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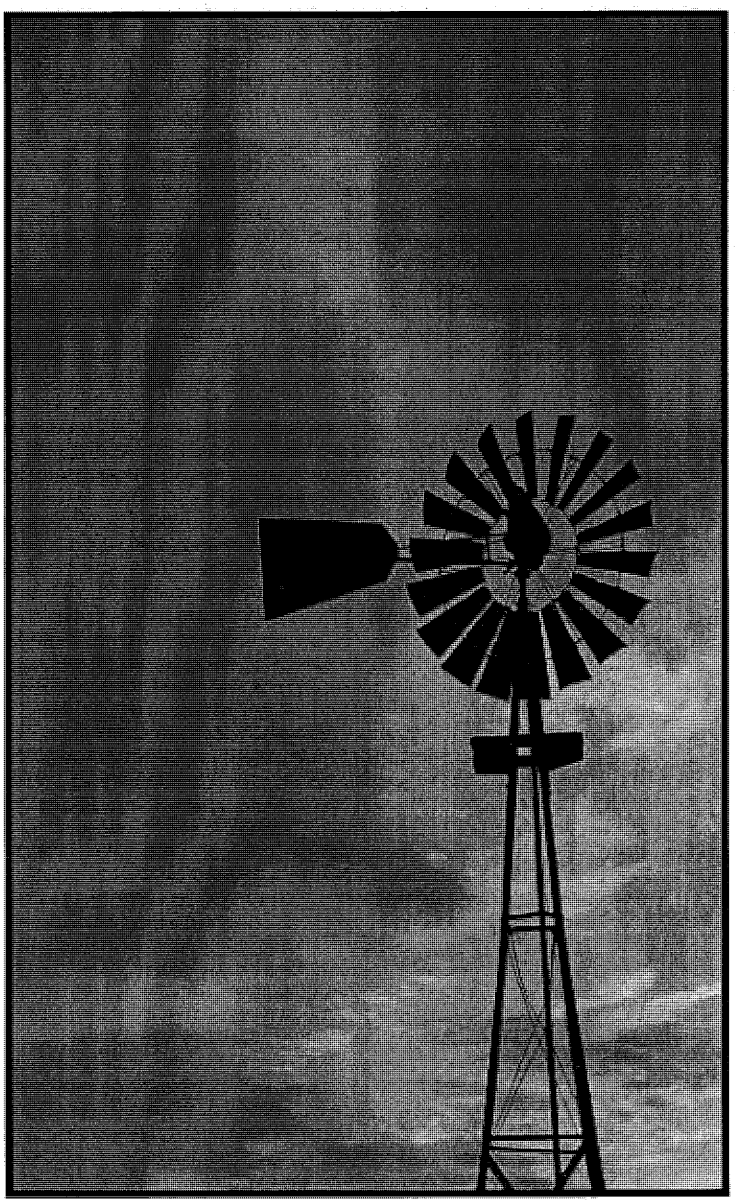

Cimarron and Comanche National Grasslands

Land Management Plan

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The Cimarron and Comanche National Grasslands are part of a USDA Forest Service unit: the Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands (PSICC). This is the first stand-alone land management plan developed solely for the Cimarron and Comanche National Grasslands (Grasslands). It is also the first plan in the nation to be developed under the National Forest System Land Management Planning Rule (2008 Planning Rule) (USDA FS 2008).

Detailed assessments, evaluations, reports, and documents associated with the Cimarron and Comanche National Grasslands Land Management Plan (Plan) can be viewed and downloaded from our Grasslands Land Management Plan Development Web site (Grasslands Web site):
http://www.fs.fed.us/r2/psicc/projects/forest_revision/gr_rev.shtml.

Maps of the Plan Area[1] and Planning Area[2], ecological areas, and special areas discussed in this Plan, are in Appendix H. They can also be viewed and downloaded from the Grasslands Web site:
http://www.fs.fed.us/r2/psicc/projects/forest_revision/gr_documents.shtml.

About This Plan

Because the organization of this Plan is different from previous land and resource management plans, and because the titles of parts and sections are also new, this section explains what those main parts are and what information is presented.

According to the 2008 Planning Rule the five components[3] of a land management plan are:

1. Desired conditions
2. Objectives
3. Guidelines
4. Suitability of areas
5. Special areas

These five plan components are not commitments or proposals to approve projects and activities.

[1] Plan Area: "The National Forest System lands covered by a plan" (36 CFR 219.16; FR p. 21512). The area within the Grasslands' administrative boundaries that includes only those lands administered by the Forest Service, not state or private lands. See Map 1 in Appendix H.
[2] Planning Area: The area within the Grasslands' administrative boundaries that includes Forest Service-administered lands (the Plan Area) and also private and state-owned and state-managed lands. See Map 1 in Appendix H.
[3] 36 Code of Federal Regulations [CFR] 219.7; Federal Register (FR) p. 21507, the five required plan components are described in the 2008 Planning Rule (USDA FS 2008). In this Plan, references to the 2008 Planning Rule will include both the CFR citation and the Federal Register page numbers. For example, 36 CFR 219.7(a)(2)(i); FR p. 21507.

In our Plan, the five plan components are distributed in three parts: Vision, Strategy, and Design Criteria.[4] Within this structure, the Plan sets out management direction for the Grasslands over the next 15 years. By focusing on outcomes achieved or maintained over time (desired conditions), the Plan:

1. Sets a context for project development.
2. Provides a framework to guide future management decisions and actions.
3. Describes the desired ecological, economic, and social conditions of the Grasslands.
4. Describes how Grasslands management contributes to the sustainable management of the nation's Forests and Grasslands in terms of the national strategic goals and objectives (USDA FS 2007).

Plan Structure

This section briefly describes the five plan components and how they are distributed among the three parts of this Plan, and the sections within those three parts. For a quick preview of the Plan structure, glance at the Table of Contents.

About Part 1: Vision

Part 1, the vision, summarizes what we aspire to—the existing and desired conditions for the Grasslands. It provides strategic direction for the Plan Area and describes the roles, contributions, and settings for local communities, and for Colorado and for Kansas. It also establishes the context for projects and activities by describing the desired conditions for each of the four primary ecosystems and nine special areas that characterize the Grasslands, along with disturbance processes[5], and the benefits and experiences that these lands can offer. The vision is long-term (it may extend beyond the 15-year planning period) and reflects ecological timeframes and social desires.

Desired Conditions: Aspirational in nature, desired conditions are the ecological, economic, and social attributes that guide management of the land and resources of the Plan Area. They don't prescribe or approve management projects or activities, but they do establish purposes for those future actions and projects. Desired conditions may be achievable only over a long time period, may be reached in the short-term, or may already exist.

Special Areas: Selected areas within the Grasslands are identified or designated (following plan approval) as special areas because of their unique or special characteristics. Special areas may be designated by statute, by a plan, plan amendment, plan revision, or by a separate process in accordance with the National Environmental

[4] The three-part plan model is recommended in the USDA Forest Service Manual (FSM) 1921.1 and USDA Forest Service Handbook 1909.12(11) (USDA FS 2006a and 2006b).
[5] A disturbance process is a force, such as fire, drought, herbivory or storm events that remove above-ground vegetation from an ecosystem, and so influence its composition and structure.

Policy Act (NEPA) and other applicable laws. Each special area may have different plan components that reflect its unique and special characteristics.

About Part 2: Strategy

Part 2, the strategy, describes how the Grasslands intend to maintain or move toward desired conditions through measurable outcomes. It includes such plan components as objectives and the suitability of areas for land uses. The strategy states intent and focus for Grasslands management actions within the planning period. Key objectives describe levels of conditions, uses, and activities to achieve the desired conditions. The strategy also identifies areas where the predominant land uses are generally suitable (compatible) with desired conditions.

Monitoring questions and associated performance measures in the strategy mark how the Grasslands are moving toward desired conditions by gauging whether objectives are being accomplished[6] or by assessing the actual progress toward the key aspects of desired conditions.[7]

Objectives: These are concise projections of measurable, time-specific outcomes intended to maintain or achieve the desired conditions described in the vision. The objectives are a means of measuring progress toward achieving or maintaining desired conditions.

Suitability of Areas: The Plan identifies areas on the Grasslands as generally suitable for various uses. An area may be identified as generally suitable for uses that are compatible with desired conditions and objectives for that area. The identification of an area as generally suitable for a use is guidance for project and activity decisionmaking and is not a commitment or a proposal approving projects and activities in the Plan Area.

About Part 3: Design Criteria

Part 3, the design criteria, includes the parameters within which the strategy operates. They are technical and scientific specifications that provide guidance and information for future project and activity decisionmaking. Design criteria can also include references to other applicable guidance for this decisionmaking.

Guidelines: These are information and guidance for project and activity decisionmaking to help achieve desired conditions and objectives. In some cases, more than one guideline is related to a desired condition and objective.

Other Referenced Direction: This referenced direction is not considered a plan component, but can be helpful in designing projects and activities. It helps achieve desired conditions and ensures that projects and activities are consistent with existing

[6] In previous plans, this may have been referred to as "implementation monitoring."
[7] In previous plans, this may have been referred to as "effectiveness monitoring."

laws, regulations, and policies that govern resource management of National Forest System (NFS) lands and with existing decisions.

About Monitoring Questions

Plan monitoring questions are in Part 2.[8] Each monitoring question must link to one or more desired condition, objective, *or* guideline. However, not every desired condition, objective, and guideline needs to be associated with a monitoring question. Performance measures, related to monitoring questions, are the basis for accountability, for both short-term objectives and long-term desired conditions.[9] For more about plan monitoring, see the Plan Monitoring and Plan Monitoring Program sections, below.

Content within the Three Parts

The content in each of the Plan's three parts is arranged in the categories and subcategories listed in Table 0-1. For maps of the four primary ecosystems and the special areas, see Appendix H.

Table 0-1. Categories and subcategories in each of the three parts of the Plan

Category and sub-categories	What's addressed
Land administration	The management of NFS lands in the Plan Area, including long-term goals for addressing boundary management and NFS land consolidation. Land administration is a separate category because, on the Grasslands, it influences the management of all other resources (ecological, economic and social, and physical).
Ecological resources: a. The Canyonland Ecosystem b. The Riparian and Aquatic Ecosystem c. The Sandsage Prairie Ecosystem d. The Shortgrass Prairie Ecosystem	The four primary ecosystems on the Grasslands are the Canyonland, the Riparian and Aquatic, the Sandsage Prairie, the Shortgrass Prairie. Ecological resources are described in terms of disturbance regimes and vegetation composition and structure.

[8] "The plan must describe the monitoring program for the plan area" (36 CFR 219.6(b); FR p. 21507).
[9] For details about the monitoring program, monitoring work plan, and associated reports, see FSM 1921.51 and FSH 1909.12 (USDA FS 2006a and 2006b); and the Cimarron and Comanche National Grasslands Land Management Plan Monitoring Guide.

Category and sub-categories	What's addressed
Economic and social resources: a. Livestock grazing b. Minerals and energy c. Recreation and tourism	The administration and management of human uses of the Grasslands, including livestock grazing, minerals and energy development, and recreation and tourism, as well as local and national values for the Grasslands identified through collaboration and comments.
Physical resources: a. Heritage b. Landscape and scenery c. Paleontological	Management of archaeological (cultural and historical), landscape and scenery, and paleontological resources.
Special areas	The general locations, within the four primary Grasslands ecosystems, of the nine areas that exhibit unique or special characteristics. The desired conditions of these special areas vary from those of the primary ecosystem(s) in which they are located, and, as a result, may require different plan components.

Plan Appendices

The Plan appendices give information, descriptions, and illustrations helpful in supporting plan components and other plan content. Several of the appendices are convenient summaries of more detailed assessments, evaluations, and other reports that make up the complete set of plan documents. A brief description of each appendix follows.

Appendix A. Contributions to the Forest Service Strategic Plan: How plan components, specifically desired conditions and objectives, align with the long-term goals and objectives of the Forest Service Strategic Plan for fiscal years 2007–2012.

Appendix B. Climate change and the Grasslands: Information and discussion about climate change in western North America, the Great Plains Ecoregion and the Planning Area, and how plan components provide the strategic guidance framework for project and activity-level decisionmaking.

Appendix C. List of species-of-concern and species-of-interest: The complete list of the species-of-concern and species-of-interest whose ranges include the Plan Area.

Appendix D. Descriptions of species-of-concern habitats: Habitat description summaries for plant and wildlife species-of-concern that support the species-level habitat descriptions in plan components.

Appendix E. Proposed and possible actions: The types of projects or activities that may take place on the Grasslands to help maintain or achieve desired conditions and objectives.

Appendix F. Plan alignment with the National Energy Policy: Information about fossil energy resources (oil and gas) within the Grasslands and how the Plan aligns with the national energy policy.

Appendix G. Monitoring questions and links to Plan components: A table illustrates the linkages between plan components and the monitoring questions and associated performance measures.

Appendix H. Maps: Three maps illustrating the Plan Area and Planning Area, the four primary Grasslands ecosystems, and the nine special areas.

Consistency of Projects and Activities with the Plan

As required by the National Forest Management Act of 1976[10] (NFMA) and the 2008 Planning Rule, all projects and activities authorized by the Forest Service must be consistent with the Plan (16 USC 1604 (i); 36 CFR 219.8 (a), (b), and (e)). A project or activity must be consistent with the plan (36 CFR 219.8(e)) by being consistent with applicable plan components (36 CFR 219.8 (a)).

Plans may have other content, such as statements of background, collaboration strategies, existing conditions, glossary, introduction, management challenges, monitoring questions, other referenced direction or guidance, performance history, performance measures, performance risks, program emphasis, program guidance, program priorities, proposed and possible actions, and roles and contributions. The NFMA requirement that all authorized projects and activities be consistent with a plan is not applicable to these other content pieces of the Grasslands Plan.

Ensuring Project or Activity Consistency with the Plan

Where a project or activity as proposed would not be consistent with the five plan components, the Responsible Official has the following options:

1. To modify the proposal so that the project or activity will be consistent;
2. To reject the proposal; or
3. To amend the plan contemporaneously with the approval of the project or activity so that the project or activity is consistent with the plan as amended. The amendment may be limited to apply only to the project or activity.

The following paragraphs describe how a project or activity is consistent with plan components and the requirements for documenting consistency.

[10] For the NFMA, see 16 U.S.C. [U.S. Code] *et seq.* Also see www.fs.fed.us/emc/nfma/index1.html (accessed 02 June 2008).

Desired conditions (36 CFR 219.7(a)(2)(i))

A project or activity is consistent with the desired conditions component of the plan if it does not foreclose the opportunity for maintenance or attainment of the applicable desired conditions over the long-term based on the spatial scales described in the plan.

The project documentation should explain how the project is consistent with desired conditions over the long-term and relevant spatial scale and describe any short-term effects the project may have regarding the maintenance or attainment of any desired condition.

Objectives (36 CFR 219.7(a)(2)(ii))

Objectives are designed to maintain or make progress toward desired conditions of the plan. A project or activity is consistent with the objectives component of the plan if it contributes to the attainment of one or more applicable objectives.

The project documentation should identify any applicable objective(s) to which the project contributes. If there are no applicable objectives, the project is considered consistent with the objectives component of the plan; the documentation should state that fact.

Guidelines (36 CFR 219.7(a)(2)(iii))

A project or activity must be consistent with all guidelines applicable to the type of project or activity and its location in the plan area. A project or activity may be consistent with a guideline in one of two ways:

1. The project or activity is designed in accordance with the guideline, or
2. The project or activity design varies from the guideline but the design is an effective means of meeting the purpose of the guideline, to maintain or contribute to the attainment of relevant desired conditions and objectives.

The project or activity documentation should describe how it is consistent with the guidelines. When the project or activity varies from the exact words of a guideline, the documentation must specifically explain that the project or activity design is nonetheless an effective means of maintaining or contributing to the attainment of relevant desired conditions and objectives.

Suitability of areas (36 CFR 219.7(a)(2)(iv))

A project or activity with the primary purpose of timber production may be carried out only in an area identified as suitable for timber production (see 16 USC 1604(k)). The documentation for the project or activity should confirm that it is located in an area identified as suitable for timber production.

Except for a project or activity with a primary objective of timber production, a project or activity may be consistent with the suitability determinations in the plan in one of two ways:

1. The project or activity is a use identified in the plan as generally suitable for the location where the project or activity is to occur, or
2. The project or activity is not a use identified in the plan as generally suitable for the location, but the Responsible Official documents the use to be appropriate for that location.

The project documentation should describe whether the project or activity is (1) a use for which the area is specifically identified in the plan as generally suitable, or (2) whether the project or activity is nonetheless appropriate for that location.

Special areas (36 CFR 219.7(a)(2)(v))

Where a plan provides plan components specific for a special area, a project or activity must be consistent with those area-specific components. The project documentation should describe how the project or activity is consistent with the area-specific components of the plan.

Maintaining Plans and Adapting to New Information

A land management plan is an integral part of the adaptive management cycle that provides a framework guiding future management decisions and actions. Adaptive management includes defining measurable objectives, monitoring, learning and changing, recognizing uncertainties in outcomes for achieving objectives, and the need for input from stakeholders. The cycle of adaptation functions through the monitoring and evaluation requirements of the plan. The Grasslands monitoring program[11] is described in more detail in the plan set of documents.

Annually, the Responsible Official (the Forest Supervisor) and other managers will consider the evaluations of monitoring information through a management review and determine if any changes are needed in management strategies or plan goals and guidance as informed by those monitoring results.

Plan Monitoring

To evaluate progress in maintaining or achieving desired conditions we use key ecological, economic, and social performance measures that are relevant to the Plan Area. To track performance and verify that we are maintaining or moving toward desired conditions and that we are accomplishing objectives, ecological, economic, and social

[11] A monitoring program consists of monitoring questions and performance measures, a monitoring guide, annual monitoring work plans and evaluation reports, and comprehensive evaluation reports. See the Plan Monitoring Program section for more information.

conditions and trends are monitored and reported annually (for selected projects or activities) or every five years (for all plan components). Also see section 2.2. in this Grasslands Plan.

The Plan Monitoring Program

The desired conditions and objectives of the highest priority are identified in the plan monitoring program. The "plan monitoring program" includes the monitoring questions and performance measures (in the plan) that are linked to plan desired conditions, objectives, or guidelines.[12]

Documents that are closely associated with the plan monitoring program include:

1. A description of the process used to develop monitoring questions and performance measures.
2. Monitoring guide: Includes methods of data collection, schedule of monitoring activities during the planning period, and cooperators and their roles.
3. Annual monitoring work plan: Identifies work expected for the upcoming fiscal year and anticipated resources for carrying out the monitoring tasks.
4. Annual evaluation report: Includes summary of what monitoring activities were carried out; evaluation of what was monitored that year, recommendations of needed actions.
5. Comprehensive evaluation report: This report is prepared every five years, and builds from the information in the annual evaluation reports.

Responses to Monitoring Results

Monitoring information is collected, reviewed, and evaluated for key changes in conditions and trends that contribute to sustainability. The degree to which on-the-ground management is maintaining or moving toward desired conditions is specifically evaluated. Based on evaluations of monitoring results, the Responsible Official (Forest Supervisor) determines any needed adjustments to the plan monitoring program or plan components.

To continually improve land management, performance measures would be periodically reviewed. These reviews help identify current and future topics of interest or concern ("issues") that could be considered in future planning. The most current and critical issues that call for concentrated effort are identified in the USDA Forest Service Strategic Plan for fiscal years 2007–2012 (USDA FS 2007) as goals, objectives, and performance measures. The Grasslands Plan objectives consider local conditions and concerns and contribute to the broader objectives of the Strategic Plan (see Appendix A).

As a result of monitoring, a plan can be updated through either amendments or administrative corrections. Amendments are used to make substantive changes to desired

[12] Information in this and the next paragraph is from FSM 1921.5 and also the Forest Service Handbook (FSH) 1909.12, chapter 10. See also 36 CFR 219.6; FR p. 21506-21507 (USDA FS 2008).

conditions, objectives, guidelines, suitability of areas, and special areas. Administrative corrections are used to make other changes, such as corrections and updates of data and maps, typographical errors, plan monitoring program and monitoring information, and other non-substantive changes.[13] The public will be notified of any future amendments and administrative corrections to a plan.[14] All proposed and final changes to the Grasslands Plan will be posted on the Grasslands Web site.

Environmental Management System

The Forest Service has committed to utilizing an environmental management system (EMS) model to improve our management of the lands and resources under our jurisdiction. EMS is an adaptive management tool that brings a systematic and accountable approach to management to help ensure we meet environmental and land management goals and objectives of the Forest Service Strategic Plan (USDA FS 2007) and the Grasslands Plan. EMS promotes a cohesive approach to resource management that begins with strategic planning and follows through to plan implementation. Monitoring and evaluation will be used to track our progress and effectiveness in adapting our management to ensure continual improvement in our environmental performance. Our environmental performance will be measured by the progress made in achieving or maintaining the desired conditions described in the Grasslands Plan.[15] Simply, an EMS promotes a "plan, do, check, and act" management system (see Figure 0-1) that tracks the unit's environmental performance associated with management actions, identifies needed improvements, and results in actions to make those improvements.

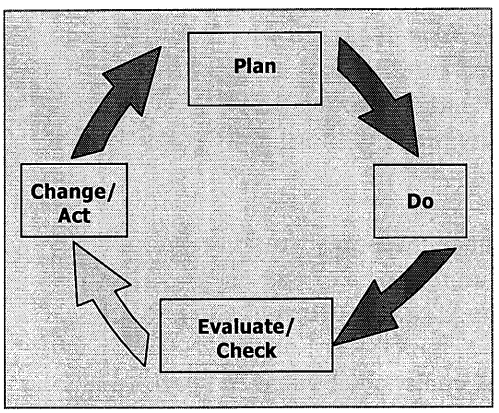

Figure 0-1. The EMS Plan-Do-Check-Act Cycle

[13] For more about administrative corrections, see 36 CFR 219.7(7)(b); FR p. 21508 (USDA FS 2008).
[14] For more about changes to the Plan, see 36 CFR 219.9 (b); FR p. 21509.
[15] For more information about EMSs, see the Forest Service EMS Web site at http://www.fs.fed.us/ems/ [accessed 20 June 2008] and the PSICC EMS Web site at http://www.fs.fed.us/r2/psicc/projects/ems/index.shtml [accessed 02 June 2008].

Because EMS is a system to move from planning, through implementation, to adaptation, it will be integrated with the Grasslands Plan and its implementation. By having the Plan under the umbrella of EMS, the effectiveness of the EMS-structured approach will help ensure the achievement of plan components. We will use EMS to better manage certain significant environmental aspects that most affect our relationship with the environment at local, regional, and national scales. In doing so, the EMS will encompass objectives, targets, and programs associated with identified key management issues. Monitoring and evaluation will provide information to management to help make adjustments to plans, objectives, programs, or methods where needed to improve performance or to redirect efforts to better achieve intended outcomes.

EMS monitoring will be designed to answer the following three questions:

1. What are the effects of resource management activities on the productivity of the land?
2. To what degree is on-the-ground management maintaining or making progress toward the desired conditions and objectives in the Grasslands Plan?
3. What changes are needed in the monitoring program to account for unanticipated changes in conditions?

For those activities covered under EMS, EMS monitoring will track project implementation to ensure continual improvement in environmental performance and conformance with and effectiveness of management actions, including operational controls.

Table 0-2 shows the plan components and the kinds of monitoring conducted. The relation to the EMS is also provided.

Table 0-2. Plan components, monitoring strategy, and relation to EMS

Plan Component	Monitoring Strategy	Relation to EMS
Desired conditions	This type of monitoring considers a range of ecological, economic, and social conditions, recognizing that many factors (natural events, human uses, and management activities) influence desired conditions. Monitoring items have a frequency specified in the monitoring guide. While monitoring may take place annually, indications of trends will likely be on the basis of three to five years or more. Broad-level monitoring is usually of national or regional design with a sampling design and statistical rigor to address common multi-forest monitoring questions. Mid-level monitoring may be used for specific areas where information that is more detailed is needed. This monitoring may be intensification of the broad-level sampling or to monitor additional variables.	Where objectives and programs have been placed under the EMS umbrella, performance monitoring data will be evaluated and used by managers to review the adequacy and effectiveness of established objectives and program direction in achieving intended plan outcomes. Management reviews will enable continuous improvement of the EMS and are central to adaptive management.
Objectives	This type of monitoring measures progress toward the objectives. Performance measures, often as identified in the budgeting process, are used to assess accomplishment of or progress toward the objectives. Performance (for example, accomplishment) is generally measured on an annual basis consistent with the annual budget process.	Where objectives and programs have been placed under the EMS umbrella, the EMS will help ensure that environmental goals are achieved and we are making progress toward meeting desired outcomes.

Plan Component	Monitoring Strategy	Relation to EMS
Guidelines	This monitoring addresses whether projects and other activities are accomplished within the plan guidelines used for project design. The Agency's administration of projects or special uses provides monitoring (such as inspection reports) that document that the activity occurs as designed. Audits and other monitoring systems are also used as additional checks. Projects are monitored as they are accomplished. Audits for a sampling of projects occur on an annual basis consistent with audits for an EMS.	EMS helps link and track implementation of projects with the specific project-level NEPA decision and monitors conformance with Grasslands Plan desired conditions, objectives and guidelines. It will also help to ensure and evaluate our compliance with laws, regulations, and policies. Monitoring, audit and management review results are made available to management and the public to ensure that identified deficiencies in performance are corrected.

About This Plan References

16 United States Code (USC) 1604.

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Introduction

This Land Management Plan (Plan) for the Cimarron and Comanche National Grasslands (Grasslands) describes the strategic program-level guidance for the future management of the Grasslands and their resources. The Plan meets the requirements of NFMA by using the procedural details outlined in the 2008 Planning Rule (USDA FS 2008). It focuses on outcomes achieved (desired conditions) instead of outputs (products, goods, and services). The Plan guides the development of the budget and projects and activities that are designed to bring about or maintain desired outcomes. Rather than making project-level decisions or commitments to authorize specific projects, the Plan provides the context for project development.

The Plan is part of adaptive management: a process of plan development, project authorization, monitoring, inventory and assessment, learning, and adjustment. It was developed collaboratively and considers the social values of local, regional, and national users and other people interested in the Grasslands. The Plan focuses on maintenance or restoration to provide a sustainable flow of uses, benefits, products, services, and visitor opportunities. We considered the best available science pertaining to the economic and social conditions and ecosystem composition, structure, and processes obtained from sustainability evaluations to ensure that the Plan components help contribute to ecological, economic, and social sustainability.

Figure 0-2. Public meeting in Elkhart, Kansas, June 2006

The ability to maintain, influence, or change the Grasslands' resources and management in ways that contribute to ecological, economic, and social sustainability depends on many factors, such as resource capability and potential, budgets, environmental policies and conditions, and public wants and needs. To understand the ecological, economic, and social contributions the Grasslands currently make and may make in the future, we evaluated and assessed the relevant resource conditions and trends and their sustainability. Understanding the history of the area that we know today as the Grasslands was fundamental to this process. Compiling a short history of the area gave us a temporal

continuum of factors that shaped past resources and conditions. This information was used as a gauge to develop a realistic and achievable vision and the desired conditions for the future.

A Short History of the Grasslands

> "The ultimate meaning of the dust storms of the 1930s was that America as a whole, not just the plains, was badly out of balance with its natural environment. Unbounded optimism about the future, careless disregard of nature's limits and uncertainties, uncritical faith in Providence, devotion to self-aggrandizement–all these were national as well as regional characteristics."
>
> Donald Worster, *The Wealth of Nature: Environmental History and the Ecological Imagination*

The Grasslands are two of the twenty National Grasslands managed by the USDA Forest Service. The Grasslands are ongoing ecosystem restoration projects whose existence, spawned by the Dust Bowl recovery efforts, reminds us daily of the importance of caring for the land. They also provide forage, wildlife habitat, recreation, energy, and tangible bonds with our past. The history and the heritage of the Grasslands connect us with the uniquely rich cultures that—then and now—shape these Grasslands and nearby communities.

The legacies of adapting to life on the High Plains for the past 12,000 years by numerous cultural and ethnic groups form the multi-cultural roots of the Grasslands and the surrounding communities.[16] Throughout the Grasslands we continue to discover, document, and protect the physical remains of the ecological, geological, and human histories of the area, such as dinosaur trackways and skeletons, rock art, middens,[17] cemeteries, early ranches, and homesteads.

Early Human Uses of the Grasslands

Prehistoric peoples have used the High Plains area of western Kansas and southeastern Colorado since about 12,000 years ago. Spear points discovered in the Grasslands areas suggest that the area was probably used by early hunters to hunt large game, including mammoth and bison. Hunting efficiency improved first during the Archaic period with the introduction of the atlatl and then again in the Late Prehistoric stage (A.D. 100 – 1450) with the introduction and widespread adoption of the bow and arrow.

Domesticated food crops (beans, maize, and squash) were introduced and became common. Ceramic vessels were first manufactured and led to new food preparation and storage methods. In some cases interregional contact became a more integral part of the

[16] For more Grasslands history, see the report Existing Conditions: Chapter 8—Heritage Resources (USDA FS 2005).

[17] Middens on the Grassslands are areas where collections of thousands or or even tens of thousands of discarded tools and food refuse items have been found.

economy (Kalasz and others 1999). Settlement patterns expanded along with campsites and village sites along the Cimarron and Arkansas Rivers.

On what is now the Comanche National Grassland (Comanche), sites and rock art from the Apishapa people were found along the Purgatoire River, its side canyons, and northern tributaries of the Dry Cimarron River.[18] Based on rock art styles and motif regularities, the Apishapa peoples seem to have been also in the Carrizo, Pat, Whitby, and Big Hole canyons.[19] On what is now the Cimarron National Grassland (Cimarron) are bison hunting and processing sites (Hughes and Huhnke 1999).

Figure 0-3. Petroglyphs, Comanche National Grassland

Increasing Complexity, Expansion, and Competition

Native Americans dominated the social and economic landscape of the southwestern High Plains at least until the 1858 Colorado gold rush began. However, their prominent role has often been underestimated because of the relative lack of historical and archaeological data for 15th–18th century native occupation in the region.

[18] The first well-documented human use of Picture Canyon dates to about A.D. 0–500 (Late Archaic). Several camps are located in rock overhangs above the canyon bottoms. These groups were replaced about A.D. 1000 by the Apishapa Culture which practiced horticulture, hunting, and gathering and lived in small villages often on the canyon rims. One Apishapa village on the northern rim has foundations of about a dozen Apishapa dwellings. For more about Picture Canyon, see the Special Areas sections in Parts 1 and 2, and Appendix C of this Plan.

[19] On the Comanche, the Purgatoire River (a major tributary of the Arkansas River) and its side canyons and the northern tributaries of the dry Cimarron River contain high densities of Apishapa habitation sites and rock art.

The region was abandoned by Late Prehistoric groups (such as the Apishapa) at the start of the Protohistoric period (A.D. 1450–1725), which coincided with the arrival of the Plains or Eastern Apache and their immediate ancestors, possibly as nomadic bison hunters and foragers (Kalasz and others 1999: 251). Archaeological evidence on the Central and Southern Plains includes sites associated with groups who may have become the Kiowa Apache (Schlesier 1972). Most groups in southeast Colorado and southwest Kansas became the Jicarilla and Mescalero Apache.[20]

In the 1600s and 1700s, the expansion of cultures from the eastern United States caused upheavals and unrest among Native American populations. By 1700, the Comanche and Kiowa who had been displaced in the north had moved into the Southern Plains and dominated the region. About A.D. 1725 various Apachean bands withdrew from the area and Spanish expeditions and Comanche incursions increased (Kalasz and others 1999: 250). The area that now includes the Grasslands was known as "Comancheria" by eighteenth-century Spanish explorers.[21]

Several important economic systems developed between 1725 and 1846 (the Early Historic period). The *comanchero* trade between New Mexican traders and Plains Indians had originated as Late Prehistoric and Protohistoric exchange networks (Spielmann 1991). Initially focused on maize and meat, it later included horses, guns, tobacco, sugar, cloth, and other manufactured goods (Carrillo 1990). The *comanchero* trade expanded after the Spanish defeated the Comanche Chief Cuerno Verde in 1779 and negotiated a treaty with them in 1786.

Bison hunts became increasingly common after 1786 probably because the Comanche and *comancheros* shifted away from trade in New Mexico to a Plains-based trade network. At about the same time the *ciboleros*, Mexican buffalo hunters who supplied food for New Mexico settlements and hides for the Santa Fe-Chihuahua trade, began forays out of the northern Rio Grande valley and onto the Plains.

After 1800, tribes from the Great Lakes region, including the Sioux, Arapaho, and Cheyenne, migrated to the Northern High Plains, then south to the area now included in the Grasslands. During the first part of the nineteenth century, portions of the Cheyenne and Arapaho tribes migrated south from North Dakota's Black Hills region (Gunnerson and Gunnerson 1988) and into the area; the Kiowa and Kiowa Apache entered the Arkansas basin around this time.

Mexico's independence from Spain in 1821 increased economic activity between Mexicans in the Rio Grande valley and residents of the Missouri valley (Missouri obtained statehood in 1821), while the influence of Comanche traders on the Southern

[20] Sites with stone rings, small projectile points, micaceous pottery and Rio Grande style rock art such as those found in the Picket Wire Canyonlands Paleontological Area of the Comanche suggest Apachean occupation.

[21] Some of the rock art on the Comanche (especially in Picture Canyon) can probably be specifically attributed to the Comanche tribe.

Plains declined. The Santa Fe Trail, the principal trade route, followed earlier Native American travel routes and was open to travelers in 1820. Later the Trail included several travel corridors and crossed over 1,200 miles. Between 1821 and 1880 thousands of wagon trains crossed the Trail between Missouri and Santa Fe.

The Santa Fe Trail increased contact between Native Americans and Hispanic and European Americans. Earlier interactions had often been trade-based and mutually beneficial. However, if trade attempts were unsuccessful, there were sometimes raids and skirmishes. By 1850, indigenous Native American populations were seriously threatened by the influx of Hispanic and European-American populations. In the 1870s, non-Native American hunters decimated buffalo herds, which had been Native Americans' key resource. Traders introduced and provided liquor. More devastating was the introduction of foreign diseases (such as cholera and smallpox) to communities of Native Americans who had no immunities to the alien invaders. Westward expansion of European-American settlement effectively pushed out Native American groups.

Escalating Settlement and the Cattle Empire Era (1846-1930s)

U.S. political control of the southwestern High Plains corresponds with the Late Historic period (1846–present). After Mexico's 1848 defeat in the Mexican-American War, activity along the Santa Fe Trail expanded steadily: permanent settlement of the region began slowly and quickened after the Civil War. European Americans from the east and Hispanic families principally from northern New Mexico settled the region in the early 1850s. This period is noted for the large influx of Hispanic and European Americans to the region.

The 1858 discovery of gold in the Colorado Front Range brought thousands of gold seekers into the western Plains. This influx of immigrants led to secondary markets for produce, livestock, and manufactured goods across the region (Carrillo 1990). But it also led to conflicts with the local Native American populations, including the Ute, Comanche, Apache, Cheyenne, and Arapaho. Raids and Army reprisals escalated through the 1850s and early 1860s. Treaties did not result in coherent or lasting political settlements.

The Cattle Empire, or Open Range, Era began in the late 1860s and ended around the 1890s. Prospective ranchers quickly claimed the High Plains grasslands; many developed enormous cattle empires. Some enterprises acquired large tracts through land grants, but most early ranching operations used the open range and established title at a few key points by land grant assignments and inheritance.

The Homestead Act of 1862 encouraged many settlers from the east to move to southeastern Colorado and southwestern Kansas; there was a moderate land rush in the mid-1880s. By the 1880s and 1890s, many small ranches and farms had consolidated into larger operations. Native American presence in the region had become intermittent (Horn 2000).

In the 1860s–1870s, many Hispanic settlers moved to southern Colorado from northern New Mexico. It is estimated that in the vicinity of Rourke Ranch in the Purgatoire River valley on the Comanche, 90% of the land owners were of Hispanic origin in 1885 (Reed and Horn 1995).[22]

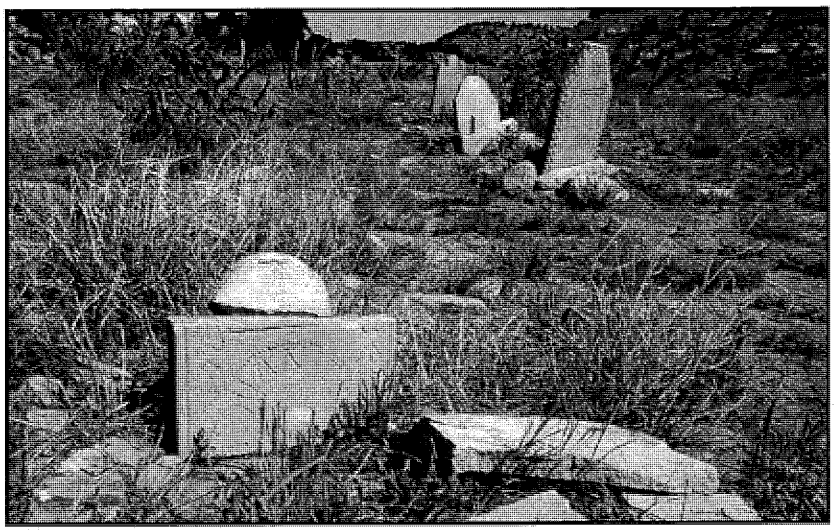

Figure 0-4. Historic cemetery, Comanche National Grassland

The immigrants' prosperity was short-lived. Droughts between 1900 and 1920 forced many to leave the region. In the 1920s, a second wave of farming homesteaders invaded the region (Lewis 1988). Population increased and local agricultural communities thrived. Mechanized farm equipment, especially the steam tractor, allowed farmers to cultivate more acres of land and so fueled expansion. Ironically, this period of increased production and yield resulted in a farm recession in the later 1920s.

The Dust Bowl Years

Settlers were ill prepared for the consecutive years of drought between 1933 and 1936. Periods of drought were not unusual, and typically occurred around every 25 years. But farmers had ploughed large tracts of marginal lands, a method unsuitable for dry land farming in the arid west, and the lack of moisture, grasses, and plant cover combined to create a disastrous loss of topsoil and the Dust Bowl conditions of the 1930s. Most marginal farms and ranches could not be maintained; many destitute families in the region abandoned their farms and ranches, while others were forced out by bank foreclosures. The Dust Bowl exodus was the largest migration in American history: by 1940, 2.5 million people had moved out of the Plains states. The population of the area

[22] Examples of cultural resources associated with early Hispanic settlement of the area include ranches, settlements, rock art, and cemeteries.

has never recovered from the double blow delivered by the Depression and the Dust Bowl.

Drought and land misuse, following the practices of the times, led to the devastation of the Dust Bowl years. The Southern Plains had once been covered with grasses that held the fine topsoil in place and provided habitat for wildlife, not the least of which were once-numerous bison herds. Cultivated crops, such as the wheat which was in high demand during World War I, exhausted the topsoil. Overgrazing by cattle and sheep herds stripped the prairie of their vegetative cover and life-sustaining grasses. When the drought came, the soil simply blew away.

The U.S. Congress recognized that strong measures were needed to repair and begin restoring the crippled land. It encouraged the federal acquisition and restoration of severely eroded farmlands. The Taylor Grazing Act, signed by President Roosevelt in 1934, established up to 140 million acres of grazing districts within the public domain. One of many New Deal efforts, the program helped arrest the deterioration, but could not undo the years of environmental damage.

Beginning in 1935, federal conservation programs were created to rehabilitate the area: changing the basic farming methods by seeding areas with grass, rotating crops, using contour plowing and strip plowing, and planting trees as wind breaks.

Establishing the National Grasslands

At a 1935 meeting in Pueblo, Colorado, experts estimated that during that year 850 million tons of topsoil had blown off the Southern Plains and, if the drought continued, 5,350,000 acres would be affected by 1936. The Resettlement Administration proposed buying 2,250,000 acres and retiring them from cultivation. By 1938, the extensive work of re-plowing the land into furrows, planting trees in shelterbelts, and other conservation methods had reduced the amount of soil blowing away by 65%, but did not remedy the damage from years of use.

From 1937 through the late 1940s, under the authority of the Bankhead-Jones Farm Tenant Act (Title III (1937)), the U.S. Department of Agriculture bought 2.6 million acres of submarginal land. Added to some 8.7 million acres purchased by the Federal Emergency Relief Administration and successor agencies (Lewis 1988), these lands were managed as land utilization (LU) projects. This federal effort exemplified new ways of thinking about managing natural resources in grasslands. Efforts that focused on removing submarginal cropland from production and restoring severely eroded lands provided real-world demonstrations of appropriate land use and conservation practices (Lewis 1988).

In 1954, LU projects were reviewed to determine their futures. Some lands suitable for certain uses were transferred to the U.S. Department of the Interior (USDI) Fish and Wildlife Service and National Park Service. Some in Western states were transferred to the USDI Bureau of Land Management. Thirteen of the remaining LU projects, mostly in

reforested areas in the south, were given National Forest status. Four million acres of LU projects (mostly in the Great Plains) were transferred to be managed by the USDA Forest Service. In 1960 Congress designated the areas managed by the Forest Service to become National Grasslands.

Grasslands Management Focus: Conservation and Multiple Use

The Bankhead-Jones Farm Tenant Act, which directs the acquisition, disposal, and administration of these lands, is one of the principal laws governing the Forest Service's administration of the Grasslands. Among the statutory authorities enacted since the Bankhead-Jones Farm Tenant Act are the general regulations pertaining to the National Grasslands; these are set out in 36 CFR 213 and direct that the National Grasslands be administered under "sound and progressive principles of land conservation and multiple use, and to promote . . . sustained-yield management of the forage, fish and wildlife, timber, water, and recreation resources. . . ." The resources of the National Grasslands are managed to "maintain and improve soil and vegetative cover and to demonstrate sound and practical principles of land use for the areas in which they are located"; and, to the extent feasible, policies for the administration of National Grasslands "exert a favorable influence for securing sound land conservation practices on associated private lands." The 213 regulations provide that other regulations applicable to National Forests are incorporated and applied to regulate the protection, use, occupancy, and administration of the National Grasslands to the extent that those regulations are not inconsistent with the provisions of the Bankhead-Jones Farm Tenant Act.

The Bankhead-Jones Farm Tenant Act does not mandate livestock grazing as the preferred or dominant use of the National Grasslands; rather, it identifies livestock grazing as one of the multiple uses of the National Grasslands. Following the requirements of the Bankhead-Jones Farm Tenant Act and other laws that are applicable to managing National Forest System lands is in the context of the goals and objectives of the USDA Forest Service Strategic Plan for fiscal years 2007–2012 (USDA FS 2007), supports the roles and contributions the Grasslands make at local and regional scales, and is reflected in the desired conditions and objectives for the Grasslands described in the this Plan.

The Grasslands Today

The Grasslands, officially designated by Congress in 1960, include two of the four units administered by the Forest Supervisor for the PSICC. The Pike and San Isabel National Forests; Comanche and Cimarron National Grasslands Land and Resource Management Plan (1984 Plan), as amended, applies to the management of public lands for all units administered as the PSICC. However, this planning process focuses only on the Grasslands and the strategic direction for managing their resources during the next 15 years.

The Cimarron is approximately 108,175 acres and is located in Morton and Stevens counties of southwest Kansas. The Ranger District office is in Elkhart, Kansas. The Comanche is approximately 443,765 acres and is located in Baca, Las Animas, and Otero counties in southeast Colorado. The Comanche incorporates two units into one Ranger District: the Carrizo unit, south and west of Springfield, Colorado; and the Timpas unit, south of La Junta, Colorado.

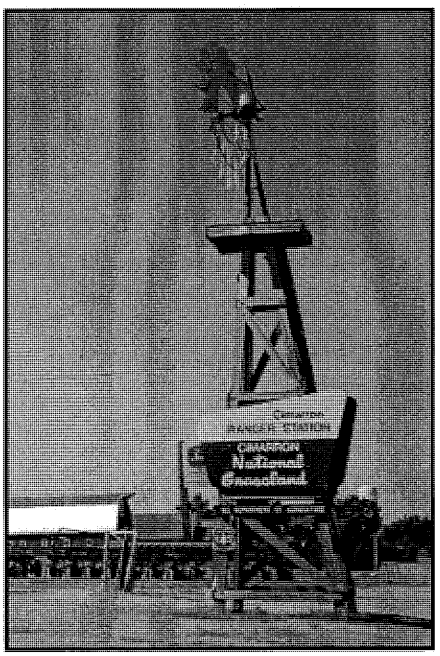

Figure 0-5. The Cimarron National Grassland, Elkhart, Kansas district office

Table 0-3 shows general locations of the Grasslands and associated acreages of NFS lands and private and State lands in the Planning Area.[23] For maps of the Plan Area[24] and Planning Area, the four primary ecosystems, and the special areas, see Appendix H.

[23] Planning Area: The area within the Grasslands administrative boundaries that includes Forest Service-administered lands (the Plan Area) and also private and state-owned and state-managed lands. See Map 1 in

Table 0-3. General locations and size of the Cimarron and Comanche National Grasslands in the Planning Area

National Grassland		General location	NFS lands (acres)[26]	Private and State lands (acres)
Cimarron		Southwestern Kansas	108,175	213,566
Comanche		Southeastern Colorado		
	Carrizo unit	Southern unit of the Comanche	257,255	580,649
	Timpas unit	Northern unit of the Comanche	186,510	97,905
Total acres			551,940	892,120
Planning Area total acres			1,444,060	

Figure 0-6. The Comanche National Grassland, Springfield, Colorado, district office

Appendix H.

[24] Plan Area: "The National Forest System lands covered by a plan" (36 CFR 219.16; FR p. 21512). The area within the Grasslands' administrative boundaries that includes only those lands administered by the Forest Service, not state or private lands. See Map 1 in Appendix H.

[25] For purposes of the Plan, all acreages are approximate.

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Part 1. Vision

This part[26] of the Cimarron and Comanche National Grasslands Plan (Plan), Part 1, describes the distinctive roles and contributions made by the Grasslands at the local, regional, and national scales. Through collaboration with interested parties, we identified a common vision for the future conditions of the Cimarron and Comanche National Grasslands (Grasslands). For descriptions of the plan components, see the National Forest System Land Management Planning Rule (USDA FS 2008a[27]).

This vision is expressed as desired ecological, economic, and social conditions for the four primary ecosystems that characterize the Grasslands. By pursuing and realizing the vision, the Grasslands can contribute to the sustainability of the economic and social systems; maintain diverse, resilient ecosystems; and provide for the long-term maintenance and restoration of ecological conditions to support the diversity and sustainability[28] of desired plant and animal species.

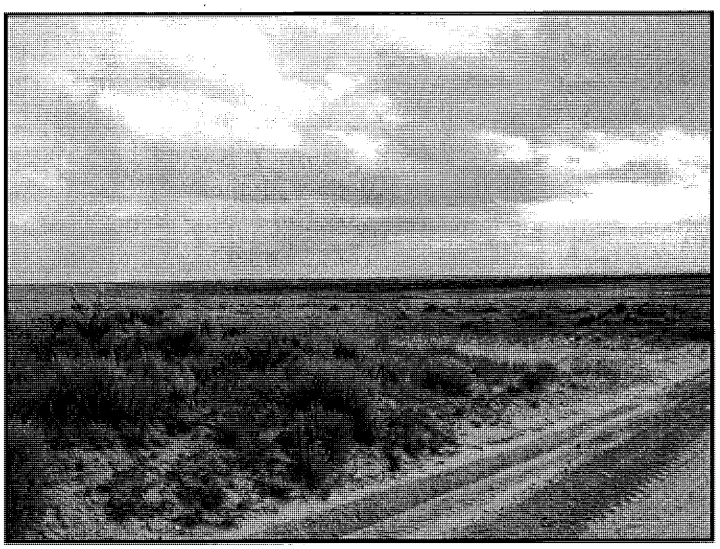

Figure 1-1. Panorama on the Cimarron National Grassland

[26] The five required plan components are distributed into three parts of the Plan. Each part is organized according to five categories. See "About This Plan" in the Introduction.

[27] In this Plan, references to the 2008 Planning Rule will include both the Code of Federal Regulations (CFR) citation and the Federal Register (FR) page numbers. For example, 36 CFR 219.7(a)(2)(i); FR p. 21505.

[28] "Sustainability" – "The overall goal of managing the National Forest System (NFS) is to sustain the multiple uses of its renewable resources in ways that best meet the needs of the American people in perpetuity while maintaining the long-term productivity of the land...The concept of sustainability integrates three interrelated and interdependent elements: social, economic, and ecological." (USDA FS 2006a). See also 36 CFR 219.10; FR p. 21509.

Many of the following sections contain summaries. For detailed supporting information, see the associated reports, evaluations, and assessments on the Grasslands Land Management Plan Development Web site (Grasslands Web site): http://www.fs.fed.us/r2/psicc/projects/forest_revision/gr_rev.shtml.

The maps in Appendix H can be viewed and downloaded from the Grasslands Web site.

1.1. Roles and Contributions

We see the current roles and contributions of the Grasslands that set a focus for the Plan when we consider where the Grasslands have been, where they are today, and where they may be going. The Grasslands' most distinctive roles in and contributions to the local area, and associated and adjacent states, are described below. Understanding these roles and contributions helps set realistic and achievable desired conditions for the Plan Area,[29] which forms the basis for management direction during the next 15 years.

1.1.1. Roles and Contributions of the Grasslands

The unique qualities of the Grasslands characterize the roles and contributions of the area. Contributions from the local to regional levels help define the past and future roles of the Grasslands. Other factors also help characterize the Grasslands' roles and contributions, least of which is climate change. As the facts along with the uncertainties of climate change are better understood, and if the impacts to resources at local and regional scales are realized, adaptive management strategies would be developed to address shifts in resource conditions. These shifts in resource conditions and management strategies may then result in future changes in the roles and contributions of the Grasslands (see Appendix B).

The importance of distinctive Grasslands resources is indicated by the following:

"The Secretary is authorized and directed to develop a program of land conservation and land utilization, in order thereby to correct maladjustments in land use, and thus assist in controlling soil erosion, reforestation, preserving natural resources, protection of fish and wildlife, developing and protecting recreational facilities, mitigating floods, preventing impairment of dams and reservoirs, developing energy resources.[30] . . ."

[29] Plan Area: "The National Forest System lands covered by a plan." 36 CFR 219.16; FR p. 21512. (The area within the Grasslands administrative boundaries that includes only those lands administered by the Forest Service.) See Map 1 in Appendix H.
[30] Bankhead-Jones Farm Tenant Act of July 22, 1937.

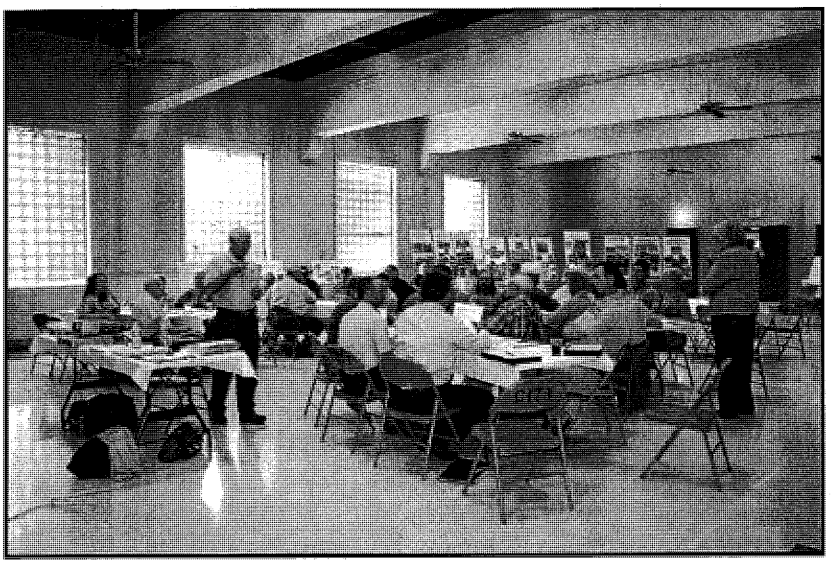

Figure 1-2. Public discussion, Elkhart, Kansas

The Grasslands provide for or contribute to the following unique qualities:

Collaboration. Opportunities for people with different interests, viewpoints, and values to come together and work toward managing the resources in ways that consider all values and uses of the Grasslands.

Habitat for species. The Grasslands habitat helps provide a framework for identified species-of-concern[31] that include:

1. Andean prairie clover (*Dalea cylindriceps*)
2. Arkansas darter (*Etheostoma cragini*)
3. Black-tailed prairie dog (*Cynomys ludovicianus*)
4. Colorado frasera (*Frasera coloradensis*)
5. Colorado Springs evening primrose (*Oenothera harringtonii*)
6. Lesser prairie chicken (*Tympanuchus pallidicinctus*)
7. Massasauga rattlesnake (*Sistrurus catenatus*)
8. Mountain plover (*Charadrius montanus*)
9. Raven Ridge false goldenweed (*Oonopsis foliosa* var. *monocephala*)
10. Rocky Mountain bladderpod (*Lesquerella calcicola*)
11. Sandhill goosefoot (*Chenopodium cycloides*)
12. Swift fox (*Vulpes velox*)
13. Triploid Colorado checkered whiptail (*Aspidoscelis neotesselata*)
14. Wheel milkweed (*Asclepias uncialis* ssp. *uncialis*)

[31] Species-of-concern are species for which the Responsible Official determines that management actions may be necessary to prevent listing under the Endangered Species Act (36 CFR 219.16; FR p. 21512). See also Appendices C and D.

Livestock grazing and oil and gas development. The Grasslands contribute to the local, regional, and national economy and a way of life in this area that has a declining population and limited economic opportunities.

Nationally recognized cultural, historic, and paleontological resources. The Grasslands have the largest assemblage of dinosaur trackways in North America: the Picket Wire Canyonlands Dinosaur Tracksite, which carries international importance. The Grasslands contain approximately 1,500 heritage resources that document about 10,000 years of human history, including Rourke Ranch which is listed as a National Historic District. There are 410 properties considered "significant"[32] and so eligible for nomination to the National Register of Historic Places (NRHP). Approximately 5,000 additional sites are expected to be eligible for nomination to the NRHP in the future.

The Santa Fe National Historic Trail. The Grasslands have preserved sections of both main routes of the Santa Fe Trail (the Mountain Route on the Comanche and the Cimarron Route on the Cimarron); and portions of several lesser-known branches, and prominent point locations along the trail routes. The Santa Fe Trail was listed as a National Historic Trail on May 8, 1987 by Public Law 100-35. In addition to its historic value, it is important because of its potential for heritage interpretation and associated recreational experiences.

Recreation and tourism. The Grasslands offer restful open space, quiet, and solitude. High-quality recreational experiences are a day's drive from the Front Range of Colorado; Amarillo, Texas; Wichita, Kansas; and Albuquerque, New Mexico. The Comanche National Grassland (Comanche) is one of two National Grasslands in Colorado; the Cimarron National Grassland (Cimarron) is the largest unit of public land in Kansas. The Grasslands' history and native flora and fauna, teach us about our past and offer occasions to appreciate the resources and beauty of the area. Commercial tourism, including outfitters and guides for hunting, bird-watching, wildlife viewing, and cultural and paleontological tours on federal lands, contributes to, and may expand, local economies.

Conservation. We have the chance to demonstrate sound resource management of the Great Plains ecosystems that are vanishing in many other areas.

Special areas.[33] Nine special areas are described in Part 1 of this Plan and, in more detail in the *Evaluations of Special Areas* document (USDA FS 2008b): Bent Canyon Bluffs Botanical Area, the Campo Research Natural Area (RNA), the Comanche Lesser Prairie

[32] For clarification of this use of the term "significant," see the Note at the end of Part 1 of this Plan.
[33] Special areas "are areas within the National Forest System designated because of their unique or special characteristics. Special areas...may be designated...in approving a plan, plan amendment, or plan revision. Such designations are not final decisions approving projects and activities. The plan may also recognize special areas designated by statute or through a separate administrative process in accord with NEPA requirements (§ 219.4) and other applicable laws." 36 CFR 219.7(a)(2)(v); FR p. 21507.

Chicken Habitat Zoological Area, Mesa de Maya Botanical Area, OU Creek Botanical Area, Picket Wire Canyonlands Paleontological Area, Picture Canyon Historical Area, the Santa Fe National Historic Trail, and Vogel Canyon Historical Area.

1.2. Management Challenges

This section identifies the most pressing challenges in resource management for the Grasslands. These challenges reflect the ecological, economic, and social trends that underpin the need to change the way the Grasslands are managed. Challenges were identified through evaluations of factors that affect the sustainability of ecosystems, species, economies and social resources on the Grasslands (USDA FS 2005a; USDA FS 2006b). Our success in achieving desired conditions depends on recognizing these challenges, some of which may be beyond our management capability (such as uncertainties in climate change and changing climatic patterns, environmental disturbances, and budgetary fluctuations), and also on our ability to recognize and adapt to changing conditions, modify management strategies where necessary, and reconcile those which we can control through resource management.

1.2.1. Land Ownership Pattern

Beginning in 1934, the U.S. Department of Agriculture purchased or acquired drought-stricken and economically unsuccessful farms from willing sellers, retired them from cultivation, and began restoring them to grass cover. This resulted in a fragmented pattern of land ownership, wherein lands under Forest Service jurisdiction make up an average of 20% of the 117 sixth level watersheds[34] on the Grasslands.

This disconnectedness challenges resource management: inconsistent habitat quality and quantity; management of disturbance processes; law enforcement; recreation uses associated with contiguous public lands; management costs and time. It also makes it difficult to manage for sustainable populations of some wildlife species: isolated blocks of land managed by the Grasslands are rarely large enough to maintain populations of large, mobile vertebrates on their own. With 80% of the Grasslands' watersheds in private ownership, the potential for Grasslands management to affect change at the watershed scale (and associated perennial streams) is very limited.

1.2.2. Tamarisk

Tamarisk (*Tamarix ramosissima*) (species-of-interest[35]) is an introduced nonnative invasive (woody) plant species listed on the Colorado state list of noxious weeds, and listed as a quarantined species in Kansas in 2004.[36] It has become well established on both of the Grasslands. Tamarisk presents management challenges to restoring riparian

[34] Levels of watershed classification are derived using the U.S. Geological Survey hydrological unit cataloging system, a system used to delineate watersheds from the largest scale (level 1) to the smallest (levels 6 to 8).
[35] For the complete list of species-of-interest for this Plan see Appendix C.
[36] The state list of noxious weeds for Colorado is found at http://www.ag.state.co.us/CSD/Weeds/Weedhome.html [accessed 14 July 2008], and for Kansas at http://www.ksda.gov/plant_protection/content/181 [accessed 14 July 2008].

ecosystems because it out-competes native trees and shrubs and it currently dominates many Grasslands riparian corridors (such as the Purgatoire and Cimarron River corridors). Undesirable results of tamarisk infestation include lowered water tables, the loss of native riparian vegetation habitat, such as plains cottonwood (*Populus deltoides* ssp. *monilifera*) and willow (*Salix* spp.), the general degradation of riparian areas, and alteration of soil characteristics. Like other nonnative invasive plant species, tamarisk's ability to spread and re-establish quickly makes broad landscape scale treatment necessary to ensure effective long-term treatment.

1.2.3. New and Incoming Nonnative Invasive Plant Species

Nonnative invasive plant species lead to the establishment of undesirable vegetation monotypes and this can result in major declines of watershed conditions. Infestations of nonnative invasive plants can reduce or replace native or desirable nonnative species (including threatened, endangered, or species-of-concern) and habitats and so affect diversity in native plant and wildlife species composition. Uncontrolled nonnative invasive plant species can also increase treatment costs and spread to adjacent private lands where they reduce crop production.

1.2.4. Habitat for Declining Bird Species

Until the mid-1800s, grazing by large herbivores and fires were important interacting disturbance processes[37] that contributed to a grassland landscape with highly variable plant species composition and vertical structure.[38] Fire suppression and the timing and intensity of livestock grazing can reduce variability in grass height and species composition across the Grasslands. Over the past fifty years, approximately 154,225 acres (75%) of the Sandsage Prairie and the Canyonland Ecosystems and approximately 100,530 acres (30%) of the Shortgrass Prairie Ecosystem have burned less frequently than they did over previous centuries. This may have contributed to reduced habitat quality for and declining populations of the lesser prairie chicken and mountain plover (see References in Appendix D, and USDA FS 2005b and USDA FS 2008c).

1.2.5. Lack of Vegetative Diversity

Plant communities over much of the Grasslands are well represented by a diversity of native species. However, about 55,190 acres (10%) of Grasslands are made up of monocultures of sideoats grama (*Bouteloua curtipendula*), James' galleta (*Pleuraphis jamesii*), or Old World bluestem (*Bothriochloa* sp.). These abandoned fields, seeded after the 1930s Dust Bowl era, have persisted as areas of low vegetative diversity. Riparian communities overtaken by tamarisk also show a lack of vegetative diversity.

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[37] "Disturbance processes" refers to forces such as fire, herbivory, and storm events that remove above-ground vegetation from an ecosystem, and so influence its composition and structure.

[38] See the report "Historic Range of Variability" for Grasslands habitat at http://www.fs.fed.us/r2/psicc/projects/forest_revision/gr_documents [accessed 14 July 2008] (USDA FS 2005b).

1.2.6. Recreation and Tourism Demands

Parts of the Grasslands, especially the Timpas unit of the Comanche, may likely experience continually increasing public use resulting from urbanization and increasing populations along the Front Range. Increased demand, use, and unmanaged dispersed recreation can bring about increased resource damage, the spread of nonnative invasive plant species, and user conflicts.

1.3. Desired Conditions

Desired conditions describe how the Grasslands resources would look and function as we use the Plan; they do this by addressing the human and ecological interactions that we aspire to, based on the best available information. They show the future direction we expect of the ecological, economic, and social resources both in and influenced by the Plan Area. They also show how we anticipate the Grasslands' four primary ecosystems and nine special areas to look and function after the Plan has been applied. Monitoring and evaluation gauge our progress and determine the success, and even our ability, in maintaining or reaching the desired conditions.

For each category in the following subsections, we summarize existing conditions and identify key aspects. To formulate desired conditions that would provide for the long-term sustainability of Grasslands resources, we developed and drew information from several sources, including public participation and

1. evaluations of factors that affect the sustainability of ecological, economic, and social resources on the Grasslands.
2. existing condition reports and an evaluation of management needs to maintain species diversity.

The existing conditions summaries presented in this Plan give some background or contrast for understanding what may need to change from existing to desired conditions. The desired conditions describe how, during the next 15 years and beyond, management of the land and resources of the Plan Area could be either maintained or changed when compared to the existing conditions. Characteristics of desired conditions are written in the future conditional tense.

Detailed supporting documents, including existing conditions reports, assessments, and sustainability and diversity evaluations, are available on our Grasslands Web site: http://www.fs.fed.us/r2/psicc/projects/forest_revision/gr_documents.shtml.

For descriptions of the ecology, management needs, and Plan components developed at the species or ecosystem level for each species-of-concern, see Appendix D: Descriptions of Species-of-Concern Habitats.

1.3.1. Land Administration

After the drought and Dust Bowl period, Congress encouraged the federal acquisition of sub-marginal farmlands. These acquired lands were not always contiguous. The acquisition of these lands created a fragmented pattern of land ownership and corresponding miles of boundary, a condition that continues today. The length of boundary for the Cimarron is 337 miles; for the Comanche it is 1,616 miles. After these lands were transferred to NFS management, lands remained interspersed with parcels of non-NFS-managed land. These isolated tracts are difficult to manage for activities such as habitat restoration, livestock grazing administration, rangeland management, and wildfire suppression. This problem can also impede management for sustainable wildlife populations, prescribed burns and nonnative invasive plant species management. Some isolated tracts of NFS lands have poor or no legal public access. Conversely, contiguous ownership along a stream course or riparian area reduces potential effects from off-site impacts, flow-disrupting structures, and private land management practices that are incompatible with public land management objectives.

This fragmented land ownership pattern is most prevalent on the Carrizo unit of the Comanche. Unconsolidated land ownership compromises the recreational potential of the land. Fragmented land ownership makes it difficult for visitors to know the locations and boundaries of private land. Management costs are higher because of travel time, land survey expenses, and law enforcement demands. The current land ownership pattern also increases the potential for conflicts between public land users and private land owners.

1.3.1.a. Desired Conditions Common to All Ecosystems

Land ownership adjustments would provide an optimum land ownership pattern for resource uses and values to meet present and future needs. There would be large, contiguous tracts of NFS lands. As opportunities for land acquisitions arise,[39] priority consideration would be given to lands with important resource values (such as habitat for threatened or endangered species, or species-of-concern), and the ability to sustainably enhance resource uses.

Administration and the costs of boundary management would be reduced. There would be reasonable public and administrative access to NFS lands. Strategic easements for access would have been acquired. Clear title to NFS lands would be retained. Unidentifiable boundaries would be resurveyed and clearly posted, substantially reducing occupancy trespass. Consolidated tracts would

1. provide for more potential and contiguous recreational opportunities and access.
2. provide for the protection of important cultural resources.
3. result in a low potential for conflicts with or impacts from activities on NFS lands with adjacent private lands (such as landscape-scale treatments like prescribed burning).

[39] Opportunities for land acquisitions depend on the proponent's willingness to propose the sale, donation, or exchange of lands with the Forest Service.

4. provide larger blocks of contiguous habitat for the black-tailed prairie dog, elk (*Cervus elaphus*) (a species-of-interest), lesser prairie chicken, mountain plover, pronghorn (*Antilocapra americana*), and swift fox.

Larger blocks of NFS lands would then enhance the integrity and effectiveness to sustain these species, as addressed in Appendix D and in the 2008 wildlife species diversity evaluation (USDA FS 2008c).

1.3.2. Ecological Resources Desired Conditions

At the Plan Area scale, four primary ecosystems have been delineated, based on variation in soil types, topography, and potential vegetation: the Canyonland, the Riparian and Aquatic, the Sandsage Prairie, and the Shortgrass Prairie. The desired conditions in the following subsections address these four ecosystems, including the ecological components—vegetation composition, structure, and disturbance regimes—that are common to all and specific to each.

For more details about how these ecosystems were delineated and how they are related to other ecosystem classifications,[40] see the ecological sustainability evaluation developed for this Plan (USDA FS 2005a).

1.3.2.a. Desired Conditions Common to All Ecosystems

The Grasslands would support desired native plant communities adapted to withstand prolonged drought, insect infestations, wildfire, herbivory, and other disturbances (such as climate change).

Land conditions would be influenced by natural disturbance processes that promote a shifting mosaic of heterogeneous plant communities and structural stages across the landscape. Small watersheds would be resilient and dynamic, sustaining desired conditions in response to natural and human-caused disturbances. A majority of the Grasslands would be at low or moderate departure from conditions associated with the pre-1800s fire disturbance regime.[41]

Populations of nonnative invasive plant species and other exotic organisms, where they occur, would be small in size, low in density, and would not dominate ecosystem processes and composition. Long-term soil productivity would continue.

Habitats of threatened and endangered species, species-of-concern, and species-of-interest (except tamarisk) (see Appendix D and USDA FS 2008c and 2008d), would provide ecological conditions that would contribute to sustainability based on the land's suitability and capability. The availability of nesting structures (trees and artificial platforms) for ferruginous hawks (*Buteo regalis*) (a species-of-interest) would continue at current levels. The Grasslands would provide for a diversity of plant and animal communities that contribute to stable or increasing populations of game species,

[40] Particularly the Ecological System Specifications developed by NatureServe, the Colorado and the Kansas Natural Heritage Programs, and The Nature Conservancy.
[41] See the Existing Conditions: Chapter 5—Fire Management report (USDA FS 2005c).

including upland game birds, wild turkey (*Meleagris gallopavo*) (a species-of-interest), and native ungulates. Clusters of native shrubs would be located where they would retain or improve foraging and escape habitat for northern bobwhite (*Colinus virginianus*) (a species-of-interest).

The functionality of existing wildlife habitat structural improvements (gallinaceous guzzlers,[42] exclosures) would continue, and those that no longer provide intended habitat benefits would be removed. Management practices on the Grasslands would be adaptive, adjusting to resource conditions as influenced by local climatic conditions.[43]

1.3.2.b. The Canyonland Ecosystem

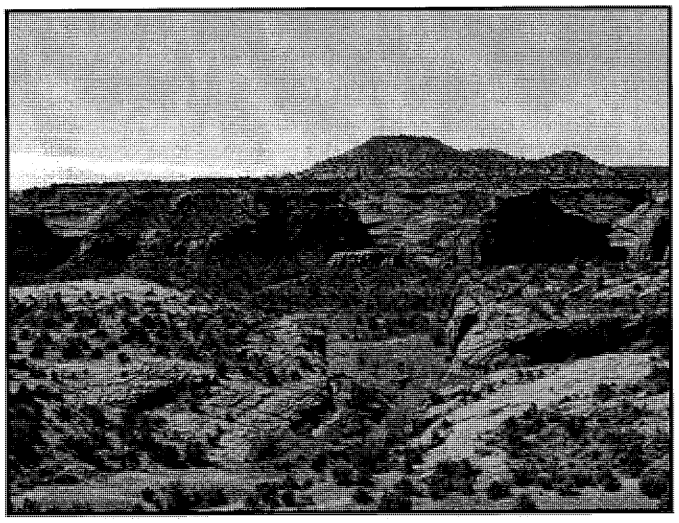

Figure 1-3. The Canyonland Ecosystem: Picket Wire Canyonlands Paleontological Area, Comanche National Grassland

The Canyonland Ecosystem, found only on the Comanche, includes approximately 40,960 acres of NFS lands. The ecosystem is distinctive and striking not only because of its colorful and contrasting relief, but also because of the abundance of oneseed juniper (*Juniperus monosperma*) that flourishes in the area. On the footslopes and the mesa tops, vegetation is similar to that of the Shortgrass Prairie Ecosystem; however, the canyons' slopes and walls are typically covered with oneseed juniper. There may be riparian corridors in the canyon bottoms that are marked by the presence of plains cottonwood and willow (*Salix* spp.).

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[42] A gallinaceous guzzler is a human-made water collection device that provides a water source for small mammals and birds.

[43] Adaptive management is "A system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes, and if not, to facilitate management changes that will best ensure that outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain." (36 CFR 219.16; FR 21512).

An existing special interest area, the Picket Wire Canyonlands, is in this ecosystem. This area encompasses 16,728 acres of public lands in Otero and Las Animas counties in Colorado. Following the 1990 transfer of administrative jurisdiction of these lands to the Secretary of Agriculture from the Secretary of the Army,[44] Picket Wire Canyonlands was designated as a special interest area[45] through a 1992 amendment to the Pike and San Isabel National Forests; Comanche and Cimarron National Grasslands Land and Resource Management Plan (1984 Plan) (USDA FS 1992a). In 1994, a management plan was prepared by the PSICC that provides management guidance of this area (USDA FS 1994).

Special areas in this ecosystem include portions of Picket Wire Canyonlands Paleontological Area, Picture Canyon Historical Area, Santa Fe National Historic Trail, and Vogel Canyon Historical Area, which are discussed further in the Special Areas section of the Plan.[46]

Existing Conditions

Fire suppression has favored mature, dense stands of oneseed juniper and so has put them at greater risk from disease and catastrophic fire. Oneseed juniper, the community-dominant plant, covers the walls, rims, and benches in the Canyonland Ecosystem, and has encroached onto the foot slopes and mesa tops of the shortgrass prairie near the canyon slopes. The existing extent of shrubland communities with moderate cover of Gambel oak (*Quercus gambelii*), greasewood (*Sarcobatus vermiculatus*), mountain mahogany (*Cercocarpus montanus*), oneseed juniper, rubber rabbitbrush (*Ericameria nauseosa*), skunkbush sumac (*Rhus trilobata*), and other native woody species is estimated at 2,050–6,145 acres (5%–15%) of the ecosystem. In some canyon bottomlands overgrazing and farming from the late 1800s through the 1920s has influenced the loss of native plants and an increase of nonnative invasive plant species, such as cheatgrass (*Bromus tectorum*) and tamarisk.

Desired Conditions

Periodic and moderately intense disturbances near known populations of Colorado frasera and Andean prairie clover (two species-of-concern) would provide germination sites to expand those plant populations. Areas with documented occurrences of wheel milkweed (specied-of-concern) would be disturbed with low frequency and intensity events and actions to retain high levels of vegetative cover.

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[44] For more about this transfer of lands, see Public Law 101-510, Section 2825.

[45] At the time of designation (1992), the Picket Wire Canyonlands was appropriately identified as a special interest area. Since that time, Forest Service direction for labeling these areas was modified; special interest areas are now referred to as special areas (FSM 2370).

[46] Special areas' existing and desired conditions are in section 1.3.5. More details about these special areas are in Part 2: Strategy, Part 3: Design Criteria, and in the *Evaluations of Special Areas* document (USDA FS 2008b).

Fewer stands of oneseed juniper dominated by mature trees (greater than six feet tall) would encroach onto the mesa tops and footslopes of the canyons. However, younger trees would occur inside those stands. Scattered piñon pine (*Pinus edulis*) would continue to be present in low densities.

Oneseed juniper woodlands would continue to be found primarily in areas of rugged topography and rocky soils, and extend over much of the mesas and footslopes within this ecosystem. These woodlands would be intermixed with mid-height (1–6 feet tall) woody shrublands and understory of native perennial shrubs, grasses, and forbs. However, the distribution of mature juniper woodlands on mesas and footslopes would dominate less than 26,625 acres (65%) of the ecosystem. Fire disturbance would help encourage oneseed juniper regeneration, in part with lower intensity fires contributing to canopy openings and stimulation of native herbaceous vegetation.

Shrubland communities making up the understory woody component would occupy approximately 8,195–12,290 acres (20%–30%) of this ecosystem. These shrublands would support a moderate cover of native shrubs, including Gambel oak, greasewood, mountain mahogany, oneseed juniper, rubber rabbitbrush, skunkbush sumac, and other native woody species. Increases in these communities may take place through the expansion of existing shrublands along canyon walls and footslopes. As fire-affected oneseed juniper woodlands transition from high-density to moderate-density stands, the woody understory would occupy the open space.

Native shrub communities, dominated by mature, higher-density stands, would occupy 15%–25% of the canyon bottomlands. Native bottomland-adapted shrubs such as cholla (*Opuntia* spp.), greasewood, rubber rabbitbrush, and wolfberry (*Lycium berlandieri*) would be well-represented in both cover and composition. These communities would be intermixed with herbaceous-dominated communities in patch sizes ranging from 1–100 acres. Restored areas in canyon bottomland floodplains would contribute to improved habitat for a wide range of riparian-associated wildlife species.

Mesa tops and canyon bottomlands would support abundant native perennial grasses, typical of shortgrass and riparian and aquatic areas, respectively. The distribution of communities dominated by herbaceous species and lacking oneseed juniper would be approximately 4,095– 6,145 acres (10%–15%) of the ecosystem, leading to an increase in grass diversity and productivity in these areas.

Herbaceous communities dominated by native perennial grasses, including low to moderate densities of native shrubs and forbs, would occupy approximately 16,384–20,480 acres (40%–50%) of the ecosystem. Grass species, such as alkali sacaton (*Sporobolus airoides*), blue grama (*Bouteloua gracilis*), and sand dropseed (*Sporobolus cryptandrus*) would dominate the cover and composition. The distribution of communities dominated by herbaceous species and lacking oneseed juniper would increase to approximately 4,095– 6,145 acres (10%–15%) of the ecosystem, leading to an increase in grass diversity and productivity in these areas.

The extent of herbaceous communities dominated by a mixture of nonnative invasive plant species, annual grasses and forbs would occupy 30%–40% of the canyon bottomlands and continually decline in occurrence. In particular, nonnative invasive plant species such as cheatgrass, kochia (*Kochia scoparia*), other annual forbs, and bare ground would become less prevalent in this ecosystem.

Diverse, well-distributed tree, shrub, and grass plant communities would provide conditions contributing to the sustainability of species: Andean prairie clover, elk, and wheel milkweed populations.

1.3.2.c. The Riparian and Aquatic Ecosystem

Figure 1-4. The Riparian and Aquatic Ecosystem: Cimarron River corridor

The Riparian and Aquatic Ecosystem, includes approximately 11,195 acres of NFS lands. The ecosystem is made up of drainage ways, ponds, and playas which are distributed as small patchy or linear elements within the other three Grasslands ecosystems. Most are too small to be identified spatially at the Plan scale. Exceptions to these small discontinuous riparian and aquatic areas are the Cimarron River, the Purgatoire River, and Timpas Creek (see Map 2 in Appendix H). In aggregate, this ecosystem makes up less than 0.80% of the overall landscape, but because water is such a scarce resource on the Grasslands, it plays a disproportionately large role in grassland biodiversity.

Special areas in this ecosystem include the riparian portions of OU Creek Botanical Area, Picket Wire Canyonlands Paleontological Area, Picture Canyon Historical Area, the Santa Fe National Historic Trail, and Vogel Canyon Historical Area, which are discussed further in the Special Areas section of the Plan.

Existing Conditions

Conditions within riparian and aquatic ecosystems are influenced by the cumulative effects of land uses within a watershed. Approximately 80% of the watersheds in the Planning Area[47] are in private ownership. The fragmented landownership pattern and limited extent of NFS land constrains the Grasslands' ability to influence overall stream hydrologic conditions, stream flows, and water quality. The shrinkage of aquifers that results from substantially greater consumptive water use practices on private land also influences the water quality and quantity beyond the Grasslands' influence.

Previous watershed impairments on some Grasslands streams include: bank damage, flow disruption, hydrologic modification, nutrient imbalances, sediment, and the spread of nonnative invasive plant species. Some of these impairments can and have been addressed through modifications in livestock grazing practices in riparian areas, and by controlling nonnative invasive plant species. Effects of livestock grazing in the primary riparian areas have been addressed through adjustments in timing and intensity of use along the Cimarron River (USDA FS 2002a), and not grazing livestock in Picket Wire Canyonlands (all of the Purgatoire River on the Comanche) and along approximately 3.7 miles of Timpas Creek on the Comanche.

Tamarisk is the primary nonnative invasive plant species on the Grasslands. It is listed as a noxious weed by the State of Colorado and as a quarantined species by the State of Kansas. The State of Kansas has a 10–Year Strategic Plan for the comprehensive control of tamarisk (Kansas Water Office 2005). Adverse effects from tamarisk on riparian and aquatic ecosystems include the displacement of native cottonwoods (*Populus* spp.) and willows and an alteration of the floodplain hydrology (tamarisk uses more water than the native vegetation it has replaced). Its ability to concentrate salts has produced changes in soil chemistry, further limiting the establishment of native species. Efforts to restore native plant communities in tamarisk-infested riparian areas have been initiated on the Grasslands.

Streams of the arid Southwest U.S. play a critical role in the life histories of native fish, even though most streams dry up periodically and may remain that way during extended droughts. Grasslands streams, especially the Purgatoire and Cimarron River basins, are habitat for an assemblage of native fishes which include:

1. Central stoneroller (*Campostoma anomalum*)
2. Fathead minnow (*Pimephales promelas*)
3. Flathead chub (*Platygobio gracilis*)
4. Longnose dace (*Rhinichthys cataractae*)
5. Red shiner (*Motropis lutrensis*)
6. Sand shiner (*Notropis stramineus*)

[47] Planning Area: The area within the Grasslands' administrative boundaries that includes Forest Service-administered lands (the Plan Area) and also private and state-owned and state-managed lands. See Map 1 in Appendix H.

Other Grasslands native fish species are:

1. Black bullhead (*Ameiurus melas*)
2. Channel catfish (*Ictalurus punctatus*)
3. Green sunfish (*Lepomis cyanellus*)
4. Plains killifish (*Fundulus zebrinus*)
5. White sucker (*Catostomus commersoni*)

Although these fishes are strongly influenced by water levels in the perennial steams (such as the Purgatoire River) on the Grasslands, water levels are primarily controlled by climate (see Appendix B), activities on private lands upstream of NFS lands, and by irrigated agriculture on private lands within the watershed.

Playa lakes, wetlands, and constructed ponds are components of the Riparian and Aquatic Ecosystem. On the Grasslands, these features are typically small and rare. While seemingly insignificant, they are that much more valuable for providing habitat for a diversity of native fishes, amphibians, and birds adapted to this unpredictable aquatic environment. There are approximately 700 playa lakes, wetlands, and ponds on the Grasslands occupying nearly 650 acres, 90% of which are less than one acre in size.

Playa Lakes

Playa lakes are flat-bottom upland depressional basins found primarily within the Shortgrass Prairie Ecosystem. There are approximately 600 playas (covering 350 acres) on the Grasslands. These basins are often dry, but are recharged by rainfall and runoff from intense thunderstorms. This periodic covering of water slowly infiltrates into the groundwater system or evaporates into the atmosphere, causing the deposition of salt, sand, and mud along the bottom and around the edges of the depression. Alterations in the surface (overland) flow of water to playa lakes can be blocked by stockpond dams or diverted by road drainage. In addition, dugout pits constructed at the center of the playas (to provide a point where water is available to livestock and for wildlife use) have altered their hydrological characteristics. These pits greatly alter the natural clay lining of the playa. In 2000, nine playas on the Comanche (Carrizo unit within the Campo and Pritchett Grazing Associations boundaries) were restored to their original forms by filling the dugout pits. The playas on the Grasslands are intermittent water sources for livestock and wildlife.

Wetlands

Wetlands consist of small seeps and springs that occur where groundwater is discharged as surface water, usually along boundaries between impermeable rock strata or slope breaks, and the water table. On the Grasslands, they are found primarily within the Canyonland Ecosystem and along the Cimarron River corridor. They can vary from small, seasonally dry seeps to complexes of relatively permanent springs. Seeps and springs may support vegetation adapted to saturated soil conditions and provide habitat for a variety of plants, invertebrates, and amphibian species.

The only known wetlands on the Grasslands, or areas classified as supporting sedges/rushes/mesic grass, include three areas that have been mapped on the Timpas unit of the Comanche, covering approximately three acres. (Similar information was not available for the Cimarron.) Additional wetlands associated with springs, livestock

watering ponds, and other waterbodies, are present, but were too small to map. Some windmills associated with human-made overflow ponds hold any water that overflows the livestock tanks. These ponds support isolated but minimal riparian habitat, habitat that is impacted by a dropping groundwater table and the presence of nonnative invasive plant species (for example, tamarisk and other nonnative phreatophytes).

There are 48 mapped springs on the Grasslands. On the Comanche, five springs are on the Timpas unit, 38 are on the Carrizo unit, and on the Cimarron there are five at the Middle Springs area. These springs are often associated with canyons; some have been developed for livestock water.

Constructed Ponds

Some constructed ponds provide additional surface water but few hold water throughout the year. Constructed ponds across the Grasslands provide recreational fisheries. Ponds that are hydrologically connected to the stream network serve as refugia for some native species when natural stream courses are dry. Wetland vegetation is associated with all of these waterbodies.

Wilburton Pond, Mallard Pond, Point of Rocks Ponds, and the four ponds associated with the Cimarron Recreation Area are all within the Cimarron River corridor. These popular fishing spots are perennial constructed waterbodies that are stocked with fish throughout the year. There are also numerous perennial seep pits or giant divots which were dug within the Cimarron River corridor that are supplied by alluvial water. They are filling in with sediment. Teal Pond is a constructed perennial pond not associated with the Cimarron River corridor; it is supplied by runoff.

Desired Conditions

Watersheds would be characterized by high infiltration rates, low soil compaction, and minimal overland flow. Within the capability of the Grasslands, streams, groundwater recharge areas, playa lakes, wetlands, and aquifers would sustain water quantity and quality. Streams exhibiting bank damage and sediment discharge would be restored.

Riparian shrublands and woodlands would consist of galleries of plains cottonwood, stands of sandbar willow, roundleaf snowberry (*Symphoricarpos rotundifolius*), and other native deciduous trees and shrubs that are capable of perpetuating themselves. The distribution and abundance of these species would increase by 20%–50% over existing levels.

Populations of native woody species, particularly the long-term presence of mature plains cottonwood stands and areas with regenerating plains cottonwood and willow saplings, would provide habitat for desirable riparian-associated wildlife species, such as elk and wild turkey. A diverse mix of native graminoids and forbs adapted to abrupt fluctuations in moisture regimes would occur in the herbaceous portion of riparian areas, and provide habitat for desirable riparian-associated wildlife species, such as northern bobwhite.

In riverine habitats, native woody and herbaceous vegetation would provide improved streambank stabilization and habitat (such as bank cover and stream shading). These

conditions would influence and help restore the fluvial processes and flooding regimes favorable to help sustain riparian and aquatic wildlife and plant species. Tamarisk and other nonnative invasive plant species would be low to non-existent in abundance and distribution.

Within the Cimarron River corridor there would be high-quality foraging habitat for elk, northern bobwhite, and wild turkey. Portions of the corridor where the sandhill goosefoot exists would continue to include patches of disturbed sandy soils.

Playa lakes and wetlands would have improved recharge rates through reconnected overland water flows, to better support their inherent ecological qualities, hydrologic functions, and provide for wildlife habitat needs. Wetlands (seeps and springs) would provide improved water quality and habitat for native aquatic species while continuing to provide a water source for livestock and wildlife. The abundance of wetland-dependent species, such as deep-rooted sedges (*Carex* spp.) and rushes, would be at high levels. Constructed pond habitats would support desired nonnative recreational fisheries.

Wild and Scenic River System Eligibility and Classification

Existing Conditions

A 16-mile segment of the Purgatoire River that runs through the Comanche was determined to be eligible for inclusion in the National Wild and Scenic River System. Located in the northern parcel of the Picket Wire Canyonlands Paleontological Area, the segment flows through 14,836 acres. This free-flowing segment of the stream and its adjacent land area was assessed and found to possess more than one "outstandingly remarkable" value that makes it eligible as a recreational river.[48] These values include paleontological, historic, fisheries, and recreational (interpretation at the dinosaur trackway) characteristics (USDA FS 2007a).[49]

Desired Conditions

The 16-mile segment of the Purgatoire River and the adjacent land area that has been found to be eligible for inclusion in the National Wild and Scenic River System runs entirely through the Picket Wire Canyonlands Paleontological Area. The identification of a river for study through the land management planning process does not trigger any protection under the Wild and Scenic Rivers Act (WSRA). However, Forest Service policy requires interim protection be provided, to the extent of our authority, to protect the river and its outstandingly remarkable values. To manage a river for its potential inclusion into the National System, the Plan should provide direction using other authorities to protect its free-flowing character, water quality, outstandingly remarkable values, and preliminary or recommended classification. The 16-mile segment and adjacent 14,836 acres of the Purgatoire River eligible for inclusion in the National Wild

[48] For more information about wild and scenic river (WSR) assessments, and the processes of identifying, designating, etc., WSRs, see FSH 1909.12, Chapter 80 (USDA FS 2006c).
[49] You can view the wild and scenic river eligibility evaluation on the Grasslands Web site at: http://www.fs.fed.us/r2/psicc/projects/forest_revision/wsr_elig_070222.pdf (USDA FS 2007a).

and Scenic River System would continue to be maintained to provide protection for the outstandingly remarkable values warranting its eligibility. This protection would be afforded through continuing to maintain or by moving toward the desired conditions described for the Picket Wire Canyonlands Paleontological Area (see the Special Areas section in this part of the Plan).

1.3.2.d. The Sandsage Prairie Ecosystem

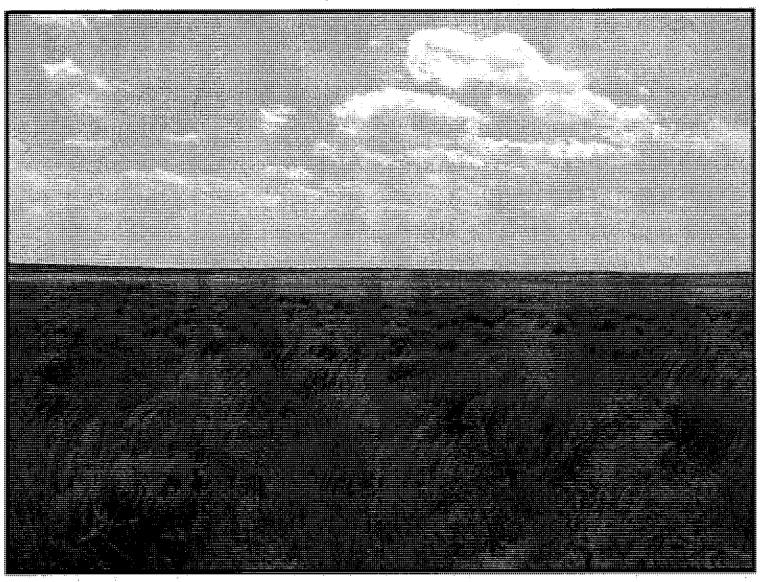

Figure 1-5. The Sandsage Prairie Ecosystem

The Sandsage Prairie Ecosystem includes approximately 164,675 acres of NFS lands; 64,624 acres on the Cimarron, and 100,050 acres on the Carrizo unit of the Comanche. The ecosystem is dominated by sand sagebrush (*Artemisia filifolia*), a conspicuous and persistent native shrub. Throughout the Grasslands, sand sagebrush occurs on deep eolian deposits, preferring well-drained sandy soils. It is well suited for stabilizing landscapes of rolling dunes, and for providing food and cover for wildlife. It is also used marginally as forage by livestock when other forage species are scarce. Other native plants common to this ecosystem are:

1. Blue grama (*Bouteloua gracilis*)
2. Little bluestem (*Schyzachrium scoparium*)
3. Sand bluestem (*Andropogon halii*)
4. Sand dropseed (*Sporobolus cryptandrus*)
5. Sand lovegrass (*Eragrostis trichodes*)
6. Switchgrass (*Panicum virgatum*)

An existing special interest area, the Comanche Lesser Prairie Chicken Habitat Zoological Area, is in this ecosystem. Initially encompassing 9,212 acres of public lands in southeast Baca County, it was established as a special interest area in 1984 with approval of the 1984 Plan (USDA FS 1984). In July 1987, the 1984 Plan was amended to

add more acreage to the area, for a total of 10,177 acres (USDA FS and CDNR 1987). This amendment was prompted by the February 13, 1987 Articles of Designation for the Comanche Lesser Prairie Chicken Natural Area (USDA FS 1987a), that formally designated the original special interest area plus the additional acres as a **Colorado Natural Area**.

Special areas in this ecosystem include the Comanche Lesser Prairie Chicken Habitat Zoological Area and portions of the Santa Fe National Historic Trail, which are discussed further in the Special Areas section of the Plan.

Existing Conditions

More than half of the Sandsage Prairie Ecosystem was abandoned cropland during the Dust Bowl period of the 1930s. Over the past six decades, reseeding efforts and livestock grazing management have restored most of these acres to sand sagebrush, native grasses and forbs species. The composition and structure of the vegetation in this ecosystem is still affected by the types of seed mixtures that were used during post-Dust Bowl restoration efforts. Vegetation has also been influenced by the timing and intensity of livestock grazing. Areas of tall-structure bunchgrass and communities dominated by native forbs are rare or completely absent in portions of the ecosystem. Ongoing management challenges include restoring disturbance processes that more closely approximate the earlier disturbance regime, and increasing the abundance of tall-structure bunchgrass species.

Desired Conditions

The Sandsage Prairie Ecosystem would be dominated by mid- to tall-structure vegetation, including perennial native warm-season grasses (such as sand bluestem, little bluestem, switchgrass, and sand lovegrass) and sand sagebrush. However, the landscape would also include a diversity of areas in different successional stages and with varying vegetative heights.

Communities where the sand sagebrush understory is dominated by blue grama, buffalograss (*Buchloe dactyloides*), and purple threeawn (*Aristida purpurea*), would be reduced in extent and replaced by an understory dominated by a diversity of native grass and forb species, including tall-structure grasses. Different plant communities would continue to have intermingled patch sizes at scales on the order of 10–1,000 acres.

A mosaic of plant communities with variable species composition and structure would be present throughout the ecosystem. This diversity of areas and mosaic of vegetation would continually change across the landscape, temporally and spatially based on the level of disturbance (both human and natural) or no disturbance at all. A broad diversity of native grasses and forbs, consistent with the site potentials of these areas, would contribute to plant communities in amounts and patterns that would provide for wildlife habitat needs, protect the soil from erosion, improve forage conditions, and discourage infestations of nonnative invasive plant species.

Perennial native tall-structure grasses, including sand lovegrass, sand bluestem, little bluestem, prairie sandreed (*Calamovilfa longifolia*), indiangrass (*Sorghastrum nutans*), and switchgrass, would be well-distributed components of the ecosystem.

Plant communities dominated by a mixture of native, tall-structure, perennial grasses, and sand sagebrush would occupy at least 16,470 acres (10%) of the ecosystem. Communities lacking perennial grasses and dominated by a high density of annual forbs or sand sagebrush or both would represent 16,470–32,935 acres (10%–20%) of the ecosystem. On the Carrizo unit of the Comanche, near-monoculture stands of sideoats grama would make up less than 5,000 acres (5%) of the 100,050-acre portion of this ecosystem.

The vegetation structure would be at the proportions shown in Table 1-1 and would continue as a dynamic mosaic on the landscape over time. The amount of moderate-structure and tall-structure vegetation would provide areas of high-quality nesting and brood-rearing habitat for the lesser prairie chicken (see Appendix D and USDA FS 2008c for further details on habitat). Recreational viewing of lesser prairie chicken on display grounds would continue to be available, but occur only in such a way that disturbances and adverse impacts to the birds are minimal.

Table 1-1. Vegetation structure levels for the Sandsage Prairie Ecosystem

Low	Moderate	Tall
40%–60% 0–4 inches[50]	25%–50% 5–11 inches	8%–15% 12 inches and greater

The spatial variability of the ecological conditions would reflect the presence of grazing and fire disturbance processes. The pattern of livestock grazing would contribute toward achieving the desired vegetative structure described in Table 1-1.

Allotment sizes would remain at 2006 levels or would increase, where possible, if the pattern of livestock grazing would help achieve vegetative or habitat objectives.

In portions of this ecosystem where the sandhill goosefoot occurs, the presence of scattered patches of disturbed, sandy soils (especially unstable sandy soils on dunes and sandy areas in blowouts) would continue to be present in at least 1,645–8,235 acres (1%–5%) of the ecosystem and would continue to provide habitat for this species.

[50] Vegetative structure as measured with Visual Obstruction Readings (Robel and others 1970).

1.3.2.e. The Shortgrass Prairie Ecosystem

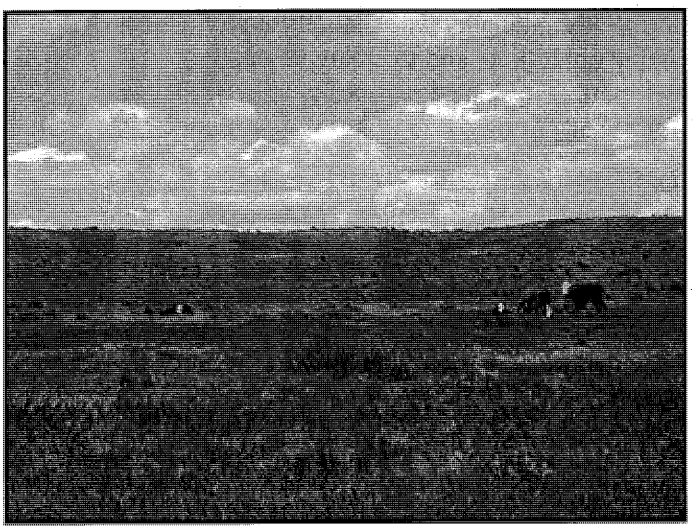

Figure 1-6. The Shortgrass Prairie Ecosystem

The Shortgrass Prairie Ecosystem includes approximately 335,112 acres of NFS lands; 35,193 acres on the Cimarron, and on the Comanche 136,131 acres on the Carrizo unit of the Comanche, and 163,788 acres on the Timpas unit. The ecosystem is closely linked to the distribution of loamy soils on the Grasslands. The two shortgrass species that typify this ecosystem are buffalograss and blue grama. Both of these native perennials are well adapted to drought, grazing, fire, and cold temperatures and are also important forage for wildlife and livestock. As key components of the varied shortgrass community types, buffalograss and blue grama occur along with medium-height native grasses such as James' galleta, purple threeawn, sand dropseed, and western wheatgrass (*Pascopyrum smithii*). The mix of vertical structures across this ecosystem can provide habitat for a variety of grassland-dependent wildlife species.

Research Natural Area: The Campo Research Natural Area (RNA) is in this ecosystem. This RNA, which encompasses 35 acres of NFS lands in south central Baca County, was established in 1987 by a designation order signed by the Chief of the Forest Service (USDA FS 1987b).

Special areas in this ecosystem include Bent Canyon Bluffs Botanical Area, the Campo RNA, Mesa de Maya Botanical Area, OU Creek Botanical Area, portions of the Santa Fe National Historic Trail, and Vogel Canyon Historical Area, which are discussed further in the Special Areas section of the Plan.

Existing Conditions

Like the Sandsage Prairie Ecosystem, much of the Shortgrass Prairie Ecosystem was abandoned cropland during the Dust Bowl period. Over the years, reseeding efforts and

grazing management have restored most of these lands to prairie dominated by native grasses and forbs. Today, species composition and structure is still influenced in part by ongoing grazing practices and the types of seed mixtures used during restoration efforts from the Dust Bowl period through the 1950s. Management challenges include using fire and livestock grazing to maintain existing conditions and to create vegetative heterogeneity that more closely approximate disturbance regimes typical of the pre-European settlement period (A.D. 1450–1850) of the High Plains.

Desired Conditions

This ecosystem would contain a mosaic of plant species and vegetative heights dominated by native shortgrass species:

1. Amounts of native perennial bunchgrasses, native forbs, and sub-shrubs would have increased.
2. The amount of native sod-forming grasses would have decreased, but would remain abundant and continue to dominate the ecosystem.

Plant communities would include low-levels of nonnative invasive plant species, to provide for varied native wildlife species habitats, and contribute to the mosaic in amounts and patterns that represent site potentials (USDA FS 2005a, 2006d).

The extent of monoculture stands of sideoats grama, James' galleta (seeded during post-Dust Bowl restoration efforts), nonnative perennials, and other nonnative invasive plant species would be declining (USDA FS 2005a) with corresponding increases in plant diversity in response to changes in the timing and intensity of livestock grazing and prescribed burning.

Widespread and interacting disturbances influencing vegetation mosaics would include grazing by black-tailed prairie dog and livestock, and fire. In any given year, there would be areas that are ungrazed, areas that are intensively grazed, and areas that have recently burned. Allotment sizes would remain at 2006 levels or would increase, where possible, if the pattern of livestock grazing would help achieve vegetative or habitat conditions.

For the portion of the shortgrass prairie on the Cimarron and on the Carrizo unit of the Comanche, the extent of communities characterized by high relative abundance of annual forbs and low abundance of blue grama, western wheatgrass, and sand dropseed would decline to 20%–30%. The extent of communities with moderate abundance of blue grama or buffalograss, or both, and a diversity of co-occurring native grasses and forbs would represent approximately 85,660–111,360 acres (50%–65%) of the ecosystem. The extent of communities dominated by blue grama, western wheatgrass, or sand dropseed, or all three, with low abundance of annual forbs, purple threeawn, and bare soil would be increasing to approximately 34,265–42,830 acres (20%–25%) of the ecosystem. Different plant communities would continue to be intermingled at scales on the order of 10–1,000 acres.

Areas of sparse, low-structure vegetation would provide abundant nesting and foraging habitat for mountain plover and swift fox (two species-of-concern), as described in

Appendix D (USDA FS 2008c). Localities supporting sparse, low-structure vegetation consistent with the nesting requirements of mountain plover would not include areas of shortgrass prairie with documented occurrences of wheel milkweed, and would be rotated over time, across the ecosystem, to allow vegetative recovery.

Taller structure shortgrass communities would occur in the vicinity of localities with sparse, low structure vegetation in order to provide breeding habitat for the long-billed curlew (*Numenius americanus*) (a species-of-interest) and fawning habitat for pronghorn. Taller structure shortgrass communities that are dominated by blue grama and buffalograss and include 70%–80% vegetative cover would occur in areas with documented occurrences of wheel milkweed.

To help provide for sustainable populations of black-tailed prairie dog, potential habitat (Appendix D, Table D-2) would continue to be available, including habitat for at least one large complex of black-tailed prairie dog colony and associated wildlife species. Unwanted colonization associated with property boundaries would be addressed.

On the Carrizo unit of the Comanche, areas of sparse, low-structure vegetation would provide germination sites for the Colorado frasera. On the Timpas unit, areas of sparse, low-structure vegetation would provide germination sites for Colorado Springs evening primrose and Raven Ridge false goldenweed.

On the Timpas unit of the Comanche, the more arid portion of the ecosystem, desired conditions differ from the remainder of the ecosystem because of differences in mean annual rainfall, soil conditions, and other existing conditions:

- For areas on loamy soils, the extent of plant communities where blue grama and James' galleta combined exceed 50%, cover would increase from approximately 1,640–8,190 acres (1%–5%) of the ecosystem to approximately 8,190–24,570 acres (5%–15%) of the ecosystem. The extent of plant communities where blue grama and James' galleta make up less than 25% combined, cover would be reduced to approximately 32,760–65,515 acres (20%–40%) of the ecosystem.

- For areas on alkaline soils, the extent of plant communities where the mean cover of alkali sacaton exceeds 30%, cover would make up approximately 32,760–65,515 acres (20%–40%) of the ecosystem. The extent of plant communities were blue grama and James' galleta exceeds 20% combined, cover would make up approximately 32,760–65,515 acres (20%–40%) of the ecosystem.

1.3.3. Economic and Social Resources Desired Conditions

The Homestead Act of 1862 encouraged many settlers to move into southeastern Colorado and southwestern Kansas. By the 1890s, many ranches and farms had consolidated into larger operations. Droughts between 1900 and 1920 forced many to leave the area. A second wave of farming homesteaders settled the region in the 1920s. Population increased rapidly and local agricultural communities thrived. The Dust Bowl

conditions of the 1930s and a disastrous loss of topsoil resulted from:

1. Poor land management practices of the time.
2. Four consecutive years of drought (1933–1936).
3. High winds across the plains (common in spring and early summer).

High winds and drought are still a threat, particularly when accompanied by high temperatures and the absence of vegetation.

1.3.3.a. Overall Grasslands Conditions

Existing Conditions

Today, the Grasslands are considered a national resource where people can see the Great Plains, view and photograph birds and other wildlife, explore paleontological resources, and learn western history on the Santa Fe National Historic Trail.

Desired Conditions

The Grasslands would be a viable and important national resource offering diverse recreation, solitude and quiet, cultural and historic ties, and providing for livestock grazing opportunities, oil and gas exploration, and energy development. The conditions of the Grasslands would continue to provide sustainable multiple uses of natural resources while meeting desired conditions for ecological resources. The Grasslands would continue to connect with communities and counties through economic development opportunities, such as special event permits, livestock grazing permits, other special use permits, oil and gas exploration, as well as payments made to states and counties based on Forest Service revenues. Local communities and counties would connect with the Grasslands through management, planning, and partnerships, events, and collaborative efforts.

1.3.3.b. Livestock Grazing

Existing Conditions

Livestock grazing opportunities on the Grasslands vary from year to year based on yearly precipitation accumulation, vegetation considerations, and other conditions (for example, economic factors). On average, 226 allotments are available on the Grasslands, with permitted head months of over 100,000 (four-year average for 1999–2002). The typical livestock grazing season lasts approximately six months (May 1 to November 15), with some allotments grazed on a year-round basis. Livestock grazing systems include season-long, deferment, deferred rotation, and rest rotation. The five grazing associations and districts on the Grasslands have over 244 members and work as partners with the Forest Service in managing the livestock grazing resources. For more specific livestock grazing information, see the existing conditions report for rangeland management (USDA FS 2005d) and the current range allotment management plans (AMPs) (USDA FS 2002a - 2002c, USDA FS 2004a and 2004b).

Desired Conditions

The Grasslands would contribute to local economies by continuing to offer livestock grazing permits. Livestock grazing contributes to the local livestock industry while continuing to provide for or move toward desired vegetation conditions that support a diversity of grassland species. Allotment management would adapt to mimic natural disturbances in order to move toward the desired vegetation composition and structure described for their associated ecosystem. AMPs would reflect these changes and identify how to mimic disturbances. Seeps, springs and developed water facilities would continue to provide a water source for livestock and wildlife. Water quality of these seeps and springs would be high and continue to provide habitat for native aquatic species. Grazing associations and districts would continue to work with the Forest Service and other interested groups to operate a livestock grazing program that moves resources toward desired vegetative conditions and consistent economic support to permittee operations. Some areas could continue without livestock grazing to help preserve heritage and paleontological values. Public education and outreach would encourage other users of the Grasslands' resources to respect livestock operators and appreciate the role of ranching in the local communities.

1.3.3.c. Minerals and Energy

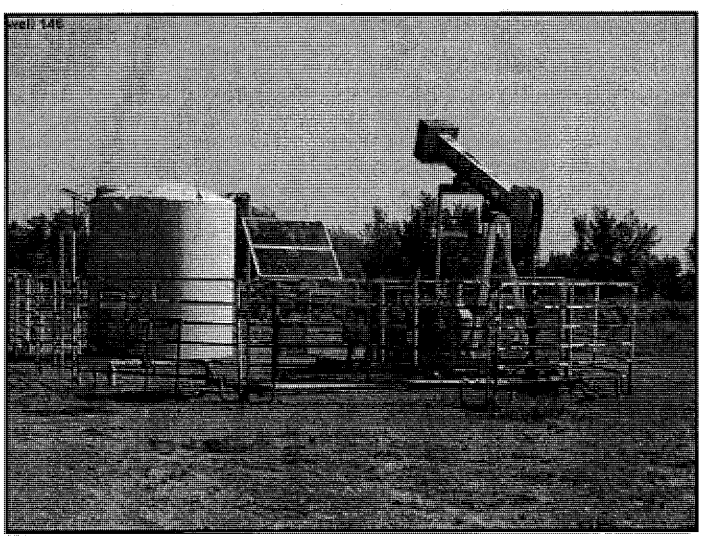

Figure 1-7. Well #146, Cimarron National Grassland

Mineral resources on the Grasslands include leasable minerals (oil and gas) and common variety minerals (gravel and caliche). The Grasslands' history of oil and gas development, the predominant type of mineral development, dates to the late 1920s and early 1930s. The Grasslands has the potential to play an important role in wind energy development. How the Grasslands Plan aligns with the national energy policy is discussed in Appendix F.

Existing Conditions

The Cimarron has high potential for the occurrence of oil and gas, and low to moderate potential for gravel and caliche. This Grassland has no coal reserves, but sand and gravel are produced for public use. There are federal oil and gas leases and oil and gas-related facilities[51] on the Grassland; there are federal oil and gas leases on private subsurface mineral estate. There are no wind energy developments on the Cimarron.

The Comanche has low to high potential for the occurrence of oil and gas (in the eastern quarter of the Carrizo unit), and low to moderate potential for gravel and caliche. This Grassland has no coal reserves. There are federal oil and gas leases and oil and gas wells on the Grassland. There are no wind energy developments on the Comanche. However, one wind energy tower was constructed on private lands within the Planning Area, southwest of Springfield, Colorado, adjacent to public lands.

Oil and Gas

The Cimarron. The history of oil and gas drilling on what would become the Cimarron National Grassland began in 1930 with the discovery and development of the Hugoton Gas Field. The Cimarron currently has 276 federal oil and gas leases, and approximately 436 active oil and gas facilities, including producing oil and gas wells and associated injection, disposal, and monitoring wells. Oil and gas leases on 61,036 acres (56%) of federal mineral estate and approximately 32,450–37,860 acres (30%–35%) of private mineral estate underlie the 108,175 acres of surface lands managed by the Forest Service. Fourteen thousand acres of the private mineral estate would revert to federal ownership by 2040 (because of mineral reversion clauses within transaction deeds). In the process of signing the oil and gas leasing availability decision in 1992, the Grasslands were evaluated for potential oil and gas exploration and development (USDA FS 1991, USDA FS 1992b). The more recent Oil and Gas Reasonable Foreseeable Development (USDI BLM 2003) concluded that exploration and development would continue on the Grasslands at the projected level during the next 15 years.

The Comanche. On the Comanche, the first exploratory oil and gas drilling took place in 1929, on lands that would eventually become the Timpas unit. The Comanche currently has 39 federal oil and gas leases, and 30 active oil and gas facilities, all on approximately 14,000 acres (about 3% of 443,765 acres). Private mineral estate exists throughout the Grassland.

Under the Bankhead-Jones Farm Tenant Act of 1937, counties receive payments from the federal government equal to 25 percent of all receipts taken in from the Grasslands. The funds are spent on public schools or roads in the county where the funds are collected. Mineral revenues and royalties for oil and gas make up the largest portion of these payments, particularly for the Cimarron. The five year average of payments to counties from Grasslands receipts is approximately $1 million per year.

[51] Oil and gas-related facilities include, but are not limited to oil and gas wells, compressor sites, and produced water disposal wells.

Additional Minerals and Energy Resources

There are several sand and gravel pits on the Grasslands. The Forest Service and local counties use the materials primarily for road maintenance. Sand and gravel may be made available for free use only to public authorities and agencies, in accordance with the Bankhead-Jones Farm Tenant Act of 1937.

There are no existing projects or pending applications for development of wind energy facilities on the Grasslands. Wind energy has the potential to play an important contributing role in the economic and social elements of the Grasslands Planning Area.

Uses Associated with Mineral Development

Approximately 500 miles of buried oil and gas and associated water pipelines traverse the two Grasslands. Pipelines are authorized under the provisions of a special use permit when they are used for transporting a product. Pipelines associated with the production of oil or gas, or both, are authorized under the provisions of a Federal lease when they are operated and owned by the lessee. Retired pipelines are abandoned in place, with no surface disturbance. Currently, the Grasslands have several identified pipeline or utility corridors. (No new corridors have been added since the 1984 Plan was approved.)

Desired Conditions

A viable mineral and energy community would continue contributing to national energy demands and support local governments and economies. Interpretive programs in partnership with industry and community groups would be developed to increase understanding of the role mineral and energy development plays in society, the nature of oil and gas exploration and development, and the relationship of the mineral estate with the surface estate.

Mineral revenues and royalties would continue to be provided to the counties. A viable gravel resource (common variety mineral) would continue to support road maintenance activities for the Forest Service road system and community (county) public road system.

The exploration, development, and production of energy resources would continue in an environmentally-sensitive manner, in accordance with existing direction.[52] Oil and gas facilities would continue to contain hazardous waste events. Land and water resources disturbed by mineral and energy activities would be restored to pre-disturbance conditions, to the extent possible, using the best available scientific knowledge, principles, and techniques.

Restoration of oil and gas development sites, when no longer producing, would help move ecological resources toward desired conditions as described for their associated ecosystem. Oil and gas activities bring substantial revenues and employment into local

[52] The direction for the Grasslands when managing these programs is in the 1992 Oil and Gas Record of Decision (USDA FS 1992b) and supporting documents, such as the associated environmental impact statement (USDA FS 1991) and the report Oil and Gas Reasonable Foreseeable Development (USDI BLM 2003).

Grasslands communities. The Grasslands would continue to be involved in and provide support to local communities for proactive planning and economic development, as appropriate, without jeopardizing other resource objectives (for example, outfitter and guide permits, tourism activities, or infrastructure developments).

Future economic uses of the Grasslands would be identified as potential alternatives to the eventual decline of oil and gas revenues and employment. The Grasslands would play an important role in wind energy development and would support development of alternative energy resources (such as wind power) in appropriate locations and quantities consistent with other resources.[53]

1.3.3.d. Recreation and Tourism

The recreation and tourism experiences that people want vary greatly. Some may prefer undeveloped, remote recreation settings, while others may want developed settings with improved accessibility. The challenge for the Grasslands is to provide for a variety of recreation experiences appropriate to the Grasslands and tourism opportunities that maintain the area's rural setting and character people enjoy.

Existing Conditions

Recreation on the Grasslands has increased moderately since 1984 (USDA FS 2002d). This is attributed to an increase in the populations of the surrounding areas and is expected to continue as Front Range populations expand. Increases in recreation can also be tied to the 1992 acquisition of Picket Wire Canyonlands (USDA FS 1992a), the designation of the Santa Fe Trail as a National Historic Trail in 1987; a desire for viewing natural features, relaxing, viewing wildlife, hiking/walking, and driving for pleasure; and increasing participation in hunting, bird watching, and fishing activities. The Grasslands' Recreation Opportunity Spectrum (ROS) (USDA FS 2007b) identified the type of recreation experience and setting people found throughout the Planning Area. The ROS inventory includes six categories: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban.

Desired Conditions

The recreation capacity of the Grasslands and an increase in the level of tourism would be acceptable to local community needs, contribute to local economies and would not detract from recreational uses and experiences. Residents of the communities and counties surrounding the Grasslands would continue to enjoy a range of recreational opportunities involving or including: a diversity of native wildlife, scenic beauty, solitude and quiet, and a well-tended infrastructure including roads, trails, picnic areas, and campgrounds. Future facilities and developments would be limited to areas that need such infrastructure to prevent resource damage and continue to maintain existing ROS categories. Desired conditions for the four ecosystems would be accommodated.

[53] Areas on the Grasslands have not been identified as neither suitable nor unsuitable for wind energy.

Tourism activities would focus on developed sites that allow people to camp, hunt, watch wildlife, and explore the area's natural and cultural history while protecting historic and heritage resources from vandalism and overuse. Dispersed recreation sites would be available for use throughout the Grasslands and would be in good condition, at or below the adopted scenic integrity level. The dispersed sites within 100 feet of a lake or stream would be designated sites. Some sites may be closed or rehabilitated based on undesirable environmental conditions.

The road system would provide for safe public travel and resource protection. Specific travel restrictions would be identified to contribute to desired recreation experiences. Access would continue to be provided into such areas as existing campgrounds, picnic areas, and trails. Access would provide recreation opportunities and limited access would help conserve wildlife, plants, heritage, historical and paleontological resources in the following special areas: Bent Canyon Bluffs Botanical Area, the Picket Wire Canyonlands Paleontological Area, Picture Canyon Historical Area, the Santa Fe National Historic Trail, and Vogel Canyon Historical Area. Motorized vehicle travel would be on designated roads, trails, or areas that would provide for positive recreational opportunities while limiting resource damage and user conflicts. Non-motorized trail loops would be emphasized, as appropriate, in the existing network of trails and roads.

Specifically, the areas designated as the Santa Fe National Historic Trail would continue to be a desirable destination for its unique historic and scenic attributes.

1.3.4. Physical Resources Desired Conditions

Physical resources on the Grasslands include the non-renewable resources: heritage, scenery and landscape, and paleontological resources. The Grasslands are nationally recognized for many of these resources. Preservation and public education, outreach, and interpretation of heritage and paleontological resources help ensure the Grasslands are a place for people to learn about their past.

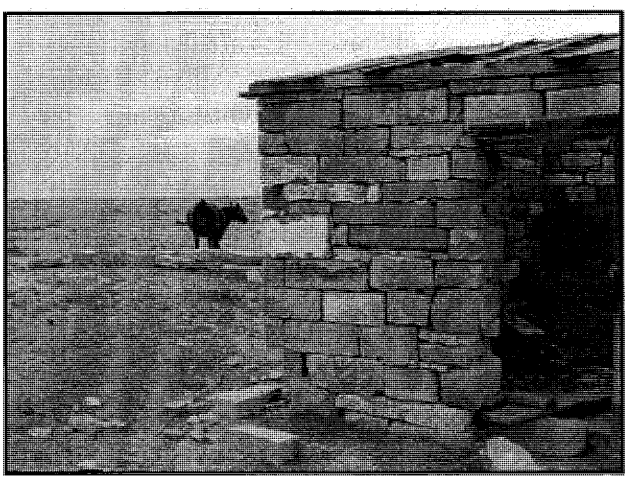

Figure 1-8. Historic homestead, Comanche National Grassland

1.3.4.a. Heritage Resources

Heritage resources on Federal lands are protected by laws enacted to protect these resources from illegal use, and damage or loss due to federally-funded or permitted activities. The public's recognition that these non-renewable resources are important and should be protected began very early in this century and continues to the present.

Existing Conditions

Approximately 14,060 acres (13%) of the Cimarron and 48,815 acres (11%) of the Comanche have been intensively surveyed and inventoried for heritage resources. An additional 2,165 acres (2%) of the Cimarron and 13,315 acres (3%) of the Comanche have received reconnaissance level surveys and inventories. Nearly 1,500 heritage resources on the Grasslands document about 12,000 years of human history. Many significant,[54] well-preserved heritage resources that represent Native American, Hispanic, and European-Americans' adaptations to the High Plains can be found on the Grasslands.

Three heritage resources have been given official status on National and State Registers of Historic Places. These include:

1. The Santa Fe National Historic Trail, which was listed as a National Historic Trail in 1987, and has segments on both Grasslands.
2. The Rourke Ranch Historic District on the Comanche, listed on the NRHP in 2000.
3. The Vogel Canyon Historic District on the Comanche, listed on Colorado's State Historic Register in 1995.

Four hundred and ten properties are considered significant and eligible to the NRHP by Forest Service staff and the State Historic Preservation Offices in Colorado and Kansas.

Some 562 resources need additional information before their NRHP eligibility status can be adequately evaluated. Heritage staff on the Grasslands maintain a list of "Priority Heritage Assets" which includes properties listed on the NRHP and State Historic Register or considered by Forest Service staff to be particularly important to understanding past lifeways on the Grasslands. Currently, 49 properties are listed as "Priority Heritage Assets" and 15 of these are segments of the Santa Fe National Historic Trail. In addition to, and sometimes because of, a site's association with historical people and events, architectural significance, and potential to yield important information, many heritage resources have recreational and interpretive values.

Desired Conditions

The Grasslands' heritage resources would continue to be located, evaluated, preserved, and protected, carrying on with Class II (reconnaissance) and Class III (intensive) inventories. Known heritage resources would be evaluated for significance on the NRHP. Recommendations of eligibility for inclusion to the NRHP would continue for identified

[54] For an explanation of this use of the term "significant," which differs from the NEPA-related definition, see the Note at the end of Part 1 of this Plan.

cultural resources and some historic properties evaluated and considered significant. Nominations of eligible sites to the NRHP would take place. All sites on the NRHP would continue to demonstrate their significance according to the merits of each particular site. Sites on the NRHP would be interpreted for public use and enjoyment. The role of the Grasslands' heritage resources in ecosystem management, including their cultural and social values, would be promoted and recognized through public education, outreach, and interpretation programs. Scientific and historical research and the distribution of resulting reports, monographs, and books to the interested public would continue.

1.3.4.b. Landscape and Scenery Resources

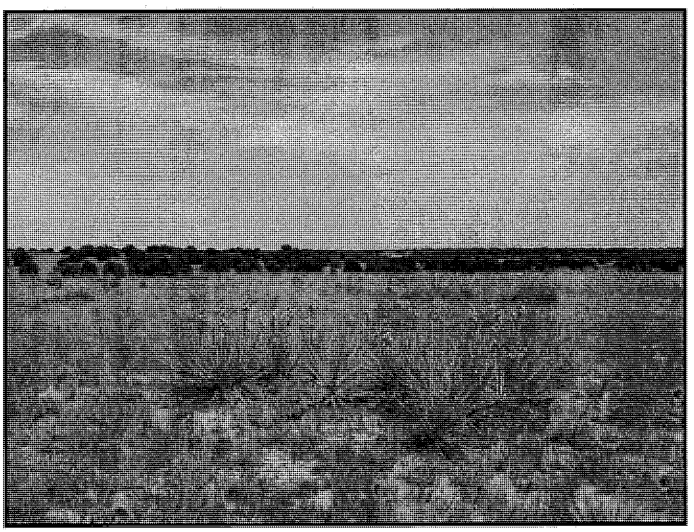

Figure 1-9. Landscape of shortgrass prairie

Scenic resources are important to the Grasslands because they provide the setting for activities, from simply driving across the Grasslands to more specific forms of recreation. Scenery and aesthetics are important to peoples' physical and emotional well-being. Research shows that scenery enhances peoples' lives and therefore benefits society (USDA FS 1988).

Existing Conditions

Long, horizontal, panoramic views are predominant because of the minimal topography and the lack of vertical features. Because of these expansive views, seemingly minor visual intrusions or impacts affect broad areas of the landscape.

Across the Grasslands, visible evidence of human use and occupation results from homesteads, livestock grazing, limited surface mining for sand and gravel, oil and gas exploration and development, private development or in-holdings, recreation facilities, and road development. Extended linear features such as fences, roads, and utilities are very visible. The Santa Fe National Historic Trail and several of its branches or cut-offs

that traverse the area can be seen from various locations. Oil and gas facilities are probably the most visible evidence of human development, because they are not screened by terrain or vegetation and their vertical appearance stands out in an otherwise horizontal landscape.

Desired Conditions

The natural, historic, and cultural features of landscapes that provide "sense of place" would continue to represent the unique values of the Grasslands. The scenic value of historic and cultural properties and resources would be preserved. Landscapes in the Plan Area would have vegetation patterns and species mixes as described in the desired conditions sections for the four primary Grasslands ecosystems. Moderate or high scenic integrity of the Plan Area would be common, while areas of low scenic integrity would move toward moderate or high scenic integrity. Existing and new human-made features and facilities and other landscape alterations[55] would complement, or at least would not detract from, desired landscape character and scenic integrity (USDA FS 2005e).

1.3.4.c. Paleontological Resources

The Grasslands are home to internationally-recognized paleontological resources. The hallmark locality for the Cimarron is the Fullerton Gravel Pit, which produces Miocene (six million years ago) remains of camel, horse, elephant, and tortoise. The Comanche has a diverse array of fossil resources, but is most noteworthy for the dinosaur trackways and skeletons in the Picket Wire Canyonlands Paleontological Area.

Existing Conditions

The Grasslands are nationally recognized for their paleontological resources. Public education, outreach, and interpretation ensure that the Grasslands are a place for people to visit and connect to the past.

Desired Conditions

The past, present, and future roles of paleontological resources in ecosystem management, including social and cultural values in an environmental context, would continue to be recognized nationally. Prominent paleontological resources would continue to contribute to scientific research, education, and recreational opportunities. Opportunities for public involvement in paleontological resource management would continue to be available through field and lab-based volunteer projects. Opportunities for recreational collection of non-significant[56] fossil resources would continue to be provided. Paleontological resources would continue to be available to the public through interpreted sites, lectures, museum displays, exhibitions, and guided field trips. Existing partnerships with museums, universities, and avocational groups would continue and new collaborative working relationships would be pursued.

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[55] Infrastructure includes roads, trails, recreation developments, minerals, energy and livestock grazing facilities and supporting features.

[56] See the note at the end of this part of the Plan for how "significance" is determined and how it differs from the NEPA definition of the term.

All collected significant fossil specimens would continue to be stored in publicly accessible, accredited curational facilities. Known significant fossil localities would continue to be incorporated into a program of cyclical survey and salvage, and recorded in a corporate database. Historical data for fossil resources collected before establishing a responsible paleontological program would be gathered, and kept current through digital methods. Detailed stratigraphy for fossiliferous geologic units would continue to be recorded to enhance contextual data of fossil specimens.

The number of known significant fossil localities would be increased. Theft and vandalism of paleontological resources would occur only rarely. Significant paleontological resources would continue to be protected or mitigated from disturbance to conserve scientific, educational, interpretive, and legacy values.

1.3.5. Special Areas Desired Conditions

Special areas are one of the five plan components listed in the 2008 Planning Rule.[57] Special areas are places within the NFS identified or designated because of their unique or special characteristics. For the Grasslands, the nine locations listed below have been identified as special areas. Included in the nine are three previously-designated special areas; the Campo RNA, the Comanche Lesser Prairie Chicken Habitat Zoological Area, and the Santa Fe National Historic Trail.

1. Bent Canyon Bluffs Botanical Area
2. The Campo Research Natural Area
3. The Comanche Lesser Prairie Chicken Habitat Zoological Area
4. Mesa de Maya Botanical Area
5. OU Creek Botanical Area
6. The Picket Wire Canyonlands Paleontological Area
7. Picture Canyon Historical Area
8. The Santa Fe National Historic Trail
9. Vogel Canyon Historical Area

These areas have been evaluated for a variety of unique or special characteristics, including natural character, botanic resources, geological features, and heritage resource qualities. Summaries of their unique or special characteristics are included in the section below. For complete evaluations of each identified area's unique or special characteristics, see the *Evaluations of Special Areas* document (USDA FS 2008b). A map of the special areas is in Appendix H.[58]

[57] For a description of the plan components, including special areas, see 36 CFR 219.7(a)(2); FR 21507 (USDA FS 2008a).
[58] For more information about these special areas, see Part 2: Strategy and Part 3: Design Criteria.

Special areas may have different plan components that reflect their unique or special characteristics. For example, one of the special areas may have desired conditions that differ from the larger ecosystem surrounding it. Project consistency for a special area would be determined in the same way as is consistency with other desired conditions, objectives, guidelines, and suitability of areas, as discussed previously, but specific to that area.

Bent Canyon Bluffs, Mesa de Maya, and OU Creek Botanical Areas were evaluated as potential RNAs by the Colorado Natural Heritage Program in 1999 (CNHP 1999a, 1999b, 1999c). CNHP prepared a series of site-specific reports through a challenge cost-share agreement with the PSICC (CNHP 1999a–CNHP 1999e). These reports provided the ecological evaluations of the characteristics that could qualify each area for nomination as an RNA. This Plan identifies these three areas as special areas because of their unique and special characteristics, but makes no recommendation for their nomination as RNAs.

1.3.5.a. Bent Canyon Bluffs Botanical Area

Bent Canyon Bluffs Botanical Area is 4,676 acres in the arid portion of the Shortgrass Prairie Ecosystem on the Timpas unit of the Comanche.

Existing Conditions

The unique and special characteristics of Bent Canyon Bluffs include its high-quality plant associations and plant communities that are supported by geological formations made up of limestone outcrops interspersed with unique "septarian concretions".

Bent Canyon Bluffs plant associations and plant communities consist of high quality shortgrass prairie, shrublands, and woodlands species. The special area is characterized by a series of limestone bluffs that extends for approximately seven miles in a west to east direction. Several intermittent drainages flow southward from the bluffs. The only area of the bluffs that is disturbed is at the far western end where a gas pipeline operated by the Colorado Interstate Gas Company runs diagonally across the west end of the area. A two-track road parallels this pipeline across the bluffs and down the slopes onto the plains below. A berm has been created in this area of the bluffs and some of the neighboring grassland contains nonnative invasive plant species. Two-track roads run along the section line between Section 35 and 36 in the center of the area and along the southern boundary fence at the eastern end of the area. A power line crosses the eastern end of the area in a northeast to southwest direction. A two-track road also runs along a limestone ridge at the far eastern end of the area.

Desired Conditions

The Bent Canyon Bluffs Botanical Area would continue to support high-quality plant associations and plant communities, and the unique limestone geological formations that characterize the bluffs. Plant associations would continue to include oneseed juniper/New Mexico feathergrass, James' seaheath/Indian ricegrass, and Bigelow sagebrush/Indian ricegrass, as well as high quality shortgrass prairie, shrublands, and woodlands communities. This area would be a reference area for shortgrass prairie and oneseed

juniper woodlands and, as such, would demonstrate the effects of no livestock grazing in similar type habitats on other areas of the Timpas unit. Projects and activities in this area would emphasize non-manipulative research, education, observation, and monitoring. Populations of nonnative invasive plant species would be non-existent or occur in very low numbers (CNHP 1999a). Only two-track roads used for administrative purposes (for example, those associated with gas pipelines) would be present.

1.3.5.b. The Campo Research Natural Area

The Campo RNA is 35 acres in the Shortgrass Prairie Ecosystem on the Carrizo unit of the Comanche.

Existing Conditions

Established as an RNA in 1987 because it was identified as an undisturbed, representative site of a typical shortgrass plains, blue grama/buffalograss potential natural community (USDA FS 1987b), the Campo RNA has never been part of a grazing allotment nor has it been plowed or subjected to other major disturbances. In 1987, the Campo RNA was a prime example of relatively undisturbed grassland at or near climax, in which blue grama and buffalograss were the dominant species.

Following the establishment of this RNA, the quality of the shortgrass prairie community and its value as a reference area began and continues to decline. Comparisons of existing plant communities to the vegetation previously mapped in 1987 show that the conditions for which the site was initially established have changed. Because of environmental factors that negatively affected the diversity of desirable native species (for example, wind-deposited sands from surrounding areas), and the physical location (an island of land adjacent to a state highway, two county roads, and a train track), the Campo RNA supports lower populations of blue grama and buffalograss now than it did in 1987. Altered conditions provide habitat for the expanding populations of existing nonnative invasive plant species and for increasing dominance by native species that are more adapted to changes in the site's physical characteristics.

Since its establishment, the Campo RNA has not been used for non-manipulative research, education, observation, or monitoring. Whether the site has the potential or capability of serving as a reference area for a typical shortgrass ecosystem has not been assessed.

Desired Conditions

The Campo RNA would support, within the area's capability, good quality examples of a shortgrass prairie community for non-manipulative research, education, observation, and monitoring. Nonnative invasive plant species would be very low in numbers. This RNA would serve as a reference area for comparing the effects of livestock grazing in similar type habitats on other areas of the shortgrass prairie.

The unique characteristics for which this RNA was established would be reviewed and evaluated to assess if it is or can be capable of sustaining the qualities and quantities of the elements that would represent the region's biodiversity.

1.3.5.c. The Comanche Lesser Prairie Chicken Habitat Zoological Area

This area is 10,177 acres in the Sandsage Prairie Ecosystem on the Carrizo unit of the Comanche. With the approval of the 1984 Plan (USDA FS 1984), this area was designated as the Comache Lesser Prairie Chicken Habitat Zoological Area. In 1987, this area was designated as a Colorado Natural Area (USDA 1987a).

Existing Conditions

The unique and special characteristics of the Comanche Lesser Prairie Chicken Habitat Zoological Area include its contiguous block of lesser prairie chicken habitat. The area once supported one of the highest densities of lesser prairie chickens in the state of Colorado. However, over the past 15 years the species has declined in abundance in this area.

There are existing oil and gas leases and two-track roads in the Comanche Lesser Prairie Chicken Habitat Zoological Area. Livestock grazing takes place in all parts of the area. Wildfires have been actively suppressed within the area in the past three decades.

Desired Conditions

Plant communities providing habitat for lesser prairie chicken would be dominated by native, tall-structure warmer season grasses and sand sagebrush. The extent of plant communities where the sagebrush understory is dominated by blue grama, buffalograss, and purple threeawn would have declined and would be largely replaced by a sand sagebrush understory dominated by bunchgrass species including sand bluestem, little bluestem, sand lovegrass, and switchgrass.

The overall vegetative structure and distribution, and heterogeneity of bunchgrasses would be increased. Vertical structure would increase to levels where 10%–15% of the area has visual obstruction readings greater than or equal to 12 inches, and 25%–50% has visual obstructions readings of 5–11 inches.

While the overall desired vegetative vertical structure would have increased, the landscape would also include a diversity of areas in different successional stages and with varying vegetative heights.

Hazards to lesser prairie chickens would be low in number. Trees that could attract lesser prairie chicken predators, other than those trees that provide nesting sites for ferruginous hawks, would continue to be uncommon. Areas dominated by sideoats grama would be restored to higher levels of plant diversity, including native mid- to tall-structure bunchgrasses and sand sagebrush. Nonnative invasive plant species in the area would be low in numbers.

1.3.5.d. Mesa de Maya Botanical Area

Mesa de Maya Botanical Area is 518 acres in the Shortgrass Prairie Ecosystem on the Carrizo unit of the Comanche.

Existing Conditions

The unique and special botanical and geological characteristics of Mesa de Maya Botanical Area include the unique plant species found in the area and the basalt formations that cap the mesa and make up the substantial cliffs and large talus slopes. The shrub communities here are unlike any others on the Comanche. The vegetation composition of the area includes shortgrass prairie, shrublands, and piñon/juniper woodlands, and shortgrass. The area has received minor human effects.

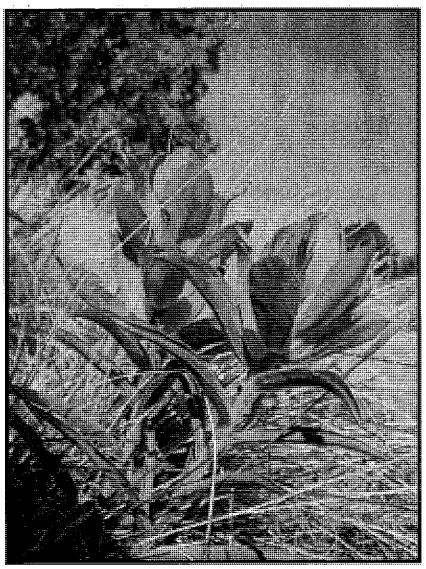

Figure 1-10. Indian paintbrush, Mesa de Maya Botanical Area, Comanche National Grassland

Desired Conditions

The existing conditions represent the desired conditions. The Mesa de Maya Botanical Area would continue to support good-quality shortgrass prairie, shrub and tree community composition, structure, and processes for which this area is known. Variations within these community types would continue to occur because of differences in slope, aspect, and elevation. The extent of tallgrass prairie and New Mexico feathergrass (*Hesperostipa neomexicana*) grasslands, while very small in size, would continue to be in good condition. There would be few nonnative invasive plant species populations in the area. There would continue to be limited evidence of past land use. The mesa slopes would not have off-road vehicle travel. Projects or activities in this area would emphasize non-manipulative research, education, observation, and monitoring (CNHP 1999b). Only two-track roads used for administrative purposes would be present.

1.3.5.e. OU Creek Botanical Area

OU Creek Botanical Area is 3,196 acres in the Riparian and Aquatic Ecosystem and the Shortgrass Prairie Ecosystem of the Comanche, approximately seven miles northeast of Kim, Colorado.

Existing Conditions

OU Creek Botanical Area supports unique botanical and geological resources, and its high-quality ecosystems can serve as a model for managing other parts of the Comanche. An extensive population of the Colorado frasera, an endemic species known only from southeast Colorado, is found in the area. Wheel milkweed and ferruginous hawks have also been found.

Livestock grazing takes place in the area.

Desired Conditions

The OU Creek Botanical Area would continue to support examples of good-quality shortgrass prairie community types, and its unique shrubland communities, including the skunkbush sumac/wax currant, mountain mahogany/needle-and-thread, and Bigelow sagebrush/Indian ricegrass associations. The area harbors a type of bedrock that would continue to support a well-distributed and self-sustaining population of the Colorado frasera. Unique geological features with the potential to yield paleontological resources are not affected by surface disturbances.

Projects or activities in the OU Creek Botanical Area would emphasize non-manipulative research, education, observation, and monitoring in the area (CNHP 1999c). Livestock grazing would continue to be authorized in combination with prescribed fire to provide the periodic disturbance and moderate vegetative cover desired in areas with known populations of Colorado frasera. Populations of nonnative invasive plant species would be low in number.

1.3.5.f. The Picket Wire Canyonlands Paleontological Area

Picket Wire Canyonlands Paleontological Area is 16,728 acres in the Canyonland Ecosystem and the Riparian and Aquatic Ecosystem, on the Timpas unit of the Comanche. It is adjacent to Department of Defense's Pinon [*sic*] Canyon Maneuver Site. The area includes the Purgatoire River Valley, its tributaries and side canyons, beginning approximately 20 miles south of La Junta, Colorado, and extending discontinuously for about 24 miles along the Purgatoire River.

The entire 16,728 acres of the existing Picket Wire Canyonlands special interest area would make up the Paleontological Area. The existing special interest area was established in 1992 by amendment (USDA FS 1992a) to the 1984 Plan (USDA FS 1984). The area was designated after the transfer of administrative jurisdiction of lands to the Secretary of Agriculture from the Secretary of the Army.[59] In 1994, the PSICC prepared a management plan that provides management guidance for this special interest area (USDA FS 1994).

Existing Conditions

The unique and special characteristics of Picket Wire Canyonlands Paleontological Area include aquatic, heritage, paleontological, vegetative, wildlife, and other natural resources. The area extends over a broad elevational gradient that is unusual on the plains, and it is representative of a broad range of natural variation among a diversity of ecosystem types.

The 16-mile segment of the Purgatoire River that runs through the Picket Wire Canyonlands Paleontological Area was determined to be eligible for inclusion in the National Wild and Scenic River System. This free-flowing segment of the stream and its adjacent lands possesses outstandingly remarkable paleontological, historical, fisheries, and recreation values (see the wild and scenic river eligibility assessment for additional information [USDA FS 2007a]).

Tamarisk in the riparian area is pervasive and has been substantially reduced in recent years using a variety of treatments.

Desired Conditions

The Picket Wire Canyonlands Paleontological Area heritage and paleontological resources would continue to be protected and preserved. The conditions of the significant paleontological assemblages of dinosaur tracks and priority heritage assets would be stable or improved. The erosion control structures diverting the Purgatoire River flow away from the dinosaur trackways would continue to be maintained. The NRHP eligibility status would be determined for all identified cultural resources. Consultation with tribal governments about cultural resources would continue to take place on a regular and recurring basis. Outdoor recreation, public enjoyment, appreciation, and understanding of these paleontological and heritage resources would continue to be promoted and interpretive signage highlighting the area's unique paleontological and heritage resources would be provided.

The 16-mile segment of the Purgatoire River that runs through the Picket Wire Canyonlands Paleontological Area would be protected along with its outstandingly remarkable values. Use of the area would not diminish its physical integrity and cultural, natural, and scenic resources. Public access to the area would continue to be controlled to help preserve natural and heritage resources. Research that improves the knowledge,

[59] For more about this transfer of lands, see Public Law 101-510, Section 2825.

understanding, and appreciation of prehistoric and historic sites and geoarchaeology of the area would continue to be encouraged.

The Picket Wire Canyonlands Paleontological Area would continue to support the existing diversity of plant associations that results from the uneven topography's range of elevations, slopes, and aspects. Many of the plant associations covering sizeable acreages, particularly within the oneseed juniper woodland cover type, would be in very good to excellent quality. Further, the sheer size of the area would continue to allow for a wide representation of landscape patterns, plant associations, and environmental variation.

Plant communities on mesa slopes, side canyons, and terraces would continue to receive minimal human impact. Areas disturbed by previous farming would support a diversity and abundance of native shrubs and grasses and improve foraging habitat for elk. Tamarisk along the Purgatoire River would be replaced by native trees, shrubs, and grasses. On-going nonnative invasive plant species management would prevent weedy species from impacting native plant communities. Tamarisk control and vegetation restoration projects would also provide for habitat needs of a diversity of wildlife species.

Desired habitats for self-sustaining elk populations in the Picket Wire Canyonlands Paleontological Area would be achieved.

1.3.5.g. Picture Canyon Historical Area

Picture Canyon Historical Area is 752 acres in the Canyonland Ecosystem and the Riparian and Aquatic Ecosystem on the Carrizo unit of the Comanche.

Existing Conditions

The unique and special characteristics of Picture Canyon Historical Area include its heritage and scenic resources and the high-quality recreational opportunities. Currently this area has restricted motor vehicle use under PSICC Order #08-12 because of resource protection and other management considerations (USDA FS 2008e). Picture Canyon Historical Area is eligible to be nominated to the NRHP as a historic district.

Desired Conditions

The Picture Canyon Historical Area would continue to support its special heritage, scenic, and recreational opportunities. Uses of the area would not diminish physical integrity and cultural, natural, and scenic resources. Heritage resources would be preserved and protected from vandalism, recreation, vehicle uses, and livestock grazing. Natural erosion of heritage resources would be stabilized when and if erosion directly affects these resources. Scenic values and qualities of the area would continue. Outdoor recreation, public enjoyment, appreciation, and understanding of these heritage resources would continue to be promoted and interpretive signage highlighting the area's unique cultural and natural resources would be provided. Research that improves the knowledge and understanding of heritage sites would continue to be encouraged.

1.3.5.h. The Santa Fe National Historic Trail

In 1987, Congress designated the Santa Fe Trail a National Historic Trail. The U.S. Department of the Interior, National Park Service (NPS) is the designated administrating agency for the Santa Fe National Historic Trail. Its management is guided by the Santa Fe National Historic Trail Comprehensive Management and Use Plan (USDI NPS 1990), and the Memorandum of Understanding between the NPS and the PSICC signed March 6, 1991 (USDA FS and USDI NPS 1991).

Two routes, two branches, and one stage road of the Santa Fe National Historic Trail cross portions of the Grasslands:

1. Aubrey Cutoff Branch (1850–1860)
2. Barlow-Sanderson Wagon Stage Road (also known as the Vogel Canyon Stage Road) (1855–1870)
3. Cimarron Route (1821–1880)
4. Granada to Fort Union Wagon Road Branch (1872–1874)
5. Mountain Route (1821–1880)

The Cimarron has 29 miles of the Cimarron Route of the Santa Fe National Historic Trail and its segments. On the Comanche the segments of the Aubrey Cutoff Branch, the Barlow-Sanderson Wagon Stage Road (Vogel Canyon Stage Road), the Granada to Fort Union Wagon Road Branch, and the Mountain Route total approximately 39.5 miles. The 68.5 miles (approximately 8,170 acres) cross portions of all four Grasslands ecosystems.

Existing Conditions

The unique and special characteristics of the Santa Fe National Historic Trail include historical, recreational, and scenic opportunities of the trail-related cultural and natural resources. The Trail itself is an extremely fragile resource, vulnerable to erosion and human and animal impacts. The condition and surface visibility of trail ruts vary across the Grasslands from well preserved and easily visible to poorly preserved with no surface visibility. Ruts not visible on the surface may be buried below the modern ground surface. To date, archaeological testing to determine if subsurface ruts are present has been conducted only in the narrow rights-of-way of oil and gas pipeline projects that cross the trail (for example, south of Tobe, Colorado).

The 29-mile Cimarron Route is the longest Trail segment on public land. Middle Springs and Point of Rocks are important historical sites along the trail and are eligible for inclusion in the NRHP. Both sites have recreational opportunities and interpretive signage.

On the Comanche, Santa Fe National Historic Trail interpretative signage and recreational opportunities are provided at Barlow-Sanderson (near Vogel Canyon), Timpas Picnic Area, Sierra Vista Overlook, and Iron Springs. On November 23, 1993, the Colorado State Historic Preservation Officer listed the Barlow-Sanderson Wagon Stage Road (historic property number 5OT452) as officially eligible for inclusion in the NRHP.

Desired Conditions

The identified segments of the Santa Fe National Historic Trail would continue to perpetuate the inherent physical integrity and cultural, natural, and scenic resources of the Trail, consistent with the Santa Fe National Historic Trail Comprehensive Management and Use Plan (USDI NPS 1990) and the Memorandum of Understanding between the NPS and the PSICC signed March 6, 1991 (USDA FS and USDI NPS 1991).

Significant route segments and cultural, natural, and scenic resources would continue to be protected. Visible and subsurface rut segments and associated sites would be protected in their current condition. Visible ruts would be stabilized when and if erosion directly affects those ruts. Archaeological testing of trail segments with no surface ruts would be used to determine if subsurface ruts are present. Recreational facilities and interpretive signage would provide high-quality recreational opportunities and would not diminish the Trail's physical integrity, scenic values, and cultural and natural resources. Research that improves the knowledge, understanding, and appreciation of trail remnants and related resources and the overall commemoration of its national significance would continue to be encouraged. Outdoor recreation, public enjoyment, appreciation, and learning about the Santa Fe National Historic Trail and related sites and side trails would be promoted.

1.3.5.i. Vogel Canyon Historical Area

Vogel Canyon Historical Area is 416 acres in the Canyonland Ecosystem, the Riparian and Aquatic Ecosystem, and the arid portion of the Shortgrass Prairie Ecosystem on the Timpas unit of the Comanche.

Existing Conditions

The unique and special characteristics of Vogel Canyon Historical Area include its important and fragile heritage resources and the high-quality recreational and educational opportunities that these resources provide. The area contains many heritage resources that date probably between 500 B.C. to A.D. 1920. Prehistoric site types found in the canyons include rock art, habitation shelters, lithic scatters, and food processing areas. Many rock art panels may date from as early as 500 B.C. to as late as A.D. 1600. The rock glyphs suggest that the shelters were used intensively during the Late Archaic and Ceramic Periods, 100 B.C. to A.D. 1500. Historic sites include the Vogel Canyon Stage Road (associated with the Santa Fe National Historic Trail), a stage station, earlier sheep ranching, and early homesteading during the Depression.

Currently this area has restricted motor vehicle use under PSICC Order #08-12 because of resource protection and management considerations (USDA FS 2008d). The Vogel Canyon Historic District was listed on Colorado's State Historic Register in 1995.

Desired Conditions

The Vogel Canyon Historical Area would continue to support its important and fragile heritage resources and the high-quality recreation and education opportunities these provide. Uses of the area would not diminish physical integrity and cultural, natural, and scenic resources. Heritage resources would be preserved and protected from vandalism,

recreation, vehicle uses, and livestock grazing. Natural erosion of heritage resources would be stabilized when and if these resources are directly affected. Scenic values and qualities of the area would continue to be exhibited or improved. Outdoor recreation, public enjoyment, appreciation and understanding of these heritage resources would continue to be promoted and interpretive signage highlighting the area's unique cultural and natural resources would be provided. Research that improves the knowledge and understanding of heritage sites would continue to be encouraged.

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Note: Determining Heritage, Historic, and Paleontological Significance

Heritage and Historic Significance Determinations

Historic properties are considered significant if they qualify for inclusion in the National Register of Historic Places (NRHP). The NRHP is a list of properties and significance must be demonstrated on an individual basis in accordance with the merits of a particular site. Recommendations of significance of each property are based on NRHP significance criteria and the property's data potential. The data potential of a particular property is based on its physical integrity and its potential to help answer Grasslands-area research questions and fill data gaps in chronologies defined in regional overviews of southeastern Colorado and southwestern Kansas prepared by federal agencies and the Colorado and Kansas State Historic Preservation Offices (Brown and Simmons 1987, Zier and Kalasz 1999). Heritage resources with physical integrity, resources containing intact cultural deposits and well preserved architectural features, are likely to be significant and considered eligible to the NRHP because these properties are more likely to preserve the residues of past human activities. Stratified multiple component heritage resources are of particular interest because they may illustrate temporal change in human adaptations in a given area.

The legal "Criteria for Evaluation" are enumerated in 36 CFR Part 60, which states that "the quality of significance…is present in districts, sites, buildings, structures, and objects of State and local importance that possesses integrity of location, design, setting, materials, workmanship, feeling, and association" and that meet one or more of four criteria. A property is considered significant if it:

a) is associated with events that have made a significant contribution to the broad patterns of our past,
b) is associated with the lives of persons significant in our past,
c) embodies the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that present high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
d) has yielded or may be likely to yield information important in prehistory or history.

References

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Paleontological Significance Determination

Significance Criteria for Paleontological Resources: vertebrate, invertebrate, plant, and trace fossils (USDA FS 2005):

The Forest Service paleontology program focuses its management activities on scientifically significant fossil resources. As a general rule of thumb, fossil specimens that are scientifically significant are management-relevant resources.

Scientific significance may be attributed to a fossil specimen or trace and/or to its context (e.g., location in time and space); or association with other relevant evidence. The scientific significance (management-relevance) of a paleontological specimen or trace and/or its context is determined by meeting any one of the following criteria:

Specimen-based criteria

- Represents an unknown or undescribed/unnamed taxon.
- Represents a rare taxon, or rare morphological/anatomical element or feature. The "rareness" criterion comprises either absolute rareness in the fossil record, or relative or contextual rareness as described below.
- Represents a vertebrate taxon.
- Exhibits an exceptional type and/or quality of preservation.
- Exhibits remarkable or anomalous morphological/anatomical character(s) or taphonomic alteration.
- Represents "soft tissue" preservation or presence.

Context-based criteria

- Is associated in a relevant way with other evidence of scientific interest, providing taphonomic, ecologic, environmental, behavioral, or evolutionary information.
- Is evidence that extends and/or constrains the stratigraphic, chronologic and/or geographic range of a species or higher-level taxonomic group.

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Part 2. Strategy

In Part 1, we grouped resources and activities of the Cimarron and Comanche National Grasslands (Grasslands) into five categories. We then described existing and desired conditions for each category.

1. Land administration
2. Ecological resources
    a. The Canyonland Ecosystem
    b. The Riparian and Aquatic Ecosystem
    c. The Sandsage Prairie Ecosystem
    d. The Shortgrass Prairie Ecosystem
3. Economic and social resources
    a. Livestock grazing
    b. Minerals and energy
    c. Recreation and tourism
4. Physical resources
    a. Heritage resources
    b. Landscape and scenery resources
    c. Paleontological resources
5. Special areas

Part 2 is the second of the three parts of the Grasslands Land Management Plan (Plan). It explains how, during the next 15 years, the Grasslands intend to move toward achieving or maintaining desired conditions described in Part 1.

For the five categories, the strategy that the Grasslands would use to move toward achieving or maintaining the desired conditions is described by identifying the following:

1. Objectives (qualitative, quantitative [measurable], time-specific)
2. Monitoring questions and associated performance measures
3. Suitability of areas

The next part of this Plan, Part 3, itemizes the guidelines that apply to the objectives and desired conditions. (Plan components are described in the National Forest System Land Management Planning Rule (2008 Planning Rule)[60] [USDA FS 2008].) Maps are in Appendix H.

[60] In this Plan, references to the 2008 Planning Rule will include both the Code of Federal regulations (CFR) citation and the Federal Register (FR) page numbers. For example, 36 CFR 219.7(a)(2)(i); FR p. 21505.

2.1. Objectives

About Objectives

This section describes the objectives, or steps that the Grasslands expect to take during the next 15 years to retain or move toward achieving desired conditions. Objectives project outcomes based on past performance and estimates of future trends, but objectives are not targets.

Objectives are

1. concise projections of intended outcomes of Grasslands projects and activities and programs.
2. measurable outcomes that guide management and measure progress toward reaching or maintaining desired conditions.

Objectives may

1. aspire to levels of conditions, uses, and activities.
2. be achieved by maintaining a desired condition.
3. be achieved by progressing toward a desired condition, based on the results of a project or an activity.

The Responsible Official considered the goals and objectives identified in the USDA Forest Service Strategic Plan for Fiscal Years 2007-2012 in developing the Grasslands Plan (USDA FS 2007). Plan objectives reflect local conditions and concerns as they contribute to the broader objectives of the Strategic Plan (see Appendix A).

Our progress in achieving Plan objectives will be reported annually or in the five-year comprehensive evaluation report. Variations in achieving Plan objectives may take place during the next 15 years because of changes in environmental conditions, available budgets, and other factors. If objectives have not been achieved by the time specified in the Plan, no Plan amendment or revision is required. If an objective is no longer appropriate or relevant to achieving the desired conditions, the Responsible Official may determine that a plan amendment or revision is necessary to remove that objective from the Plan.

2.1.1. Land Administration

Land administration objectives identify measurable steps that the Grasslands may take to help achieve the desired conditions for opportunistic land exchange and acquisition, and to ensure that accurate and appropriate landlines and other boundaries are surveyed and marked, as described in Part 1 of this Plan. For specific guidelines related to land administration, see Part 3.

2.1.1.a. Common to All Ecosystems: Land Administration Objectives

During the next 15 years:

1. A minimum of 20 miles of net property boundary length would be reduced.
2. A minimum of 20 miles (1%) of the length of total permanent fence would be reduced.
3. A minimum of 50 miles of boundary would be marked, with an emphasis on boundaries in the vicinity of management activities, along public access routes, and urban interface.
4. A minimum of 150 miles of boundary would be surveyed.

2.1.2. Ecological Resources

The ecological resources objectives for the Grasslands identify measurable steps that the Grasslands may take to achieve or retain desired conditions for the four primary ecosystems that are identified in Part 1 (Canyonland; Riparian and Aquatic; Sandsage Prairie; and Shortgrass Prairie) and for the special areas identified within each ecosystem. For specific guidelines related to each of these ecological resources, see Part 3.

2.1.2.a. Common to All Ecosystems: Ecological Resources

During the next 15 years:

1. Integrated weed management measures would be employed annually.
2. A minimum of 500 acres of nonnative invasive plant species (other than tamarisk[61]) would be treated.

2.1.2.b. The Canyonland Ecosystem

During the next 15 years:

1. A minimum of 200 acres of native plant species along canyon bottomland floodplains would be restored.
2. A minimum of 1,500 acres (3.7%) of the ecosystem would be burned.

Figure 2-1. Tamarisk (*Tamarix ramosissima*) along the Purgatoire River

[61] See 2.1.2.c.1. for the tamarisk treatment objective.

2.1.2.c. The Riparian and Aquatic Ecosystem

During the next 15 years:

1. A minimum of 6,000 acres of tamarisk (a species-of-interest) would be treated.
2. A minimum of 10 wetlands (seeps or springs) would be rehabilitated or enhanced.
3. A minimum of two existing dams or impoundments, or both, along riparian areas would be removed as part of improving the overall condition of the watershed.
4. A minimum of five areas that show bank damage and sediment sources would be restored to near-natural conditions.

2.1.2.d. The Sandsage Prairie Ecosystem

During the next 15 years:

1. A minimum of 24,000 acres (14.5%) of the ecosystem would be burned.
2. A minimum of 16,470 acres (10%) of potential habitat for lesser prairie chicken (*Tympanuchus pallidicinctus*) (a species-of-concern) and other native bird species would be improved.[62]

2.1.2.e. The Shortgrass Prairie Ecosystem

During the next 15 years:

1. A minimum of 50,270 acres (15%) of the ecosystem would be burned
2. A minimum of one large habitat complex for black-tailed prairie dog (*Cynomys ludovicianus*) colonies would be provided.
3. A minimum of 70% vegetative cover of blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*) would be provided in habitats with documented occurrences of wheel milkweed (*Asclepias uncialis* ssp. *uncialis*).
4. A minimum of 20% vegetative cover would be provided in habitats on the Timpas unit of the Comanche with documented occurrences of Colorado Springs evening primrose (*Oenothera harringtonii*) and Raven Ridge false goldenweed (*Oonopsis foliosa* var. *monocephala*) (both species-of-concern).

[62] Refer to Appendix E for possible ways that habitat for lesser prairie chicken and other native bird species could be improved.

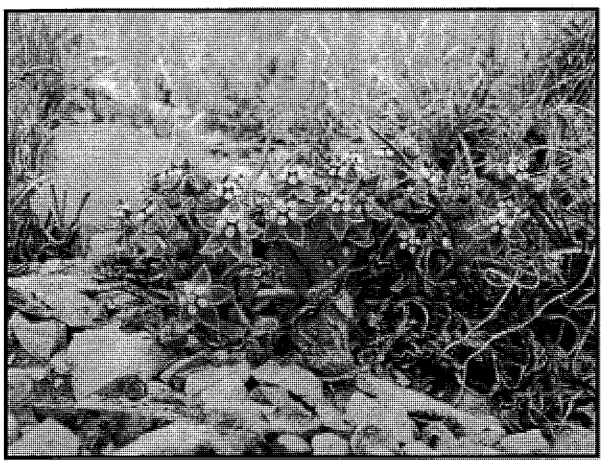

Figure 2-2. Wheel milkweed

2.1.3. Economic and Social Resources

The objectives for the Grasslands' economic and social resources identify measurable steps the Grasslands would take to achieve the desired conditions for human uses. These include the economic and social resources of recreation and tourism, livestock grazing, and minerals and energy. The Plan objectives identified for all of these resources are listed in "Common to All Economic and Social Resources." For specific guidelines related to each of the economic and social resources, see Part 3.

2.1.3.a. Common to All Economic and Social Resources

During the next 15 years:

1. Dispersed recreation sites within 100 feet of surrounding playa lakes and streams would be closed and rehabilitated unless otherwise designated.

Figure 2-3. Paleontological excavation, Comanche National Grassland

2.1.4. Physical Resources

The objectives for the Grasslands' physical resources identify the measurable steps the Grasslands would take after Plan approval to achieve the desired conditions for heritage, landscape and scenery, and paleontological resources. Because these physical resources are found within one or more of the four primary Grasslands ecosystems, *the objectives of that ecosystem also apply*. For descriptions of each physical resource and its desired conditions, see Part 1. For the specific guidelines related to each resource, see Part 3.

2.1.4.a. Heritage Resources

During the next 15 years:
1. A minimum of 10 sites would be evaluated for eligibility of listing on the NRHP or State Register.
2. A minimum of two eligible sites would be nominated on the NRHP or State Register.
3. A minimum of 30 sites would be preserved.
4. A minimum of 15 heritage interpretation projects would be completed.

2.1.4.b. Landscape and Scenery Resources

There are no unique or additive objectives for this section.

2.1.4.c. Paleontological Resources

During the next 15 years:
1. A minimum of two large-scale (requiring more than three people for several weeks) fossil inventories would be conducted annually on the Grasslands.

2.1.5. Special Areas

Special areas are places in the NFS that are identified or designated as such because of their unique or special characteristics.[63] Nine locations on the Grasslands have been identified as special areas:
1. Bent Canyon Bluffs Botanical Area
2. The Campo Research Natural Area
3. The Comanche Lesser Prairie Chicken Habitat Zoological Area
4. Mesa de Maya Botanical Area
5. OU Creek Botanical Area
6. The Picket Wire Canyonlands Paleontological Area
7. Picture Canyon Historical Area
8. The Santa Fe National Historic Trail
9. Vogel Canyon Historical Area

The following objectives are considered unique and additive for each special area. And because each identified special area falls within one or more of the four primary Grasslands ecosystems, *the objectives of that ecosystem also apply to that special area.*

[63] For more about special areas, see 36 CFR 219.7(a)(2)(v); FR p. 21507.

For example, when designing activities or projects to take place in Bent Canyon Bluffs Botanical Area, the desired conditions, objectives, and guidelines must be considered for Bent Canyon Bluffs Botanical Area, the Shortgrass Prairie Ecosystem, and for those Common to All Ecosystems in the Land Administration and Ecological Resources sections of the Plan.

2.1.5.a. Bent Canyon Bluffs Botanical Area

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.e. The Shortgrass Prairie Ecosystem

2.1.5.b. The Campo Research Natural Area

During the next 15 years:

1. A minimum of 35 acres would be treated for noxious weeds.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.e. The Shortgrass Prairie Ecosystem

2.1.5.c. The Comanche Lesser Prairie Chicken Habitat Zoological Area

During the next 15 years:

1. A minimum of 500 acres would be treated to increase native plant diversity.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.d. The Sandsage Prairie Ecosystem

2.1.5.d. Mesa de Maya Botanical Area

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.e. The Shortgrass Prairie Ecosystem

2.1.5.e. OU Creek Botanical Area

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.c. The Riparian and Aquatic Ecosystem
4. Section 2.1.2.e. The Shortgrass Prairie Ecosystem

2.1.5.f. The Picket Wire Canyonlands Paleontological Area

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.b. The Canyonland Ecosystem
4. Section 2.1.2.c. The Riparian and Aquatic Ecosystem
5. Section 2.1.4.a. Heritage Resources
6. Section 2.1.4.c. Paleontological Resources

2.1.5.g. Picture Canyon Historical Area

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.3.a. Common to All Economic and Social Resources
4. Section 2.1.2.b. The Canyonland Ecosystem
5. Section 2.1.2.c. The Riparian and Aquatic Ecosystem
6. Section 2.1.4.a. Heritage Resources

2.1.5.h. The Santa Fe National Historic Trail

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.b. The Canyonland Ecosystem
4. Section 2.1.2.c. The Riparian and Aquatic Ecosystem
5. Section 2.1.2.d. The Sandsage Prairie Ecosystem
6. Section 2.1.2.e. The Shortgrass Prairie Ecosystem
7. Section 2.1.4.a. Heritage Resources

2.1.5.i. Vogel Canyon Historical Area

There are no unique or additive objectives for this section.

Also see the objectives for:

1. Section 2.1.1.a. Common to All Ecosystems: Land Administration
2. Section 2.1.2.a. Common to All Ecosystems: Ecological Resources
3. Section 2.1.2.b. The Canyonland Ecosystem
4. Section 2.1.2.c. The Riparian and Aquatic Ecosystem
5. Section 2.1.2.e. The Shortgrass Prairie Ecosystem
6. Section 2.1.4.a. Heritage Resources

2.2. Monitoring Questions and Associated Performance Measures

About Monitoring Questions

The monitoring program (described in the About This Plan section) for the Plan Area establishes monitoring questions.

Monitoring questions ask if we are maintaining or moving toward desired conditions in the Plan Area. Each monitoring question must link to one or more desired condition, objective, or guideline. However, not every desired condition, objective, and guideline must have a monitoring question.[64]

The monitoring questions are intended to identify what specific components in the Plan would be evaluated and the aims of that evaluation. The Plan components linked to each monitoring question and associated performance measure(s) are in Appendix G, with a cross-reference to the pertinent Plan sections. The monitoring questions specify the information that's essential for measuring Plan accomplishments and effectiveness. Through monitoring and evaluation, observed changes will be evaluated to determine whether they are consistent with the desired conditions and what adjustments may be needed.

Frequency of monitoring, whether annually or once in 15 years is identified in a monitoring guide.[65] All monitoring questions would be addressed at least once every five years in a comprehensive evaluation report. This report would reflect any substantial changes that have taken place in the conditions and trends since the previous comprehensive evaluation.[66]

We have two types of monitoring questions: the primary monitoring questions are in this Plan; supplemental monitoring questions (those that could be added to the monitoring program at any time during the planning period) are in the Monitoring Guide.

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[64] For more about monitoring questions and programs, see the USDA Forest Service Handbook (FSH) 1909.12, chapter 10 (USDA FS 2006).
[65] For more about monitoring, see 36 CFR 219.6(b); FR p. 21507 and also FSH 1909.12.
[66] For more about evaluations, see 36 CFR 219.6(a); FR p. 21506-21507.

About Performance Measures

The monitoring program also establishes the performance measures associated with specific monitoring questions.

Performance measures are aspects of monitoring. Designed to be quantitative or qualitative, performance measures are used to help answer the monitoring questions. They assess results in maintaining or progress in moving toward desired conditions, and address how effective the Plan is in contributing to the components of sustainability and to the key assumptions that support Plan desired conditions and objectives.

This part of the Plan includes one or more performance measures associated with each monitoring question. As with monitoring questions, the complete monitoring program provides the schedule and processes to be followed in evaluating monitoring information based on performance measures.

2.2.1. Land Administration

2.2.1.a. Common to All Ecosystems

Monitoring question A

1. What is the trend in land ownership consolidation?

Performance measure A

1. Net boundary length reduction as a result of exchanges (excluding donations and acquisitions).

2.2.2. Ecological Resources

2.2.2.a. Common to All Ecosystems: Ecological Resources

Monitoring question B

1. How does prescribed fire design (size, placement on the landscape, fuel type, seasonality) and resulting projects or activities (timing, duration, intensity) maintain or move vegetation conditions (composition and structure) toward desired conditions?

Performance measure B

1. Changes in vegetative composition (and structure for shrubs where appropriate) in each of the ecosystems where prescribed fire design and implementation have taken place.

2.2.2.b. Common to All Ecosystems: Fire Management

Monitoring question C

1. How do wildfires contribute to maintaining or moving vegetative conditions toward desired conditions?

Performance measure C

1. Scale, size (acres) and spatial distribution of wildfires within each ecosystem.

2.2.2.c. Common to All Ecosystems: Livestock Grazing

Monitoring question D

1. How are livestock grazing practices (animal unit months [AUMs], time and timing, intensity, duration, and frequency) continuing the existing vegetative conditions (composition and structure) or moving vegetative conditions toward desired conditions?

Performance measure D

1. Changes in vegetative composition in allotments where modifications have been made to livestock grazing timing, intensity, or frequency, or all three.

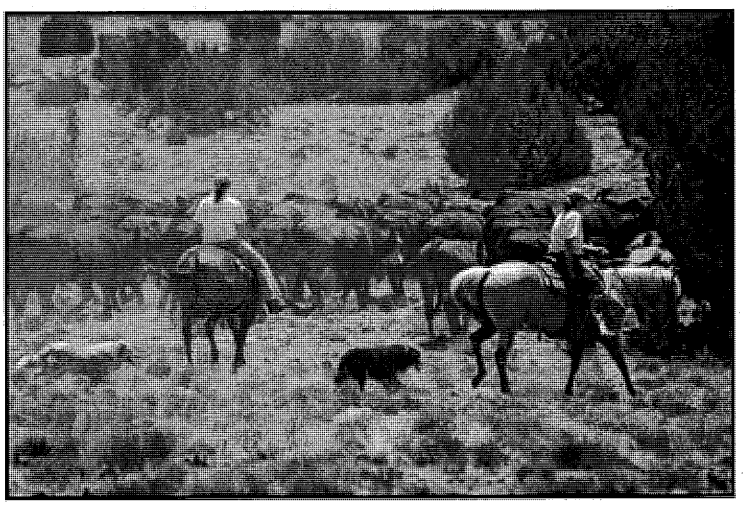

Figure 2-4. Livestock grazing in Vogel Canyon, Comanche National Grassland

2.2.2.d. The Canyonland Ecosystem

Monitoring question E

1. What is the distribution of oneseed juniper stands on the mesa tops and footslopes of canyons?

Performance measure E

1. Number of acres of oneseed juniper stands on mesa tops and canyon footslopes.

2.2.2.e. The Riparian and Aquatic Ecosystem

Monitoring question F

1. What is the trend in the proportion of the riparian ecosystem dominated by tamarisk on the Grasslands?

Performance measures F

1. Number of acres of riparian habitat that are dominated by tamarisk.
2. Number of acres of tamarisk-dominated habitat that are treated annually for eradication.

Monitoring question G

1. What is the distribution of native plant communities along the Cimarron River corridor, Purgatoire River corridor, Timpas Creek, and Sand Canyon?

Performance measure G

1. Number of acres of plains cottonwood/willow species communities.

2.2.2.f. The Sandsage Prairie Ecosystem

Monitoring question H

1. What is the plant community composition and structure in the Sandsage Prairie Ecosystem?

Performance measures H

1. Proportion of the ecosystem with plant communities dominated by native, perennial tall-structure vegetation.
2. Abundance (percentage of cover) of sand sagebrush (*Artemisia filifolia*).
3. Proportion of the ecosystem with plant communities dominated by annual forbs.
4. Proportion of the ecosystem in monocultures of sideoats grama (*Bouteloua curtipendula*).
5. Proportion of ecosystem with vegetation structure that is short (0–4 bands in Robel pole methodology) compared to that which is medium (5–11 in., Robel) compared to tall (≥12 in., Robel) (Robel and others 1970).

Monitoring question I

1. What is the distribution and abundance of lesser prairie chicken?

Performance measure I

1. Populations from spring surveys of lesser prairie chicken.

2.2.2.g. The Shortgrass Prairie Ecosystem

Monitoring question J

1. What is the trend in distribution and abundance of black-tailed prairie dog (a species-of-concern) colonies?

Performance measure J

1. Number of acres of occupied habitat, based on global positioning system (GPS) mapping.

Monitoring question K

1. What is the plant community composition and structure in the Shortgrass Prairie Ecosystem?

Performance measures K

1. Proportion of the ecosystem in monocultures of sideoats grama or James' galleta (*Pleuraphis jamesii*).
2. Proportion of the ecosystem with plant communities dominated by native sod-forming grasses.
3. Proportion of the ecosystem with plant communities dominated by native bunchgrasses.
4. Proportion of transects that contain both short- and tall-structure vegetation within subplots.

2.2.3. Economic and Social Resources

2.2.3.a. Common to All Economic and Social Resources

Monitoring question L

1. What is the trend in the flow of goods and services to the local communities and how does this compare to a rolling five-year average?

Performance measure L

1. Mineral royalty revenues, permitted and authorized head months, animal unit months, grazing fee credits utilized by grazing associations, recreation fees,[67] and special use fees.

2.2.4. Physical Resources

2.2.4.a. Heritage Resources

There are no primary monitoring questions and associated performance measures unique to heritage resources.

2.2.4.b. Landscape and Scenery Resources

There are no primary monitoring questions and associated performance measures unique to landscape and scenery resources.

2.2.4.c. Paleontological Resources

There are no primary monitoring questions and associated performance measures uniue to paleontological resources.

2.2.5. Special Areas

There are no primary monitoring questions and associated performance measures unique to any of the nine special areas.

2.3. Suitability of Areas

The Grasslands are generally suitable for a variety of uses, as provided for in the 2008 Planning Rule (USDA FS 2008).[68] The four broad use categories in Tables 2-1 and 2-2 are not intended to be all-inclusive. Other uses, projects, or activities, may be proposed during the life of the Plan. Uses that are not specifically identified as generally suitable would be evaluated in terms of the desired conditions for the ecosystem or special area. Uses that are neutral to, or help move the Grasslands toward, the desired conditions may be allowed. Specifics about suitable uses are addressed at the project or activity level and are subject to laws, regulations, and Plan guidelines.

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[67] Recreation fees maintained at unit generating such funds (Federal Lands Recreation Enhancement Act) (FLREA).

[68] See 36 CFR 219.7(a)(2)(iv); FR p. 21507. The 2008 Planning Rule requires the Responsible Official to identify lands not suitable for timber production within the plan area (36 CFR 219.12; FR p. 21510). Based on the definition of "Forest land" (36 CFR 219.16; FR p. 21512) and the criteria for determining suitability of forest land (FSH 2409.13), all land on the Grasslands is considered unsuitable for timber production. For details about this suitability determination, see the report Existing Conditions Descriptions: Chapter 7—Forests and Woodlands (USDA FS 2005).

2.3.1. Uses Generally Suitable Across the Grasslands

Table 2-1 summarizes the general suitability for four broad use categories in each of the Grasslands ecosystems. An "X" in a particular box indicates that the identified use may be compatible with an ecosystem's desired conditions. *Even though a use is identified as generally suitable in an ecosystem, additional guidelines may also apply to that use.* The guidelines to consider would include not only those specific to the ecosystem where the project or activity would take place, but those common to all ecosystems for land administration and for all ecological resources, and those that pertain to economic and social resources, and physical resources. See Part 3 of the Plan for descriptions of the guidelines that may apply when determining whether a use is generally suitable in an ecosystem.

Table 2-1. General suitability by ecosystem

Ecosystem and guidelines[69] (by Plan section)	Broad use categories			
	Livestock grazing	Oil and gas development	Motorized travel[70]	Utility corridors
Canyonland 3.1.1. 3.1.2.1. – 3.1.2.5. 3.1.3. 3.1.4.	X	X	X	X
Riparian and Aquatic 3.1.1. 3.1.2.1. – 3.1.2.5. 3.1.2.6. 3.1.3. 3.1.4.	X	X		X
Sandsage Prairie 3.1.1. 3.1.2.1. – 3.1.2.5. 3.1.2.7. 3.1.3. 3.1.4.	X	X	X	X

[69] See Part 3 of this Plan for a description of the guidelines that are identified by Plan section in this table, specific to the suitable use categories.

[70] Motorized travel includes off-highway vehicle (OHV) use. All motorized travel would be managed consistent with the Travel Management Rule which became effective December 9, 2005 (36 CFR Parts 212, 251, and 261). Motor vehicle use maps are available for the Cimarron and would be available for the Comanche by 2009.

Ecosystem and guidelines[69] (by Plan section)	Broad use categories			
	Livestock grazing	Oil and gas development	Motorized travel[70]	Utility corridors
Shortgrass Prairie 3.1.1. 3.1.2.1. – 3.1.2.5. 3.1.2.8. 3.1.3. 3.1.4.	X	X	X	X

The following Table 2-2 summarizes the suitability for four broad use categories in each of the nine special areas. An "X" in a particular box indicates that the identified use may be compatible with the desired conditions described for that special area. *Even though a use is identified as generally suitable in a special area, additional guidelines may also apply to that use.* To understand if a particular use is compatible with that special area's desired conditions, use the guideline references for each special area (see Table 2-2) along with those that apply to the ecosystem(s) where the special area is located (see Table 2-1). See Part 3 of the Plan for descriptions of the guidelines that may apply when determining whether a use is generally suitable in a special area.

Table 2-2. General suitability in special areas

Special areas and guidelines[71]	Broad use categories and guidelines			
	Livestock grazing	Oil and gas development	Motorized travel[72]	Utility corridors
Bent Canyon Bluffs Botanical Area – in the Shortgrass Prairie Ecosystem BCB-1 and BCB-2	X	X	X	X

[71] For the guidelines specific to the suitable use categories, see Part 3 of this Plan for a description of the special areas guidelines listed in this table, and for the applicable ecosystem guidelines that are listed by Plan section in Table 2-1.

[72] Motorized travel includes off-highway vehicle (OHV) use. All motorized travel would be managed consistent with the Travel Management Rule which became effective December 9, 2005 (36 CFR Parts 212, 251, and 261). Motor vehicle use maps are available for the Cimarron and would be available for the Comanche by 2009.

Special areas and guidelines[71]	Broad use categories and guidelines			
	Livestock grazing	Oil and gas development	Motorized travel[72]	Utility corridors
Campo RNA – in the Shortgrass Prairie Ecosystem CMP-1			X	
Comanche Lesser Prairie Chicken Habitat Zoological Area – in the Sandsage Prairie Ecosystem LPC-1 and LPC-2	X	X	X	X
Mesa de Maya Botanical Area – in the Shortgrass Prairie Ecosystem MDM-1 and MDM-2	X	X	X	X
OU Creek Botanical Area – in the Riparian and Aquatic and Shortgrass Prairie Ecosystems OUC-1 and OUC-2	X	X	X	X
Picket Wire Canyonlands Paleontological Area – in the Canyonland and Riparian and Aquatic Ecosystems PWC-1 and PWC-2	X		X	X

Special areas and guidelines[71]	Broad use categories and guidelines			
	Livestock grazing	Oil and gas development	Motorized travel[72]	Utility corridors
Picture Canyon Historical Area – in the Canyonland and Riparian and Aquatic Ecosystems PC-1 and PC-2	X	X	X	X
Santa Fe National Historical Trail – in all ecosystems SF-1 and SF-2	X	X	X	X
Vogel Canyon Historical Area – in the Canyonland, Riparian and Aquatic, and Shortgrass Prairie Ecosystems VC-1 and VC-2	X	X	X	X

Part 2 References

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Part 3. Design Criteria

3.1. Guidelines

This section, Part 3, of the Cimarron and Comanche National Grasslands Land Management Plan (Plan), contains the design criteria, or guidelines, that provide information and guidance for carrying out projects and activities[73] to help maintain or achieve the desired conditions (Part 1) and objectives (Part 2) of the Plan. Like Part 1 and Part 2, this section is organized according to the Grasslands' five resource-based categories (land administration; ecological resources; economic and social resources; physical resources; special areas). Maps are in Appendix H.

About Guidelines

If you don't see a particular resource addressed, by name, in the guidelines section, that does not mean that the resource is not managed, nor does it mean that the Grasslands considers that resource less important or valuable than those that are listed. In some cases, guidelines have been identified that are common to all ecosystems or resources, and would apply.

These guidelines are specific to the Grasslands. Laws, regulations, and Forest Service directives are not repeated here. Some resource areas, such as heritage resources or threatened and endangered species, have very specific direction in laws, regulations, or policies, Forest Service directives, and other sources, such as recovery plans; that direction is not repeated here; it may be adequate for managing the resource at the Grasslands level. For more details, see the 2008 Planning Rule (USDA FS 2008).

Guidelines contribute to maintaining or achieving desired conditions and objectives: they are specifications that a project or activity would adopt unless there is a reason to vary from the guidelines. If such variance is considered appropriate, the Responsible Official records, in the project-level document, the reasons for that variance; no Plan amendment is required.

About Other Referenced Direction

Material which follows under the heading "other referenced direction" is not considered a plan component, but can be helpful in designing projects and activities. It helps achieve desired conditions and ensures that projects and activities are consistent with existing laws, regulations, and policies that govern resource management of NFS lands and with existing decisions. As previously explained in the introduction of the Plan, the NFMA requirement that all authorized projects and activities be consistent with the Plan is not applicable to "other referenced direction", which are not plan components.

[73] Appendix E describes the proposed and possible actions that may take place on the Grasslands at the project or activity-level to help maintain or achieve desired conditions.

3.1.1. Land Administration

3.1.1.1. Common to All Ecosystems

Lands-1. Land adjustments should be considered when they contribute to the following:

1. Net reduction of Forest Service administrative costs and improvement of management efficiency.
2. Reduction of conflicts between objectives of the Forest Service and of private landowners, especially when conflicts adversely impact NFS management.

Lands-2. Land acquisitions by purchase, donation or exchange should consider the following:

1. Lands with important botanical, fishery, and wildlife, management value, particularly those that contribute to supporting self-sustaining populations of species-of-concern.
2. Lands that enhance the ability to manage rangeland resources and uses in a sustainable manner.
3. Lands with important heritage resources, important paleontological or geological sites, outstanding scenic values, or critical ecosystems or habitats, when these resources are threatened by change of use, or when management may be enhanced by public ownership.
4. Lands with essential habitats that support unique or important aquatic ecosystems. Priority areas should include:
    a. The Cimarron River
    b. The Purgatoire River
    c. Streams in the Carrizo drainage
    d. Timpas Creek
5. Lakes, streams, flood plains, wetlands, and riparian ecosystems.
6. Lands needed to protect resource values by reducing fire risks or soil erosion.
7. Lands needed to consolidate existing NFS lands.
8. Lands that would add to available Grasslands goods and services.
9. Lands in a municipal-supply watershed when:
    a. The community does not have the capability to acquire the essential tract.
    b. Grasslands management would provide the best insurance against existing or potential uses that are incompatible with effective watershed management.
    c. The lands are suitable, and would be used for other Grasslands programs in addition to watershed protection.

Lands-3. Land disposal should consider the following:

1. Lands in developed areas that have lost or are losing their grasslands character.
2. Land transferred to states, counties, cities when disposal would serve a greater public interest than would retention in Federal ownership.

3. Lands suitable for development by the private sector, when development (such as agricultural, industrial, recreational, or residential) would not adversely affect management of adjoining NFS land.
4. Lands isolated from other NFS lands.
5. Lands encumbered with occupancy trespass cases and encroachments involving substantial structural improvements.

3.1.2. Ecological Resources

Other Referenced Direction

Watershed conservation practices designed to protect soil, aquatic, and riparian systems would follow the design criteria found in Watershed Conservation Practices Handbook (USDA FS 2006).

3.1.2.1. Common to All Ecosystems

Ecol-1. Revegetation projects should use native plant species of local genetic stock.

Ecol-2. Short-term, temporary soil stabilization and groundcover projects should use non-persistent plant species while native perennials become established or are being re-established after disturbance.

Ecol-3. Ground-disturbing activities[74] (such as the construction and re-construction of roads, water improvements, pipelines, utilities, oil and gas facilities, and fencing; seismic exploration; oil and gas drilling; and water well drilling) should not take place where known species-of-concern plants are located.

Ecol-4. Mowing (not including road and trail maintenance) and prescribed burning of grasslands should not take place during nesting and brood-rearing periods of ground-nesting birds to protect their nests and young broods.

Ecol-5. Roads and other disturbed sites should be designed to the feasible numbers, widths, and total lengths that are consistent with the purpose of specific operations, local topography, and climate.

Ecol-6. Construction or reconstruction of all fencing should ensure that the bottom wire is smooth and 18 inches above the ground and the top wire is no higher than 42 inches above the ground.

Ecol-7. Seed mixes used for restoration projects should include a native seed mix beneficial to ecological resources.

[74] "Ground-disturbing activities" refers to actions such as the construction of roads, oil and gas wells, pipelines and water wells that result in the destruction of both above- and below-ground vegetation.

Other Referenced Direction

Additional fence construction guidelines are found in the handbook, "Fences" (USDI BLM 1988).

3.1.2.2. Nonnative Invasive Plant Species

Invas-1. Projects or activities that would authorize the use of forage products should be limited to those that are certified "noxious weed seed-free."

Invas-2. Treatment of nonnative invasive plant species in areas having known populations of plant species-of-concern should avoid harm to these species in order to maintain sustainable species-of-concern populations.

Other Referenced Direction

The direction for managing nonnative invasive plant species comes from the decision notice for the 1998 environmental assessment for noxious weed management for the PSICC (USDA FS 1998).

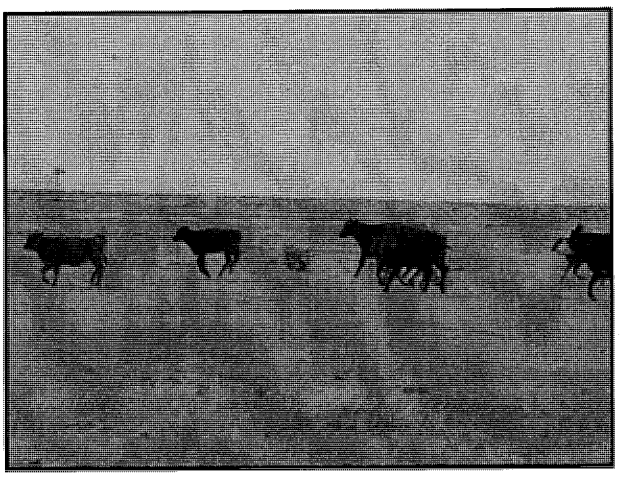

Figure 3-1. Running cows, Comanche National Grassland

3.1.2.3. Livestock Grazing

LivGraz-1. Newly-constructed livestock water tanks should include the installation of durable and effective escape ramps for birds and small mammals. As part of existing water tanks, ramps should be installed where missing, or upgraded, as needed, during routine stock tank maintenance.

LivGraz-2. Grazing systems should be phased out that allow for livestock use in an individual unit during the entire vegetative growth period (for example, season long), except where such management has been determined to help maintain or move toward the desired plant community.

LivGraz-3. Livestock should be moved from the grazing unit or allotment when further utilization on key areas may cause changes in the vegetation that do not contribute to achieving desired vegetative conditions.

LivGraz-4. Livestock grazing operations should be scheduled outside of the flowering and fruiting periods of known locations of species-of-concern plants where these species are impacted by this activity.

3.1.2.4. Wildlife

Wlife-1. Timing restrictions and buffers should be applied where activities cause unacceptable disturbances during reproductive periods (denning, nesting, brood-rearing) to species-of-concern and species-of-interest.

3.1.2.5. The Canyonland Ecosystem

There are no plan-level guidelines specific to the Canyonland Ecosystem. Guidelines that do apply are in Section 3.1.1.1. Common to All Ecosystems (Land Administration) and Section 3.1.2.1. Common to All Ecosystems (Ecological Resources).

3.1.2.6. The Riparian and Aquatic Ecosystem

RipAq-1. Activities involving road construction and other site disturbances should be designed to reduce sediment discharge into streams, lakes, and wetlands.

3.1.2.7. The Sandsage Prairie Ecosystem

Sand-1. New structures or facilities should not be constructed within a distance (typically within two miles) that negatively impacts lesser prairie chickens on known display grounds. Known display grounds are defined as those with lesser prairie chicken (*Tympanuchus pallidicinctus*) activity during one of the last five years.

Sand-2. Timing restrictions (typically from March 15 to July 15) and buffers (typically within two miles) should be applied where unacceptable disturbances to the lekking, nesting, and early brood-rearing life-cycle stages of the lesser prairie chicken are caused by activities such as:

1. Construction and reconstruction of water impoundments
2. Dog training
3. Oil and gas drilling
4. Pipelines, utilities, oil and gas facilities, and fencing
5. Road construction
6. Seismic exploration
7. Water-well drilling

Sand-3. Adequate residual cover (measured before the nesting period) should be carried over from the previous growing season in areas where tall, dense cover is desired for ground-nesting birds that nest in April or May.

Sand-4. Wildlife viewing sites should not exceed acceptable wildlife disturbance levels during key periods.

Figure 3-2. Swift fox (*Vulpes velox*), Comanche National Grassland

3.1.2.8. The Shortgrass Prairie Ecosystem

Short-1. Timing restrictions (typically from April 10 to July 10) and buffers (typically within 0.25 miles) should be applied where activities cause unacceptable disturbances to mountain plover (*Charadrius montanus*) and long-billed curlew (*Numenius americanus*) during reproductive periods.

Short-2. Timing restrictions (typically from March 1 to August 31) and buffers (typically within 0.5 miles) should be applied where activities cause unacceptable disturbances to active swift fox den sites.

3.1.3. Economic and Social Resources

3.1.3.1. Common to All Economic and Social Resources

There are no plan-level guidelines common to all economic and social resources.

3.1.3.2. Minerals and Energy

There are no plan-level guidelines for this section specific to minerals and energy.

Other Referenced Direction[75]

The direction for all oil and gas operations that addresses facility design (such as roads, well sites) and potential impacts to resources comes from the Record of Decision to the 1992 Oil and Gas environmental impact statement for the PSICC (USDA FS 1992).

[75] See Appendix F for a description about how the Plan aligns with the national energy policy.

3.1.3.3. Recreation and Tourism

RecTour-1. New facilities should be designed to resemble natural patterns.

RecTour-2. Construction and design of facilities should be consistent with the development scale appropriate to the ROS class.

RecTour-3. When closing, rehabilitating, or mitigating resource conditions at dispersed recreation sites, native vegetation and natural barriers should be used, as well as posted information to encourage public assistance in rehabilitation efforts.

Other Referenced Direction

Additional facility construction and design guidance is in the Forest Service Built Environment Image Guide (USDA FS 2001).

Recreation site operation changes and maintenance, and prioritization of investments would be consistent with the Rocky Mountain Region's "Recreation Strategy" with guidance from the Pike and San Isabel National Forests, Cimarron and Comanche National Grasslands Recreation Facility Master Plan and the most current Recreation Facility Analysis 5-year program of work (USDA FS 2007).

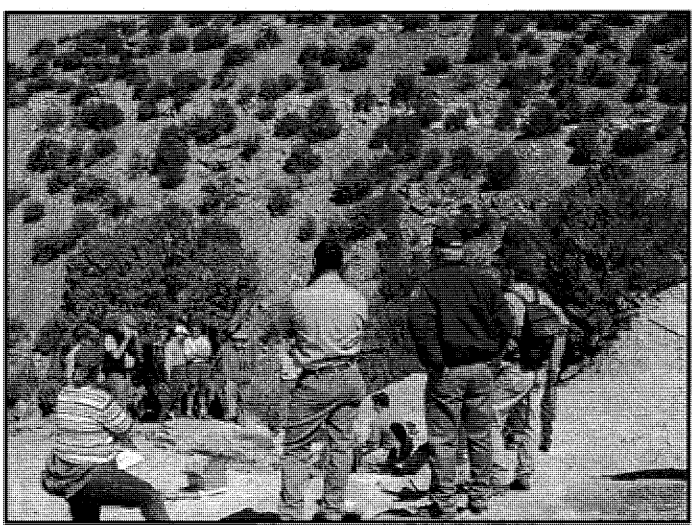

Figure 3-3. Lecture at dig site, Picket Wire Canyonlands Paleontological Area, Comanche National Grassland

3.1.4. Physical Resources

3.1.4.1. Common to All Physical Resources

There are no plan-level guidelines common to all physical resources.

3.1.4.2. Heritage Resources

There are no guidelines specific to heritage resources.

3.1.4.3. Landscape and Scenery Resources

There are no guidelines specific to landscape and scenery resources.

Other Referenced Direction

Integrating human values about scenic resources into resource management is guided by the Scenery Management System (SMS) developed for the Grasslands (USDA FS 2005).

3.1.4.4. Paleontological Resources

Paleo-1. Before ground-disturbing activities begin, known significant paleontological resources should be salvaged and curated in a federally-approved repository.

Other Referenced Direction

The Paleontology Technical Guide provides the guidance for management of paleontological resources (USDA FS 2004).

3.1.5. Special Areas

3.1.5.1. Bent Canyon Bluffs Botanical Area

BCB-1. Designated routes for motor vehicle use [76] should avoid areas that are necessary for the protection of habitats and populations of species-of-concern plants.

BCB-2. Construction of new structures, facilities, and pipelines should avoid unique geological features.

3.1.5.2. The Campo Research Natural Area

CMP-1. Designated routes for motor vehicle use should avoid habitats and populations of shortgrass prairie representative species.

3.1.5.3. The Comanche Lesser Prairie Chicken Habitat Zoological Area

LPC-1. Livestock grazing should take place in ways that do not result in negative effects on lesser prairie chicken nesting habitat.

LPC-2. Livestock grazing should take place in ways that help ensure the occurrence of desired changes in plant species composition.

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[76] All motorized travel would be managed consistent with the Travel Management Rule which became effective December 9, 2005 (36 CFR Parts 212, 251, and 261).

3.1.5.4. Mesa de Maya Botanical Area

MDM-1. Designated routes for motor vehicle use should avoid habitats and populations of species-of-concern plants.

MDM-2. Construction of new structures, facilities, and pipelines should avoid unique geological features.

3.1.5.5. OU Creek Botanical Area

OUC-1. Designated routes for motor vehicle use should avoid habitats and populations of species-of-concern plants.

OUC-2. Construction of new structures, facilities, and pipelines should avoid unique geological features.

3.1.5.6. The Picket Wire Canyonlands Paleontological Area

PWC-1. Shrub plantings should be designed to improve cover and foraging habitat for native bird species. Cottonwood and shrub plantings and grass reseeding projects should be designed to improve cover and foraging habitat for elk (*Cervus elaphus*).

PWC-2. Vegetation management should take place in ways that complement the overall value of heritage and paleontological resources.

Other Referenced Direction

The dawn-to-dusk closure order would continue to limit motorized access consistent with Order #08-15 (USDA FS 2008b).

3.1.5.7. Picture Canyon Historical Area

PC-1. Designated routes for motor vehicle use should avoid habitats and populations of species-of-concern plants and heritage and paleontological resources.

PC-2. Construction of new structures, facilities, and pipelines should avoid unique geological features.

Other Referenced Direction

Motor vehicle use is restricted under Order #08-12 to protect resources and for other management considerations (USDA FS 2008c).

3.1.5.8. The Santa Fe National Historic Trail

SF-1. Ground-disturbing activities should not take place in the designated major routes of the Santa Fe National Historic Trail (including ruts, rut zones, swales, and vegetation changes) and within the 300-foot buffer zone on either side of the designated trail.

SF-2. Placement of structures near the Santa Fe National Historic Trail should consider landscape and scenery resources.

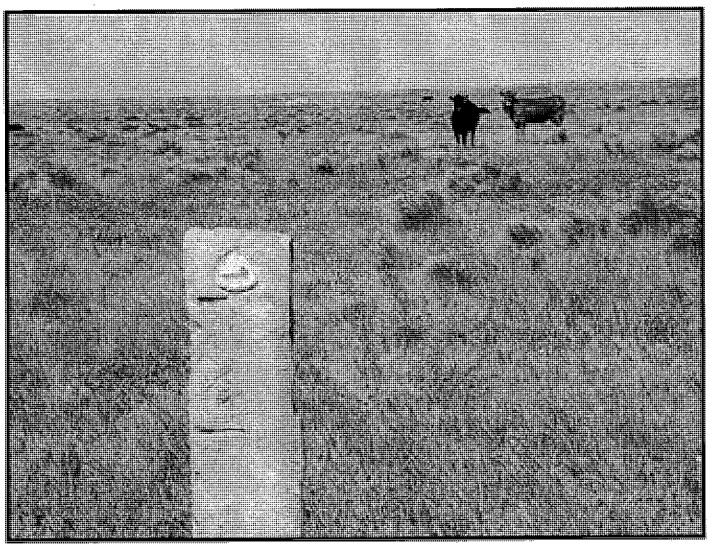

Figure 3-4. Marker on Santa Fe National Historic Trail, Cimarron National Grassland

3.1.5.9. Vogel Canyon Historical Area

VC-1. Designated routes for motor vehicle use should avoid habitats and populations of species-of-concern plants and heritage and paleontological resources.

VC-2. Construction of new structures, facilities, and pipelines should avoid unique geological features.

Other Referenced Direction

Motor vehicle use is restricted under Order #08-12 to protect resources and for other management considerations (USDA FS 2008c).

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References, Glossary, Acronyms, and List of Species Names

References

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Appendix A. Contributions to the Forest Service Strategic Plan

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