8% of total employment by county. Revenues from travel spending has increased over the past 10 years in all counties, most markedly in Campbell and Converse counties. Wyoming tourism data can be found at the following website:

http://www.deanrunyan.com/impactsWY.html

Recommendations: Continue tracking payments to grassland information for this monitoring item.

Miscellaneous Products 1

Goal 2.c Miscellaneous Products Objective 1
Frequency of Measurement: Five Year
Reporting Period: Five Year

This monitoring item asks the question:

To what extent is the demand for miscellaneous products being met?

Monitoring Protocol/Data Collected
Project level analysis, special forest product permits issued.

Results/Evaluation
The TBNG LRMP identified that an objective of management was to provide appropriate opportunities to satisfy demand for miscellaneous products (special forest and grassland products, such as mushrooms, floral products and medicinal plants) through environmentally responsible harvest and collection methods on NFS Lands.

The Grassland receives a minimal number of requests for the collection of floral products, seed collection, and/or medicinal plants. Each request is addressed and analyzed for effects on sustainability of populations and collection methods. Where conditions were met, appropriate permits for collection were issued.

Results/Evaluation
Proposals for collection of special forest products were analyzed for effects on sustainability of populations and collection methods. Where conditions were met, permits for collection were issued.

Conclusions
The demand for miscellaneous products was accommodated. The products were collected in an environmentally sound manner and at levels determined.

Recommendations
Continue to monitor this item. There were no changes to the plan identified as needed.

Scenery 1

Goal 2.c Scenery Objective 1
Frequency of Measurement: Five Year
Reporting Period: Five Year

This monitoring item asks the question:

To what extent have scenery management objectives been met?

Results/Evaluation
Management activities can alter the scenic integrity of an area either positively or negatively. For many visitors the condition of the grassland or forest scenery is key to enjoying their experience.

Scenery integrity objectives have been met in most areas of the Thunder Basin National Grassland since the implementation of the Grassland Plan. New mineral developments such as oil and gas wells and pipelines have been constructed across the grassland with structures painted in a recommended standard environmental color to minimize scenic contrast with the surrounding grassland and to meet the scenic integrity objectives. Several wells were also plugged and abandoned and are being reclaimed. Other surface disturbing activities such as the new utility line and substation built on the grassland were located and constructed in the area that minimize scenic impacts when viewed from primary travelways. Approximately 14,000 acres of mined sites were permanently reclaimed on five active coal mines within the

grassland (2005 Annual Reports to WYDEQ and various 2005 and 2006 permit reports). The reclaimed sites were designed to repeat the landscape character and meet scenic integrity objectives.

Conclusions
Overall, changes of the scenic integrity on the Thunder Basin National Grassland in five years were very small and the landscape character of the grassland is continuing to be maintained.

Implementation Monitoring

Threatened and Endangered Species – Action Plans

Endangered Species Act
Goal 4.b. Public and Organizational Relations Objective 2
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***Are actions identified in national recovery plans for threatened and endangered species being implemented where opportunities exist on national grasslands and forests?***

Plants

Monitoring Protocol/Data Collected
Project level botanical surveys, WYNDD botanical surveys and data.

Results/Evaluation
There is one threatened plant (*Spiranthes diluvialis*) for which potential habitat has been identified on the TBNG. National Forest System lands provide the basic habitat for this plant species.

Potential habitat was identified in the analysis for the Thunder Basin Analysis Area Vegetation Management Final Environmental Impact Statement (FEIS) and in the analysis for additional easement for the BNSF RR Logan Hill to Reno Junction project. The effects to potential habitat resulted in biological determination of "may affect, not likely to adversely affect" was made for these projects.

There is a draft recovery plan for Ute Ladies Tresses (USFWS 1995).

Conclusions
All actions were in compliance with the draft recovery plan for Ute Ladies Tresses (USFWS 1995).

Recommendations
Continue to monitor this item. There were no changes to the plan identified as needed.

Black Footed Ferret

As part of the recent draft National Black-footed Ferret Recovery Plan (USFWS, 2006), Thunder Basin NG has been identified as a potential reintroduction site. The following items were taken from the draft Recovery Plan, and identify actions needed to recover ferret populations:

1. Maintain a captive ferret population of optimal size and structure to support genetic management and reintroduction efforts.
2. Complete the search for remnant wild ferret populations to support genetic management and reintroduction efforts.
3. Reduce disease-related threats in wild populations of ferrets and associated species.
4. Ensure sufficient habitat to support a wide distribution of self-sustaining ferret populations.
5. Establish free-ranging populations of ferrets to meet downlisting and delisting goals.
6. Promote partner involvement and adaptive management through regular programmatic review and outreach.

Items 4-6 are action items that TBNG can contribute toward ferret recovery. To ensure sufficient habitat is available, TBNG has established a prairie dog shooting closure, maps prairie dog colonies annually, and through LRMP direction provides additional standards and guidelines for activities within prairie dog colonies. LRMP direction also outlines ferret reintroduction habitat by establishing a management area designation for black-footed ferrets. TBNG is also currently pursuing a 10(j) designation for the identified ferret reintroduction habitat. This would allow for release of black-footed ferrets on TBNG as nonessential experimental population. As a part of this process, the TBNG as developed a prairie dog strategy, which involved other Federal agencies, state agencies, and private landowners, and private land owner group. Programmatic review of the Forest Plan/Grassland Plan occurs annually

Proactive management actions for TBNG include developing a prairie dog strategy involving partners, pursuing a 10(j) designation, and continually monitoring prairie dog populations. Many of these partnerships have been long in the making, and are now at a place where we are make new strides in the management of prairie dogs and the reintroduction of ferrets. These partners include: US Fish and Wildlife Service, Wyoming Game and Fish Department, Thunder Basin Prairie Ecosystem Association, Thunder Basin Grazing Association, The Nature Conservancy, Defenders of Wildlife, Coal Companies, Biodiversity Conservation Alliance, Bureau of Land Management, etc. These actions and partnerships are expected to provide long term conservation of prairie dogs, and contribute to a future ferret reintroduction.

Bald Eagle

The Bald Eagle was delisted from protection under the ESA in 2007, and so the Bald Eagle now has status as a sensitive species and efforts will continue to ensure the viability of the species on the grassland. More information can be found under the T&E 2 Monitoring Item in this report.

Administration – Actions Plans in Goals and Objectives

Agency Expectations, Public Expectations and Issues
Goal 3 Objectives 1, 2, &3
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

Are the action plans identified in objectives being completed on schedule?

Grassland wide goals and objectives are listed in Appendix 1. Progress updates towards the action plans is given for all of the objectives. Appendix 2 lists the Geographic Area objectives and contains progress reports towards these objectives.

Figure 18. Black Footed Ferrets. (Photo courtesy of USFWS)

Implementation of Standards and Guidelines

Legally Required Monitoring Item
36 CFR 219.12(k)
Frequency of Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

Have site-specific decisions successfully implemented the Land and Resource Management Plan Direction?

Monitoring Protocol/Data Collected

There was an Interdisciplinary Team (IDT) monitoring trip in April 2007 by the Forest Monitoring and Evaluation Team which reviewed three projects. In addition, the Douglas District IDT reviewed two projects during FY07. The results of these reviews are summarized below.

Westport (Nicholson) Coal Bed Methane

The ID team reviewed the location of approved, but not yet built CBM wells. The specific issue was the proximity to a bald eagle nest on adjacent private land.

The decision has mitigation specifically designed to reduce disturbance to the bald eagle nest. Two of the wells will be underground. Construction and repairs would occur during non-nesting periods, except in case of emergencies.

The conditions of approval in the EA were included in the decision.

The mitigation concerning the bald eagle was incorporated into the plan of operations. Soil and water design criteria / mitigation related to soil and water was included in the Conditions of Approval.

It will be difficult to determine the effectiveness of the mitigation due to the ongoing CBM activity on adjacent private lands, which does not have constraints related to the eagle nest.

There was discussion by the team due to the confusion between design criteria, mitigation, conditions of approval and the plan of operations. The following suggestions were made to try to ensure that the necessary design criteria are implemented with the project:

- Design criteria / mitigation should be up front in specialist's report so the decision maker and project manager can easily identify them.
- Specialists should look at existing Conditions of Approval statements to use same language where appropriate to reduce work and avoid confusion.
- Design criteria and mitigation carried forward by the line officer should be in the Decision document, not as a reference to other documents.
- Conditions of Approval should be tracked through process to ensure they are put in the permit.
- Consider having Conditions of Approval as an appendix to the decision.
- Changing FS project managers and the project proponents over time made this project difficult.
- Review EA and decision for consistency; for example the EA says there are wetlands in the area and the Decision said there were no wetlands.

Additional Monitoring Needs:
Decision required monitoring effect to eagles and/or raptors. Due to activity on adjacent private lands, it will be difficult to determine effects from activities on private.

Teckla to Antelope 69 Kv Powerline

This powerline required a site specific plan amendment as the project proposed placing the line in the existing powerline corridor where a raptor nest had built on an existing powerline. Standard 76 (Raptors) prohibits development of new facilities within line of sight distance of active raptor nests.

The powerline was designed to follow current Avian Powerline Commission rules and an additional timing restriction for construction to avoid disturbance during breeding season was incorporated into the Decision.

The powerline appeared to follow the correct design standards although the entire length of the powerline had not yet been inspected.

The existing raptor nest was occupied, so it appears the timing restrictions were effective.

Conclusions:
The need for a plan amendment was identified late in the process – it would have been easier if it was identified early on. The project went from a CE to an EA with an amendment.

Additional Monitoring Needs:
- Continue monitoring the nest to see if it is occupied.
- Inspect the length of the line on NFS lands to ensure that perch inhibitors are placed on each of the power poles.

Note:
The district is working with the utility companies to retrofit existing power lines to meet raptor standards when they upgrade their poles.

Dull Center Oil Well

This stop on the field trip reviewed a conventional oil well which is on NFS surface but private minerals, which is an unusual situation. The land was acquired in a land exchange, in such a way that the minerals were not acquired with the surface land. The land was acquired as it is within the proposed ferret re-introduction area.

Since the NFS only has jurisdiction over the surface, this is not a federal action, so there was no CE or EA and no Decision document. Federal control was limited – the NFS can negotiate with the subsurface mineral owners.

The USFS did put in gravel over the road into the site. The gravel will be removed and placed on a NFSR road when the project is completed. The project owner did agree to basic reclamation, including seeding with USFS approved seed.

The well was a dry hole, so the operators will pump out the drilling mud waste water, currently in lined pits and fill in the holes. The site looked orderly without trash or other debris around. The site is not yet reclaimed – but so far it appears to have an acceptable level of disturbance.

Conclusions:
This process worked well and the district would follow the same process of negotiating with the project proponent if there is another similar project.

Additional Monitoring Needs:
Inspect the area to determine if reclamation is completed and seeding is successful.

Upton Osage Prescribed Burn

This stop on the field trip reviewed the burn plan for the Upton Osage prescribed burn, which had not yet been implemented. This project included both WUI mechanical treatments and prescribed fire.

The design criteria and mitigation appears to have been incorporated into the decision memo.

The 80 acre standard for sage-grouse did not apply as this project is a long distance from any lekking areas. Also this area is in between private lands and across the

highway from a golf course and so is not prime sage-grouse habitat due to the high disturbance level in the area.

To address cheatgrass, which is common in the area, the burn area will be sprayed with plateau. To mitigate scenery concerns, the burn is planned to have irregular edges.

The burn plan is the only document related to implementation and should have the Standards and Guidelines and mitigation that effects how the burn is implemented. The burn plan identifies staging areas and other factors to comply with the decision.

Recommendations
Access across private lands was an issue with this burn. Access changed during project planning. The NFS did secure access through one piece of private land, and is working on access through another parcel of private land.

Of the projects in this decision, the prescribed burn was the most controversial with the adjacent landowners, due to fear of decreased visuals and the perceived risk to their houses. The landowners were also affected by the boundary survey (and posted NFS boundary locations) which occurred after project planning but prior to the burn. Errors in the old property lines resulted in bad feelings by some of the land owners towards the Forest Service. This now makes acquiring access across their lands for the burn more difficult.

The recommendation is to start a project like this with the less threatening actions such as thinning and boundary treatments, and then implement the prescribed burn later.

Additional Monitoring Needs:
Cheatgrass is planned to be monitored after the fire using vegetation transects.

Marten's Tank

This project is a stock tank with a short length of pipeline recently installed on NFS lands. The pipeline leads to additional water sources on private lands.

The Decision contained requirements concerning a paleontological survey and seeding specifications. Design criteria requiring an escape ramp (Biological Resources Standard 3) or the color of the tank were not included in the Decision.

The decision did not mention water rights. FSM directs that the USFS should be the sole holder of a water right for a use on forest, such as this stock tank. The water right is currently in the name of both the ranch and the USFS, which is against NFS policy.

For this type of project – which is implemented by the grazing association, there is no contract. There is a letter stating they can go ahead with the project, which could be a place to specify design features and mitigation.

The Paleo design features were followed. The area may have been re-seeded but it did not work and so should be seeded again.

Are the Standards & Guidelines Effective?
The paleontological standard and guideline appears to be effective. As it was not mentioned in the decision or letter to the grazing association, the tank has no escape ramp.

There was no mention in the water specialist input or decision about how to locate and design the tank outflow. The outflow was located on a slope with minimal vegetation and so has the potential for erosion. A better location would have been a flatter slope with more vigorous vegetation on a different side of the tank.

There was discussion over the blue, temporary plastic stock tank adjacent to the permanent brown tank. The blue tank did not meet the recommended color to blend in with the landscape. It is unclear if there are standards and/or guidelines related to the color of the tank.

Recommendations: Include key design features and mitigation in the letter to the permittee – including the escape ramp requirement, color of tank and water rights direction. These design features should be included in specialist's reports and in the decision, possibly as an appendix.

When working with the permittee / grazing association to locate the pipe, the forest service representative should identify the best outflow location, and stress the need to retain a vegetated filter for the overflow water to prevent erosion.

Additional Monitoring Needs:
- Monitor revegetation success.
- Follow up inspections of the overflow are to determine if rock or other work is necessary to prevent erosion.

District Project Field Monitoring

The following two projects were reviewed by the district Interdisciplinary Team.

Black Hills Well

This well was inspected to determine that the well pad was meeting design criteria. The standard and guidelines were part of the conditions of approval. The conditions of approval for construction and production are being followed

Follow up monitoring: Inspect the drilling mud pit when it is being removed since the well is now a producing well and ensure that recontouring has occurred as required in the permit.

Rankin-Brown Waterline / Tank Project

The reviewed the implementation of installing a water pipeline and stock tank in accordance with the Decision. Design criteria were incorporated into the Decision along with standard and guidelines.

Only two of the eight tanks had been installed at the time of the review. The disturbed area where the pipeline was installed needed to be seeded. Only one escape ramp had been installed. Wildlife drinkers also should be installed. Additionally, monitoring on Beaver Creek needs to be completed to determine utilization.

Recommendations: Since this project was just starting to be implemented, it needs further monitoring for re-vegetation success, escape ramps installed and wildlife drinkers installed. Pipeline area needs to be shaped at intermittent stream crossings.

Comparison of Estimated and Actual Outputs and Services

Legally Required Monitoring Item
Measurement: Annual
Reporting Period: Annual

This monitoring item asks the question:

> ***Are the projected annual outputs and services being met annually and at anticipated costs?***

The outputs tracked for this monitoring report include forage provided to domestic livestock; noxious weed control, terrestrial wildlife habitat, and minerals permit processing and operations, as these are the primary outputs of the Thunder Basin National Grassland. Costs are tracked for the Douglas District, of the Medicine Bow – Routt NFs and Thunder Basin National Grassland. This figure does not reflect administrative costs, which are common to all program areas (cost pools). Costs shown do include costs for the Laramie Peak Unit as that area is also administered by the Douglas District. Fiscal Year (October 1 to September 30th) allocated budgets for 2003 to 2006 are given below.

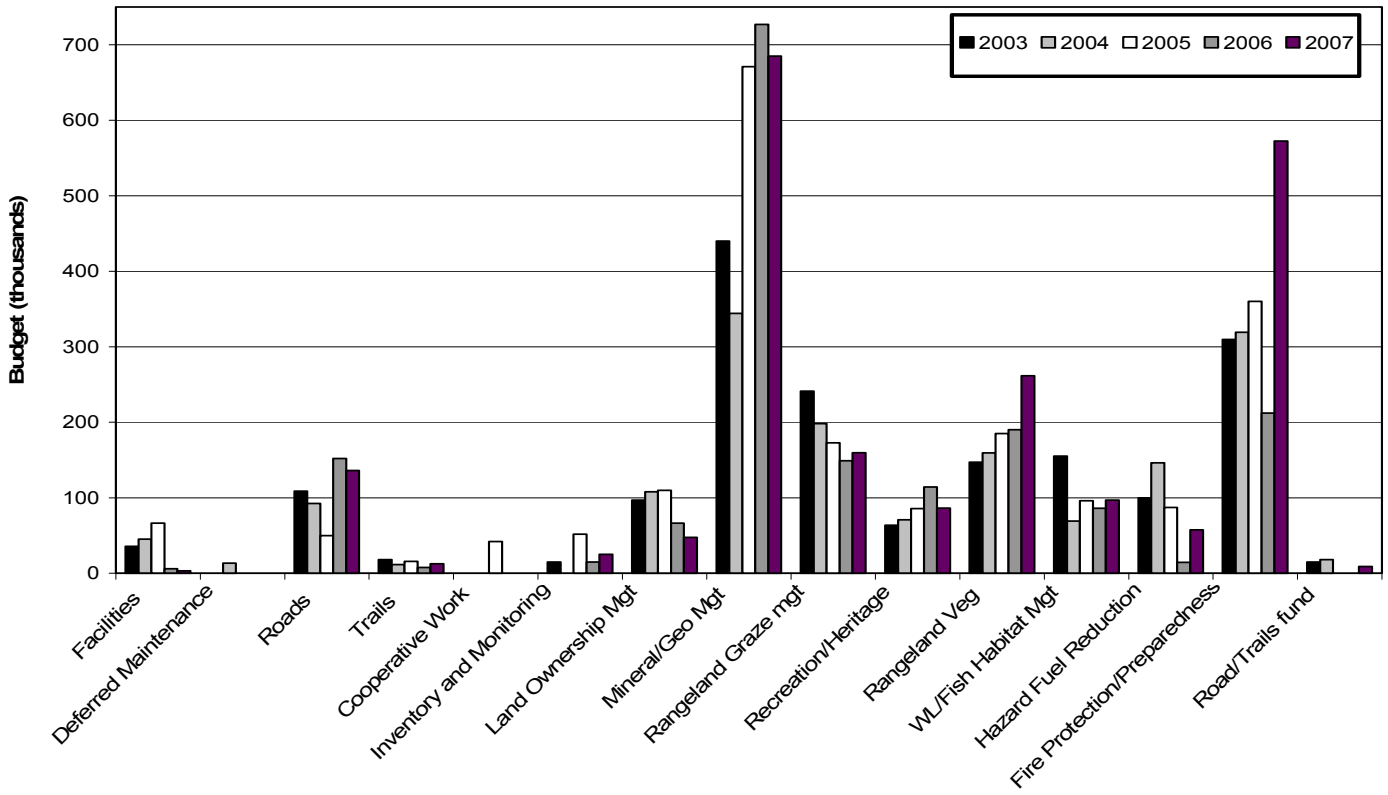


Figure 19. Budget for 2003 - 2005 for The Douglas District of the Medicine Bow - Routt NFs and Thunder Basin National Grassland. (Graph does not include costs for administrative programs common to all program areas).

Rangeland Outputs

Livestock grazing use is one of the projected outputs to be monitored by the Grassland Plan (noxious weed control is discussed above). Following are the results for the previous four years of domestic livestock use:

Table 47. Livestock Grazing Use for 2004 – 2007 (in AUMs)

Livestock Grazing	Planned Level	2004 AUMs	2005 AUMs	2006 AUMs	2007 AUMs
Cattle		89,580	102,432	78,237	60,245
Sheep		3,881	4,739	3,739	7,568
Total Use	**115,430**	**93,461**	**107,171**	**81,976**	**67,813**

Animal Unit Months)

Grazing use is measured using animal unit months (AUMs) which is a standard unit for each type of livestock; for example, 1 AUM for cattle is the amount of forage that one cow/calf unit would eat in one month.

As is apparent from the table, the amount of authorized grazing use over each of the last four years has been less than the planned level – from a high of about 93% of planned levels in 2005 to a low of only 59% in 2007.

Year 2007 was the eighth consecutive year of this extended and extreme drought in Wyoming. Up until 2004, the Grassland had received scattered, moderate amounts of winter and spring moisture, and conditions had been somewhat better than other areas of the state. However, in 2004 it became the Grassland's turn as the Thunder Basin had probably the worst climatic conditions to be found anywhere across the state and the Region; some areas, particularly along the Antelope Creek and Cheyenne River drainages, had little winter and no spring moisture, and much of that area did not ever green up. Rainfall patterns in 2005 were quite variable, with some places showing little improvement over the previous grazing season while many others had very timely, but limited, spring rains that produced slightly above-average forage production. Nearly all the areas cured out earlier than usual with the extended hot, dry summer.

In 2006 the Grassland was once again the hardest-hit area of the state – in exceptional drought status. There was very little winter precipitation. The northern and eastern reaches of the Thunder Basin benefited somewhat from a wet spring snowstorm. But much of the southern and central portions received very little winter precipitation and even less spring/summer moisture – none in much of the area. The Antelope Creek and Cheyenne River drainages and surrounding areas once again suffered the worst. Soil moistures were and are extremely low. Some areas are being impacted by wind (and occasionally water) erosion; the hardest-hit areas have also experienced recent fires.

In 2007, southeastern Wyoming once again received less than average winter precipitation. Spring rains were a little better in some areas; however, amounts were highly variable across the landscape. Many areas did receive infrequent, highly scattered, summer storms, but overall moisture across most of the Grassland was again below average.

Nearly every producer has liquidated at least a portion of their herd – some have sold everything. Many have gone out-of-state to lease forage for the remaining portions of their herds. Nearly every rancher had to reduce numbers even further from 2006, increasing their non-use for resource protection. A majority of the allotments, and especially high numbers in the Antelope Creek and Cheyenne River drainages, delayed entry until after seed-set in the middle of June. Non-use of animal numbers for resource protection averaged about 50%, with the total amount of grazing use at only about 59% of the projected Grassland Plan level – because many were unable to run the considerably-reduced numbers for the full season.

Recommendations:
Continue to report actual grazing use each year in relation to the planned level, and explain in the narrative section the annual climatic fluctuations or other reasons that account for the differences. At the five-year reporting interval, report both AUMs and Head-Months (HMs) since the Bills for Collection for grazing use are issued for HMs.

Anticipated and Actual Rangeland Management Costs
Costs are displayed for the Douglas Ranger District. These figures do not reflect administrative costs, which are common to all program areas (cost pools), and are extracted at higher organizational levels before budgets are allocated to the individual Forests and Grasslands. Costs shown do include costs for the Laramie Peak Unit of the Medicine Bow NF (180,454 acres) as that area is also administered by the Douglas District. With current financial processes, it is not possible to separate those costs from those expended on just the Grassland.

Table 48. Rangeland Management Program budget for the Douglas Ranger District, 2004-2007 (in thousands of dollars).

Budget Line Item	Plan Level*	2004	2005	2006	2007
Grazing Permit Administration (NFRG)	223.0	198.4	161.0	149.2	159.7
Rangeland Vegetation Management (NFVW – RV)	335.0	159.5	180.0	246.1	261.5
TOTAL	558.0	357.9	341.0	395.3	421.2

*The full implementation level is constrained to 150% of (recent) experienced budget levels.

Rangeland management budgets for the Grassland fund the following activities: grazing permit and range allotment administration, allotment management analysis and planning and implementation, rangeland vegetation monitoring, improvement planning, and noxious weed prevention and treatment.

Required funding for full Grassland Plan implementation has been only 61-71% of needed levels; 2007 was the highest year (at 75%) driven largely by the target of completing allotment management planning efforts on 88 of the 181 Grassland allotments.

Minerals
The minerals program on the Thunder Basin N.G. has moved from a program heavily involved with the processing of applications to one now leaning more towards administration of existing facilities. For several years, the District received

applications for huge projects ranging form 6 APD's to 400 APD's, primarily for Coalbed Methane (CBM). The trend now is back to conventional oil/gas APD's , and the District will continue to receive 5-7 APD's a year with current market conditions. An occasional CBM project may come in the door, but they are anticipated to be much smaller than past projects.

The District is committed to inspecting 100% of the existing facilities to standard. This will help ensure that monitoring of existing conditions occurs, which in turn will allow the District to see the effectiveness of mitigations placed in the Surface Use Plan of Operations (SUPO). It will also help bring older operations into compliance with today's standards, and to follow up to ensure that reclamation (both interim and final) occurs in a timely fashion. This change in trends still requires the same number of minerals personnel; it simply changes their work priorities or tasks.
The following administration and permit processing was accomplished on the TBNG during 2007.

Energy Operations Processed: In 2007, 46 Energy Operations were processed, and are broken down as follows:

Figure 20. Loading a coal truck at a coal mine on TBNG.

- 8 Oil/gas APD's
- 1 Oil/Gas Sundry Notices
- 13 Mineral Related Special Use Permits (tank batteries, powerlines to wellsites, pipelines, etc)
- 2 Coal Exploration Licenses
- 4 Mineral Material Permits processed (1,100,000 tons for $780,000.00)
- 19 Oil/Gas Lease requests processed to the BLM

Operations Administered to Standard: In 2007, 644 operations were administered to standard, including:

- 2 Bonded Mineral Material Sales
- 595 Oil/Gas well inspections
- 25 Follow up inspections
- 2 Bioremediation inspections performed
- 4 Surface Coal Mine Plans
- 13 Mineral related Special Use Permits
- 3 Geologic Resources

Oil and Gas Wells: There were 11 new oil/gas wells drilled, 3 Bond releases for wells were processed, and 2 spills inspected and administered.

Geologic Resources: 18 Geologic Permits and Reports were prepared.

Figure 21. Oil well on the TBNG.

Table 49. Five year summary of mineral activities.

	FY2003	FY2004	FY2005	FY2006	FY2007
Oil & Gas Well Inspections	n/a	470	495	576	595
Follow-up Inspections	n/a	23	25	34	25
Mineral-related SUPs	n/a	5	20	n/a	n/a
Bond releases	n/a	2	2	5	3
Spills	n/a	2	4	3	2

Figure 22. Badger on TBNG.

Validation Monitoring

Wildlife

Endangered Species Act, Migratory Bird Act
36 CFS 219.19
Goal 1 b, Objectives 2 & 4 &
Frequency of Measurement: Annual
Reporting Period: Five Year

This monitoring item asks the question:

> ***Are oil and gas stipulations effective, inadequate, or excessive in protecting and conserving raptors, prairie grouse, mountain plover, black-footed ferrets, bighorn sheep, and other wildlife species and their habitats?***

Most, if not all oil and gas wells drilled on the Thunder Basin National Grassland originate from leases prepared and awarded before the current LRMP was approved. At this time project level implementation of the new (LRMP) lease stipulations have been accomplished through coordination with lease holders. In addition, new leases on National Grassland surface have the current stipulations incorporated. Monitoring of the above species in association with oil and gas development since the implementation of the current LRMP has occurred.

At this time there are no black-footed ferrets occurring on the Thunder Basin National Grassland. Oil and Gas stipulations designed to protect their habitat have been implemented, and appear to be effective.

Raptors: Annual monitoring indicates that oil and gas stipulations (USDA Forest Service, 2002) have been effective. Raptor nesting and successful fledging continues to occur within most oil or gas development areas. A few areas do not have the appropriate habitat available for nesting to occur. Over the past 5 years of Plan implementation the overall raptor population has increased.

Prairie Grouse: During this monitoring period there has been an increase in oil and gas exploration and development in portions of the TBNG and especially in the Spring Creek Geographic Area. Lek survey results for sage-grouse and sharp-tailed grouse indicate a potential decline in activity. Studies on the effectiveness of similar oil and gas stipulations in other parts of Wyoming have indicated that these types of stipulations may not be fully effective in mitigating effects to lekking grouse. However, at this point in time the grouse monitoring on Thunder Basin National Grassland remains inconclusive on the exact cause of the potential declines in grouse numbers and activity. While it is unclear what the current oil and gas stipulation effectiveness is, the U.S. Forest Service is working with local, state and other federal entities to determine what, if any additional stipulations might be needed to mitigate adverse impacts to prairie grouse on the TBNG. In addition, project specific design and mitigation measures have been applied to existing activities to reduce habitat disruption.

Mountain Plover: Current stipulations associated with mountain plover habitat appear to be effective. However, the loss of black-tailed prairie dog colonies to plague continues to reduce the available habitat.

Black-footed Ferrets: At this time there are no black-footed ferrets occurring on the Thunder Basin National Grassland. Oil and Gas stipulations designed to protect their habitat have been implemented and appear to be effective. However, as mentioned above, plague continues to reduce black-footed ferret habitat by reducing the amount of active black-tailed prairie dog colonies.

Bighorn Sheep: Bighorn sheep do not occur on Thunder Basin National Grassland. Oil and Gas stipulations for bighorn sheep were developed specifically for other grassland units as a part of the overall analysis. RECOMMENDATION: This species should be removed from this monitoring item.

Other Wildlife Species: Current monitoring of bats, big game, swift fox, and U.S. Forest Service Sensitive Species indicates that oil and gas stipulations for these animals are being effective currently. Monitoring all stipulations will continue.

MIS

36 CFS 219.11
Goal 1 b
Frequency of Measurement: Annual
Reporting Period: Five Year

This monitoring item asks the question:

> ***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?***

Greater sage-grouse
Sage-grouse are a MIS in all six Geographic Areas on TBNG. Due to recent (2008) surveys, sage-grouse have been documented in each of the Geographic Areas. The sage-grouse is considered to adequately represent management effects on other species in their associated response guild within each of these Geographic Areas.

In the Hilight Bill Geographic Area the greater sage-grouse is an adequate indicator species for mineral development. Many of the known leks are near the coal bed natural gas and surface coal mine operations. As these leks fluctuate they are good indicators of the potential habitat in this area. Unfortunately this Geographic Area has never had large numbers of greater sage-grouse. The ten-year average for sage-grouse males/lek is 4.3 and in 2004 there were 1.2 sage-grouse males/lek. Most of the known occupied sage-grouse habitat and known lek sites are currently under leases to be mined. Continued mining operations in this Geographic Area may result in a loss or decline of this species at the local population level, or at a minimum be displaced outside of the Geographic Area.

Sharp-tailed grouse
The sharp-tailed grouse is considered an adequate MIS for the Spring Creek Geographic Area. Known leks are distributed throughout the Geographic Area and do indicate management effects to a taller mixed-grass habitat type.

After five years of surveying the Upton-Osage Geographic Area only one sharp-tailed grouse lek has been identified. Additional sharp-tailed grouse observations were obtained from the Wyoming Game and Fish Department in 2006 and all these leks were away from NFS lands in this area. Since the area provides more of a timbered habitat type it may be that sharp-tailed grouse are not an adequate MIS in this Geographic Area. Survey efforts for this species will be increased in 2008 to ensure that all sharp-tailed grouse leks in the area are identified.

Black-tailed Prairie Dog
Black-tailed prairie dogs are MIS for the Cellars Rosecrans and Broken Hills Geographic Areas and these populations are currently being impacted by sylvatic plague. The presence of plague can make assessment of management impacts on this species difficult to detect. However, the habitat persists through epizootics, and is usually re-colonized. What active colonies do exist indicate management. This species maintains shortgrass habitat for a number of associated species and the number of active acres does indicate potential habitat. Prairie dogs are good indicators of management activities associated with shortgrass ecosystem types. Over time the prairie dog population is expected to increase, as it moves out of an epizootic mode and into enzootic. As prairie dog populations increase, they are expected to continue to indicate management activities associated with shortgrass habitats.

Recommendations:
The geographic area objective for sage-grouse is recommended to be modified through a grassland plan amendment to account for effects of the coal mining activity on sage-grouse habitat in the Hilight Bill GA. The proposed modifications are as follows:

Existing Sage Grouse (MIS) Objective 1:

> *Provide diverse and quality sagebrush habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sage-grouse and other wildlife with similar habitat needs*

Proposed Sage Grouse (MIS) Objective 1:

> *Provide diverse and quality habitat where existing and possible, and encourage mine reclamation to reestablish this habitat type in order to provide habitat for the reestablishment of greater sage-grouse after mining operations are completed".*

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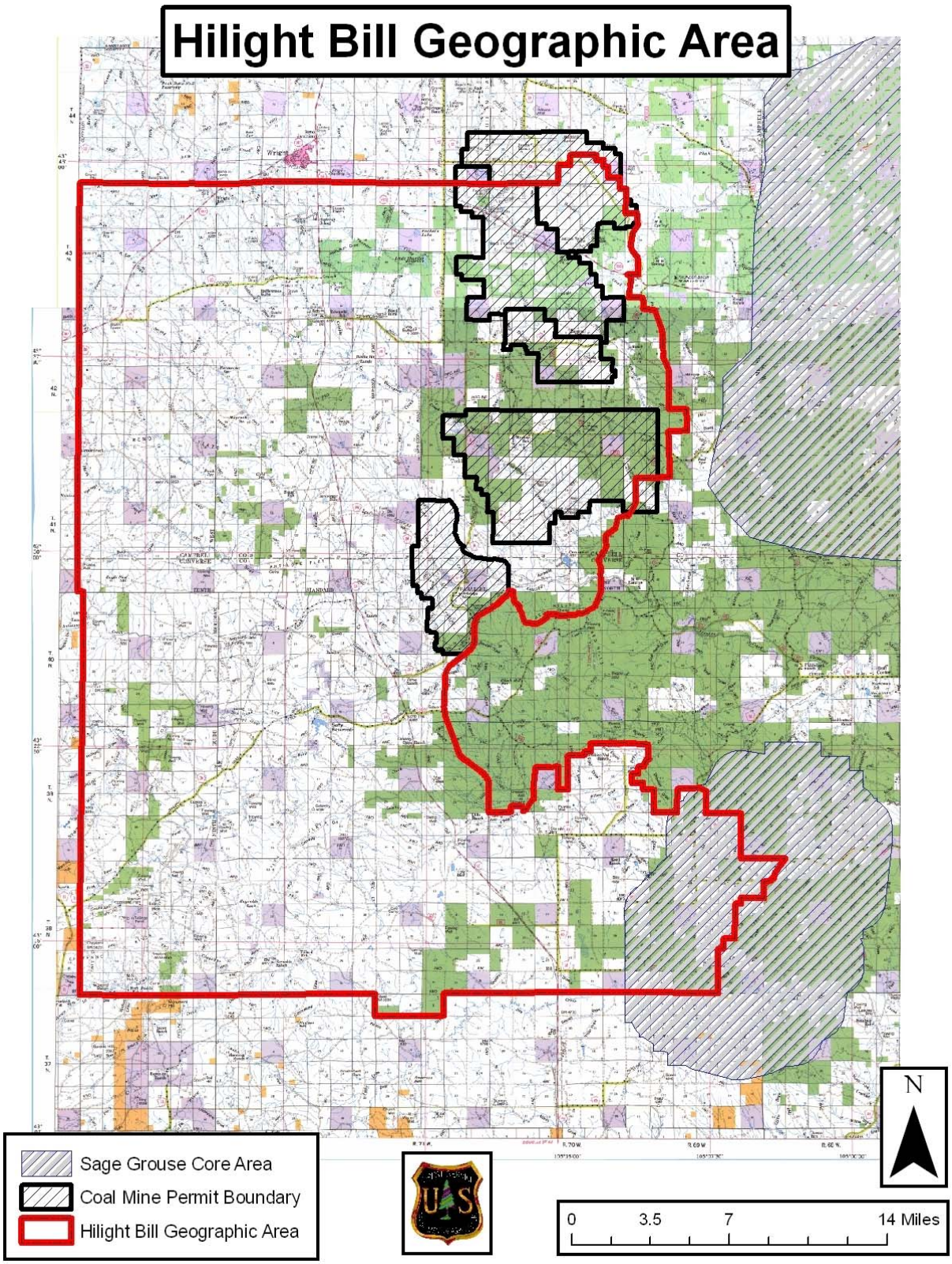
Photographs are from USFS personnel unless otherwise noted.

Acronyms

AMP	Allotment Managment Plan
APD	Application of Permit to Drill
ATV	All Terrain Vehicle
AUM	Animal Unit Months
BLM	Bureau of Land Management
BMPs	Best Management Practices
CBM	Coal Bed Methane
CE	Categorical Exclusion
CFR	Code of Federal Regulations
COA	Conditions of Approval
DM	Decision Memo
DM&E	Dakota, Minnesota, and Eastern Railroad Corporation
DN	Decision Notice
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FFR	Ferret Family Rating
FMO	Fire Management Officer
FPO	Forest Protection Officer
FSM	Forest Service Manual
FY	Fiscal Year
GA	Geographic Area
GIS	Geographic Information System
GPS	Global Positioning System
IDT	Interdisciplinary Team
IRI	Integrated Resource Inventory
JCR	ob Completion Report by the Wyoming Game and Fish Dept.
LEO	Law Enforcement Officer
LRMP	Land and Resource Management Plan
MA	Management Area
MIS	Management Indicator Species
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NFIM	National Forest Inventory and Monitoring funds
NFMA	National Forest Management Act
NFS	National Forest System
NFSR	National Forest System Road
NGP	Northern Grasslands Plan
OHV	Off-Highway Vehicle
PFC	Proper Functioning Condition
PIF	Partners in Flight
PRB	Powder River Basin
PSD	Prevention of Significant Deterioration
R2	Region 2 (Rocky Mountain Region of USFS)
RNA	Research Natural Area
ROD	Record of Decision
SHPO	State Historic Preservation Officer
SIA	Special Interest Area
SLC	Species of Local Concern
SOPA	Schedule of Proposed Actions
SUPO	Surface Use Plan of Operations
SS	Sensitive Species
TCP	Traditional Cultural Properties
T&E	Threatened and Endangered Species
TBNG	Thunder Basin National Grassland
USDA	United States Dept. of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
WGFD	Wyoming Game and Fish Division
WYDEQ	Wyoming Department of Environmental Quality
WYNDD	Wyoming Natural Heritage Database

Appendix 1. Map 1 Hilight Bill Geographic Area, Coal Mine Permit Areas and Sage-Grouse Core Areas


Hilight Bill Geographic Area
Sage Grouse Core Area
Coal Mine Permit Boundary
Hilight Bill Geographic Area
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3.5
7
14 Miles

Appendix 2. Grassland Wide Goals and Objectives

Goal 1: Ensure Sustainable Ecosystems: Promote ecosystem health and conservation using a collaborative approach to sustain the Nations forests, grasslands and watersheds.

Goal 1.a: Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses.

Objective 1. Within 10 years, identify watershed conditions to provide baseline data sufficient to meet the following objectives: **Year Due 2012**

a) Improve 20 percent of 6th Hydrologic Unit Code (sub-watershed) level watersheds from Class II to Class I, or from Class III to Class II. Maintenance of unimpaired watersheds and restoration of impaired watershed are high priorities.

In 2003, a Watershed Condition Assessment was completed, which identified existing watershed conditions (Class I, II or III) for the TBNG. Projects to improve soil and watershed conditions will continue to be identified and implemented to improve watershed condition. See the Water 1 monitoring item for additional information.

b) Achieve a 20 percent reduction in acres of eroded or disturbed soils by Forest Service permitted or management actions.

Currently, no baseline soil disturbance data exists for TBNG. Absence of this data makes measurement and documentation of a 20 percent reduction problematic. A potential approach to meet this objective would be the utilization of GIS data to measure the annual increase or decrease in disturbed soils based on acres of permitted or management actions per annum. This data could be collected for two to three years and be used as a baseline for the remaining years of the planning cycle. In light of this proposal, the accelerating rate of permitted actions on the grassland gives the impression that this objective may be unobtainable. See the Soil 1 monitoring item for additional information.

c) Achieve a 20 percent reduction in the amount of degraded water bodies, such as dam impoundments by Forest Service permitted or management actions.

This will be accomplished through implementation of projects to improve soil and watershed conditions in addition to on-going review of projects and the incorporation of Best Management Practices into project design to minimize impacts. See the Water 1 monitoring item for additional information.

Objective 2. Implement management practices that will move at least 80 percent of riparian areas and woody draws toward self-perpetuating tree and shrub communities within site capability **Year Due 2017**

Personnel from the Niobrara and Johnson County Conservation Districts have begun assessing riparian conditions in northeastern Wyoming, including the Cheyenne River basin. Preliminary results indicate that Antelope Creek displays

some of the best mix of tree and shrub age-classes of the drainages in all of the Powder River basin area.

Woody draw regeneration data were gathered for the 15 allotments on the Spring Creek GA and used in determining that the entire GA was meeting or moving toward desired vegetative conditions. The Inyan Kara and Thunder Basin Grazing Association analyses determined that the majority of the riparian areas across the main portion of TBNG were also meeting or moving toward desired conditions. This is part of the process during allotment management planning to identify existing and desired conditions for riparian as well as upland areas. Management practices are adjusted as needed to maintain or move towards attaining desired woody draw or riparian conditions.

See also the Riparian 1 Monitoring Item.

Objective 3. At least 80% of the perennial streams will meet or move toward Proper Functioning Condition (PFC).	**Year Due 2017**

See the Riparian 1 Monitoring Item.

Objective 4. Within 15 years, identify, maintain, and/or improve stream flows for at least 10 percent of stream segments having high resource values within watersheds	**Year Due 2017**

Conditions necessary to maintain adequate stream flows can be included for land use authorizations which may reduce stream flows. No projects have been proposed which may reduce stream flows since 2002.

There are no approved or proposed State Instream Flow Permits on the TBNG.

See also the Watershed 3 Monitoring Item.

Objective 5. Throughout the life of the Plan, ensure proper plugging of abandoned wells to prevent cross contamination of aquifers (e.g., seismograph holes, water wells, etc.).	**Year Due 2017**

See Watershed 4 Monitoring Item.

Goal 1.b: Provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for Management Indicator Species (MIS).

Objective 1. As scientific information becomes available, jointly develop with the US Fish and Wildlife Service and other agencies conservation and recovery strategies for plant and animal species, listed as threatened or endangered under the Endangered Species Act, and implement established conservation or recovery strategies over the life of the Plan.	**Year Due 2017**

See T & E 1 & 2 Monitoring Items. Ute Ladies' Tresses (Spiranthes diluvialis), a plant T&E species with potential to be found on the TBNG has a draft conservation/recovery plan. In addition there is a petition to delist this species.

Objective 2.	**Within 15 years, demonstrate positive trends in population viability, habitat availability, habitat quality, population distribution throughout the species range within the planning area, and other factors affecting threatened, endangered, sensitive species (there are sensitive fish and leopard frog) and MIS.**	**Year Due 2017**

Plants:

There is one threatened plant (*Spiranthes diluvialis*) for which potential habitat has been identified on the TBNG. National Forest System lands provide the basic habitat for this plant species. In addition, activities on NFS lands of the TBNG have been identified to affect potential habitat on adjacent lands. Potential habitat was identified in the analysis for the Thunder Basin Analysis Area Vegetation Management Final Environmental Impact Statement (FEIS) and in the analysis for additional easement for the Burlington Northing Sante Fe RR Logan Hill to Reno Junction project. The effects to potential habitat resulted in biological determination of "may affect, not likely to adversely affect was made for these projects. Project actions that improve riparian/wetland function and condition may also improve or create habitat for this plant species. There is no documented trend (positive or negative) for this species for population viability, habitat availability, habitat quality or population distribution.

There are R2 sensitive plant species that is documented to occur on the TBNG. These are Barr's milkvetch (*Astragalus barrii*) and Common twinpod (*Physaria didymocarpa var. lanata*). There have been additional populations documented for Barr's milkvetch in areas with a low potential for disturbance. This survey work has documented a lower overall threat to viability to Barr's milkvetch than was thought to exist at the time the LRMP was developed. The Wyoming Natural Diversity Database (WYNDD) has removed this species from its list of species of concern for the state. A variety of management actions are documented in project level biological evaluations (>20) to adversely impact individuals but not lead to a trend towards Federal listing or where management actions are not located in sensitive plant habitat to have no impact. Management actions have been adjusted in several projects to avoid sensitive plant populations or habitat. This avoidance reduces effects but generally not to the no-impact level. There were a few instance of "no-impact" made in project analysis. Management actions that temporarily change vegetation conditions are documented to maintain habitat in some instances. Development actions where wells, roads, railroads etc. are constructed are documented to have long-term effects on a minimal amount of habitat. Even though new occurrences have been documented, there is no documented trend (positive or negative) for this species for population viability, habitat availability, habitat quality or population distribution. Common twinpod has not been encountered in any project level surveys. There is no documented trend (positive or negative) for this species for population viability, habitat availability, habitat quality or population distribution.

There is one additional R2 sensitive plant species, Visher's buckwheat (*Eriogonum visheri*) that is tentatively documented

to occur on the TBNG. This species was not previously known to occur on the TBNG and the observation was of an aged plant beyond a stage where positive identification confirmation could be made. Even though this tentative new occurrences has been documented, there is no documented trend (positive or negative) for this species for population viability, habitat availability, habitat quality or population distribution

There are an additional 6 R2-sensitive plant species (*Botrychium campestre, Botrychium lineare, Festuca hallii, Triteleia grandiflora, Carex alopecoidea, Eleocharis elliptica*) suspected to occur on the TBNG. There is no documented trend (positive or negative) for these species for population viability, habitat availability, habitat quality or population distribution.

Aquatic Species:

The only R2, aquatic sensitive species known to be extant in the TBNG are: flathead chub, plains minnow, sturgeon chub; and northern leopard frog. Due to lack of adequate funding, staffing, and existing workload priorities, there have been no systematic efforts in recent years to affect positive trends in: population distribution and viability; habitat availability; and habitat quality throughout the planning area. See Viability 2 & 6 Monitoring Items for more information.

Terrestrial Wildlife Species:

See Viability and MIS Monitoring Items.

Objective 3.	**Develop and implement conservation strategies for Forest Service sensitive species, as technical information becomes available**	**Year Due 2017**

Plants:

Conservation assessments were published for all R2 sensitive plant species known or suspected to occur on the TBNG (available at: http://www.fs.fed.us/r2/projects/scp/assessments/index.shtml). Conservation strategies specific to the TBNG have not been developed at this time. There is no documentation that any project actions at this time will lead to a trend towards federal listing for any of these species, so it appears that adhering to project level analysis will conserve these species on the TBNG in the near future.

Aquatic Species:

No conservation strategies exist for R2, aquatic sensitive species in the planning area, although aquatic assessments have been constructed for these species. It will take time, personnel, and money to accomplish the prerequisite inventories to construct conservation strategies. Aquatic personnel have accomplished very limited inventories in the planning area as of FY05 due to existing workload priorities.

Objective 4.	**Within 15 years, conserve populations of species at risk and rare communities by demonstrating positive trends in habitat availability and quality, or any other applicable factors affecting species at risk.**	**Year Due 2017**

Botany:

Additional plant species at risk have been identified as plant species of local concern and are included in project level botany surveys and project level analysis. Similarly, rare plant communities of the TBNG have been determined through the LRMP and site specific analysis. Projects that influence more than insignificant amounts of vegetation include analysis for rare plant communities. There is no documentation that any project actions at this time will lead to a loss of viability for any plant species of local concern, so it appears that adhering to project level analysis will conserve these species on the TBNG in the near future. There is no documentation that any project actions will lead to a disturbance or change to rare plant communities that would reduce their continued presence on the TBNG, so adhering to project level analysis will conserve these plant communities on the TBNG in the near future. There is no documentation of trends (positive or negative) in habitat availability and quality, or any other applicable factors affecting species at risk or rare plant communities.

Aquatic Species:

To date, no specific conservation measures have been implemented to address the needs of aquatic "species at risk" in the planning area due to staffing, budget, and other workload priorities.

Terrestrial Wildlife

Refer to the Viability Monitoring Items

Objective 5. Identify rare plant and animal communities, inventory them, and develop associated management strategies to conserve them. Support the development and implementation of State and Regional Conservation Plans as they apply to the grassland or forest units**.**	**Year Due 2017**

Aquatic Species:

Although the sturgeon chub and other aquatic sensitive species are considered locally rare in the planning area, there were no ad hoc inventories or management strategies developed to conserve them up to FY05 due to staffing, budget, and other workload priorities. Selected baseline inventories were conduction from 2002 through 2006. To my knowledge, the WG&F has not developed a specific conservation strategy for either the sturgeon chub or other sensitive, aquatic species extant in the planning area.

Plants:

Projects that influence more than insignificant amounts of vegetation include inventory and analysis for rare plant communities. There is no documentation that any project actions will lead to a disturbance or change to rare plant communities that would reduce their continued presence on the TBNG, so adhering to project level analysis will conserve these plant communities on the TBNG in the near future. There is no documentation of trends (positive or negative) in habitat availability and quality, or any other applicable factors for rare plant communities. There have not been any proposals for State and Regional Conservation Plans that applied to the rare plant communities of the TBNG.

Objective 6. Within 10 years, provide sufficient habitat for Management Indicator Species to reduce adverse impacts on populations during droughts. .	**Year Due 2012**
See the MIS and Viability Monitoring Items, in addition to the Prairie Dog and Prairie Grouse Assessments.	
Objective 7. Establish scientifically credible monitoring programs, develop survey methods, and initiate baseline and trend surveys for populations, habitats and/or ecological conditions to contribute to viability of threatened and endangered species, species at risk, and MIS.	**Year Due 2017**

Plants:

Based on FWS published survey protocol, suitable, unoccupied habitat for Ute Ladies' tresses has been identified in project level surveys. As needed and as possible, projects have been modified to avoid or minimize effects to this habitat.

Several occurrence of Barr's milkvetch have been visually monitored over at least 3 years. While visual observations are not conclusive, occurrences appear to respond to available moisture and no consistent downward trend has been noted. Additional occurrences have been noted in recent years. Other R2 sensitive species are either in the process of identification confirmation or location confirmation at this time.

Plant species that are at risk but not covered by T/E/S direction have been identified as plant species of local concern and habitat described. These plant species of local concern are included in botanical target surveys at the project level. Survey protocol is based on national direction for T/E/S plant species and scientific protocols. Protocols are available at: http://www.warnercnr.colostate.edu/frws/research/rc/tesintro.htm [06/05/06].

Objective 8. Complete and initiate implementation of conservations strategies for globally rare plant species (G2-3 rankings) including Barr's milkvetch and other high priority species in cooperation with other conservation agencies and organizations. . **Year Due 2017**

See Viability 1 Monitoring Item.

Barr's milkvetch is no longer tracked by WYNDD because surveys documented a sufficient level of abundance. Smooth goosefoot (*Chenopodium subglabrum*), a globally rare species (G3) documented to occur on the TBNG has been added the plant species of local concern list and as such is included in botany surveys and project level analysis.

Objective 9. Conduct target surveys for globally rare plant species (Barr's milkvetch, smooth goosefoot, Ute ladies' tresses) and other rare plant species with viability concerns. **Year Due 2017**

Plants: See Viability 1 Monitoring Item.

- Target surveys are currently conducted as part of project level analysis for Barr's milkvetch and smooth goosefoot based on habitat and phenology (timing of flowering). As part of recent AMP analysis, target surveys within appropriate habitat were conducted over 505,876 acres.

Goal 1.c: Increase the amount of forests and grasslands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species.

Objective 1. . Within 10 years, implement management practices, including prescribed fire, that will **Year Due**

move all affected landscapes toward desired vegetation composition and structure as described in Geographic Area direction.	**2012**
See Vegetation Monitoring Items	
Objective 2. Over the next 15 years, retain only those range structures (fences and water developments) that achieve resource management (i.e., wildlife habitat, botanical, range management, visual quality, and recreation) goals and objectives.	**Year Due 2017**
Existing rangeland structures are evaluated as to need, condition, and desirability when each allotment analysis effort is carried out. Identified new improvements are evaluated as to applicability and, if planned for installation, incorporate multiple-resource requirements in the design. Existing improvements no longer needed or functional are planned for removal, in conjunction with the Plan direction of no net gain of fences and water developments	
Objective 3. Within 5 years, develop and implement cooperative noxious weeds and undesirable non-native or invasive species management plans in consultation with appropriate partners and agencies	**Year Due 2007**
An Invasive Species Strategy was developed in 2005 for all of the Thunder Basin National Grassland for terrestrial and aquatic species as well as for invasive plants. An analysis for an Integrated Management approach to the control of noxious weeds was completed for the entire area in 1996, and in Implementation Plan for that effort was completed in 2000. Cooperative Agreements are in place with Campbell, Converse, Niobrara, and Weston counties for control of noxious weeds on the Grasslands. Thunder Basin, Inyan Kara, and Spring Creek Grazing Associations cooperate physically and financially with the Forest Service and those counties in weed control. Thunder Basin Grassland Prairie Ecosystem Association has also contributed financially in the inventory and control of weeds on federal, state, and private lands in the Grasslands.	
Objective 4. Within 3 years, develop and implement a certified noxious weed-free forage program in consultation with appropriate state agencies	**Year Due 2005**
A certified weed-free forage program has been in place for all National Forest System lands in the state of Wyoming since 1995. The existing Closure was strengthened in 2005 to include products such as hay cubes and pelleted forage products.	

Objective 5. Within 10 years, limit further expansion of areas affected by noxious weeds	**Year Due 2012**
See Damage Control 2 Monitoring Item.	
Objective 6. Within 10 years, implement an integrated prevention and pest control management program for noxious weeds and undesirable non-native or invasive plant species.	**Year Due 2012**
An analysis for an Integrated Management approach to the control of noxious weeds was completed for the entire area in 1996, and an Implementation Plan for that effort was completed in 2000. An Invasive Species Strategy was developed in 2005 for all of the Thunder Basin National Grassland for terrestrial and aquatic species as well as for invasive plants; it is updated annually.	
Objective 7. Immediately initiate hazardous material cleanup on identified sites	**Year Due Annually**
All previously identified hazardous material sites have been cleaned up. Hazardous material spills associated with on-going minerals operations are administered through the minerals permits.	
Objective 8. In a timely manner, review Prevention of Significant Deterioration (PSD) permit applications, and make recommendations where needed to reduce impacts to air quality related values for all Class I and Class II areas.	**Year Due Annually**
There have been no known PSD permits for review.	

Goal 2: Multiple Benefits to People: Provide a variety of uses, values, products, and services for present and future generations by managing within the capability of sustainable ecosystems.	
Goal 2.a: Improve the capability of the Nation's forests and grasslands to provide diverse, high-quality outdoor recreation opportunities.	
Objective 1. Annually maintain or reconstruct 20% of National Grassland to regional standards.	**Year Due Annually**
See the Recreation 1 Monitoring Item.	
Objective 2. Over the next 15 years, provide readily available information concerning recreation opportunities for developed, historic, and cultural sites.	**Year Due 2017**

These items were identified and prioritized in the forest interpretive plan, finalized in 2005. Information regarding the grassland is readily available on the forest website and is updated when necessary.	
Objective 3. ***Within 5 years, provide appropriate directional signing to key recreation sites and inform people about the public access routes to national grasslands and national forests***.	**Year Due 2007**
Beginning in FY07, a large emphasis has been placed on installing repaired, corrected and new directional signing on the grassland. Plans are underway to continue this effort for FY08 and into the future as funding allows. The FY07 emphasis was very successful with a noticeable increase in legible signs throughout the grassland. Hunters in particular, as well as landowners, have made positive comments on the higher quality and quantity of signs. Recommendations: • Maintain funding levels to allow hiring of a sign crew and to purchase supplies to continue this effort. • Place U.S. flag stickers on all signs to prevent vandalism and reduce replacement costs.	
Objective 4. ***Within 10 years, complete site and recreation plans, including rehabilitation and re-vegetation strategies. As demand warrants, increase recreational opportunities where compatible with resource objectives. These opportunities may include trails, campgrounds, and interpretation.***	**Year Due 2012**

At this time, no site or recreation plans have been completed; however, grant money was secured from the state in 2005 to complete a recreation plan for the Weston portion of the spring Creek Unit. Two factors occurred that stopped this planning process and all recreation planning on the grassland.

- The TBNG travel management analysis was scheduled for 2007 – 2009, providing an opportunity to analyze and designate a series of motorized trails, which will in turn, determine where and what type of developed recreation facilities may be required to support these systems.
- A new toilet was installed in Weston in the fall of 2004 and was immediately and persistently vandalized. Such a large target was irresistible to shooters and gave to pause to any plans to construct any further facilities at the site. Similar vandalism is found on other parts of the grassland, leaving little incentive to invest in any new facilities. A shooting closure was put in place for Weston in early 2008 and it is hoped that this will reduce the vandalism of this site.

As a result of these factors, plans were put on hold for any further analysis until after the travel management analysis was completed, and the money was returned to the state.

Since then, the Recreation Site Facility Master Plan (RSFMP) was conducted in 2006 for the forest and grassland, which emphasized dispersed recreation and discouraged development of any new developed recreation sites. This coincides with a better understanding of the recreation use on the grassland, which is almost entirely day-use motorized.

Recommendations:

- Once travel analysis is complete, implement decisions on the ground for greater clarity and opportunities for the public.
- Complete recreation, vegetation and rehabilitation plans for key recreation areas for 2012.
- Conduct visitor surveys in key areas to broaden understanding of the recreation use on the grassland.
- Create strategies in with cooperation with research and development on providing appropriate developed recreation with minimal operation and maintenance so demand is met for both the public and federal policies (administrate to standard) and budgets.

Objective 5. Within 5 years, draft and begin implementing a science and marketing based interpretive program strategy that uses a variety of communication media. The purpose of the strategy will be to effectively use communication principles and methods based in the field of interpretation to "Communicate with target audiences regarding management concerns or issues, changes in management direction, and specific projects ". Enhance visitor's recreation experiences by identifying and implementing interpretive projects that highlight national grassland and forest resources and management.	**Year Due 2007**
Thunder Basin National Grassland was included in the forest interpretive plan which was updated and finalized in 2005. Grant money was secured from the Wyoming State Trails program in FY08 to create a "media blitz" for the Campbell County population. The message will be "responsible riding on national forests and grasslands" to discourage off-road use by ATV riders. This effort is in partnership with the Bighorn National Forest, Black Hills National Forest, and the Buffalo Field Office BLM, as all of these areas, as well as the grassland, are greatly affected by Campbell County recreation users. The message/s will be conveyed through print and radio media. Recommendations: • Identify similar message needs as warranted. • Use 2008 media blitz as a pilot and tweak for use in other communities as needed.	
Objective 6. Provide nonmotorized and motorized trails for a wide variety of uses and experiences.	**Year Due Annually**
The Thunder Basin Travel Management Decision should address the need for motorized trails. Budgets have been too prohibitive to create any plans for a non-motorized trail system.	
Objective 7. Manage trail systems to minimize conflicts among users.	**Year Due Annually**
The Thunder Basin Travel Management Analysis should identify conflicts by type, user groups, and geographical locations.	
Objective 8. When appropriate, authorize special use permits for outfitter-guide services on NFS lands.	**Year Due Annually**
Outfitter and guide permits are regularly authorized.	

Objective 9. Through partnerships, encourage, establish, and sustain a diverse range of recreational facilities and services on NFS lands. Encourage outfitters and guides who support interpretive and educational awareness of grassland ecosystems or who provide services to people with disabilities.	**Year Due Annually**
Outfitters are encouraged to provide educational and interpretive awareness in their programs.	
Objective 10. When appropriate, designate, and manage outfitted camp locations.	**Year Due Annually**
There are no outfitter camps on the Grassland.	
Goal 2.b: Improve the capability of wilderness and protected areas to sustain a desired range of benefits and values.	
Wilderness Objective*:*	
Objective 1. Within 5 years of Congressional designation, revise or develop wilderness plans to emphasize recreational, aesthetic, and educational experiences consistent with values of those areas.	**Year Due 2008**
There are currently no designated Wilderness Areas on the Grassland.	
Heritage Sites Objectives:	
Objective 1. Within 5 years, develop and implement a heritage inventory strategy and implementation schedule to survey and evaluate sites, in support of management actions and activities as agreed upon with the State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO) and to include compliance with laws Sec. 106 and Sec. 110 of the National Historic Preservation Act.	**Year Due 2007**
Currently the Forest is in the final stages of a comprehensive Programmatic Agreement for many aspects of the National Historic Preservation Act, especially under section 106. Otherwise the schedule to survey and evaluate sites under Sec. 110, outside of projects, is extremely limited due to the annual allocation of heritage funds to the Grassland - less than $10,000 per year – and that amount is also for section 110 compliance on the Laramie Peak Unit of the Medicine Bow-Routt NF.	
Objective 2. Within 5 years, assess identified sites eligible for the National Register of Historic Places (NRHP) in conjunction with SHPO and THPO and provide interpretation for National Register of Historic Places sites where appropriate and consistent with developed preservation plans.	**Year Due 2007**

No sites on TBNG are currently listed on the National Register of Historic Places. We currently have a draft nomination for the Dorr Place, an historic homestead and ranch headquarters. If placed on the NRHP a plan will be developed for the site in consultation with the SHPO. At this time, we prefer off-site interpretation for most sites since we cannot maintain new developments due to limited budgets and do not want to attract vandalism and theft.	
Objective 3. Within 3 years, identify and protect traditional cultural properties in consultation with federally recognized American Indian tribes	**Year Due 2005**
Two Traditional Cultural Properties (TCP) have been identified on TBNG and are under protection with Plan standards and guidelines as well as other legal protections. One TCP lies only partially in a SIA and it is recommended the SIA boundary be expanded to include the entire TCP. Many tribes have concerns about identifying TCPs to federal agencies unless the sites are threatened by a project and have told us they will share the information only as needed. We continue to work to develop and maintain relations with tribes to aid in the identification and protection of TCPs, although most of this relationship building comes in the form of project consultation. The Grassland has participated in a Deptartment of Defense Legacy project called "after the smoke clears" on protecting TCPs and sacred sites during and after fire suppression on Grasslands.	
Objective 4. Within 10 years, update prehistoric, ethnographic, and historic overviews.	**Year Due 2012**
These tasks have not been started, however information continues to be gathered about prehistory and history of the area that will be available for the updates. Also a context for homesteading in the Powder River Basin has been developed for understanding specific historic homesteading sites. An ethnography or updated ethnographic information may be developed during a large planned project on TBNG but has not been formalized at this date.	
Objective 5. Educate, interpret, and promote partnerships to increase public awareness, protect heritage resources, and further the goals of research.	**Year Due Annually**
Information from treatments on TBNG have been made for Forest partners at regional archaeological and anthropological conferences. The Grassland unit has conducted volunteer projects during the period to help record and protect historic properties and increase public involvement. The unit has worked with and presented to some local historic societies and museums to protect sites and enhance local understanding of area history. Forest Service living history has been presented to thousands of school children via outdoor education expos in Gillette and Casper. Project work that impacts cultural resources as well as cultural resource inventory has been used to further the goals of research and interpret the archaeological record of the Grassland. One grassland partner was awarded the 2007 National Grasslands' Grassland Research and Technology Award. The Grassland has provided internships for MA candidates at the University of Wyoming to aid in our partnering expertise and experience with the University.	

Special Areas Objective:	
Objective 1. Within 5 years, develop and implement a management and monitoring plan for each Research Natural Area.	**Year Due 2007**
See Research Natural Area Monitoring Item.	
Goal 2.c: Improve the capability of the Nation's forests and grasslands to provide a desired sustainable level of uses, values, products, and services. :	
Livestock Grazing Objectives	
Objective 1. Annually, provide forage for livestock on suitable rangelands. Annual grazing levels will be adjusted, as needed, during periods of drought or for other conditions	**Year Due Annually**
Consistently, and historically, grazing levels are adjusted annually according to local climatic conditions as well as any other factors that may be affecting vegetative production. Discussion of conditions during the life of this Plan is included in the Comparison of Estimated and Actual Outputs and Services Monitoring Item.	
Objective 2. As needed, revise allotment management plans (AMP) to meet desired vegetative conditions described in Geographic Areas and to implement all appropriate management plan direction	**Year Due Annually**

The allotment management EA for the Spring Creek Unit was completed in 2005; following appeal, and partial remand, the decision was completed in late 2007. The decision has been implemented on all 15 allotments, although AMPs have not yet been updated, as needed. Few updates will be required as existing conditions are almost totally meeting desired conditions across the area.

The allotment management decision for the 71 allotments in the Thunder Basin Grazing Association EIS was issued in October 2007. The District Ranger was upheld on appeal in March 2008. The AMPs have yet to be updated, but adaptive management is already being implemented.

The Decision Memo for 18 allotments in the Inyan Kara Grazing Association planning area was signed in September 2007. By definition, using the 2005 legislative categorical exclusion authority means that existing management is meeting or moving toward desired conditions, and current management will be continued. No AMPs have been updated for these allotments at this time, and there are few anticipated changes.

The EIS for the remaining 77 allotments in the Inyan Kara area is scheduled for completion in September 2008. Field analysis for these allotments was completed in 2007, and the results are included in this report above regarding rangeland vegetation structure and seral stage.

Thus, allotment management planning will have been completed and updated for all 552,480 acres of the Grassland within the next six months. As data in the above tables show, most areas of the Grassland as a whole are already meeting desired conditions.

Geologic and Paleontologic Resources Objectives

Objective1. Within 15 years, inventory and evaluate 20 percent of high potential paleontological formations	**Year Due 2017**

Paleontological resource surveys have been performed on approximately 100 projects from 2002-2007; nearly half have been in high potential paleontological formations. Although the presence of fossils has been documented in surveys, none has been evaluated as a significant occurrence. At present, it is difficult to cumulatively scale project area to high priority formation area in order to determine a meaningful percentage of high potential paleontological formation area inventoried by the surveys.

Objective 2. Within 15 years, develop conservation plans for significant geological and paleontological sites.	**Year Due 2017**

Two known significant geological and paleontological sites on the TBNG are being conserved through their designation as Special Interest Areas (SIA): the Lance Geologic SIA (geology & paleontology) and the Alkali Divide SIA (paleontology). Continued adherence to the SIA management standards and guidelines will function to conserve the paleontological and geological resources in these areas. As noted in item 1 above, paleontological surveys performed in the context of projects to date have not documented other significant geological or paleontological sites.	
Objective 3. Within 15 years, provide interpretation for at least 20 percent of important geological and paleontological sites, consistent with the conservation plans.	**Year Due 2017**
Public interpretation, in the form of physical signs and/or road stops, has not been provided for important geological and paleontological sites to date. This is largely due to the remoteness of the areas and lack of regular LEO patrol capabilities in these areas; these factors combine to result in a high risk of site vandalism and/or illegal collection of irreplaceable resources if their locations become common knowledge.	
Mineral and Energy Resources Objectives:	
Objective1. Ensure reclamation provisions of operating plans are completed to standard.	**Year Due Annually**
Inspections are completed and formal approval is sent to the State DEQ by the Forest Service. All provisions are completed before reclamation bonds are released.	
Objective 2. Honor all valid existing legal mineral rights,	**Year Due Annually**
Operating Plans are addressed annually. New proposals are addressed through the NEPA process. Mitigations necessary to ameliorate concerns are included in Special Use Permits and Plans of Operations.	
Miscellaneous Products Objective:	
Objective1. Provide appropriate opportunities to satisfy demand for miscellaneous products (special forest and grassland products, such as mushrooms, floral products and medicinal plants) through environmentally responsible harvest and collection methods on National Forest System Lands.	**Year Due Annually**
See Miscellaneous 1 Monitoring Item	
Scenery Objective	
Objective1. Implement practices that will meet, or move the landscape character toward scenic integrity objectives. Reference Geographic Area direction.	**Year Due 2017**

Standard Lease Terms (SLT) provide guidance on color requirement for oil and gas facilities on TBNG to blend with the surrounding grassland landscape and meet and maintain the adopted scenic integrity objective and the desired landscape character. CSU stipulations for areas with High and Moderate Scenic Integrity Objectives (SIOs) provide guidance on meeting and maintaining the adopted scenic integrity objective and the desired landscape character. Coal companies are required to reclaim mined lands to meet and maintain the adopted scenic integrity objective and the desired landscape character.	
Special Uses Objective:	
Objective1. Ensure all special use permits are meeting requirements for customer service and are in compliance with the terms of their permits or contracts.	**Year Due Annually**
Customer service requirements will continue to be met through the cost recovery process. The grassland meets or exceeds its' target for "Administered to standard". Several "Notice of Non-Compliance With Opportunity To Cure" letters were issued and compliance was obtained.	
Wildlife, Fish, and Plant Use Objectives:	
Objective 1. Within 10 years, identify, manage, develop, and interpret appropriate watchable wildlife and plant viewing sites	**Year Due 2012**
Although not currently identified as plant viewing sites, the watchable wildlife sites (mostly at the reservoirs) could be expanded to include plants. Information on plants in bloom is available through VIS and Celebrating Wildflowers info. The Grassland is seeking a volunteer to develop a Celebrating Wildflowers webpage for the TBNG.	
Objective 2. Within 10 years, support native and desirable non-native plant, fish, and wildlife populations by meeting or making measurable progress towards desired vegetative composition and structure, as described in Geographic Area direction.	**Year Due 2012**
Range, wildlife, botany and aquatics personnel have worked to identify upland and riparian-vegetation condition requirements that are beneficial to terrestrial and aquatic species. See also Vegetation Monitoring Items.	
Goal 3: Scientific and Technical Assistance Develop and use the best scientific information available to deliver technical and community assistance and to support ecological, economic, and social sustainability.	
Goal 3.a: Improve the knowledge base provided through research, inventory, and monitoring to enhance scientific understanding of ecosystems, including humans, to support decision making and sustainable management of the Nation's forests and grasslands.	

Objective 1*. *Implement inventory and monitoring systems to provide scientific information and decision support across all land ownerships.	**Year Due 2017**
Four Ecological Classification Types developed by rangeland research scientist Dr. Daniel Uresk of the Forestry Sciences Laboratory at Rapid City, South Dakota were used in the Cover-Frequency transects installed across the Grassland to gather and evaluate data for species composition (seral stages). Methods and results were used to support allotment management decisions and assure sustainable management of the rangelands. Results are applicable for all land ownerships across the grassland landscape. The Grassland collaborated with The Nature Conservancy, an adjacent landowner with conservation goals; and coordinated with BLM and FWS level 1 team on survey strategies, flowering timing and determinations for Ute Ladies' tresses.	
Objective 2*. *Provide research results and tools through technology transfer to support effective management, protection, and restoration of ecosystems.	**Year Due 2017**
Between 2004 and 2007, five conservation assessments have been completed for the following TBNG fish and amphibian species: plains killifish; flathead chub; plains minnow; and northern leopard frog	
Objective 3*. *Assess potential habitat capability at the local level for management indicator species by identifying existing or establishing new reference areas and implementing long-term monitoring. Some reference areas will need to be managed for multiple-year accumulation of vegetation and litter for those management indicator species of high structure grasslands and sagebrush habitats.	**Year Due 2017**
The Grassland needs to evaluate whether the habitat capability and suitability models are the most effective measure of habitat quality for MIS species or if another protocol should be used. Habitat quality for MIS will be assessed for the next 5 year evaluation.	
Objective 4*. *Assess the potential impacts of the construction of impoundments in upper watersheds on hydrologic flows and patterns on downstream habitat on the sturgeon chub and other sensitive native fish species.	**Year Due 2017**
Because of budget, time, personnel, and other workload priorities, there have been no systematic efforts to make this determination in recent years.	
Objective 5*. *Assess the condition of watersheds containing aquatic habitats of sensitive fish species that are found primarily in clear-water streams and rivers.	**Year Due 2017**

There are no aquatic sensitive species extant in the planning area that primarily prefer clear-water streams. This objective may not be applicable to the TBNG.	
Goal 4: Effective Public Service Ensure the acquisition and use of an appropriate corporate infrastructure to enable the efficient delivery of a variety of uses.	
4.a: Improve the safety and economy of the USDA Forest Service roads, trails, facilities, and operations and provide greater security for the public and employees	
Objective 1. ***Within 5 years, identify travel opportunities and restrictions, including designating motorized travel-ways and areas, to meet land management objectives. Provide reasonable access for use of the national grasslands and national forests***	**Year Due 2007**
Travel management planning for the Grasslands is beginning in 2007, with an expected completion in 2009 with the publication of map designating motorized travel opportunities.	
Objective 2. ***Within 5 years, provide site-specific maps and information showing closures, restrictions, and opportunities for motorized and non-motorized use using a science-based Roads Analysis process.***	**Year Due 2007**
The 2004 Roads Analysis for the Grassland is being used as the starting point for the travel analysis planning. Publication of the Motor Vehicle Use Map in 2009 will show site-specific motorized travel opportunities.	
Objective 3. ***Within 5 years, identify the minimum Forest Service road system for administration, utilization, and protection of National Forest system lands and resources, while providing safe and efficient travel and minimizing adverse environmental effects***	**Year Due 2007**
The Thunder Basin Roads Analysis was completed in 2004 providing a framework for motorized uses on the Grasslands. Recommendations for a minimum road system will be implemented in project level decisions.	
Objective 4. ***Where appropriate, encourage and authorize recreation opportunities for people with disabilities.***	**Year Due 2017**
All newly constructed and reconstructed facilities will be accessible to the extent possible within physical constraints.	
Goal 4.b: Provide appropriate access to NFS lands and USDA Forest Service programs.	
Land Ownership and Access Objectives	

Objective 1. Within 3 years, develop and implement approved land ownership adjustment plan in response to resource management and public needs. The plan shall be coordinated, reviewed, and updated annually.	**Year Due 2005**
A landownership adjustment plan has not proven to be the best tool due to the existing pipeline of projects and the political nature of land exchanges. The pipeline of projects is addressed each year and priorities are set in conjunction with resource management needs and budget. The current pipeline of projects exceeds five years of projects.	
Objective 2. Within 3 years, develop and implement a 5-year Rights-of-Way Acquisition Program in response to resource management programs and access needs. This 5-year plan will be coordinated, reviewed, and updated annually.	**Year Due 2005**
A Rights of Way Acquisition plan will be developed over the next several years as a necessary byproduct of implementing the Travel Management Decision. Priority projects have been identified.	
Unauthorized Uses Objective:	
Objective 1. Take appropriate law enforcement or administrative actions on all unauthorized uses.	**Year Due Annually**
All discovered or reported unauthorized use is investigated and followed up with. Where appropriate, law enforcement action is taken.	
Public and Organizational Relations Objectives:	
Objective 1. Provide opportunities for federally recognized American Indian tribes to participate in planning and management of the national grasslands and national forests, especially where tribes have claimed special geographic, historical, or cultural interest.	**Year Due 2017**
Federally recognized Tribes that have evinced interest are regularly scoped for projects and plan revisions. These tribes are in Wyoming, Oklahoma, South Dakota, North Dakota, and Montana. Tribes with Tribal Historic Preservation Officers regularly comment on project and site protection. Site visits have been made with tribes and treatment plans reviewed by Tribal historic Preservation offices and tribes are regularly invited to participate, although with the long distances involved it is difficult for many tribes to get to the Grassland. These tribes will be on mailing lists for Forest Plan revisions.	
Objective 2. Work in cooperation with federal, state, and county agencies, individuals, and nongovernment organizations for control of noxious weeds and invasive species and animal damage.	**Year Due 2017**
See Community Relations 1 Monitoring Item	

Objective 3. Create and foster partnerships with other agencies, accredited educational and research institutions, and other appropriate public and private sector organizations to further the goals of research, education, protection, and interpretation.	**Year Due 2017**
A Challenge Cost Share Agreement was developed with Wyoming Natural Heritage Database (WYNDD) in 2002 which has and continues to contribute to research, education, protection, and interpretation - specifically for Barrs Milkvetch and Ute's lady's Tresses Orchid. The Botany Program is working with other partners to develop sources of local native plant materials which are genetically appropriate for use on MBRTB.	
Objective 4. Cooperate with the appropriate state and federal agencies in balancing desired wildlife and fish population objectives with desired habitat conditions.	**Year Due 2017**
On a regular basis we meet with the Wyoming Game and Fish Department to discuss and review their population goals and objectives. The District develops habitat improvement projects to meet the population goals set by the Wyoming Game and Fish Department	
Objective 5. Identify opportunities for partnerships to provide new recreational fisheries and/or waterfowl and wetlands habitat.	**Year Due 2017**
The DM& E decision identified the creation of wetlands as part of mitigation. The location has been selected and is currently being analyzed for site specific effects.	

Appendix 3. Geographic Area Objectives

All Geographic Areas

Vegetation

Objective 1. Desired seral stages (plant species composition) and vegetation structure across the geographic area are as follows:	**Year Due 2016**

See Vegetation 1 and 2 Monitoring Items

Disturbance Processes

Objective 1. To achieve Goal 1.c Ecological Integrity, fire will be reintroduced into the ecosystem. The amount and scope of burning will be determined by project specific resource needs.	**Year Due 2016**

The ecosystems have been altered with infestations of cheatgrass. It is inadvisable to use fire in areas where cheatgrass infestation are present because cheatgrass is very well adapted to fire, and fire is a key factor in the spread of cheatgrass on the landscape.

Livestock Grazing

Objective 1. To achieve Goal 1.c Wildlife and Fish Habitat, as well as Grassland Wide Direction, rest 1 to 10% of the suitable rangeland each year as determined by project specific resource needs.	**Year Due Annual**

Up to this time, acres rested have not been tracked for each Geographic Area since the same requirement exists for all six of them.

Summary of Rangeland Acres Rested for the Thunder Basin National Grassland
(552,480 gross acres - 17,792 acres inside permitted coal mines = 534,688 net acres)

Year	Acres Rested	Net Grassland Acres	Percent Rested
2004	3,021	534,688	0.6%
2005	12,687	534,688	2.4%
2006	16,976	534,688	3.2%
2007	68,438	534,688	12.8%

Wildlife	
Sage Grouse (MIS)	
Objective 1. Provide diverse and quality sagebrush habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sage grouse and other wildlife with similar habitat needs.	**Year Due 2016**
Vegetation is being managed to meet the objectives for structure and composition as described in vegetation 1 and 2 monitoring items. By moving towards and meeting the objectives, this should provide for a diverse and quality sagebrush habitat. Energy development and coal mine expansion has altered Sage grouse habitat in the Hilight Bill GA. See the Viability 1 monitoring item for more discussion of sage grouse habitat in Hilight Bill and the recommendations relating to this objective. 5 years of surveys in the Upton Osage GA have not found any active sage grouse leks. Sage grouse may not be a suitable MIS species for the Upton Osage GA.	
Objective 2. Establish and maintain quality nesting habitat for sage grouse (see Appendix H) and associated wildlife by meeting vegetation objectives for high structure sagebrush understories within 10 years.	**Year Due 2011**
Vegetation is being managed to meet the objectives for structure and composition as described in vegetation 1 and 2 monitoring items. By moving towards and meeting the objectives, this should provide for quality nesting habitat. Energy development and coal mine expansion has altered Sage grouse habitat in the Hilight Bill GA. See the Viability 1 monitoring item for more discussion of sage grouse habitat in Hilight Bill and the recommendations relating to this objective. 5 years of surveys in the Upton Osage GA have not found any active sage grouse leks. Sage grouse may not be a suitable MIS species for the Upton Osage GA.	
Objective 3. Reduce the impacts of extended droughts on sage grouse populations and their recovery after droughts by managing land uses in sage grouse habitat in a manner that does not significantly magnify the adverse effects of drought on grouse nesting, brooding and foraging habitats.	**Year Due 2016**

Over the past several years of drought, grazing numbers have been reduced more each year with a total of 12.8% being rested in 2007 as described above. These reduced numbers have helped to mitigate drought impacts to sage grouse habitats in most areas of the grassland while some areas have still shown drought impacts.

Energy development and coal mine expansion has altered Sage grouse habitat in the Hilight Bill GA. See the Viability 1 monitoring item for more discussion of sage grouse habitat in Hilight Bill and the recommendations relating to this objective.

5 years of surveys in the Upton Osage GA have not found any active sage grouse leks. Sage grouse may not be a suitable MIS species for the Upton Osage GA (see recommendations section).

Broken Hills, Cellars Rosecrans, Spring Creek and Upton Osage Geographic Areas

Forest Vegetation

Objective 1. Manage timber stands to enhance wildlife and TES habitats while doing the following:	**Year Due 2016**

a) Improving forest health.

In general, natural ecosystem processes are allowed to occur in the forested areas of TBNG. Bark beetle outbreaks are quite extensive on the adjacent Black Hills National forest, but infestations in Ponderosa Pine on the Grassland have not yet been documented.

b) Preventing potentially damaging forest pest populations.

See the Damage Control 1 Monitoring Item

c) Reducing fuel loading and risk of catastrophic wildfire adjacent to communities and homes.

Fuels reduction is an ongoing effort across the forests and grasslands. Where feasible fire is being used to reduce threats to communities and homes. In 2007 we completed a fuels reduction project at Upton Osage of approximately 200 acres.

d) Improving riparian habitat.

No forest management projects designed to improve riparian habitat have been identified on TBNG.

Objective 2. During vegetation management projects in ponderosa pine forests, use methods that emphasize development of structural stages 4 (mature) and 5 (late successional). Long-term objective is to have 40% of the forest cover in structural stage 4 and 20% in structural stage 5.	**Year Due 2016**

The Upton Osage Geographic Area contains 32,310 acres, of which approximately 12,000 acres are Ponderosa Pine and/or Rocky Mountain Juniper community types with a foliar canopy of sufficient level to influence the understory production or composition. Normally found on moderate to steep slopes, these sites generally display potential native understory vegetation of approximately 80% perennial grasses, 15% perennial forbs, and 5% shrubs.

No timber harvest activities have occurred during the first five years of the Plan. However, a 200-acre prescribed fire was completed in the fall of 2007 (in the Upton Osage GA) to control encroaching Rocky Mountain juniper stands and to improve wildlife (predominantly big game) habitat.

Objective 3. Over the long term (100 years), manage forest cover to create stands with four structural stages in the forest cover as follows: **Year Due 2101**

- **15-25% in structural stage 2.**
- **15-25% in structural stage 3.**
- **40% in structural stage 4.**
- **20% in structural stage 5.**

The forested community types are estimated to have 60-75% of the acres in structural stage 4 and/or 5 with the remaining 40-25% in structural stages 2 and 3. These estimates indicate the forested stands are already meeting desired conditions. However, the acreages in structural stages 4 and 5 are already at the high end of the desired range; plans are underway for continued use of prescribed fire to keep adequate representation for all 4 structural stages across the Grassland.

Objective 4. Within 10-15 years, achieve forest structural diversity by maintaining or enhancing hardwood trees, shrub inclusions, and other beneficial plant communities and openings. **Year Due 2011-16**

The grassland is starting to identify areas to enhance structural diversity.

Broken Hills and Cellars Rosecrans Geographic Areas

Wildlife

Black-tailed Prairie Dog (MIS)

Objective 1. Maintain an increasing trend of black-tailed prairie dog populations across the geographic area over the next 10 to 15 years. **Year Due 2011-16**

Black-tailed prairie dog populations have fluctuated over the last 5 years (see assessment). These fluctuations are most likely a result of the plague epizootic across the Thunder Basin National Grassland rather than management activities. The Forest Service is currently proposing to implement a Black–tailed prairie dog management strategy across the grassland which may include a plan amendment.	
Objective 2. Maintain and expand the current distribution of black-tailed prairie dogs across the geographic area over the next 10 to 15 years.	**Year Due 2011-16**
Black-tailed prairie dog colony distribution has fluctuated over the last 5 years (see assessment.) These fluctuations are most likely a result of the plague epizootic across the Thunder Basin National Grassland rather than management activities. The Forest Service is currently proposing to implement a Black–tailed prairie dog management strategy across the grassland which may include a plan amendment.	
Objective 3. Improve the complex of prairie dog colonies (10 or more colonies with distances between nearest colonies not exceeding 6 miles) in the central part of the Broken Hills Geographic Area and the southwestern part of the Cellars Rosecrans Goegraphic Area over the next 10 to 15 years. This area has been designated as MA 3.63.	**Year Due 2011-16**
See 1 & 2 above.	
Objective 4. To help increase prairie dog populations and habitat for associated species, allow and encourage expansion of the prairie dog colony complex (10 or more colonies with a total colony acreage of at least 1,000 acres and intercolony distances of less than 6 miles) in the central portion of this geographic area over the next 10 to 15 years. Colonies protected by conservation agreements or easements on adjoining land jurisdictions, including private, may be considered part of a complex.	**Year Due 2011-16**
See 1 & 2 above.	
Broken Hills Geographic Area	
Infrastructure	
Objective 1. Increase the average pasture size as opportunities arise over the next 15 years.	**Year Due 2016**

THE NGP FEIS (pg 3-97) estimated that the average pasture size on the Thunder Basin National Grasslands to be 1640 acres. Since 2003, only once fence project has been completed in the South Dorr Pasture of the Fiddleback Allotment. Other old fences in the Fiddleback Allotment and Rothereutner Allotment have been removed to maintain pasture size. Other opportunities within the Thunder Basin Vegetation Analysis will be used to increase pasture size in the upcoming years.	
Objective 2. Provide at least 20 miles of system non-motorized trails within 10 years.	**Year Due 2011**
The Thunder Basin Travel management analysis is currently in progress and is projected to be completed in the Fall of 2009. As part of this, non-motorized trails are being proposed.	
Cellars Rosecrans Geographic Area	
Infrastructure	
Objective 1. The landscape is dominated by large pasture size.	**Year Due 2016**
THE NGP FEIS (pg 3-97) estimated that the average pasture size on the Thunder Basin National Grasslands to be 1640 acres. Since 2003, no new fences have been constructed, nor have any been removed in this geographic area.	
Spring Creek Geographic Area	
Wildlife	
Plains Sharp-tailed Grouse (MIS)	
Objective 1. Provide diverse and quality grassland habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sharp-tailed grouse and other wildlife with similar habitat needs.	**Year Due 2016**
Vegetation is being managed to meet the objectives for structure and composition as described in vegetation 1 and 2 monitoring items. By moving towards and meeting the objectives, this should provide for a diverse and quality habitat.	
Objective 2. Establish and maintain quality nesting and brooding habitat for sharp-tailed grouse (see Appendix H) and associated wildlife by meeting vegetation objectives for high structure over the next 10 to 15 years.	**Year Due 2011-16**
Vegetation is being managed to meet the objectives for structure and composition as described in vegetation 1 and 2 monitoring items. By moving towards and meeting the objectives, this should provide for a quality nesting habitat.	

Objective 3. Reduce the impacts of extended droughts on sharp-tailed grouse populations and their recovery after droughts by managing land uses in sharp-tailed grouse habitat in a manner that does not significantly magnify the adverse effects of drought on grouse nesting, brooding and foraging habitats.	**Year Due 2016**
Over the past several years of drought, grazing numbers have been reduced more each year with a total of 12.8% being rested in 2007 as described above. These reduced numbers have helped to mitigate drought impacts to sharptail grouse habitats in most areas of the grassland while some areas have still shown drought impacts.	
Infrastructure	
Objective 1. Increase the average pasture size as opportunities arise over the next 15 years.	**Year Due 2016**
THE NGP FEIS (pg 3-97) estimated that the average pasture size on the Thunder Basin National Grasslands to be 1640 acres. Since 2003, no new fences have been constructed, nor have any been removed in this geographic area.	
Recreation	
Objective 1. Provide at least 1 developed recreation facility at a fishery-stocked reservoir within the next 10 years.	**Year Due 2011**
A parking area and toilet were constructed near the Weston Pond in 2003/2004. The pond has not filled with water so is not used as a fishery yet; however, the toilet and parking area are used frequently by ATV riders, recreational shooters (as a target) and hunters. This site was not evaluated in the RSFMP; however, because of the extent of the vandalism to the toilet, estimated at $5,000 to repair, with another $3,000 to pump the vault as it has dried out completely, it may prove necessary to remove the toilet. A shooting closure order is in the works, so the decision to remove the toilet will be deferred until the closure order is in place to see if this cuts down on the vandalism.	
Upton Osage Geographic Area	
Wildlife	
Plains Sharp-tailed Grouse (MIS)	
Objective 1. Provide diverse and quality grassland habitat across the geographic area at levels that, in combination with habitat on adjoining lands, helps support stable to increasing populations of sharp-tailed grouse and other wildlife with similar habitat needs.	**Year Due Wildlife**
After 5 years of surveys, only one sharp-tailed grouse lek has been observed. Sharptail grouse may not be a suitable MIS species for this GA.	

Objective 2. Establish and maintain quality nesting and brooding habitat for sharp-tailed grouse (see Appendix H) and associated wildlife by meeting vegetation objectives for high structure over the next 10 to 15 years.	**Year Due 2011-16**
See answer to Objective 1 above.	
Objective 3. Reduce the impacts of extended droughts on sharp-tailed grouse populations and their recovery after droughts by managing land uses in sharp-tailed grouse habitat in a manner that does not significantly magnify the adverse effects of drought on grouse nesting, brooding and foraging habitats.	**Year Due 2016**
See answer to Objective 1 above.	
Infrastructure	
Objective 1. Increase the average pasture size as opportunities arise over the next 15 years.	**Year Due 2016**
THE NGP FEIS (pg 3-97) estimated that the average pasture size on the Thunder Basin National Grasslands to be 1640 acres. Since 2003, no new fences have been constructed, nor have any been removed in this geographic area.	
Objective 2. Provide at least 10 miles of system motorized and non-motorized trails within 10 years.	**Year Due 2011**
The Thunder Basin Travel management analysis is currently in progress and is projected to be completed in the Fall of 2009. As part of this, motorized and non-motorized trails are being proposed.	
Recreation	
Objective 1. Provide at least 2 recreation facilities (e.g., toilets, picnic sites, boat ramps) at fishery-stocked reservoirs within the next 10 years.	**Year Due 2011**
A fishing pier, toilet and kiosk and parking are were constructed at Turner Reservoir in 1998 and are enjoyed by the local community. However, in order to cut annual O&M costs, it was recommended the toilet be removed (as per the RSFMP, 2006). Further development in this area is discouraged because of the distance to Douglas (160 miles on way).	

Appendix 3: Regional Forester's Sensitive Species List for the Thunder Basin National Grassland

Common Name	Scientific Name	Status on TBNG*	ASSOCIATED HABITAT(S)					
			Grassland and Sagebrush	Riparian and Wetland	Forested	Prairie Dog Colony	Caves, Cliffs, Buttes, Blowouts and Barrens	Aquatic
MAMMALS								
Black-tailed prairie dog	*Cynomys ludovicianus*	K	+			X		
Spotted bat	*Euderma maculatum*	L		+			X	
Fringed myotis	*Myotis thysanodes*	K		+			X	
Townsend's big-eared bat	*Corynorhinus (Plecotus) townsendii*	K		+			X	
Swift fox	*Vulpes velox*	K	X			+		
BIRDS								
Northern goshawk	*Accipiter gentilis*	K			X			
Grasshopper sparrow	*Ammodramus savannarum*	K	X					
Sage sparrow	*Amphispiza bellii*	K	X					
Burrowing owl	*Athene cunicularia*	K	+			X		
American bittern	*Botaurus lentiginosus*	K		X				
Ferruginous hawk	*Buteo regalis*	K	X			+		
McCown's longspur	*Calcarius mccownii*	K	+			X		
Chestnut-collared longspur	*Calcarius ornatus*	K	+			X		
Greater sage-grouse	*Centrocercus urophasianus*	K	X			+		
Mountain plover	*Charadrius montanus*	K	+			X		
Black tern	*Chlidonias niger*	K		X				
Northern harrier	*Circus cyaneus*	K	X	+				
Yellow-billed cuckoo	*Coccyzus americanus*	K		X				
Olive-sided flycatcher	*Contopus cooperi*	K			X			
American peregrine falcon	*Falco peregrinus anatum*	K					X	
Bald eagle	*Haliaeetus leucocephalus*	K	+	X	+			
Loggerhead shrike	*Lanius ludovicianus*	K	X	+				
Lewis's woodpecker	*Melanerpes lewis*	K			X			
Long-billed curlew	*Numenius americanus*	K	X	+				
Brewer's sparrow	*Spizella breweri*	K	X					

Common Name	Scientific Name	Status on TBNG*	ASSOCIATED HABITAT(S)					
			Grassland and Sagebrush	Riparian and Wetland	Forested	Prairie Dog Colony	Caves, Cliffs, Buttes, Blowouts and Barrens	Aquatic
AMPHIBIANS								
Northern leopard frog	*Rana pipiens*	K		**X**				+
FISHES								
Mountain sucker	*Catostomus platyrhynchus*	K						**X**
Plains minnow	*Hybognathus placitus*	L						**X**
Flathead chub	*Platygobio gracilis*	L						**X**
Sturgeon chub	*Macrhybopsis gelida*	L						**X**
PLANTS – FERNS AND ALLIES								
Iowa moonwort	*Botrychium campestre*	L	**X**					
Narrowleaf moonwort	*Botrychium lineare*	L	**X**					
PLANTS – MONOCOTS								
Foxtail sedge	*Carex alopecoidea*	L		**X**				
Boreal Spikerush	*Eleocharis elliptica*	L		**X**				
Hall Fescue	*Festuca hallii*	L			**X**			
Large flower triteleia	*Triteleia grandiflora*	L	**X**					
PLANTS – DICOTS								
Barr's milkvetch	*Astragalus barrii*	K	**X**					
Dakota buckwheat	*Eriogonum visheri*	K	**X**					
Common twinpod	*Physaria didymocarpa var. lanata*	K	**X**					
Highbush cranberry	*Viburnum opulus* var. *americanum*	L		**X**				

X = species is most commonly associated or suspected to occur with this habitat on the TBNG.
+ = species may additionally occur or be suspected to occur in this habitat on the TBNG.

***KEY to Status Given for the TBNG**

K - Species currently documented to occur on National Forest System (NFS) lands.
L - Species or habitat is suspected to occur on NFS lands, but unconfirmed.