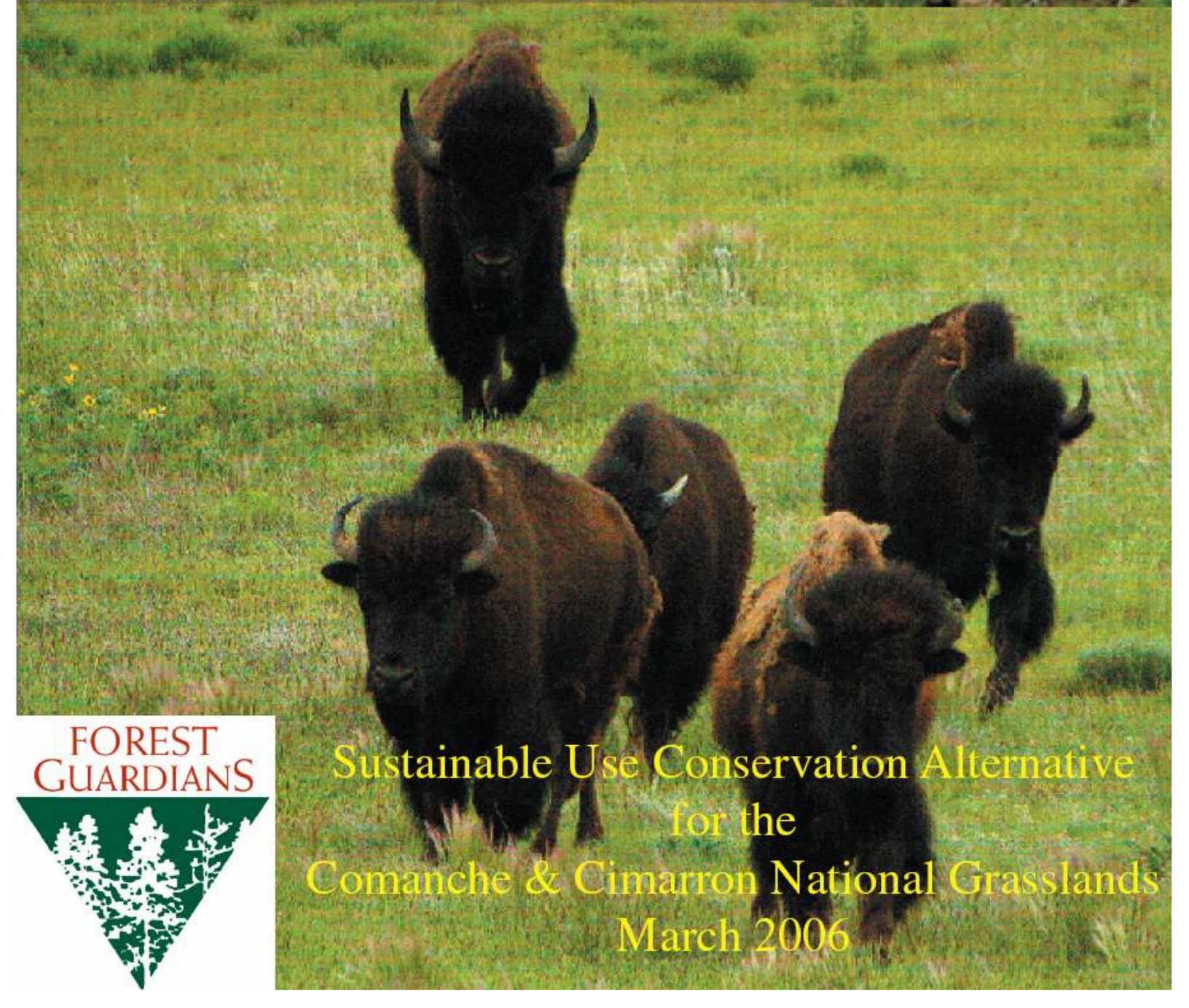




A Vision for Wild Grasslands



Sustainable Use Conservation Alternative
for the
Comanche & Cimarron National Grasslands
March 2006

FOREST
GUARDIANS





A SUSTAINABLE USE CONSERVATION ALTERNATIVE FOR THE CIMARRON AND COMANCHE NATIONAL GRASSLANDS REVISED LAND MANAGEMENT PLAN

INTRODUCTION

On December 28, 2005 the U.S. Forest Service released its Draft Cimarron and Comanche National Grasslands Land Management Plan (70 FR 77373-77374). The Forest Service has been working on the revised plan for several years. Every 10 to 15 years each Forest Service management division must undergo a management plan revision, and the existing plan is over 20 years old. The Comanche and Cimarron National Grasslands revision process and subsequent Revised Plan will affect the general character and specific components of these public lands including native species and habitat viability, livestock grazing, oil and gas development, and recreation. The revision process presents an opportunity to highlight the diverse wildlife and unique natural and cultural features of the Southern Great Plains prairie region and to promote a shift to biodiversity protection and a nature-based economy. This is also an opportunity for the public to influence management direction on its lands. The purpose of this Sustainable Use Conservation Alternative is to provide a set of land and resource management planning options for the Comanche and Cimarron National Grasslands that promote restoration and protection of native wildlife and natural communities while allowing sustainable human uses of these federal lands.

The Comanche and Cimarron National Grasslands Context

The Comanche and Cimarron National Grasslands are hidden jewels within the vast network of public land managed by the federal government. Though containing just over half a million acres these lands host over 1,000 vertebrate and plant species, rare plant communities, picturesque rocky canyons and expansive mesas, numerous sites displaying ancient Native American rock art, long stretches of the Santa Fe National Historic Trail, and the largest assemblage of preserved dinosaur tracks in North America.

The Comanche and Cimarron are also home to the largest complex of black-tailed prairie dogs on public land in the Southern Plains. Prairie dogs are keystone species (Kotliar et al. 1999; Kotliar 2000; Miller et al. 2000). They serve as prey for a variety of prairie wildlife and some use their burrows for breeding sites and shelter. The endangered black-footed ferret, now extirpated from the Cimarron and Comanche, rely on prairie dogs for over 90 percent of their diet. Several

birds, including the imperiled mountain plover, nest and feed in prairie dog towns because of the increased insect biomass and vegetative diversity on colonies versus un-colonized grassland. Black-tailed prairie dog populations have declined by close to 99 percent, and this decline is linked to the imperilment of other species. Prairie dog recovery and protection—especially on our public Grasslands—is essential to the survival of dependent species.

Commercial livestock grazing by locally based ranchers has traditionally been the primary use of the Cimarron and Comanche Grasslands. Located off the beaten path in the rural Southern Great Plains—far from urban centers and major highways or the mountains and forests most people associate with public lands—these national grasslands have historically received relatively few recreational visitors and little attention from the general public.

However, this is changing. As Colorado's human population grows, especially along the Front Range and in the mountains, residents seek new places to find open space, natural beauty, solitude, and opportunities to experience wildlife, wild plants, and nature. Colorado's mountains are getting crowded. More urbanites now head east to the plains to recreate and to see more of the wildlife, including prairie dogs, foxes, coyotes, pronghorn, eagles, and hawks, disappearing from their own backyards to make way for more people and businesses. Kansans are taking greater advantage of opportunities provided by their largest public land area as well. Nationwide activities such as bird- and other wildlife watching, hiking, and camping are on the rise.

Additionally, there is a growing realization that it is not just our forests, waterways, and coastlines that are suffering biological destruction and species loss; North America's grasslands are among the most imperiled natural areas in the world. This is not surprising. It should be clear to anyone who flies over the Great Plains and looks down to see the impressive grid of crop fields and cow pastures interspersed with center pivot irrigation circles. We have devoted grasslands almost exclusively to agriculture. Humans had altered the prairie grassland ecosystems for thousands of years. But the large-scale human settlement of the Great Plains over the past 150 years brought wholesale transformation, taming much of the wildness out of the region with the plow, a dense network of roads and barbed wire fences; high-tech irrigation schemes, the purposeful and accidental introduction of non-native forage and invasive plants, and the deliberate—often government-sponsored—extermination of native animals believed to lower agricultural production. The shortgrass prairie regions emerged in better shape than the more eastern tallgrass prairies, where 99.9 percent of the native vegetation is now gone. Yet, only 23 percent of the native shortgrass prairie vegetation remains (USDA Forest Service 1996).

To become the "World's Breadbasket," the United States sacrificed most Great Plains wildlife and habitat once so vast and diverse that it rivaled Africa's savannas. Top predators, wolves and grizzly bears were shot and poisoned out of the prairie. Systematic execution nearly exterminated the American bison population from tens of millions to a few hundred individuals at the end of the "Great Slaughter" in the early 1880s (Lott 2002). As the bison perished, the seemingly endless herds of elk and pronghorn lost the majority of their feeding grounds and ability to roam freely across the plains when fences, roads, and plowed fields circumscribed migration routes. Key stopover points for millions of migrating birds that historically made the prairie their temporary home disappeared. Still persecuted as agricultural pests, the beaver and prairie dog—both keystone species—were nearly wiped out. Black-tailed prairie dog populations are currently at only one to two percent of their historic size, and beavers are missing from most of the riparian systems where they belong. Prairie ecosystems continue to be degraded by direct habitat destruction, suppression of natural processes such as wildfire, fragmentation by roads and urban sprawl, and adverse impacts from the spread of invasive species.

Every nation must feed its citizens. We all deserve high quality affordable food that benefits the country's producers as well as consumers. Yet a country as advanced as the United States can find creative ways to make room for and protect some of the creatures who lost out in our quest to become an agricultural superpower—so successful that one of our biggest social and health problems has become an excess of food. The National Grasslands should therefore increasingly be focal areas for restoring biodiversity.

We can start revitalizing the wild prairie by focusing on our National Grasslands. Very few protected areas exist in the Great Plains for native wildlife. Because most of the land in the Southern Plains is privately owned and devoted to commercial farming and ranching, the National Grasslands offer some of the best hope for restoring and conserving significant pieces of native prairie. However, shifting old management procedures and practices will be a significant social challenge as well as a biological challenge. Those who have benefited from the long-standing policy of prioritizing commercial activities over the natural heritage of public lands have strongly opposed conservation efforts by the Forest Service and continue to resist new proposals that might limit commercial use in any way. To prevent the total loss of the Southern Prairie natural heritage, Grasslands management must evolve.

The U.S. Forest Service manages 20 National Grasslands primarily concentrated in the Great Plains. The Comanche and Cimarron comprise part of a cluster of National Grasslands in the Southern Plains that also include the Kiowa in northeastern New Mexico and the Rita Blanca, which sits on the Texas and Oklahoma panhandles right at the New Mexico border. The Forest Service Southwest Region Three manages the Kiowa and Rita Blanca along with Black Kettle, which is on the eastern edge of the Texas panhandle in Oklahoma and outside the shortgrass prairie range.

The Rocky Mountain Region of U.S. Forest Service manages the Comanche and Cimarron Grasslands within the Pike and San Isabel and Comanche and Cimarron (PSICC) National Forest System.

The Comanche's 435,028 acres is divided into two management units in southeastern Colorado, the Timpas Unit in Otero County south of the town of La Junta and the Carrizo Unit in Baca and eastern Las Animas Counties.

The Cimarron occupies part of southwestern Kansas along the Cimarron River in Morton and Stevens Counties, and at 108,175 acres, is the largest public land holding in the state.

Both the Comanche and Cimarron National Grasslands sit within the High Plains, characterized by shortgrass prairie vegetation and average annual rainfall below 20 inches. Livestock ranching remains the dominant use of the Comanche and Cimarron National Grasslands with oil and gas development a close second, but the Forest Service must manage them for a range of uses and values, including native wildlife, plants, and ecosystem functions.

National Grasslands Management

The National Grasslands began as a bailout program for Dust Bowl farmers who went bust in the 1930s. The Homestead Act of 1862, which granted U.S. citizens deed to 160 acres of plains land for farming, and the railroad boom catalyzed a mass migration from the East Coast. By 1890, almost six million people had made their way to the Plains. At the time, national priorities

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included controlling the region politically, killing or expelling the Native American inhabitants, and expanding the country's agricultural base. However, the plentiful water and fertile soils that made states like Illinois incredibly productive were not characteristic of the western edge of the Plains. Tricked by a few atypical wet years in the early 1900s, the farmers and ranchers realized they had exceed the land's carrying capacity many times over with crops and livestock when the major drought hit in 1930. What is now the Comanche and Cimarron Grasslands became "ground-zero" for the Dust Bowl's ravages. About 850 million tons of topsoil blew off the Southern Plains in 1935 alone (Worster 1979). The farmers' plight was then exacerbated by the Great Depression, and many were on the brink of starvation when the U.S. Government started buying up failed farms under the National Industrial Act of 1933 and the Emergency Relief Act of 1935.

The U.S. Department of Agriculture's Soil Conservation Service consolidated and managed these "Land Utilization Projects," under the Bankhead-Jones Farm Tenant Act of 1937. The Forest Service took over administrative control in 1954, and in 1960, the Secretary of Agriculture christened these dispersed clusters of public land, collectively known as the National Grasslands.

While the National Grasslands are subject to the variety of federal land use and environmental laws, regulations, and guidelines that govern management on all National Forest System lands, Bankhead-Jones continues to direct National Grasslands policy. In 1962 the Department of Agriculture determined that oil, gas, and mineral extraction were consistent uses, and in 1981 energy development became an explicit purpose of the Grasslands when Congress amended Bankhead-Jones. Congress directed the Forest Service to protect recreational facilities on the Grasslands in 1966. Another 1962 amendment to the Act made "protecting fish and wildlife" part of the Grasslands mandate as well. As of this writing, the Bankhead-Jones Farm Tenant Act authorizes the Secretary of Agriculture to,

(D)velop 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, protecting fish and wildlife, developing and protecting recreational facilities, mitigating floods, preventing impairment of dams and reservoirs, developing energy resources, conserving surface and subsurface moisture, protecting the watersheds of navigable streams, and protecting the public lands, health, safety, and welfare, but not to build industrial parks or establish private industrial or commercial enterprises. (7 U.S.C. § 1010).

The Bankhead-Jones regulations also authorize the Forest Service to make the Grasslands a model for "sound and progressive" conservation and land use principles in their geographic regions. This includes influencing practices on private lands (36 C.F.R. 213.1). The regulations specify,

The Chief of the Forest Service shall, to the extent such action is feasible provide that policies for management of the Federally-owned lands exert a favorable influence for securing sound land conservation practices on associated private lands. (36 C.F.R. 213.1(d)).

Other laws that affect National Grasslands management include the Clean Water Act, Endangered Species Act, Multiple-Use Sustained-Yield Act, the National Environmental Policy

Act, Wild and Scenic Rivers Act, and Wilderness Act. The National Forest Management Act of 1976 directs the land management planning process.

Management Plan Revision Process

The Forest Service implemented the current Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands Land and Resource Management Plan in 1984. On May 26, 2005, the Forest Service gave public notice (70 FR 30411) that the Comanche and Cimarron plan revision process would abide by a new forest planning rule announced January 5, 2005 (70 FR 1022-1061). Under the current planning process, the Forest Service is revising the Grasslands plan separately from the Forest units.

The PSICC administrators and district rangers for the Grasslands spent several years undergoing a scoping process for preliminary information gathering to develop the revised plan. They issued a set of draft "Specialist Reports" dated May 10, 2005 describing current conditions on the Grasslands, available on the Forest Service Plan Revision website at: http://www.fs.fed.us/r2/psicc/projects/forest_revision/index.shtml. PSICC staff held four public meetings to gain input for the revised plan in June 2005. Public comments on the Draft Cimarron and Comanche National Grasslands Land Management Plan are due April 3, 2006. The PSICC management plan revision team expects to finalize the Plan in September 2006.

In a departure from policy before the new rule took effect, current planning regulations do not require the Forest Service to develop a range of alternative plans for consideration. However the Forest Supervisor, the Responsible Official charged with overseeing plan revision, can develop and consider planning options as part of the revision process (36 CFR 219.7(a)(6)). We have developed this Alternative as an option to be considered by the Forest Service and the public as an alternative to the Forest Service's Draft Plan, to be incorporated into the final Revised Plan as a whole or in part. The Alternative focuses on restoring and conserving the native biodiversity, healthy ecosystems, and natural ecological processes in the region while continuing compatible, sustainable commercial and recreational activities.

THE PLAN

The Alternative proceeds in 11 sections based on topic. Each section includes three parts consistent with the Revised Plan structure followed by the Forest Service:

1. A **Vision** for the Grasslands that includes a set of future desired conditions, or long-term outcomes to be achieved over the course of the new plan and beyond.
2. A **Strategy** for achieving those desired conditions that includes specific management and monitoring objectives.
3. **Design Criteria**—guidelines that provide preexisting management direction for Forest Service activities.

As a whole, the Alternative provides an ecologically and economically sound option for Comanche and Cimarron land management.

Forest Guardians has developed, with the evidence and advice of scientists, organizations, and citizens, this Sustainable Use Conservation Alternative for the Comanche and Cimarron National Grasslands Land Management Plan revision process

- Represents a significant public interest in restoring and conserving the native biodiversity, healthy ecosystems, and natural ecological processes in the region.
- Recognizes that vital, functioning native ecosystems are valuable in their own right and that humans depend on the services these natural systems provide, including clean air and water and fertile soil.
- Responds to the growing demands of the national public for wildlife and natural habitat protection and remains sensitive to the needs and desires of the local human community.
- Acknowledges the Forest Service mandate to retain multiple uses on the National Grasslands lands, including recreational activities, ecologically-sensitive grazing, and other resource uses, recognizing that these uses are subordinate to sustainable ecological management.
- Outlines a comprehensive plan that combines sustainable local resource use with the necessary tools to implement a management system that will prevent and reverse some of the negative ecological trends described above
- Embodies the provisions of the National Forest Management Act, the implementing regulations, and other guiding documents

The primary goal of this proposed Sustainable Use Conservation Alternative is to provide the information and recommend management prescriptions and guidelines for restoring and protecting the native biological diversity and natural ecological processes of the Comanche and Cimarron National Grasslands. This includes:

- Establishing these federal lands as core conservation areas with an eye toward creating future linkages with other public and private conservation lands to enable wildlife movement and migration that more closely approximates natural conditions.

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- Promoting local and region-wide tolerance of important but controversial wildlife such as prairie dogs and beavers, large free-roaming native ungulates including bison, and predators.
- Promoting sustainable interactions between the local human community, the larger public, and the natural environment of the Comanche and Cimarron National Grasslands.

Advancing the health and proper functionality of native biological communities within the Comanche and Cimarron requires careful conservation planning and management. The Alternative's management recommendations are based on the most current scientific research and species data. We benefited from other National Forest and Grassland plans and alternatives, including the Mountains to Mesas Plan from Colorado (<http://www.hccaonline.org/page.cfm?pageid=2059>), Northern Plains Conservation Network (<http://www.npcn.net>), the Sustainable Multiple Use Alternative by the Three Forests Coalition in Utah (<http://www.redrockforests.org/tfc/>), and the Northern Great Plains Management Plans (<http://www.fs.fed.us/ngp/plan/feis.htm>). These plans and alternatives served as templates and additional guidance for this work. As ecosystem information and conservation methods and opportunities change, the Cimarron and Comanche Grassland managers will need to make appropriate modifications.

Desired conditions, objectives, and design criteria (guidelines), presented in detail below, are based on ecosystem protection, and maximum feasible recovery and health rather than on risk-based management for minimal wildlife and ecosystem values. Objectives, guidelines and monitoring requirements are stated in objective, measurable terms so that Grassland managers and users can help reach or maintain the Desired Conditions. While we believe that standards are essential public commitments of management by the Forest Service to establish accountability, the 2005 regulations do not allow for standards (See 36 CFR 219, Part A). We, along with many other organizations, support challenges to these regulations. We have substituted guidelines for standards, but believe that these lack essential accountability, much as our society establishes standards for highways, buildings, professionals, and businesses.

GRASSLAND MANAGEMENT PLANNING PRINCIPLES

The new forest planning rule issued by the Bush Administration on January 5, 2005 (70 FR 1022-1061) and promulgated in the Department of Agriculture's forest planning regulations (36 CFR 219.1-219.16) significantly change how the Forest Service revises Forest and Grassland land and resource management plans. The Bush Administration believes that modifications in the regulations will enable planning processes to be exempted, or "categorically excluded," from a full environmental analysis resulting in an Environmental Impact Statement (EIS), as required by the National Environmental Policy Act (NEPA). The National Forest Management Act stipulates that Forest and Grassland plans must conform to NEPA requirements. The EIS process can be at times cumbersome resulting in instances of non-compliance by the Forest Service. However, the EIS process laid out clear expectations regarding authority, the role of public participation, decision timelines, appeal procedures, and the need to address potential impacts of plans to the environment. The 2005 forest planning regulations are in some ways simpler but provide less clarity.

U.S. citizens must be able to hold their government accountable for its actions. U.S. Government agencies, including the Forest Service, must uphold certain standards to enable public accountability in policy making and implementation. Some of these standards are codified and others are derived from shared democratic values. The U.S. public duly expects government decision making to follow the mandates set forth by its democratically elected Congress, facilitate public participation and influence, utilize the best available information, remain open and transparent, define clear goals and objects, enable objective evaluation, and provide feedback mechanisms for improvement.

The 2005 forest planning regulations provide guidance in some of these areas. The Comanche and Cimarron National Grasslands plan revision process would be significantly improved if the Forest Service bolstered these guidelines by outlining clear expectations regarding revision and management planning procedures. We offer the following set of management planning principles for the Forest Service to provide assurances to the public that democratic standards will be upheld throughout the plan revision process and that the public will be able to hold the Service accountable to provisions in the Revised Plan.

Equal Public Participation and Power

We believe that all members of the public, not just the commercial users of public lands, should have influence over the management of our National Grasslands. Reaching decisions through transparent, informed, and democratic processes that consider potentially affected parties, including, in absentia, future generations of humans and other species is essential. The Forest Service shall involve the public in reciprocal relationships (i.e., care as well as use) regarding its Grasslands management activities.

Adaptive, Precautionary Management

The benefit of scientific uncertainty should favor the native species, habitat, and ecosystem health rather than harm. In circumstances in which there is insufficient information available to gauge the impacts of an action, deference must be given to protecting native biological diversity.

The goal of precautionary management is to bring human uses of the Grasslands within constraints of nature so that the Grasslands may eventually support all species with natural abundance and diversity. Adaptive management means habitually considering whether activities implicated in impairment of native species, habitat, and ecosystems are necessary and to seek less destructive, more appropriate ways of using or managing the Grasslands.

Science- and Ethics-Based Decision-Making

The best scientific information available is developed and used to deliver technical and community assistance and to support ecological, economic, and social sustainability. Improve the knowledge base provided through research, inventory, and monitoring to enhance scientific understanding of ecosystems, including humans, to support decision making and sustainable management of the Grasslands. The Forest Service must respond to scientific evidence based on sound methods regardless of the source from which that information comes. Decisions must also be made using ethical principles.

Managerial Accountability and Transparency

The National Grasslands are publicly owned by an entire nation. Managers are accountable to the entire nation (including future generations) for transparency of information, participatory decision-making, long-term as well as short-term fiscal responsibility, long-term sustainability, and responsiveness to national as well as local desires for both non-consumptive as well as consumptive uses. The Forest Service must cooperate and exchange information with the Colorado Division of Wildlife and the Kansas Department of Wildlife and Parks, scientists, citizens, other public land managers, and Grassland users to prevent impairment of and insure candid reporting on the condition and trends of all types of Grassland resources and their underlying ecosystem processes. The Forest Service must ensure the transparency of information, surveying and monitoring methods, and gaps in essential information regarding productivity of the land.

Measurable Desired Conditions, Objectives, and Guidelines

Although under the new planning regulations, only guidelines will be included in the final plan, we insist that these be treated as standards, divergence from which requires full National Environmental Policy Act environmental assessments or environmental impact statements (not categorical exclusions). Standards are actions that must be followed or are required limits to activities in order to achieve grassland/forest objectives. Site-specific deviations from standards must be analyzed and documented in management plan amendments. Objectives and standards should be measurable to enable the public to monitor compliance and non-compliance.

Responsive Monitoring and Evaluation

Monitoring and evaluation are separate, sequential activities required by NFMA regulations to determine how well objectives have been met and how closely management standards and guidelines have been applied. Monitoring generally includes the collection of data and information, either by observation or measurement. Evaluation is the analysis of the data and

information collected during the monitoring phase. The evaluation results are used to determine the need to revise management plans or how they are implemented, and form a basis for adapting management on national grasslands and national forests. Monitoring and evaluation keep the revised management plan up-to-date and responsive to changing issues by verifying the effectiveness of management plan standards and guidelines and anticipated program and project effects on resources, and providing information for amendments to the management plan.

We want the plan to require adequate monitoring of human uses and their impacts. For example, grazing forage utilization rates and impacts on riparian and other natural features should be monitored, and the results of monitoring should be used to determine need for livestock reductions or riparian exclosures.

Diligent Enforcement

We want protections for wildlife and plants within the plan to be enforceable. We are concerned that the plan will be largely open to the discretion of US Forest Service staff, and choices staff makes could be overly influenced by industry (oil and gas, cattle) to the detriment of natural values on the grasslands. The Forest Service must take appropriate law enforcement or administrative actions on all unauthorized uses.

**GENERAL DESIRED CONDITIONS
FOR GUIDING ECOSYSTEM AND RESOURCE MANAGEMENT**

We selected and adapted these Desired Conditions based on principles of conservation biology and sustainable resource use. The current Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands Land and Resource Management Plan, annual monitoring reports, and the Forest Service's Specialist Reports on the Grasslands informed this process. Our participation at public meetings, written summaries of public comments (http://www.fs.fed.us/r2/psicc/projects/forest_revision/newsletters.shtml), and discussions with Forest Service staff members also influenced the selection of desired conditions. This list of Desired Conditions is intended to guide management activities on the Comanche and Cimarron National Grasslands for the life of the Revised Plan and beyond.

- 1. Healthy Air, Water, and Soil**
- 2. Restoration and Protection of All Native Ecosystems**
- 3. Recovery and Conservation of Native Plant and Animal Species**
- 4. Adaptation to Ecological Processes**
- 5. Consolidation of Fragmented Landholdings and Connectivity between Other Public Lands and Protected Areas**
- 6. Careful Control and Prevention of Invasive and Exotic Species**
- 7. Responsible and Sustainable Resource Use**
- 8. Economically Vibrant, Ecologically Sensitive Recreation**
- 9. Safeguards for Important Historic Resources**
- 10. Preservation of Scenic Beauty**
- 11. Designation and Protection of Special Areas**

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HEALTHY AIR, WATER, AND SOIL

AIR

Existing Conditions

Current threats to air quality include neighboring agricultural operations, especially hog farms; livestock feedlots; emissions from gas compressors and other oil and gas facilities; emissions and dust from vehicular traffic related to livestock grazing, oil and gas facilities, and recreation; dust from strong winds; trash burning; and particulates from wildfires and prescribed burns on and around the Grasslands.

Desired Conditions

The Comanche and Cimarron planning area sustains high air, water, and soil quality sufficient to enable native species and ecosystems to thrive.

Human uses of the Grasslands are managed to surpass air quality standards and prevent air pollution.

The Forest Service works with surrounding communities and businesses to ensure that human activities outside the Grasslands do not harm air quality.

Objectives

- Air quality within the Comanche and Cimarron Grasslands is regularly monitored.
- Air quality assessments are included in plans for Grassland projects.

Guidelines

- ◆ Ensure emissions from grassland and forest management activities do not contribute to lower air quality.
- ◆ Conduct all land management activities in such a manner as to comply with all applicable federal, state, and local air-quality standards and regulations.

WATER SYSTEMS AND WATERSHEDS

Water resources in the Cimarron and Comanche National Grasslands are rare, and thus extremely important to the ecosystem. Riparian areas provide habitat to numerous species. Because watersheds contribute to ecosystems as a whole, it is important to maintain functional streams, rivers, playas and ponds that each contribute to an individual watershed. "Streams in prairies are . . . endangered, because many of the remaining fragments of prairie are not large enough to encompass a significant, functional watershed" (Dodds et al. 2004, 205). The remaining fragments of these watersheds should be maintained in pristine conditions in order to protect and preserve the remaining biota they support. There are several problems with water resources in the Grasslands that require attention. Because these scarce water resources are so vital to life in the region, sound management practices must be adopted through specific objectives to meet desired conditions.

Existing Conditions

Watersheds

An assessment undertaken between 1997 and 1999 found at least half of the 10 primary watersheds in the Grasslands in a limited to degraded condition (Winters and Gallagher 1997, 1998). A "limited" condition is defined in the assessment as a Class II watershed, one where management activities are occurring and one that is not in a pristine condition and thus at risk. A "degraded" condition is a Class III watershed, where major impacts to the land have resulted in severe damage to stream and riparian function. All the water systems of the Comanche and Cimarron are impaired by bank damage, noxious weeds, sediment, nutrients, hydrological modifications, and/or flow disruption (Winters and Gallagher 1997, 1998). Improving watershed conditions presents a management challenge for the Grasslands, as about 80 percent of watersheds are owned by private parties.

Stream Channels and Surface Water

There are 2,624 miles of streams on and adjacent to the Grasslands, but only 1,220 miles are actually on public lands. (USDA Forest Service 2005(21), 3). Ground and surface water is subject to contamination by livestock grazing and feedlots, pollutants from automobiles, agricultural chemicals, run-off from oil and gas operations, and concentrations of salts and heavy metals from irrigation recharge upstream.

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Cattle trampling in Tobe Creek. © Nicole Rosmarino

Livestock operations on and off the Grasslands contribute to surface water degradation. Hoof shear and sediment problems are caused by cattle grazing within the Grasslands. Upstream feedlots and other agricultural activities create excessive nutrient problems. The Grasslands Watershed Condition Analysis reports that the entire Sand Canyon Watershed has bank damage. In addition, the riparian corridor along Sand Canyon is actually dominated by old and dying

Cottonwoods, with little re-growth or new generation present. This is due largely to unmanaged livestock grazing. The Forest Service acknowledges this problem; “Unmanaged or ill-adapted livestock grazing can alter a cottonwood and/or willow community, oftentimes to one dominated by grass species or non-natives such as tamarisk. Changes such as these could leave streambanks susceptible to erosion and water susceptible to increases in temperature” (USDA Forest Service 2005(21), 10).

Tamarisk is a major problem in Grassland creeks and rivers. Tamarisk, the primary invasive species in riparian areas of the Grasslands, has displaced native cottonwoods and willows and altered the hydrology of the floodplain by consuming more water than the native vegetation.



One of two springs in Picture Canyon protected by a livestock exclosure fence. © Lauren McCain

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Degraded Water Systems of the Cimarron and Comanche National¹

4 TH LEVEL WATERSHED	WATER BODY	LOCATION	CONDITION CLASS	IMPAIRMENTS
Upper Arkansas				
Apishapa River		Timpas Unit, Comanche, NG		
Purgatoire	Purgatoire River (Picketwire)	Timpas Unit, Comanche NG	III	Bank damage, tamarisk infestation
	Tobe Creek	Carrizo Unit, Comanche NG	III	Bank damage, tamarisk infestation
Upper Arkansas – Lake Meredith	Timpas Creek	Timpas Unit, Comanche NG	III	Noxious weeds (tamarisk infestation), bank damage, sediment
	Timpas tributary	Timpas Unit, Comanche NG	II	Noxious weeds, tamarisk infestation
Upper Cimarron				
Bear Creek				
Cimarron Headwaters	Carrizo Creek	Carrizo Unit, Comanche NG	II	Nutrients
	Tecolote Creek	Carrizo Unit, Comanche NG	II	Bank damage, sediment
North Fork Cimarron	North Fork Cimarron	Cimarron NG	II	Tamarisk infestation
	Frazier Lake	Cimarron NG	II	Hydrologic modification
Sand Arroyo		Carrizo Unit, Comanche NG		
Two Butte Creek		Carrizo Unit, Comanche NG		
Upper Cimarron River	Cimarron River	Cimarron NG	III	Noxious weeds (tamarisk), flow disruption, sediment
	Cimarron tributaries	Cimarron NG	III	Bank damage, sediment
	Picture Canyon	Carrizo Unit, Comanche NG	III	Bank damage
	Sand Canyon	Carrizo Unit, Comanche NG	III	Bank damage

¹Table information adapted from USDA Forest Service, Comanche and Cimarron National Grasslands. 2005. Specialist Reports – Water Resources, Chapter 21. May 10.

Playas, Wetlands, Ponds, and Springs

The riparian zones and the few natural ponds, playas, and wetlands that remain on the Grasslands are crucial for wildlife, but many are degraded by poorly managed cattle grazing and the spread of invasive weeds, especially tamarisk and Russian olive.

There are approximately 600 playas on the Grasslands. Alterations in the surface flow, such as stock dams or road drainage may disrupt the flow of water into these playas. Some of the playas have been dug out in the center to provide “dugout pits” as a water source for livestock year round. Modifying playas in this way actually contributes to water loss. Playas are lined with clay, which creates a natural barrier to water seepage through the soil. Pitting playas also harms the native plant and animal communities that the water bodies sustain.

There are only three areas of wetlands mapped on the Comanche National Grassland, but there are many smaller areas too small to map. “These ponds support isolated but minimal riparian habitat, which is threatened by a dropping groundwater table, unmanaged livestock grazing and invasive species.” (USDA Forest Service 2005(21), 6).

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Wilburton, Mallard, and Point of Rocks Ponds, along with an unnamed set of four ponds in the Cimarron Recreation Area, are stocked with non-native fish for sports fishing. Non-native fish have escaped during flood events and high water periods and outcompete native fish species, contributing to the decline of most native fish species in the region.

Approximately 105 natural springs exist on the Grasslands. Most are used for stockwater, and only one spring and two small ponds in Picture Canyon have been set aside in a permanent enclosure for protection from cattle grazing.

Water Quality

According to the Forest Service, “Threats to surface water quality on the Comanche National Grasslands are: storm water runoff from nearby animal feeding operations (Colorado Department of Public Health and Environment – Water Quality Control Commission 2000), water quality issues associated with unmanaged or ill-adapted grazing in the riparian areas (Kanaan 2004; Federal Interagency Stream Restoration Working Group 1998), sediment from ground disturbing activities, channel instability and sedimentation as a result of riparian species conversion (Rosgen 1996) and spills from oil and gas activities (USDA Forest Service 1991)” (USDA Forest Service 2005(21), 10).

Several miles of streams in the Grasslands are listed on the States’ 303(d) lists for monitoring and evaluation. The 1998 Section 303(d) list includes 19 river segments and 4 lakes in the Cimarron River Basin that have impaired water quality. The greatest impairment in the streams is chloride and the greatest impairment in the lakes is excessive algae (Kansas Department of Health and Environment 2006). However, these segments are considered “use protected.” Colorado regulations say that if a ‘use’ cannot be achieved, the use will be downgraded so that there is no impact to local economies. This simply means that if there is a water quality problem, no action is required because the designated use will just be downgraded. In addition, ignoring water quality problems leads to longer term and likely more pernicious impacts to local economies, as local human communities – particularly agricultural ones – cannot persist without access to clean water.

Though some of the waters within the Cimarron National Grassland are classified as “Outstanding National Resource Waters” by the state of Kansas, this designation only means that discharges to the waters are not allowed. Since agricultural runoff is a non-point source pollution, it is not considered a discharge.

As the Forest Service notes, there are significant adverse impacts from livestock grazing on water quality. “Surface water quality concerns directly related to grazing are water temperature for aquatic life due to the removal of protective riparian vegetation, possible introduction of sediment, nutrients, and bacteria associated with livestock, or toilets in or near the floodplain along the Cimarron River corridor.” (USDA Forest Service 2005(21), 7).

There is a nutrient problem on East Carrizo Creek from a feedlot located upstream of the Carrizo Canyon Recreation Area. This designated beneficial use to this segment of Carrizo Creek is Recreation 1A, “where ingestion is probable.” (USDA Forest Service 2005(21), 9).

Roads also cause significant adverse impacts. “Sediment sources in the Grasslands Planning area are from the two-track native-surface roads in the canyon that are adjacent to the riparian area and river.” (USDA Forest Service 2005(21), 9). Off-road vehicles degrade water quality by

passing through streams, and churning up sediment. Any oil and gas leaks on a vehicle can end up in the water.

Water contamination from oil and gas spills and pumps and other facilities can be a major problem and always exists at a threat on the Grasslands where oil and gas is being extracted.

Desired Conditions

The nine level-four watersheds of the Cimarron and Comanche move toward pristine (Class I) condition.

Stream channels stabilize and return to pre-settlement functionality.

Water quality in streams, springs, lakes, wetlands, and other water bodies meets or exceeds state standards.

The several miles of stream in the Grasslands that are listed on the States' 303(d) list are monitored and evaluated with the goal of meeting their designated uses and being removed from the list instead of being downgraded so as to avoid impact to local economies.

Healthy, functioning wetlands and floodplains exist due to removal of cattle grazing from those areas.

Oil and gas and off-road vehicle use is not causing degradation of water quality on the Grasslands.

Stream flows are shifting from intermittent or ephemeral to perennial.

Objectives

- Develop a watershed/habitat rehabilitation program in order to restore degraded riparian areas and protect other riparian areas to aid in recovery of aquatic systems.
- Assure sufficient instream water to maintain and restore fully functioning aquatic and riparian systems. This can be done by designating streams in the Cimarron with Kansas' MDS and by the Colorado Water Conservation Board appropriating streams in the Comanche for instream flow purposes.
- Restore vegetation and large woody debris on the landscape where they have been diminished by land use practices. Specifically, restore native cottonwoods and willows along riparian areas where young generations have been trampled and grazed by livestock, such as in Sand Canyon.
- Phase out water diversion permits that adversely affect Species of Concern and their habitats.

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- Provide guidance to users of the Grasslands and Forest Service officials to identify, monitor and report violations of water appropriation, use and pollution requirements or laws.
- Within 5 years, identify suitable and potentially suitable habitat for beaver and then restore them to this habitat

Watersheds

- Impairments caused by bank damage, noxious weeds, sediment, nutrients, hydrological modifications, and flow disruption are minimized and the damages fixed through restoration efforts.
- All land use activities are monitored in ways to achieve overall watershed protection.
- Degradation along individual stream segments in Sand Canyon is minimized in order to protect the overall watershed.

Streams and Surface Waters

- Contamination of surface water by feedlots and agricultural run-off is minimized by removing and/or relocating these degrading activities from such close proximity to riparian areas.
- Livestock grazing is prohibited in riparian areas to stop bank damage and sediment problems associated with hoof shear and grazing.
- Livestock grazing is prohibited in riparian areas to allow regeneration of native cottonwoods and willows.
- Stock dams are removed and road drainage is minimized so that there is no disruption in the surface flow of streams.
- Restore and improve stream segments with bank damage, flow disruptions, noxious weeds, nutrients and sediment and prevent further degradation by eliminating livestock grazing and other agricultural activities from riparian areas and reestablishing native riparian vegetation.
- Improve watershed conditions so that those currently designated Class III may become Class II, and those currently designated Class II may become Class I. Minimize degradation so that all waters meet their intended beneficial uses as determined by state.
- Restore perennial streams that have been rendered ephemeral or intermittent by land use practices by eliminating dams for cattle ponds and other flow disruptions.

Playas, Wetlands, Ponds, and Springs

- Dugout pits in playas are filled in to restore the playas to their natural form.

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- More than half of the 105 springs located on the Grasslands are set aside in permanent enclosures to be protected from cattle grazing

Water Quality

- The nutrient problem on East Carrizo Creek is minimized by working with adjacent landowners to alter the management and location of the feedlot located upstream of the Carrizo Canyon Recreation Area.
- Sediment sources are minimized by decommissioning unnecessary two-track roads located near riparian areas and rivers.
- The 19 river segments and 4 lakes in the Cimarron Basin that were identified on the 1998 Section 303(d) list should be monitored, evaluated, and have conditions improved until the excessive levels of chloride and algae are diminished and they can be removed from the list.

Guidelines

- ◆ All land use activities are monitored in ways to achieve overall watershed protection.
- ◆ All human uses, including animal feeding operations, grazing and oil and gas activities, are managed to prevent physical, chemical, and biological degradation of water, especially of riparian and wetland areas.
- ◆ The further spread of invasive species such as tamarisk and Russian olive is prevented, thus reducing the need for removal by herbicides which endanger water quality
- ◆ Place primary emphasis on prevention of new invasive species and the spread of existing ones rather than toxic treatments and expensive removal efforts.
- ◆ Maintain all motorized activity on routes designed to avoid riparian areas where possible and removing stream bottom roads and routes wherever feasible.
- ◆ Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.
- ◆ Manage land treatments to maintain enough organic ground cover in each land unit to prevent harmful increased runoff (exceptions shall occur in special habitat situations such as prairie dog habitat).
- ◆ In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term health and riparian ecosystem condition.
- ◆ Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.

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- ◆ Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health.
- ◆ Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function.
- ◆ Maintain enough water in perennial streams to sustain existing stream health. Return some water to de-watered perennial streams to minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment.
- ◆ Manage water-use facilities to prevent gully erosion of slopes to prevent sediment and bank damage to streams.
- ◆ Mitigate roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands.
- ◆ Apply runoff controls to disconnect pollutant sources from surface and ground water.
- ◆ Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem including quantity and quality of water.
- ◆ Locate facilities away from the water's edge or outside the riparian areas, woody draws, wetlands and floodplains unless alternatives have been assessed and determined to be more environmentally damaging. If necessary to locate facilities in these areas, then:
 - ◇ Deposit no waste material (silt, sand, gravel, soil, slash, debris, chemical or other material) below high water lines, in riparian areas, in the areas immediately adjacent to riparian areas or in natural drainageways (draws, land surface depressions or other areas where overland flow concentrates and flows directly into streams or lakes).
 - ◇ Prohibit deposition of soil material in natural drainageways.
 - ◇ Locate the lower edge of disturbed or deposited soil banks outside the active floodplain.
 - ◇ Prohibit stockpiling of topsoil or any other disturbed soil in the active floodplain.
 - ◇ Locate drilling mud pits outside riparian areas, wetlands and floodplains.
 - ◇ Remove gravel pits that are located in riparian zones.
- ◆ Stream channel hydrologic bankfull width-to-depth ratios, entrenchment ratios, and channel sinuosity are moving toward the channel type expected based on the steepness of the valley bottom (gradient), width of the valley bottom, valley floor sediments and the stream bank composition and stratigraphy.
- ◆ Human-associated pollutants are decreasing in streams and riparian areas.
- ◆ Where sediment is limited but the habitat is suitable for beaver, channel capacity can be reduced to pre-disturbance capacity by encouraging beavers to build dams, which trap water and what sediment is available.
- ◆ Where stream banks are eroding due to stream action (called “fluvial processes”), active bank stabilization via the reestablishment of riparian vegetation on streambanks and bars is taking place.

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- ◆ Infiltration of precipitation and floodwaters into the valley sediments is increasing.
- ◆ Soil water-holding capacity is increasing.
- ◆ Seep, spring, and pond physical “developments” are in place and functioning to insure natural conditions of seeps, springs, and ponds,
- ◆ Wetland vegetation is abundant and bare ground minimal.
- ◆ The soil in the spring/seep areas is moist.
- ◆ The ground within 100 feet of springs, seeps, and wetlands is minimally (less than 15%) trampled.
- ◆ Water bodies within Grassland watersheds surpass State water quality standards when this is necessary to maintain or restore watershed habitat or riparian/aquatic-dependent species.
- ◆ Annual soil erosion from uplands into aquatic systems does not exceed that of appropriate reference areas.
- ◆ Annual soil and sediment erosion from uplands (e.g., bare soil, roads, recreational activities, livestock grazing) into aquatic systems does not exceed that of appropriate reference areas.
- ◆ Where soils are naturally erosive, upland ground cover (live vegetation plus litter) is being re-established to 85% cover of reference areas.
- ◆ Within five years of implementation of this Plan, a website map is prepared which indicates stream ratings for measured functioning condition, and priorities for restoration.
- ◆ When bank trampling due to human activities or developments (e.g., livestock, roads, routes, trails) exceeds 15 percent for any 200 feet of stream length (i.e., this equals 400 feet by counting both stream sides), one or more of the activities must be altered or eliminated to reduce the bank trampling to 15% or lower.
- ◆ Beaver dams are not removed, and beavers are not lethally controlled.
- ◆ Instream structures other than addition of woody debris will not be used as a means of restoring stream function. If large woody debris is added, it should provide natural amounts, types, sizes, and spatial distributions of wood both in and along stream channels. The addition of woody debris can be considered only in conjunction with recovery of off-channel habitat and cessation of off-channel activities that have led to a deficiency of in-channel woody debris.
- ◆ New or replacement spring and seep livestock developments cannot allow livestock to trample the spring or seep riparian vegetation within 100 feet of the water; the springs and seeps must be fenced.

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- ◆ A permittee cannot bring livestock onto a pasture until all water development structures are in proper functioning condition.
- ◆ Throughout the life of the Plan, ensure proper plugging of abandoned wells (i.e., seismograph holes, water wells, etc.) to prevent cross contamination of aquifers.

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SOILS

On just one day, May 11, 1934, 300 million tons of earth blew from the region (Jones and Cushman 2004), darkening skies across the eastern U.S. and dumping precious soil in the Mississippi River to be washed out to sea. Between 1931 and 1938 the Dust Bowl region of the Southern Plains lost about 850 million tons of topsoil annually (Worster 1979). Photos from the era tell the story—dark, billowing clouds of dust during “black blizzards” engulfed the landscape. Dust covered farm equipment, roads, and homes and filled the lungs of livestock and locals who succumbed to “dust pneumonia.” The soil was everywhere but where it was needed most: on the land serving its role as the structural and nutritional basis of prairie life. Soil is a non-renewable resource that can be lost when nothing holds it in place.

Existing Conditions

Restoration work conducted on the National Grasslands over the last 70 years has helped reestablish the soil lost during the Dust Bowl days. Reseeding, replanting, and rest stabilized soils on the move in the 1930s. But, drought in the early 2000s and current dry conditions continue to expose the fragility of the arid soils in the Comanche and Cimarron Grasslands region. Dust storms are not uncommon. There were days between 2000 and 2003 where cars would have headlights on in mid-day to see through the airborne dust and where farmers continued to plow up fields.

Native prairie vegetation, the activities burrowing fauna, and the build up of organic soil crusts maintain soil fertility and stability. The low structure of the shortgrass prairie plants disguises their resilience and total biomass. The root systems of some native prairie plants can descend over 100 feet into the ground, and a single square yard of soil can contain twenty linear miles of root networks (Licht 1997). About 60 percent of plant productivity and 85 percent of vegetative biomass occurs below-ground. These adaptations hold the soil in place during intense winds and periods of drought. Grass species such as buffalo grass and blue grama produce tough seeds that withstand climatic extremes, fire, and wild ungulate grazing. Burrow digging and dwelling wildlife contribute to soil fertility, structure, and water infiltration. As many as 70 percent of all prairie animal species spend at least part of their lives underground (Licht 1997).

Biological soil crusts cover and protect the surface layer of several soil types on the Grasslands. Soil crusts may contain a range of bacteria, cyanobacteria, green algae, fungi, lichens, and mosses (St. Clair and Johansen 1993; Belnap et al. 2001; Ford et al. 2004). They fix nitrogen to increase soil fertility and improve the establishment of seedlings. Soil crusts are particularly sensitive to trampling by livestock, vehicles, and humans and can require a long time to rebuild after disturbance.

Human uses on and off the federal domain continue to harm the fragile soils of Comanche and Cimarron National Grasslands and prevent full restoration of the Grasslands' ecosystems. Livestock grazing and plowing across the Southern Plains region—especially during drought conditions—still contribute to soil loss, soil nutrient depletion, and degradation. Soil erosion and compaction due to livestock grazing continues to be a problem (Environmental Assessment for the Kim Grazing Association and Range Allotment Management Plan; Allotment Management Plan for the Kim Grazing Association 2001; Allotment Management Plan for the Timpas Grazing District 2002; Environmental Assessment for the Campo and Kim Grazing Associations). Sandy

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and shallow soils are particularly susceptible to soil erosion and the loss of protective biological crusts. Other threats include recreation, invasive weeds such as tamarisk, off-highway vehicles, and water diversion and depletion.

See tables below for soil associations, types, and characteristics.

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Soils of the Comanche National Grassland¹

Soil Association	Elevation (ft)	Ecotype	Soil Characteristics	Dominant Vegetation	Site Characteristics	Threats
Manvel-Penrose	+/- 4,000	Timpas Shortgrass Prairie	Well-drained shallow to deep soils; subsoil is silt loam and silty clay loam that is high in calcium carbonate content.	Shortgrass species are typical of this area, blue grama, snakeweed.	Found in Timpas Unit. Nearly level to strongly sloping topography. Loamy plains, limestone breaks.	Water erosion, compaction
Minnequa-Penrose	+/- 4,000		Deep to shallow loams over limestone breaks	Blue grama, buffalo grass, galleta	Level – undulating, Penrose soils found over limestone bedrock	Susceptible to wind erosion, especially after loss or removal of protective organic horizon on soil surface
Vona-Olney-Dwyer	+/- 4,000		Develop from fine sands high in lime, sandy loam surface layer and subsoil	Blue grama, sideoats grama, Indian ricegrass, galleta, sand dropseed, little bluestem	Level-undulating topography	
Travessilla-Kim-Wiley	4,300-5,600	Canyonlands	Travessilla sandy loams are excessively drained and shallow to sandstone bedrock. Kim soils are composed of deep calcareous material developed from weathered sandstone and limestone. Wiley deep loams are developed from wind deposited silts over weathered bedrock.	Blue grama, side-oats grama, little bluestem, juniper	Restricted to Picket Wire Canyon-lands.	Erosion due to overgrazing, slow recovery; crusts susceptible to livestock/human trampling
Travessilla-Kim	4,300-5,600	Canyonlands	Travessilla sandy loams are excessively drained and shallow to sandstone bedrock. Kim soils are composed of deep calcareous material developed from weathered sandstone and limestone. Often have high percentage of cryptogammic crusts on surface.	Blue grama, side-oats grama, little bluestem, juniper	Limited to canyons in the south central portion of Carrizo Unit. Sandstone outcrop and canyons.	Erosion due to overgrazing, slow recovery; crusts susceptible to livestock/human trampling
Baca-Wiley	4,300-5,600	Shortgrass Prairie	Deep, well drained clay loams and loams.	Blue grama, shortgrass species	Nearly level to gently sloping terrain on loess uplands. Loamy plains.	Blowing & erosion if not protected by vegetation, susceptible to compaction
Vonna-Manter-Dalhart	4,300-5,600	Shortgrass Prairie & Sandsage	Deep, well drained to somewhat excessively drained sandy loams and loamy sands.	Mix of shortgrass and mid-grass	Nearly level to undulating topography of uplands, Sandy Plains	Wind erosion
Otero-Potter	4,300-5,000	Sandsage	Deep, sandy loams & strongly calcareous, shallow, gravelly loams that overlie caliche	Blue grama, sandsage, yucca, sand dropseed, sand lovegrass	Low, irregular relief, occurs in Campo/Pritchett area.	Wind & water erosion, compaction

¹Data from grazing EAs

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Soils of the Cimarron National Grassland¹

Soil Association	Elevation (ft)	Ecotype	Soil	Soil Characteristics	Dominant Vegetation ²	Site Characteristics	Threats
Richfield-Wagonbed-Ulysses	3,190-3,680	Shortgrass Prairie	Richfield	very deep soils on nearly level to gently sloping topography. the soils, located on plains and tablelands, are well drained; subsoils are clayey and silty.	shortgrass species dominate uplands. mid- and tallgrass species are found in swales and drainages.	limy uplands and loamy uplands	erosion
			Wagonbed				erosion
			Ulysses				erosion
Atchinson-Happyditch	3,175-3,650	Cimarron River Corridor	Atchinson	very deep, well drained and is on nearly level to strongly sloping terrain. found on floodplains and terraces; subsoil, the subsoils are loamy.	little bluestem, sideoats grama, big bluestem, blue grama, green needlegrass, switchgrass, western wheatgrass, misc. perennial forbs, mid- and tallgrass species occupy low-lying areas and shortgrass species are found on upland sites.	sandy lowland	
			Happyditch				blowing
Atchison-Shore-Haverson	3,180-3,640	North Fork Cimarron River	Atchison		little bluestem, sideoats grama, big bluestem, blue grama, green needlegrass, switchgrass, western wheatgrass, misc. perennial forbs, mid- and tallgrass species occupy low-lying areas and shortgrass species are found on upland sites.		erosion
			Shore			erosion	
			Haverson			blowing	
Eva-Optima	3,200-3,600	Sandsage	Eva	very deep soils on undulating to rolling topography. these excessively drained soils are found on dunes and paleoterraces; subsoils are loamy and sandy.	Sandsage, sand bluestem, misc. perennial forbs, misc shrubs, sand lovegrass, sideoats grama, switchgrass	sands	blowing
			Optima	Choppy sands	Choppy sands: sand bluestem, giant sandreed, little bluestem, misc perennial forbs, sand lovegrass, switchgrass, misc shrubs		blowing
Dalhart-Bigbow-Satanta	3,200-3,575	Sandsage	Dalhart	Sandy, loamy upland	Loamy upland: blue grama, sideoats grama, western wheatgrass, buffalo grass, big bluestem, little bluestem, misc, perennial forbs Sandy: blue grama, sand bluestem, sideoats grama, little bluestem, sand dropseed, yellow Indiangrass, misc, perennial forbs, switchgrass		blowing
			Bigbow		sandsage, blue grama, sideoats grama, western wheatgrass, buffalo grass, big bluestem, little bluestem, misc, perennial forbs	erosion	
			Satanta	very deep soils on nearly level to gently sloping topography. these well drained soils are located on eolian modified paleoterraces; subsoils are loamy.	sandsage, blue grama, sideoats grama, western wheatgrass, buffalo grass, big bluestem, misc, perennial forbs, switchgrass	loamy upland	

¹Data from the Soil Survey of Morton County.

²Over 5%

Desired Conditions

With the adoption of the *Sustainable Use Conservation Alternative*, careful management of human uses on the Comanche and Cimarron National Grasslands continues to improve soil quality, defined as “the capacity of a specific kind of soil to function within natural or managed ecosystem boundaries, to sustain biological productivity, maintain environmental quality, and promote plant and animal health” (Soil Science Society of America 1997).

Careful management of livestock grazing, energy and mining activities, roads, recreation, restoration work, and other human uses prevents soil erosion, compaction, degradation, and the introduction and spread of exotic and invasive plant species.

Soils are maintained to ensure proper nutrient cycling, allow water filtration, and to minimize erosion.

The basic integrity of all soils and biological soil crusts on the Grasslands are intact and degraded soils are restored.

All soils of the Comanche and Cimarron Grasslands exhibit infiltration and permeability rates that are appropriate to the soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for sustainable plant growth and minimizes surface runoff.

Soil erosional losses occurring on the Grasslands are below the allowable limits of the Grassland Plan standards and guidelines.

All Grassland Standards and Guidelines for soil are being met or exceeded for the Comanche and Cimarron National Grasslands.

Human-caused soil erosion due to recreational and commercial activities are minimized.

Watersheds are maintained to have stable, productive soils with little evidence of rills and gullies, pedestaling, sheet erosion or blowouts.

Objectives

- Reduce acres of disturbed soils by Forest Service permitted or management actions.
- Develop soil reference areas for each vegetation type on the Grasslands. These are identified and intact biological crusts examined in those areas in order to create a baseline for degraded soil site evaluation.
- Degraded soil areas are identified and prioritized. Those areas with the most restoration potential (those areas with the best chance of restoration success) have first priority.
- The Forest Service encourages the voluntary efforts of citizens and scientists in appropriate activities to monitor and protect soil quality and health.
- A ‘Call for Research’ regarding soil health knowledge gaps to independent sources (i.e. universities) is completed and distributed to appropriate venues to facilitate communication of the Grasslands’ research needs with the surrounding research community.

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- Within three years of plan implementation, develop and implement a program to educate the public about the ecological value of soil crusts, long-rooted native vegetation, and burrowing fauna and the need for behaviors that protect the integrity of soils and organic soil crusts.
- Within three years the Forest Service will identify reference areas for each vegetation type that will be used as a comparative measure for soil quality across the Grasslands.
- Within 5 years the Grasslands will confirm presence or absence of biological soil crusts in vegetation types listed above and monitor soil stability.
- Every 3 years the Forest Service will complete a new 'Call for Research' reflecting new information compiled, distribute it to appropriate venues, and post it on the Forest Service website.
- The Desired Conditions will be met by periodic, random, soil density testing conducted by the PSICC Soils Staff. Testing will be conducted post-grazing, in control areas isolated from grazing, and post-winter to evaluate change in soil density following freeze-thaw cycles.

Guidelines

- ◆ Prohibit soil-disturbing activities (e.g., road construction, well pad construction, intensive livestock grazing) on soils highly susceptible to erosion and degradation of soil crusts.
- ◆ Limit roads and other disturbed sites to the minimum feasible number, width, and total length consistent with the purpose of specific operations, local topography and climate.
- ◆ Decommission unnecessary roads within the Grasslands' planning areas and restore vegetation and natural systems to reestablish health soils.
- ◆ Stabilize and maintain roads and other disturbed sites during and after construction to control erosion.
- ◆ Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage.
- ◆ Predominant, native ground cover retains soil, bulk density, and soil biological life.
- ◆ Commercial, recreational and other Permitted activities are not allowed within soil restoration areas until the soil has stabilized and soil quality tests are similar to soils reference areas for that vegetation type.
- ◆ Adequate standing forage is expected to remain at the end of the grazing season to protect the soil from erosion, catch and hold fall and winter precipitation, and provide forage and cover for wildlife species dependent on the prairie ecosystem.

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**RESTORATION AND PROTECTION OF
ALL NATIVE ECOSYSTEMS**

An ecosystem is an area where plants, animals and other organisms interact with each other and the non-living physical environment, such as soil, rock, dead organic matter, air, and water. The distribution of ecosystem types, as well as the plants and animals associated with each, depends on variables such as climate, water availability, topography, geology, soils, latitude, and elevation.

Managing ecosystems and conserving their biological diversity first requires understanding the distribution and condition of that diversity. This in turn requires consistent classifications systems to characterize ecosystems and their component diversity at the scale of local, regional, and ecoregional landscapes.

This Alternative uses “ecological systems” developed by NatureServe and adapted by the Colorado Natural Heritage Program (CNHP) to classify vegetation and ecosystems of the Comanche and Cimarron National Grasslands. Ecological systems are recurring groups of biological communities that are found in similar physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding. The terrestrial ecosystem classification represents practical, systematically defined units that provide the basis for mapping terrestrial ecosystems at multiple scales of spatial and thematic resolution (NatureServe 2003). NatureServe’s ecological systems are consistent with the International Ecological Systems Classification and the National Vegetation Classification Standard.

Existing Conditions

The Forest Service classifies the Comanche and Cimarron Grasslands into four major ecosystem groups. Sandsage prairie, shortgrass prairie, and the canyonlands ecosystems occur on the Comanche. Sandsage prairie, shortgrass prairie, and riparian/aquatic (the Cimarron River Corridor) ecosystems occur on the Cimarron. The Comanche is dominated by shortgrass prairie and the Cimarron is dominated by sandsage. (See table below).

ECOSYSTEM	COMANCHE	CIMARRON
Sandsage Prairie	29%	60%
Shortgrass Prairie	61%	30%
Canyonlands	10%	
Riparian & Aquatic		10%

Data from Comanche and Cimarron Vegetation/Ecology Specialist Report.

However, the Forest Service neglects other key Southern Prairie ecosystems in its Draft Management Plan. The CNHP provided the Forest Service with descriptions of 12 distinct ecosystem types that occur on various parts of the Grasslands (R. Rondeau, pers. com. 2005). These ecosystem accounts were adapted from NatureServe (2003). CNHP has also developed a multi-factor ratings system to characterize the condition of a particular ecosystem patch.

By limiting the number of ecosystems attended to in the Draft Plan, the Forest Service is ignoring important differences in the larger set of ecosystem types that likely indicate very different management approaches. Though more complex, the Forest Service must consider

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the full range of known ecosystems in the Plan and develop management provision for each of these. (See table below)

Major Ecosystems of the Cimarron and Comanche National Grasslands

Forest Service Categories	The Nature Conservancy Categories	CO Natural Heritage Program Categories
Sandsage Prairie	Western Great Plains Sandhill Shrubland	Sandsage Prairie
Shortgrass Prairie	Western Great Plains Shortgrass Prairie	Shortgrass Prairie
	Central Mixedgrass Prairie	Midgrass Prairie
	Inter-mountain Basins Mixed Salt Desert Scrub	Mixed Salt Desert Scrub
		Shale Barrens
	Inter-mountain Basins Greasewood Flat	Greasewood Flats
	Southern Rocky Mountain Juniper Woodland and Savanna	Juniper Woodland & Savanna
Canyonlands	Southwestern Great Plains Canyon	Southern Great Plains Canyon Ecological System Complex
	Inter-mountain Basins Mixed Salt Desert Scrub	Mixed Salt Desert Scrub
	Inter-mountain Basins Greasewood Flat	Greasewood Flats
	Southern Rocky Mountain Juniper Woodland and Savanna	Juniper Woodland & Savanna
	Rocky Mountain Lower Montane-Foothills Shrubland	Lower Montane-foothills Shrubland –Large Patch
Riparian & Aquatic	Western Plains Riparian Woodland, Shrubland, and Herbaceous	Western Plains Riparian Woodland & Shrubland
	Western Great Plains Closed Depression Wetland	Depressional Wetlands (Playas)
	North American Arid West Emergent Marsh	Seeps & Springs

Shortgrass Prairie

This system is found primarily in the western half of the Western Great Plains Division east of the Rocky Mountains and ranges from the Nebraska Panhandle south into Texas and New Mexico, although some examples may reach as far north as southern Canada where it grades into Northwestern Great Plains Mixedgrass Prairie. This system occurs primarily on flat to rolling uplands with loamy, ustic soils ranging from sandy to clayey. In much of its range, this system forms the matrix system with blue grama grasses (*Bouteloua* spp.) dominating this system. Other associated graminoids may include buffalograss (*Buchloe dactyloides*), needle and thread (*Hesperostipa comata*), prairie Junegrass (*Koeleria macrantha*) (= *Koeleria cristata*), western wheatgrass (*Pascopyrum smithii*) (= *Agropyron smithii*), purple threeawn (*Aristida purpurea*) and sand dropseed (*Sporobolus cryptandrus*). Although tallgrass and mixedgrass species may be present especially on more mesic soils, they are secondary in importance to the sod-forming short grasses. Shrub species such as sand sagebrush (*Artemisia filifolia*), big sagebrush (*Artemisia tridentate*), and rabbitbrush (*Chrysothamnus* spp.) that dominate the Western Great Plains shrubland systems may also be present. Also, because this system spans a wide range, there can be some differences in the relative dominance of some species from north to south and from east to west.

Large-scale processes such as climate, fire and grazing influence this system. In contrast to other prairie systems, fire is less important, especially in the western range of this system, because the often dry and xeric climate conditions can decrease the fuel load and thus the relative fire frequency within the system. However, historically, fires that did occur were often very expansive. Currently, fire suppression and certain grazing patterns in the region have likely decreased the fire frequency even more, and it is unlikely that these processes could occur at a natural scale. A large part of the range for this system (especially more mesic areas in the eastern part of the Central Shortgrass Prairie) has been converted to agriculture. Further west in the Central Shortgrass Prairie, areas have been impacted by the unsuccessful attempts to develop dryland cultivation during the Dust Bowl of the 1930s. The short grasses that dominate this system are extremely drought- and grazing-tolerant. These species evolved with drought and large herbivores and, because of their stature, are relatively resistant to overgrazing.

This system in combination with the associated wetland systems represents one of the richest areas, in the United States, for large mammals. Grassland bird species may constitute one of the fastest declining vertebrate populations in North America. A healthy shortgrass prairie system should support viable populations of pronghorn, endemic grassland birds, prairie dog complexes, and other Great Plains mammals. Historically, such areas would also have been populated by bison in sufficient numbers to support populations of wolves.

Sources: K. Decker, S. Kettler, R. Rondeau, Date: May 2004.

Sandsage Prairie

The sandsage prairie ecological system is found primarily in the south-central areas of the Western Great Plains Division. Occurrences range from the Nebraska Sandhill region south to central Texas, although some examples may reach as far north as the Badlands of South Dakota.

The greater part of the system occurs in the Central Shortgrass Prairie Ecoregion in eastern Colorado, western Kansas and southwestern Nebraska. The climate is semi-arid to arid for much of the region in which this system occurs. This system is found on somewhat excessively to excessively well-drained, deep sandy soils that are often associated with dune systems and ancient floodplains. In some areas, this system may actually occur as a result of overgrazing in Western Great Plains Tallgrass Prairie or Western Great Plains Sand Prairie (NatureServe 2003).

In eastern Colorado, this system is found in extensive tracts on Quaternary eolian deposits (Tweto 1979) along the South Platte, Arikaree and Republican Rivers, between Big Sandy and Rush Creeks, and along the Arkansas and Cimarron Rivers, where it is contiguous with areas in Kansas (Comer et al. 2003).

Throughout its range, this system is characterized by a sparse to moderately dense woody layer dominated by sand sagebrush. These shrubs usually do not grow as clumps but as individuals, and the intervening ground is most often dominated by a sparse to moderately dense layer of tall, mid- or short grasses (Bruner 1939, Steinauer 1989, Ramaley 1939, Dick-Peddie 1993).

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Associated species can vary with geography, precipitation, disturbance and soil texture. Graminoid species such as sand bluestem (*Andropogon hallii*), sand dropseed, prairie sandreed (*Calamovilfa longifolia*), giant sandreed (*Calamovilfa gigantean*), needle and thread, and grama are often associated with this system. Other shrub species may also be present including soapweek yucca (*Yucca glauca*), honey mesquite (*Prosopis glandulosa*), skunkbrush sumac (*Rhus trilobata*), and Chickasaw plum (*Prunus angustifolia*). A few species such as the shrubs *Prunus pumilla* var. *besseyi* and leadplant (*Amorpha canescens*) and the grasses switchgrass (*Panicum virgatum*) and indiagrass (*Sorghastrum nutans*) are believed to have been formerly more common, but now much decreased, most likely by cattle grazing throughout the growing season (pers. comm. Harvey Sprock and Ben Berlinger, Colorado NRCS).

Colorado's eastern plains exhibit climatic differences from north to south which may be reflected in the local expression of sandsage prairie. Occurrences in southern Colorado experience a longer growing season, lower annual precipitation, and differences in precipitation patterns (Western Regional Climate Center 2004), and may be dominated by different species than northern stands.

In the southern range of this system, Havard oak (*Quercus havardii*) may also be present and represents one succession pathway that develops over time following a disturbance. Havardi oak is able to resprout following a fire and thus may persist for long periods of time once established (Wright and Bailey 1982).

Fire and grazing are the most important dynamic processes for this type, although drought stress can impact this system significantly in some areas (Ramaley 1939). Overgrazing can lead to decreasing dominance of some of the grass species such as sand bluestem, giant sandreed, prairie sandreed and little bluestem (*Schizachyrium scoparium*).

Greater and lesser prairie-chickens (*Tympanuchus pallidicinctus*), Cassin's sparrows, and ornate box turtles (*Terrapene ornate*) are indicators of a healthy sandsage prairie system.

Source: S. Kettler, K. Decker, R. Rondeau, and D. Augustine, Date: July 2004)

Juniper Woodland & Savanna

The Juniper Woodland and Savanna ecological system occupies the lower and warmest elevations growing from about 4260 to 6000 feet (1300-1830 m) in a semi-arid climate, primarily along the east and south slopes of the southern Rockies and Arizona-New Mexico mountains. Juniper woodlands and savannas are usually found just below the lower elevational range of ponderosa pine and often intermingle with grasslands and shrublands. In the canyons and tablelands of the southern Great Plains this system also forms extensive cover at some distance from the mountain front. In the Central Shortgrass Prairie, this system is largely confined to the southwestern portion of the ecoregion and forms an extensive matrix with the Southwestern Great Plains Canyon ecological system. The Juniper Woodland and Savanna system is best described as a savanna that has widely spaced mature (>150 years old) juniper trees and occasionally twoneedle pinyon (*Pinus edulis*). Oneseed juniper (*Juniperus monosperma*) and Rocky Mountain juniper (*Juniperus scopulorum*) are the dominant tall shrubs or scattered short trees, though there may be inclusions of more dense juniper woodlands. Graminoid

species are similar to those found in Western Great Plains Shortgrass Prairie, with blue grama (*Bouteloua gracilis*) and James' galleta (*Pleuraphis jamesii*) being most common. In addition, succulents such as species of *Yucca* and *Opuntia* are typically present.

Although juniper woodlands and savannas are expected to occur naturally on the landscape, the extent and quality of this system has been severely altered since the early 1900's. Numerous studies have shown that juniper has encroached on shrublands and grasslands (e.g., Blackburn and Tueller 1970, West 1999). Processes that influence the formation and persistence of juniper savannas include climate, grazing, fires, tree harvest, and insect-pathogen outbreaks (West 1999; Eager 1999). Within a given region, the density of trees, both historically and currently, is strongly related to topoedaphic gradients. Less steep sites, especially those with finer textured soils, are where savannas, grasslands, and shrub steppes have occurred in the past. Juniper stands on these gentler slopes may have been larger but more savanna-like, with very open upper canopy and high grass production. Alteration of fire intensity and frequency, historic heavy livestock grazing, and changes in climate has led to various densities of younger trees occurring on some sites that were once shrublands or grasslands (West 1999, Commons et al. 1999).

Sources: R. Rondeau, K. Decker, Date: October 2004.

Southern Great Plains Canyon Complex

This system occurs in both perennial- and intermittent-stream canyons of the southwestern Central Shortgrass Prairie ecoregion. Soils can range from deep loams to alluvial to sandy. The mosaic of soil types which have developed from sandstone, limestone, basalt, and shale parent materials create a complex mosaic of grasslands, shrublands, and woodlands within the canyon system (Shaw et al. 1989). Although the system combines many elements from Southern Rocky Mountains Juniper Woodland and Savanna, Southern Rocky Mountains Lower Montane- Foothills Shrubland, Western Great Plains Shortgrass Prairie, and other shrublands, the varied geology, diverse soil types, and topographic dynamics together form a distinct ecological system complex characteristic of the canyons and dissected mesas of the southwestern Great Plains.

Vegetation varies both regionally and locally depending on latitude, aspect, slope position and substrate and can range from riparian vegetation to xeric or mesic woodlands and shrublands.

Rock outcrops with sparse vegetation are also common. Open to moderately dense piñon-juniper woodlands occupy most of the canyonland slopes. Scattered twoneedle pinyon may occur within these community types but are never dominant. Woodlands may be floristically similar to and intergrade with Southern Rocky Mountains Juniper Woodland and Savanna, but are distributed along rocky outcrops, canyon slopes, and mesas. Oneseed juniper is the most common tree species, and forms extensive woodlands with an understory of black grama (*Bouteloua eriopoda*), blue grama, hairy grama (*B. hirsute*), sideouts grama (*B. curtispindula*), and James' galleta, or sometimes with an open shrub layer dominated by alderleaf mountain mahogany (*Cercocarpus montanus*). Isolated small patches of ponderosa pine (*Pinus ponderosa*) or quaking aspen (*Populus tremuloides*) woodland are found in some locations. Shrublands occur on canyon bottoms, in narrow side canyons, and integrate with woodlands on upper slopes. A mosaic of shrub species is characteristic of canyon walls and slopes, and

varies with substrate and moisture availability. Common species include Bigelow sage (*Artemisia bigelovii*), alderleaf mountain mahogany, skunkbrush sumac, currant (*Ribes spp.*), common hoptree (*Ptelea trifoliata*), littleleaf mock orange (*Philadelphus microphyllus*), and soapweed yucca. James' seaheath (*Frankenia jamesii*) and spiny greasebush (*Glossopetalon spinescens* var. *meionandrum*) (*Forsellesia meionandra*) form a community restricted to gypsiferous and calciferous soils. Canyon floors, gravelly river benches and the bases of mesa slopes often support a degraded shrubby grassland of rubber rabbitbrush (*Chrysothamnus nauseosus*) and tree cholla (*Opuntia imbricate*) with an understory of blue grama and James' galleta.

Because of the varied topography, relatively permanent water along stream beds and southern location, these canyonlands have a rich herpetofauna. This system provides good habitat for a number of snake species that are otherwise uncommon in the Central Shortgrass Prairie ecoregion, including Texas blind snake (*Leptotyphlops dulcis dissectus*), ringnecked snake (*Diadophis punctatus arnyi*), night snake (*Hypsiglena torquata jani*), ground snake (*Sonora semiannulata*), wandering garter snake (*Thamnophis elegans vagrans*) and blacknecked garter snake (*Thamnophis cyrtopsis cyrtopsis*) (Mackessy 1998). These areas also provide excellent habitat for a variety of other reptiles and amphibians, including eastern fence lizards, collared lizards, Texas horned lizards, six-lined racerunners (*Cnemidophorus sexlineatus*), Colorado checkered whiptail lizards (*Cnemidophorus tesselatus*), plains garter snakes (*Thamnophis radix*) lined snakes, racers, ground snakes and prairie rattlesnakes, green toads (*Bufo debilis insidiosus*), chorus frogs, red-spotted toads (*Bufo punctatus*), and plains leopard frogs (*Rana blairi*) (Mackessy 1998). Occasional seeps and springs of the canyon walls provide habitat for rare ferns.

Sources: K. Decker, Date: August 2004.

Midgrass Prairie (Central Mixedgrass Prairie)

The midgrass prairie system ranges from South Dakota to northern Texas and is bordered by the shortgrass prairie on the western edge and the tallgrass prairie to the east. The loessal regions in west-central Kansas and central Nebraska, the Red Hills region of south-central Kansas and northern Oklahoma are all located within this system (NatureServe 2003). Although the greater part of the midgrass prairie lies to the east of Colorado, the western extent of this system has probably moved in and out of what is now eastern Colorado during much of the Holocene, as climatic conditions alternated between wetter and drier. In the sandhills of eastern Colorado, midgrass prairie dominated large areas in the early years of the 1900s. By the late 1940s, most of these communities had been replaced by shortgrass or sandsage communities, due to the effects of grazing and drought (McGinnies et al. 1991). Due to its position on the periphery of Ecological Sustainability 10/6/2005 Page 44 of 115 the range of the midgrass prairie ecological system, Colorado has probably never supported extensive tracts of this type.

Because of its position between two other prairie systems, this system contains elements from both shortgrass and tallgrass prairies, which combine to form the midgrass prairie ecological system throughout its range. The distribution, species richness and productivity of plant species within the midgrass ecological system is controlled primarily by environmental conditions, especially soil moisture and topography. Grazing, fire, and drought are important dynamic processes in this system. The relative dominance of the

various grass and forb species within different associations in the system also can strongly depend on the history and degree of natural or human disturbance.

The majority of midgrass associations in this system are dominated by western wheatgrass or little bluestem, although other grass species such as sideoats grama, big bluestem (*Andropogon gerardii*), needle and thread, prairie dropseed *Sporobolus heterolepis*, and blue grama are often present. Numerous forb and sedge species (*Carex* spp.) can also occur within the mixedgrass system in the Western Great Plains. Although forbs do not always significantly contribute to the canopy, they can be very important. Some dominant forb species include Cuman ragweed (*Ambrosia psilostachya*), blacksamson echinacea (*Echinacea angustifolia*), and rush skeletonplant (*Lygodesmia juncea*). Shrubland associations can occur in areas protected from fire due to topographic conditions.

Although there are no species which are strictly endemic to midgrass prairie, grassland birds such as chestnut-collared longspur (*Calcarius ornatus*), lark bunting (*Calamospiza melanocorys*), Cassin's sparrow, and grasshopper sparrow (*Ammodramus savannarum*) do use these mid-height grassland for major portions of their life cycle, and are indicators of a functioning system.

Sources: K. Decker, R. Rondeau, Date: May 2004.

Mixed Salt Desert Scrub (inter-Mountain Basins Mixed Salt Desert Scrub)

This extensive ecological system includes open-canopied shrublands of typically saline desert basins, alluvial slopes and plains across the Intermountain western U.S. This type also extends in limited distribution into the southern Great Plains. In the Central Shortgrass Prairie the Mixed Salt Desert Scrub ecological system is largely confined to the western edge of the ecoregion, although occurrences may be found at some distance from the mountain front in southeastern Colorado. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but include some coarser-textured soils. The salt-desert shrubland system is a matrix system in the Intermountain West, but occurs as a large patch type in the Western Great Plains. Sites can be found on all aspects and include valley bottoms, alluvial and alkaline flats, mesas and plateaus, playas, drainage terraces, washes and interdune basins, bluffs, and gentle to moderately steep sandy or rocky slopes (NatureServe 2003). This system is often adjacent to occurrences of Ecological Sustainability 10/6/2005 Page 51 of 115 the Greasewood Flat ecological system, and may intergrade with it, depending on local variation in hydrologic regime, soil salinity and texture.

In the Western Great Plains, the vegetation of this system is characterized by a typically open to moderately dense (5-15% cover) shrubland. Fourwing saltbush (*Atriplex canescens*) is the most common dominant, although Shadscale saltbush (*Atriplex confertifolia*) is also found in isolated areas of southeastern Colorado (Brown 1982, Branson et al. 1967). Other shrubs that may be present or codominant include winterfat (*Krascheninnikovia lanata*), pale desert-thorn (*Lycium pallidum*), rubber rabbitbrush, tree cholla, soapweed yucca, and broom snakeweed (*Gutierrezia sarothrae*). Greasewood (*Sarcobatus vermiculatus*) is generally absent, but if present does not codominate. The characteristic shrubs are most common under regimes of infrequent fire and moderate browsing (Carey 1995, Howard 2003). The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as Indian ricegrass

(*Achnatherum hymenoides*), blue grama, New Mexico feathergrass (*Hesperostipa neomexicana*), western wheatgrass, James' galleta, or alkali sacaton (*Sporobolus airoides*). Various forbs are also present.

Sources: G. Kittel, K. Decker, Version Date: October 2004.

Shale Barrens

This system includes shale and limestone outcrops of the southern great plains. In some cases, occurrences of this system will be inclusions in the Southern Great Plains Canyon ecological system complex. Barrens are generally found on shales, soft limestone (chalk), or shale-derived soils, and are characterized by a high percentage of open, rocky ground between the low-growing shrubs and herbaceous cover. Some occurrences have an overstory of sparse juniper, and may include scattered larger shrubs and bunchgrasses. Shale substrates often form a rocky "pavement" between plants. This system is distinguished from the Western Great Plains Cliff and Outcrop system that is found further north on the Pawnee grasslands by the different substrate and growth patterns of the vegetation. In the Central Shortgrass Prairie ecoregion, this system may provide suitable habitats for northward range extension of species that are more typical further south (Kelso 1999).

Occurrences of this system are most often found Cretaceous bedrock of the Middle and Upper Chalk members of the Smoky Hills Member of the Niobrara Formation. The area between Pueblo and Cañon City contains the highest frequency of such shale barrens in southeastern Colorado (Kelso 1999). Slope angles range from flat on summits to moderately steep on side slopes, and exposures are variable, depending on how uplift, regional erosion, or downcutting has occurred (Kelso 1999). Soils belong to the Penrose series and are typically shallow. Summit flats have shallower soils than slopes, with slope bottoms generally deeper than slope tops (Kelso 1999).

Vegetation is characterized by a "cushion-plant" community, with cover less than 25%, and often much lower. Some occurrences may support a sparse overstory of Oneseed juniper. Typical shrub species are James' seaheath, spiny greasebush, Fourwing saltbush, and Bigelow sage. Perennial low-growing forbs and sub-shrubs include stemless four-nerve daisy (*Tetranneuris acaulis*), buckwheat (*Eriogonum* spp.), roundleaf four o'clock (*Oxybaphus rotundifolius*), Fendler's bladderpod (*Lesquerella fendleri*), ribseed sandmat (*Chamaesyce glyptosperma*), Hooker's Townsend daisy (*Townsendia hookeri*), plains blackfoot (*Melampodium leucanthum*), Rocky Mountain zinnia (*Zinnia grandiflora*), *Cryptantha* spp., and leafy false goldenweed (*Oönoopsis foliosa*). Occurrences may include low cover of bunchgrasses such as New Mexico feathergrass, Indian ricegrass, purple threeawn, and blue grama. Along with the substrate, wind appears to be an important factor shaping the appearance of this system. As this community grades into adjacent communities in more sheltered areas below ridgetops, cover and plant height increases.

Sources: K. Decker, R. Rondeau, May 2004.

Greasewood Flats (Inter-Mountain Basins Greasewood Flat)

This ecological system occurs throughout much of the western U.S. in Intermountain basins and extends onto the western Great Plains. In the Central Shortgrass Prairie,

elevations range from perhaps 4500 to 6600 feet, and are largely concentrated in the southwestern portion of the ecoregion. In Colorado, occurrences are found in the lower elevations of the western valleys, throughout much of the San Luis Valley, and in the southeastern plains.

The Greasewood Flats ecological system typically occurs near drainages on stream terraces and flats, on alluvial fans along streams or arroyos, or may form rings around playas. Sites typically have saline soils, a shallow water table and flood intermittently, but remain dry for most of the growing season. The Greasewood Flats ecological system usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or codominated by greasewood, Fourwing saltbush, Shadscale saltbush, rubber rabbitbrush, *Cylindropuntia candelabra*, or winterfat may be present to codominant.

Occurrences are often surrounded by mixed salt desert scrub, sandsage, or shortgrass prairie.

The herbaceous layer, if present, is usually dominated by graminoids such as *Sporobolus airoides*, saltgrass (*Distichlis spicata*), and blue grama. Small patches of *Sporobolus airoides*, saltgrass (where water remains ponded the longest), or common spikerush (*Eleocharis palustris*) herbaceous types may be found within the shrubland system (NatureServe 2003).

Although most studies indicate that black greasewood is relatively unharmed by fire, the degree of damage may vary according to season of burn, fuel loading, and intensity of fire. Greasewood is competitive after disturbance, including fire, but is not primarily a disturbance driven system (Tirmenstein 1987). Because greasewood flats are tightly associated with saline soils and groundwater that is near the surface, the primary ecological process that maintains greasewood flats is groundwater recharge, rather than surface water.

Sources: R.J. Rondeau, J. Sanderson, K. Decker; October 2004.

Southern Rocky Mountain Lower Montane-Foothills Shrubland

Lower montane-foothills shrubland ecological system is a large patch system that is found in over 5% of the Southern Rocky Mountains ecoregion and well represented from the most northern latitudes to the most southern area of the ecoregion. This system is found between 5,000-9,000 feet in elevation and usually associated with rocky substrates. This system may have scattered trees but is a shrub dominated system with a variety of shrubs including alderleaf mountain mahogany, antelope bitterbrush (*Purshia tridentate*), skunkbrush sumac, or wax currant (*Ribes cereum*). The lower montane-foothills shrublands may occur as a mosaic of two or three plant associations often surrounded by grasslands or woodlands. Fires play an important role in this system as the dominant shrubs usually have a severe die back, although some plants will stump sprout (<http://www.fs.fed.us/database/feis>). Fire suppression has allowed an invasion of trees into some shrublands as well as an invasion of shrubs into grasslands. Additional threats to this system include fragmentation by roads and development, both provide an unnatural fire break as well as a conduit for weeds.

Viable populations of Green-tailed towhee and Scrub jay (especially oaks) indicate a healthy occurrence.

Source: Renée Rondeau, Date: July 2, 2000.

Western Plains Riparian Woodland & Shrubland

This system is found in the riparian areas of medium and small rivers and streams throughout the Western Great Plains. It is likely most common in the Central Shortgrass Prairie and Northern Great Plains Steppe, but extends west into the Wyoming Basins. This system is composed of associations found on alluvial soils in highly variable landscape settings, from deep cut ravines to wide, braided streambeds. Hydrologically, the associated rivers tend to be more flashy with less developed floodplain than on larger rivers, and typically dry down completely for some portion of the year. Dominant vegetation overlaps with generally drier portions of larger floodplain systems downstream, but overall abundance of vegetation is generally lower.

Vegetation may be a mosaic of communities that are not always tree or shrub dominated. Communities within this system range from riparian forests and shrublands to tallgrass wet meadows and gravel/sand flats. Dominant species include eastern cottonwood (*Populus deltoids*), *Salix* spp., silver sagebrush (*Artemisia cana* ssp. *cana*), western wheatgrass, sand dropseed, little bluestem, big bluestem, and indiagrass. Plant associations of the North American Arid West Emergent Marsh ecological system may occur along or adjacent to portions of this system.

These areas are often subjected to heavy grazing and/or agriculture and can be heavily degraded. Tamarisk (*Tamarix* spp.) and less desirable grasses and forbs can invade degraded examples up through central Colorado. Furthermore, groundwater depletion and lack of fire have created additional species changes.

Native amphibians and reptiles (e.g., leopard frogs, spadefoot toads, ornate box turtles), and native prairie fishes are indicators of a healthy riparian shrubland and woodland system.

Sources: R.J. Rondeau, K. Decker, Date: August 2004.

Depressional Wetlands (Playas)

Closed depression wetlands:

Communities associated with the playa lakes in the southern areas of the Western Great Plains and the rainwater basins in Nebraska characterize this system. They are primarily upland depressional basins. This hydric system is typified by the presence of an impermeable layer such as a dense clay, hydric soil and is usually recharged by rainwater and nearby runoff. They are rarely linked to outside groundwater sources and do not have an extensive watershed. Ponds and lakes associated with this system can experience periodic drawdowns during drier seasons and years, often drying completely, and are often replenished by spring rains or thunderstorms.

Spikerush (*Eleocharis* spp.), foxtail barley (*Hordeum jubatum*), along with common forbs such as golden tickseed (*Coreopsis tinctoria*), eastern annual saltmarsh aster (*Symphotrichum subulatum* (= *Aster subulatus*), and Pennsylvania smartweed

(*Polygonum pensylvanicum* (= *Polygonum bicorne*) are common vegetation in the wetter and deeper depression, while western wheatgrass and buffalograss are more common in shallow depressions in rangeland. Species richness can vary considerably among individual examples of this system and is especially influenced by adjacent land use, which is often agriculture, and may provide nutrient and herbicide runoff. Dynamic processes that affect these depressions are hydrological changes, grazing, and conversion to agricultural use.

Saline depression wetlands:

This system is very similar to the Western Great Plains Closed Depression Wetland system. This system is distinct from the freshwater depression systems by its brackish nature caused by strongly saline soils. Salt encrustations can occur on the surface in some examples of this system, and the soils are severely affected and have poor structure. Species that typify this system are salt-tolerant and halophytic species such as saltgrass, *Sporobolus airoides*, and foxtail barley. During exceptionally wet years, an increase in precipitation can dilute the salt concentration in the soils of some of examples of this system which may allow for less salt-tolerant species to occur. Communities found within this system may also occur in floodplains (i.e., more open depressions), but probably should not be considered a separate system unless they transition to areas outside the immediate floodplain. This system is primarily driven by hydrological processes. Increases in precipitation and/or runoff can dilute the salt concentration and allow for less salt tolerant species to occur. Conversion to agriculture and pastureland can also impact this system, especially when it alters the hydrology of the system.

Sources: R. J. Rondeau, K. Decker, Date: May 2004.

Seeps and Springs (North American Arid West Emergent Marches)

Seeps and springs are small wetland ecological systems that are hydrologically supported by groundwater discharge (USDI 2001; Hynes 1970). A seep is an area of minor groundwater outflow onto the land surface or into a stream channel or other water body. Flows are usually too small to be a spring. (Horton 2000). A spring is a place where ground water flows naturally from a rock or the soil into the land surface or into a body of surface water. Its occurrence depends on the nature and relationship of rocks, especially permeable and impermeable strata, on the position of the water table, and on the topography (Horton 2000). Seeps differ from springs in that they often periodically dry and consequently support a lower diversity of wetland vegetation. Springs often have a more persistent source of water and thus support a greater diversity of wetland vegetation and often provide aquatic habitat (BLM 2000, Doyle et al. 2002).

Seeps and springs may occur as isolated wetlands, or as extensive riparian complexes that form mosaics of wetland plant communities. These systems are often found as part of the Southern Great Plains Canyon ecological system complex, but are not restricted to canyons. The plant associations of seeps and springs are those characterized as belonging to the North American Arid West Emergent Marsh ecological system.

This widespread ecological system occurs throughout much of the arid and semi-arid regions of western North America. Natural marshes may occur in depressions in the landscape (ponds, kettle ponds), as fringes around lakes, and along slow-flowing streams and rivers (such riparian marshes are also referred to as sloughs). Marshes are frequently or continually inundated, with water depths up to 2 m. Water levels may be

stable, or may fluctuate 1 m or more over the course of the growing season. Marshes have distinctive soils that are typically mineral, but can also accumulate organic material. Soils have characteristics that result from long periods of anaerobic conditions in the soils (e.g., gleyed soils, high organic content, redoximorphic features). The vegetation is characterized by herbaceous plants that are adapted to saturated soil conditions. Common emergent and floating vegetation includes species of *Scirpus* and/or bulrush (*Schoenoplectus*), cattail (*Typha*), rush (*Juncus*), pondweed (*Potamogeton*), *Polygonum*, pond-lily (*Nuphar*), and *Phalaris*. This system may also include areas of relatively deep water with floating-leaved plants such as duckweed (*Lemna*), pondweed, and *Brasenia* and submergent and floating plants such as watermilfoil (*Myriophyllum*), hornwort (*Ceratophyllum*), and waterweed (*Elodea*).

In the Western Great Plains, seeps and springs provide habitat for a variety of amphibian species, including tiger salamander (*Ambystoma tigrinum*), red-spotted toad (*Bufo punctatus*), Woodhouse toad (*Bufo woodhousi*), chorus frog (*Pseudacris triseriata maculata*), plains leopard frog (*Rana blairi*), Couch's spadefoot toad (*Scaphiopus couchii*), plains spadefoot toad (*Spea bombifrons*), and New Mexico spadefoot toad (*Spea multiplicatus*) (Mackessey 1998).

Sources: R. J. Rondeau, K. Decker, Date: August 2004.

Desired Conditions

Management improves the integrity and health of all native ecosystem types historically found in the Comanche and Cimarron Grasslands regions.

The Forest Service manages human activities in a way that enables the Grasslands' native ecosystems to function and recover as naturally as possible.

The Forest Service also helps educate the public and user groups about the importance of healthy ecosystems to human and animal life in the region.

The user community supports Grasslands restoration and conservation work.

The Forest Service is fulfilling its mandate to influence conservation practices throughout the region beyond the Grassland boundaries.

The Forest Service facilitates and supports successful and popular community-based restoration projects that involved local and other interested citizens and conservation organizations.

Grassland users are aware of opportunities for working with the Forest Service, non-governmental organizations, and private entities to restore depleted habitat, ecosystem functions, and populations of sensitive or extirpated species.

Objectives

- Restoration plans are developed for reference areas and restoration areas for degraded ecosystems.

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- Proceeding with active restoration, when it is appropriate, on the basis of our best knowledge and aiming for long-term recovery of ecosystems rather than short-term convenience or profit.
- A seeps, springs, and ponds riparian vegetation restoration strategy is prepared within six years of Grasslands Plan implementation.
- Passive methods are prioritized over active revegetation to increase native riparian vegetation and decrease non-native riparian vegetation. Revegetation takes place primarily through reclamation of oil and gas facilities, rest from livestock grazing and destabilizing recreational activities.
- Manage each ecosystem according to its individual needs. Management includes fire management, eradicating and preventing spread of non-native species, and managing, altering and/or prohibiting activities and uses that impede progress toward desired conditions.
- Develop and maintain an accurate GIS-based system at least including, for all ecological systems mapping:
 - Alliances;
 - Associations;
 - Spatial extent;
 - Vegetation condition;
 - Trends on associated floral and faunal species of concern and interest;
 - Restoration treatments.
- Develop cooperative interagency agreements that analyze management of vegetation in consultation with local, state, federal, and non-governmental organizations. Impacts of any proposed management activity on adjacent or overlapping jurisdictions or otherwise affected lands shall be analyzed cooperatively. Examples include adjacent Multiple Species habitat Conservation Plans, Species Conservation Plans, and Fire Management Plans.

Guidelines

- ◆ Restore and maintain natural fire regimes (frequent surface fire), emphasizing use of naturally ignited fires to emulate the location and seasonality of natural fire regimes.
- ◆ The Forest Service encourages, supports, and/or joins in public partnerships for restoration of native ecosystems, habitat, and species on the Grasslands.
- ◆ A list of desirable non-invasive maintenance activities (e.g., hand-pulling of easily-identified invasive species; maintaining gates open or closed, as found) is posted on the Grasslands websites.
- ◆ Maintenance and restoration projects by Grasslands users that involve altering Grasslands conditions in order to protect, maintain, or restore Grasslands ecosystems are subject to Forest Service approval and conditions, which are posted on the Grasslands websites. All relevant information regarding such projects is publicly available.

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- ◆ Protect biological soil crusts where they occur from uses that would damage them. Manage uses to promote the recruitment of new soil crusts in areas where there is evidence of degradation or elimination of historical soil crusts.
- ◆ Monitoring shall include all monitoring requirements for:
 - ◇ Invasive plants
 - ◇ Livestock grazing
 - ◇ Federally listed species
 - ◇ Species of Concern and Interest
 - ◇ Oil and gas activities
 - ◇ Motorized recreation
 - ◇ Fire History
 - ◇ Responses to restoration activities
- ◆ Measure abundance and diversity of aquatic insect species on an ongoing basis.
- ◆ Prohibit gravel mining, or other extractive stream-bed activities.
- ◆ Use physical barriers to keep people out of riparian areas.
- ◆ Move existing roads and trails out of riparian areas, where possible, provided the relocated roads and trails are not more damaging than the original ones.
- ◆ Place signage to educate users to stay on the trail.
- ◆ Create erosion control barriers to prevent erosion and sedimentation.
- ◆ Provide education and signage to keep motorized users on the trail and out of the streambed.
- ◆ Close motorized trails in sensitive areas to prevent resource damage.
- ◆ To the degree legally possible, the speed and amount of water loss from the Grasslands is minimized by appropriate hydrological channels and fully functioning aquatic and riparian hydrological systems and associated vegetative and wildlife communities.
- ◆ Cooperative agreements are formed with communities and user groups to help provide education, trail monitoring and maintenance.
- ◆ An annual report is prepared on conservation stewardship activities undertaken by the public on the Grasslands, including:
 - ◇ Methods acceptable to the Forest Service to evaluate the condition and functioning of the Grasslands' ecosystems, processes, vegetation and wildlife, including quality assurance, are posted on the Forest Service website.
 - ◇ Sound scientific, independent research relevant to Grasslands Desired Conditions is encouraged, supported, and considered in management decisions.
 - ◇ Monitoring methods and results of scientific research submitted to the Forest Service are made available to the public.

- ◆ An ongoing 'Call for Research' regarding key natural, social, and economic information gaps is posted on the Grasslands websites to facilitate communication of the Forest Service's research needs with the surrounding research community.
- ◆ Data and analyses cannot be rejected for consideration in management decisions other than on the basis of lack of scientific relevance and/or sound methodology.

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RECOVERY AND CONSERVATION OF NATIVE PLANT AND ANIMAL SPECIES

“American Serengeti” remains a useful yet over-used metaphor to convey the quintessential scene of vast ungulate herds; large predators; small carnivores waiting for some scraps after a kill; busy rodents and other small herbivores scurrying for seeds; flocks of birds taking flight simultaneously over a field or pond; and wild, sweeping landscapes. We invoke the African scene to supplement our vision of grand caribou herds migrating across the coastal plain of the Arctic National Refuge and the mix of bison, elk, grizzly bears and wolves of Yellowstone National Park. American Serengeti often finds play in writings about the Great Plains. But the metaphor is used not to describe the wildlife that is there but what has been lost – we need the metaphor because we have lost the capacity to visualize our prairie grasslands as wild places.

Within the last 150 years the Southern Prairie lost most of its large mammals native to the region including the grizzly bear, black bear, wolf, mountain lion, wolverine, black-footed ferret, beaver, moose, elk, and American bison. While some are making a slow recovery, others may be gone for good. Many species that belong in the region are still declining or have yet to recover.

ALL NATIVE SPECIES AND NATURAL MIGRANTS

Existing Conditions

Over 600 native plant species, close to 400 vertebrate species, and an unknown number of native invertebrate animals still reside on the Comanche and Cimarron National Grasslands, at least for some part of the year. The Grassland management plan can help promote the protection of these species and encourage the restoration of others who belong to these lands.

Plants

By 1930, the native vegetation of the Southern Plains had almost completely been replaced by wheat. On what is now the Cimarron National Grassland, for example, only four percent of the native vegetational community remained in the 1930s (Morton County Grazing Association AMP 2002). The last 70+ years have been devoted to restoring vegetation lost during the Dust Bowl. Unfortunately, early and even later restoration efforts did not always include native grasses for planning and reseeding. People and their livestock brought exotic plant species to the region that spread due to suppression of natural fire, loss of bison grazing, and conversion of native prairie to cropland. Native grasses and forbs have made a recovery but competition from exotic plant species, domestic livestock grazing, the continued lack of fire restorative fire, vehicles, and the construction of new roads all keep native plants on the defensive. Several rare and endemic species make the Grasslands unique. The Cimarron Grasslands have inventoried rare plant species (Freeman 1989) and the Comanche has documented its vascular plants (Hazlett 2004). These values must be protected from the threats listed above through diligent management.

Invertebrates

Very little is known about grassland invertebrates region-wide and locally, and they remain poorly studied (Arenz and Joern 1996). Yet, invertebrates contribute far more to ecosystem processes than do vertebrate animals. The total biomass of arthropods (the most familiar variety of invertebrates that include insects, spiders, and centipedes) alone exceeds that of all vertebrates combined, minus domestic livestock (Lauenroth and Michunas 1992).

Managing for vertebrate focal species may not provide sufficient habitat conditions for native invertebrates (Samways 1993). Based on what is known, habitat loss, fragmentation, and degradation; chemical pollutants including pesticides, herbicides, and fertilizers; and competition with non-native species all constitute threats to native invertebrates (Arenz and Joern 1996). Different invertebrates respond differently to fire. Managers must consider the effects of timing, frequency, and extent of prescribed burns on invertebrates in the burn area. Patchy burns that provide some non-burned area as refugia for fire-sensitive species and do not exceed 25-50% of intact plant communities are recommended (Opler 1991; Panzer 1988). The management planning process provides an opportunity for the Forest Service to promote knowledge about invertebrates through research and creating benchline data for the long-term monitoring of key Grassland insects, spiders, and the rest of these small creatures.

Vertebrates

The complete modification of the prairie water systems upstream and down has affected native fish species. Water diversion and storage from streams has altered natural water flows and resulted in less water for aquatic species. Herbicides and fertilizers from nearby farms along with cattle excrement and vehicle emissions pollute Grassland waters. Only three streams on the Grasslands provide year-round water: Timpas Creek, Purgatoire River, and Carrizo Creek. Even the Cimarron, once a river with a regular flow, has become an intermittent creek; it is even used as a road in some places. Several native fishes are struggling. The Arkansas River shiner is listed as threatened; the Fish and Wildlife Service designated some waters downstream as critical habitat for this species. The Arkansas darter is a federal candidate for Endangered Species Act listing. The flathead chub, speckled chub, emerald shiner, plains minnow, and plains killfish are all either declining or extirpated from the larger streams. The blacknose shiner and Topeka shiner are barely hanging on or are even gone from the Cimarron River.

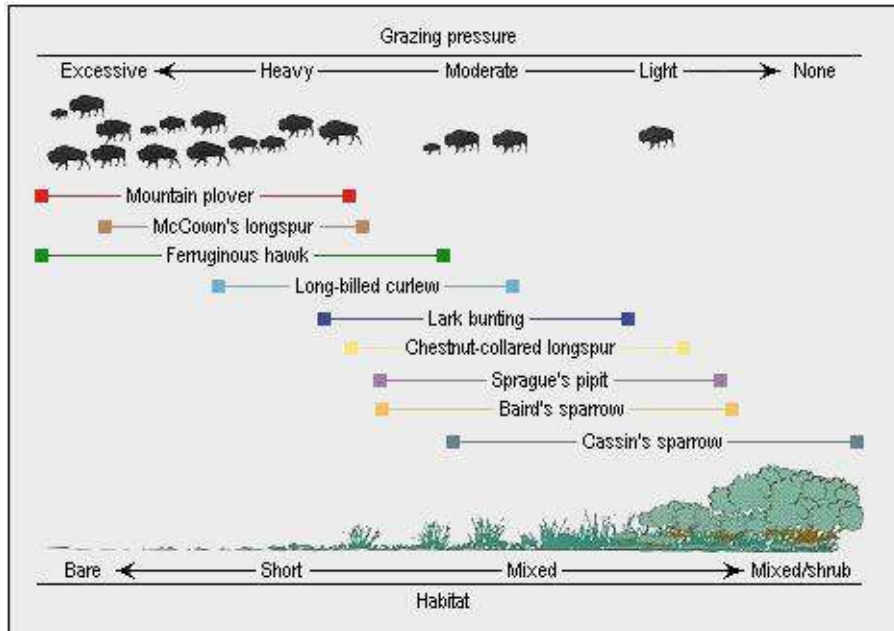
Many grassland birds are experiencing catastrophic declines owing to the cumulative effects of agricultural domination in the Great Plains. Knopf 1996 described the magnitude of avian losses,

During the last 25 years, grassland species have shown steeper, more consistent, and more geographically widespread declines than any other behavioral or ecological guild of North American birds, including Neotropical migrants (pg. 296).

Brennan and Kuvlesky 2005, root the problem in “a critical mass of negative effects” from a combination of factors including drought, livestock grazing, woody plant encroachment, exotic species invasions, and road-building” (pg. 5). They put most of the blame for the decline of grassland birds in the West on the loss of wild bison and historic grazing regimes of native grazers to domestic livestock and the shift to cattle ranching on the Plains. Huge herds of bison moved around the open Plains to graze where they pleased, leaving some grassland areas ungrazed for years. Commercial ranching involved confining animals, building roads,

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suppressing fire, altering hydrologic systems, lowering the water table, and pushing the land beyond its carrying capacity (Saab et al. 1995; Brennan and Kuvlesky 2005). As discussed in the Ecological Processes section of this *Conservation Alternative*, the natural processes of the prairie grasslands—bison grazing, prairie dog colonization, periodic fires and floods, along with occasional droughts created a diverse habitat mosaic that supported a range of avian species. Some bird species, such as the Cassin’s sparrow, select for taller structure grasses and shrubs while others, such as the mountain plover, prefer the true shortgrass. The graphic below illustrates the different vegetations structure heights provided by traditional native bison grazing patterns and preference by grassland endemic birds.



(Knopf 1996. pg. 137)

Only twelve birds are endemic to the Great Plains grasslands. Seven of ten of these species monitored by the Breeding Bird Surveys (1966-1991) exhibited long-term population declines (Knopf 1995). The mountain plover, Franklin’s gull, Sprague’s pipit, Cassin’s sparrow, and lark bunting all showed statistically significant drops. The plover, Cassin’s sparrow, and lark bunting all occur on the Cimarron and Comanche Grasslands

In fact, the Grasslands provide some of the most important nesting and breeding habitat for grassland birds in the entire Southern Plains. Because of the Forest Service’s ability to manage land uses on the Grasslands, restoring a vegetative mosaic on these lands provides the best hope to start reversing the trend in grassland bird decline.

Current conditions in the Southern Plains demonstrate how the loss of one “cog in the wheel” can cause dysfunction down the line. Actually the prairie has lost four cogs in the form of keystone mammals. Though extirpated by the 1880s, bison have made a come-back but are primarily raised like cattle. European trappers took as many beaver as they could for the fur trade and those left at the beginning of the homesteader years were killed by farmers who wanted control of the scarce prairie streams. Beaver dams slowed water flow from west to east, enabling some collection and storage for a host of fish, amphibians, and terrestrial species, and also maintained healthy riparian habitats. Prairie dogs have been poisoned and shot down to such low numbers across the western grasslands that the isolated and fragmented colonies are

not able to sustain health populations of species that depend on them for food and their burrows for shelter. Finally, wolves, who once preyed on bison in significant numbers were persecuted out of existence on the Plains.

The actions and interactions of these mammals, along with fire and other ecological and climatic processes, maintained the natural habitat and prairie landscape for eons. Beaver helped provide precious water necessary for all life and minimize the effects of extreme flood events. Bison grazing helped keep the grasses short, enabling easier prairie dog colony expansion. Along with serving as prey and expert prairie home-builders, prairie dog burrowing and digging helps aerate and fertilize the soil, which enables more water retention and produces healthier forage on colonies. Prairie dog colonies attracted an array of species from microorganisms, insects to bison. Bison also enjoyed grazing on prairie dog colonies for the more nutritious, succulent grasses. Wolves hunted bison, enforcing some population control and leaving partially eaten carcasses for other hungry species. Decaying bison carcasses further fertilized the soil, part of the ecosystem process removed by the expansion of commercial livestock operations on the Plains. Wolves also kept the populations of smaller, more generalist carnivores, such as coyotes and red foxes in check. The tiny swift fox, native to the prairie, has suffered greatly due to the loss of the wolf which control coyotes. Coyotes and red foxes compete with swift foxes for food and often kill the smaller canid. The loss and decline of these mammals have had a ripple effect across the Southern Plains and have, in part, shaped the ecological conditions on the Grasslands today.

Desired Conditions

Ecological conditions exist to achieve natural patterns of abundance and distribution of all native plant and animal species.

Degraded habitat that historically supported wildlife species or currently supports diminished populations of native and migratory species is restored.

Species are monitored regularly and populations are stable or geographically expanding to fill potentially suitable habitat within historic range.

Conservation measures demonstrate positive trends in habitat availability and quality, or any other applicable factors affecting species at risk and rare communities.

New sound scientific knowledge about native and migratory species continually informs management planning and decision making to promote species conservation.

Monitoring of key focal species, including Species of Concern, Species of Interest, Endangered, Threatened, and Sensitive reveals population trends indicating ecosystem improvements, disturbances, and/or damage and ultimately allow informed and appropriate management responses.

Forest Service education programs increase tolerance for controversial native species, such as invertebrates, prairie dogs, beaver, pronghorn, elk, coyotes, rattlesnakes, and other predators.

Community stewardship programs have attracted volunteers to help monitor ecological conditions and species population trends on the Grasslands and have also fostered greater public appreciation for the local wildlife and natural communities.

Plants

Habitat conditions favor reproduction in all populations of all plant species of concern.

The trend toward monoculture has been reversed.

Careful, well-planned management of disturbance regimes, primarily grazing and fire, enables the formation of a mosaic of short- to tall-structure vegetation to provide a closer approximation of natural conditions for maximizing species biodiversity.

Degraded habitat, which historically supported native species (or their pollinators) whose populations have been reduced or are declining, is being restored.

Within three years, for each sensitive species, the Forest Service will identify suitable habitat on the Grasslands, at minimum as a coarse-grain map completed using digital layers in GIS. If the creation of such a map cannot be completed by the Forest Service, the agency will accept interim, independent identification of suitable habitat utilizing methods identified by the Forest Service as sound.

Partnerships with Colorado Native Plant Society, Colorado Natural Heritage Program, other conservation organizations, Kansas Natural Heritage Inventory and independent botanists extend the capability of the Grasslands to survey and document sensitive species presence, threats, and potential habitat.

Invertebrates

Research sponsored by the Forest Service in conjunction with entomologists and other experts, regional universities, conservation organizations, and volunteers increase knowledge about the diversity of native invertebrates and provides baseline data from which to monitor population trends and responses to uses and management activities.

Invertebrate collection by researchers does not result in biological harm to individual taxa.

Management actions on the Grasslands conserve all native invertebrate species and promote natural biodiversity of native invertebrates.

Protection of rare invertebrate maintains viable populations.

Vertebrates

The recovery and conservation of native fish species are prioritized over non-native sport fishes. Non-native fish are not released into waterways where native fish occur.

Grassland conditions enable expansion and restoration of native fish populations to their historic range.

Healthy populations of prairie dogs within and around the Comanche/Cimarron Planning Area provide a robust complex of multiple colonies of varying sizes. Barriers to prairie dog movement have been reduced, tolerance for the rodents has increased within the local community, and prairie dogs are once again able to fulfill their keystone functions within the Planning Area.

Grassland species dependent on prairie dogs are experiencing stable and increasing populations. Prairie dog populations are sufficient to support a sustainable population of black-footed ferrets in the Grasslands region.

Stream and riparian conditions have improved to enable beavers—a keystone species—to reestablish themselves within the Grasslands, especially on the larger water courses including the Purgatoire and Cimarron Rivers.

Since the Comanche and Cimarron Grasslands permitted bison, bison have gradually replaced cattle as the primary grazers on the Grasslands. One or more healthy, sustainable wild herds now roam the Grasslands.

Objectives

Identify rare plant and animal communities, inventory them and develop associated management strategies to conserve them. Support the development and implementation of State and Regional Conservation Plans as they apply to the Grasslands.

Plants

- Manage vegetation so native forbs complete their full reproductive cycle.
- Complete and initiate implementation of conservation strategies for globally rare plant species (G2-3 rankings) and other high priority species in cooperation with other conservation agencies and organizations.
- Conduct target surveys for globally rare plant species and other rare plant species with viability concerns.
- During the Allotment Management Plan process or as other opportunities arise, design and implement livestock grazing strategies that allow sensitive plant species to complete their reproductive cycles at a frequency that maintains and enhances their populations.
- Identify sensitive plant habitats and rare plant communities as priorities for invasive plant monitoring and control.
- As opportunities arise, design timing, intensity and frequency of mowing, burning and livestock grazing to maintain and/or increase populations of sensitive plant species and the health of rare plant communities.
- Using existing information, the Forest Service will adopt a conservation plan for rare and endemic plant species within three years of implementation of the Grassland Plan, using the best available scientific information. The conservation plan identifies:
 - goals for the species;
 - habitat historically occupied by the species;
 - a map of current populations and occupied habitat;
 - pollinators, and pollinator habitat needs, if known;
 - a map of habitat feasible for recovery of well-distributed, multiple populations;
 - primary human threats to protection or recovery of the species and its pollinators;

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- measures that have been demonstrated to help protect or recover the species on the Grasslands and in and around the planning area;
 - management measures that are being or will be used to reduce or eliminate barriers to protection or recovery;
 - a least-cost monitoring protocol capable of documenting presence and population trends; and
 - crucial information gaps.
- The Forest Service will maintain a list of native plant species (trees, shrubs, grasses, forbs) experiencing population declines on the Grasslands. Files on each such plant species will be maintained, including scientific evidence on any current uses or management practices on the Grasslands that may be contributing to its population decline.
 - For any new federally listed, candidate, or proposed species for which distribution and abundance is not current (i.e., the information is older than five years), the Forest Service will, within two years, survey potentially suitable habitat on the Grasslands for each species using sound survey methodology.
 - For each federally listed and candidate/proposed species, the Forest Service will, every three years, monitor population trends (distribution and abundance) using the simplest, most effective protocols recommended by botanists and biologists familiar with the species.
 - Commercial, recreational and other activities that do not adhere to mitigation or recovery measures specified in the conservation plans are not permitted within occupied and unoccupied suitable habitat for listed, candidate/proposed, and rare species.
 - If no U.S. Fish and Wildlife conservation/recovery plan exists for a federally listed or candidate/proposed species on the Grasslands, the Forest Service cannot permit ground-disturbing activities in suitable habitat without a Grassland-specific recovery plan that uses the best available scientific information.

Invertebrates

- Collect existing scientific information about potential invertebrate species within the planning area to document species occurrences, establish baseline data, and identify knowledge gaps.
- Develop protocols for monitoring native invertebrates to assess population trends and identify human activities that are detrimental to populations.
- Select appropriate invertebrate Species of Concern and Species of Interest for each of the 12 major ecosystem types of the Grasslands. Monitoring invertebrates will help more comprehensively evaluate ecosystem conditions on the Grasslands.
- Develop and implement conservation plans for native invertebrate Species of Concern.

Vertebrates

- When native fish are present in any given stream, non-native sport fish will not be introduced. If sport fish are also present, stocking will discontinue.
- An active file of all populations and individuals of native fishes that are noted in streams and reaches on Grasslands are updated every year; files include:
 - Observations from field technicians;
 - Any observed geographical or population expansion of native fish;
 - Monitored conservation populations; and
 - Continued conservation and management proposals, actions, and results from the Colorado Division of Wildlife, Kansas Department of Wildlife and Parks, and the Forest Service that involve direct monitoring of native fishes or that directly or indirectly affect populations or habitat of native fish species.
- Collaborate with the Colorado Division of Wildlife, Kansas Department of Wildlife and Parks, other conservation groups, and interested members of the public to restore native fish populations to their historic range within the Grasslands.
- Distribute maps of any fish disease to the public, agencies, and organizations that can help prevent the spread to un-infected streams and reaches.
- Design and construct new facilities to minimize the risk of accidental spills and discharge of petroleum and other toxic materials into waters occupied by sensitive fish species, and implement appropriate precautionary measures.
- Assess the potential impacts of the construction of impoundments in upper watersheds on hydrologic flows and patterns on downstream habitat on the sturgeon chub and other sensitive native fish species.
- Assess the condition of watersheds containing aquatic habitats of sensitive fish species that are found primarily in clear-water streams and rivers.
- The Forest Service considers birds listed on the US Fish and Wildlife Service's 2002 List of Birds of Conservation Concern and priority species identified by Partner's in Flight before each management decision with potential to impact those birds.
- Habitat for all migratory birds potentially existing on the Grasslands is a priority for passive restoration where it is not currently productive for migratory birds.
- Impacts to migratory bird habitat are identified, documented, and minimized.
- Within three years of implementation of the Grasslands Plan, determine suitable protocol with appropriate partnerships (e.g., with Audubon Society, Kansas and Colorado wildlife departments), the presence/absence of migratory birds for which potential suitable habitat exists on the Grasslands.
- All livestock permits, designation of ORV routes, and oil and gas projects will note the proximity/absence of potentially suitable habitat for migratory birds.

Guidelines

- ◆ Ecological conditions exist to achieve natural patterns of abundance and distribution of all native plant and animal species.
- ◆ When installing new livestock water tanks, install durable and effective escape ramps for birds and small mammals. During maintenance of existing tanks, replace ramps that are ineffective or missing.
- ◆ Conserve populations of species at risk and rare communities by demonstrating positive trends in habitat availability and quality, or any other applicable factors affecting species at risk.

Plants

- ◆ Do not authorize vegetation management and construction projects that would prevent re-colonization of sensitive plant populations from adjacent populations.
- ◆ Do not authorize new facilities, roads, trails, fences, salting and mineral areas, or water developments in habitat occupied by sensitive plant species.
- ◆ Do not authorize the use of invasive plant control methods, such as chemical herbicides, that may negatively impact sensitive plant species.
- ◆ As opportunities arise, design timing, intensity and frequency of mowing, burning and livestock grazing to maintain and/or increase populations of sensitive plant species and the health of rare plant communities.

Invertebrates

- ◆ Design vegetation and pest management activities (e.g., prescribed burning, mowing, livestock grazing, or grasshopper spraying) and pesticide application projects in known habitats of sensitive butterfly species to reduce mortality of butterflies and to maintain or enhance nectar and larvae host plant species.
- ◆ Document invertebrate responses to livestock grazing changes, prescribed burns, restoration activities, invasive species, and species reintroduction.
- ◆ Prescribed burns should leave patches of unburned area to provide refugia for fire-sensitive invertebrates and should not exceed 50% of the intact plant community.
- ◆ Adaptive management should include evaluation of the effects of management actions based on effects to indicator species and assemblages and making necessary modifications to management and conservation plans.

Vertebrates

- ◆ When native fish are present in any given stream, non-native sport fish will not be introduced. If sport fish are also present, stocking will discontinue.
- ◆ Manage riparian and upland ecosystems to reduce in-stream sediment to acceptable levels.
- ◆ Do not authorize uses that would deplete instream flows below levels needed to protect the aquatic habitats of sensitive native fish species.
- ◆ Design and implement vegetation management and construction projects so they do not degrade habitat for clear-water stream species by increasing sediment load and turbidity.
- ◆ To help prevent abandonment, reproductive failure or nest destruction, prohibit development of new facilities within the minimum distances (line of sight) of active raptor nests and winter roost sites as specified in the following table. For the bald eagle, golden eagle, merlin, ferruginous hawk and Swainson’s hawk, a nest is no longer considered active if it’s known to have been unoccupied for the last 7 years. For the burrowing owl and other raptor species, a nest is no longer considered active if it’s known to have been unoccupied during the current or most recent nesting season. This does not apply to pipelines, fences and underground utilities.

<u>Species and Habitat</u>	<u>Minimum Distance (miles)</u>
Bald Eagle Nest	1.0
Bald Eagle Winter Roost Area	1.0
Golden Eagle Nest	0.5
Merlin Nest	0.5
Ferruginous Hawk Nest	0.5
Swainson’s Hawk Nest	0.5
Burrowing Owl Nest	0.5
Nests of Other Raptors	0.5

- ◆ To help reduce disturbances to nesting and wintering raptors, prohibit the following activities within the minimum distances (line of sight) of active raptor nests and winter roost areas during the dates specified in the following table:
 - ◇ Construction (e.g., roads, water impoundments, oil and gas facilities),
 - ◇ Reclamation,
 - ◇ Gravel mining operations,
 - ◇ Oil and gas drilling, and
 - ◇ Drilling of water wells.

<u>Species and Habitat</u>	<u>Minimum Distance (miles) & Dates</u>
Bald Eagle Nest	1.0 from 2/1 to 7/31
Bald Eagle Winter Roost Area	1.0 from 11/1 to 3/31
Golden Eagle Nest	0.50 from 2/1 to 7/31
Merlin Nest	0.50 from 4/1 to 8/15
Ferruginous Hawk Nest	0.50 from 3/1 to 7/31
Swainson’s Hawk Nest	0.50 from 3/1 to 7/31

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Burrowing Owl Nest	0.25 from 4/15 to 8/31
Nests of Other Raptors	0.125 from 2/1 to 7/31

- ◆ To the extent possible, Forest Service activities in or near breeding habitat are conducted outside of migratory bird breeding seasons, minimize temporary habitat losses, avoid long-term habitat losses, and mitigate unavoidable habitat losses. Grasslands mitigation includes habitat enhancement any time migratory bird habitat is disturbed.
- ◆ Consult state and regional Partners in Flight Bird Conservation Plans for additional guidance on habitat management for land birds.
- ◆ Design and build new structures, including fences, to reduce hazards to big game and to allow big game movement throughout the year. This doesn't include fences designed to specifically exclude wildlife. Bottom rung of fences should be 18' or more from the ground, and the top rung should be no more than 42" high.
- ◆ Do not authorize construction of new woven wire fences and barbed-wire fences with 5 or more strands. This doesn't include fences designed to specifically exclude wildlife.
- ◆ Provide access for bats and other cave-dependent species when closing caves or mine shafts.
- ◆ Protect all known day roost areas and wintering sites used by bats.

FEDERALLY LISTED SPECIES

The Endangered Species Act of 1973 provides protection for endangered and threatened species by requiring federal agencies to ensure activities they conduct, authorize, or fund do not jeopardize the continued existence of those species. Specifically, the ESA 1) requires all federal agencies to use their authority to conserve endangered and threatened species, 16 U.S.C. §§ 1531(c)(2), 1536(a)(1); 2) requires each federal agency to "insure" that any action it authorizes is not likely "to jeopardize the continued existence of any endangered species or threatened species," *Id.* § 1536(a)(2); 3) requires federal agencies to consult with, in this case, the Fish and Wildlife Service (FWS), before deciding to carry out or authorize any action that might have an effect on these species; 4) and prohibits federal or state agencies from taking endangered or threatened species, 16 U.S.C. § 1538.

Existing Conditions

The Forest Service acknowledges seven listed species and two candidate species whose ranges coincide with the Comanche and Cimarron National Grasslands (See table below).

Federally Listed Species of the Comanche/Cimarron Region¹

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS
Arkansas Darter	<i>Etheostoma cragini</i>	Candidate
Arkansas River Shiner	<i>Notropis girardi</i>	Threatened
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Interior Least Tern	<i>Sterna antillarum</i>	Endangered
Lesser Prairie-Chicken	<i>Tympanachus pallidicinctus</i>	Candidate
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened
Piping Plover	<i>Charadrius melodus</i>	Threatened
Whooping Crane	<i>Grus americana</i>	Endangered
Black-footed Ferret	<i>Mustela nigripes</i>	Endangered

¹Adapted from: Cimarron and Comanche National Grasslands. 2005. Specialist Report – Existing Conditions Descriptions, Wildlife.

The *Draft Cimarron and Comanche Land Management Plan* does not comply with Endangered Species Act. It fails in both the duty to conserve threatened and endangered species and a duty to consult with the U.S. Fish and Wildlife Service to assure planned actions do not harm listed species and/or their habitat. The Forest Service uses a few species surveys conducted on the Grasslands that did not identify occurrences of select threatened or endangered species to make the claim that it need not account for these species in the management plan (pg. 101-102). At least two of these species, the Arkansas River shiner and the bald eagle are likely to occur on the Grasslands now (see below). The dismissal of these species and failure to provide conservation provisions in the plan for these species is not justified.

The implementation of the current Draft Plan would indeed have significant and harmful impacts to several of these species. The Draft Plan allows the continuance of actions that have and will continue to have a detrimental effect on threatened and endangered species and actions that have likely contributed to the decline of some of these species and their habitats already. Potential future projects that would be in compliance with current Draft Plan will likely impact threatened and endangered species that currently exist on the Grasslands and affect habitat that could be restored to enable the reestablishment of viable populations of threatened and endangered species to the Grasslands. Some of these current actions and potential future projects that will continue to or will likely impact threatened and endangered species and their habitats include livestock grazing, oil and gas development, recreation—especially motorized recreation, fishing and stocking ponds with non-native fish, re-vegetation, riparian area restoration, invasive species control, and prescribed fire.

The following species accounts illustrate how the Draft Plan is likely to affect key endangered and threatened species on the Comanche and/or Cimarron National Grasslands.

Arkansas Darter

We propose the Arkansas Darter be designated as a Species-of Concern. See justification and proposed management details below in species-of-concern section.

Arkansas River Shiner

Once common in the Cimarron (Kilgore and Rising 1965) and Arkansas Rivers (Kansas Department of Wildlife and Parks 1989), the Arkansas River shiner is on the verge of disappearing from the Cimarron within the Cimarron Grassland, if it is not gone already (Eberle et al. 1989; Chynoweth 1998). One individual was collected from the Cimarron in 1987 (Eberle et al. 1989). Small populations may still make their way back to the Cimarron in Morton County during periods of high streamflows (Kansas Department of Wildlife and Parks 1989). The Forest Service cites Chynoweth (1998) to argue that the species no longer exists in the Cimarron River and therefore does not require any conservation provisions in the revised management plan (Plan at 101). Though the Chynoweth (1998) survey found no specimens, the study report listed the fish as “probable” to occur in the Cimarron River. Threats in the Grasslands include dewatering of the Arkansas and Cimarron Rivers (Cross et al 1985), competition with non-native fish stocked on the grasslands for sport fishing and other reasons (Fisheries Specialist Report 2005), and quite likely collection by scientists during surveys.¹

Restoring the Arkansas River shiner habitat and reestablishing viable populations of this fish in both Grasslands is still possible. The State of Kansas considers all parts of the Cimarron River critical habitat for the species under Kansas Administrative Regulation 23-17-2 (Kansas Department of Wildlife and Parks 1989). Eberle et al. (1989) recommend restoring streamflows to the Cimarron River in Morton County to bring back populations of protected fish.

The Draft Plan will affect Arkansas River shiner and this species’ habitat in the following ways:

- The failure to prohibit non-native fish stocking of Grassland ponds has and will continue to harm the shiner and other native fish species. The Forest Service’s “Fisheries Specialist Report” acknowledges non-native fish from stocked ponds can out-compete struggling natives by entering “stream systems through water diversions or during flood events” (Fisheries Specialist Report 2005 citing Chynoweth 1998).
- The riparian and aquatic ecosystem is found suitable for livestock grazing (Plan at 78). The continued allowance of livestock grazing in Grassland riparian areas will continue to degrade and contribute to dewatering of streams and rivers. Cattle trample stream banks, widening channels and contributing to the loss of streambank vegetation. This contributes to water loss by increasing water surface area and loss of stream canopy, which increases evaporation, and by increasing water seepage into the soil and out of stream and river channels. The Forest Service acknowledges that livestock have contributed to stream impairment (Plan at 31) but fail to provide objectives (Plan at 65-66) and guidelines (id. at 87) that would reduce these impairments. There is not even one proposed monitoring question designed to observe the impacts of livestock grazing in aquatic and riparian areas. (See Plan at 66.)
- The lack of a plan for riparian area restoration and specific provisions to re-water dewatered rivers, especially the Cimarron River will not produce the important outcome of improving habitat for the Arkansas River shiner.
- The US Fish and Wildlife has noted water quality issues related to oil and gas activities that are harmful to this species (63 Federal Register 64771-64799). Oil and gas must be

¹ Eberle et al. 1997 discuss their methods (pg. 1) which include using electroshock and preserving caught samples for the Fort Hayes State University Museum.

restricted in areas such as the Cimarron River corridor, where those activities can harm the shiner.

- As discussed in the Recreation section, off-road vehicles are also being heavily used in the Cimarron River. This activity must be restricted to ensure no harm to the shiner.

Bald Eagle

Before the water systems of the Southern Plains were completely altered by upstream and local water diversion for agriculture, municipal use, flood control, and other purposes, the Comanche and Cimarron likely provided excellent habitat for bald eagles, who prefer running streams lined by tall trees for roosting and nesting. Bald eagles also prey on prairie dogs and thus may occur near prairie dog towns in winter in shortgrass prairie habitat (Andrews and Righter 1992). The Comanche and Cimarron Grassland region has the largest complex of black-tailed prairie dogs in the Southern Plains region. The Draft Plan states:

Because of a lack of suitable habitat, this species is not known or suspected to nest anywhere on the Grasslands (Chynoweth 1998). Bald eagles are an uncommon winter resident on both Grasslands, where they likely feed on rabbits, prairie dogs, squirrels, and carrion (Andrews and Righter 1992; Cable, et al. 1996). (Plan at 101)

The Forest Services uses these claims to justify not including bald eagle conservation or consultation in the Draft Plan. Cable et al. (1996) list bald eagles as “uncommon” winter *and fall* residents but not “rare” or “accidental”. Andrews and Righter (1992), cited by the Forest Service above, describe bald eagles as uncommon to *locally common* winter resident of Colorado’s eastern plains. The Chynoweth (1998) study, a summary of various avian surveys, *never mentions bald eagles or bald eagle habitat* and only applies to the Cimarron Grassland, not the Comanche. The Forest Service Wildlife Specialist Report for the Cimarron and Comanche also cites Hanni 2003 to state, “Section-based bird point-counts conducted on 189 sections within the Planning Area in 2003 did not document any bald eagles” (Wildlife Specialist Report 2005, 17). This study was conducted in the spring, when bald eagles are not known to naturally occur anywhere in the region. The studies and species accounts the Forest Service uses to determine that bald eagles do not occur in the Grasslands, and therefore not need to be addressed in the management plan, are insufficient by any standard and are far below the “best available science” standard required by the ESA and by 36 CFR 219.11(a).

The Comanche and Cimarron may not provide the best known habitat for bald eagles currently, but bald eagle sightings in, around, and over the Grasslands are not infrequent occurrences. It is more likely that bald eagles are not common in the Grassland *because they are threatened by current land uses* not because the Grasslands provide incompatible habitat. One signer of these comments (L. McCain and others, including R. Reading²) have seen bald eagles hunting over prairie dog colonies in the Carrizo Unit of the Comanche and roosting in trees near riparian areas on several occasions. It is possible that a bald eagle nest occurs on the Everett Ranch within 1 mile of the Carrizo Picnic Area on the Comanche. Two bald eagles were spotted there, roosting in a cottonwood tree with a nest in November 2004 (L. McCain and R. Reading personal observation 2004). There is one old nest site in Bent County, Colorado, which is

² Richard Reading is a wildlife biologist and Director of Conservation at the Denver Zoological Foundation and an Associate Research Professor at the University of Denver, Department of Biology.

adjacent to Baca and Otero Counties where the Comanche Grassland is located (Andrews and Righter 1992).

The Draft Plan will affect bald eagles and the species' habitat in the following ways:

- The failure to acknowledge the real and potential presence of bald eagles in and around the Grassland will preclude them from being considered in future project decisions that are likely to impact habitat and roosting areas.
- The Draft Plan includes the following objective pertaining to cottonwood regeneration: "The distribution and abundance of native woody riparian species, such as cottonwood, sandbar willow, and snowberry, would increase by 20%-50%" (Plan at 65), but the Plan does not include the means to achieve that goal, beyond removing tamarisk. The failure to include specific objectives and guidelines that would encourage the conservation of young cottonwoods and the re-establishment of cottonwood seedlings is likely to be detrimental to any eagle habitat and potential habitat in the Grasslands.
- As with the Arkansas River shiner, the failure of the Draft Plan to include provisions to limit and exclude livestock grazing in riparian areas will likely continue to degrade existing and potential bald eagle habitat. Cottonwood trees now provide roosting habitat for bald eagles. Cottonwoods are large and plentiful in many areas on the Grasslands, especially along Comanche streams and the Cimarron River corridor, but many of these trees are old and dying off. Sufficient populations of younger trees to replace dying cottonwoods have not been established. One problem is the changes in the water table and alterations to water systems in areas outside of the Grasslands. However, another major barrier to cottonwood regeneration is livestock grazing on the Grasslands themselves. Cattle trample young trees; compact soil, making tree regeneration difficult; and even eat cottonwood seedlings. The Plan includes no objectives or guidelines to prohibit cattle from riparian and aquatic areas. Indeed such areas are specifically considered *suitable* for livestock grazing (Plan at 78).
- Any adverse impacts from oil and gas on riparian areas similarly have the potential to harm bald eagles. In addition, wind turbines and power transmission lines have the potential to cause killing of bald eagles from collision and electrocution.
- Motorized recreation should be restricted to avoid harm to riparian areas which provide habitat for bald eagles.

Interior Least Tern

The interior least tern may occur along the Cimarron River in the Cimarron National Grassland, bare river sandbars, and shorelines of playa lakes (Zuckerman 1991). This Comanche and Cimarron are both within the summer range of this tern (Sibley 2003). They have breeding grounds along the Arkansas River in Otero County and Kiowa Counties in Colorado (Andrews and Righter 1992); the Timpas Unit of the Comanche is in Otero County. The terns are attracted to the large reservoirs in these areas. While neither Grassland has large reservoirs, restoring playa lakes for wildlife, not livestock drinking would create attractive habitat for the interior least tern.

The least tern presents another case where the Forest Service is missing an opportunity to restore and conserve habitat for a listed species, not because the species did not naturally occur in the region, but because the species is absent or rare due to human alterations in the species' natural habitat. The Draft Plan includes no objectives or guidelines that would encourage the restoration of playa lakes, which are natural depressions that hold water. Because so much of the land surrounding the Grasslands is private and devoted to agricultural production, it is unlikely that such restoration will occur anywhere but the Grasslands.

Lesser Prairie-chicken

The Forest Service has recommended that the lesser prairie-chicken be designated a species-of-concern. We support this proposal. See proposed management details below in species-of-concern section.

Mexican Spotted Owl

The Comanche and Cimarron National Grasslands exist outside the historic and current range of the Mexican spotted owl.

Piping Plover

The piping plover may occur along the Cimarron River in the Cimarron National Grassland, bare river sandbars, and shorelines of playa lakes (Zuckerman 1991). Piping plovers occur along the Arkansas River where they find sandy, open shorelines (Andrews and Righter 1992). The species has been found around the Cimarron Grassland and should not be considered absent from the Grasslands. The species has been found around the Cimarron Grassland and its presence on both Grasslands should not be ruled out. The Comanche National Grassland is within the summer range of the piping plover (Sibley 2003). The same missed opportunity for the interior least tern discussed above applies to the piping plover.

Whooping Crane

Whooping cranes may occasionally fly over the Grasslands during migration but are unlikely to stop over. The Grasslands do not contain the large wetlands preferred by these cranes.

Black-footed Ferret

The black-footed ferret is believed to be extirpated from the eastern plains of Colorado and all of Kansas. The historic ferret range includes the Cimarron and Comanche areas. The black-footed ferret is one of the most endangered mammals in North America. Ferret survival is dependent on the success of reintroduction programs. Their dramatic decline is due primarily to the loss of the ferret's main food source, prairie dogs. Prairie dogs make up over 90 percent of the ferret diet. Black-footed ferrets rely on prairie dog burrows for breeding dens and refugia; they cannot survive without this keystone rodent. Black-footed ferrets require large complexes of prairie dogs (Miller et al. 1996).

The Comanche and Cimarron Grasslands region hosts the largest black-tailed prairie dog complex in the Southern Plains on public land. Black-tailed prairie dog populations have declined to less than 99 percent of their historic size. It is absolutely essential to protect this special region for there to be any hope of re-establishing black-footed ferret populations in the Southern Plains. There is a significant public interest in returning this species to all

representative regions of its historic range. The goal of the Fish and Wildlife Service's Black-footed Ferret Recovery plan is to establish 10 self-sustaining sites of black-footed ferrets, a goal it is far from accomplishing. There is, arguably, one sustainable ferret site in Conata Basin in the Buffalo Gap National Grassland in South Dakota. However, the Forest Service and the State of South Dakota have poisoned thousands of acres of prairie dogs around the ferret reintroduction site. Prairie dog poisoning should not be tolerated on the Comanche and Cimarron Grasslands; potential ferret habitat is too precious.

Ferrets are susceptible to sylvatic plague, as are prairie dogs. Thus, establishing many reintroduction sites to promote genetic diversity and prevent the loss of major ferret areas to plague is essential.

Ferrets need a minimum of 5,000-10,000 acres of prairie dogs to persist as a viable population after reintroduction. Though prairie dog colonies in the Cimarron and Carrizo Unit of the Comanche have expanded in the last few years, the Forest Service must do more to protect the existing prairie dogs and encourage colony expansion.

The Draft Plan included goals for protecting prairie dogs on the grasslands (Plan at 70) but does not acknowledge the importance of the region for future black-footed ferret reintroductions. Reintroducing black-footed ferrets and maintaining a viable ferret population must be explicit objectives in the Comanche and Cimarron Land Management Plan. Developing a ferret reintroduction plan and reintroducing ferrets is possible within the 15-year life of the plan.

Desired Conditions

Healthy, viable populations of the Arkansas River shiner are re-established to the species' former habitat in the Comanche and Cimarron National Grasslands, the main channel of the Cimarron and major tributaries of the Arkansas.

Bald eagles are frequent visitors to the Comanche and Cimarron National Grasslands due to efforts to improve eagle habitat that include removing livestock from riparian areas, planting and protecting young cottonwood trees for future roosting sites, and working with surrounding communities to reestablish natural flows to Grassland rivers and creeks.

Playa lakes and other aquatic systems provide healthy habitat for the interior least tern and piping plover, who are frequent visitors to the Comanche/Cimarron region.

Efforts to conserve and expand black-tailed prairie dog colonies on the Comanche and Cimarron Grasslands have provided sufficient habitat to reintroduce black-footed ferrets to the region.

Black-footed ferrets are back and thriving in the Cimarron and Comanche Grasslands region.

Objectives

- The Forest Service will engage the Fish and Wildlife Service in a formal consultation process regarding the potential impacts the new land management plan might have on the Arkansas River shiner, bald eagle, interior least tern, piping plover, and black-footed ferret.
- To aid the recovery of the Arkansas River shiner, the Forest Service will discontinue stocking ponds with non-native fish that compete with the native species, upon implementation of this plan.
- Survey methods for the Arkansas River shiner (and for all fish species) should preclude techniques that result in take—the harming of the fish or loss of specimens to the natural environment.
- The Forest Service will collaborate with upstream and instream users of the Grassland water systems, especially the Cimarron River and Arkansas River tributaries, to develop plans and projects that restore water and natural flows to these water systems for the benefit of the Arkansas River shiner and other native species and also to improve bald eagle habitat.
- The Forest Service will begin monitoring specifically for bald eagles in both Grasslands.
- Bald eagles will be included on all lists of species that occur or could occur on both Grasslands.
- A black-footed ferret recovery strategy will be developed for the Comanche and Cimarron in cooperation with FWS, the Piñon Canyon Maneuver Site adjacent to the Timpas Unit, the Kansas and Colorado state wildlife departments, interested conservation organizations, and cooperative surrounding landowners. The plan will lay out specifically how a 5,000+ prairie dog colony will be established and how sufficient numbers of prairie dogs will be conserved and allowed to increase on the Grasslands.

SPECIES OF CONCERN AND INTEREST

With the implementation of the final Comanche and Cimarron Land Management Plan, the Forest Service will no longer be required to protect designated Sensitive Species and their habitat, monitor Management Indicator Species (MIS) on the Grasslands, or ensure the viability of species populations that occur on the Grasslands. Though the Service may designate Species of Concern and Species of Interest, the planning rule and directives provide few mechanisms for protecting, monitoring, or providing habitat for them.

Even for designated Species of Concern, the Forest Service is required to do no more than help prevent them from becoming federally listed. The Forest Service describes the “Species of Concern” concept and criteria below:

Species-of-concern are species for which the Responsible Official determines management actions may be necessary to prevent listing under the Endangered Species Act (ESA). The Responsible

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Official, as appropriate, may identify the following plant and animal species, including macro-lichens, as species-of-concern:

1. Species identified as proposed and candidate species under the ESA.
 2. Species with ranks of G-1 through G-3 on the NatureServe system.
 3. Intraspecific (subspecific) taxa with ranks of T-1 through T-3 on the NatureServe ranking system.
 4. Species that have been petitioned for federal listing and for which a positive "90-day finding" has been made (a 90-day finding is a preliminary finding that substantive information was provided indicating that the petition listing may be warranted and a full status review will be conducted).
 5. Species that have been recently delisted (these include species delisted within the past five years and other delisted species for which regulatory agency monitoring is still considered necessary).
- The identified species-of-concern may include listable entities such as distinct population segments or evolutionarily significant units that may be listed under the ESA. (FSH.1909.12.43.22b)

The Draft Plan proposes four species for Species of Concern status (see table below).

The Forest Service describes the "Species of Interest" concept and lists criteria for designating Species of Interest in the Forest Service handbook. These are reproduced below:

Species-of-interest are species for which the Responsible Official determines that management actions may be necessary or desirable to achieve ecological or other multiple-use objectives. The Responsible Official may review the following sources for potential species-of-interest:

1. Species with ranks of S-1, S-2, N1, or N2 on the NatureServe ranking system.
2. State listed threatened and endangered species that do not meet the criteria as species-of-concern.
3. Species identified as species of conservation concern in State Comprehensive Wildlife Strategies.
4. Bird species on the U.S. Fish and Wildlife Service Birds of Conservation Concern National Priority list.
5. Additional species that valid existing information indicates are of regional or local conservation concern due to factors that may include:
 - a. Significant threats to populations or habitat.
 - b. Declining trends in populations or habitat.
 - c. Rarity
 - d. Restricted ranges (for example, narrow endemics, disjunct populations, or species at the edge of their range).
6. Species that are hunted or fished and other species of public interest. Invasive species may also be considered.

These sources may contain numerous species for which there is little concern or public interest. The Responsible Official should consider the following factors when identifying species-of-interest. The presence of one or more factors would suggest, but not compel, that a species be included as a species-of-interest.

- a. Species habitat or population has declined significantly in the plan area.
- b. Species and its habitats are not well-distributed in the plan area.
- c. Species population numbers are low in the plan area.
- d. Species is dependent on a specialized and/or limited habitat in the plan area.
- e. Species is subject to some imminent threat (for example, invasion of exotic species into habitat or disturbance due to road systems).
- f. Species habitat or population is not generally secure within its range and NFS lands act as an important refuge.
- g. Species is of public interest, including those species identified cooperatively with State Fish and Wildlife Agencies consistent with the Sikes Act.
- h. Species is invasive.
- i. Species poses a threat to ecosystem or species diversity. (FSH.1909.12.43.22c)

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Forest Service Proposed Species of Concern

COMMON NAME	SCIENTIFIC NAME	ESA STATUS	NATURE-SERVE RANK	DIRECTIVE CRITERIA
Forest Service Proposed in Draft Plan				
Plants				
Andean Prairie Clover	<i>Dalea cylindriceps</i>	None	G3G4	1, 2
Colorado Frasera (or Colorado Green Genetian)	<i>Frasera coloradensis</i>	None	G3	1
Colorado Springs Evening Primrose	<i>Oenothera harringtonii</i>	None	G2	2
Raven Ridge False Goldenweed	<i>Oonopis foliosa</i> var. <i>monocephala</i>	None	G2G3T2	1, 3
Wheel Milkweed	<i>Asclepias uncialis</i> ssp. <i>Uncialis</i>	None	G3G4T2T3	2, 3
Sandhill Goosefoot	<i>Chenopodium cycloids</i>	None	G3G4	1, 2
Invertebrates				
None proposed				
Vertebrates				
Black-tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Former candidate ("not warranted" 8/2005)	G3G4	2
Lesser Prairie-chicken	<i>Tympanuchus pallidicinctus</i>	Candidate	G3	1, 2
Mountain Plover	<i>Charadrius montanus</i>	Former proposed ("not warranted" 9/2003)	G2	2
Swift Fox	<i>Vulpes velox</i>	Former candidate ("not warranted" 1/2001)	G3	2

Forest Service Proposed Species of Interest

COMMON NAME	SCIENTIFIC NAME	NATURE-SERVE RANK	STATE STATUS	DIRECTIVE CRITERIA
Plants				
Tamarisk	<i>Tamarix ramosissima</i>	NR		h, i
Invertebrates				
None proposed				
Vertebrates				
Elk	<i>Cervus elaphus</i>	G5		6
Ferruginous hawk	<i>Buteo regalis</i>	G4		2
Long-billed curlew	<i>Numenius americanus</i>	G5		2
Northern bobwhite	<i>Colinus virginianus</i>	G5		6
Pronghorn	<i>Antilocapra americana</i>	G5		6

We support all of these designations. We also believe that others should be included in the Forest Service's Concern and Interest species lists. Furthermore, we believe the Draft Plan does not go nearly far enough to protect these species.

The Species of Concern and Interest management provisions are insufficient to protect locally imperiled and declining species. In the case of wide-ranging species such as black-tailed prairie dogs and swift foxes, whose current ranges includes 10 U.S. states (MT, ND, SD, NE, KS, CO, OK, NM, TX, and WY), and migratory birds, the Species of Concern obligations do not account for the local and regional importance of these species.

For example, black-tailed prairie dogs are keystone species of the shortgrass prairie ecosystem and occur on both the Grasslands. Their colonies provide habitat for a range of other species. Along with the black-footed ferret, nine prairie species are prairie dog obligates—dependent on these keystone rodents (Kotliar et al. 1999). Black-tailed prairie dog populations have declined by 98-99 percent throughout their range (65 Federal Register 5476-5488). The Grasslands

provide important habitat for prairie dogs and their associated species. Because these Grasslands host the largest prairie dog complex in the Southern Plains on public land, the Comanche and Cimarron colonies together make up a precious natural resource. Nothing in the planning regulations, directives, or Draft Plan itself, mandates additional protections for prairie dogs. They are still vulnerable to poisoning on both Grasslands. Though a Colorado State policy (Luce 2003) prohibits prairie dog shooting on federal land, the Cimarron National Grassland actually encourages prairie dog shooting by providing maps of colonies specifically for prairie dog shooters.³ The Forest Service could kill all of its prairie dogs or lose them through benign neglect and still be compliant with the Draft Plan and within the directives for Species of Concern, as long as prairie dogs remained viable in other parts of their range. But this would be a tremendous ecological loss to the Grassland region.

Given the anti-prairie dog sentiment of the local primarily agricultural community in Stevens, Morton, Baca⁴, Otero, and Las Animas Counties, it was a relief to see that the Draft Plan contained no Desired Conditions, Objectives, or Guidelines aimed at minimizing prairie dogs on the Grasslands. Indeed, there are some objectives to suggest that the Forest Service is interested in maintaining and expanding prairie dog acreage on the Grasslands, including the objective to have “at least one large (>5000 acre) colony”—a proposal we support (Plan at 70, Sec. 2.1.2.d.10.a). However, these objectives are not supported by necessary monitoring questions or guidelines. What are “appropriate livestock grazing strategies” that “may improve habitat conditions for black-tailed prairie dogs where populations have declined to low levels following plague epidemics” (Plan at 70, Sec. 2.1.2.d.10.d)? Does that mean more grazing or less? Where would grazing strategies be applied? How would this be monitored? The Objective 2.1.2.d.10.b proposes to: “Encourage the consolidation of ownership in black-tailed prairie dog *potential* habitat in order to minimize unwanted colonization onto adjoining private lands” (Plan at 70, emphasis added). The object should include *existing* habitat as well; why not include private landowners who may already have prairie dogs on land adjacent to the Grasslands? All of the prairie dog-specific objectives in the Draft Plan are found in the Objective section for the Shortgrass Prairie Ecosystem (2.1.2.d) not a separate section for prairie dogs.

Indeed, there is no specific section in the Draft Plan for wildlife Desired Conditions, Objectives, or Guidelines, further indicating the minimal significance wildlife and plants are given in this plan. Appendix B, which lists proposed Species of Concern and Interest and their selection process, does not include any additional conservation management provisions. Species needs are addressed through other sections of the plan. Lesser prairie-chicken objectives are provided in the Sandsage Prairie section (2.1.2.c); the mountain plover and swift fox are included in the Shortgrass section with the prairie dog as are the Colorado Springs evening-primrose, Colorado Frasera, and Raven Ridge false Goldenweed. The Plan includes no monitoring questions or guidelines for any of the plant species.

The livestock grazing treatments proposed for some Species of Concern are inappropriate and potentially harmful. Section 2.1.2.d. states:

Where appropriate and feasible, livestock grazing would take place in areas recently burned, to 1) provide high-quality nesting habitat for mountain plover (a species-of-concern); and 2) increase germination potential in areas near existing

³See http://www.fs.fed.us/r2/psicc/cim/prairie_dog.shtml.

⁴The Baca County Commissioners just approved a \$20,000 budget item to subsidize land owners for prairie dog poison.

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populations of Colorado Springs evening-primrose, Colorado fraseria, and Raven Ridge false goldenweed (all species-of-concern).

The Grasslands’ own preliminary specialist reports and other documentation notes that livestock grazing is potentially harmful for the Colorado fraseria, a Colorado endemic known only to Baca and eastern Las Animas Counties, because “(g)razing can prevent plants from seeding” (Botany Specialist Report, pg. 3 citing NatureServe 2003). The “Plant Species Assessment” for the Comanche and Cimarron indicates that the Colorado Springs evening-primrose is sensitive to livestock grazing and recommends that disturbance activities be avoided around known populations (Assessment, pg. 4). Thus, grazing as a management action for these plants will cause significant impacts and possibly even contribute to the listing and eventual extinction of these species because they are rare endemics. Livestock grazing is unnecessary and inappropriate in recently burned areas, where livestock should specifically be excluded until native grasses and forbs re-establish themselves. Though livestock grazing may help provide shorter-structure grasses in mixed grass prairies to the benefit of mountain plovers, a newly burned site alone on shortgrass prairie provides excellent habitat for plovers without the addition of grazing.

We are encouraged that the Forest Service acknowledges the importance of fire to some prairie ecosystems and species. The Plan proposes in the Shortgrass Prairie Ecosystem Objectives Section 2.1.2.d.5:

A minimum average of 1% of the ecosystem on the Cimarron and on the Carrizo Unit of the Comanche would be affected by fire (wildfires, prescribed burns, or both) annually, with an objective of having 2%-5% of the Grasslands affected by fire annually. This would provide and improve habitat for mountain plover and swift fox (two species-of-concern), and may provide new germination sites for the Colorado Springs evening-primrose, Colorado fraseria, and Raven Ridge false goldenweed (all species-of-concern). (Plan at 70).

However, depending on its growing stage, fire is beneficial as well as damaging to Colorado fraseria; fire can prevent the seeding of actively growing plants (Plant Species Assessment, pg. 7). Thus, the specific times to avoid fire in areas with Colorado fraseria must be included in the Plan objectives and/or guidelines.

One major concern is that the Forest Service has omitted some important species that should be designated as Species of Concern (See table below).

Additional Recommended Species of Concern

COMMON NAME	SCIENTIFIC NAME	ESA STATUS	NATURE-SERVE RANK	DIRECTIVE CRITERIA
Plants				
Colorado Gumweed	Grindelia inornata	None	G2	2
Rocky Mountain Bladderpod	Lesquerella calcicola	None	G2	2
Invertebrates				
Regal Fritillary		None	G3	2
Vertebrates				
Arkansas Darter		Candidate	G3	1, 2

Additional Recommended Species of Interest

COMMON NAME	SCIENTIFIC NAME	DIRECTIVE CRITERIA
Plants		
Plains Cottonwood	Populus deltoides	5a, 5b
Cheatgrass	Bromus tectorum	5a, 5b
Invertebrates		
Selection of Invertebrate Species of Concern is recommended		
Vertebrates		
Beaver	Castor Canadensis	5a, 5b, 5c, 5d, a, d
Cassin's Sparrow	Aimophila cassinii	a, b, c, d, e, f

Justification for Additional Recommendations

Colorado Gumweed and The Rocky Mountain Bladderpod (Species of Concern)

The Colorado gumweed and Rocky Mountain bladderpod were originally recommended as Species of Interest in the Comanche and Cimarron “Plant Species Assessment” (pg. 4) and meet at least one of the criteria for designation. However, the Forest Service chose not to include them as a proposed species in the Draft Plan, “because very little is known about these species’ ecology, or the effects land management practices would have on individuals or populations” (Plan at 104).

The Colorado Natural Heritage Program lists at least two records for the Colorado gumweed on the Comanche from 1997 (CNHP 2003). The Assessment is quite specific about management actions that help or harm the plant:

The species is apparently tolerant of moderate disturbance. Although a habitat generalist, this species occurs at low density in its habitat. Management actions that may affect this species include grazing, prescribed fire, roads, trails, weed management, and unregulated recreation. Efforts should be made to maintain current populations by avoiding ground disturbance at known sites to protect established plants. Any herbicide use in the vicinity of these populations should be closely monitored. Searches should be conducted for additional plants in appropriate habitat. Soil disturbance may be necessary to provide seedbed for population expansion. (Plant Assessment at 4, 11/3/2005 version; at 4-5, 12/21/2005 version).

The November 3, 2005 version of the Plant Assessment recommends that the Colorado gumweed be designated as a Species of Concern because it is a rare endemic to the area and because the Comanche Grassland provides the best habitat on which to manage it (pg. 4). However, the December 21, 2005 version of the Plant Assessment states, “Colorado gumweed is not recommended as a species-of-concern because this is a species over which Forest Service management would have no known influence in the Plan Area” (pg. 6). Given that the Forest Service has control over grazing, prescribed fire, roads, trail, weed management, and recreation, it is hard to see how its management actions will not affect this species.

The Rocky Mountain bladderpod may be affected by roads, trails and recreation but tolerates some disturbance (Plant Assessment, pg. 8, 11/3/2005 version); these are all activities that the Forest Service can control through management. It is also a good species for monitoring the shale barrens ecosystem described by the Colorado Natural Heritage Program).

Regal Fritillary (Species of Concern)

The regal fritillary is a butterfly that is declining across its range. Eastern Colorado and Western Kansas are on the western edge of the species range (NatureServe 2006). It is “critically imperiled” though “apparently secure” in Kansas. However, it is declining most severely in the eastern parts of its range and the Southern Prairie region may provide a stronghold for the species due to less habitat conversion for agriculture. Designating this species would also set a good precedent. Very little is currently known about grassland invertebrates. Monitoring and protecting habitat for this butterfly would provide an important first step in improving scientific knowledge about invertebrate species on the Grasslands.

Arkansas Darter (Species of Concern)

Though the Arkansas darter was originally considered for designation as a Species of Concern by the Forest Service (Species Diversity Evaluation – Fish 2005), the idea was rejected due to a current lack of suitable habitat in the Grasslands. However, darters were found on the Comanche as late as 2002 (Forest Service 2002 – fish survey data). The Colorado and Kansas wildlife departments have reintroduced the species in adjacent waters to the Comanche and Cimarron Grasslands. Potential habitat for the darter currently exists on the Comanche (Winters 2003).

Plains Cottonwood (Species of Interest)

Looking across the prairie landscape to the widely distributed aquatic and riparian areas, one can see the cottonwood and willow galleries mentioned in the Draft Plan that provide landmarks for the wet areas. A dense ribbon of Cottonwood trees lines both sides of the Cimarron River Corridor and other streams in the Grasslands. Cottonwood trees are keystone species of the prairie. They help stabilize streambanks and provide a shady canopy over waterways to reduce water evaporation. Their leaves are eaten; their trunks and large branches are used as shelter for birds, small mammals, and a range of invertebrates; they provide nesting and roosting sites for small songbirds to large birds of prey, including bald eagles. When they die, they provide homes and food for another set of wildlife species and decompose to rejuvenate the soil.

The Cottonwood populations on the Cimarron and Comanche are generally unhealthy. Most of the trees are old and in the process of dying. Younger generations of cottonwood trees to replace the old have not been able to establish themselves. The loss of water throughout the area because of water impoundment, water diversion, and draining of the Ogallala Aquifer has lowered the water table and dried up former riparian areas. The continued allowance of cattle grazing in riparian areas has further prevented cottonwood seedlings from maturing. As discussed above in the bald eagle section, cows trample and eat seedlings—killing most before they ever get a foothold. Promoting the regeneration of cottonwoods is a Desired Condition of the Draft Plan. This goal should be formalized and strengthened by designating the cottonwood as a Species of Interest.

Cassin's Sparrow (Species of Interest)

It is unclear why Cassin's Sparrows did not make the proposed Species of Interest list. They are a perfect candidate for helping to monitor and achieve the Desired Condition of creating a mosaic of vegetation structures on the prairie. Cassin's Sparrows prefer taller vegetation on both the sandsage and shortgrass prairie ecosystems. The Cassin's Sparrow is imperiled and

declining the Grasslands region. The mountain plover (proposed Species of Concern) prefers short-structure vegetation; the long-billed curlew prefers different structure heights for nesting and feeding. The Cassin's sparrow would help round out an emerging set of grassland birds to serve as indicators for shortgrass and sandsage ecosystem conditions. Plus, the bird needs some additional protection.

Desired Conditions

Species of Concern and Interest are monitored regularly and populations are stable or increasing (except for invasive species, including tamarisk and cheatgrass).

Demonstrate positive trends in population viability, habitat availability, habitat quality, population distribution throughout the species range within the planning area, and other factors affecting species of concern.

Objectives

- Develop and implement conservation strategies for Forest Service species of Concern and Interest, as technical information becomes available.
- Within 10 years, provide sufficient habitat for Species of Concern/Interest to reduce adverse impacts on populations during droughts.
- Establish scientifically credible monitoring programs, develop survey methods and initiate baseline and trend surveys for populations, habitats and/or ecological conditions to contribute to viability of threatened and endangered species, species at risk, and Species of Concern and Interest.
- Assess potential habitat capability at the local level for Species of Concern/Interest by identifying existing or establishing new reference areas and implementing long-term monitoring.
- The Forest Service maintains an active file on each wildlife/group of species, which contains:
 - Observations by Grassland employees
 - Independent research completed on Grassland
 - Citizen/Grassland User observations/reports
 - Trained volunteer inventory and monitoring reports
- A 'Call for Research' regarding wildlife species knowledge gaps from independent sources (i.e. universities) is completed and distributed to appropriate venues to facilitate communication of the Grasslands' research needs with the surrounding research community.
- For each wildlife/group of species of concern, every three years, the Forest Service will complete a new 'Call for Research' reflecting new information reviewed in the file, distribute it to appropriate venues, and post it on the Grasslands websites.

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- For sensitive plant species present in the area of a proposed project or permit, the project or permit decision, including categorical exclusions, cannot proceed without:
 - stating the probability of expansion or maintenance of the species population size, based on best current scientific evidence, for all alternatives considered;
 - a monitoring protocol and schedule capable of detecting declines in the species if the project poses potential threats; and
 - independently verifiable thresholds of contributions to decline of sensitive plant species that will trigger rescinding or altering the project or permit.
- Implement a permanent ban on prairie dog poisoning and shooting on both Grasslands.
- To reduce risks and habitat loss for prairie dogs and other wildlife species closely associated with prairie dog colonies, align new roads outside prairie dog colonies. If it's necessary to place a new road in a prairie dog colony, minimize the amount of road within the colony to the extent that soil, drainage, topographical and other physical factors will allow.
- To help reduce adverse impacts to breeding lesser prairie-chicken and their display grounds, prohibit construction of new facilities within 3 miles of active display grounds. This also applies to pipelines, fences, windmills, and underground utilities.
- Prohibit livestock grazing in grazing allotments with known lesser prairie-chicken leks.
- Modify livestock grazing practices as needed to reduce adverse impacts of drought on food and cover for lesser prairie-chicken.
- Manage viewing activities on lesser prairie-chicken display grounds to reduce disturbances and adverse impacts to the birds.
- Do not plant trees in prairie chicken habitat.
- During the Allotment Management Plan process or as other opportunities arise, design and implement livestock grazing strategies that provide a mosaic of low, moderate and high grassland structure in occupied swift fox habitat, consistent with vegetation objectives for the geographic area.
- Pursuant to the Swift Fox Conservation Strategy, identify population monitoring and habitat inventory methods; identify key habitats on the Grasslands; and develop appropriate population and habitat management strategies.
- Pursuant to the Swift Fox Conservation Strategy, implement management activities for expanding the distribution of swift fox.
- To reduce disturbances to swift fox during the breeding and whelping seasons, prohibit the following activities within 5 miles of their dens from March 1 to August 31:
 - Construction (e.g., roads, water impoundments, oil and gas facilities),
 - Reclamation,
 - Gravel mining operations,
 - Drilling of water wells,
 - Oil and gas drilling.

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- To reduce disturbances to swift fox during the breeding and whelping seasons, do not authorize the following activities within 1 mile of their dens from March 1 to August 31:
 - Construction (e.g., pipelines, utilities, fencing),
 - Seismic exploration,
 - Maintenance of oil and gas wells,
 - Permitted recreation events involving large groups of people.
- Prohibit the use of M-44s (sodium cyanide) for predator control on the Grasslands to protect the swift fox.
- Because swift fox are often mistaken for coyotes by hunters, prohibit coyote shooting on the Grasslands.

Guidelines

- ◆ Species of concern and Interest are monitored regularly and populations are stable or increasing.
- ◆ The Forest Service encourages the voluntary efforts of citizens and scientists in appropriate activities to identify, monitor, and protect wildlife species.
- ◆ The Forest Service develops procedures for volunteers to inventory and monitor wildlife species and their habitats.
- ◆ The Forest Service uses information collected according to Grassland procedures by volunteers to achieve desired conditions.

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ADAPTATION TO ECOLOGICAL PROCESSES

The diversity and distribution (location) of ecosystems in the Southern High Plains are controlled by two major factors: (1) the distribution of species according to their unique environmental requirements (e.g., temperature extremes, water availability, cover); and (2) patterns of disturbance and recovery within communities of those species. Historic natural disturbances in the Grasslands region included fire, prairie dog colonization, bison grazing, drought, insect epidemics, and periodic flooding. In healthy, natural ecosystems, these disturbances renew vegetation, promote resilience, create habitat for wildlife, and maintain patterns of diversity. An important management priority is restoring natural disturbances (e.g., floodplain flooding and fire) that have been excluded from the Grasslands' ecosystems.

FIRE

Fires are a natural and fundamental component of the Southern Prairie grasslands and played a central role in shaping them for thousands of years. Fire is a keystone ecosystem process, meaning it regulates a range of other factors such as vegetation structure and pattern, habitat for wildlife, nutrient cycling, soil development and erosion, and carbon storage. Natural fire cycles change with climate, with more fires occurring during drier periods. Historical fire suppression, the conversion of native grasslands to croplands, roads, and livestock grazing have altered fire regimes across the Great Plains and the Comanche and Cimarron Grasslands.



Prairie fire near Kim, CO – just south of the Comanche's Timpas Unit. © Rich Reading

The inability of fire to perform its natural ecological role in the Southern Plains has resulted in significant changes on the landscape. Most obvious is the encroachment of woody shrubs, such as mesquite, and trees, particularly juniper. While the public urges the Forest Service to protect the remaining trees in the Forests, the Grasslands,

especially on the Comanche, have *too many trees* in some areas. Invasive and some exotic species, such as tamarisk, have been able to spread due to fire suppression.

Climate change (see below) is predicted to increase the frequency of conditions that support more active fire behavior, resulting in historically unprecedented fire frequency and severity in many forest types, magnifying risks of uncharacteristically severe fire in ponderosa pine and drier mixed conifer forests, and threatening habitat for imperiled species. Increasing acreage of area burned with climate change effects will magnify fire management challenges in the future.

Existing Conditions

The 2002 fire season was memorable due to the large number of large fires across the West. Forest fires captured the Country's attention but wild fires broke out through the Southern Plains as well. In 2006, drought conditions again created fire conditions. Large fires occurred in Texas, Oklahoma, and New Mexico. In the winter of 2006 8,000 acres of the Cimarron National Grassland burned.

The long-term challenge for Grassland managers and the public is to safely accommodate fires. This means preventing the loss of human life associated with fire, substantially reducing risks to property from fire, and wherever possible, restoring and maintaining fires' critical role in prairie ecosystems in a way that minimizes impacts to imperiled species.

Within this framework, specific management challenges include:

- Preventing the loss of human life to grassland fire.
- Creating a safer landscape context for fire by increasing fire preparedness and defensibility of at-risk communities.
- Safely restoring fire to areas of the Grasslands where fire exclusion has caused deleterious ecological impacts.
- Delineating areas on the landscape and conditions in which natural fires can be allowed to burn.
- Planning in advance for naturally ignited fires so that when they do occur, management areas and containment strategies for them are already in place.
- Ensuring that containment strategies do not cause excessive ecological harm through off-road vehicle use, land disturbance from firebreaks, and toxic retardant.
- Minimizing the negative effects of fire to imperiled species and sensitive ecological values.
- Focusing fire suppression where it most effectively protects communities, and minimizing the impacts of fire suppression to species and ecosystems.
- Understanding and accommodating how fire regimes may change with climate change.

Desired Conditions

Fire is a principal factor regulating the structure, pattern, and diversity of ecosystems.

Fire occurs within a range of frequencies, severities, and extents that, to the degree practicable, approximates the natural variability of each ecosystem.

Fires are managed to minimize negative impacts to imperiled and sensitive species and habitats.

Fire does not result in the loss of human life, and is facilitated by a relatively safe landscape context characterized by defensible and prepared at-risk communities.

Fire is an effective tool for minimizing the encroachment of trees and woody shrubs, native increasers, on grassland ecosystems that are historically open with low-structure vegetation.

Fire is used as an effective tool for controlling some exotic species but suppressed in areas where fire-adapted exotic species, such as cheatgrass, respond well to fire.

Objectives

- Restore and maintain fire regimes according to the natural variability of each ecosystem.
- Safely restore fire to grassland areas where fire exclusion has caused deleterious ecological impacts.
- Delineate areas on the landscape and conditions in which natural fires can be allowed to burn.
- Plan in advance for naturally ignited fires so that when they do occur, management areas and containment strategies for them are already in place.
- Minimize the negative effects of fire to imperiled species and sensitive ecological values.
- Focus fire suppression where it most effectively protects communities, and minimizing the impacts of fire suppression to species and ecosystems.
- Understand and accommodate how fire regimes may change with global warming.
- Create a safer landscape context for fire by increasing fire preparedness and defensibility of at-risk communities.
- Identify and develop mitigation for values at risk that are compatible with wildland fire use. Values at risk may include but are not limited to:
 - Habitat for federally listed, sensitive, and other species of concern
 - Fire-vulnerable archeological sites
 - Administrative sites
 - Developed recreation areas
- Where values at risk are incompatible with wildland fire use, develop suppression triggers specifying the fire weather conditions, fuels conditions, and geographic locations in which fire shall initiate suppression actions. The development of triggers shall consider both the potential impacts of suppression and fire under different conditions.
- Develop cooperative agreements with other jurisdictions, including private landowners, to facilitate wildland fire use across ownerships and maximize the contiguous acreage of areas appropriate for wildland fire use.

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- Identify, and prioritize for acquisition, private lands impeding wildland fire use or lands that, if acquired, would increase the contiguous acreage eligible for wildland fire use.
- Avoid land trades that fragment federal ownership in such a way that impedes wildland fire use or decreases the contiguous acreage eligible for wildland fire use.
- Minimize ecological impacts of fire suppression.
- Fire suppression activities are restricted in areas where fire will cause little to no ecological damage and where it poses little or no threat to life or property.
- Fire suppression activities minimize ecological harm to wilderness, roadless areas, old growth and riparian habitats, steep slopes, sensitive solids, rare and relict biotic communities.
- Conduct fire suppression activities in a manner that avoids direct, indirect, or cumulative impacts to threatened, endangered, or sensitive species and their habitats.
- Provide training, information, and protocols to avoid impacts to federally listed and sensitive species and species of concern for all permanent field personnel.
- Maps, mitigation measures, GIS data and other information necessary to avoid impacts to federally-listed and sensitive species and species of concern will be made available at and incorporated into incident planning and operations.
- Ecological advisors are part of incident planning and operations teams to oversee incorporation of biological resource protection and mitigation during incident planning and operations.
- Map, in a GIS, annual burn perimeters, severities, and timing.

Guidelines

- ◆ Use prescribed fire to restore natural fire cycles where it can be accomplished without substantial risk of unnaturally high intensity fire.
- ◆ To maximize the effectiveness of limited federal funds, the Forest Service should prioritize restoration treatments, focusing these treatments in an area within a few miles of communities. To be effective, restoration must be focused on the places where it is needed most. In areas with no nearby noxious weeds, restoration should involve allowing natural processes of plant recolonization as much as possible or use of local genetic plant materials.
- ◆ Let fire perform its role where and when it can be done safely. Where human lives and property are not at stake, fire suppression should be undertaken only when fire threatens critical or rare components of ecosystems (such as endangered species habitat) while these elements are being restored to healthy levels.

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- ◆ The Forest Service should abandon its policy requiring fire suppression based on management prescription. Such a policy can result in ecological harm by preventing cyclical fires from occurring and regenerating fire-adapted forests. In addition, this policy unnecessarily diverts limited resources (money and personnel). To summarize, the decision to suppress fire should be made on the grounds of human life and home protection, rare ecosystem component protection, and historic range of variability, not prescription.
- ◆ A strategic program of early detection and timely treatment of weeds for years after the fire will provide the best defense against the rampant spread of new weeds in the burn area. Proper management of domestic livestock and wildlife numbers in line with grazing capacities, preventing the buildup of dangerous woody debris, and an on-going program of early detection of exotic plants coupled with timely eradication to minimize weed seed source, are examples of management practices that will minimize catastrophic weed invasions following fire.
- ◆ Minimize impacts to paleontological and heritage resources, streams, stream banks, shorelines, lakes and associated vegetation, and habitat for threatened, endangered, proposed, and sensitive species from wildfire suppression efforts in the following ways:
 - ◇ Prohibit the use of earth-moving equipment on known paleontological or heritage sites.
 - ◇ Discourage the application of fire-retardant chemicals over riparian areas, wetlands and open water.
 - ◇ Prior to using earth-moving equipment, consult appropriate specialists for guidance.
 - ◇ Notify the U.S. Fish and Wildlife Service when TES habitat is threatened or impacted by fire.
- ◆ Encourage the use of wildland fire management strategies in wilderness areas, backcountry recreation non-motorized areas, special interest areas, and research natural areas that minimize land and resource disturbance.
- ◆ Where fire poses a direct, immediate threat to life and structures, aggressive suppression is appropriate. The Forest Service should work collaboratively with residents adjacent to National Grasslands land to prioritize and help implement risk reduction projects where appropriate.
- ◆ During project-level planning for prescribed burning, schedule prescribed fire activities at intervals designed to improve or maintain habitats of desired plant and animal species.
- ◆ Ground disturbing suppression activities in wilderness areas and roadless areas are avoided.
- ◆ All equipment used in fuels and fire management activities shall be washed prior to and after use to remove dirt and seeds to prevent the introduction and spread of invasive plants.

DROUGHT

Droughts are prolonged periods of below normal precipitation. They last from a few years to several decades. Prolonged drought results in less water for plants, animals, and people. Drought can cause vegetation dieback through water-starvation, or through water-stress when vegetation is unable to defend against parasites. Fire activity increases during droughts as forest vegetation becomes unusually dry, and dry, hot, and windy weather helps fires spread. Drought, through vegetation dieback and fire, can change the makeup and structure of ecosystems, and shift boundaries between ecosystems. These changes may last for decades and may affect populations of wildlife that depend on certain types of vegetation. Droughts also affect the availability of natural resources, including snow pack, spring and stream flows, lake and reservoir levels, and growth and availability of timber and forage. Climate models predict that climate change will cause increasingly severe droughts in the West in coming decades. Because drought decreases the production and availability of many natural resources, adjusting levels of resource use during drought is often necessary to prevent long-term damage to specific resources, ecosystems, and populations of individual species.

Existing Conditions

The Comanche and Cimarron Grassland region emerged briefly from a severe several year drought starting in 2005. However, drought conditions are once again affecting the farming and ranching communities in the Southern Plains. Fires in Oklahoma, Texas, New Mexico and other Plains states provide evidence of this. The drought of the 1930s became legend because it initiated the Dust Bowl conditions caused by the loss of native vegetation to crops. However, a drought in the 1950s was more severe but revegetation programs started on the Grasslands helped keep the soil in place to a greater extent. Another sustained drought hit in the 1960s.

Regular drought cycles in the Southern Plains of the past 10,000 years are well-documented, and the pattern indicates that we can expect an increase in the severity of droughts compared to those of the twentieth century (Woodhouse 2003).



Effects of the 2002 drought year on a Baca County stock pond. © Rich Reading

Desired Condition

Droughts occur periodically and are a natural ecosystem process.

Vegetation dieback, increased fire activity, and corresponding changes to ecosystem composition, structure, and landscape pattern are occurring during periodic droughts.

Damage to resources, ecosystems, and populations of individual species are minimized as resource use is adjusted to diminished resource availability during drought.

Objectives

- The Grasslands develop a Drought Plan that lays out contingency management strategies for drought conditions. Threshold drought conditions triggering mitigation measures shall be either of:
 - When annual water year precipitation is less than 50% of the 30-year average water year precipitation as measured on March 15th each year, and;
 - When five-year water year precipitation averages are less than 50% of the 30-year average water year precipitation.
- Drought mitigation strategies are incorporated into all relevant permits, uses, and contracts to adjust levels of use during drought in order to avoid damage to resources.
- Drought mitigation measures shall be triggered by threshold drought conditions.
- Mitigation measures include:
 - Standards for altering the season, duration, and intensities of use during drought conditions;
 - Threshold resource conditions triggering non-use.
- Relevant permits, uses, and contracts that shall compel drought mitigation strategies include but are not limited to:
 - Livestock grazing;
 - Seed and other vegetation collection;
 - Hunting.
- A drought mitigation report will be compiled every three years documenting:
 - Adjustments to season, duration, and intensities of uses that resulted from drought mitigation measures.
 - Monitoring results demonstrating that threshold resource conditions triggering non-use were not exceeded for each adjusted permit, use, or contract.

Guidelines

- ◆ Permits, uses, and contracts shall be temporarily cancelled during threshold drought conditions if:
 - ◇ Drought mitigation measures are not in place;
 - ◇ Drought mitigation measures are not followed, or;
 - ◇ Threshold resource conditions triggering non-use are exceeded.

PRAIRIE DOGS⁵

It is hard to overstate how important prairie dogs are to the ecology of the shortgrass prairie. The role of prairie dogs as a keystone species is now well-established scientifically (Kotliar et al. 1999; Kotliar 2000; Miller et al. 2000). Prairie dogs probably qualify under multiple categories of keystone species – as prey and for their modification of habitat (Mills et al. 1993).⁶ The shortgrass prairie areas that prairie dogs inhabit should probably be considered ecosystems unto themselves.

Keystone species enrich ecosystem function uniquely and significantly through their activities, and their impact is larger than predicted relative to their biomass (Paine 1980; Terborgh 1988; Mills et al. 1993; Power et al. 1996; Kotliar et al. 1999; Miller et al. 1998/1999). Kotliar (2000: 1715). Prairie dogs are functionally unique; they perform roles within their ecosystem not performed by other species or processes. The scientific literature is growing that supports the argument that prairie dogs fulfill all the requirements of keystone species (Coppock et al. 1983a, b; Detling and Whicker 1988; Whicker and Detling 1988a, b; 1993; Reading et al. 1989; Society for Conservation Biology 1994; Kotliar et al. 1997; 1999; Wuerthner 1997; American Society of Mammalogists 1998; Kotliar 2000, Miller et al. 2000).

Prairie dog activities and the changes made by these activities create a unique ecological system known as the “prairie dog ecosystem” (Clark et al. 1989; Miller et al. 1996). Over 200 vertebrate species have been observed on prairie dog colonies (Koford 1958; Tyler 1968; Campbell and Clark 1981, Clark et al. 1982; O’Meilia et al. 1982; Agnew et al. 1986; Reading et al. 1989; Sharps and Uresk 1990; Mellink and Madrigal 1993; Hoogland 1995; Barko 1996; Manzano 1996; Ceballos and Pacheco 1997; Ceballos et al. 1999; Kotliar et al. 1999). Some of these species appear to depend on prairie dog colonies for their survival and many appear to benefit, at least seasonally or opportunistically (Reading et al. 1989; Hoogland 1995; Manzano 1996; Ceballos et al. 1999; Kotliar et al. 1999). Other species that apparently derive little to no benefit from prairie dog activities directly, are associated with a habitat feature that facilitates prairie dog persistence (such as stock ponds or salt licks), or are accidental (Reading et al. 1989, Kotliar et al. 1999, Miller et al. 2000).

Prairie dogs and other animals inhabiting prairie dog colonies represent a rich prey patch for a large number of predators (Reading et al. 1989; Miller et al. 1996; Plumpton and Anderson 1997; Berry et al. 1998; Kotliar et al. 1999). A variety of predators including prairie rattlesnakes (*Crotalus viridis*), golden eagles (*Aquila chrysaetos*), great horned owls (*Bubo virginianus*), weasels (*Mustela frenata*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), and others prey on prairie dogs and small mammals that have a higher abundance on prairie dog colonies (Agnew et al. 1986). Some predators, especially black-footed ferrets (*Mustela nigripes*), are completely dependent on prairie dogs (Clark 1989; Miller et al. 1996). Other species, such as badgers (*Taxidea taxus*), swift foxes (*Vulpes velox*), and ferruginous hawks (*Buteo regalis*), benefit substantially from the presence of prairie dogs as prey (Uresk and Sharps 1986; Sharps and Uresk 1990; Allison et al. 1995; Plumpton and Andersen 1997, 1998; Berry et al. 1998; Goodrich and Buskirk 1998).

The benefits of prairie dogs extend well beyond simply being food for predators (Reading et al. 1989; Ceballos et al. 1999; Kotliar et al. 1999). Prairie dogs also substantially alter their

⁵ This section adapted from previous work by R. Reading and L. McCain (see references).

⁶ Mills et al. 1993 disclose these different categories of keystone species, but they question the utility of the keystone concept in species conservation.

environment. Since prairie dogs excavate more burrows than they regularly utilize⁷, they create hibernacula, dens, and nests for many animals, such as black-footed ferrets, swift fox, badgers, cottontails (*Sylvilagus* spp.), burrowing owls, shrews, other rodents, and several species of reptiles and amphibians (Reading et al. 1989; Sharps and Uresk 1990; Plumpton and Lutz 1993; Fitzgerald et al. 1994; Desmond et al. 1995; Kretzer and Cully 2001). These species and more also use the burrows as refugia from predators or temperature extremes. As a result, researchers have found that desert cottontails (*S. audonbonii*), thirteen-lined ground squirrels (*Spermophilis tridecemlineatus*), and northern grasshopper mice (*Onychomys leucogaster*) exist in higher numbers on prairie dog colonies than in surrounding grasslands (O'Meilie et al. 1982; Agnew et al. 1988; Dano 1952 in Stapp 1998). Similarly, studies in Mexico found higher rodent species richness, density, and diversity and higher avian species richness on prairie dog colonies compared with surrounding grasslands in Chihuahua, Mexico (Manzano 1996; Ceballos and Pacheco 1997; Ceballos, Pacheco, and List 1999). Most of the work to date has focused on birds and mammals with considerably less research on reptiles and amphibians (but see Kretzer and Cully 2001). Similarly, little is known about prairie invertebrates, yet the burrows in a prairie dog colony should offer habitat advantages to invertebrates as well.

Prairie dogs also have a large effect on vegetation structure, productivity, nutrient cycling, and ecosystem processes (Coppock et al. 1983; Detling and Whicker 1988; Whicker and Detling 1988a, b; 1993; Weltzin et al. 1997a; Stapp 1998). The activities of prairie dogs, especially their grazing and clipping of tall vegetation, result in changes in plant composition (Bonham and Lerwick 1976; Coppock et al. 1983, Detling and Whicker 1988; Whicker and Detling 1988a, b; 1993, Weltzin et al. 1997a; Detling 1998). In general, the vegetation on prairie dog colonies is characterized by lower biomass, a greater preponderance of annual forbs and short grasses compared to tall grasses and shrubs, but is higher in nitrogen content than vegetation from surrounding areas (Bonham and Lerwick 1976; Coppock et al. 1983, Weltzin et al. 1997a; Detling 1998). Prairie dogs negatively impact some plant species, reducing the prevalence and controlling the spread of taller grasses and several shrubs, such as mesquite (*Prosopis* spp.), sagebrush (*Artemisia* spp.), and longleaf jointfir (*Ephedra trifurca*) (Bonham and Lerwick 1976; Coppock et al. 1983; List 1997; Weltzin et al. 1997b). Ironically, prairie dogs are poisoned for livestock interests, but these shrubs reduce grass available for cattle, and mesquite makes roundups more difficult (Miller 1991).

Prairie dog burrowing activities modify ecosystem processes such as water, mineral and nutrient cycling. Prairie dogs turn over approximately 225 kg of soil per burrow system, which translates to several tons of soil per hectare (Whicker and Detling 1993). By mixing in nutrient-rich urine and manure, prairie dog digging can change soil composition, chemistry, and microclimate, facilitate below-ground herbivory, increase porosity of soil to permit deeper penetration of precipitation, and increase the incorporation of organic materials into the soil (Ingham and Detling 1984; Whicker and Detling 1988 a, b; Munn 1993; Outwater 1996). As a result, prairie dog colonies support higher numbers of nematodes and higher levels of soil nitrogen (Ingham and Detling 1984, Detling 1998). All of these processes contribute to aboveground plants with a higher nutritional content, greater digestibility, and a larger live plant to dead plant ratio, creating favorable feeding habitat for other herbivores (Whicker and Detling 1993). Indeed, pronghorn and bison preferentially graze on prairie dog colonies (Coppock et al. 1983; Krueger 1986; Detling and Whicker 1993, Detling 1998). Foraging models predict that bison can gain weight faster by grazing on pastures with prairie dog colonies than on grasslands without prairie dogs (Vanderhyde 1985 in Whicker and Detling 1993).

⁷Despite the common belief that there are several prairie dogs per burrow entrance, there are actually several burrow entrances per prairie dog (Biggins et al. 1993; Hoogland 1995).

Kotliar et al. (1999:177) concluded that collectively these functions are large, not wholly duplicated by other species (either in form or extent), and that the loss of prairie dogs would lead to "substantial erosion of biological diversity and landscape heterogeneity across the prairie." They concluded that the prairie dog therefore fulfills the definition of keystone (see also Kotliar 2000). We agree (see Stapp 1998 for an alternative view). The structure, form, and function of prairie dog colonies provide a keystone role in the prairie, and the role is large. Despite the difficulty in quantifying a role, we contend that existing evidence indicates prairie dogs (and other associated species) provide important prey to predators, and their grazing and burrowing activities modifies the environment in a manner exploited by other prairie organisms (Whicker and Detling 1993; Kotliar et al. 1999). Most importantly, those grazing and burrowing activities affect vegetative composition, vegetation quantity and quality, productivity, nutrient cycling, and soil quality (Bonham and Lerwick 1976; Coppock et al. 1983; Detling and Whicker 1988; Whicker and Detling 1988 a, b; 1993). We suggest that these data should guide our policy decisions until future data prove otherwise (i.e., the 'Precautionary Principle"; Johnston et al. 1999; Foster et al. 2000).

Existing Conditions

Together, the Cimarron and Comanche Grasslands are home to the largest complex of black-tailed prairie dogs on public land in the Southern Prairie. The prairie dogs on the Comanche Carrizo Unit and the Cimarron Grassland are currently recovering from a plague epizootic that brought the population down to less than one percent occupancy.

Desired Conditions, Objectives and Guidelines

In the Draft Cimarron and Comanche management plan, the Forest Service has proposed black-tailed prairie dogs be designated a Species of Concern—a designation we strongly support. Specific desired conditions, management objectives and guidelines for prairie dogs are outlined in the "Species" section (Section 2) of this Alternative.

CLIMATE CHANGE

Climate change poses a fundamental challenge to Grasslands management in coming years and decades. During the past century, global surface temperatures have increased by 1.1°F, but this trend has dramatically increased to a rate approaching 3.6°F/century during the past 25 years, the fastest rate of warming in the past 1000 years (IPCC 2001). Temperatures during the latter period of warming have increased at a rate comparable to the rates of warming that conservative projections predict will occur during the next century with continued increases of greenhouse gases. As climate change progresses, maximum high and minimum low temperatures are expected to increase, as are the magnitude and duration of regional droughts (IPCC 2001).

The ecological effects of warming temperatures and droughts associated with climate change are affecting the Southern Plains, including the Comanche and Cimarron Grasslands. Among those effects are:

- 1) increased fire activity (McKenzie et al. 2004),

- 2) increased potential for insect epidemics (EPA 1999),
- 3) decreased duration and depth of winter snowfall (IPCC 2001),
- 4) decreased water availability,
- 5) upward elevation and latitudinal migration of individual species' distributions (IPCC 2001),
- 6) unprecedented rates of vegetation shifts due to die off, especially along boundaries of semi-arid ecosystems (Allen and Breshears 1998), and
- 7) decreased productivity and cover of herbaceous vegetation and increased soil erosion (Davenport et al. 1998, Wilcox et al. 2003).

These changes may pose threats to native species as:

- 1) rates of climate change may exceed the migration capabilities of species,
- 2) losses of existing habitat occur during vegetation shifts,
- 3) reductions in habitat patch size support fewer species, and, in semi arid landscapes,
- 4) the quality and quantity of aquatic, riparian, and mesic upland ecosystems decline with decreased water availability.

A particular management difficulty arises in setting goals and objectives for ecosystem management in the context of a warming climate. Our understanding of how ecosystems function is based in large part upon our understanding of their historical conditions. Historical conditions also form the basis for assessment tools from which ecosystem management objectives are derived—like properly functioning condition and fire regime condition class. However, managing ecosystems toward a range of historical conditions amidst a warming climate may be problematic because natural ecosystem responses to today's climate may differ from historical conditions. Over time, climate change will render historical "reference" conditions decreasingly useful as a basis of comparison for ecosystem management. At the same time, protected areas, like reference areas, and Research Natural Areas will become increasingly valuable for understanding natural responses to climate change as the basis of comparison for ecosystem management elsewhere on the Grasslands.

Within this framework, specific management challenges associated with climate change include:

- Identifying, understanding, and mitigating impacts to species and other ecological values threatened by the effects of climate change.
- Using reference-based assessments and objectives while taking precautions in the face of their limitations in the context of climate change.
- Developing ecologically functional reference areas, and efficient and informative means of measuring those areas, in order to understand natural ecosystem responses to climate change as a basis of comparison for ecosystem management.
- Understanding the degree to which ecosystem behavior is the result of past management practices or climate change, and developing management responses that are appropriately cautious in light of such uncertainty.
- Tailoring levels of uses to facilitate ecological sustainability amidst rapidly changing and vulnerable ecosystems.
- Educating the public about the relationships between climate change and ecosystem behavior, and about the need for management that is cautious in the face of uncertainty.

Climate change is likely to alter both the distribution of individual species (e.g., moving certain habitat conditions such as temperature, northward) and disturbance patterns (e.g., increasing the frequency of fires). Coming decades will likely witness significant change to the distribution and diversity of species and ecosystems due to climate change.

Desired Conditions

The Forest Service has identified biological values most at risk to the effects of climate change and is implementing corresponding mitigation measures. Resource management focusing on restoration and maintenance of natural processes is creating and maintaining ecosystem conditions that are more resilient to the effects of climate change. As a result, ecosystems are responding naturally to climate change and thus minimizing negative effects to the viability of native species. Natural responses to a warming climate include increased insect epidemics in some forests, increased fire activity, changing composition within ecosystems, and shifts between the boundaries of ecosystems.

Grassland management seeks, wherever possible, to support healthy ecosystem conditions; understand, expect, and restore natural disturbances; and prepare for natural ecosystem responses to climate change.

Objectives

- Identify, understand, and mitigate impacts to species and other ecological values threatened by the effects of global warming.
- Develop ecologically functional reference areas, and efficient and informative means of measuring those areas, in order to understand natural ecosystem responses to global warming as a basis of comparison for ecosystem management.
- Understand the degree to which ecosystem behavior is the result of past management or global warming, and develop management responses that are appropriately cautious in light of such uncertainty.
- Tailor levels of uses to facilitate ecological sustainability amidst rapidly changing and vulnerable ecosystems.
- Educate the public about the relationships between global warming and ecosystem behavior, and about the need for management that is cautious in the face of uncertainty.
- Identify, prepare for and mitigate impacts of global warming.
- Within two years of plan adoption, convene a panel of scientists to identify:
 - biological values on the Grasslands most at risk to global warming and corresponding mitigation measures to reduce those risks;
 - anticipated effects to vegetation, hydrology, and ecosystem processes resulting from global warming and preparatory and mitigation measures to reduce undesirable effects.
 - Strategies to facilitate natural ecological responses to global warming.
 - Long-term monitoring protocols to document the effects of global warming.
 - Research needs associated with global warming.

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- Within one year of the panel convening, the Forest Service shall publish results in a technical report and incorporate recommendations into all relevant plans.
- The Forest Service will identify and undertake measures to reduce contribution to greenhouse gas emissions.

Guidelines

- ◆ In order to eliminate, minimize, or undo impacts to native biological diversity, any environmental analysis conducted by the Forest Service shall analyze the projected impact of climate change on the Grassland resources affected by the activity or project. Activities to be evaluated for their impacts include but are not limited to oil leasing and drilling, livestock grazing, and off-road vehicle use.
- ◆ In order to reduce contributions to greenhouse gas production, the Grasslands shall, within three years of plan adoption:
 - ◇ Convert the car, pickup, van and SUV component of the vehicle fleet to low emission hybrid vehicles.
 - ◇ Convert to renewable energy sources through direct installation of power generation facilities (solar panels, wind turbines) or purchase of renewable energy through power purchase options.

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CONSOLIDATION OF FRAGMENTED LANDHOLDINGS; CONNECTIVITY BETWEEN OTHER PUBLIC LANDS AND PROTECTED AREAS

Maps of the Comanche and Cimarron National Grasslands planning areas that depict specific land ownership boundaries illustrate the Grasslands' checkerboard pattern—an assortment of state and private land holdings intermingled with segments of federal Grassland. The highly fragmented nature of the Grasslands is a legacy of New Deal legislation to help farmers ruined by the Dust Bowl. At the time public officials did not count on these federal lands serving the role of public parks or natural areas that many now envision the Grasslands to be. The purpose was simply to stem the loss of topsoil blowing away by the ton in the 1930s and provide the bankrupt homesteader with a little money to resettle elsewhere.



Common Grasslands scene: Cropland next to Grassland. © Lauren McCain

With a new set of management priorities conferred on the Forest Service when it took over Grassland administration, including ecosystem protection, the land fragmentation now presents a significant management challenge for the Service. Consolidating fragmented segments of the Grasslands in a way that increases the size of natural ecosystem segments and establishes connectivity with other protected areas would help maximize biodiversity and serve the public and the Forest Service.

Habitat fragmentation has become one of the greatest threats to biodiversity world-wide (Harris 1984; Wilcox and Murphy 1985; Noss and Cooperrider 1994). The subdivision of whole, continuous natural communities due to agriculture, road systems, urban sprawl, fencing, and other human land alterations creates isolated, remnant patches of ecosystems (Saunders et al. 1991; Wilcove et al. 1986; Merola-Zwartjes 2004). Ecosystems are more than merely a specific set of plants and animals that live in a particular region; they are a complex co-dependent network of species and micro- and macro-processes. Losing one part of the network—“one cog in the wheel”—can bring down the whole system. Cutting up healthy ecosystems into isolated patches or “islands” inhibits the exchange of genetic materials among species, makes some specialized wildlife species more vulnerable to predation by generalist species, and inhibits natural disturbance regimes such as fire and seasonal flooding, for example (Risser 1996). Habitat fragmentation contributes to species loss by local extinctions.

The landscape of the Southern Plains has been completely diced apart. Conversion of grassland to cropland, human settlements, roads, fences, damming and diverting natural water systems have segregated once continuous populations of native grasses and forbs and natural systems into small, isolated fragments.

At landscape to regional scales, habitat connectivity is essential for many species (especially large animals), which cannot maintain viable populations in small, isolated areas (Frankel and

Soulé 1981; Noss and Harris 1986; Noss and Cooperrider 1994). Linkages are areas that are important for providing landscape connectivity for wide-ranging predators and other wildlife species such as deer, elk, pronghorn, and in the future black-footed ferrets, bison, and wolves, among others. Connectivity provides for natural dispersal of individuals within an area, seasonal migration of groups, genetic exchange between populations, and ability to shift natural ranges in response to climate change (Noss and Cooperrider 1994; Miller et al. 1998). Biological connectivity in any area should be assessed by analyzing locally relevant processes, interactions, and the needs of particular species.

Existing Conditions

Private inholdings surrounded by federal land are common to other national forests. However, the Dust Bowl policies that led to the establishment of the National Grasslands resulted in a public land base that is exceptionally fragmented by private and state land holdings. Additionally, the Southern Plains Grasslands, including the Kiowa and Rita Blanca, are isolated from each other and other lands specifically protected for wildlife and habitat. Despite the low human population in the region, the road density is high—another Dust Bowl legacy. Particularly in the Cimarron National Grassland Region and the western part of the Comanche, cultivated land surrounds the federal holdings. Barbed wire fences enclose cropland as well as federal, state, and private pastures. The natural movement and migration patterns for elk, bison, and wide-ranging predators ended decades ago. The far-reaching consequence of this fragmentation and isolation is an assortment of partial and non-functioning remnants of ecosystems and habitat that cannot support the full suite of species native to the region and hinders healthy genetic exchange among native plant and animal species.

The checkerboard ownership pattern of the Grasslands breaks up habitat and creates management challenges and extra administrative costs for the Forest Service. Some isolated segments of Grassland contain less than 320 acres of land surrounded completely by private land. Some isolated segments are not accessible to the public. The Service noted problems associated with fragmentation:

Isolated tracts of land are difficult to manage effectively as federal lands for various reasons (for example, lack of public access, range administration, wildfire suppression, vegetation and habitat management). A fragmented land pattern can hinder conservation initiatives such as species reintroductions, and also makes it difficult to implement prescribed burns and other management practices. Fragmentation can compromise the recreational potential of the land by not providing the solitude many recreationists desire. It also increases the cost of management. Currently, a large portion of a Grassland employee's time is spent driving from one tract to another. Some sites rarely get visited at all. The large amount of land boundary increases administrative and enforcement time, and allows a greater potential for disputes. (USFS Specialist Reports 2005, ch. 10, pg. 1).

Though most of Cimarron Grassland land area is situated along the Cimarron River corridor, several small sections are isolated to the north and east by private and state land holdings. In some places irrigated crop fields surround small islands of Grassland and likely degrade them with fertilizers and other hazardous chemicals. The 108,127 acres of the Cimarron contains 42 separate land segments with a boundary length of 337.3 miles total (USFS Specialist Reports

2005, ch. 10). The average size of each segment is 2,572 acres with the median being 183 acres.

The Comanche Grassland is even more highly fragmented, especially within the Carrizo Unit. Segments of Grassland smaller than one-quarter section (160 acres) are surrounded by private land. The 443,800 acres of the Comanche is divided into 126 separate segments scattered across the southeast corner of Colorado in three counties (USFS Specialist Reports 2005, ch. 10). The average fragment size is 3,522 acres with a median of 320 acres.

Grassland management objectives should be designed to facilitate maximum connectivity for all species, including those that are wide-ranging and require extensive home ranges. Ownership can be consolidated through direct purchases (generally funded by earmarked Congressional appropriations from the Land and Water Conservation Fund), land exchanges between private land owners and the Forest Service, and outright donations. Acquisitions clearly depend on willing sellers, but the Forest Service can assist the process by pro-actively encouraging land exchange proponents to offer private lands in key areas.

Summary of Fragment Size and Boundary, Area Ratios of the Grasslands¹

Grassland Units	Total Acres	Total Boundary Length (Miles)	Number of Fragments	Mean Fragment Size (Acres)	Median Fragments Size (Acres)	Total Boundary Divided by Total Area (miles/sq mile)
Comanche	443,765	1616.4	126	3,522	320	2.33
Carrizo Unit	257,255	1065.6	113	2,277	320	2.65
Timpas Unit	186,510	550.7	13	14,347	606	1.89
Cimarron	108,500	337.3	42	2,572	183	2.00

¹From: USDA Forest Service PSICC. 2005. Ecological Sustainability. Preliminary Planning Report. October 6.

Desired Conditions

Land exchange projects have resulted in larger contiguous blocks of National Grassland and reduced ownership fragmentation.

Prioritized land exchange projects and land adjustment administration foster consolidation of fragmented ecosystems in a way that improves the health and functioning of all native ecosystems and maximizes native biodiversity on the Grasslands.

Sewing together some of the patchwork of the federal Grasslands has increased and improved populations of and habitat for lesser prairie-chickens, black-tailed prairie dogs, mountain plovers, swift fox, pronghorn, elk, and other protected species, species of concern, and species of interest and has also increased protection for rare native plants and plant communities.

Consolidation of the Forest Service land base within the Comanche and Cimarron planning regions is reducing land administration costs, complexity, and conflict.

Partnerships and complementary management arrangements with willing adjacent landowners and local conservation organizations have enlarged areas of healthy native habitat around the Grasslands through the use of conservation easements and other conservation tools.

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Grassland consolidation enables easier public access and minimizes visitor confusion over ownership.

Management plans reflect the sound conservation principles of establishing core conservation areas and linkages between these core conservation areas for safe passage for wildlife and genetic exchange.

Management plans and decisions are based on forward-thinking strategies for establishing habitat connectivity across fragmented sections of the Grasslands, between all Southern Plains National Grasslands, and between other public and private protected areas.

The Forest Service actively facilitates habitat connectivity by working with private landowners to adopt more wildlife-friendly practices and conservation organizations to promote tools such as conservation easements.

Forest Service biologists are working with landowners, other scientists, conservation organizations, and other members of the public on conservation strategies, such as removing unnecessary fencing, encouraging wildlife-friendly fencing, decommissioning roads, and making road crossings safer for wildlife.

Natural habitat in the Comanche and Cimarron regions is increasing, ecosystem functions are being restored, and wildlife are moving more freely across ownership boundaries.

Objectives

- Prepare and execute a land consolidation and connectivity strategy that would identify priorities for land acquisition and exchange to enable the Forest Service to make the most of land adjustment opportunities as they present themselves and prevent missing such opportunities.
- Establish land exchanges, acquisition, and conservation easements that enhance regional biodiversity and protect native species and habitat, with special attention to arrangements that benefit species of concern, species of interest, and other rare species.
- Schedule necessary resurveying of Grassland boundaries as indicated in *Draft Cimarron and Comanche Land Management Plan* (pg. 60).
- Post signs to clearly distinguish federal Grasslands from private and state lands.
- Remove obstacles to wildlife movement by removing unnecessary fencing, requiring wildlife-friendly fencing, decommissioning unnecessary roads, making road crossings safer for wildlife, and removing other unnecessary human structures.
- Maintain/restore habitat connections that support ecologically and evolutionarily effective populations of large predators.
- Establish wildlife crossing signs on roadways that are heavily used by wildlife, such as pronghorn, swift foxes, prairie dogs, deer, raptors and other grassland birds, and tarantulas, to prevent road mortality. Roads on which to establish signs include US 350

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and State 109 in the Timpas Unit, US 160 and 287 in the Carrizo Unit, and US 56 and State 27 in the Cimarron.

- Develop a collaborative strategy in conjunction with Southern Plains Grassland managers, state land managers, state wildlife agencies, interested conservation organizations, and supportive landowners for promoting connectivity between public land units and private protected lands.

Monitoring

1. Where do roads, fences, oil and gas operations, agricultural operations, and other human facilities and practices hinder wildlife movement and genetic exchange in the Cimarron and Comanche planning area?
2. What human structures and facilities can be removed to promote habitat connectivity?
3. Where do key wildlife corridors occur on the Grasslands and how can free movement along these corridors be achieved through land exchange, brokering conservation easements, and using other land administration tools?
4. What areas are suffering the heaviest wildlife road mortalities?

Guidelines

- ◆ Land exchange projects must maintain full compliance with the National Environmental Policy Act, including Environmental Impact Statements or Environmental Assessments, transparency, and public involvement.
- ◆ Establishing linkages between core conservation areas should be considered when embarking on land exchange projects.
- ◆ Acquisition priorities shall include:
 - ◇ Land with important or unique resources, such as water frontage, wetlands, floodplains and associated riparian ecosystems, threatened or endangered species habitat and habitats needed for recovery, Forest Service sensitive species habitat, habitat for species of concern and interest, rare plants and plant communities, important paleontological or geologic sites, important historical heritage resources or traditional cultural properties, outstanding scenic values, or critical ecosystems when these resources are threatened by change of use, or when management may be enhanced by public ownership.
 - ◇ Riparian and canyon areas: Timpas Creek and Purgatoire River in the Timpas Unit; Carrizo Creek, Cottonwood Canyon, Sand Canyon, Picture Canyon, Cimarron North Fork in the Carrizo Unit; and the Cimarron River in the Cimarron Grassland.
 - ◇ Playa lakes and natural springs, seeps, and ponds.
 - ◇ Key lesser prairie-chicken existing and potential habitat including known leks and nesting grounds and also potential expansion areas, especially within the Campo Grazing Association district in the Comanche Grassland and the southwest region of the Cimarron Grassland.

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- ◇ Lands that include prairie dog colonies or that present opportunities to allow colony expansion are a high priority.
 - ◇ Land that allows linkages that provide wildlife movement and migration corridors.
 - ◇ Important botanical, wildlife and aquatic community management areas. This includes lands supporting rare plant communities.
 - ◇ Lands with important value for outdoor recreational purposes.
 - ◇ Non-federal lands in mineralized areas that have low potential for future mineralized patents, and where the minerals will be donated to the United States.
 - ◇ Lands within or around existing blocks of public ownership of at least 2,000 acres.
- ◆ Consider the following to identify lands for possible disposal:
 - ◇ Isolated parcels of any size, such as parcels having no legal public or administrative access and the effort to acquire such access is not cost-efficient or otherwise reasonable.
 - ◇ Lands less than 500 acres that are not contiguous to larger blocks of public lands and the disposal of which will not result in the net loss of ecosystem, wildlife, geologic, scenic, recreational, historic, or cultural values.
 - ◇ Existing, reserved, or acquired rights-of-way parcels that are no longer needed for rights-of-way purposes.
 - ◇ Obtain reasonable public and administrative access to all National Forest System lands in the following ways:
 - ◇ Require reciprocal grants, where needed, when granting rights-of-way easements across the forests or grasslands.
 - ◇ Reserve in land disposal actions, existing and designated inventoried rights-of-way that are needed for implementation of the management plan and to protect them from future construction and occupancy.
 - ◇ Acquire through purchase or donation rights-of-way to provide public access where needed.
 - ◆ Forest Service land exchanges and acquisitions shall not:
 - ◇ Relinquish ownership of species of concern habitat, rare or biologically rich or important ecosystems such as rare and relict communities, riparian areas, linkages, etc. without a corresponding acquisition doubling the Grasslands' ownership of relinquished habitats or biological values.
 - ◇ Result in a trend toward loss of population viability for any species of concern.
 - ◇ Increase ownership fragmentation.
 - ◇ Impede or degrade the Forest Service's ability to manage wildland fire for resource benefits.
 - ◇ Exchange lands in situations that would result in more construction of roads and other infrastructure on the Grasslands than would forego that exchange.

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CAREFUL CONTROL AND PREVENTION OF INVASIVE WEEDS AND EXOTIC SPECIES

Native plants are an integral part of all healthy ecosystems. They provide genetic material that strengthens our major food crops, native medicines, native products, and the natural beauty of the landscape. They provide food and shelter necessary to wild animals and birds. When exotic flora invade, wildlife habitat deteriorates, water quality diminishes, erosion increases, nutrient cycling and filtration are altered, and recreational values are degraded. Native wildflowers cannot compete with invasive plants for nutrients, sunlight and water. In the Southern Plains, native invaders may be as problematic as exotic species (Payson and Gustafson 1996). The loss of fire as a natural disturbance process, climate change, and the change in the grazing regime from wild bison to commercial domestic livestock has led to the encroachment of woody scrubs and trees, such as mesquite and juniper, in what was once primarily grassland (Sims 1988).

As a result of altered fire ecology and anthropogenic disturbance, native ecosystems risk being overrun by non-native weeds and native increasers. Noxious weeds become established in soils disturbed by a variety of activities, including construction, motorized travel, concentrated livestock grazing, and natural disturbances such as fire. Noxious weed seeds are transported to new sites in numerous ways such as by wind, water, tires, machinery, and people (e.g. via boot tread), as well as wild and domestic animals.

Existing Conditions

Like the rest of the country, Europeans brought many of the invaders on purpose and by accident when they immigrated across the West. People planted tamarisk as an ornamental, for example; now the shrub is out of control, lining streams and creeks with its reddish-pink forests. Crops, especially on the Cimarron, also encroach on the native Grasslands' native vegetative communities. Much of the Cimarron, particularly the small, more isolated segments, and the eastern portion of the Comanche border dry and irrigated farms. This disturbance activity also makes these areas of the Grassland more vulnerable to other invasive species. Of course, plowing up the native vegetation to make way for crops in the late 1800s and early 1900s made the exposed soil ripe for noxious weed establishment. Additionally, restoration of the Southern Plains after the Dust Bowl included the intentional planting of non-native grasses from Africa and Asia. The extremely high density of roads on both Grasslands, especially throughout the Comanche's Carrizo Unit, and frequent grading of these mostly dirt roads, plus persistence of livestock grazing in all ecosystems of the Grasslands, including sensitive riparian areas, contributes to the establishment and persistence of noxious weeds and invasive species.

Invasive species are degrading ecosystems in both the Comanche and Cimarron National Grasslands. A recent Comanche National Grasslands plant survey found 126 non-native plant species in 785 recorded plants—16 percent exotic (Hazlett 2003). Though such an inventory has not occurred in Kansas' Cimarron Grassland, several invasive species are well-known. Cheatgrass (*Bromus tectorum*) is spreading and difficult to control on the terrestrial grassland ecosystems on both the Cimarron and Comanche. Other upland invasive species include field bindweed (*Convolvulus arvensis*), Japanese brome (*Bromus japonicus*), Russian thistle (*Salsola*

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tragus)—better known as “tumbleweed,” alkali or kochia (*Kochia scorpia*), and horseweed (*Conyza candensis*).

The Colorado Noxious Weed Act of 2003 (HB03-1140) classifies weeds into three categories: A – “a rare noxious weed that should be eradicated wherever it is found,” B – “a weed that is just beginning to spread into an area, it may designated [sic] by a commissioner as a weed for eradication,” and C – “wide-spread and well-established weeds” (Hazlett 2003, 13). The Comanche has weeds in each category:

- A) yellow star thistle (*Centaurea solstitialis*)
- B) Dalmation toadflax (*Bromus inermis*), broadleaf pepperplant (*Lepidium latifolium*), Russian olive (*Elaeagnus angustifolia*), and musk thistle (*Carduus nutans*) [Other potential category B candidates include Russian knapweed (*Centaurea repens*) and teasel (*Dipsacus fullonum*.)]
- C) Canadian thistle (*Cirsium arvense*), bindweed, cheatgrass, Japanese brome, Russian thistle, kochia, and horseweed.

Tamarisk (*Tamrix* spp.) is a category B weed in some areas and C in others; it is especially pernicious in the Grasslands’ riparian areas. Tamarisk uses much more water than the native cottonwoods and willows it is out-competing. Thus, it is reducing stream channel movement and drying up some of the already small, ephemeral creeks in the Grasslands. It also increases soil salinity and increases fire frequency (Ecological Sustainability Report 2005). These changes in riparian vegetation, soils, and water quantity and composition have degraded habitat for wildlife including elk (*Cervus elaphus*), deer (*Odocoiles* spp.), Lewis’s woodpecker (*Melanerpes lewis*), northern bobwhite (*Colinus virginianus*), red-headed woodpecker (*Melanerpes erythrocephalus*), and wild turkey (*Meleagris gallopavo*). However, completely eradicating tamarisk may actually do more harm than good for some species dependent on riparian trees and woody shrubs, and full elimination has become controversial in some places. One species that may actually benefit from tamarisk is the southwest willow flycatcher (*Empidonax traillii extimus*), whose northernmost range may extend into the southern reaches of the Comanche at the New Mexico border. Thus, phased elimination of tamarisk is required.

Tamarisk Infestations on the Grasslands

LOCATION	STREAM MILES	TAMARISK INFESTATION
Comanche National Grassland		
Bighole Canyon	1.7	<25%
Carrizo Canyon	1.6	None
Holt Canyon	2.9	None
Pat Canyon	0.1	None
Picture Canyon	1.9	Eradicated 2004
Purgatoire Canyon	20.7	>75%
Sand Canyon	1.6	Eradicated 2003
Soldier Canyon	0.8	None
Tecolote Creek	0.6	None
Timpas Creek	5.2	>75%
Tobe Creek	1.3	>25%
Ute Canyon	1.2	<25%
Vogel Canyon	0.5	>75%
Whitby Canyon	1.2	<25%
Cimarron National Grasslands		
Cimarron River	33.8	>75%
North Fork Cimarron River	2.6	<25%

Data from USDA Forest Service, PSICC 2005.

Other problematic riparian weeds include musk thistle, Dalmation toadflax, Russian olive, and prickly lettuce (*Lactuca serriola*), among others. The harsh winds, lack of rain, and temperature extremes make it difficult for most exotics to establish themselves on the open grasslands and scrublands, and weeds are concentrated in the riparian areas. Yellow sweet clover (*Melilotus officinalis*) is ubiquitous in both riparian and upland ecosystems.

Desired Conditions

The area in which invasive species are present is decreasing on the Grasslands.

Conditions favoring the introduction, establishment, and spread of invasive species are significantly decreasing.

Those native species that have lost ground to (a) exotic invasive species and (b) native increasers are regaining ground.

New invaders are not obtaining any significant footholds in the Grasslands.

Native plants dominate in all vegetation communities.

Persistent and/or invasive exotic plants earlier introduced and/or seeded by users of the Grasslands (e.g., cheatgrass, Kentucky bluegrass, smooth brome, crested wheat grasses) are declining in area on the Grasslands relative to native species.

Objectives

- The goal of invasive plant management is to restore healthy, native vegetation, not merely to kill invasive plant species. Invasive plant treatments may be passive (i.e., cessation of the activities that create conditions favoring the invasive species) as well as active (i.e., manual, mechanical, biological, cultural, or fire direct treatment of the invasive species). Active treatments may depend on being linked to passive treatments for long-term success. Chemical treatments would only be used as a last resort and in a limited, highly discriminating manner.
- Within the next two years a comprehensive flora survey of the Cimarron National Grassland vegetation will begin and will include a survey of non-native species and native increasers.
- Within 3 years, develop and implement cooperative noxious weeds and undesirable non-native or invasive species management plans in consultation with appropriate partners and agencies.
- Within 3 years, develop and implement a certified noxious weed-free forage program in consultation with appropriate state agencies.
- Within 5 years, limit further expansion of areas affected by noxious weeds.

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- Within 10 years, implement an integrated prevention and control management program for noxious weeds and undesirable non-native or invasive plant species.
- An ongoing, Grasslands-wide, GPS-based, invasive species inventory is maintained.
- A 50-year plan for prevention and minimization of invasive exotic vegetation within the Grasslands will be prepared within two years of implementation of this Grasslands Plan. Short-term projects and permits are integrated within the 50-year plan. The long-term invasive species plan for the Grasslands includes:
 - Identification and approximate prioritization of the conditions and major activities that cause or favor the introduction, establishment, and spread of invasive species
 - Options for ameliorating those conditions and altering those activities
 - Prioritization of intact ecosystems for protection from invasions
 - Plans for preservation or restoration of historical disturbance regimes
 - Priorities and plans for restoration of the native vegetation via seeding and planting, to increase resistance to invasion
 - A general plan for damaged biological soil crusts
 - Options for active vegetation treatments to reduce the abundance of invasive exotic species populations.
- Emphasize prevention of conditions favoring invasive plant introduction, establishment and spread in watershed analysis; travel management planning; fire management plans; emergency wildfire situation analysis; allotment management plans; annual operating instructions for livestock permittees, and other land management assessments.
- Through annual operating instructions and livestock allotment management plans, incorporate invasive plant prevention measures that help reduce conditions (e.g., bare ground) that favor the introduction, establishment and spread of invasive plants, and support cooperative management of invasive plants with the Grasslands Grazing Associations and Districts. Prevention practices may include, but are not limited to:
 - Managing livestock movement patterns to reduce ground disturbance and transport of invasive plant propagules (seeds, root fragments) from invaded areas to non-invaded areas
 - Altering season of use to improve native plant vigor and reduce conditions that favor invasive plants
 - Resting pastures to allow native plants to recover (passive restoration)
 - Retiring the allotment (eliminating livestock grazing) in areas of high populations of invasive plants, areas that are ecologically sensitive, and/or areas of unique ecological value
 - Actively restoring native plant communities by revegetating degraded areas.
- Prevent the introduction and spread of invasive and exotic species by off-road vehicles:
 - Close and decommission non-essential roads where evidence or roads analysis indicates that a particular route may be a high-risk vector for spread of invasive plants.
 - Prohibit recreational and other non-essential off-road motorized travel away from designated transportation system roads and designated ORV routes.

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- For off-road actions conducted or authorized by the Forest Service (including public works and service contracts), clean all off road vehicles before leaving the project site, when operating in areas where invasive plants are present at a level where transport of invasive plant seed or vegetative propagules (e.g., root fragments) is likely.
- A thorough Environmental Impact Statement must be undertaken for major invasive species eradication projects to assess benefits as well as potential harms to native wildlife, plants, and habitat and to develop effective mitigation measures to minimize harm to species that benefit from established noxious weeds.
- Minimize application of herbicides and prohibit broadcast spraying in riparian areas and in known aquatic and terrestrial amphibian habitat, including breeding, rearing, and overland dispersal areas. Avoid application of herbicides with adverse effects on aquatic species and amphibians. The Precautionary Principle should be applied to all herbicide proposals: USFS must determine based on best available science that an herbicide will pose no significant risk to the environment before approval.
- Design herbicide treatments to eliminate herbicide drift/adverse effects to threatened, endangered and sensitive species. Use site-specific project design (e.g., treatment method, buffers) to reduce the potential for adverse disturbance and/or contaminant exposure. The Precautionary Principle should be applied to all herbicide proposals: USFS must determine based on best available science that an herbicide will pose no significant risk to the environment before approval.
- Emphasize monitoring, learning, and adjusting management techniques in response to effectiveness of passive and active treatments in re-establishing native vegetation.
- When discussing plant diversity and vegetation trends, the distinction is drawn between native and non-native plants.
- Grass seeding must be done with grasses native to southeastern Colorado and southwestern Kansas.
- A Grassland-wide, GPS-based inventory is maintained of:
 - invasive species treatments
 - monitoring records of invasive species treatments
- The Forest Service prepares an invasive and exotic species control progress report every 3 years.

Guidelines

- ◆ Manage invasive plant species using integrated management techniques, including mechanical, chemical, prescribed fire, and biological control methods. Chemical and biological control are techniques of last resort; the Precautionary Principle should be applied to all herbicide and bio-control proposals: USFS must determine based on best available science that an herbicide will pose no significant risk to the environment before approval.

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- ◆ Attempt to prevent the spread of undesirable non-native, invasive, or noxious plant species to the Comanche and Cimarron, by including necessary provisions in contracts and permits designed to limit its lands and resources to exposure to these plants.
- ◆ No haying is or should be allowed on the Grasslands.
- ◆ Contain and control established undesirable non-native and invasive plant species and nonnative insect infestations based on the following:
 - ◇ Rate of species spread;
 - ◇ Invasions within special management areas, such as RNAs and Wildernesses, activity corridors, and high use areas;
 - ◇ Probability of successful treatment(s) in meeting desired conditions.
 - ◇ Once appropriate consultation with state agencies has taken place, allow only certified noxious weed seed-free products for recreational animal feed or revegetation projects. This includes use of certified hay or straw, and heat-treated, or other appropriately processed products.
- ◆ Utilize all methods feasible, including bison grazing strategies, in the integrated pest management program.
- ◆ Where technically and economically feasible, use genetically local (at the ecological subsection level) native plant species in revegetation efforts. To prevent soil erosion, non-native annuals or sterile perennial species may be used while native perennials are becoming established.
- ◆ Prevent introduction of exotic weeds into new areas by:
 - ◇ Avoiding new road and trail construction Grasslands-wide, to the extent feasible,
 - ◇ Avoiding ground-disturbing activities in remote uninfested areas.
 - ◇ Avoiding new uses in uninfested areas.
 - ◇ Restricting uses/prohibit modes of travel once first instance of infestation is found.
- ◆ Prevent spread of existing weeds by:
 - ◇ Planning travel management to minimize travel through known infested areas.
 - ◇ Implementing an aggressive education campaign for all users of the Grasslands.
 - ◇ Providing rules for grazing allotment permittees; oil, gas, and mining companies; and other Grassland permittees on minimizing spread of invasive and exotic species and enforcing these rules.
 - ◇ Closing areas to travel where control is not possible.
- ◆ Formulate an assessment and treatment plan as follows:
 - ◇ Identify the Grasslands' priority species and populations.
 - ◇ Identify the Grasslands' priority monitoring and treatment areas.
 - ◇ Create timetables for inventory and/or treatment of all roads on the Grassland units.
 - ◇ Unless otherwise negotiated, Levels 3, 4, and 5 roadways, and major system trails will be inventoried and treated on a three-year cycle. Level 1 and 2 roads will be on a five-year cycle. More frequent monitoring and treatment is needed;

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monitor, and treat if necessary, for weeds every year for at least three years after weeds are first found.

- ◇ Evaluate the adequacy of existing invasive species inventories.
 - ◇ Identify and establish at least one Coordinated Weed Management Area per Grassland annually with local partners.
 - ◇ Identify funding needed to implement the desired program of work and incorporate this need into program budget planning.
 - ◇ Schedule validation monitoring of the action plan and summary of past three years' activities.
- ◆ An active treatment project on any site larger than one acre cannot be undertaken without documentation identifying:
 - ◇ existing site condition
 - ◇ long-term vegetation goal
 - ◇ current site activities and conditions that may be favoring invasive plants
 - ◇ steps necessary to transition the site towards the goal
 - ◆ Only native seed and seedlings can be used in revegetation of invasive plant sites and burned areas unless native seeds/plants are not available. If native seeds/plants are not available, revegetation projects will rarely be undertaken until native plant seed or plants become available, except as an intermediate step to achieve native restoration, and only non-persistent, plants will be used.
 - ◆ Grassland users who report invasive species according to Forest Service guidelines on reporting must be provided with a response acknowledging the report and indicating what action, if any, is being taken by the Forest Service.

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RESPONSIBLE AND SUSTAINABLE RESOURCE USE

LIVESTOCK GRAZING

Large-scale cattle ranching dominated the Great Plains in the mid- to late-1800s, after the government cleared the entire region of its primary native ungulate and keystone species: the American bison. Recurring droughts, disease, and then competition with the farming homesteaders dethroned the Cattle Kings who were exiled onto remnant islands of their once expansive rangeland empires. But ranching made a resurgence in the Southern Prairie after the Dust Bowl wiped out the farms in the 1930s.

Agricultural production of crops or livestock has never reached economic or ecologic sustainability in the Southern Plains. Farming still exists on private lands around the Cimarron and Comanche, but it is largely dependent on the increasingly scarce waters of the Ogallala Aquifer and undependable stream systems. A low precipitation year can mean ruin, and this is especially true for the rancher. In 2002, during a cyclical drought period, the government opened up Conservation Reserve Program (CRP) lands to emergency livestock grazing and harvesting for livestock feed. Such emergency actions in the face of natural cyclic conditions call into question the sustainability of commercial livestock grazing in the Southern Plains.



Cattle on the Comanche. © Lauren McCain

The Grasslands can help bring about balance.

Existing Conditions

Livestock, particularly cattle, ranching remains the dominant use of the Comanche and Cimarron National Grasslands. It provides some social and private economic benefits and entails social, economic, and ecological costs, including foregone opportunities for native wildlife, fisheries, and wetlands and riparian functioning and recovery (Power 2004, Connelly, et al. 2000; Belsky, et al 1999; Fleischner 1994; Belsky and Blumenthal 1997). A particularly important problem is livestock destruction of riparian areas, including degradation of cottonwood galleries (Cheney et al. 1990; Bock et al. 1993; Clary and Medin 1990; Kauffman and Krueger 1984; Ohmart 1996; Samson et al. 1988; Schulz and Leininger 1990).

The 1984 Pike and San Isabel and Cimarron and Comanche Land and Resource Management Plan designated at least 80 percent of the Comanche and Cimarron federal land base as 6B, managed for intensive livestock grazing (USDA Forest Service 1984) [see Table below]. The Forest Service permits livestock grazing in areas designated for other management emphasis: 4B for wildlife, 9A for riparian protection, 10A for existing and potential Research Natural Areas,

and 10C for Special Interest Areas. Very few areas are off-limits to domestic livestock. Picketwire Canyon, the southern-most region of the Comanche's Timpas Unit, is the largest such area. The Canyon hosts a number of historic sites and the famed dinosaur tracks as well as sensitive riparian habitat. A short stretch of Timpas Creek is also closed to grazing.

Livestock grazing, though not the most important industry economically, may indeed define the cultural identity in the Comanche/Cimarron region. Large herds of cattle are an accepted and arguably welcomed part of the landscape for the proximal human community. While some corporate cattle operations utilize the Grasslands, most livestock ranchers that lease Cimarron and Comanche allotments live in and around the community and run cattle on their own private properties as well as the public pastures. With low and declining public lands grazing fees and government subsidized control of wildlife many ranchers consider pests, allotment lessees have a strong incentive to maximize grazing opportunities by pushing for longer seasons and larger numbers of cattle, measured in Animal Unit Months (AUMs), allowed on the Grasslands. Grazing on the public Grasslands is just a lot cheaper than on private lands.

Despite strong support for ranching in the local community, the Forest Service must come to terms with the fact that 60+ years of intensive commercial livestock grazing has, on the whole, been detrimental to Cimarron and Comanche ecosystems, flora, and fauna. Unlike many areas of the interior West, the Great Plains did evolve with bison and large herds of elk and pronghorn. Prairie plants adapted to large ungulate grazing. Grazing by native species kept the natural vegetative composition in balance. A synergistic relationship between bison and prairie dogs—both keystone species—maintained grassland biodiversity in the Southern Plains (Lott 2002). Bison prefer grazing on prairie dog colonies (as do cattle). Prairie dog burrowing aerates and mixes nutrients into the soil and their eating and clipping down vegetation stimulates plant re-growth, resulting in vegetation that is more nutritious and succulent than off colony vegetation. Bison in turn keep vegetation low on and around colonies allowing prairie dogs to expand more easily than on ungrazed areas.

Livestock grazing advocates claim that cattle and bison are interchangeable and serve equivalent ecological functions. But bovine are not bison. The replacement of the native ungulates with these “invasive” species in the 1800s initiated a long-term trend in decline for Southern Plains ecosystems. Though less destructive than farming for this arid region, livestock grazing has impeded the full recovery of native prairie habitat since the Dust Bowl. Bison and cattle differ in the following ways:

- Bison spend little time in fragile riparian areas, while cattle degrade such areas by defecating and loitering in streams and destroying streambanks, which causes erosion and stream disappearance.
- Cattle dependence on water results in destroyed riparian areas, water developments, and groundwater pumping.
- Bison behavior creates a vegetation mosaic across the landscape. In particular, bison wallows provide a refuge for specialized prairie flora. We can't say the same for cattle.
- When free-roaming, bison don't return to grazed areas until the vegetation is rejuvenated, while cattle are more stationary.
- Cattle seek refuge from the sun and snow by seeking woody draws and other shelter, while bison are more adapted for inclement prairie weather.
- Cattle overgrazing has been linked with brush encroachment in the southern plains, while bison roaming and grazing patterns are a natural part of prairie ecology.

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- Making the range safe for cattle has entailed the stringing of barbed wire across the landscape, which obstructs wildlife migration and causes direct mortality to wild animals.
- Rangeland management for cattle continues to involve the ruthless extermination of any wildlife seen as a predator of cows or a competitor for forage.
(Lott 2002; Callenbach 1996).

Some grassland ecosystems require grazing by large ungulates. Optimally, bison would be restored to the Comanche and Cimarron and replace cattle. The Forest Service could and should use the opportunity presented by the management plan revision to move toward restoring bison to the Grasslands. However, a wholesale exchange of cattle for bison is currently not socially, politically, or economically feasible, nor is it practical in the near-term. Proposing to eliminate cattle grazing would lead to outright revolt among current allotment lessees and grazing does benefit some shortgrass prairie species. Thus, commercial livestock grazing is likely to continue on the Grasslands for quite some time.

The best available data on ecosystem conditions make it clear, however, that livestock grazing must be reduced in most areas and eliminated in other parts of both the Cimarron and the Comanche. On the Campo Grazing District within the Comanche, 31 of 71 (44%) grazing allotments demonstrated poor upland vegetation conditions in need of improvement. Thirty-seven of 51 allotments (69%) within the Pritchett Grazing District need improvement. Fourteen Pritchett allotments and 20 in Campo exhibited poor soil health and erosion (EAs). The Timpas, Kim, and Cimarron Environmental Assessments do not include allotment-specific data on landscape conditions. The Timpas Grazing District Allotment Management Plan shows 19 of 23 allotments with ecological problems associated with livestock grazing (Timpas EA). Range condition assessments for the Cimarron and Comanche reported in the Vegetation/Ecology Specialist Report are less than desirable. In the Cimarron: 53 percent of the shortgrass ecosystem vegetation is in fair to very poor condition, 73 percent of the Cimarron River Corridor is in fair to very poor condition, and 92 percent is fair to very poor in sandsage areas (U.S. Department of Agriculture, Forest Service. 1998, 2002a, 2002b, 2004a, 2004b). (See table below.)

Vegetation Conditions on the Comanche National Grassland

CIMARRON	VERY POOR	POOR	FAIR	GOOD	EXCELLENT	UNRATED
Shortgrass	9%	21%	23%	34%	10%	3%
Sandsage	50%	27%	15.5%	2%	1.5%	4%
Cimarron Corridor	16.5%	34%	22.5%	3%	0	24%

Data from Cimarron and Comanche Vegetation/Ecology Specialist Report

A comparison of watershed conditions between 1997 and 2002 indicates no change in condition. All Grassland watersheds remained moderately impacted to severely degraded; none are in pristine condition (PSICC 2004 Monitoring Report).

The only conclusion one can come to from these data is that livestock management on the Cimarron and Comanche Grasslands needs a significant overhaul.

Desired Conditions

Because so much of the land surrounding the Grasslands is private and devoted to livestock production and farming, the Grasslands become places where wildlife and habitat restoration and protection is emphasized over livestock management.

The goal of restoring the Grasslands to achieve healthy habitat for native species and fully functioning ecosystems dictates the timing, duration, and intensity of livestock grazing on the Grasslands.

Grassland grazing allotment and pasture fences are removed to open up large areas of unencumbered prairie.

Grazing management on the Grasslands allows natural disturbance systems, soils, vegetation, aquatic and riparian areas, and wildlife species to continue recovering from the devastation of earlier intensive agricultural practices.

Livestock management practices promote vegetational heterogeneity, natural patterns of native plants, and a mosaic of plant successional stages to maximize native floral and faunal diversity across all Grassland habitat types.

Protecting scarce natural water sources and riparian areas, including playas, wetlands, and streams, from cattle trampling and overgrazing revitalizes and stabilizes riparian habitat, which sustains water resources for wildlife and human use.

Wild bison eventually replace domestic livestock as the predominant grazing ungulate on the Grasslands.

Considering the economic needs and cultural background of the local community, the Forest Service has garnered support from grazing allotment lessees and community members for an incremental approach to significantly reduce livestock grazing on the Grasslands. A transition plan includes forward-thinking ways to ease potential disruptions to the local economy and individual ranchers, including grazing permit buyouts.

Objectives

- Grassland vegetation conditions on all habitats improves through adaptive management practices that include limiting and adjusting grazing seasons, duration, intensity, frequency of use; providing for adequate rest; and actively restoring degraded areas.
- Grassland streams, springs, playas, wetlands, and ponds are fenced to prevent livestock from grazing in these sensitive areas enabling restoration of the seriously degraded riparian habitat of the Grasslands. A buffer of 150 feet is established between the edge of riparian habitat and enclosure fences. Enclosures must be diligently monitored by Forest Service personnel to prevent cattle from breaching fences. Fences must be

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designed to enable wildlife access to riparian areas; the lower fence strand must be smooth wire, for example, to enable safe passage by pronghorn.

- Excluding livestock from key recreation areas, including parts of Vogel Canyon, Picture Canyon, Sand and Holt Canyons, Carrizo Creek, and Point of Rocks increases safety and enhances the visitor experience.
- Careful monitoring of species of concern, sensitive, and declining species that are sensitive to livestock grazing impacts and necessary adjustments in grazing management help increase and stabilize wildlife populations. Such species include but are not limited to lesser prairie-chickens, Cassin's sparrows, ferruginous hawks, long-billed curlew, Bullock's oriole, loggerhead shrike, and native fishes.
- Public outreach programs increase tolerance for native wildlife species including pronghorn, elk, prairie dogs, coyotes, rattlesnakes, and other predators that are believed to harm livestock or compete with livestock for forage.
- Livestock is excluded from areas with populations of sensitive plant species, including plant species of concern such as Colorado frasera and Andian prairie clover.
- Livestock must be removed from allotments where soils are degraded and/or compacted until healthy soil is restored.
- Management practices provide periodic rest or deferment from grazing during critical growth periods to allow adequate recovery and regrowth of vegetation, and to provide opportunities for seed dissemination and seedling establishment.
- Eliminate livestock grazing in unsuitable locations including:
 - Riparian lands (need 150 foot buffer on each side of a water body, playa, seep, spring, or water course);
 - Areas where Threatened, Endangered or Sensitive species have failed to make a full recovery;
 - Habitat for, or conditions for, species of special concern or interest that is not meeting the reproductive, structural or functional needs of that species;
 - Administrative sites, developed recreation sites, livestock exclosures, Research Natural Areas, and some special interest areas;
 - Historic sites that would be impacted by livestock grazing;
 - Key grassland bird nesting habitat; and,
 - Potential nesting and brood-rearing habitat for lesser prairie-chicken.
- Grazing management techniques inhibit prolonged concentration of livestock in one area and thus prevent soil compaction, riparian area damage, and overgrazing.
- When grazing permits are renewed, the Forest Service will prepare an Environmental Impact Statement that bases grazing stocking levels, seasons of use and management practices on an ecologically based range capacity analysis.
- Achieve and maintain the potential natural community of vegetation (the composition and structure of vegetation that would likely exist in the absence of intensive and persistent human activity).

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- Set AUM quotas to achieve vegetation mosaic. Eliminate or significantly reduce grazing in regions used by species that prefer taller vegetative structure, such as Cassin's sparrows (a proposed species of concern). Maintain some grazing in areas known to be used by prairie dogs and mountain plovers, who prefer true shortgrass prairie. Species such as long-billed curlews and loggerhead shrikes benefit from a mix of short structure and taller structure vegetation for nesting and foraging.
- Implement livestock grazing systems that provide a mosaic of cover types that meet the habitat needs of the lesser prairie-chicken (a proposed species of concern and ESA candidate).
- Promote taller and denser cover consisting of sand sagebrush and grasses on areas determined as potential nesting habitat for the lesser prairie-chicken.
- Meet residual cover requirements on all areas determined to provide nesting habitat, as measured with the Robel pole, after the growing season and prior to nest initiation in the spring.
- Promote areas of early successional plants, such as perennial and annual forbs, with some bare ground exposed for brood rearing habitat.
- Promote areas of short grasses, such as blue grama and buffalo grass, for lek habitat.
- Allow bison grazing on the Grasslands.
- The Forest Service will arrange public meetings and yearly range readiness tours to visit critical allotments before, during and after the grazing season.
- Allotment management plans and term grazing permits will be completed in a public process that includes an environmental impact statement.
- To assist monitoring efforts and public oversight, develop allotment maps that indicate: home ranges of endangered, threatened, candidate, sensitive, Management Indicator, Concern, and Interest species; fences, wells, and other livestock developments; livestock exclosures; and trend monitoring locations.
- The Forest Service will collect and assess grazing allotment monitoring data in set 3-5 year rotational intervals on permanent, representative trend transects to determine allotment trends of: upland and riparian plant communities based on the proportion of plant species present and including but not limited to measures of ground cover, canopy cover and production of vegetation species, bare ground, rock, crust, and litter; riparian area condition of streams, seeps, springs, playas and wetlands; and soil bulk density. Evaluation of trend in condition (excellent, good, fair, poor) and direction of change (upward, static or downward) will be made following each measurement period and livestock grazing management will be adjusted to accelerate restoration of riparian areas in fair condition or downward direction including long-term rest if needed to initiate recovery. A serious conflict exists if trends are not upward for lands in poor or fair condition based on multiple years' comparison of data.

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- Monitoring criteria that measure biodiversity and native ecosystem trends are used in place of traditional rangeland measures that assess conditions with reference to livestock and not native biological communities.
- Monitoring strategies are quantitative, representative, timely, capable of independent verification, and result in accurate documentation of Grassland conditions in order to manage livestock grazing in a sustainable manner, provide for restoration, change management proactively to prevent degradation and reduce or eliminate conflicts with other uses and values.
- To ensure compliance with management practices generally, the Forest Service will employ a monitoring system such as suggested in the Forest Service Rangeland Analysis and Management Training Guide. Specifically the Forest Service should implement riparian area monitoring methods as discussed in Methods for Evaluating Riparian Habitats with Applications to Management (GTR INT-221). The Forest Service will encourage use of established photo points.
- An established Drought Contingency Plan enables the Forest Service to react quickly and make modifications to grazing management in the event of sustained periods of limited precipitation.

Guidelines

- ◆ During periods of drought, stocking rates must be decreased to preserve forage for wildlife species, such as pronghorn and other grazers.
- ◆ Prioritize and remove any fences or water developments that are not contributing to achieving desired conditions.
- ◆ Livestock must be removed from allotments where vegetation is in less than good condition until healthy native vegetation has been restored.
- ◆ Management emphasis is on improving soil, riparian and upland vegetation conditions. Active management and well-planned rotational systems are required to prevent resource damage and maintain sustainable range conditions.
- ◆ Range improvement projects will be designed consistent with overall ecological functions and processes. Natural occurrences such as fire, drought and flooding, and prescribed land treatments will be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape. This will provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors that maximize wildlife habitat connectivity.
- ◆ Grazing practices do not introduce or advance the spread of noxious weeds and other invasive species.
- ◆ Adjust livestock management activities annually as needed to take into account the effect of natural processes, such as droughts, fires, floods, and grasshoppers on forage availability.

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- ◆ Allotments should be rested from grazing when
 - ◇ higher vegetative structure is required for plant and animal communities and/or reproductive success of Management Indicator Species, Species of Concern or Interest, and threatened, endangered, and sensitive species,
 - ◇ increased fuel loads are desired for prescribed burning,
 - ◇ rest is required for vegetative recovery after wildfire or prescribed burns,
 - ◇ ungrazed areas are desired for monitoring vegetation structure,
 - ◇ ungrazed areas are desired for research needs, and
 - ◇ ungrazed areas are desired for biological diversity.
- ◆ Where livestock grazing is found to be leading to unsatisfactory ecological conditions, livestock grazing is changed, in order to restore such grassland values as native plant community structure and function, native wildlife habitat, appropriate infiltration and water storage of soils, or soil stability.
- ◆ Prohibit feed storage and regular and routine feeding of domestic livestock on National Grasslands.
- ◆ Management practices promote plant health by providing periodic rest or deferment from grazing during critical growth periods to allow adequate recovery and regrowth of vegetation and to provide opportunities for seed dissemination and seedling establishment.
- ◆ Sensitive areas or areas experiencing historic overuse and associated plant community impairment should be placed into total non-use and/or permanently retired.
- ◆ The Forest Service will enforce existing standards that are adequate to protect and restore rangeland. Grazing management practices must maintain sufficient residual vegetation on both upland and riparian sites to protect soil from wind and water erosion, and to buffer temperature extremes.
- ◆ Design and implement livestock grazing systems that provide grasses and shrubs adequate rest during the growing season for the health and recruitment of native plant species.
- ◆ Incorporate stubble heights as utilization guides in riparian areas, in areas around playa lakes and in key allotment areas identified in the Allotment Management Plans, to benefit grassland wildlife species.
- ◆ Manage livestock grazing by adjusting timing and duration within each unit to avoid overgrazing of plants and to avoid grazing the same unit during the same time every year. Rotation from one unit to the next will be based on proper use. Units will be cleared of livestock within three days of the agreed date for leaving the unit.
- ◆ Prevent livestock and wildlife grazing which reduces the percent of plant cover to less than the amount needed for watershed protection and plant health.
- ◆ Prohibit placement of salt within 1/4 mile of riparian areas.

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- ◆ Seed disturbed soil areas that result from the construction of range improvements.
- ◆ Structural and nonstructural improvements benefit, or at least do not adversely affect wildlife.
- ◆ Conflicts between livestock and wildlife are resolved in favor of wildlife. Conflicts between livestock and native plants are resolved in favor of native plants.
- ◆ Enforce fencing standards that require smooth bottom wire that is 18" above ground and a top strand that is no higher than 42".
- ◆ Follow all of the management requirements related to threatened, endangered and sensitive species.
- ◆ Protect trees that are currently being used for nesting by ferruginous hawks and other raptors and shrikes from cattle rubbing and trampling,.
- ◆ Plant new trees, in protective exclosures, for potential nesting trees for ferruginous hawks and other raptors and shrikes, in areas where deciduous trees have been destroyed.
- ◆ Construct artificial nesting platforms for ferruginous hawks, in areas where long standing nests have been lost.
- ◆ Limit or prohibit activities such as road building, mineral extraction, range improvement construction, recreation facility construction and prescribed burning, within 1/2 mile of ferruginous hawk nests, during nest building, egg laying and the incubation period, 3/1 to 6/30 (these dates may change with climate change).
- ◆ Manage prairie dog colonies to benefit other species associated with the colonies.
- ◆ Implement grazing systems that produce low vertical cover components on suitable, flat topography for swift fox, mountain plover and long-billed curlew.
- ◆ Use prescribed fire combined with livestock grazing to maintain suitable habitat for swift fox, mountain plover and long-billed curlew.
- ◆ Avoid season-long grazing in riparian areas to maintain suitable habitat for riparian dependent species.
- ◆ Prohibit placement of salt within 1/4 mile of known populations of Colorado green gentian and dwarf milkweed.
- ◆ Avoid all populations of Colorado green gentian and dwarf milkweed when conducting ground disturbing projects.
- ◆ Make any necessary management changes to benefit Colorado green gentian and dwarf milkweed populations as a result of new information gained through monitoring.

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- ◆ Grazing management will occur in a manner that does not encourage establishment or spread of noxious weeds.
- ◆ Use certified weed-free hay for all grazing operations to prevent noxious weed infestation.
- ◆ Use only certified noxious weed-free hay or straw in association with projects on the Comanche and Cimarron Grasslands.
- ◆ No seeding of non-native forage species is allowed.
- ◆ Nonstructural restoration and forage improvement practices available are seeding, planting, burning, fertilizing, crushing and plowing.
- ◆ Burned sites are rested from grazing until vegetation has attained good condition.
- ◆ Vegetation on burned sites is monitored until forage has attained suitable use status.
- ◆ Livestock cannot enter a pasture until fences and other livestock developments are in functioning condition.
- ◆ Rehabilitate disturbed areas that are contributing sediment directly to intermittent or perennial streams or wetlands..
- ◆ The Forest Service will encourage public participation in Grassland Plan-level grazing decisions, allotment management planning, and yearly-grazing planning. The Forest Service will encourage relationships between permittees and interested parties to enhance local cooperation. Permittees and interested parties can benefit from agency-sponsored range ecology and livestock grazing management and training sessions.
- ◆ Conduct monitoring to determine if mitigation measures, standards and management practices are moving allotments toward the desired condition.
- ◆ Livestock cannot remain on a pasture after any of the pasture standards in livestock objectives have been exceeded.

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OIL & GAS

Existing Conditions

Oil and Gas. The Cimarron National Grassland has high potential for the occurrence of oil and gas and currently has 436 active oil and gas facilities. 61% of the Cimarron is currently under federal mineral lease, with the remainder under private lease. Since 1990, an average of nine new wells have been drilled annually, with a similar number of wells plugged and abandoned each year. The eastern one-fourth of the Carrizo Unit of the Comanche National Grassland contains the Campo Oil Field, which currently has 33 active oil and gas facilities, and a total of 74 (inactive and active) wells. However, only six wells have been drilled in the past decade and the Campo Oil Field appears to be near the end of its productive life. The remainder of the Carrizo and all of the Timpas Unit have low potential for fluid minerals. There are approximately 500 miles of buried oil and gas and associated water pipelines under the Comanche and Cimarron. Some of these pipelines are abandoned in place.

Wind Energy. In 2003, two large wind energy sites were constructed on private lands adjacent to the Grasslands; one in southwest Kansas, and another in southeast Colorado. Another site southwest of Springfield, Colorado has the potential to be developed for wind energy and this would include a portion of the Carrizo Unit.

Common Variety Minerals. Both the Cimarron and Comanche have low to moderate potential for common variety minerals, including sand, gravel, caliche, and building stone. Several sand and gravel pits are located on the Grasslands. Six gravel pits are located on the Cimarron, and five of these are less than 1 mile from the Cimarron River. There are ten gravel pits on the Comanche.

Harms from energy and minerals extraction. These uses can result in significant threats to native wildlife, plants, and ecosystems, including:

- Harm to native wildlife and plants due to habitat degradation and loss;
- Increased human disturbance, including higher volumes of vehicular traffic, resulting in increased threats from road mortality, air pollution, and shooting of wildlife;
- Noise from pumpjacks, gas compressors, wind turbines, transmission lines, and vehicular traffic;
- Degradation of plant communities, including proliferation of noxious weed with increased disturbance from roads, wellpads, wind-tower pads, pipelines, seismic exploration, gravel pits and open wastewater pits;
- Increased erosion and sedimentation and consequent adverse impacts on native animal species;
- Contamination of water, soil, and natural habitat via saltwater, toxics, and oil spills;
- Heightened bird mortality with unmitigated wind turbines and powerlines; and
- Cumulative environmental impacts resulting from harms from energy development and minerals extraction, alongside livestock grazing, off-road vehicle use, and other harmful activities.

One species that has suffered greatly from oil and gas development is the lesser prairie-chicken. On the Cimarron, researchers have documented avoidance by lesser prairie-chickens of oil and gas structures and potential disturbance from noise generated by oil and gas

machinery (Elson 2000; Pittman 2003). Yet, recent lease sales by the U.S. Bureau of Land Management have included parcels on the Cimarron with potential lesser prairie-chicken habitat.⁸ A 2003 doctoral dissertation also documented lesser prairie-chicken avoidance of human activity and structures and suggested that, “Future impact assessments and conservation plans should consider the construction or presence of anthropogenic features as a potential detriment to habitat suitability for lesser prairie-chickens.” That study reported that the majority of mortality was due to predation (which is exacerbated by habitat degradation), powerline collisions, and hunting (Hagen 2003).

In southwestern Kansas outside of the Cimarron, Robel et al. documented anthropogenic features on the landscape reducing nesting habitat quality for lesser prairie-chickens in the sand sagebrush ecosystem on which they depend. Gas compressors, center-pivot irrigation systems, pumpjacks, vehicular traffic, power plants, and electric transmission lines all caused movement and noise that can disturb prairie-chickens. Gas compressors could be heard two miles away from the source. Out of a total of 214,183 acres of sand sagebrush in their study area, the habitat impacted by oil and gas wellheads doubled between 1973 and 2001, from 8,564 acres to 17,562 acres. Roads impacted some 40,000 acres of sand sagebrush in 2001. Buildings (including gas compressor stations) impacted 15,774 acres in 2001. Electric transmission lines caused impacted another 16,803 acres of sand sagebrush. Combining these impacts with those of center-pivot irrigation, lesser prairie-chickens would be expected to avoid some 58% of remaining sand sagebrush habitat.



Male lesser prairie-chickens competing in mating ritual. © Jess Alford.

Because of the importance of nest success to lesser prairie-chicken population viability, the authors state that, “any negative impacts of anthropogenic features on nesting of lesser prairie-chickens is of great concern” (Robel et al. at p. 6). Robel et al. (at p. 8) therefore recommend that “The avoidance buffers around oil and oil/gas wellheads, electric transmission lines, and buildings must be recognized and integrated into environmental assessments of the development of petroleum resources and the construction of industrial wind energy facilities.”

Jensen et al. (2000) note the need to restore sand sagebrush in Kansas to benefit lesser prairie-chickens. Walker (2000) similarly recommends conservation of sand sagebrush in Kansas to facilitate prairie chicken recovery, warning against the destruction or overgrazing of this habitat.

Another threat to lesser prairie-chickens in Kansas and other states is loss of habitat and disturbance due to wind farms. Indeed, the Service recommended in 2003 that wind turbines not be placed within 5 miles of known prairie grouse leks. The Service also recommended avoiding placement of turbines in native grassland habitat so as to protect grassland songbirds (Manville 2004). Because grassland songbirds are the most rapidly declining guild of birds in North

⁸Lease Sale Notices are viewable at www.nm.blm.gov. Forest Guardians has protested the lease of these parcels, due to the perils oil and gas development presents to lesser prairie-chickens.

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America (Sauer et al. 2005), avoidance of their habitat – by either wind turbines or oil and gas facilities – is imperative. In addition, wind turbines can cause significant mortality to raptors, grassland birds, and bats (BLM 2005). Mitigations are imperative.

Black-tailed prairie dogs may suffer increased shooting as a result of increased human presence related to energy and minerals extraction. As discussed in the Recreation Section, prairie dog shooting harms prairie dog populations, along with wildlife dependent on prairie dogs and their towns, such as mountain plover, burrowing owl, swift fox, ferruginous hawks, pronghorn, and many others.

Native ungulates, such as pronghorn, elk, and mule deer, have also suffered declines due to energy development. These impacts are caused both by habitat degradation and loss and ungulate avoidance of disturbed habitat and human activity. In the Pinedale Anticline area in Wyoming, researchers have documented negative impacts to mule deer from oil field development. Sawyer et al. (2005) found that deer selected areas farther from wellpads in the course of field development, and that deer use was lower within 2.7 to 3.7 km of wellpads, suggesting indirect habitat losses significantly greater than direct habitat loss (e.g., the physical footprint of a wellpad). In addition, these authors cautioned that seasonal restrictions on energy activity may not be enough to compensate for disturbance. Rather, they suggested directional drilling and other strategies to reduce habitat loss.

In an open desert environment in Wyoming, Sawyer and Nielson (2005) discussed likely impacts to elk from increased human activity such as energy development given elk avoidance of roads and human activity. They predicted changes to elk distribution and habitat use from increased road density and traffic and suggested restrictions on vehicular access in order to protect elk and their habitat.

Similarly, the New Mexico Department of Game and Fish (NMDGF) has documented mule deer and elk decline in the northwest New Mexico, within the San Juan basin. In 1999, the agency documented 987 elk and 1,519 deer, contrasted with only 119 elk and 691 deer in 2004 and 2005. These are declines on the order of 88% and 55%, respectively. An NMDGF official reported that oil and gas development definitely factored in the population decline (Clarren 2006).

The most common native ungulate in the Comanche and Cimarron is the pronghorn. But census counts in the late 1990s indicated fewer than 700,000 pronghorn across North America, down from one million in the mid-1980s (Yoakum et al. 1999). There are certainly a variety of factors contributing to this decline, including livestock grazing, fire suppression, fencing, and roads. Energy development should be considered part of the cumulative threats harming this species.

Energy and minerals development also degrades scenic and recreational values on the grasslands. This type of land use is not compatible with special areas on the grasslands. While the view from Point of Rocks



Gas Pipeline north of Mesa de Maya, on the western Carrizo Unit of the Comanche.

on the Cimarron is fantastic, it is marred by several pumpjacks and pads. A gas pipeline just north of Mesa de Maya similarly degrades the scenic value of that area. As of March 2006, it was entirely denuded of vegetation and will undoubtedly provide a seedbed for cheatgrass proliferation and other noxious weeds in the coming growing season. Herbicides used to treat this type of situation bring with them their own slew of environmental harms (Freilich et al. 2003).

A gas pipeline also runs across the western end of the Bent Canyon Bluffs and non-native plants have been documented by USFS in that area. Both Mesa de Maya and Bent Canyon Bluffs have been recommended by USFS for Special Area designations, yet they are being degraded by oil and gas operations. In addition, several oil wells and energy pipelines are in cross proximity or intersect with the Santa Fe National Historic Trails, one of the premier recreation draws to the Cimarron and Comanche.

In the 1992 Oil and Gas Amendment to the 1984 PSICC plan, USFS discussed the incompatibility of oil and gas with the Picture Canyon, Vogel Canyon, Campo Research Natural Area, and the Carrizo Fradera areas (O.U. Creek). Yet, in the 2005 Draft Comanche & Cimarron plan, USFS describes all of these areas (except the Campo RNA, which is not included in the 2005 plan as a special area) as suitable for oil and gas development.⁹ The 2005 Draft Plan thus constitutes a setback in protection for the values on these special areas from the harms caused by energy development.

Additionally, over 70% of the Cimarron River corridor was leased for oil and gas at the time of the 1992 Oil and Gas Amendment. While USFS maintained that further leasing would not reduce the river's eligibility for Wild & Scenic Rivers designation as a recreation segment,¹⁰ oil and gas development certainly degrades its value for recreational use.

The 1992 Oil and Gas Amendment describes the following conditions under which the Forest Plan provides for a No Surface Occupancy (NSO) stipulation:

- 1) Slopes steeper than 60%.
- 2) High erosion hazard rating.
- 3) High geologic hazard rating.
- 4) Low visual absorption capacity that prevents reclamation to the established visual quality objective.
- 5) A conclusion that the action will jeopardize the survival or recovery of federally listed threatened or endangered wildlife or plant species.
- 6) Intrusion on the critical or essential habitat of a federally listed T&E wildlife or plant species or upon the plant or animal itself.
- 7) Intrusion upon the habitat of an individual plant or animal species listed by a State as threatened or endangered.¹¹

These conditions for an NSO will be presumably carried over to the Comanche & Cimarron Grasslands plan, given that USFS stated in the 2005 Draft Plan that energy development would continue to be managed in accordance with the 1992 Amendment.¹² Stipulations in the 1992 Amendment included: a timing restriction from December 1 to April 15 on the Comanche to protect 75,000 acres that are important habitat for native ungulates and turkey; a controlled

⁹See Draft Plan at Table 2-13.

¹⁰See PSICC ROD for 1992 Oil and Gas Amendment at p. 11.

¹¹*Id* at p. 30.

¹²2005 Draft Plan at p. 42.

surface occupancy stipulation to protect nearly 50,000 acres on the grasslands for scenic values.

However, significant new information obtained since the 1992 Amendment should compel USFS to increase protections for special status species from energy development. For example, since 1992, the black-tailed prairie dog was petitioned for Endangered Species Act (ESA) listing, and designated a candidate for listing for four years; the lesser prairie-chicken has now been a candidate for listing for eight years; pronghorn survey data indicates significant declines; the Arkansas River shiner was listed under the ESA in 1998; and wind energy development research has revealed the need for mitigations to avoid significant harms from this land use to native species.

Desired Conditions

Production will end on the Campo Oil Field on the Carrizo Unit of the Comanche.

Wellpad twinning and direction drilling technologies will be employed on the Cimarron, therefore minimizing new disturbance.

Reclamation of abandoned wellpads will result in restoration of native plant and faunal communities.

A significant portion of roads associated with oil and gas extraction will be closed and reclaimed.

Energy and minerals development will not harm groundwater or surface water resources or contaminate soils.

Oil and gas facilities will be removed from areas where they are harming species of concern, including, but not limited to lesser prairie-chickens, black-tailed prairie dogs, and mountain plovers.

The Grasslands will allow wind energy development only after insuring adequate mitigations to protect birds, bats, and other wildlife from collision hazards and habitat disturbance.

Monitoring Questions

1. Is reclamation of wellpads and other energy infrastructure resulting in restoration of native plant communities?
2. Is new disturbance causing proliferation of noxious weeds? What are impacts to native wildlife and plants of herbicides used to treat these weeds?
3. Is reclaimed acreage lower or higher than newly disturbed acreage?
4. Are wildlife, especially special status species, using reclaimed areas to a similar extent as undisturbed areas?

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5. How much wildlife mortality is occurring due to collisions with vehicles employed for energy and minerals extraction? collisions with wind turbines? being trapped or drowned in wastewater pits? shooting of wildlife by employees of energy and minerals industries?
6. Are oil and gas producing areas meeting air and water quality standards?
7. Are users complaining about impact of oil and gas on other uses, especially recreation and scenic values?
8. What impacts are energy and minerals extraction having on special areas?
9. What impacts are energy and minerals extraction having on special status species and ecosystems?

Objectives

- Execute an energy and minerals extraction policy which minimizes impacts on native wildlife, plants, and ecosystems.
- Balance the energy and minerals program with other important uses of the grasslands, including biodiversity and recreation.
- Obtain a grasslands-wide reduction of new acreage disturbance from energy and minerals activities.
- Avoid new disturbance in order to avoid noxious weed proliferation and habitat loss for wildlife.
- Develop a collaborative strategy in conjunction with Southern Plains Grassland managers, state land managers, state wildlife agencies, interested conservation organizations, and supportive landowners for promoting balance between energy and other uses of the Grasslands.

Guidelines

- ◆ Protection of special areas and special status species habitats with No Surface Occupancy stipulations.
- ◆ Prevent any disturbance of riparian areas, including increased sedimentation, from energy and minerals extraction.
- ◆ Any fluid mineral leasing will fully examine the impacts to special status species and harms to soil, water, and other environmental concerns in a full NEPA analysis prior to leasing.
- ◆ Any approvals of new wells, wind turbines, or common variety minerals extraction will fully consider environmental impacts prior to approval.

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- ◆ Ensure emissions from energy and minerals development do not contribute to lower air quality.
- ◆ Ensure disturbance related to energy and minerals extraction is not located in areas of potential or occupied habitat for special status plants.
- ◆ Ensure disturbance related to energy and minerals extraction does not occur during time periods which could harm ground-nesting birds (March 15 to June 15 or later).
- ◆ Ensure disturbance related to energy and minerals extraction does not occur when the ground is wet, in order to avoid rutting and other long-term damage.
- ◆ Ensure disturbance related to energy and minerals extraction does not occur within 1 mile of an active swift fox den.
- ◆ Do not allow ground-disturbing activities within 0.5 miles of active nests of mountain plover or within 1 mile from active ferruginous hawk nests.
- ◆ Do not allow ground-disturbing activities within 5.0 miles of active or historic lesser prairie-chicken lek sites from March 15 to July 15. Do not allow new structures to be erected within 5.0 miles of historic lesser prairie-chicken lek sites.
- ◆ Do not allow disturbance related to energy and minerals extraction to harm native ungulates or their over-wintering or calving habitat.
- ◆ Conduct all energy and minerals development activities in such a manner as to comply with all applicable federal, state, and local air-quality standards and regulations.

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**ECONOMICALLY VIBRANT,
ECOLOGICALLY SENSITIVE RECREATION**

The Grasslands provide much needed open space, solitude, and a wide variety of recreational activities. The increasing public interest in recreation on the Grasslands provides opportunities for economic growth and diversity for the local community. The Forest Service has an opportunity on the Cimarron and Comanche National Grasslands to develop comprehensive recreation plans that provide for public use while maintaining protection for the land.

Recreation has an important role in determining landscape condition since it is a factor determining how, when, and where people access public lands. Recreational experiences are diminished as landscape health declines, and the Forest Service should restrict oil and gas, livestock grazing, and other extractive uses on the grasslands in order to provide the opportunity for recreation. However, the Forest Service must also ensure that recreation does not have significant adverse impacts on wildlife and biodiversity. In addition, the agency should reverse ecological degradation of areas of the Grasslands that have sustained and continue to sustain excessive recreational use. In order to protect and enhance healthy biodiverse habitats, the Forest Service must adopt policies that prevent new areas from becoming similarly impacted.

In the planning process, the Forest Service's task is to ensure that recreational uses, in concert with other land uses, do not impair landscape health. The agency should provide a wide spectrum of opportunities within this broader mandate, and at no point should the agency sacrifice the goal of landscape sustainability to provide additional recreational opportunities. In addition, the Forest Service should take feasible steps to prevent harm to private landowners and the environment from littering, vandalism, and trespass by recreators.

Recreational opportunities are heavily influenced by the Forest Service's management of wildlife and plants, historical and paleontological resources, special areas, and scenic beauty. While these dimensions are mentioned in this section, complete descriptions of our recommendations for management of these values is provided in other sections of this *Sustainable Use Conservation Alternative*.

Existing Conditions

Compared with the Forest units of the Pike and San Isabel and Cimarron and Comanche Forest System, the Grasslands receive far fewer visitors. However, recreational use has increased over the past two decades on the Comanche. The Cimarron, as the largest unit of public land in Kansas, accounts for more Trout Stamp sales and has more fishing days per acre than any other area in the state. The Grasslands are also nationally recognized for their paleontological, historical, and cultural values. The Cimarron contains the longest Santa Fe Trail segment on public land (the 24 mile-long Cimarron Branch), and the Comanche contains the largest assemblage of dinosaur tracks known to North America.

In this table, we describe key recreational features on the Grasslands, threats to those features, and recommendations for protection.

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Recreation on the Comanche National Grasslands¹

Recreation type	Description	Ecological sustainability issues	Economic vitality issues	Recommendations
Developed recreation	<ul style="list-style-type: none"> •12 Picnic Areas (Carrizo, Picture Canyon, Timpas, and Vogel Canyon) •Five trailheads (Carrizo, Picture Canyon, Timpas, Vogel, Withers Canyon) •One wildlife viewing area (Lesser Prairie Chicken observation site) •One shooting range 	<ul style="list-style-type: none"> •Disturbance of wildlife may be significant, depending on how well regulated human visitors are. •Loss of habitat occurs with development of recreation site but is small and localized currently. 	<ul style="list-style-type: none"> •Checkerboarded ownership reduces attractiveness for recreation. •Livestock grazing and oil and gas activities in particular areas detracts from recreational values. •Picket Wire Canyonlands tours generated \$5,030 in fees for USFS in 2003. 	<ul style="list-style-type: none"> •Conduct education around impacts reckless behavior can cause. •Enforce protections of wildlife from disturbance and harassment. •Prevent other resource damage.
Wildlife-related recreation	<ul style="list-style-type: none"> •Hunting (species commonly hunted include mule deer, pronghorn antelope, dove, quail, and turkey). •Bird-watching (235 species of birds to observe) 	<ul style="list-style-type: none"> •Hunting impacts: harm from use of lead shot. Disturbance of non-target wildlife. Use of off-road vehicles by hunters. •Bird-watching impacts: disturbance of birds and other wildlife. •Illegal prairie dog shooting is occurring. 	<ul style="list-style-type: none"> •People travel from across the U.S. to hunt and bird-watch on Comanche & Cimarron. •Increased interest in hunter-outfitter guiding on the Comanche. •Other rural communities in New Mexico and Texas have organized festivals around lesser prairie-chickens, which provided added economic revenues to local communities. 	<ul style="list-style-type: none"> •Manage lesser prairie-chicken viewing to avoid any disturbance to the birds. •Restrict use of lead shot and off-road vehicles by hunters to prevent adverse environmental impacts. •Increase enforcement of prairie dog shooting prohibition.
Motorized recreation	<ul style="list-style-type: none"> •234,944 acres of the Comanche are categorized as "Semi-primitive motorized" in the USFS Recreation Opportunity Spectrum •An additional 201,374 acres are categorized as "Roaded natural" in the ROS 	Existing road system adequate for recreation access. Off-road and off-trail use is increasingly becoming a threat to resource protection.	Excessive motorized vehicle use degrades other recreational attractions.	Restrict off-road vehicle use to existing roads and trails to prevent further resource damage.
Non-motorized recreation	<ul style="list-style-type: none"> •The Comanche has 14 trails (21 segments), making up a combined total of 81.5 miles. •The Santa Fe Trail accounts for approximately 48% (39.5 miles) of Comanche's trail system. •All the trails are non-motorized and open for hiking, horseback riding and mountain biking. •Star-gazing can be expected to increase in popularity given the low level of light pollution in the Grasslands. 	17.5 miles of the Purgatoire River in the Picket Wire Canyonlands is eligible for Wild & Scenic River designation.	Reduction of motorized recreation, oil and gas, and livestock grazing will increase attractiveness of Comanche to hikers and star-gazers.	<ul style="list-style-type: none"> •Reduce motorized vehicle use, oil and gas, and remove livestock grazing from special areas. •Designate segments of Purgatoire as Wild & Scenic River.
Cultural and paleontological recreation	<ul style="list-style-type: none"> •4 heritage and paleontological sites (Iron Springs, Timpas, Barlow-Sanderson at Vogel Canyon, Sierra Vista Overlook, and Picket Wire Dinosaur Tracksite) •The Picket Wire contains the largest concentration of dinosaur tracks in the country. It also contains dinosaur skeletons. •The Grasslands contain approximately 1,490 heritage resources that document about 12,000 years of human history, with an additional 5,000 sites estimated to exist. •The Santa Fe National Historic Trail constitutes an important cultural element, with potential for interpretive recreation. 	<ul style="list-style-type: none"> •Vandalism of historic and paleontological sites. Problem is especially severe in Picture Canyon. •Conflict with livestock grazing (e.g., Picture and Vogel Canyons) exists. •Vulnerability of Santa Fe Trail to erosion, human, and animal impacts. 	National recognition of these values on the Comanche provides tourism, with accompanying economic benefits to local communities.	<ul style="list-style-type: none"> •Prevent theft of paleontological and cultural resources. •Ensure livestock grazing and other extractive uses do not harm these resources.

¹Adapted from: Recreation (Chapter 15). *Cimarron and Comanche National Grasslands Specialist Reports – Existing Condition Descriptions*. (Draft) May 10, 2005. pp. 1-7.

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Recreation on the Cimarron National Grasslands¹

Recreation type	Description	Ecological sustainability issues	Economic vitality issues	Recommendations
Developed recreation	<ul style="list-style-type: none"> ▪Four fishing areas (Atwood Ponds, Mallard Ponds, Point of Rocks Ponds, and Wilburton Pond) ▪Three picnic grounds (Cimarron, Cottonwood, and Middle Springs) ▪Four interpreted heritage sites (Cimarron River, Tunnerville Work Center, Middle Springs, and Point of Rocks) ▪Six trailheads (Conestoga, Murphy, Cimarron River, Cottonwood, Middle Springs, and Point of Rocks) ▪ Lesser Prairie Chicken Observation Site ▪Cimarron family campground and group picnic site 	<ul style="list-style-type: none"> ▪Disturbance of wildlife may be significant, depending on how well regulated human visitors are. ▪Loss of habitat occurs with development of recreation site but is small and localized currently. 	<ul style="list-style-type: none"> ▪Checkerboarded ownership reduces attractiveness for recreation. ▪Livestock grazing and oil and gas activities in particular areas detracts from recreational values. 	<ul style="list-style-type: none"> ▪Conduct education around impacts reckless behavior can cause. ▪Enforce protections of wildlife from disturbance and harassment. ▪Prevent other resource damage.
Wildlife-related recreation	<ul style="list-style-type: none"> ▪Hunting (species commonly hunted include mule deer, pronghorn antelope, dove, quail, prairie dog, and turkey) ▪Bird-watching (235 species of birds to observe) ▪Fishing popular on the Cimarron 	<ul style="list-style-type: none"> ▪Hunting impacts: prairie dog shooting is occurring throughout the Cimarron, with resulting harms to prairie dogs and associated wildlife. Other hunting impacts include harm from use of lead shot. Disturbance of non-target wildlife. Use of off-road vehicles by hunters. ▪Fishing impacts: release of non-native fish through bait escape. ▪Bird-watching impacts: disturbance of birds and other wildlife. 	<ul style="list-style-type: none"> ▪People travel from across the U.S. to hunt and bird-watch on Comanche & Cimarron ▪More fishing days/acre than anywhere in Kansas ▪Rural communities in New Mexico and Texas have organized festivals around lesser prairie-chickens, which provided added economic revenues to local communities 	<ul style="list-style-type: none"> ▪Manage lesser prairie-chicken viewing to avoid any disturbance to the birds. ▪Restrict use of lead shot and off-road vehicles by hunters to prevent adverse environmental impacts. ▪Restrict use of non-native baits whose release will harm aquatic species. ▪Prohibit prairie dog shooting. Stop distributing maps to shooters.
Motorized recreation	All 108,127 acres of the Cimarron are authorized for motor vehicle use as they are classified "Roaded natural" in the ROS.	Existing road system adequate for recreation access. Off-road and off-trail use is increasingly becoming a threat to resource protection.	Excessive motorized vehicle use degrades other recreational attractions	Restrict off-road vehicle use to existing roads and trails to prevent further resource damage.
Non-motorized recreation	<ul style="list-style-type: none"> ▪The Cimarron National Grassland has 13 trails making up a combined total of 66.16 miles. ▪The Santa Fe Trail, a National Historic Trail, accounts for approximately 44% (29 miles) of Cimarron's trail system. ▪This Grassland contains the longest Santa Fe Trail segment (24 miles) on public land. ▪Most trails on the Cimarron are non-motorized, and open for hiking, horseback riding, covered wagon, and mountain biking. ▪A five mile section of the West Turkey Trail is open for motorized use. ▪Star-gazing can be expected to increase in popularity given the low level of light pollution in the Grasslands. 	Segment of Cimarron eligible for Wild & Scenic River designation.	Reduction of motorized recreation, oil and gas, and livestock grazing will increase attractiveness of Cimarron to hikers and star-gazers.	<ul style="list-style-type: none"> ▪Reduce motorized vehicle use, oil and gas, and remove livestock grazing from special areas. ▪Designate segment of Cimarron as Wild & Scenic River.
Cultural and paleontological recreation	<ul style="list-style-type: none"> ▪Fullerton Gravel Pit contains Miocene era (six million years ago) remains of camel, horse, elephant, and tortoise. ▪The Santa Fe National Historic Trail constitutes an important cultural element, with interpretive sites including .Middle Springs and Point of Rocks. 	<ul style="list-style-type: none"> ▪Vandalism of historic and paleontological sites can be a problem. ▪Conflict with livestock grazing exists. ▪Vulnerability of Santa Fe Trail to erosion, human, and animal impacts. 	National recognition of these values on the Cimarron provides tourism, with accompanying economic benefits to local communities.	<ul style="list-style-type: none"> ▪Prevent theft of paleontological and cultural resources. ▪Ensure livestock grazing and other extractive uses do not harm these resources.

Adapted from: Recreation (Chapter 15). *Cimarron and Comanche National Grasslands Specialist Reports – Existing Condition Descriptions*. (Draft) May 10, 2005. pp. 1-7.

Motorized recreation should be restricted. It is currently allowed throughout the Grasslands. It is permitted on 436,318 acres, or 98%, of the Comanche National Grassland and across all of the Cimarron. Tire tracks from off-road vehicles are readily apparent in the Cimarron's riverbed. In order to better balance a variety of recreational uses and to prevent loss of ecological integrity, motorized recreation needs to be restricted. The ecological harms from motorized recreation include:

- Creation of new trails and roads, which fragment wildlife habitat;
- Increased erosion and sedimentation, leading to soil loss, exotic weed proliferation, and air and water pollution;
- Disturbance, killing, and harassment of wildlife;
- Severe damage, including rutting and permanent scars, during wet conditions;
- Creation of new dispersed campsites and parking areas; and
- Harms to cultural resources, such as Native American sites.

Indeed, the federal government has recognized for over two decades the harms from off-road vehicle use. The White House Council on Environmental Quality wrote:

ORVs have damaged every kind of ecosystem found in the United States: sand dunes covered with American beach grass on Cape Cod; pine and cyprus woodlands in Florida; hardwood forests in Indiana; prairie grasslands in Montana; chaparral and sagebrush hills in Arizona; alpine meadows in Colorado; conifer forests in Washington; arctic tundras in Alaska. In some cases the wounds will heal naturally; in others they will not, at least not for millennia.¹³

In the Comanche and Cimarron, there is an opportunity to prevent excessive damage from this activity before it becomes excessive.

In addition, extensive motorized vehicle use degrades the attractiveness of these grasslands for other forms of recreation, particularly bird-watching. Bird watching is the most rapidly increasing form of wildlife-related recreation. In 2001, recreation oriented around wildlife brought \$170 million into Colorado's and Kansas's economies (USFWS 2002). Southern Plains municipalities have enjoyed income flows from wildlife observation include Canadian, Texas, and Milnesand, NM. Both of these towns host events around observations of lesser prairie-chickens and black-tailed prairie dogs.

An environmentally harmful recreational activity that should be prohibited is prairie dog shooting. Prairie dog shooting is legal on the Cimarron and the Forest Service even provides maps of colonies for shooting. On a visit to the Cimarron in June 2005, evidence of prairie dog shooting (spent cartridges and prairie dog carcasses) were found on almost every prairie dog colony visited (Lauren McCain and Nicole Rosmarino, pers. observation). While prairie dog shooting is illegal on the Comanche, it continues to occur.

The environmental impacts of prairie dog shooting are several. Prairie dog shooting significantly reduces black-tailed prairie dog populations and population densities (USFWS 1998a, b). Shooting also alters prairie dog behavior. For instance, Irby and Vosburgh (1994) found that even light shooting has a significant effect on prairie dog behavior, with 42% of prairie dogs retreating to the burrows on a lightly shot colony, contrasted with a 22% retreat rate on unshot

¹³See Havlick, Dave. 1999. "Roaring from the past: off-road vehicles on America's National Forests." Prepared for Wildlands Center for Preventing Roads. Dated November 30, 1999.

colonies, and 55% retreat rate on heavily shot colonies. Further, Irby and Vosburgh (1994) found that prairie dog shooters prefer higher densities of prairie dogs. This causes shooters to spread the pressure of their activity depending on population density, causing uniformity in prairie dog populations across colonies. Biologically, such uniformity is destabilizing to prairie dog populations.

Studies also report that shooting may decrease colony expansion rates (Miller et al. 1993; Reading et al. 1989). One study revealed that a colony in Montana had a 15% annual expansion rate when prairie dogs were not hunted, contrasted with a 3% expansion rate when they were (Miller et al. 1993). This dramatic decrease in rates of expansion represents decreased migration, which constitutes human interference with an integral population dynamic in prairie dogs: prairie dog dispersal.

Even without shooting pressure, there is a low survival rate of dispersing males (Garrett and Franklin 1981). In addition, prairie dog dispersal takes place in late spring (Knowles 1985; Garrett and Franklin 1981), which is one of the most popular times of the year for recreational prairie dog shooting. The negative impacts of shooting on prairie dog migration may therefore be considerable.

Shooting impacts may be unpredictable and colony-specific. Knowles and Vosburgh (2001: 7) compared black-tailed prairie dog shooting studies conducted in Montana, and concluded, "Shooting can impact prairie dog populations and ...it is just a matter of the number of hours of shooting effort expended on a colony in relation to the size of the colony that determines the level of impact."

Individual shooters can seriously impact prairie dog colonies. Randall (1976) chronicled the activity of three individual shooters who traveled from Minnesota to shoot white-tailed prairie dogs in Wyoming. In one week they concentrated on seven towns and tallied 1023 kills. This was in 1976, and prairie dog shooters are much better equipped today. Jerry Godbey of the U.S. Geological Survey Biological Resources Discipline reported that when he surveyed white-tailed prairie dog towns in Colorado, Utah, and Wyoming in 1997-1998, he found spent shells or dead prairie dogs at "virtually every site" (Jerry Godbey, USGS, personal communication to Erin Robertson, 3 August 2001). Mr. Godbey said that he met one shooter near Delta, Colorado with three rifles who said that he shot white-tailed prairie dogs at least four times a week. This shooter estimated that he used 10,000 rounds per year, with an estimated 95% kill rate. Those figures translate to take of 9500 prairie dogs annually by a single person. Keffer et al. (2000) found that after they shot 22% of the black-tailed prairie dogs on one colony as part of a controlled shooting study, 69% (212 individuals) of the remaining prairie dogs left the colony. Small colonies may be particularly vulnerable to negative impacts from shooting (Knowles 2002, citing J. Capodice, pers. comm.). Entire colonies can potentially be eliminated from shooting pressure (Knowles 1988; Livieri 1999).

In addition, the threat that shooting poses extends to prairie dog associated species. For example, prairie dog shooting causes a reduction in the prey base. This may affect a broad range of avian and mammalian predators that prey on prairie dogs. The danger here is apparent:

Viable populations of associated species cannot be expected at low prairie dog densities. Based on our observations of other prairie dog complexes in Montana, prairie dog complexes need to be broadly distributed and with relatively high

occupancy to assure minimal viable populations of associated species (Knowles and Knowles 1994).

Low population densities result from shooting and will therefore work to the detriment of mammalian and avian prairie dog predators. In addition, there is no evidence to suggest that prairie dog shoots do not result in the harming or killing of non-target species, such as the burrowing owl, ferruginous hawk, and mountain plover. To the contrary, first-hand accounts indicate that these shoots do result in the harming and killing of a variety of wildlife species other than prairie dogs.

Relatedly, there is growing concern about the effects that spent shells may have on prairie dog predators. A preliminary study on the effects of prairie dog shooting on raptors (Wyoming Cooperative Fish and Wildlife Research Unit 2001) showed that black-tailed prairie dog towns on Thunder Basin National Grassland that were shot were visited by raptors an average of 2.42 times per hour, while towns that were not shot were visited an average of 0.5 times per hour. Blood samples taken from burrowing owls on a town where shooting occurred showed elevated lead levels. Knowles and Vosburgh (2001: 15-16) also raise this issue:

Fragments of lead ingested by raptors when scavenging shot prairie dog carcasses have the potential to kill or severely disable raptors. Burrowing owls are reported to scavenge poisoned prairie dogs (Butts 1973) and would also be expected to feed on prairie dogs killed by recreational shooting. Ferruginous hawks and golden eagles are 2 other raptors known to scavenge on dead prairie dogs. Shooting in some areas has been sufficiently intense during the past decade to literally put millions of pieces of lead on the ground. It is unknown if passerine birds are picking up pieces of this toxic heavy metal. Mortalities in morning [sic] doves have been noted with ingestion of only 2 lead pellets. Ingestion of lead is a known significant problem for birds (Lewis and Ledger 1968 and Wiemyer et al. 1988).

On his Moreno Valley (NM) study site, Cully (1986: 2) noted that, "One of the major sources of recreation for the residents of the area is shooting prairie dogs, a practice that may contribute to the attraction of raptors to the valley." He suspected many of the area raptors were primarily subsisting on shot prairie dogs. To the extent shooters were using lead shot – which is extremely likely – those raptors were being exposed to lead poisoning.

While some of the above studies pertain to white-tailed and Gunnison's prairie dogs, cited biological impacts - reduced populations and population densities, altered behavior, potential colony extirpation, and impacts on associated wildlife – would reasonably extend to black-tailed prairie dogs on the Cimarron and Comanche.

Extractive land uses such as oil and gas can have significant adverse impacts on recreation. We have discussed the environmental harms from these activities in the Resource Use section of this *Sustainable Use Conservation Alternative*. Negative impacts on recreational enjoyment are caused by the noise and emissions from pumpjacks and compressors, cattle feces in both riparian and upland areas, and corrals, stocktanks, and windmills scattered across the grasslands. Public safety concerns include contamination of soil and water by oil and gas operations, water pollution by livestock, M-44s used for predator control, and aggressive behavior by cattle. M-44s have resulted in the deaths of dogs accompanying public land users, and cattle have caused bodily injury to humans.

Desired Conditions

Recreational, activities (particularly human-powered recreation), and services contribute to visitors' physical and mental well-being and relationship with the Grasslands and Forest Service.

Well-managed, sustainable recreation on the Grasslands contributes to the local economy.

Maintaining and expanding recreational opportunities depend on the continued restoration and protection of native species and habitat as well as historic and cultural resources.

Recreation is managed in a holistic manner using least-impact principles, in order to protect natural, cultural and historical heritage values, and to minimize conflicts.

Non-motorized visitation and recreation are facilitated and encouraged for visitor health and ecosystem protection.

The Forest Service provides for visitor (including youth) opportunities to join restoration activities as a form of recreation.

The overall level of development on the Grasslands (roads, trails, recreation facilities, fencing, oil and gas wells, and other infrastructure) would be managed at a level sustainable with ecological health, and Forest Service budget and staffing levels.

Objectives

- Determine acceptable level of recreation to balance this use with the need for biodiversity and intact ecosystems.
- Develop plan that determines travel restrictions necessary to protect ecological integrity of the Grasslands and land adjustments needed to ensure public access. The plan should also allocate uses across the landscape in such a way that cumulative and site impacts are minimized to within reasonable limits. Where impacts are unacceptably high (i.e., the condition of the landscape is in long-term decline as measured by a series of biological and physical parameters), recreation uses must be reallocated to prevent further impacts and to allow the area to recover. The recreation plan must be based primarily on a comprehensive analysis of landscape condition. An analysis of the projected increases in recreation demand is also fundamental.
- Management provides non-motorized recreation opportunities in a natural or natural-appearing landscape with little or no evidence of recent human-caused disturbance. These areas provide non-motorized recreation near the primitive end of the recreation opportunity spectrum.
- Apply seasonal or year-round restrictions on human use to provide seclusion for wildlife such as nesting for raptorial birds, big-game rearing areas, and mammals with large home ranges.

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- Prohibit new road construction or reconstruction. Existing unclassified roads should be converted to trails or closed and decommissioned.
- Motorized travel off of trails and roads is prohibited except when authorized by special use permit for administration of permitted facilities, for Forest Service administration, or for emergency purposes.
- Consistent monitoring of recreational activities allows for timely and appropriate responses to unforeseen environmental impacts or misuse, as well as recreational equipment developments and trends not now anticipated.
- Over the next 5 years, provide readily available information concerning recreation opportunities for developed, historic, and appropriate cultural sites with an emphasis on how visitors can protect natural and historic resources.
- Within 5 years, complete site and recreation plans, including rehabilitation and re-vegetation strategies. As demand warrants, increase non-motorized recreational opportunities where compatible with resource objectives. These opportunities may include trails, campgrounds, and interpretation.
- Manage trail systems with appropriate signage and information at trailheads to minimize conflicts among users.
- Provide for a reasonable spectrum of non-motorized uses within the ecological constraints of the landscape.
- Plan for the long-term by anticipating trends in recreational use and ecological condition.
- Develop recreation monitoring baseline data and targets to assess trends in recreational impacts.
- Protect the last remaining roadless places by allowing only recreation that is compatible with retaining the roadless character in these areas.
- Protect instream flows at recreation sites.
- On sites where dispersed recreation activities have contributed to bare mineral soil and accelerated erosion, mitigate impacts by redirecting use, rehabilitating the site to minimize erosion and off-site movement of soil.
- The Forest Service works with volunteers and conservation organizations to protect the resource, educate visitors, guard against illegal activities, provide necessary assistance, and help monitor recreational impacts.
- Design recreational facilities to blend with the elements found in the natural landscape.
- The Forest Service eliminates overuse in sensitive habitats by one or more of the following:
 - closing areas where, or when, biological resources are at risk;
 - monitoring and enforcing permanent or seasonal closures;

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- directing users towards more resilient areas;
- educating users on the incompatibility of certain recreational activities with sustainable natural conditions.
- Maintain or reconstruct National Grassland trails to regional standards
- Provide readily available information concerning recreation opportunities for developed, historic, and appropriate cultural sites.
- Provide appropriate directional signing to key recreation sites and inform people about the public access routes to national grasslands and national forests.
- Develop and implement a science- and marketing-based interpretive program strategy that uses a variety of communication media. The purpose of the strategy will be to effectively use communication principles and methods based in the field of interpretation to:
 - Communicate with target audiences regarding management concerns or issues, changes in management direction, and specific projects
 - Enhance visitor's recreation experiences by identifying and implementing interpretive projects that highlight national grassland and forest resources and management.
- Maintain non-motorized trails for a wide variety of uses and experiences.
- The Forest Service encourages partnerships with recreationists for the ultimate protection of the Grasslands, to maintain appropriate access and to instill among community members the ideals of minimum impact and a sound land ethic.
- On sites where dispersed recreation activities have contributed to bare mineral soil and accelerated erosion, mitigate impacts by redirecting use, rehabilitating the site to minimize erosion and off-site movement of soil.
- Monitoring activities includes assessments of impacts recreational activities are having on special status species, paleontological resources, and historic sites, especially the Santa Fe Trail. Some suggestion monitoring questions include:
 - Are user conflicts increasing?
 - With what frequency are recreationists complaining about harm to recreational values from oil and gas and livestock?
 - With what frequency are grazing permittees complaining about open livestock gates, vandalism, littering, and other problems related to recreation?

Guidelines

- ◆ Manage trail systems to minimize conflicts among users.
- ◆ Plan for the long-term by anticipating trends in recreational use and ecological condition.

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- ◆ Protect the last remaining roadless places by allowing only recreation that is compatible with retaining the roadless character in these areas.
- ◆ Refrain from building new recreation facilities in riparian areas.
- ◆ Implement a "pack-it-in/pack-it-out" solid waste/garbage removal policy where disposal facilities are not available.
- ◆ Consider the following criteria before making a decision to issue an outfitter and guide service permit:
 - ◇ Other resource considerations, including the biological needs of wildlife, are considered and found compatible with the proposed activity.
 - ◇ The permit furthers National Grassland ecological goals.
- ◆ Administer permits and pursue and prosecute illegal outfitters and guides.
- ◆ Use seasonal closures as necessary to protect wildlife, plant communities, soils, and water quality, and to avoid excessive resource damage.
- ◆ Monitor high-impact areas, and relocate them or otherwise mitigate impacts when the resource shows signs of significant deterioration.
- ◆ Manage high use areas within ecological capacities in order to maintain the quality of experiences and natural ecology.
- ◆ Apply monitoring measures specified under wildlife and vegetation sections to recreation activities.
- ◆ Prohibit recreation activities in areas where efforts to protect sensitive species/habitat or ecosystem conditions are not effective.
- ◆ Prohibit water diversions for commercial recreation activities.
- ◆ Restrict motorized recreation development.
- ◆ Close recreation sites where ecological integrity is being impacted.
- ◆ Do not allow dog training in areas where dogs can impact native wildlife, particularly lesser prairie-chickens and mountain plovers.
- ◆ Prohibit prairie dog shooting.
- ◆ Restrict use of lead shot and non-native bait.

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SAFEGUARDS FOR IMPORTANT HISTORIC RESOURCES

The Cimarron and Comanche National Grasslands reveal 12,000 years of human history and eons of life in the Southern Plains region. The Grasslands provide a half million-acre museum of geologic, paleontological, and human historic sites.

Existing Conditions

The Comanche boasts the largest set of preserved dinosaur tracks in North America and numerous fossilized dinosaur remains. Both Grasslands contain many pre-settlement sites with examples of rock art, habitation, old rock mines for quarrying materials used in tool-making, and hunting grounds and kill sites with collections of bison bones and those of other large mammals. The Cimarron contains the largest stretch of the Santa Fe Historic Trail on public land, and both Grasslands contain old trail markers and trail ruts. The trail carried traders and European settlers west starting in the 1820s until the early 1880s. The early Europeans left signs of their passing and time in the Southern Plains with rock art, cemeteries, homesteads, and military sites.

The Draft Cimarron and Comanche Land Management Plan tallies 1,490 heritage resources, 410 of which may be eligible for the National Register of Historic Places. With more research in the area and assessment of these sites, an additional 5,000 resources may also be eligible (Draft Plan 2005, 24). The Santa Fe Trail is a National Historic Trail. Rourke Ranch in Picket Wire Canyon is on the National Register, and Vogel Canyon is a Colorado State Register Site. Over 80 percent of the Grasslands' historic resources have not yet been surveyed to the standards of the Colorado and Kansas Historic Preservation Offices. The Forest Service has proposed the Santa Fe Trail, Picture Canyon, Vogel Canyon, and Picket Wire Canyon as "Special Areas," and all contain historic resources that should received protection. Sadly, many of the most well-known historic areas, particularly sites in Vogel and Picture Canyons, have experienced significant vandalism and graffiti.

Desired Conditions

The Comanche and Cimarron National Grasslands remain an important nexus for historic exploration of human and pre-human history for generations to come. The opportunity exists for a sense of discovery as one visits remote cultural resource sites on the Grasslands and finds neither evidence of recent looting or vandalism, nor evidence of illegal motor vehicle trespass.

Historical resources, including geological, paleontological, and anthropological, remain intact and offer scientific, recreational, as well as spiritual opportunities to the public.

Alterations of surrounding environment or setting caused by livestock grazing and vegetation manipulation are limited.

Remote sites remain accessible only by foot or horseback.

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Research continues to provide understanding of the Grasslands' historical resources and contributes to public understanding of geological, paleontological, and human history. While cultural resources are available for scientific study, these studies are benign and do not alter a site significantly.

Protection of cultural sites takes precedence over resource-consumptive activities, and includes a volunteer monitoring program.

The condition of cultural and historical sites, and the intensity of disturbance to sites are known.

Illegal disturbances are rare.

Recreational visitation occurs where cultural and historic resources are maintained or stabilized sufficiently to preclude further damage. Unstable sites are not publicized and rarely found by visitors. Ethical site stewardship awareness is widespread among visitors, and visitors take responsibility for the preservation of cultural and historical resources on public lands.

Objectives

- Within 5 years, develop and implement a heritage inventory strategy and implementation schedule to survey and evaluate sites, in support of management actions and activities as agreed upon with the State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO) and to include compliance with laws Sec. 106 and Sec. 110 of the National Historic Preservation Act.
- Within 5 years, assess remaining identified sites eligible for the National Register of Historic Places (NRHP) in conjunction with SHPO and THPO and provide interpretation for National Register of Historic Places sites where appropriate and consistent with developed preservation plans.
- Within 3 years, identify and protect traditional pre-European settlement properties in consultation with federally recognized American Indian tribes.
- Within 10 years, update prehistoric, ethnographic, and historic overviews.
- In partnership with American Indian tribes and/or others, educate and interpret to increase public awareness, protect heritage resources, and further the goals of research.
- Within 10 years, develop and implement conservation plans for significant geological and paleontological sites.
- Within 15 years, provide interpretation for at least 50 percent of important geological and paleontological sites, consistent with the conservation plans.
- Protect key paleontological resources from disturbance, or mitigate the effects of disturbance, to conserve scientific, interpretive, and legacy values.
- Survey and post federal land boundaries where paleontological sites have Fossil Potential.

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- Prior to ground-disturbing activities, conduct paleontologic surveys in any area where there is a high potential to encounter these resources.
- Develop criteria for issuing paleontological research permits.
- Stabilize or close to visitors sites that are easily accessible by road or motorized recreation routes.
- Exclude livestock grazing from areas with high concentrations of historic resources, such as segments of the Santa Fe Trail, and from other areas with one or more National Register-eligible sites.
- Annually report incidents of site vandalism and unintentional disturbances.

Guidelines

- ◆ Consult with designated representatives of federally recognized American Indian tribes during design of projects with potential to affect cultural rights and practices to help ensure protection, preservation and use of areas that are culturally important to them.
- ◆ Consider American Indian traditional cultural plant use when designing vegetative management activities.
- ◆ Leave human remains undisturbed.
- ◆ Protect heritage resources from damage by activities or vandalism through project design, specified protection measures, monitoring, and coordination.
- ◆ Enhance and interpret significant heritage sites for the education and enjoyment of the public, while protecting the integrity of the sites.
- ◆ Limit non-research oriented ground-disturbing activities on heritage districts and sites eligible for the National Register Historic Preservation (NRHP) that creates adverse impacts to the district or site.
- ◆ Restrict human activities which will alter the natural geologic formation of the land.
- ◆ Forest Service actively pursues violators of the various cultural and historic resource protection laws, and provides, as necessary and appropriate, physical presence to deter looting and vandalism.

PRESERVATION OF SCENIC BEAUTY

“Anyone can love the mountains, but it takes soul to love the prairie.”

The Forest Service has been including this quote in its information about the Comanche and Cimarron National Grasslands plan revision process. And the sentiment is true. The prairie can be an acquired taste but the observant visitor is richly rewarded.

Existing Conditions

The Cimarron and Comanche National Grasslands region is graced with the subtle but profound beauty of the High Plains. Those who have never been here may picture a flat, monotonous scene. But, this prairie landscape undulates with gentle, soothing relief in some places while giving way to high rocky mesas and plunging canyons in others. The terrain enables frequent sightings of native wildlife. This is truly a country of wide-open spaces, big sky, and seemingly infinite views.

On clear days, visitors can see Colorado’s Spanish Peaks from strategic points in both the Timpas and Carrizo Units of the Comanche about 60 and 90 miles away, respectively, and a 360 degree panorama at Point of Rocks in the Cimarron with a bird’s eye view of the Cimarron River and Santa Fe Historic Trail. On clear nights, the celestial canopy is spectacular. The low human population density and minimal light pollution allows for some of the best star gazing in the country. The Comanche Grassland boasts some striking scenic areas, such as Purgatoire Canyon and the southwestern Timapas Unit, where red rock mesas and plunging canyons provide a bold contrast to the vast, normally deep blue, sky. These places can be even more impressive when dark, foreboding thunderstorm clouds move in and play with the light. On the Cimarron, one can view the sensuous, verdant curves of the Cimarron River cutting across the plains from Point of Rocks, a key Grassland historic site.

Set in the heart of the shortgrass prairie bioregion, these Grasslands exhibit much of the characteristic expansive low-lying vegetation interspersed with cottonwood tree galleries in riparian pockets. In areas with healthy native plant life, thick carpets of buffalograss and blue grama provide a foundation for a rich garden of forbs, shrubs, cacti, and other grasses. Decent spring and summer rains bring out vibrant displays of wildflowers cycling throughout the season—the magenta and lemon yellow prickly pear, deep copper of stiff flax and mallow, blues and purples of flax and penstemon and liatris, and snowy white of sand verbena and creamy colored mentzelia (just to name a few). The seed stalks of the grasses—Indian rice, feathergrass, needle and thread, buffalograss, and blue grama— shimmer and sway in the sunlight and warm wind.

The shortgrass prairie ecotype dominates both the Grasslands. But the Cimarron River corridor breaks up the Cimarron prairie with an oasis of riparian vegetation and a large swath of sandsage prairie on the south side of the river—prime lesser prairie-chicken habitat. The Comanche’s Timpas unit, concentrated along the west side of the Purgatoire River is a mix of prairie, buttes, and intermittent streams. The northern sections of the Carrizo unit, predominated

by shortgrass prairie, melt into a series of canyons to the south against the backdrop of Black Mesa and Mesa de Maya on the Colorado-New Mexico border.

Unfortunately, the scenic quality of the Cimarron and Comanche is currently degraded by human development and debris. The results of road construction, oil and gas exploration and operation, livestock grazing, mining, fences, and poor mitigation of abandoned human facilities often compromise the scenic integrity of the Grassland landscapes.

Access to remote wildlands for scenic beauty, recreation, and nature education provides substantial public good in improving the quality of life for the local community and larger society. Revitalizing the wild character and preserving the aesthetic beauty of the Comanche and Cimarron region require restoration of native ecosystems and promotion of biodiversity.

Desired Conditions

Restoration and preservation enhances aesthetic and open space values, especially those of highly-valued landscapes that serve as scenic backdrops to local communities and those with increasingly rare values such as open space and solitude.

Land restoration and wildlife and native plant conservation enhance the scenic beauty on the Grasslands.

The Forest Service takes into account the potential impact to the aesthetic values of the Grasslands in management activities and project development and execution.

Grassland resource users and visitors appreciate and work cooperatively with the Forest Service to preserve the scenic integrity of these public lands.

Practices are implemented that meet or move the landscape character toward scenic integrity objectives.

Actions are taken to prevent new, permanent light sources from hindering clear views of the night sky.

Objectives

- Identify and mitigate specific impediments (human-made features and facilities) that compromise scenic integrity.
- Advance areas of less-than-desired scenic integrity toward moderate or high level of scenic integrity.
- Utilize a Scenery Management System to rate, prioritize, and zone Grassland landscapes to guide future management activities and meet objectives for the Grasslands' scenic resources. The Forest Service's *Landscape Aesthetics, A Handbook for Scenery Management* (USFS 1995) should guide the development of a Scenery Management System on the Grasslands.

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- Designate Special Interest Areas to protect regions with unique scenic values including botanical, zoological, scientific, geological, historical, and cultural values. Special Interest Areas should include Vogel Canyon, Purgatoire Canyon, Carrizo Creek, Picture Canyon, Sand Canyon, Holt Canyon, Point of Rocks, parts of the Cimarron River Corridor, as well as areas of expansive grasslands and sandsage with few fences and roads to obstruct the view.
- Annually report on the magnitude and duration of changes in conditions including scenic integrity and landscape character.
- Create stewardship partnerships with members of the public to help promote appreciation of the Grasslands' scenic values among the public.
- Prepare and distribute information to Grassland users to help them understand the value of allowing natural processes to take place.

Guidelines

- ◆ Manage activities to be consistent with the scenic integrity objectives.
- ◆ Restrict or prohibit uses that prevent accomplishing scenic integrity objectives.
- ◆ Rehabilitate areas that do not meet the scenic integrity objectives specified for the management area. Consider the following when setting priorities for rehabilitation:
 - ◇ Relative importance of the area and the amount of deviation from the scenic integrity objectives.
 - ◇ Length of time it will take natural processes to reduce the visual impacts so that they meet the scenic integrity objective;
 - ◇ Length of time it will take rehabilitation measures to meet scenic integrity objectives;
 - ◇ Benefits to other resource management objectives to accomplish rehabilitation.
- ◆ Scenery Management System classifications require protection of scenic zones from disturbances such as those caused by motor vehicles and roads.
- ◆ Because visual quality is emphasized, all activities and interactions maintain the scenic beauty for which the area is designated.

DESIGNATION AND PROTECTION OF SPECIAL AREAS

The Cimarron and Comanche are islands in a sea of intensive land use, with dryland and center-pivot irrigation, feedlots, intensively grazed pastures, and oil and gas development. The Grasslands provide a vital refuge for wildlife not tolerated on neighboring private lands – such as prairie dogs and coyotes – or who suffer with predominant land uses – such as lesser prairie-chickens and Cassin’s sparrows. It is vital that the Forest Service select areas that will be designated as specially protected, in order to serve as living laboratories and to fulfill the life history requirements of the region’s native wildlife and plants.

The Forest Service has proposed seven “Special Areas” for designation in the Draft Cimarron and Comanche National Grasslands Land Management Plan. The Forest Service defines Special Areas in the most current Forest Planning Regulations:

Special Areas are areas within the National Forest System designated because of their unique or special characteristics. Special areas such as botanical areas or significant caves may be designated, by the Responsible Official 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 accordance with NEPA requirements (Sec. 219.4) and other applicable laws. (36 CFR 219.7(2)(v)).

The Forest Service Directives provide some more detail:

Special areas are places within the NFS identified or designated because of their unique or special characteristics (36 CFR 219.7(a)(2)(v)). Land management plans may identify areas as special for various reasons without a formal designation. In addition, land management plans should include special areas designated by statute or through a separate administrative process.

1. The Responsible Official may recommend the designation or removal of those special areas that require a Congressional or higher level administrative decision; or
2. The Responsible Official may identify, designate, or remove special areas that fall within the Responsible Official’s authority through approval of a land management plan, plan amendment, or plan revision.

While we do not oppose the designation of any of the Special Areas proposed by the Forest Service (See table below) in the Draft Plan, we are concerned that the selections do not sufficiently represent the full spectrum of Grasslands ecosystems or capture sufficient sampling of the many unique resources. They are not protected from human uses such as livestock grazing (except for Picket Wire Canyon, which was already off-limits to grazing) and oil and gas development. Thus, Special Area designations afford no new protections to ecological resources on the Grasslands despite a great need for such protections. We proposed the designation of new Research Natural Areas (RNAs).

At a minimum: 1) each ecosystem type should be represented in an RNA using the larger set of ecosystem type classifications defined by NatureServe and adapted by the Colorado Natural Heritage Program (CNHP); and 2) an RNA is designated to afford protection to each plant and animal species of concern and interest designated in the Grasslands.

A VISION FOR WILD GRASSLANDS

Comanche and Cimarron Proposed Special Areas (from Draft Plan)

PROPOSED AREA	LOCATION	ACRES	FS ECOSYSTEM	UNIQUE FEATURES	C/I & T/E SPECIES	FS SUITABLE USES	FS NOT SUITABLE
Bent Canyon Bluffs Comanche (Timpas)	T 27S, R 56W, sec 31-34 T 27S, R 57W, sec 33-36 Picket Wire Canyon-Rolling Plains ecological subsection approximately 23 miles southwest of La Junta, CO	4,676	shortgrass prairie	botanical geological - limestone outcrops, bluffs up to 150 feet above plain, septarian concretions		LV (2 allotments now), O&G, Fire, UC, RU	OHV
Mesa de Maya Comanche (Carrizo)	T 33S, R 55W, sec 7, 8, 17, 18 Tablelands-Red Hills ecological subsection approximately 15 miles west of Kim, CO	518	Shortgrass P&J shrublands	botanical - unique plant associations, shrub communities geological - basalt formations, cliffs, & talus slopes	~long-billed curlew (I)	LV, O&G, Fire, UC	OHV
OU Creek Comanche (Carrizo)	T 31S, R 52, Sec 22, 23, 26, 27, 34, 35 Picket Wire Canyon- Rolling Plains ecological subsection approximately 7 miles northeast of Kim, CO	3,196	Shortgrass Shrubland	botanical geological	~Colorado fraseria (I)	LV, O&G, Fire, UC	OHV
Picket Wire Canyonlands Comanche (Timpas)	• T 27S, R 55W, sec 20, 26 - 29, 33-35 • T 28S, R 55W, sec 3, 4, 5, 7-9, 17-19, 29, 30-32 • T 29S, R 55W, sec 5 and 6; • T 28S, R 56W, sec 13, 23 - 26, 34-36 • T 29S, R 57W, sect 2 - 5, 7 - 10, 18 • T 30S, R 57W, sect 9, 17-21, 30 Picket Wire Canyon-Rolling Plains ecological subsection approximately 20 miles south of La Junta and extending discontinuously for about 24 miles along the Purgatoire River	15,697	Riparian & aquatic Canyonlands	botanical – unique shrubland communities paleontological heritage wildlife aquatic	~ Colorado Fraseria (I) ~ Wheel milkweed (C) ~ ferruginous hawks (I) ~ Elk (I)	LV, O&G, Fire, UC	LV, OHV
Picture Canyon Comanche (Carrizo)	T. 35S, R. 47 W, section 7, S½; S½ N½; NE¼ NW¼ T. 35S, R. 47W, section 18, N½ N½	752	sandsage	heritage recreation scenic		LV, O&G, Fire, UC	OHV
Santa Fe Trail Comanche & Cimarron		[68.5 miles]		heritage recreation scenic		LV, O&G, Fire, UC	OHV
Vogel Canyon Comanche (Timpas)	• T26S, R.55W, section 24, S½ S½; NE¼SE¼; SE¼NE¼ • T26S, R.54W, section 19, W½ SW¼; SW¼,NW¼ • T26S, R.54W, section 30, NW¼ NW¼	416	canyonland some shortgrass	heritage recreation scenic		LV, O&G, Fire, UC	OHV
LV = livestock grazing, O&G = oil and gas development, Fire = fire use and management, UC = utility corridors, RU = two-track road use for administrative purposes							

RESEARCH NATURAL AREAS (RNAs)

A Research Natural Area is the highest level of protection that can be bestowed administratively to National Forest System lands. Creating a network of Research Natural Areas across the landscape is desirable to:

- Preserve a range of natural habitat types for research and reference
- Protect biodiversity, hotspots and valuable or unusual habitat
- Avoid damaging fragile soils and habitat
- Limit impacts to and enhance the understanding and recovery of imperiled species and ecological associations.

RNAs are usually the core of a particular ecotype and are generally more limited in size than wilderness and other legislative designations. Several conservation organizations (for example, the CNHP) are increasingly participating in identifying and assessing candidate areas on federal lands as federal funds have become scarce. Nominations aim at completing a portfolio of protected habitat types, with redundancy in the event that one of the representatives is damaged or destroyed by natural or human causes.

Existing Conditions

Currently there is one 35-acre designated Research Natural Area on the Comanche National Grassland. It is located two and one-half miles south of Campo at the intersection of County Roads 28 and F and sandwiched between Highway 287 and the railroad tracks.

Desired Condition

RNAs are being established to ensure ecosystem and natural process representation on the Grasslands. Existing and proposed RNAs are maintained as significant natural ecosystems for comparison with those influenced by humans, for provision of ecological and environmental study sites, and for preservation of gene pools for declining native plants and animals.

RNAs serve as baseline areas for measuring long-term ecological changes. Lands surrounding RNAs are designated as primitive non-motorized areas to serve as buffers for these natural outdoor laboratories. Some RNAs also serve as reference areas for major vegetation habitats.

Protected species are present at functionally significant levels.

Research and restoration projects eradicate or control invasive exotic species.

Activities are not allowed that would impact the ecological integrity or complexity of the RNA; vehicle use and livestock grazing are not occurring.

As part of the planning process, candidate RNAs are surveyed and described, with valid, scientific assessments from the public and the States of Kansas and Colorado included in the analysis. Recommendations in part derive from a list of absent or insufficiently represented types. As the planning process continues, descriptions are refined.

Nominations for additional RNAs are sought by the Forest Service throughout the life of the Plan.

Long-term transects and plots are established in every RNA for use in a range of research projects.

Objectives

- Evaluate the expansion of the RNA system based on recommendations from establishment records, and/or proposals generated from scientific research, and/or proposals from Forest Service scientists. Continue the search to add new areas to the system for plant communities and riparian and wetland elements not currently in RNAs or proposed RNAs, including those suggested in Appendix K.
- Develop a GIS database for each RNA to track information generated through research projects.
- Sustain and safeguard the natural resource values for which the RNA was established, with particular emphasis on the preservation of the target elements or processes.
- Use at least one RNA on each Grassland unit (Timpas, Carrizo, and Cimarron) to examine responses of resource elements to global warming.
- Research and restoration projects will be undertaken to eradicate or control invasive exotic species within an RNA to protect values for which the RNA was established.
- Signs identify RNA boundaries and list permitted or prohibited uses on the RNA.
- Collect adequate data to document baseline conditions of the RNA and produce analytically based assessments of changes in the ecological status of target vegetation types and other sensitive species.

Guidelines

- ◆ No livestock grazing or trailing is allowed in Research Natural Areas, and permittees will not be allowed to graze their livestock for two years in their nearest pasture to the RNA if their management results in livestock trespass into a Research Natural Area.
- ◆ Oil and gas operations and off-road vehicle use will not be authorized in RNAs or close enough to RNAs to impact the values for which the RNA was designated.
- ◆ No recreational use that threatens or interferes with the objectives or purposes for which the RNA was established is allowed.
- ◆ No collecting (e.g., fossils, plants, animals) is allowed within RNAs unless under an approved research project.

A VISION FOR WILD GRASSLANDS

Proposed Research Natural Areas

PROPOSED AREA	LOCATION	ACRES	ECOSYSTEM	UNIQUE FEATURES	C/I & T/E SPECIES	SUITABLE, NOT SUITABLE USES
Bent Canyon Bluffs Comanche (Timpas)	(see Forest Service description above)					Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation
Mesa de Maya Comanche (Carrizo)	(see Forest Service description above)					Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation
OU Creek Comanche (Carrizo)	(see Forest Service description above)					Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation
Bravo Canyon Comanche (Timpas)	T28S R56W Sections 27, 26, 34, 35 and T29S R56W in the Picket Wire Canyonlands of the Comanche National Grassland	2962	piñon-juniper woodlands, Shrubland; grasslands, canyonlands	Geological and botanical features, extensive canyons and mesas		Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation
Eightmile Cimarron	occupies all or parts of T35S R43W Sections 17, 18, and 19 approximately eight miles west of Elkhart, Kansas on the Cimarron National Grassland	1316	Shrublands, grasslands	Undulating sand dunes, sand dune blowouts, loggerhead shrikes, burrowing owls, prairie dogs	Lesser prairie-chicken	Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation
Lone Rock Draw Comanche (Carrizo)	occupies those portions designated as National Forest System lands in T31S R47W Sec. 6,7,18 and 19 and in T31S R48W Sec. 13, 24 and 25	1077	plains shrublands, sandsage and midgrass prairie	flat terrain is punctuated by a series of gravel benches		Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation
Rourke Canyon Comanche (Timpas)	occupies all or parts of T28S R55W Sections 29-32 and 19; T29S R55W Sections 5 and 6; T28S R56W Sections 24, 25, and 36 located on the Picket Wire Canyonlands	3498	piñon -juniper woodlands, plains shrublands and grasslands	bounded on the west and north by the Purgatoire River and on the east by Beatty Canyon, steep canyon walls; sitings of rufous-crowned sparrow (<i>Aimophila ruficeps</i>), hepatic tanager (<i>Piranga flava</i>), and gray vireo (<i>Vireo vicinior</i>).		Suitable: non-manipulative research, education, observation and monitoring within the area Not suitable: livestock grazing, oil and gas development, Off-road vehicles, recreation