

4—Management Direction



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Proposed wilderness units on the refuge provide secure habitat for wildlife like these bighorn sheep.

Starting with an overview, this chapter describes the management direction for the Charles M. Russell and UL Bend National Wildlife Refuges. As presented in sections 4.2–4.9, the objectives and strategies are designed to achieve the refuge purposes, vision, and goals; the mission of the Refuge System; and the mission of the Fish and Wildlife Service (refer to chapters 1 and 2).

The last sections of this chapter describe important aspects of implementation, monitoring, and review of the CCP:

- 4.10 Stepdown Management Plans
- 4.11 Plan Monitoring and Evaluation
- 4.12 Plan Amendment and Revision
- 4.13 Funding and Personnel

4.1 MANAGEMENT OVERVIEW

The Service will begin to carry out the CCP immediately on publication of the record of decision (appendix A) in the Federal Register, in 2012. Selected management activities and projects will be carried out as money becomes available. The plan does not constitute a commitment for funding, and future budgets could influence implementation priorities.

ECOLOGICAL PROCESSES EMPHASIS

In cooperation with partners, the Service will use natural, dynamic ecological processes and management activities in a balanced, responsible manner to

restore and maintain the biological diversity, biological integrity, and environmental health of the refuge. Once natural processes are restored, a more passive approach (less human assistance) will be favored.

Figure 41 depicts the CCP management direction for resources and public use, which is summarized below:

- **Habitat:** To maintain plant diversity and health in upland and riparian areas on the refuge, fire will be used in combination with wild ungulate herbivory (wildlife feeding on plants) or prescriptive livestock grazing, or both.
- **Water:** By increasing streamflows, pools, and beaver ponds on the refuge, the natural water processes will be restored. Select stock ponds will be maintained.
- **Wildlife:** The health and diversity of all species' populations will be restored and maintained on the refuge as balanced, self-sustaining populations through coordinated habitat and wildlife objectives and public use objectives such as hunting.
- **Threatened and endangered species:** Through disease management, population augmentation, or habitat manipulation, the refuge will protect or enhance threatened and endangered species and other species of concern.
- **Research:** Research and monitoring will be designed to understand the interaction between fire, grazing, plant response, wildlife populations, and other ecological factors affecting the refuge.

- *Fire*: Prescribed fire will restore the natural fire regime on the refuge. Wildfires will be evaluated to determine management response.
- *Public use*: There will be an emphasis on quality wildlife-dependent public uses, experiences, and facilities at the refuge for hunting, fishing, wildlife observation, photography, environmental education, and interpretation.
- *Access*: Secure access will be provided to the refuge. Access will be primarily managed to benefit natural processes, but some improvements will be made for quality visitor experiences.
- *Economic use*: These uses will be limited when they are injurious to ecological processes.
- *Wilderness*: The UL Bend Wilderness, 15 proposed wilderness units, and 8 wilderness study areas will be protected.
- *Cultural and paleontological resources*: Significant cultural and paleontological resources will be protected and managed.
- *Refuge operations*: Personnel will be added—outdoor recreation planners, law enforcement officer, refuge manager, maintenance employees, and fire specialist. Facilities will be expanded including office space, a bunkhouse, and a science interpretive center.
- *Partnerships*: The CCP will be carried out through partnerships with agencies, counties, conservation districts, private landowners, communities, and others.

LEGAL COMPLIANCE and RESOURCE PROTECTION

The Service will comply with all applicable laws, regulations, and policies for management activities that could affect refuge resources such as soil, water, air, threatened and endangered species, cultural resources, and paleontological resources. Disturbance activities include subsurface mineral reservations and management of utility lines, easements, contaminants, and invasive species. A list of key legislation and policies that the Service adheres to is in appendix E.

The Service will continue to protect all areas with special land designations: wilderness, proposed wilderness, wilderness study areas, the Lewis and Clark National Historic Trail, the Hell Creek and Bug Creek Fossil Areas, the research natural areas, and the Upper Missouri River Breaks Wild and Scenic River.

INTRODUCTION to the GOALS, OBJECTIVES, and STRATEGIES

Based on the vision and goals for the refuge, the Service developed objectives and strategies:

- Objectives are concise statements of what needs to be achieved; how much, when, and where it will be achieved; and who will be responsible. An explanation, or rationale, for each objective describes how and why the objective's actions are important to achieving the associated goal.
- Strategies are specific activities or techniques that are used to achieve objectives.

Objectives provide the basis for monitoring refuge accomplishments and evaluating success in meeting the goals. To the extent possible, each objective has been developed to be specific, measurable, achievable, results-oriented, and time-fixed (FWS 2000c). Timeframes for the objectives are based on the assumption that implementation will occur over 15 years.

Focal, Target, and Sentinel Species

It is important to understand the designations for species that the refuge staff has identified for management and monitoring in the plan, as detailed in the objectives and strategies.

- A *focal bird species* is representative of a broader group of species that share similar conservation needs. It may have restrictive habitat needs or be more sensitive to or limited by certain ecological processes or management activities such as fire or grazing. For example, an area that supports Sprague's pipit also supports western meadowlark, but an area that supports western meadowlark does not necessarily support Sprague's pipit (Lambeck 1997). The Service identified 13 focal bird species for habitats on the refuge: uplands (6 species), river bottoms (3 species), and riparian areas and wetlands (4 species).
- A *target wildlife species* is one the Service chose to manage for specific biological or social reasons. A target species could be a focal, endangered, big game, or other species. Establishing a hutable bighorn sheep population east of Timber Creek is an example of a species being targeted for a specific area.
- A *sentinel plant species* is one that vanishes first when ecological processes are out of balance. The Service identified 23 sentinel plant species to monitor as indicators of refuge habitat conditions. An important limiting component for many wildlife species is the availability of quality foods (White 1978); for example, the sentinel Maximilian sunflower provides valuable wildlife forage, fruit, and pollen-producing food plants and is desired by both wildlife and livestock.

As the landscape conservation cooperatives described in chapter 1 (section 1.5) are starting to integrate strategic habitat conservation across landscapes larger

Figure 41 follows (two foldout pages)

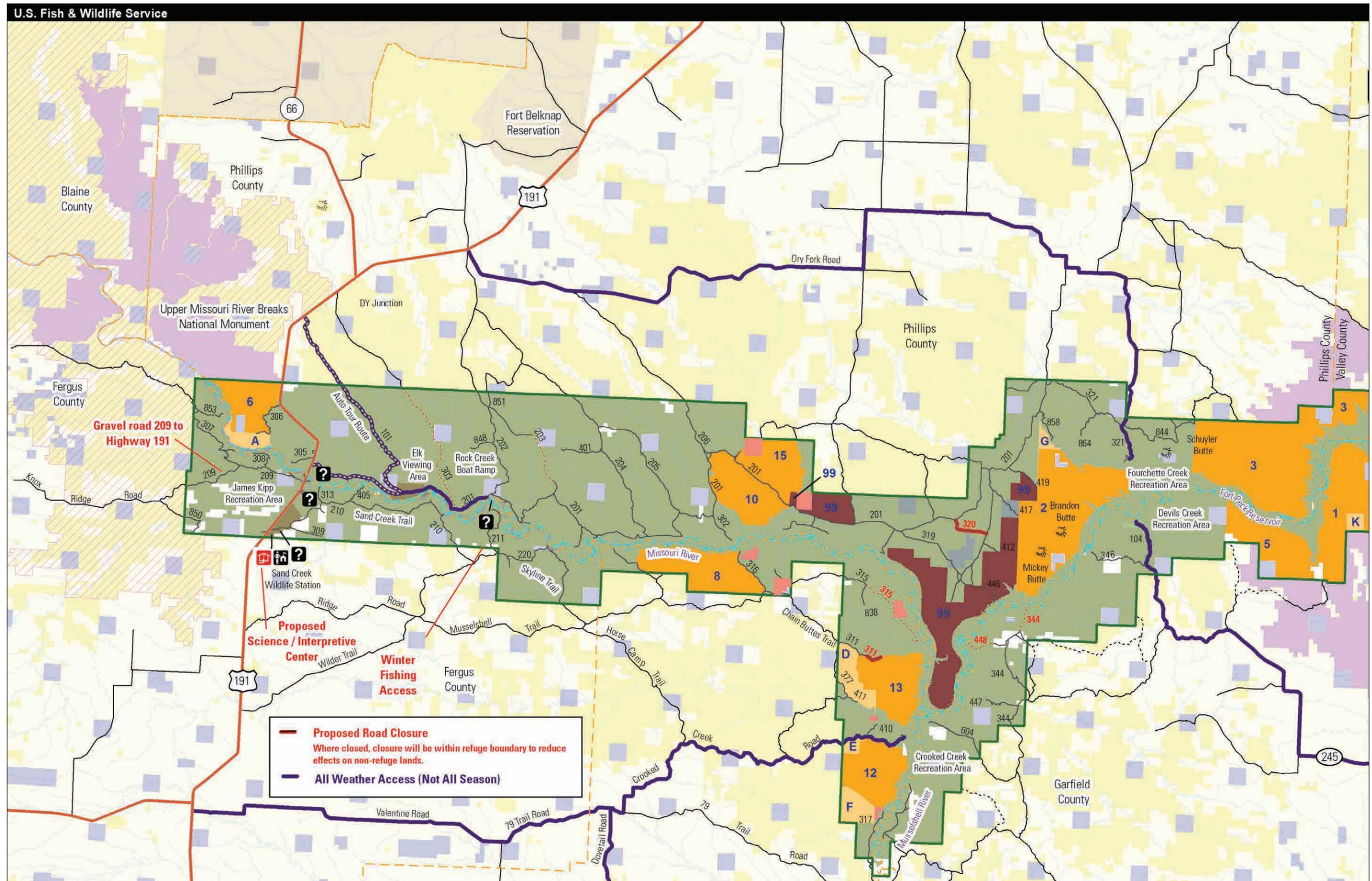


Figure 41. Map of management direction for the Charles M. Russell and UL Bend Refuges, Montana.

Figure 41 (west)

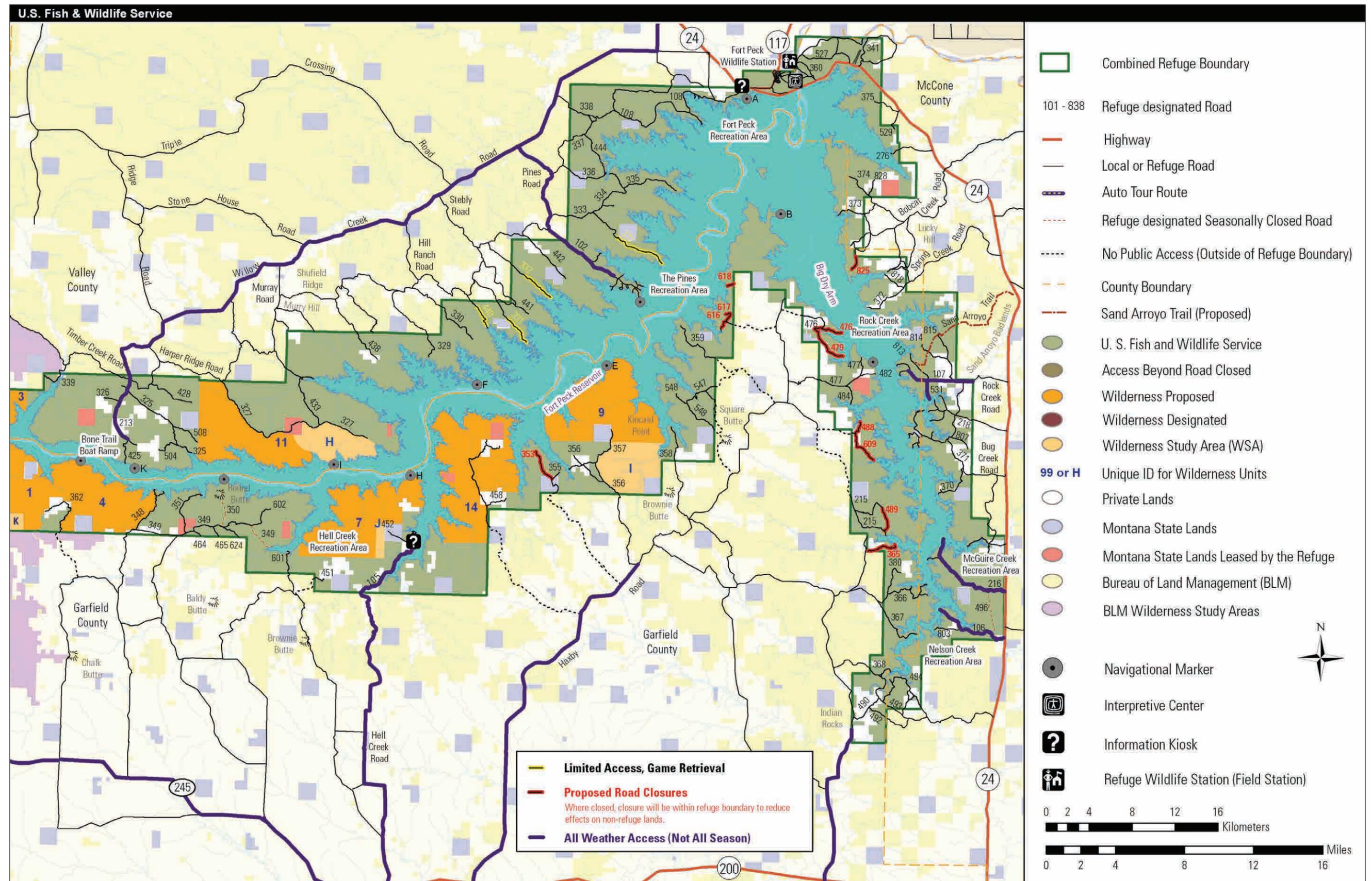


Figure 41 (east)

than an individual refuge, the Service is beginning to adopt other terminology, such as “surrogate species,” under these efforts. Surrogate species is a term for species-based conservation planning; it can include various categories such as focal, target, umbrella, representative, keystone, indicator, and flagship species.

Organization of the Objectives

The following sections, organized by goal title, contain the specific objectives designed to achieve the goals and meet the ecological processes emphasis of the plan. Rationale and strategies are also described for the objectives.

- 4.2 Goal for Habitat and Wildlife Management
- 4.3 Goal for Threatened and Endangered Species and Species of Concern
- 4.4 Goal for Research and Science
- 4.5 Goal for Fire Management
- 4.6 Goal for Public Use and Education
- 4.7 Goal for Wilderness
- 4.8 Goal for Cultural and Paleontological Resources
- 4.9 Goal for Refuge Operations and Partnerships

Objectives for the first four goals above—habitat and wildlife, threatened and endangered species and species of concern, research and science, and fire—are intricately linked in managing habitat, wildlife, and water resources.

4.2 GOAL for HABITAT and WILDLIFE MANAGEMENT

Conserve, restore, and improve the biological integrity, environmental health, and ecological diversity of the refuge’s plant and animal communities of the Missouri River Breaks and surrounding prairies to support healthy populations of native plants and wildlife in a changing climate. Working with others, reduce and control the spread of nondesirable, non-native, invasive plant and aquatic species for the benefit of native communities on and off the refuge.



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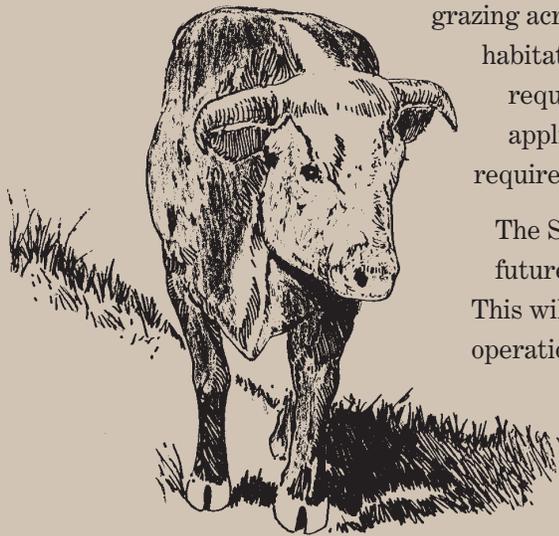
The use of prescribed fire, wildfire, and grazing by wild ungulates and livestock is addressed.

What is Prescriptive Livestock Grazing on the Refuge?

Prescriptive livestock grazing is the planned application of livestock grazing at a specified season, duration, and intensity to achieve specific vegetation objectives. The objectives are designed to meet the broader habitat and wildlife goals. Rather than managing refuge resources to support livestock grazing or other economic uses, livestock grazing is used as a habitat management tool to achieve the goals and objectives for wildlife habitat (FWS 2001).

The Service has been gradually making the transition to prescribed livestock grazing for more than 20 years as a result of the 1986 record of decision on an earlier EIS (FWS 1986) and Service policies that resulted from passage of the Improvement Act—compatibility (FWS 2000a) and biological integrity (FWS 2001). Current prescribed grazing is applied on about 34 percent of the refuge. In practice, these current grazing prescriptions range from variable livestock timing and distribution to long-term rest or permanent exclusion.

Future prescriptive grazing regimens may include short-duration, high-intensity grazing treatments to control invasive plants (FWS 2011b); habitat management for specific wildlife or focal bird species; or multiple-unit rotational systems to provide long-term rest between grazing treatments. These and other prescriptions such as pyric herbivory will be considered for achieving habitat objectives and developing a mosaic of desired habitat conditions that support a variety of wildlife species.



The Service will continue the transition to prescribed grazing across the refuge. The Service will identify habitat-based objectives to support the life requirements of wildlife species and, where applicable, use grazing as a tool to achieve the required vegetation structure and composition.

The Service will communicate with existing and future grazing permittees as HMPs are developed. This will help permittees to plan and adapt their operations at the same time the Service is applying prescriptive grazing as a management tool to meet habitat and vegetation objectives.

Section 1.2 in chapter 1 has more information on the Service's biological integrity policy. Section 3.2 in chapter 3 describes the history of livestock grazing on the refuge and upland vegetation monitoring.

HABITAT MANAGEMENT

Where feasible, the Service will apply management practices that mimic and restore natural processes on the refuge, managing for a diversity of plant species in upland and riparian areas. The Service will maintain plant diversity and health using fire in combination with wild ungulate herbivory (wildlife feeding on plants) or prescriptive livestock grazing, or both, to ensure viable populations of sentinel plant species (species that decline first when management practices are injurious).

The emphasis on ecological, or natural, processes recognizes the importance of fire, grazing by ungulates, hydrology, temperature, nutrients, and soil compaction in shaping and sustaining diverse, healthy habitats on the refuge. Initially, this will

include a concerted manipulation of habitats or wildlife populations (prescribed fire and grazing and hunting) through coordinated objectives. Eventually, the Service will favor more passive approaches using fire, grazing, or flooding, which require less manipulation and money.

The habitat objectives are split into four vegetation categories:

- upland
- river bottom
- riparian area and wetland
- shoreline

In addition, there are objectives for two major factors—invasive species and climate change—that influence habitat.

OBJECTIVES for HABITAT

UPLAND OBJECTIVES

Each species of wildlife that uses the uplands has unique habitat needs. Their needs for food, water, and protection are different. Ecological processes (disturbances) affect each species' habitat. The major disturbances that occur in the uplands are herbivory (ungulate grazing) and fire. Uplands exist in alternate states depending largely on the frequency and intensity of herbivory and fire.

The Service will promote ecological resilience, restore the pyric herbivory, promote animal movement with long periods of abandonment to reduce plant species selectivity, increase landscape species and structural heterogeneity, and improve wildlife diversity.

Although the upland habitat objectives are intended to improve conditions for a broad range of resident and migratory wildlife species that use the refuge, the objectives will complement the Service's efforts toward bird conservation and protecting and enhancing threatened and endangered species and species of concern (refer to section 1.4 in chapter 1).

The Service has identified six focal bird species for monitoring the health of uplands: long-billed curlew, Sprague's pipit, Baird's sparrow, brown creeper, sharp-tailed grouse, and greater sage-grouse (refer to the "Bird Objectives" below and section 3.2 in chapter 3).

Prescriptive livestock grazing, as described below, is one of the strategies the Service uses, where appropriate, to achieve upland habitat objectives. (Refer to the facing inset, "What is Prescriptive Livestock Grazing on the Refuge.")



Dave Menke / USFWS

Upland habitat is important to the lazuli bunting.

UPLAND OBJECTIVE 1. Within 5 years, develop new HMPs including inventory and monitoring plans based on soil characteristics, historical fire occurrence, and hunting district boundaries. Include effective implementation of new management strategies (prescriptive pyric herbivory, prescribed fire and wildfire return, and sentinel plant monitoring and enhancement) that achieve desired habitat conditions and restore ecological resilience.

(Refer to the end of Upland Objective 7 for criteria for successful implementation.)

UPLAND OBJECTIVE 2. Within 6–9 years, consolidate the 65 habitat units into 3–8 units for restoration of the pyric herbivory, long-distance animal movement, long periods of abandonment, reduced selectivity for sentinel species, and increased landscape species and structural heterogeneity (diversity or dissimilar species within a landscape) to promote resilience and stability of ecological systems.

UPLAND OBJECTIVE 3. Over 15 years, evaluate the success of prescriptive grazing and the pyric herbivory program with HDPs and sentinel plant monitoring in locations where the Service has the capability to manage ungulates effectively (no common pastures, and large enough refuge acreage). Measure success through a comprehensive monitoring program that evaluates changes in viability, distribution, and robustness of individual sentinel plants within established plots. Develop adaptive management changes if sentinel plants continue to decline (refer to section 4.11 and figure 42). Adhere to the Service's information quality guidelines and peer review of scientific information (FWS 2011a).

UPLAND OBJECTIVE 4. Within 2–4 years, begin working with range ecologists and biostatisticians to develop and establish a protocol to assess the effectiveness of the sentinel species concept on select areas of the refuge absent of livestock. Every 7–10 years, monitor habitat health, heterogeneity, and ecosystem resilience (the ability to recover from disturbance or stress).

UPLAND OBJECTIVE 5. Over 15 years, increase both the population viability and a 10- to 15-percent increase in coverage by winterfat, saltbush, grey rubber rabbitbrush, and other fire-adapted sentinel species on sites with remnants of these species across 20–30 percent of the refuge.

(Refer to the end of Upland Objective 7 for criteria for successful implementation.)

UPLAND OBJECTIVE 6. Over 15 years, maintain existing stands or densities of fire-intolerant big sagebrush on fire refugia to support sage-dependent wildlife species in each of the habitat units while restoring shrub diversity in the shrub-steppe uplands (such as fire refugia, sage-grouse leks, and the UL Bend Refuge).

UPLAND OBJECTIVE 7. Over 15 years, increase both the population viability and 10- to 15-percent increase in coverage by purple prairieclover, white prairieclover, dotted gayfeather, purple coneflower, stiff sunflower, and other sentinel forb species as appropriate to the sites with remnants of these species across 20–30 percent of the refuge to restore diversity, promote the ecological resilience of highly palatable, summer-growing forbs, and enhance the required



Maximilian Sunflower

habitat of the focal bird species identified in the bird objectives.

Successful implementation of Upland Objectives 5–7 is defined as follows:

- Fifty percent of populations of winterfat, salt-bush, grey rubber rabbitbrush, and other fire-adapted sentinel shrub species are able to reach their height and fruit-bearing potential and successfully recruit young plants into the populations on uplands without physical protection during normal weather conditions.
- Fifty percent of populations of chokecherry, golden currant, redosier dogwood, green ash, silver buffaloberry, aspen, cottonwood, limber pine, and other fire-adapted sentinel species are able to reach their height and fruit-bearing potential and successfully recruit young plants into the populations in coulees and riparian areas.
- Populations of purple prairieclover, white prairieclover, dotted gayfeather, purple coneflower, stiff sunflower, Maximilian sunflower, and other sentinel forb species increase in coverage on remnant sites by approximately 10 percent over 15 years.
- Fire-intolerant species are maintained in areas that did not burn or where there is a low fire-return interval.
- Habitat is enhanced to meet the needs of focal bird species (refer to bird objectives below).

Rationale for Upland Objectives 1–7. While several existing habitat units have recovered from past abuses, there are currently several units that are not meeting their stated habitat objectives as identified in the 1986 EIS and associated HMPs. A principal focus of upland management is the directive found in the Service’s Biological Integrity, Diversity, and Environmental Health Policy (FWS 2001). Additionally, using the concepts of resilience management (Resilience Alliance 2007), the Service will strive to improve the resilience in the refuge’s ecological systems. Key components of resilience management include major ecological processes or disturbances, alternate stable states, thresholds between states, adaptive cycles, cross-scale interactions, interventions, and management.

The concept of sentinel species monitoring is not new. In 1947, Aldo Leopold discussed diagnostic plant species that were early to respond to ungulate grazing pressure (Leopold et al. 1947). More recently, focal species are understood to be the individual wildlife species that have the most stringent limitations for area, dispersal, or resources or are limited by ecological processes (Lambeck 1997). While animal species are clearly the best indicators of habitat area and dispersal needs, plant species (as suggested by Landsberg and Crowley, 2004) are important indi-

cators of habitat quality and the ecological processes that sustain it. An important limiting component for many, if not most, animals is the availability of quality foods (White 1978). Even generalist herbivores prefer the highest quality plants (Mysterud 2006), which are the first to decline or disappear. Sentinel plant species include the most valuable wildlife forage, fruit, and pollen-producing food plants. Sentinel species are also important indicators for monitoring biological diversity (Cousins and Lindborg 2004, Cushman et al. 2008, Gibson and Bosch 1996, Noss 1990, Rogers and Biggs 1999, Simberoff 1998), which are a critical component of wildlife conservation and a defining purpose of the Refuge System. Monitoring for sentinel plants is a key measure of success or failure of the Service’s desire to promote ecological resilience by managing for natural and diverse processes.

Resilience is the ability to absorb disturbances, to be changed, and then to reorganize and still have the same identity, that is, keep the same basic structure and ways of functioning. A resilient system is forgiving of external shocks; a disturbance is unlikely to affect the whole. As resilience declines, the magnitude of a shock from which it cannot recover gets smaller. A resilient habitat (1) sustains many species of plants and animals and a highly variable structural composition; (2) is asymmetric; (3) exemplifies biological integrity, biological diversity, and environmental health; and (4) adapts to climate change (Resilience Alliance 2007).

In contrasting stability and resilience, Holling (1973) writes, “A management approach based on resilience, on the other hand, would emphasize the need to keep options open, the need to view events in a regional rather than local context, and the need to emphasize heterogeneity. Flowing from this would be not the presumption of sufficient knowledge, but the recognition of our ignorance; not the assumption that future events are expected, but that they will be unexpected. The resilience framework can accommodate this shift of perspective, for it does not require a precise capacity to predict the future, but only a qualitative capacity to devise systems that can absorb and accommodate future events in whatever unexpected form they may take.”

The following sources have more information about managing ecological resilience: Gunderson and Holling (2002), Walker and Salt (2006), Norberg and Cumming (2008), and the Resilience Alliance (2007).

As part of the actions needed to improve the resiliency of the refuge’s habitats, there is emphasis on restoring the environmental processes, plants, and animals that have been damaged—for return of the evolutionary forces of fire and herbivory that shaped this landscape during the past 6,000 years (Higgins et al. 1986). Total ungulate effects and fire effects on

plant communities will be measured with sentinel species. More discussion on sentinel plants is in section 4.1 above, and a list of the sentinel species is in appendix G.

When declining trends are found or when competition for resources results in habitat damage, livestock numbers will be reduced or eliminated before wild ungulates. The Service estimates it could convert about 75 percent of the refuge to prescriptive grazing due to the need to add or remove fences. The Service will remove interior fences to facilitate management of environmental processes including patch burning and long-distance movement of animals. Much of the fencing work that remains is in rugged terrain, and the work will need to be prioritized. As money and resources allowed, the refuge will continue to convert to prescriptive grazing over 15 years.

Several refuge permittees have grazing permits that include Service lands, BLM, and DNRC lands. The implementation of prescriptive grazing on Service lands may negatively affect the ability of permittees to continue to graze DNRC lands within the refuge boundary. It is not the intent of the Service to negatively affect DNRC's ability to meet their obligation of generating revenue for local schools. The Service will work with local DNRC land managers to allow permittees continued access for grazing DNRC lands. If current permittees of DNRC lands do not want to keep their permits, the Service will work within current budget constraints to obtain leases that benefit refuge management activities.

Since the demise of the wild bison in 1881 (FWS 2010d), the fire-return interval has lengthened on the refuge, and the fires that do occur are often more intense than commonly happened historically (Frost 1998). Figure 13 in chapter 3 shows the fire frequency intervals found on the refuge. This map will continue to be checked and updated for accuracy, but it currently provides a good representation of fire frequency. The fire-grazing interaction (which included intense herbivory after fire, long-distance movement, and years of abandonment) was replaced by constant grazing and no fire with the transition to ranches, fences, and livestock. The landscape changed from patches of diverse habitats to a more uniform landscape as a result of constant fire suppression and annual grazing within fenced pastures (Fuhlendorf and Engle 2001). Today, many species of plants that are fire-adapted, fire-dependent, or highly palatable have been locally eliminated or reduced to remnants. In the uplands, the formerly diverse shrub-steppe community now supports extremely low populations of fire-adapted, palatable shrub species such as saltbush, winterfat, silver sagebrush, and grey rubber rabbitbrush. The landscape today is almost a monoculture of relatively unpalatable and fire-intolerant

big sagebrush. In addition, highly palatable forbs such as white prairieclover are gone from most sites. Introduced plants such as Japanese brome and yellow sweetclover have prospered in this environment and have replaced native species that are more valuable. The lack of variety in management strategies has additionally reduced the heterogeneity of plant community structure.

These changes have affected wildlife populations. For example, grassland bird species have declined at a faster rate than any other guild of terrestrial birds in North America (Fuhlendorf and Engle 2001, Knopf 1994). Particularly affected are the focal bird species and sentinel habitats that are positioned at the ends of natural processes such as those species that live in the wake of recent fire or require long periods of no disturbance, such as Baird's sparrow (Green et al. 2002) and Sprague's pipit (Robbins et al. 1999, FWS 2010e). Also affected are species that require a wide diversity of vegetation structure, plant species, and insect species within their home ranges such as sharp-tailed grouse and greater sage-grouse. There are similar concerns for some small mammals, invertebrates, and other wildlife groups. Refer to "Bird Objectives" below for more literature about focal birds.

Upland health will be restored on the refuge by reestablishment of historical fire-return intervals and the historical fire-grazing interaction. There will be careful control of the numbers of all ungulate species (both wild and domestic) to compensate for the overgrazing effects of the last 100–150 years. However, the Service will protect sagebrush areas that are important for greater sage-grouse (refer to prescribed fire objectives below).

Inventory and monitoring procedures will focus on sentinel plant species and focal bird species that have been most severely affected. Monitoring will also include the grasses and other plants to ensure that all species' populations are viable.

Strategies for Upland Objectives 1–7

- Within 2–4 years, fully determine the species of plants that are first to decline and the cause of the decline (refer to appendix G for the list of existing sentinel species). Tie habitat monitoring to focal bird species monitoring (for more information, refer to "Bird Objectives" below, section 3.2 in chapter 3, and appendix G).
- Continue to work with range ecologists and use current monitoring results, along with newly acquired information, to develop adaptive management strategies. Make sure monitoring protocols meet Service information quality guidelines (FWS 2011a).
- In cooperation with universities, NRCS, and other partner scientists and statisticians, con-

tinue to develop and monitor methods for identification, inventory, and monitoring of sentinel plant species. Reduce HDP monitoring as sentinel plant-monitoring procedures are developed that efficiently and consistently monitor habitat conditions.

- In cooperation with NRCS, reestablish populations of sentinel plant species on 50 percent of the sites where they have been eliminated.
- Evaluate important habitat areas for focal bird species where fire will be detrimental and protect those areas (refer to prescribed fire objectives in the next section).
- Improve the population viability of herbivory-sensitive sentinel plant species in four ways: (1) control numbers of ungulates (domestic and wild); (2) coordinate management of ungulates and fire; (3) reduce selectivity by ungulates for sentinel species through pyric herbivory; and (4) manage for long (several-year) periods of rest or abandonment.
- When monitoring of the population viability of herbivory sensitive sentinel plant species indicates a declining population, manage livestock grazing by reducing AUMs or the season of use or by resting areas. If sentinel plant populations continue to decline after elimination of livestock grazing, explore opportunities to promote periods of rest or abandonment for sensitive areas. If sentinels continue to decline due to herbivory pressure, work with MFWP to reduce the numbers of large ungulates throughout the Missouri River Breaks to levels lower than objectives in MFWP's management plans.
- Manage the landscape with pyric herbivory to restore historical fire-return intervals and the fire-grazing interaction including concentrated herbivory coupled with long periods of abandonment to increase the amount and diversity of palatable plants to reduce selectivity for sentinel species.
- Evaluate the success of habitat treatments (the population viability of all species and the structural heterogeneity of the landscape) using methods developed by universities, NRCS, the Service, or other scientists. Focus on viability analysis of sentinel plant species populations at permanent trend sites.
- As HMPs for prescriptive grazing are developed, conduct fence projects based on defined priorities to achieve removal of interior fences on about 10–25 percent of the refuge and construction of boundary fences where absent. Use practical fencing strategies in cooperation with other landowners in areas where topography is too rugged.
 - Hire seasonal employees for fence removal and professional fence builders for boundary fence construction; the remaining boundary fences are located in the most difficult terrain.
 - Within 6–9 years, implement prescriptive grazing and pyric herbivory across 50–75 percent of the refuge to restore the resilience and stability of ecosystems on the refuge through the development and implementation of HMPs by working with BLM, DNRC, conservation districts, and permittees. Use prescriptive grazing only on Service-managed lands (refer to the prescriptive grazing explanation in the introduction for “Habitat—Upland” objectives). Because it is possible that prescriptive grazing practices on Service lands may negatively affect current permittees that graze BLM, DNRC, and Service lands, work with DNRC as budgets allow to mitigate any loss of revenue by assuming leases on these pastures.
 - Coordinate the construction of boundary fences to facilitate moving to prescriptive grazing with BLM, DNRC, and local ranches. Communicate with permittees as HMPs are developed so they can make plan and adjust their operations for future grazing needs.
 - Continue to collect grazing fees in accordance with the region 6 grazing policy.
 - Continue to issue special use permits for grazing on the State school sections that recognize those AUMs allotted.

RIVER BOTTOM OBJECTIVES

River bottoms are areas above high pool of the lake exclusively on the west end of the refuge and within the original floodplain of the Missouri River. These areas consist of former agricultural fields that are now infested with invasive plants. There are 17 river bottoms totaling 5,000–7,000 acres on the west end of the refuge. Two river bottoms are undergoing restoration, and the other 15 areas have about 4,500–6,000 acres that need the removal of invasive plants (refer to figure 20 in chapter 3). The plant communities left on the river bottoms have now mostly been invaded by Russian knapweed, leafy spurge, smooth brome, and quackgrass, which have very little value to wildlife.

Restoration of the river bottoms will consist of a healthy native plant community including those that occurred on the river bottoms 150 years ago. Climax river bottom communities include, but are not limited to, Maximilian sunflower, diamond bark willow, sand bar willow, redosier dogwood, green ash, cottonwoods, and grasses.

Refuge staff started restoring 160 acres of bottomlands in 2005 and an additional 160-acre project began in 2009 on the west end of the refuge. Three



R.A. Howard Image Collection / Smithsonian Institution

Redosier Dogwood

bird species, all migratory birds, were selected as focal species that are important for monitoring the health of river corridors: red-eyed vireo, Brewer's blackbird, and veery. For more information about the objectives for these species, refer to "Bird Objectives" and "Threatened and Endangered Species and Species of Concern Objectives" below.

RIVER BOTTOM OBJECTIVE 1. Within 1–3 years, identify and rank according to priority and resource value all former farm fields on river bottoms that have been invaded by invasive plants. Develop a comprehensive plan that identifies methods and timeframes for completing each phase.

RIVER BOTTOM OBJECTIVE 2. Within 2–4 years, work with NRCS and cooperators to develop restoration plans for each bottomland necessary to carry out the comprehensive restoration plan. Address in treatment plans the equipment needs, invasive species control, a farming plan, native plant composition mix for planting, grants, and partnerships.

RIVER BOTTOM OBJECTIVE 3. Within 3–5 years, begin implementing the approved restoration plan on the first river bottom on the priority list.

RIVER BOTTOM OBJECTIVE 4. Over 15 years, develop and carry out a habitat-monitoring plan to determine success of invasive plant removal efforts. Make adjustments to ensure successful native plant restoration.

RIVER BOTTOM OBJECTIVE 5. Over 15 years, complete 20–30 percent of the identified restoration projects (more if funding is available). If time, personnel, and funding allows, start one new river bottom project every 2 years until all are restored to healthy native plant communities.

Rationale for River Bottom Objectives 1–5. A healthy diverse native plant community in the river bottoms will enhance wildlife diversity and populations in

addition to promoting biological diversity, ecological integrity, and environmental health. Healthy stands of native plants withstand or outcompete many non-native species and create many more niches than that of monoculture food plots or invasive plants.

Native plant communities that once existed on these bottoms have been unable to reestablish themselves. This is most likely due to a lack of viable seed sources and competition from nonnative species. Restoring river bottoms with native species will allow these areas to perform their natural ecological function of trapping sediment during floods, which promote cottonwood regeneration. In addition, these native plants provide valuable wildlife habitat for numerous species. Vibrant native species will promote resilience and resist invasive species invasions in the future. The approach toward removing invasive plants in river bottoms will be gradually carried out. This is due to the expense and time needed to establish native plants.

Once established, the correct combination of native forbs, shrubs and grasses, such as Maximilian sunflower, wild licorice, basin, wildrye, green needlegrass, redosier dogwood, and silver buffaloberry will be highly competitive with nonnative plants (Riley and Wilkinson 2007). NRCS' ecological site description has a complete list of native plants that most likely occurred on these sites (NRCS 2009).

In sensitive areas like river bottoms, fencing will be used to exclude livestock except at designated water gaps (areas where livestock can access water).

Refuge staff will continue to consult with NRCS range specialists and design a restoration program that includes prescribed fire, herbicide application, short-duration grazing to reduce invasive species (FWS 2011b), tilling, and native seed planting.

Strategies for River Bottom Objectives 1–5

- When native forbs and grasses are reestablished, plant native shrubs in the fields and protect them

from browsing by total exclosures until they are able to grow out of the browse zone. Water shrubs and trees four to six times during the first summer they are planted.

- Continue restricting domestic livestock grazing from the river bottoms unless a short-term grazing application is needed to control invasive species.
- Continue to seek partnerships for projects already in progress to remove invasive plants in river bottoms.
- Continue to seek outside funding opportunities such as grants from The Rocky Mountain Elk Foundation and other cooperators to secure necessary money to acquire equipment and supplies as needed.
- Hire a grant writer to pursue more funding avenues to secure money for weed removal projects.
- Clean former river bottoms through the application of herbicides and farming. If money permits, hire a biological technician who is knowledgeable in planting crops to start work on the first river bottom on the priority list.
- Work with NRCS and cooperators using knowledge gained from prior projects and experiences to establish methods of operation.
- Coordinate work with the road maintenance staff to fix roads necessary to safely access river bottoms. Some areas will have to be accessed by foot or horse.
- Initially burn areas to be planted and have the Service's weed strike team spray invasive plants. Plant areas with wildlife food crops to clear invasive plants. Follow with native plantings after invasive plants have been removed to meet national and regional priorities.
- Over 15 years, continue to monitor and spot treat all invasive plants that may become established.

RIPARIAN AREA and WETLAND OBJECTIVES

Riparian habitat areas include wetland and upland vegetation associated with rivers, streams, and other drainage ways. Riparian and wetland areas provide important habitat for a variety of wildlife species, ranging from reptiles and amphibians to upland mammals and many birds. While riparian areas occupy a small proportion of the landscape, wildlife and livestock depend on these areas more than any other habitat type (Kaufman and Krueger 1984, Johnson et al. 1977, Ames 1977). The ability of a riparian site and its associated stream reach to perform normal riparian functions determines the health of the site. Other important functions of riparian vegetation

include sediment filtering, streambank stabilization, water storage and aquifer recharge, and dissipation of streamflows (Hansen et al. 1995).

Select stock ponds will be maintained and rehabilitated. Riparian habitat will be restored where possible and standard watershed management practices will be enforced. Water rights will be adjudicated and defined. The Service will work with others to restore or encourage natural water development within streams such as increased flow, pools, and beaver ponds to restore ecological processes. The Service will refer to riparian area research and publications for guidance on improving water quality in identified areas. Additionally, the Service will assess the uses and needs of current reservoirs and remove those no longer needed for livestock or wildlife. Artesian wells will be capped to prevent depletion of ground water. The Service will carry out all refuge management activities for water development in accordance with the final outcome as decided by the Montana Reserved Water Rights Compact Commission (refer to "Water Resources" under section 3.1 in chapter 3).

Four focal bird species have been identified for monitoring the health of riparian areas and wetlands: ovenbird, Cordilleran flycatcher, black-billed cuckoo, and western wood-pewee. (Refer to "Bird Objectives" and "Threatened and Endangered Species and Species of Concern Objectives" below.)

RIPARIAN AREA and WETLAND OBJECTIVE 1. Within 2–4 years, carry out management actions to restore the health of those streams identified as "nonfunctional" (unhealthy) or "functional at risk" (healthy, but with problems). Reassess in 10–15 years using the Lotic Wetland Health Assessment Survey (Ecological Solutions Group 2011) to measure achievement of at least 75 percent of the 82 miles of stream and 1,300 acres of riparian areas that, when resurveyed, have improved to the next category ("nonfunctional" improved to "functional at risk" and "functional at risk" improved to "functioning"). Maintain 90 percent of the reaches assessed as "functioning" (healthy) in the 2009 survey (Ecological Solutions Group 2009) at that level.

RIPARIAN AREA and WETLAND OBJECTIVE 2. Over 15 years, remove all reservoir and stock ponds that do not support species of concern (for example, northern redbelly dace and finescale dace) and, adhering to any permit requirements, begin restoration of the natural hydrology of the drainage. Determine if more stock ponds are needed to meet the needs of target species. Coordinate with Montana Department of Environmental Quality for impoundment plans to ensure consistency with the total maximum daily load assessments and water quality restoration plans.

Any stock pond removal will depend on the outcome of the adjudication of water rights through the Montana Reserved Compact Commission (refer to “Water Resources” under section 3.1 in chapter 3). Stock pond removal and riparian area restoration could require more permitting through USACE or through coordination with other Federal and State agencies.

RIPARIAN AREA and WETLAND OBJECTIVE 3. Within 4–6 years, for those reservoirs and stock ponds that cannot be removed due to species of concern, maintain or improve these areas for amphibian, reptile, bird, or fish use.

RIPARIAN AREA and WETLAND OBJECTIVE 4. Over 15 years, survey the current health of a representative sample of segments of the Missouri River using the “U.S. Lotic Wetland Health Assessment for Large River Systems” (Ecological Solutions Group 2011).

RIPARIAN AREA and WETLAND OBJECTIVE 5. Within 5–7 years, resurvey the current health of segments previously surveyed on the Musselshell River by the University of Montana, Riparian and Wetland Research Program, between 1999 and 2000 using the “U.S. Lotic Wetland Health Assessment for Large River Systems” (Ecological Solutions Group 2011).

RIPARIAN AREA and WETLAND OBJECTIVE 6. Over 15 years, construct wildlife-friendly fence based on highest need as determined by current river health assessments along Missouri and Musselshell Rivers where prescriptive livestock grazing will be occurring (Paige 2008).

RIPARIAN AREA and WETLAND OBJECTIVE 7. Over 15 years, provide alternate water sources for cattle away from riparian areas and sensitive upland sites, on a priority basis, where prescriptive grazing is needed to accomplish habitat objectives.

RIPARIAN AREA and WETLAND OBJECTIVE 8. Over 15 years, identify locations along riverbanks in need of stabilization and revegetation, and restore 50–75 percent of those locations.

RIPARIAN AREA and WETLAND OBJECTIVE 9. Over 15 years, restore the natural hydrology of five first-, second-, and third-order streams that would normally flow into the Missouri and Musselshell Rivers.

Rationale for Riparian Area and Wetland Objectives 1–9. The first priority for riparian area restoration is those sites already found to be nonfunctioning as identified by the latest riparian area study completed in the summer of 2009 (Ecological Solutions Group 2009).

Restoration measures will vary depending on the condition and trend of the riparian-wetland habitat. Considerations should include the potential of



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Restoration will benefit riparian areas and associated wildlife that are currently impacted.

the site; desired plant community; stabilization of streambanks and elimination of hoof bank-shearing (where impacts from hooves shear off bank segments); value of site for forage production; and amount of vegetation stubble required to trap and hold sediment deposits during runoff events. For instance, if one of the objectives for a riparian-wetland area is streambank stability, then woody vegetation vitality should be of utmost importance due to the vastly different streambank stability protection afforded by the woody vegetation when compared to the herbaceous vegetation (Hansen 1992). Also to be considered are water quality and quantity issues, wildlife, aesthetic values, amount of time for restoration, and reduction of erosion and maintenance of soil production (Hansen 1992).

Key species vary with the potential of each site. The Riparian and Wetland Research Program, University of Montana, developed the key to riparian and wetland sites of the refuge (Hansen 1995, Parker et al. 1996). This reference should be used whenever possible. Willows and other large woody vegetation (such as trees) filter large waterborne organic material and their root systems provide streambank stabilization. Sedges, rushes, grasses, and forbs capture and filter out the finer materials while their root masses help stabilize streambanks and colonize filtered sediments (Hansen 1992).

The objectives and strategies recognize the habitat value of stock ponds. Phytoplankton (algae) is consumed by zooplankton, insects, crustacean, and tadpoles that live in ponds. Larger invertebrates, amphibians, reptiles, fish and birds also will use a stock pond. (NRCS 2005b).

Fencing will be used to exclude livestock from the vast majority of the riparian habitats along the Missouri and Musselshell Rivers. Livestock has been excluded by fencing in a few other important riparian areas (for example, Rock Creek in Phillips County and Bobcat Creek in McCone County). Through changes in ranch ownership, management

changes and other factors, livestock grazing has been reduced or eliminated from several other habitat units and conditions in these riparian habitats are improving.

Strategies for Riparian Area and Wetland Objectives 1–9

- Contract with a qualified riparian habitat consultant to resurvey riparian areas surveyed by Cook et al. (1996), Parker and Hansen (1996), Thompson and Hansen (1998 and 1999), Montana Department of Environmental Quality (2001), and Ecological Solutions Group (2009) to determine current health.
- Set priorities for stream restoration using Thompson and Hansen (1999) (functioning versus nonfunctioning streams) and USGS gauge information. Establish more permanent stream gauging stations on refuge. Identify species of concern that are being affected by nonfunctioning streams, and identify dams on private and BLM land off refuge that have the ability to influence stream health on the refuge. Define realistic and attainable management objectives for the site or stream reach.
- Set priorities for stream restoration based on water rights or the ability to influence stream health.
- Locate key areas for monitoring in representative parts of the riparian-wetland areas as well as in the uplands.
- Determine the amount of vegetation stubble required to trap and hold sediment deposits during runoff events to rebuild streambanks and restore and recharge aquifers.
- Reestablish vegetation along streambanks using willow cuttings, tree revetments, perennial grasses or other streambank stabilization planting techniques.
- Restore the refuge prairie streams by using enclosures in riparian areas, applying prescriptive livestock management, rehabilitating stock reservoirs that are no longer needed and planting riparian species, placing salt and mineral blocks, establishing or improving off-stream watering sites, installing stable access points to limit streambank trampling, requiring permittees to use riders to keep herds out of riparian areas, considering different turn-in locations, placing instream structures such as boulders to increase the water tables (Fitch and Adams 1998, Leonard et al. 1997, Kaufman and Krueger 1984, Ehrhart and Hansen 1997, Wyman et al. 2006).
- Restore the beaver colonization of perennial and intermittent streams.
- Seasonally restrict livestock access to wetlands or limit duration and intensity of use and establish water troughs with escape ramps (troughs should not be placed in locations that lead to unacceptable effects on important upland habitats (Pilliod and Wind 2008). Where livestock have to cross a stream, construct a bridge, water gap, or streambed crossing.
- Encourage livestock to move away from the stream through several methods such as conducting prescribed burns of uplands to regenerate desirable species or placing salt and supplemental feed in upland areas.
- Apply rangeland rest wherever and whenever possible.
- Incorporate applicable regulatory compliance (such as wetlands permitting or dam safety requirements) into stock pond removal efforts.
- Within stock ponds, incorporate logs for amphibians and turtles to bask; fish, frogs, and salamanders to lay eggs; and birds to perch.
- Provide a buffer of woody vegetation around part of constructed earthen livestock watering ponds.
- Design a monitoring plan that evaluates the effectiveness of the management plan (grazing management must be flexible enough to accommodate changes).
- Monitor vegetation community change in response to management actions by using the U.S. Lotic Wetland Inventory (Ecological Solutions Group 2011) to record species canopy and habitat type or community type covers on a reach of stream and its riparian zone. Quantify such vegetative variables as invasive plants, undesirable herbaceous species, and the structure and diversity of the plant community.
- Determine site potential, existing vegetation types and desired plant community or desired future condition. Continue to exclude livestock from riparian areas if possible.
- Follow Hoitsma Ecological, Inc.'s (2006) recommendations for future riparian area efforts along Telegraph Creek as well as the refuge staff's restoration efforts from 1991 to 1993 in the Rock Creek/Bug Creek Habitat Unit and Hawley Creek.
- Supervise frequently to avoid adverse effects such as trampling damage to streambanks and excessive use.

SHORELINE OBJECTIVES

The shoreline is a highly dynamic area that fluctuates based on lake levels. Shoreline habitat is defined as the vegetation found between current lake level and high pool elevation. This habitat type is used by wildlife during periods of drought when lake levels drop.

The Service does not manage the shoreline but does cooperate with USACE in their efforts to treat invasive species along the shoreline.

Focal bird species were not selected for shoreline habitat because the shoreline is a highly dynamic area that fluctuates based on lake levels. Potential focal bird species such as piping plover and least tern are totally dependent on the shoreline for nesting and the adjacent water for food.

SHORELINE OBJECTIVE 1. When completed, cooperate with USACE and others in implementing the Missouri River Ecosystem Restoration Plan, to address habitat needs for threatened and endangered species and other species along the shoreline.

SHORELINE OBJECTIVE 2. Over 15 years, continue to cooperate with USACE and other partners—such as nongovernmental organizations, neighboring counties, and the State of Montana—in treating a minimum of 200 acres of invasive plant species per year that colonize Fort Peck Reservoir and the Missouri River shorelines.

Rationale for Shoreline Objectives 1–2. USACE has primary jurisdiction for management of the lakeshore areas including treating saltcedar infestations; therefore, the refuge does not take the lead role in managing the shoreline. The Service will defer to the Missouri River Ecosystem Restoration Plan to guide management of this habitat and provide aid as requested. The Service is working in cooperation with USACE and other partners to develop the plan (USACE 2009b) to meet the habitat needs of various threatened and endangered species such as piping plover, least tern, and pallid sturgeon. Once this restoration plan is completed, refuge staff will cooperate to carry out any recommendations that come out of the plan.

Continual water fluctuations and changes in shoreline exposure result in constant infestations of saltcedar along the exposed shoreline. The Service will continue to collaborate with USACE in treating saltcedar, both above and below the high water line. The invasive species discussion below has more details.

Strategies for Shoreline Objectives 1–2

- Maintain water gap structures as the shoreline recedes.
- Coordinate invasive plant control by meeting and cooperating with USACE and other partners to share information and discuss control strategies.
- Use integrated pest management and review literature for updated information on control techniques.
- Map all treatment sites.
- Monitor and re-treat areas to prevent reinfestation.
- Restore bare areas resulting from saltcedar removal to native plant cover and monitor results.
- Obtain help with invasive plant control and monitoring by pursuing additional money through partnerships, grants, and invasive species programs.
- Deploy early detection and rapid response strategies to attack newly found infestations before they become large and costly initiatives.
- Within 1 year, invite all parties who have an interest in invasive plant control to pool their resources and to coordinate control and restoration methods.
- Over 15 years, when money is available, continue to help USACE in controlling saltcedar and restoring cottonwood.
- Over 15 years, continue to help USACE with historical plover and tern surveys so that data remains consistent.

INVASIVE SPECIES OBJECTIVES

The Service will work with many partners to combat invasive plants and encourage growth of native vegetation. When feasible, the Service will also work with USACE and others on habitat enhancement to benefit plovers, terns, or other species of Federal and State concern along the shoreline. The biological potential and economical feasibility of using additional biological control measures will be evaluated for safety and effectiveness as a way to reduce the use of chemical controls for treatment of invasive plant infestations.

The control of invasive weeds and integrated pest management will be done using a variety of tools such as biological and mechanical controls, grazing, and herbicides. The Service will continue to update invasive species mapping, use the Service's weed strike team, and work in partnership with others to reduce weed infestations.

Invasive species objectives apply to both woody and nonwoody invasive plants and aquatic invasives such as zebra mussels.

INVASIVE SPECIES OBJECTIVE 1. Over 15 years, maintain the existing invasive species control program including mapping, use of biocontrol and chemical spraying, weed wash stations, and requiring horse users to use weed-seed-free hay.

INVASIVE SPECIES OBJECTIVE 2. Within 1–3 years, develop an integrated pest management plan (step-down plan) for control of invasive plants.

INVASIVE SPECIES OBJECTIVE 3. Within 5–7 years, map current infestations, and develop a strategy to achieve a 25-percent reduction in acres affected by noxious nonwoody plants.

INVASIVE SPECIES OBJECTIVE 4. Over 15 years, achieve a 25-percent or greater reduction in acres affected by noxious nonwoody plants.

INVASIVE SPECIES OBJECTIVE 5. Within 5–7 years, target further encroachment of invasive woody plants (such as saltcedar and Russian olive) on Fort Peck lakeshores and bays.

INVASIVE SPECIES OBJECTIVE 6. Within 5 years and with adequate funding, reduce the occurrence of invasive, woody plants in riparian areas, primarily the Missouri River and Musselshell River corridors above the full-pool elevation by 10–25 percent.

INVASIVE SPECIES OBJECTIVE 7. Over 15 years, measure trends of invasive species not classified as noxious including Japanese brome, sweetclover, and cheatgrass. Implement adaptive management as appropriate.

INVASIVE SPECIES OBJECTIVE 8. Over 15 years, work with partners to increase public awareness of invasive plants on the refuge and surrounding lands by establishing an improved, coordinated signage system at major entrance points.

INVASIVE SPECIES OBJECTIVE 9. Continue current educational and monitoring efforts in cooperation with MFWP and USACE. Prevent further spread of aquatic invasive species through 2027.

Rationale for Invasive Species Objectives 1–9. Shrub-steppe, grassland mosaic areas throughout western North America continue to decline in quantity and quality due, in part, to invasion by exotic plant species (Samson and Knopf 1994, Bragg and Steuter 1995). River bottoms, lakeshore, and, now, the refuge uplands are experiencing an increase in invasive species. To date, only a small part of the uplands has been mapped for invasive species, and numerous acres could be infested. Studies suggest that shrub-steppe, grassland mosaic bird species favor areas dominated by native vegetation. These bird species include focal

species such as grasshopper sparrow, Baird's sparrow, long-billed curlew, upland sandpiper, mountain plover, lazuli bunting, chestnut-collared longspur, burrowing owl, and greater sage-grouse (Davis and Duncan 1999, Dhol et al. 1994, Fairfield 1968, Johnson and Igl 2001, Kantrud and Higgins 1992, Lindmeier 1960, Maher 1974, Owens and Myres 1973, Stewart 1975, Wilson and Belcher 1989). The degradation of remaining grassland areas in the northern Great Plains is a principle factor in the declining populations of grassland bird species and is likely due to inadequate or improper management.

Monotypic stands of invasive or nonnative species not only have the ability to negatively affect biodiversity but they also alter the flow energy and nutrients in the ecosystem and reduce the resilience of the system.

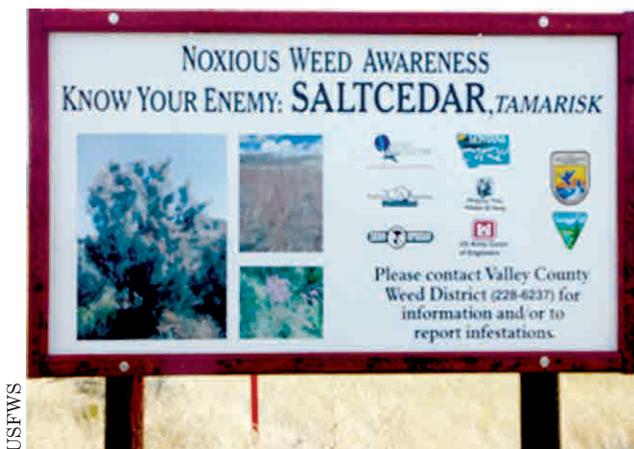
Invasive species such as Russian knapweed, spotted knapweed, leafy spurge, saltcedar and other species are increasing on refuge due to spread from illegal off-road vehicle use, infestations from upstream sites, and changes in lake levels that expose bare lakeshore areas. In 2008, about 1,431 upland acres of undesirable plant species, excluding saltcedar below the high-watermark, were mapped on the refuges.

The Service has been treating new infestations, working with partners to treat high public use areas, sponsoring weed wash stations, promoting education among users toward identifying weeds, and exploring other ways to reduce their spread. The Service will continue to work with partners to improve overall habitat conditions across the refuge. Healthy ecosystems with a diversity of native plants are resilient to new infestations of invasive species (Kennedy et al. 2002).

Long-term control requires the cooperation of public and private land managers throughout the area. A joint effort by all partners is needed to conduct research on finding the best management practices to control or eliminate individual species.

Strategies for Invasive Species Objectives 1–9

- Continue work with partners to provide at least one weed wash station during the hunting season.
- Work with partners to explore options for boat-washing stations.
- Continue to provide educational materials to all contacted hunters and develop additional outreach methods to educate various users on the threat of invasive species to wildlife habitat.
- Work with partners and assess traffic-count data to prioritize areas for location of informational invasive species signage.
- Over 15 years, in cooperation with USACE, treat 200 acres of Service lands plus other USACE acres of saltcedar along the shoreline each year,



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Saltcedar is the most prolific invasive species on the refuge.

depending on funding by contractor and strike team members. Maintain native vegetation in treated areas.

- Emphasize efforts to test and introduce biological controls for saltcedar.
 - Continue to work with Service's invasive species strike team, county weed boards, neighbors and conservation organizations to maintain and update mapping of weed infestations. Review and update the integrated pest management plan every 5 years.
 - Employ hunters in weed monitoring efforts by encouraging them to use their GPS devices to mark infestation sites.
 - Prepare annual progress reports or have meetings to share current treatment techniques and results. In annual updates, include information on what treatment protocols may, or may not, have been successful in achieving stated objectives and any future plans.
 - Conduct inventories, following the Service's invasive species strike team operational guidelines, and include mapping criteria.
 - Store all inventory data in the refuge land Geographic Information System (RLGIS).
 - Repeat inventories at a minimum of 10-year intervals.
 - Apply early detection, rapid response strategies to attack new infestations before they become large and costly to treat.
 - Use GIS to predict areas at greatest risk of new infestations.
 - Conduct a surveillance program for new infestations of invasive plants every 2 years.
 - Every 5 years, complete surveys for invasive plants using GPS map locations. Create a baseline map and collaborate with partners to map records for neighboring lands.
 - Monitor change over time by collecting RLGIS cover-type data for all invasive plant species.
 - Map and store in RLGIS anecdotal observations of infestations made by Service staff while conducting other work activities.
 - Map sites of invasive plant treatment each year in RLGIS.
 - Monitor infestation rates and effectiveness of control efforts.
 - Share GIS layers of invasive plant infestations with partners.
 - Get help with invasive plants (applications and monitoring) by pursuing more money through partnerships, grants, and invasive plant programs.
 - Communicate with local, State, and Federal agencies and the public about invasive plant issues.
- Promptly make information known about new infestations, effective or ineffective treatment methods, and new treatment options.
 - Coordinate invasive plant control by meeting at least once per year with county weed boards, representatives from weed management areas, and other partners to share information and discuss control strategies.
 - Respond promptly to all landowner or other public complaints and address public complaints about invasive plants on Service lands, while using integrated pest management strategies.
 - Ensure seed used to restore habitat is certified weed-free. Avoid buying seed from sources known to have violated the weed-free seed regulation.
 - Begin habitat management treatments to develop habitat that is more resilient to invasive plants.
 - Use short-term livestock grazing applications (prescriptive) to treat infested areas (FWS 2011b).

CLIMATE CHANGE OBJECTIVES

Over the past century, human activities have led to increases in "greenhouse" gases in the atmosphere. These gases are primarily carbon dioxide and methane, nitrous oxide, and halocarbon emissions. Places where atmospheric carbon may be sequestered are the ocean and in plants. About half the carbon emitted during the last 50 years is now stored in these places. The rest has remained in the air. Global temperatures have risen, and sources and sinks of carbon will likely change as climate continues to warm. The following information summarizes information from a comprehensive report produced by the U.S. Global Change Research Program (Karl et al. 2009), which influenced the climate change objectives herein.

Global average temperature and sea level have increased, and precipitation patterns have changed. Global temperatures are expected to rise at least 1 °F over the life of the CCP. Current climate change studies indicate that a further 2 °F increase will lead to severe, widespread, and irreversible negative effects. Global temperatures are expected to continue rising and precipitation patterns will change. Dry areas will be drier and wet areas will be wetter. Sea levels will continue to rise. Currently, rare, extreme weather events will become more common and abrupt changes are possible due ice level collapse, the thawing of frozen soil, and changes in ocean current circulation.

The average U.S. temperature has risen more than 2 °F over the past 50 years and is expected to rise more in the future. Projections of future precipitation indicate that northern areas will be wetter and southern areas, particularly in the west, will be

drier. Extreme weather events, such as heavy downpours of rain, heat waves, regional drought, and hurricanes, have increased in the past 50 years and likely will increase further in the future. Sea levels have risen along the United States' coasts and will continue to rise. Cold-season storm tracks are shifting northward and the strongest storms are likely to become stronger and more frequent. Arctic sea ice is declining rapidly and this is very likely to continue.

As in much of the rest of the Nation, the Great Plains, including the refuge, is projected to experience increases in temperature, evaporation, and drought frequency. The average temperature is expected to increase 2–4 °F by the year 2020 in the plains.

Agriculture and ranching will be stressed by an increasingly limited water supply. Drought- and grazing-adapted weeds will increasingly compete with native vegetation on rangelands. Wetland and riparian areas will decrease in size or be lost. Preservation of native vegetation, wetlands, and riparian areas will require increased vigilance, adaptation, and mitigation as the climate changes.

Based on climate change predictions and following Service and departmental policies and initiatives, the Service will identify (1) species of plants that are likely to be first to decline, (2) animals that are associated with these plant species including insects, birds, and mammals, and (3) species of plants and animals that could increase. Additionally, the Service will design science-based, long-term monitoring protocols to document changes in plant and animal composition or health due to climate change. The Service will coordinate with adjoining agencies and partners to immediately alleviate declines, if needed, using tools such as prescriptive grazing, prescribed fire, or flooding. The Service will cooperate on national and international projects to maintain biological diversity, integrity, and environmental health on a global basis.

Following Service policy and guidelines on climate change initiatives, the Service will carry out the following actions: (1) replace all vehicles with more fuel-efficient vehicles; (2) upgrade offices to “green” standards; (3) consider installing solar panels or small wind turbines for offices and field stations; (4) provide more recycling bins; (5) encourage teleconferencing instead of meetings; (6) encourage staff to be energy efficient (such as turning off lights, recycling, and turning down heat); (7) study and promote the carbon sequestration benefits of the refuge; and (4) consider what conditions precipitated by climate change the refuge may deal with, such as increased drought, longer fire seasons, hotter fires, loss, or increase, of plant and wildlife species, change in migration patterns, and relocation of species.

The Service will implement climate change objectives within the existing habitat management practices.

CLIMATE CHANGE OBJECTIVE 1. Over 15 years, follow Secretarial Order 3289 (DOI 2009) and Executive Order 13514, and implement the Service's climate change initiatives (FWS 2010c) as they apply to the refuge:

- biological planning and conservation design at broad landscape scales
- landscape conservation that supports climate change adaptations by fish, wildlife, and plant populations of ecological and societal significance
- monitoring and research partnerships
- achieving carbon neutrality by 2020
- building capacity to understand, apply, and share terrestrial carbon sequestration science, and work with partners to sequester atmospheric green house gases while conserving fish and wildlife habitat at landscape scales
- providing educational and training opportunities for Service employees about the implications and urgent nature of climate change as it relates to the Service mission and will engage them in seeking solutions
- public education
- partnerships—locally, nationally, internationally.

CLIMATE CHANGE OBJECTIVE 2. Within 3 years, develop a climate change research project with other partners that can be carried out across the Great Plains, which looks at fire, sentinel plants, pollinators, riparian area health, and sentinel animal changes in behavior or use due to climate change.

Rationale for Climate Change Objectives 1–2. Ecological systems store large amounts of carbon in plants and soils, they regulate waterflow and quality, and they stabilize local climates. These functions are not accounted for financially, but society depends on them. Ecosystem processes underpin photosynthesis, the plant and soil processes that recycle nutrients from decomposing material and maintain soil fertility, herbivory, predation, natural fire, flooding, and the processes by which plants draw water from the soil and return water to the atmosphere. These ecosystem processes are affected by climate and the concentration of carbon in the atmosphere.

Biological diversity in ecological systems is, in and of itself, an important resource that maintains the ability of these systems to provide functions on which society depends. Many factors affect biodiversity including: climate conditions; the influences of competitors, herbivores, predators, parasites and diseases; and disturbances such as herbivory and fire. Human-induced climate change, in conjunction with nonclimate stresses, is exerting major influences on natural environments and biodiversity, and these influences are expected to grow with increased warming.

The following information is from the publication *Global Climate Change Impacts in the United States* (Karl et al. 2009). Large-scale shifts have occurred in the ranges of species and in the timing of seasons and animal migration. These factors are very likely to continue. The range and timing of each species shift will be in response to its sensitivity to climate change, its mobility, its lifespan, and the availability of the resources it needs, such as soil, moisture, food, and shelter. The speed with which species can shift their ranges is influenced by factors including their size, lifespan, and seed dispersal techniques in plants. Some migration pathways will be blocked by development and habitat fragmentation. All of these variations result in the breakup of existing ecosystems and the formation of new ones, with unknown consequences. Interactions among effects of climate change and other stressors will greatly increase the risk of species extinctions. At the same time, insect pests, disease pathogens, and invasive weeds have increased, and these trends are likely to continue.

A first step to mitigate climate change is to advance the management of ecological processes on the site to reduce nonclimate stressors (Hansen et al. 2003). In many places, habitat fragmentation, over use, invasive species, and herbivory, are nonclimate stressors that are having a greater affect on species viability than climate change at this time. Reduction of nonclimate stressors will promote ecological resilience and insulate species from subtle changes in climate.

To reduce the effects of these stressors and the future effects of climate change, the refuge will improve heterogeneity of species and structure, protect grassland types across environmental gradients, promote connectivity and corridors to facilitate migration, restore natural fire regimes, promote riparian area health, and promote sustainable herbivory.

The refuge staff is currently working with multiple partners to restore ecological processes, promote heterogeneity, and build habitat linkages and ecological resilience within the Missouri River Breaks and the northern Great Plains. Habitat linkages and corridors will be developed through partnerships with the landscape conservation cooperative sphere of influence (refer to section 1.5 in chapter 1).

The refuge will continue to take reactive and anticipatory approaches to managing landscapes for carbon sequestration and climatic resilience, heterogeneity of species, structure, and succession. Fire-herbivory interactions are keys to resilience in this region. The focus is on the research, monitoring, and management of carbon sinks and sources, black carbon, climate sentinel plants and dependent animals, and ecological-process sentinel plants and the food web that uses them, beginning with pollinators.

The refuge will evaluate the response of ecosystems to fire, herbivory, and other ecological processes using sentinel plant species. These diagnostic plant species warn of impending ecosystem-wide changes to plant and animal populations and can guide adaptive management actions. They are the first to vanish. They serve primarily not as management goals themselves but as diagnostic lookouts for fully functional ecological processes. The sentinel approach to ecological systems management uses first-to-decline species as diagnostic and direct indicators of ecosystem well-being and management direction.

The refuge will assess and reduce carbon footprints associated with using adaptive management to achieve resilience to climate change, including the role of wildland fire.

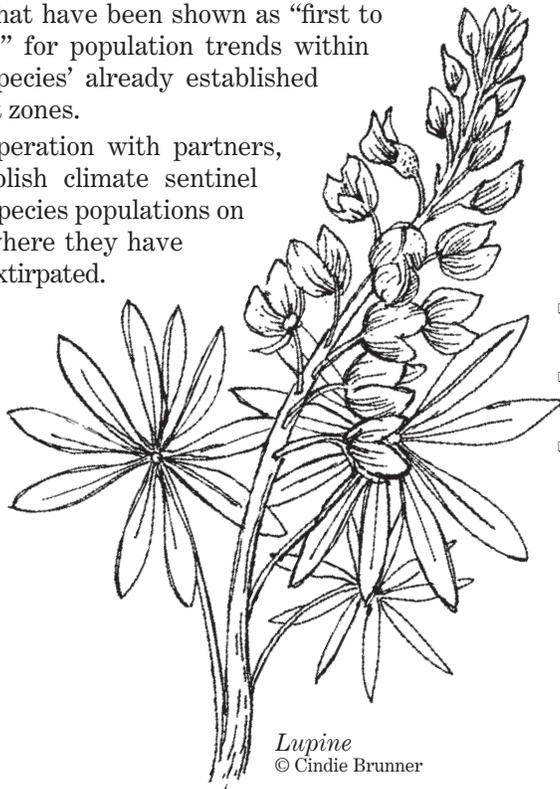
Because fire happens in the region as both wild-fire and prescribed fire, the refuge will focus much of the research on pyrogenic carbon sequestered in the soil from fire. Fire is also important for the climatic resilience associated with diversity of species and succession (DeLuca and Aplet 2008, DeLuca et al. 2006, DeLuca and Sala 2006).

The refuge will serve as a model for other land management agencies and landowners to manage for wildlife first with best management practices for climate resilience and carbon sequestration. The components of this program will include a focus on carbon sequestration, monitoring, and management and on climate sentinels, ecological-process sentinels, and resilience adaptation.

Strategies for Climate Change Objectives 1–2

- Continue maintaining a small wind turbine, recycling, increasing energy efficiency, and adopting other ways to reduce the refuge's carbon footprint.
- Consider what conditions precipitated by climate change that the refuge may deal with like increased drought, longer fire seasons, hotter fires, loss of plant and wildlife species, increase of other plant and wildlife species, change in migration patterns, and relocations of species.
- Help with the implementation of the Service's Climate Change Plan (refer to chapter 1).
- Monitor the effects of climate change on the spread of West Nile virus and the decline of buffaloberry.
- In cooperation with universities and other partner scientists and statisticians, develop methods to identify, inventory, and monitor climate sentinel plant species and potentially affected wildlife species.
- Evaluate climate sentinel plant species population viability analysis at permanently established trend sites.

- Continue to monitor wildlife populations that have been shown as “first to decline” for population trends within each species’ already established habitat zones.
- In cooperation with partners, reestablish climate sentinel plant species populations on sites where they have been extirpated.



- Reduce the carbon footprint of refuge operations and continue “greening” efforts to meet climate change initiatives (for example, upgrade offices to “green standards:” encourage teleconferencing, turning off lights, recycling, turning down heat, and installing solar panels or a small individual wind turbine for new facilities like that at the Sand Creek Field Station). Carefully locate any new structures or energy-efficient equipment to limit visual obstructions.
- Study the carbon sequestration benefits of the refuge.
- Incorporate the Service’s climate change messages in the refuge’s public use programs.
- Assess the vulnerabilities of refuge resources to climate change.

WILDLIFE MANAGEMENT

In collaboration with MFWP and others, the Service will maintain the health and diversity of all species' populations (including game, nongame, and migratory bird species) by restoring and maintaining balanced, self-sustaining populations. This could include manipulating livestock grazing and using hunting to control wildlife numbers, or both, if habitat monitoring shows that conditions are declining or plant species are being affected by overuse.

At a landscape scale, the Service will work with others on ways to benefit wildlife diversity and health such as (1) promoting private conservation easements and conservation incentives to benefit species diversity or restore extirpated (eliminated) species, and (2) cooperating with MFWP to consider

species reintroductions or expansion of species when there is adequate habitat to support the species.

Predator control by the USDA Wildlife Services will stop, and predators will be managed to benefit the ecological integrity of the refuge.

While the habitat objectives will benefit most wildlife on the refuge, the following categories of wildlife were identified based on scoping comments and have specific objectives: birds, threatened and endangered species and species of concern, furbearers and small predators, American bison, gray wolf, big game (elk, deer, pronghorn, Rocky Mountain big-horn sheep, and mountain lion), and other wildlife (invertebrates, amphibians, reptiles, fish, and small mammals). Although wild American bison and gray wolf are not currently found on the refuge, they are discussed.

OBJECTIVES for WILDLIFE

BIRD OBJECTIVES

The refuge has been designated an Important Bird Area by the National Audubon Society because "The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern" (National Audubon Society 2009). More than 250 species of birds have been documented on the refuge including both migratory birds and residents.

As described in chapter 1, the Service works closely with many partner organizations in achieving its bird conservation priorities and mandates (FWS 2011c). Objectives for birds on the endangered species list are discussed following these bird objectives in the section on threatened and endangered species and species of concern.

The Service will review plans for the Partners in Flight program and joint ventures to identify key parameters for improving habitats to support grassland-dependent birds. Additionally, the Service will collaborate with others to prevent species from being listed, primarily through restoring biological diversity, integrity, and environmental health across the landscape.

In 2005, the Service initiated the focal species strategy to better measure success in achieving its bird conservation priorities and mandates. The Service will maintain plant diversity and health using fire in combination with wild ungulate herbivory (wildlife feeding on plants) or prescriptive livestock grazing, or both, to ensure the viability of focal bird species (species that are representative of a broader group of species that share similar conservation needs). The bird objectives are closely associated with the previous habitat objectives.

BIRD OBJECTIVE 1. Within 7 years, design and complete a bird atlas collection of data and information on the refuge to determine the existing composition, distribution, and relative abundance of breeding, nonbreeding, resident, and migratory bird species using the refuge during each season of the year.

BIRD OBJECTIVE 2. Within 8–15 years, repeat the bird atlas of the refuge to help establish a permanent, refuge-wide, bird-monitoring program and determine and describe the sentinel plant associations and habitat requirements of 90 percent of high-priority species and focal bird species.

BIRD OBJECTIVE 3. Within 10 years, complete bird management plans for each of the four habitat types (upland, river bottom, riparian area and wetland, and shoreline) for resident, wintering, breeding, and migratory bird species, with an emphasis on designated focal birds.

Rationale for Bird Objectives 1–3. The land base within the refuge has never had a comprehensive baseline inventory of bird species present throughout the different seasons of the year. Collecting baseline inventory data and conducting monitoring on wildlife refuges are essential for identifying conservation targets, detecting climate-related system changes, identifying vulnerable species and habitats, and evaluating management choices (Defenders of Wildlife 2008).

To help plan management actions for the greatest benefit for migratory and resident birds in upland areas, Federal, State, and nongovernmental lists were reviewed to determine birds of conservation concern that use this habitat during breeding, nonbreeding, and migration. The refuge does not cur-

rently have a completed bird species list. However, based on a preliminary refuge list of 286 birds, one species is listed as endangered (least tern); one species is threatened (piping plover); two species are candidate species, meaning they are warranted but are currently precluded from listing (Sprague's pipit and greater sage-grouse); and 21 birds are on the Service's birds of conservation concern list.

Birds of conservation concern are the migratory and nonmigratory bird species beyond those already designated as federally threatened or endangered that represent the highest Service conservation priorities (FWS 2011c). The refuge is located within the Badlands and Prairies Bird Conservation Region "BCR 17". Twenty-eight birds are listed for BCR 17, and 23 of these birds are on the refuge bird list.

The Service's migratory bird program has a focal species strategy from August 2005 that identifies migratory bird species in need of focused conservation action and leads targeted campaigns to return the species to healthy and sustainable levels (FWS 2011c). Of 139 focal birds on the list, 39 are on the refuge bird list.

The refuge's focal bird species (tables 20, 21, and 22) are birds officially documented as being found on the refuge and have restrictive habitat needs that can serve as an umbrella for ecological processes as well as for other, generalist, bird species found in the same habitat type. For example, an area that supports Sprague's pipit also supports western meadowlark. Whereas, an area that supports western meadowlark does not necessarily support Sprague's pipit (Lambeck 1997).

Literature shows that 90 percent of birds rely on arthropods (insects, spiders, and other inverte-

brates) during at least one stage in their life. Pollinating insects are food for birds and, therefore, are a central part of a very important food web for resident and migratory birds. The resulting insect-pollinated seeds and fruits also feed birds, especially in the months when insects are not present. One very effective way to increase local pollinator numbers is to increase the native flower-producing forbs and shrubs, which not only increases the numbers of invertebrates that can be directly eaten by birds but also increases the amount of seed and fruit available for winter bird foods. By managing for the highly specialized butterflies and bees, other invertebrates such as pollinating flies, beetles, spiders, and aphids, also benefit. A landscape rich in quality nectar and pollen plants is central to any pollinator and bird conservation effort. (Mader et al. 2011)

Unlike many forbs and shrubs, grass flowers are wind-pollinated. Therefore, they do not attract the insect pollinators needed by most birds. Grasses do attract specific arthropods because, unlike some forbs and shrubs, most grass species lack the variety of compounds that deter herbivory, so they are readily grazed by some insects. Grasses can be the hosts of many specialized endophagous insects, which are concealed inside leaf tissue for much of their life cycle, and ectophages insects, which feed externally on leaf tissue by chewing, scraping, and sucking. Birds take advantage of these during the breeding season. Grasses can serve as host plants for some butterflies as well as potential nesting sites for colonies of bumblebees and as overwintering sites for many insects.

As with many grassland birds, heavy stocking with domestic animals negatively affects insect communities; whereas, a reduction of grazing pressure increases the insect species richness and abundance as well as bird species richness and abundance. Grassland management practices can enhance invertebrate diversity by increasing grassland diversity for healthy populations of forbs and fruit-producing shrubs as well as healthy stands of grass species (Tschardt 1995).

Sentinel plants are the best food plants for wildlife, birds and many insects included, providing quality food in four ways: forage, pollen, fruits and seeds, and hosts to abundant insect species. Many of the refuge's sentinel plants (refer to habitat objectives above and appendix G) are also designated as Montana pollinator-friendly plants (NRCS 2005a). Several sentinel plants are also included as "most important forage and most important browse" for mule deer and elk in the Missouri River Breaks (Mackie 1970). Sentinel plants and focal birds are those species first to vanish due to changes in ecological processes. They are indicators of complete flora and avifauna (birds of a specific region or period) com-



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The long-billed curlew (a focal bird species) nests in wet and dry uplands.

munities. Focal birds often have the most restrictive needs within any given area; therefore, they can be indicators of a complete avifauna. Ultimately, they are dependent on a complete flora with its corresponding arthropod community. The tasks of management are to provide structural heterogeneity at multiple scales while sustaining the complete flora and avifauna. Sentinel plants and focal birds will be the measures of success or failure. Refer to “Birds” under section 3.2 in chapter 3 for a complete discussion of habitat needs for focal birds.

Upland. Six bird species—three migrants and three residents—were selected as focal bird species (table 20): long-billed curlew, Sprague’s pipit, Baird’s sparrow, brown creeper, sharp-tailed grouse, and greater sage-grouse. Each species was selected based on the following:

- uses the refuge for breeding
- is identified as needing conservation action
- has the most demanding requirements (late-successional stage trees and abundant insect-providing forbs and fruit-bearing shrubs) and can represent a broader group of species sharing the same or similar needs
- contributes to meeting the primary purpose for the refuge of protecting sharp-tailed grouse, which is declining in most of its range
- represents winter habitat requirements, which are of concern for the two grouse species. At times, there may be an influx of greater sage-grouse in the winter from areas outside the refuge

River Bottom. Three focal species—red-eyed vireo, Brewer’s blackbird, and veery (table 21)—were selected based on the following:

- nests on the refuge
- is identified as needing conservation action



Dan Sudia / USFWS

The veery is a “focal” species, one of the first to respond to changed conditions, for refuge river bottoms.

- has the most demanding requirements and can represent a broader group of species sharing the same or similar needs

Riparian Area and Wetland. Four focal species—ovenbird, Cordilleran flycatcher, black-billed cuckoo, and western wood-pewee (table 22)—were selected based on the following:

- nests on the refuge
- is identified as needing conservation action
- has the most demanding requirements, such as late-successional stage trees and abundant insect-providing forbs and fruit-bearing shrubs, and can represent a broader group of species sharing the same or similar needs
- represents species that are primarily nocturnal flocking birds like the black-billed cuckoo, whose numbers have experienced severe declines, possibly due to pesticide use

Shoreline. Focal birds were not selected for the shoreline habitat because it is a highly dynamic area that fluctuates based on lake levels. Potential focal bird species, such as piping plover and least tern, are totally dependent on the shoreline for nesting and the adjacent water for food. USACE has primary jurisdiction for management of the lakeshore.

Bird monitoring, if done correctly, can quantify the status of bird populations, measure trends or changes in status, reveal effects of natural or human-induced changes, and aid in the development and evaluation of management decisions (Lambert et al. 2009).

Strategies for Bird Objectives 1–3

- Conduct a refugewide bird atlas to collect data four times a year, during 24-hour blocks of time, for 7 years on the distribution, abundance, habitat use, and breeding and migratory phenology of the avifauna using each selected section of the atlas. Repeat the bird atlas during years 8–15 of the CCP.
- Work with partners, and gather historical data to add to the inventory database.
- Develop a data management system including a GIS database for recording bird sightings. Incorporate all habitat and management information into the bird data management system.
- Conduct studies to find specific connections between sentinel plant species and focal bird species.
- Carry out a vegetation monitoring program to assess if each focal bird’s habitat requirement is being met during each season of the year.
- Conduct a study to figure out the habitat needs of select focal birds from each of the refuge’s four habitat types, including evaluating the influence of herbivory and fire and the abundance and distribution of each species for each season of the year.

Table 20. Focal bird species for uplands at the Charles M. Russell and UL Bend Refuges, Montana.

<i>Breeding habitat*</i>	<i>Sentinel plant association</i>
<p>BROWN CREEPER</p> <p><i>Associated bird species*</i>: No data available from the refuge</p> <p><i>Species of concern lists</i>: Montana Partners in Flight, Montana Natural Heritage Program, Montana Comprehensive Fish and Wildlife Conservation Strategy</p>	
<p>HABITAT: Late-successional stages of coniferous forests and mixed coniferous–deciduous forests</p> <p>MICROHABITAT: Large trees and snags for foraging and nesting; late-successional stages of coniferous forests and mixed coniferous–deciduous forests</p> <p>NEST SITE: Between the trunk and a loose piece of bark on a large, typically dead or dying, tree</p> <p>FOOD: Variety of insects and larvae, spiders, and ants (no vegetation)</p> <p>WINTER FOOD and HABITAT: Variety of insects and larvae, spiders, and ants and some vegetation; large trees and snags for foraging and nesting; late-successional stages of coniferous forests and mixed coniferous–deciduous forests</p>	<p>SHRUBS and TREES: Douglas-fir ponderosa pine (fire sentinels)</p>
<p>LONG-BILLED CURLEW</p> <p><i>Associated bird species*</i>: gadwall, northern shoveler, marbled godwit, northern harrier, horned lark, mourning dove, vesper sparrow, lark bunting, Brewer’s sparrow, western meadowlark, brown-headed cowbird</p> <p><i>Species of concern lists</i>: Service Birds of Conservation Concern (focal species), Montana Partners in Flight, BLM, Audubon Watchlist 2007</p>	
<p>HABITAT: Shortgrass or mixed prairie with flat to rolling topography</p> <p>MICROHABITAT: Areas with trees; high density of shrubs and tall, dense grass generally avoided</p> <p>NEST SITE: On the ground, in patchy areas and relatively dry, exposed sites; often near conspicuous objects</p> <p>FOOD: Entirely carnivorous; terrestrial insects and benthic invertebrates; pecks for food on breeding grounds; feeds on ground-nesting bird eggs and young birds in the nest; forages in shortgrass</p> <p>WINTER FOOD and HABITAT: Not applicable</p>	<p>FORBS: purple coneflower stiff sunflower dotted gayfeather white prairieclover purple prairieclover Maximilian sunflower</p>
<p>SPRAGUE’S PIPIT</p> <p><i>Associated bird species*</i>: Canada goose, upland sandpiper, mourning dove, American crow, horned lark, house wren, vesper sparrow, lark sparrow, grasshopper sparrow, western meadowlark, red cross-bill</p> <p><i>Species of concern lists</i>: Service Endangered Species list, Service Birds of Conservation Concern (focal species), Montana Partners in Flight, Partners In Flight Watchlist 2010, Montana Natural Heritage Program, BLM, Audubon Watchlist 2007, Montana Comprehensive Fish and Wildlife Conservation Strategy</p>	
<p>HABITAT: Native grasslands with no shrubs</p> <p>MICROHABITAT: Intermediate grass height and thickness with moderate litter depth</p> <p>NEST SITE: Open grassland, usually at the base of a dense tussock of grass</p> <p>FOOD: Arthropods, primarily grasshoppers and crickets, including forb-eating insects such as leaf hoppers and caterpillars; forages on the ground in shortgrass</p> <p>WINTER FOOD and HABITAT: Not applicable</p>	<p>FORBS: purple coneflower stiff sunflower dotted gayfeather white prairieclover purple prairieclover Maximilian sunflower</p>

(continued)

Table 20. Focal bird species for uplands at the Charles M. Russell and UL Bend Refuges, Montana.

<i>Breeding habitat*</i>	<i>Sentinel plant association</i>
<p>BAIRD'S SPARROW</p> <p><i>Associated bird species*</i>: ferruginous hawk, horned lark, clay-colored sparrow, Brewer's sparrow, western meadowlark, brown-headed cowbird</p> <p><i>Species of concern lists</i>: Service Birds of Conservation Concern, Montana Partners in Flight, Partners in Flight Watchlist 2010, Montana Natural Heritage Program, BLM, Audubon Watchlist 2007, Montana Comprehensive Fish and Wildlife Conservation Strategy</p>	
<p>HABITAT: Mixed native-grass prairie with scattered low shrubs (<25%) and residual vegetation; returns to burns after 3 years</p> <p>MICROHABITAT: Ungrazed to moderate grazing with high forb coverage</p> <p>NEST SITE: On the ground in tall vegetation, oftentimes at the base of shrubs</p> <p>FOOD: Insects and some seeds; insects gleaned from grass and forbs; forages on the ground between grass clumps</p> <p>WINTER FOOD and HABITAT: Not applicable</p>	<p>FORBS:</p> <p>purple coneflower stiff sunflower dotted gayfeather white prairieclover purple prairieclover Maximilian sunflower</p>
<p>GREATER SAGE-GROUSE</p> <p><i>Associated bird species*</i>: No data available from the refuge</p> <p><i>Species of concern lists</i>: Service Endangered Species List (warranted but precluded), Montana Partners In Flight, Partners in Flight Watchlist 2010, Montana Natural Heritage Program, BLM, Audubon Watchlist 2007, Montana Comprehensive Fish and Wildlife Conservation Strategy</p>	
<p>HABITAT: Mosaic of sagebrush habitats; tall sagebrush; low sagebrush; forb-rich mosaics of low and tall sagebrush; riparian meadows; native grass and forb steppe; scrub-willow; and sagebrush savannas with juniper, ponderosa pine, or quaking aspen</p> <p>MICROHABITAT: Leks situated on broad ridgetops, grassy swales, and disturbed sites such as burns and dry lakebeds, all having less herbaceous and shrub cover than surrounding habitats; broods found in rich mosaics of sagebrush, riparian meadows, and greasewood bottoms, all rich in forbs and insects</p> <p>NEST SITE: In relatively thick vegetative cover usually dominated by big sagebrush; also can be dominated by grasses or other species of shrubs such as rabbitbrush, greasewood, and bitterbrush</p> <p>FOOD: Leaves (dominant throughout year), buds, stems, flowers, fruit, and insects; forbs are particularly important for prelaying females; insects such as grasshoppers, beetles, and ants are important for juveniles; forb use increases as juveniles age; forages on the ground and in open habitats</p> <p>WINTER FOOD and HABITAT: Sagebrush—big, low, silver, and fringed—is essential for food with low sagebrush preferred over big sagebrush; areas are dominated by 6–43% cover of big sagebrush, low sagebrush, and silver sagebrush; variation in topography and height of sagebrush ensures the availability of sagebrush in different snow conditions</p>	<p>FORBS:</p> <p>purple coneflower stiff sunflower dotted gayfeather white prairieclover purple prairieclover Maximilian sunflower</p> <p>SHRUBS:</p> <p>big sagebrush (fire sentinel)</p>
<p>SHARP-TAILED GROUSE</p> <p><i>Associated bird species*</i>: mourning dove, vesper sparrow, grasshopper sparrow, western meadowlark</p> <p><i>Species of concern lists</i>: Montana Partners in Flight</p>	
<p>HABITAT: Dense herbaceous cover and shrubs mixed with grass</p> <p>MICROHABITAT: Leks occur on elevated areas with less vegetation; broods depend on areas with abundant forbs and insects with a high diversity of shrubs and cover types</p> <p>NEST SITE: Under or near shrubs or small trees or thick and taller residual grass cover</p> <p>FOOD: Forbs, grasses, insects (ants crickets, moths, grasshoppers, and beetles), fruits, and flowers; forages in areas dominated by forbs and sparse grass cover</p> <p>WINTER FOOD AND HABITAT: Buds, seeds, herbaceous matter, and fruits and forages on the ground where succulent forbs or grains are available or in shrubs and trees on fruits and buds; riparian areas, deciduous hardwood shrub draws, and deciduous and open coniferous woods; deciduous trees and shrubs important for feeding, roosting, and escape cover</p>	<p>FORBS:</p> <p>purple coneflower stiff sunflower dotted gayfeather white prairieclover purple prairieclover Maximilian sunflower</p> <p>SHRUBS and TREES:</p> <p>silver buffaloberry aspens peachleaf willow chokecherry</p>

* Birds found in conjunction with Sprague's pipit, Baird's sparrow, long-billed curlew, and sharp-tailed grouse on refuge transects (Rocky Mountain Bird Observatory data, 2009–10). Breeding habitat data is from Cornell Lab of Ornithology (2010).

Table 21. Focal bird species for river bottoms at the Charles M. Russell and UL Bend Refuges, Montana.

<i>Breeding habitat*</i>	<i>Sentinel plant association</i>
RED-EYED VIREO	
<i>Associated bird species*</i> : American goldfinch, American kestrel, American redstart, American robin, black-capped chickadee, brown-headed cowbird, black-headed grosbeak, Bullock's oriole, common grackle, cedar waxwing, common yellowthroat, downy woodpecker, gray catbird, eastern kingbird, house wren, lazuli bunting, least flycatcher, mourning dove, ovenbird, northern flicker, red-winged blackbird, spotted towhee, song sparrow, tree swallow, warbling vireo, western wood-pewee, yellow-breasted chat, yellow warbler	
<i>Species of concern lists</i> : Montana Partners in Flight	
HABITAT: Deciduous and mixed deciduous–coniferous forest	SHRUBS and TREES: chokecherry green ash plains cottonwood redosier dogwood boxelder golden currant peachleaf willow
MICROHABITAT: Absent from sites where understory shrubs sparse or lacking	
NEST SITE: Terminal or subterminal fork of a branch in live midstory to understory trees or shrubs	
FOOD: Mostly insects, particularly caterpillars; forages in the middle and upper third of trees; ground foraging rare	
WINTER FOOD and HABITAT: Not applicable	
BREWER'S BLACKBIRD	
<i>Associated bird species*</i> : American goldfinch, American kestrel, American redstart, American robin, black-capped chickadee, brown-headed cowbird, black-headed grosbeak, Bullock's oriole, common grackle, cedar waxwing, common yellowthroat, downy woodpecker, eastern kingbird, house wren, lazuli bunting, least flycatcher, mourning dove, ovenbird, northern flicker, red-winged blackbird, spotted towhee, tree swallow, warbling vireo, western wood-pewee, yellow-breasted chat, yellow warbler	
<i>Species of concern lists</i> : Montana Partners in Flight	
HABITAT: Riverbanks	SHRUBS and TREES: plains cottonwood green ash peachleaf willow
MICROHABITAT: Forages on relatively bare ground	
NEST SITE: In colonies near water	
FOOD: Insects and other invertebrates; some small fleshy fruits	
WINTER FOOD and HABITAT: Not applicable	
VEERY	
<i>Associated bird species*</i> : No data from the refuge	
<i>Species of concern lists</i> : Montana Partners in Flight, Montana Natural Heritage Program, Montana Comprehensive Fish and Wildlife Conservation Strategy	
HABITAT: Deciduous riparian forest	SHRUBS and TREES: boxelder redosier dogwood golden currant peachleaf willow plains cottonwood
MICROHABITAT: Requires dense understory, primarily shrubs or early successional trees	
NEST SITE: On or near the ground in deciduous trees or shrubs, often near moist areas	
FOOD: 60% insects and 40% fruits; feeds on the ground and in shrubs and trees	
WINTER FOOD and HABITAT: Not applicable	

* Birds found in conjunction with red-eyed vireo and Brewer's blackbird on refuge transects (Avian Science Center, University of Montana bird surveys within the refuge 2005–10). Breeding habitat data is from Cornell Lab of Ornithology (2010).

Table 22. Focal bird species for riparian areas and wetlands at the Charles M. Russell and UL Bend Refuges, Montana.

	<i>Breeding habitat*</i>	<i>Sentinel plant association</i>
OVENBIRD	<i>Associated bird species*</i> : Unknown <i>Species of concern lists</i> : Montana Partners in Flight, Montana Natural Heritage Program	
HABITAT: Contiguous tracts of large, mature trees in deciduous or mixed deciduous-coniferous closed-canopy forest		SHRUBS and TREES: plains cottonwood green ash Douglas-fir
MICROHABITAT: Less ground cover; deeper leaf litter and high prey biomass		
NEST SITE: Ground nester in sparse shrubs and small trees		
FOOD: Forest invertebrates; forages low to the ground		
WINTER FOOD and HABITAT: Not applicable		
CORDILLERAN FLYCATCHER	<i>Associated bird species*</i> : Unknown <i>Species of concern lists</i> : Montana Partners in Flight	
HABITAT: Forest on or near streams		SHRUBS and TREES: ponderosa pine Douglas-fir aspen plains cottonwood peachleaf willow
MICROHABITAT: Coniferous trees overhanging streams and steep banks; thick shrub undergrowth		
NEST SITE: Cool, shaded areas associated with water and forest openings		
FOOD: Exclusively insects caught in the air or from the foliage of trees and shrubs		
WINTER FOOD and HABITAT: Not applicable		
BLACK-BILLED CUCKOO	<i>Associated bird species*</i> : Unknown <i>Species of concern lists</i> : Service Birds of Conservation Concern, Montana Partners in Flight, Montana Natural Heritage Program	
HABITAT: Groves of trees and thickets frequently associated with water		SHRUBS and TREES: chokecherry boxelder green ash plains cottonwood aspen peachleaf willow
MICROHABITAT: Thickets of small trees and scrubs. Usually feeds within canopy but occasionally takes prey from ground		
NEST SITE: Thick bushes sometimes associated with streams and marshes, between branches or in the crotch against the main trunk		
FOOD: Large insects Consumes a variety of caterpillars		
WINTER FOOD and HABITAT: Not applicable		
WESTERN WOOD-PEWEE	<i>Associated bird species*</i> : American flicker, least flycatcher, yellow warbler, lazuli bunting, spotted towhee, clay-colored sparrow, American goldfinch, eastern kingbird, common yellowthroat, field sparrow, Brewer's blackbird, Say's phoebe, western meadowlark, northern oriole, American kestrel, mourning dove, black-headed grosbeak, chipping sparrow <i>Species of concern lists</i> : Montana Partners in Flight	
HABITAT: Riparian woodland and forest, especially along the forest edge		SHRUBS and TREES: plains cottonwood green ash aspen
MICROHABITAT: Large tree diameters, open understory, and dead trees or trees with dead limbs		
NEST SITE: Trees, primarily cottonwoods and also mature aspens; both living and dead trees		
FOOD: Flying insects, especially flies, ants, bees, wasps, beetles, moths, and bugs; forages in the upper 25% of the canopy		
WINTER FOOD and HABITAT: Not applicable		

* *Birds found in conjunction with ovenbird, Cordilleran flycatcher, black-billed cuckoo, and western wood-pewee on refuge transects ("Second Survey of Birdlife in Two Coulees near Bobcat Creek on Charles M. Russell National Wildlife Refuge," 1993; "Bird Species Composition and Abundance in Two Riparian Areas with Differing Grazing Histories on Charles M. Russell National Wildlife Refuge," 1994; "Avian Community Composition and Nesting Productivity Relative to Cattle Grazing in North-Central Montana," 2001; and "Avian Species Detected during Point-Count Surveys on Riparian Sites," 1998). Breeding habitat data is from Cornell Lab of Ornithology (2010).*



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American Badger

FURBEARER and SMALL PREDATOR OBJECTIVES

Furbearers include beaver, muskrat, river otter and mink, raccoons, badgers, and other small mammals. Small predators include coyotes, swift fox, weasel, and civet cat (spotted skunk).

FURBEARER and SMALL PREDATOR OBJECTIVE 1. Within 5 years, begin a comprehensive monitoring program to determine density levels and distributions if considering opening furbearer species for harvesting by either hunting or trapping.

FURBEARER and SMALL PREDATOR OBJECTIVE 2. Over 15 years, maintain self-sustaining populations of furbearers by restricting and regulating harvest opportunities on the refuge when harvest begins for species regulated by MFWP (muskrat, beaver, mink, swift fox, and bobcat) and those unregulated by MFWP (least weasel, long-tailed weasel, striped skunk, badger, raccoon, red fox, and coyote).

FURBEARER and SMALL PREDATOR OBJECTIVE 3. By 2017, evaluate habitat and determine the habitat suitability of reintroducing populations of swift fox to the refuge and, if so, the number of breeding population pairs that could be reintroduced into suitable habitat. If reestablishment does not occur by 2020, increase active management to establish a viable population on the refuge.

FURBEARER and SMALL PREDATOR OBJECTIVE 4. Within 10 years, have viable beaver populations in a minimum of two tributaries of the Missouri River on the refuge.

FURBEARER and SMALL PREDATOR OBJECTIVE 5. Over 15 years, encourage research on priority furbearer species on the refuge to determine their ecological role. Universities or other organizations conduct research with refuge help in the form of money, supplies, volunteers, or technical assistance.

FURBEARER and SMALL PREDATOR OBJECTIVE 6. As part of the Service's programs for strategic habitat conservation and landscape conservation cooperatives (refer to chapter 1), evaluate the potential for natural colonization of extirpated species into suitable habitats by evaluating current corridors. If extirpated species naturally colonize the refuge, work with the State and others to ensure refuge management is compatible with State and Federal management plans.

Rationale for Furbearer and Small Predator Objectives 1–6. Little is known about the limiting factors for these species on the refuge, but habitat management for diversity and health should benefit them. Expanding suitable riparian habitats will provide the basis for increased populations of muskrat, beaver, river otter and mink.

A few swift fox sightings have been reported on or near the refuge and reintroduction into suitable habitat will help speed population establishment.

A research project on bobcats conducted in 1979 and 1980 showed illegal hunting to be the largest mortality factor among radio-collared bobcats on the refuge (Knowles 1981). Current population numbers on the refuge remain relatively unknown; however, continued restrictions will help support a viable bobcat population in the Missouri River Breaks as areas around the refuge continue to be hunted.

The Service will evaluate the harvest potential for furbearers and small predators to provide a wildlife-dependent recreational opportunity (refer to "Hunting Objectives" in section 4.6 below). A stable or growing population of furbearers and small predators will be maintained for its contribution to the overall biological diversity and integrity and to the environmental health of the refuge.

Similar to the mountain lion, Federal law prohibits any hunting or trapping on a national wildlife refuge unless specifically authorized. To open the refuge for the hunting or trapping of furbearers or small predators, a proposal, or hunt plan, needs to be prepared that includes a justification with population status, determination of harvest levels, and monitoring results. Proposals are subject to additional public input and National Environmental Policy Act compliance.

USDA Wildlife Services conducts predator control activities along the southeast part of the refuge on private and BLM lands under cooperative agreements. This activity has declined in recent years due

to fewer domestic sheep populations (personal communication with John Steuber, Wildlife Services, on November 7, 2011). Wildlife Services does not conduct predator control on the refuge unless they are in pursuit of an animal or are requested by the refuge for help (by earlier agreement with the Service); however, it is difficult to discern private lands from refuge lands, which may result in some taking that occurs on the refuge by contracted aerial shooters. Aerial shooting of coyotes on the refuge will not be allowed.

Strategies for Furbearer and Small Predator Objectives 1–6

- Maintain current protection and do not permit any harvest until population surveys are completed and it has been found that a harvest strategy could be carried out without affecting the naturally occurring population dynamics.
- Consider reintroducing swift fox.
- Restore riparian communities in Missouri River tributaries to promote beaver, muskrat, river otter, and mink expansion.
- Increase law enforcement to reduce potential illegal take of bobcat or coyote.
- Within 1 year, end taking of coyotes on the refuge by USDA Wildlife Services or other contracted shooters.
- Maintain current oversight for those species already protected on the refuge.
- With stable population levels, allow furbearers and small predators (coyote, long-tailed and least weasel, swift fox, skunk, beaver, muskrat, mink, river otter, bobcat, badger, raccoon, and red fox), as defined by MFWP, to be managed for naturally occurring population dynamics.
- Allow hunting of red fox. Permit limited coyote hunting (mid-October through March 1).
- Develop a standardized data sheet for furbearing animals to collect information for input into a newly designed database to establish a GIS layer for mapping their locations.

AMERICAN BISON RESTORATION OBJECTIVES

The American bison historically ranged throughout the Great Plains, and the last wild bison was extirpated from this area in the late 1800s (FWS 2010d). Wild bison played a significant ecological role with fire to shape the landscape. Restoring historical fire-return intervals and wild bison will be a major step in restoring the biological integrity and natural ecosystem functions on the refuge and surrounding areas.

The momentum and interest in wild bison restoration in North America has increased substantially in recent years. The International Union for Conservation of Nature established the Bison Specialist

Group, which was charged in 2005 with developing a “North American Strategy for Bison Conservation.” That comprehensive plan is expected to be released in the near future and will provide scientifically based guidelines for proponents interested in restoring wild bison at an ecologically functional scale.

The Wildlife Conservation Society has recently reestablished the American Bison Society to promote bison conservation. The society, originally active from 1905 to 1935, was largely responsible for keeping bison from going extinct and establishing the conservation herds that are managed today by the Service and the National Park Service for the American public.

MFWP’s Comprehensive Fish and Wildlife Conservation Strategy (MFWP 2005a) lists the American bison as a priority, tier 1, species for conservation. MFWP and others have invested time and effort trying to produce brucellosis-free bison from the genetically valuable Yellowstone herd as stock to establish herds managed for conservation and ecological purposes elsewhere. In 2010, MFWP began a process to evaluate the opportunity for establishing a wild plains bison population in Montana. In 2011, MFWP published its findings. The purpose was not to make management decisions but to create the foundation for an informed public dialogue about the future of bison in the State of Montana (Adams and Dood 2011).

There will be multiple agencies, partners, and cooperators in any proposed wild bison restoration effort. The Service has taken the position that it will not consider reintroducing wild bison on the refuge unless MFWP initiates an effort to restore wild bison (Adams and Dood 2011) on a large landscape. The Service recognizes the State’s role in managing native wildlife and will work cooperatively with MFWP in the development of a wild bison restoration plan. MFWP does not have any plans at this time to consider reintroducing a free-ranging herd of wild bison in the area.

AMERICAN BISON RESTORATION OBJECTIVE 1. Over 15 years, continue to work with MFWP, conservation organizations, and neighbors to evaluate the economic, social, and biological feasibility of restoring wild bison as a natural component on the surrounding landscape.



AMERICAN BISON RESTORATION OBJECTIVE 2. On advancement of a MFWP proposal that includes refuge lands in a wild bison restoration effort, develop a stepdown framework defining the conditions under which the refuge will participate.

AMERICAN BISON RESTORATION OBJECTIVE 3. Within 1 year of framework development (refer to American Bison Objective 2), and in cooperation with MFWP and other partners, develop a wild bison management plan that specifies and ranks areas of suitable habitat; establishes abundance, composition and distribution targets based on habitat conditions and appropriate wildlife and recreation management on a national wildlife refuge; and details cooperative management responses to be applied to anticipated conflicts.

AMERICAN BISON RESTORATION OBJECTIVE 4. Over 15 years, continue to develop, and carry out, research proposals to better understand the interaction of wild bison, livestock, wild ungulates and other wildlife and vegetation in relation to fire and other life-threatening influences.

Rationale for American Bison Restoration Objectives 1–4. Any reintroduction of wild bison will need to be a cooperative venture with MFWP. At this time, the State does not have an ongoing plan to reintroduce wild bison in the Missouri River Breaks.

The Service will cooperate with MFWP, BLM, DNRC, conservation organizations, and others to conduct the necessary biological, social and economic research to determine the feasibility of such a proposal.

The Service recognizes the ecological importance of such an effort, but also recognizes the complexity and controversy that is associated with any such effort. Therefore, the approach is to work cooperatively and collaboratively with others as a full partner in any proposal, with full engagement of the public.

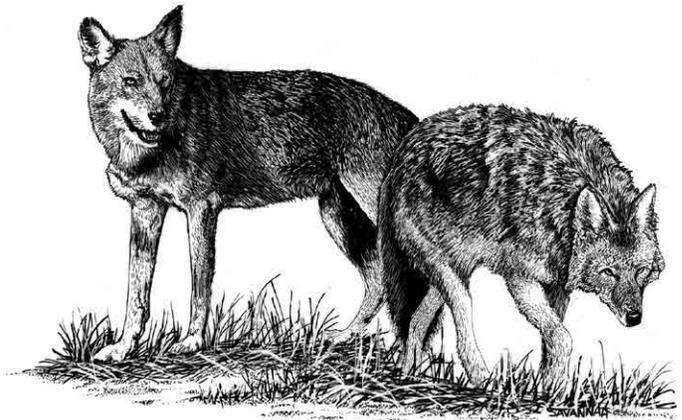
The following strategies will be conducted concurrently with any proposal by MFWP for wild bison restoration in areas around the refuge.

Strategies for American Bison Restoration Objectives 1–4

- Work with MFWP, major universities, National Wildlife Federation, World Wildlife Fund, The Nature Conservancy, American Prairie Reserve, and others to develop and carry out research proposals to evaluate the biological, social, and economic feasibility of restoring free-ranging wild bison in and around the refuge.
- Work with a variety of economists to determine the potential economic benefits and negative effects of a free-ranging wild bison herd in the area.
- Before any wild bison reintroduction, complete a cooperative wild bison management plan developed and agreed-on by all involved management parties, which addresses population objectives and management, movement of animals outside restoration areas, genetic conservation and management, disease management, and conflict resolution procedures.

NORTHERN GRAY WOLF OBJECTIVE

Wolves were reintroduced into Yellowstone National Park in 1995 and have steadily increased in numbers to an estimated population of 566 wolves in Montana with at least 35 breeding pairs (MFWP 2011). There have not been any confirmed sightings of wolves on the refuge since they were extirpated in the late 1800s or early 1900s. There are no plans to reintroduce wolves on the refuge.



Gray Wolf
Bob Savannah / USFWS

NORTHERN GRAY WOLF OBJECTIVE. Manage the northern gray wolf in cooperation with MFWP and in accordance with the State management plan and Service policy.

Rationale for the Northern Gray Wolf Objective. Should the northern gray wolf naturally colonize the refuge, the Service will adopt the State's plan and follow Service policies in monitoring and managing the species. Hunting will not be established until a proposal, or hunt plan, was developed in accordance with National Environmental Policy Act requirements and until regulations were published in the Federal Register.

Strategies for the Northern Gray Wolf Objective

- Work with MFWP and others to document wolf presence on the refuge and to monitor abundance, distribution, and population trends if wolves become established.
- Collaborate with others to educate the public and refuge users about the ecological role wolves play in the environment.

- On a case-by-case basis, remove wolves that are documented depredating livestock.
- Promote, help sponsor and conduct research on wolf ecology in the Missouri River Breaks.

BIG GAME OBJECTIVES

There are six big game species of primary importance that are found on the refuge: Rocky Mountain elk, mule deer, white-tailed deer, pronghorn, Rocky Mountain bighorn sheep, and mountain lion.

The Service will work collaboratively with MFWP and adjoining landowners to identify suitable habitat for Rocky Mountain bighorn sheep and establish new populations using modeling and transplant criteria.

BIG GAME OBJECTIVE 1. Develop cooperative big game population and habitat monitoring programs with MFWP by 2015. Establish population levels, sex and age composition targets, and harvest strategies that are jointly agreed to and tailored to the varied habitat potential on the refuge during the development of HMPs. To provide a variety of quality recreational opportunities, design hunting regulations to include population objectives with diverse male-age structures not generally managed for on other public lands.

Rationale for Big Game Objective 1. In accordance with national policy, striving to the extent practicable to achieve consistency with State management objectives and regulations (MFWP 2001, 2004, 2009a), refuge-specific objectives for abundance and population composition will be established through HMPs and tailored to regional habitat conditions, productivity, and other considerations. The objectives will consider naturally functioning ecosystem processes, biological integrity, hunting opportunities, and quality of recreational experiences.

Early explorers left vivid accounts of the abundant big game populations that inhabited the region (Moulton 2002). With restoration of natural ecological processes the focus, the aim is to restore such game abundance and diversity within the current limits of habitat capability. Before those visits of early explorers, the intensity of human harvest of big game was different than today, as likely there was not the active selection for killing the largest antlered males possible that is the norm of some hunting programs today.

National wildlife refuges are the only Federal lands managed specifically for wildlife conservation, and the objectives reflect an emphasis on sustaining abundant and healthy wildlife populations. Such wildlife-priority management is not generally possible elsewhere because of multiple use mandates on other Federal lands and conflicting priorities on State and private lands. The big game objectives



White-tailed Deer

USFWS

reflect the wildlife-priority emphasis and for providing quality opportunities for wildlife-dependent recreation, which are described in the Improvement Act and the Service's hunting policy (FWS 2006f).

Big game hunting is the dominant public use activity on the refuge and surrounding lands, accounting for nearly 90,000 hunter visits (refer to "Hunting" under section 3.4 in chapter 3). Between Service lands, BLM lands, and MFWP block management areas, there are huge areas open to public hunting. Such free and open access to such large blocks of land is becoming increasingly valued by the hunting public as access to some private lands becomes more restrictive. The Service, together with its partners, will work to provide access and quality recreational experiences for hunting big game populations throughout the refuge. However, some limitations may need to be imposed, but the Service believes there is public support for this approach.

The Missouri River Breaks region including the refuge is recognized throughout Montana as a highly valued wildlife recreation sites anywhere in Montana (Dickson 2008) (for more information, see figure 34 in chapter 3).

The refuge views sex and age structure of big game populations as important considerations in managing human harvest of native ungulates to achieving ecological resilience and biological integrity (FWS 2001). Ungulate population management considers densities, social structures, and population dynamics. The aim is to strike the right balance between managing for natural wildlife populations (as called for in the Executive orders that established game ranges back in the 1930s), wildlife-dependent public uses, and other needs and responsibilities.

Strategies for Big Game Objective 1

- Continue to respond to inquiries and provide information about refuge hunting opportunities.
- Continue listening to refuge users throughout the year and annually review refuge hunting regulations to ensure clarity, address any emerging issues or concerns and adjust as necessary to achieve refuge objectives.
- Continue to publish the refuge hunting regulations brochure to inform the public of hunting opportunities (including accessible opportunities) and refuge-specific regulations.
- Distribute the refuge's brochure more widely.
- Continue to monitor boat use for accessing hunting areas along the river to ensure that wildlife species using the habitat along the river are not negatively affected over the long term.

BIG GAME OBJECTIVE 2 (elk and deer). Within 5 years, work with all partners to begin ecological studies of elk and mule deer habitat selection and response to management actions (for example, prescribed fire) and natural disturbances.

Rationale for Big Game Objective 2 (elk and deer). Comparatively conservative harvest levels for bull elk by MFWP in the Missouri River Breaks has likely contributed to the popularity (statewide and nationally) of the big game resources in this area. The long-term average adult bull-to-cow ratio in hunting district 410 is 32:100 (Tom Stivers, personal communication, June 2010). The objective in MFWP's elk management plan for the Missouri Breaks calls for a minimum of 30:100, or three times the objective of a minimum of 10:100 found in many western Montana areas. In many years the actual bull-to-cow ratio in the Missouri Breaks is substantially higher, averaging around 45:100 in Phillips County (Mark Sullivan, personal communication, June 2010). Such management for quality elk herds and recreational opportunities is one reason why the Missouri Breaks are valued by the public.

Strategies for Big Game Objective 2 (elk and deer)

- In collaboration with the partners, use previous survey data and habitat modeling to tailor big game density objectives to specific ecological regions of the refuge based on the ability of different areas to support big game. Regulate and monitor harvest levels.
- Develop habitat monitoring programs to detect when, where, and which ungulate populations negatively affect habitats.
- Continue or enhance current ungulate population monitoring surveys to document deer and elk abundance, distribution, and herd composition.
- Continue to meet with MFWP and other cooperators to implement habitat and population moni-

toring procedures to adjust management based on monitoring data.

- Continue throughout the life of the CCP with monitoring for chronic wasting disease in cervids, and respond as needed to the detection of chronic wasting disease as specified in the refuge's chronic wasting disease management plan (FWS 2007b).

BIG GAME OBJECTIVE 3 (bighorn sheep). Manage bighorn sheep ram harvest levels to result in a minimum age of 6.5 years old for harvested rams (MFWP's objective is at least 6.5 years old). Manage ewe harvest in the Mickey/Brandon Buttes area to maintain a population of 25–30 ewes (same as MFWP objective). Manage harvest levels to maintain a population of about 225 sheep for the currently occupied sheep habitat in hunting district 622. Establish more bighorn sheep in suitable habitat.

Rationale for Big Game Objective 3 (bighorn sheep). Bighorn sheep are a highly valued big game animal, and ram harvest levels across Montana are managed conservatively with an emphasis on having opportunities to harvest older rams. As stated in MFWP's Bighorn Sheep Conservation Strategy, the goal for Missouri River Breaks bighorn sheep is to manage for healthy and productive populations with a diverse age structure of rams.

Alternatively, harvest guidance from MFWP's Bighorn Sheep Conservation Strategy could be followed that is based on population size, ram:ewe ratio and number of 3/4+ curl rams observed.

Strategies for Big Game Objective 3 (bighorn sheep)

- Develop habitat potential maps using GIS, published literature and field surveys to delineate what is thought to be bighorn sheep habitat.
- Develop and carry out reintroduction plans in conjunction with MFWP to stock areas with bighorn sheep.
- Use GPS collars on current residents in established areas and newly translocated individuals into new areas to monitor survival, sightability, habitat use, and movement.
- Continue monitoring bighorn sheep populations with aerial winter and summer counts and ground-based surveys.
- Establish monitoring programs for habitat and disease risk to evaluate habitat and herd health conditions.
- Continue to restrict ewe permits east of Timber Creek until all available habitat is occupied and population levels suggest a need for reduction.
- Harvest ewes (in any area) when there is a demonstrated need to reduce sheep density for herd health (disease potential) or because of habitat degradation.

BIG GAME OBJECTIVE 4 (mountain lion). By 2015, with support from MFWP and other cooperators, develop the methodology and conduct a study of mountain lion to determine population levels, abundance, distribution and population trends. Consider harvest if monitoring shows a limited harvest could be sustained. (Refer to “Hunting Objectives” in section 4.6 below.)

Rationale for Big Game Objective 4 (mountain lion). A mountain lion study is ongoing within the refuge, Missouri Breaks, Bear Paws, and Little Rocky Mountains to determine density, movement, habitat, and causes of mortality. If the results show mountain lion populations are robust and healthy, the Service will consider a limited harvest (refer to “Big Game” under section 3.2 in chapter 3). Federal law prohibits any hunting or trapping on a national wildlife refuge unless specifically authorized. To open the refuge for a mountain lion hunt, a proposal (hunt plan) needs to be prepared that includes a justification including the population status, determination of harvest levels, and monitoring results. A proposal needs to comply with the National Environmental Protection Act.

Strategy for Big Game Objective 4 (mountain lion)

- Maintain and monitor GPS and very high frequency (VHF) collars on 5–10 percent of the estimated lion population on the refuge.

BIG GAME OBJECTIVE 5 (pronghorn). By 2015, collaborate with partners to begin a pronghorn ecology research study with a focus of documenting movements, habitat use, and what role refuge lands play in pronghorn ecology in a landscape context.

Rationale for Big Game Objective 5 (pronghorn). Although pronghorn use the refuge, their numbers are generally low, except during severe winters. Pronghorn migrate through the refuge, so it is important to understand their habitat use and needs during the time they spend on the refuge.

Strategies for Big Game Objective 5 (pronghorn)

- Establish pronghorn survey areas based on habitat potential modeling using GIS.
- Conduct aerial surveys and adjust as needed with information resulting from research studies.
- Based on pronghorn research results and habitat monitoring specific to pronghorn, manage livestock grazing and fire to maintain or enhance pronghorn habitat.
- Regulate harvest to keep big game populations at levels that promote healthy sentinel plant populations and other species. Consider effects on adjoining landowners.
- Identify and protect important wintering habitat for pronghorn by reducing hazardous fuel in these areas using prescribed fire.



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A mountain lion on the refuge.



© Diane Hargreaves

Pronghorn

OTHER WILDLIFE OBJECTIVE

Many species of invertebrates, amphibians, reptiles, fish, and small mammals are found on the refuge and serve as key indicators in evaluating the environmental health of the ecosystem.

OTHER WILDLIFE OBJECTIVE. Within 1–2 years, assess the need for baseline inventory plans, surveys, or research for fish, reptiles, amphibians, invertebrates, or other small mammals found on the refuge. Prioritize the highest needs (for example, top 7–10) particularly those that support or are tied to the monitoring efforts for upland, river bottom, and riparian area objectives. Within 5 years, begin and complete inventory plans or baseline surveys for about 30–50 percent of the highest priority needs. Over 15 years, complete 75–100 percent of the top 10 priorities. Prioritize monitoring needs based on sentinel species that support habitat goals and objectives or climate change effects.

Rationale for the Other Wildlife Objective. Limited information is available on the diversity of fish, reptiles, amphibians, invertebrates, and other small mammals such as bats and rodents that are found on the refuge including the composition and distribution of these species. As part of implementing the objectives for uplands, river bottoms, and riparian areas, baseline information or more survey work is needed to monitor and evaluate the success of the habitat objectives. While the need for understanding baseline information is important for habitat monitoring, money limitations and other staff priorities require the prioritization of these plans and surveys and coordination with MFWP, including getting necessary permits. The refuge staff currently helps with the large-scale North American Amphibian Monitoring Program and a refuge-specific monitoring strategy will be patterned on that effort.

The Missouri River Breaks provide unique habitats for the many nongame species including fish, amphibians, invertebrates, and small animal in the northern plains due to the topographic features and forest outliers present. This region has not had a comprehensive baseline inventory of species present. Establishing the species present is the foundational first step in species conservation. This step will lead to species and habitat associations and adaptive management actions that are tied to the habitat objectives.

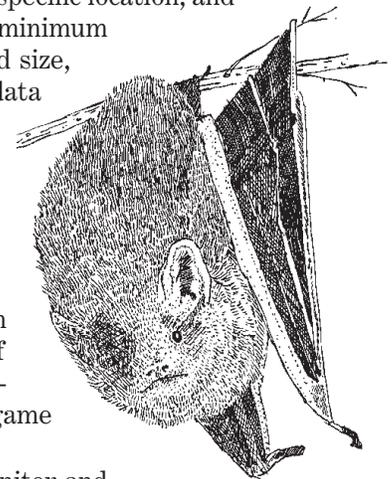
Terrestrial small mammals have limited distributions and small home ranges and require relatively high densities to maintain viable populations (Silva 2001). Therefore, they are susceptible to population declines resulting from habitat degradation or loss at many scales including local disturbances (Van Dyke 2003, Gaines et al. 1997, Rossenberg et al. 1997). However, detailed data about specific habitat influences on abundance and distribution are lacking, and this limits the ability of managers to effectively sustain healthy populations across the landscape.

Important habitats for plants and animals can be restricted or otherwise modified by prescribed fire, rotational grazing, or other types of habitat management such as thinning, reseeding, and chemical or mechanical weed control. Because populations can be sampled relatively easily, small mammal communities are often used as indicators for monitoring ecosystem responses to habitat restoration and management (Douglass 1984, Olson et al. 1994). As a prerequisite of using small mammals in such a conservation program; however, it is critical to identify and understand the structure and composition of small mammal communities in areas exposed to management.

Strategies for the Other Wildlife Objective

- Conduct stream surveys based on refuge priorities (functioning and nonfunctioning streams)

- using qualified aquatic ecologists versed in prairie stream survey techniques and methods.
- Work in partnership with Federal, State, non-governmental organizations, and others to write management plans and incorporate other plans or planning efforts such as the Missouri River Fish Management Plan, strategic habitat conservation and land conservation cooperatives, and the Montana Fish and Wildlife Conservation Strategy.
- Document fish inhabiting the refuge's ephemeral, intermittent, and perennial streams using Bramblett and Zale (1999) as a baseline.
- In cooperation with BLM, restore degraded riparian areas by limiting expansion of existing stock ponds or limiting additional stock ponds and other water developments.
- Remove fish passage impediments such as culverts, grade-control structures, or diversion structures on case-by-case basis.
- To preserve and enhance populations of nongame species on the refuge, develop habitat management strategies such as detailed prescriptions for habitat management, protocols to monitor species' status, and methods to evaluate the effectiveness of management actions.
- Hire more refuge staff and encourage universities or other organizations to conduct surveys on the effects of public use, wildland fire (wildfire and prescribed fire), and other management strategies throughout the calendar year on a yearly basis to determine changes in use.
- Establish standardized reporting methods for incidental sightings to include species, date, property, specific location, and habitat type as minimum information; and size, sex, and age data as additional information where possible.
- Develop and maintain a GIS database to record distribution and locations of incidental sightings of all nongame species.
- Continue to monitor and identify nongame species with limited distribution or specific habitat needs (for example, snake den sites and bat rookery or roosting sites) using 3-year rotation surveys.



Red Bat
© Cindie Brunner

4.3 GOAL for THREATENED and ENDANGERED SPECIES and SPECIES of CONCERN

Contribute to the identification, preservation, and recovery of threatened and endangered species and species of concern that occur or have historically occurred in the northern Great Plains.

There are objectives for threatened and endangered species of importance that are found on the refuge:

- black-footed ferret (endangered)
- least tern (endangered)
- piping plover (threatened)
- pallid sturgeon (endangered)

This section also addresses grizzly bear (threatened), which is not currently found on the refuge but could migrate within the 15-year period.

In addition, there are objectives for the following species of concern for the refuge:

- black-tailed prairie dog
- greater sage-grouse (candidate)
- mountain plover
- sicklefin chub
- sturgeon chub
- Sprague's pipit (candidate)

The Service will protect or enhance populations of threatened and endangered species such as the black-footed ferret, nongame species such as the black-tailed prairie dog, and bird species or other species of management concern through research, disease management, population augmentation, or habitat manipulation.

With approved MFWP management plans and in cooperation with MFWP and others, the Service will consider reintroduction of more black-footed ferrets, swift foxes, black-tailed prairie dogs, pallid sturgeons, and bighorn sheep into the landscape. Populations of the black-tailed prairie dog will be expanded to maintain or increase the health and diversity of all species' populations where prairie dogs are a critical component.

The Service will develop management plans for the grizzly bear, in accordance with Federal and State regulations and plans to address potential immigration of this species to the refuge.

Predators will be managed as an important component of the wildlife community, and predator management by the USDA will be stopped.

A biological evaluation ("Appendix H, Section 7 Biological Evaluation") assessed the management actions in this plan. The evaluation determined that these actions will have "no effect" on or "may affect, but not likely to adversely to affect" the threatened and endangered species on the refuge.



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Black-footed ferrets were "rediscovered" in Wyoming in 1981.



Gene Nieminen / USFWS

Piping Plover

OBJECTIVES for THREATENED and ENDANGERED SPECIES and SPECIES of CONCERN

THREATENED and ENDANGERED SPECIES (TES) and SPECIES of CONCERN OBJECTIVE 1 (black-footed ferret). Maintain habitat for, and maintain a minimum of, 30 breeding pairs of black-footed ferrets on six or more prairie dog towns when animals are available and there is successful management of plague outbreaks.

TES and SPECIES of CONCERN OBJECTIVE 2 (black-footed ferret). Over 15 years, continue to provide technical and scientific assistance where possible in black-footed ferret recovery to State, conservation organization, and private landowners interested in black-footed ferret recovery.

TES and SPECIES of CONCERN OBJECTIVE 3 (black-footed ferret). Continue the monitoring of the existing UL Bend population and consider additional releases of captive-reared ferrets.

Rationale for TES and Species of Concern Objectives 1–3 (black-footed ferret). With successful management of plague and with partner cooperation, the refuge could produce sufficient prairie dog habitat to support a black-footed ferret population that contributes to recovery of the species.

The Service has actively released and monitored ferrets at UL Bend Refuge since 1994. The refuge also built a captive-rearing and preconditioning facility near Malta that operated for several years, but has now been abandoned. The refuge staff have also helped with ferret reintroductions and monitoring on BLM lands, on the Fort Belknap Indian Reservation and on the Northern Cheyenne Indian Reservation.

A self-sustaining ferret population has yet to be established in Montana. MFWP is the leader in prairie dog conservation in Montana, and the refuge staff will collaborate with them on ferret recovery activities where possible.

Strategies for TES and Species of Concern Objectives 1–3 (black-footed ferret)

- Cooperate with adjacent land managers to maintain, expand, and protect prairie dog colonies in configurations capable of supporting a viable black-footed ferret population. Continue to provide monitoring, management and research expertise by refuge staff.
- Provide technical and scientific expertise to State, counties, and other landowners interested in black-footed ferret recovery efforts on their lands.

TES and SPECIES of CONCERN OBJECTIVE 4 (least tern). Over 15 years, work with USACE to maximize suitable nesting habitats that are attractive to least terns with the goal of maximizing annual productivity to promote recovery.

TES and SPECIES of CONCERN OBJECTIVE 5 (piping plover). Over 15 years, work with USACE to maximize suitable nesting habitats that are attractive to piping plovers with the goal of maximizing annual productivity to promote recovery.

Rationale for TES and Species of Concern Objectives 4–5 (least tern and piping plover). Certain areas of the reservoir, some islands and shorelines, tend to be more attractive to nesting least terns and piping plovers. Once identified, it may be practical to manage those habitats to ensure their continued suitability. Recognizing that reservoir levels vary greatly, it may only be feasible to identify sites that, in most successive years, are attractive and available to these species.

Strategies for TES and Species of Concern Objectives 4–5 (least tern and piping plover). Refer to strategies for TES and Species of Concern Objectives 1–15 below.

TES and SPECIES of CONCERN OBJECTIVE 6 (pallid sturgeon). Over 15 years, work cooperatively with MFWP and other partners along the Missouri River to develop management actions, in compliance with the recovery plan, to benefit pallid sturgeon populations.

TES and SPECIES of CONCERN OBJECTIVE 7 (pallid sturgeon). Over 15 years, work cooperatively with partners to monitor populations of pallid sturgeons.

Rationale and strategies for TES and Species of Concern Objectives 6–7 (least tern and piping plover). Refer to rationale and strategies for TES and Species of Concern Objectives 1–15 below.

TES and SPECIES of CONCERN OBJECTIVE 8 (grizzly bear). Over 15 years, develop a grizzly bear management plan, in cooperation with MFWP, for managing grizzly bears that could naturally colonize the refuge.

Rationale for TES and Species of Concern Objective 8 (grizzly bear). This refuge-specific plan is being developed in case grizzly bear naturally recolonize the refuge. The philosophy will be to promote grizzly bear abundance, within ecological constraints, and to provide for recreational viewing opportunities. Grizzly bears will provide natural predation pressure on large ungulates and influence their movement around the refuge.

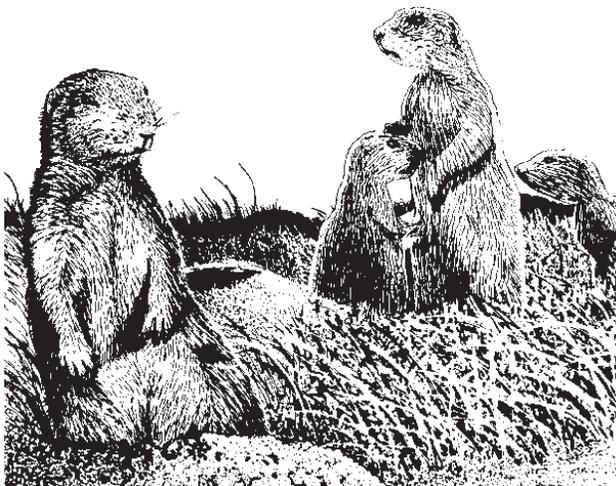
Strategies for TES and Species of Concern Objective 8 (grizzly bear)

- Work with MFWP and others to document grizzly bear presence on the refuge and to monitor abundance, distribution, and population trends if grizzly bears become established, and educate user groups about the ecological role grizzly bears play in the environment.
- If grizzly bears are documented on the refuge, take steps to minimize potential conflicts with livestock. However, on a case-by-case basis, permit approved agents to remove grizzly bears that are documented to be depredating livestock.
- Promote, help sponsor, and conduct research on grizzly bear ecology in the Missouri River Breaks.
- Refrain from establishing a hunting season for grizzly bears on the refuge if grizzly bears are delisted.

TES and SPECIES of CONCERN OBJECTIVE 9 (black-tailed prairie dog). Over 15 years, continue protection, restoration and expansion of black-tailed prairie dog populations refuge-wide to maximize occupancy of potential habitat.

TES and SPECIES of CONCERN OBJECTIVE 10 (black-tailed prairie dog). Work with MFWP, conservation organizations, and neighbors to implement MFWP's "Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana" (MFWP 2002b). Work to establish at least two 5,000-acre complexes that could support black-footed ferrets in which the refuge could contribute to the larger complex.

TES and SPECIES of CONCERN OBJECTIVE 11 (black-tailed prairie dog). GPS map all black-tailed prairie dog colonies on the refuge every 3 years, if funding and personnel allow. Continue research, monitoring, and treatment.



Prairie Dog Town
Bob Savannah / USFWS

Rationale for TES and Species of Concern Objectives 9–11 (black-tailed prairie dog). Refer to rationale for TES and Species of Concern Objectives 1–15 below.

Strategies for TES and Species of Concern Objectives 9–11 (black-tailed prairie dog)

- Within 3 years, map and rank the quality of all potential and existing prairie dog habitats.
- Promote expansion by mechanically removing vegetation, targeted prescriptive grazing, and fire.
- Coordinate with MFWP and others on how the refuge could best contribute to conservation of prairie dogs and associated species.
- Use current disease (plague) management tools and translocation procedures (Truett et al. 2001, Dullum et al. 2005) to promote prairie dog population growth and persistence in desired areas.
- Continue research and field trials on existing and developing plague management tools.

TES and SPECIES of CONCERN OBJECTIVE 12 (greater sage-grouse). Over 15 years, assist MFWP in carrying out the State's conservation strategies for greater sage-grouse and work with other partner agencies and organizations in sage-grouse conservation and research. Within 2 years, using MFWP's sage-grouse core area map (MFWP 2005b) and existing research projects, delineate areas of the refuge that are of high importance to sage-grouse. Adjust proposed actions and responses to wildfires to minimize short-term negative effects and maximize long-term benefits for sage-grouse and other sage-steppe-associated species.

Rationale for TES and Species of Concern Objective 12 (greater sage-grouse). In 2010, the Service decided that the greater sage-grouse was warranted, but precluded, for listing under the Endangered Species Act. On the refuge, populations are generally stable. Greater sage-grouse has been identified as a focal species for the upland habitat, refer to "Bird Objectives" in section 4.2 above. The sagebrush flats in UL Bend National Wildlife Refuge provide critical breeding and wintering habitat for sage-grouse.

Greater sage-grouse is adapted to a mosaic of plant communities on the refuge, with its natural variation in plant species composition, topography, substrate, weather, and frequency of fire. Leks are normally found on sites with less herbaceous and shrub cover, surrounded by potential nesting habitat. Hens have been recorded nesting 2.5–4.8 miles from leks where they are first observed. Nests are placed in relatively thick cover dominated by big sagebrush, silver sagebrush, grasses, rabbitbrush, greasewood, and other shrubs. Broods also use a variety of habitats; however, brood habitat must be rich in forbs and insects. During the winter, greater



Dr. Thomas G. Barnes / USFWS

Greater Sage-Grouse

sage-grouse will use the same areas as during breeding time but can move to areas dominated by a 6- to 43-percent cover of sagebrush, depending on snow conditions. Sagebrush is essential for winter habitat, and it dominates the late autumn, winter, and early spring diet. However, plants must be tall enough in deep snow conditions to supply needed leaves or buds for food. At all times of the year, greater sage-grouse forages on the ground in open habitats (Schroeder et al. 1999).

The Service will continue to protect essential habitat, particularly important breeding areas during prescribed fire and wildfire operations. For more details, refer to habitat objectives in section 4.2 above and to fire management objectives and strategies in section 4.5 below. The use of prescribed fire can result in a net loss of sagebrush and should be avoided in breeding areas, but it can be an effective tool for dense sagebrush cover and suppressed herbaceous cover. Wildfires are less predictable and unplanned, and they have had significant effects in upland areas on the refuge (refer to section 3.2 in chapter 3). A primary objective in the CCP is to reduce severe wildfires, increase plant diversity, and provide a mosaic of habitats. The habitat objec-

tives and strategies described above will benefit sage-grouse. This includes transitioning away from annual grazing and toward habitat-based prescriptive grazing strategies, reducing fencing, reducing invasive species, minimizing the severity of wildfire in sage-grouse habitat, continuing ongoing research, and improving overall habitat quality (Connelly et al. 2000, MFWP 2005b).

The Service will continue to help MFWP in achieving the conservation strategies for sage-grouse (MFWP 2005b). Their 2005 plan identifies core areas and outlines strategies for wildfire suppression, prescribed fire, livestock grazing, hunting, noxious weeds, and development of energy resources. Hunting will continue to be allowed. Additionally, the Service will work with other partners across the region to protect and enhance sage-grouse habitat.

Strategies for TES and Species of Concern Objective 12 (greater sage-grouse)

- Using existing lek locations and existing research telemetry data, combined with the many available GIS data layers, map and model sage-grouse habitat and rank its quality.
- Identify existing and potential threats to sage-grouse habitat and develop remedies.

- Protect brooding habitat on the refuge.
- Collaborate with private landowners and other land managers in protecting the region's sage-grouse habitat.

TES and SPECIES of CONCERN OBJECTIVE 13 (mountain plover). Over 15 years, continue to promote prairie dog towns to provide habitat for mountain plovers and other prairie dog-dependent species.

Rationale for TES and Species of Concern Objective 13 (mountain plover). Refer to rationale for TES and Species of Concern Objectives 1–15 below.

Strategies for TES and Species of Concern Objective 13 (mountain plover)

- Promote the persistence and expansion of prairie dog colonies, especially those on ridges and with gravelly substrates, as such sites appear more attractive as nesting habitat for mountain plovers.
- At least every 3 years, design and conduct population surveys for mountain plovers.

TES and SPECIES of CONCERN OBJECTIVE 14 (sicklefin chub and sturgeon chub). Over 15 years, work with MFWP and other partners to improve monitoring of rare fish, such as the sicklefin chub and the sturgeon chub, and develop management actions to benefit pallid sturgeon populations.

Rationale for TES and Species of Concern Objective 14 (sicklefin chub and sturgeon chub). In 2001, the Service found that the sicklefin and sturgeon chub do not warrant listing as threatened or endangered. The sicklefin chub has been documented in the Missouri River above Fort Peck Reservoir, but little is known about its abundance or distribution. The Montana Chapter of the American Fisheries Society reports that the sturgeon chub is relatively common and widespread in eastern Montana, and populations appear relatively secure. The refuge has spent little effort on rare fish, but it is willing to work with others on their conservation. Neither of these species was encountered during a 1999 fishery of several streams on the refuge conducted by Robert Bramblett and Alexander Zale (1999).

Strategy for TES and Species of Concern Objective 14 (sicklefin chub and sturgeon chub)

- Meet with MFWP fishery staff to discuss the status of these fish species and what actions the refuge might consider for better management of them.

TES and SPECIES of CONCERN OBJECTIVE 15 (general). Over 15 years, protect, conserve, and enhance populations of special status species where the refuge and partners can make significant contributions to recovery efforts on the refuge. Give priority to species that are listed federally or by the State of Montana.



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A Service employee prepares to release an endangered black-footed ferret on the refuge.

Rationale for TES and Species of Concern Objectives 1–15. The Service manages threatened and endangered species as trust species and is responsible for helping with the recovery of these species that occur within the Refuge System. To implement effective management for the protection and recovery of threatened and endangered species, a major goal of the Refuge System is to develop priorities for refuge management among species. Prioritization is important because limitations in money and staff time prevent targeting all special status species for management. Limited resources are allocated, in part, based on inventories of special status species and prioritization of management needs.

Maintenance, restoration, and enhancement of special status species will be used to restore natural ecological processes. Resources will be directed toward maintaining, and enhancing where appropriate, population levels to the maximum extent possible and practicable for these special status species.

On October 4, 2011, the Service concluded that listing under the Endangered Species Act was not warranted for the northern leopard frog.

Strategies for TES and Species of Concern Objectives 1–15

- By 2014, evaluate and prioritize the special status species that occur on the refuge to figure out which species require active management and the level and type of management needed. Use criteria for prioritization that includes listing status, implementation of actions identified in recovery plans, status within Montana, population size on the refuge, threats to survival, sensitivity to disturbance, and the ability of the refuge to contribute to recovery or conservation of the species.

- By 2015, compile all field surveys, literature, and historical records pertaining to the special status species that occur on the refuge. Incorporate MFWP's Comprehensive Fish and Wildlife Conservation Strategy whenever possible.
- By 2016, develop habitat management strategies to preserve and enhance populations of high-priority special status species on the refuge (including federally listed species such as black-footed ferret, piping plover, least tern, and pallid sturgeon). These strategies include detailed prescriptions for habitat management, protocols to monitor the status of these species, and methods to evaluate the effectiveness of management actions. Monitor the effects of public use on special status species.
- Over 15 years, encourage research by refuge staff, graduate students or other organizations on priority special status species to better understand and promote their conservation. Continue to help USACE with historical plover and tern surveys so that the survey data remains consistent.
- Within 5 years, work with the Ecological Services branch of the Service to identify areas of critical habitat for endangered species and species of concern. Consider using prescribed fire in these areas to achieve specific resource objectives, as long as there were not significant negative effects. Identify these areas in the fire management plan as areas of special concern to be protected from wildfire.
- Collaborate with other interested parties and secure money to hire more seasonal employees to conduct amphibian monitoring and turtle monitoring.
- Refer to "Riparian Area and Wetland Objectives" in section 4.2 above for strategies to improve riparian habitats to benefit amphibians.

TES and SPECIES of CONCERN OBJECTIVE 16 (Sprague's pipit). Over 15 years, map locations of Sprague's pipit found on the refuge.

Rationale for TES and Species of Concern Objective 16 (Sprague's pipit). In September 2010, the Service reviewed the conservation status of the Sprague's

pipit to decide whether the species warranted protection under the Endangered Species Act. The status review found that listing Sprague's pipit as threatened or endangered is warranted, but is precluded by the need to complete listing actions of a higher priority (FWS 2010e). Although Sprague's pipit has been documented on the refuge, areas where pipits are found are not mapped. This species will be monitored as part of the Service's overall bird objectives and upland habitat objectives.

Sprague's pipit is an open-grassland bird and avoids poorly drained areas as well as areas with even low densities of shrubs. Pipits avoid roads and trails, requiring large patches of grassland (greater than, or equal to, 358 acres) with smaller edge-to-area ratios. These birds are most commonly found in native grasses of intermediate height and thickness with moderate litter depths. Due to the poor soils and low precipitation of the Missouri Breaks, intermediate heights are difficult to achieve when compared to their full potential in wetter areas in North Dakota and can only be accomplished by limited herbivory. Areas dominated by nonnative grasses and crested wheatgrass are not used. Sprague's pipits forage for a wide array of arthropods on the ground in grass that is several inches tall. They usually nest in native grass of intermediate height and density with little bare ground.

Sprague's pipit is susceptible to habitat degradation due to high-intensity grazing and is affected by lack of fire and the subsequent increase in woody vegetation and increase in the accumulation of litter. Soon after a burn, numbers may decline but will increase in the years following a burn. For arid parts of the pipit's range including the refuge, the literature states a fire interval of 8–20 years is recommended. Mowing has negative effects on Sprague's pipits (Robbins 1999).

Strategies for TES and Species of Concern Objective 16 (Sprague's pipit)

- Identify locations where Sprague's pipits occur on the refuge.
- Follow the Service's recommendations in the conservation plan for Sprague's pipit (FWS 2010e) on fire, grazing, and other tools to enhance habitat.

4.4 GOAL for RESEARCH and SCIENCE

Advance the understanding of natural resources, ecological processes, and the effectiveness of management actions in a changing climate in the northern Great Plains through compatible scientific investigations, monitoring, and applied research.

Research and monitoring will be designed to understand the interaction between fire, grazing, plant response, wildlife populations, and other ecological

factors. The Service will adopt an active approach to using livestock grazing as a management tool by shifting from traditional annually permitted grazing to a prescriptive grazing regime for enhancement of wildlife habitats. If monitoring reveals that adequate populations of sentinel plant species were not viable, changes in livestock permitting such as reduced AUMs or retired permits will be initiated.

The below objectives are for research activities through partnership efforts. In addition, research needs are described in the habitat, wildlife, and public use objectives.

OBJECTIVES for RESEARCH and SCIENCE



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Refuge staff monitor plants on the refuge.

RESEARCH and SCIENCE OBJECTIVE 1. Over 15 years, encourage universities and other organizations to conduct annual surveys on the effects of public use, wildfire, prescribed fire, and other management strategies throughout the calendar year.

RESEARCH and SCIENCE OBJECTIVE 2. Over 15 years, support research of habitat, wildlife, and public use.

RESEARCH and SCIENCE OBJECTIVE 3. Over 15 years, work with MFWP to annually study the movement of big game relative to habitat changes (for example, fire and grazing).

RESEARCH and SCIENCE OBJECTIVE 4. Within 5 years, begin monitoring wintering pronghorn on the refuge to meet the Executive order.

RESEARCH and SCIENCE OBJECTIVE 5. Over 15 years, work with MFWP to conduct research on habitat suitability for bighorn sheep.

RESEARCH and SCIENCE OBJECTIVE 6. Within 1 year, monitor visitor counts to determine the number and types of visitors on the refuge, and by 2017 complete a visitor use study.

Rationale for Research and Science Objectives 1–6. Research will support the emphasis of managing for biological diversity. The Service will continue working with many universities and researchers.

Before a mountain lion hunt can be conducted on the refuge, more research will be needed to determine population numbers, food requirements, and the role these

predators have on other wildlife on the refuge. This will be necessary before the full package can be submitted to Washington for approval.

Strategies for Research and Science Objectives 1–6

- Evaluate refuge assets that can be affected by climate change.
- Include questions on a visitor use study aimed at quantifying the type and amount of public use occurring in the wilderness.
- Within 5 years, work with MFWP to conduct research on the age structure of mule deer herds within the Missouri River Breaks.

4.5 GOAL for FIRE MANAGEMENT

Manage wildland fire using a management response that promotes fire's natural role in shaping the landscape while protecting values at risk.

Fire management and habitat management are inseparable, thus objectives for prescribed fire and wildfire were developed to support the achievement of habitat objectives for the four vegetation categories—upland, river bottom, riparian area and wetland, and shoreline.

The terms and concepts for wildland fire, prescribed fire and wildfire, are based on Federal inter-agency policy (National Wildfire Coordinating Group 2011, USDA and DOI 2009). Wildland fire is any non-structure fire that occurs in the wildland including prescribed fire and wildfire. Response to wildland fire is based on consideration of a full range of fire management actions. These include allowing a fire

to be managed to achieve benefits where possible and taking suppression action when those benefits are not attainable or when there is a likely negative effect on important resources or adjacent lands. Fire management actions may include controlling the fire's perimeter, protecting a specific area with highly valued resources, and monitoring fire conditions and activity.

All wildfire suppression and prescribed fire activities will be carried out under an approved fire management plan. Any prescribed burns will be carried out in conformance with an approved smoke management plan that addresses critical smoke concerns, measures to reduce negative effects, downwind receptors, and smoke-vector maps in individual burn plans. The Service will acquire an outdoor burning permit issued by the Montana Department of Environmental Quality. The use of prescribed fire will follow protocol and guidelines established in the Montana/Idaho Airshed Operating guide (MIAG 2010). The Service will obtain clearance from the Montana/Idaho Airshed Group before any use of prescribed fire.

OBJECTIVES for FIRE MANAGEMENT

PRESCRIBED FIRE OBJECTIVES

A prescribed fire is any fire ignited by management actions to meet specific objectives. A prescribed fire is conducted under a project-specific prescription of needed conditions such as weather, fuel moisture, and soil moisture. The prescription is designed to confine the fire to a predetermined area and produce the intensity of heat and rate of spread required for the fuel consumption needed to accomplish the objectives.

The Service is a member of the Montana/Idaho Airshed Group. The group comprises State, Federal, tribal, and private member organizations who are dedicated to the preservation of air quality in Montana and Idaho. Members work cooperatively to prevent smoke impacts while using fire to accomplish land management objectives. Each member that conducts prescribed burns in Montana is required to have an annual air-quality, major, outdoor-burning permit issued by the Montana Department of Environmental Quality.

The Service will restore the natural fire regime through an increased use of prescribed fire to increase the viability of fire-dependent plant species. The Service will burn patches of varying size and within the historical fire-return intervals on a rotational basis. This technique will create a mosaic of habitats that (1) restores heterogeneity (more natural diversity in species) within landscapes, (2) preserves fire refugia and associated plant species, (3) enhances food

resources for wildlife, (4) ensures biological diversity and integrity and environmental health, and (5) promotes ecological resilience. Furthermore, some areas could need intensive manipulation with mechanical and hand restoration tools. The Service will minimize the use of fire in other areas to protect species of concern like the greater sage-grouse.

PRESCRIBED FIRE OBJECTIVE 1. Within 2–4 years, revise the fire management plan.

PRESCRIBED FIRE OBJECTIVE 2. Within 5 years, identify priority habitat units where sentinel plant species have declined due to lack of fire, and develop burn plans to apply prescribed fire in those areas.

PRESCRIBED FIRE OBJECTIVE 3. Develop a patch-burning system using wildland fire to annually improve at least 2,500 acres of habitat suitable for target species and focal bird species. Additionally, reestablish the natural fire regimes (fire occurs on average every 8–70 years) for fire refugia on about 30,000 acres using prescribed fire and wildfire managed for resource benefit.

PRESCRIBED FIRE OBJECTIVE 4. Within 2 years, identify critical habitat for threatened and endangered species and species of concern that could be adversely affected by fire. In addition, use prescribed fire in conjunction with research to determine if there will be any negative effects on species or critical habitat.

PRESCRIBED FIRE OBJECTIVE 5. Within 1–2 years, work with the Ecological Services branch of the Service to identify what, and how, critical habitat for threatened and endangered species and species of concern could be adversely affected by prescribed fire and incorporate into the fire management plan.

PRESCRIBED FIRE OBJECTIVE 6. Over 15 years, use prescribed fire and wildfire managed for resource benefit to restore the natural ecological process of fire and to reduce the encroachment of ponderosa pine and Douglas-fir into the dry needlegrass–wheatgrass prairie by 5–10 percent.

PRESCRIBED FIRE OBJECTIVE 7. Over 15 years, reduce 5 percent of hazardous fuel on forested slopes, with an emphasis on protecting old-growth forests that have a fire-return interval of 75–100 years from catastrophic fire.

PRESCRIBED FIRE OBJECTIVE 8. Over 15 years, establish partnerships with nongovernmental organizations, local governments, and private cooperators to identify and reduce 200–400 acres of hazardous fuel in the wildland–urban interface.

Rationale for Prescribed Fire Objectives 1–8. Refer to the rationale for upland objectives in section 4.2 above for a description of landscape changes since the demise of wild bison in 1881.

The Service has long recognized fire as a unique process that shapes wildlife habitat structure and function, and the agency has managed and used fire extensively for the past 70 years. Guiding principles of fire management in the Service include responsible stewardship, habitat management strategies based on conserving ecological integrity, reducing hazardous fuel, and establishing effective partnerships.

The emphasis of the refuge’s fire management program has switched from a strict suppression orientation to a program that uses prescribed fire and wildfire as management tools to achieve habitat objectives and large, landscape-level change.

The sagebrush flats in the UL Bend Refuge are critical nesting and wintering habitat for sage-grouse. Wildland fire in an area such as this could dramatically alter the habitat and result in severe negative effects on associated wildlife (Connelly et al. 2000, MFWP 2005b). While the literature generally urges caution when applying prescribed fire to sage-grouse habitats, the literature also stresses the importance of providing a mosaic of habitats for different seasons including winter, summer, and brooding seasons (Connelly et al. 2000). Breeding habitats will be protected from fire when possible. Within 1–2 years, refuge biologists will evaluate such areas and provide fire managers with a detailed map of the essential habitat to be protected, which will be taken



A small, low-intensity prescribed fire in 2008.

into account in prescribed fire and wildfire plans. For example, prescribed fire will be used to create a mosaic only when the lack of the mosaic is known to be limiting local sage-grouse populations.

Sprague's pipit has evolved with fires on the landscape and may be limited by reduced fire frequencies (FWS 2010e). Reduced fire frequency has led to encroachment by woody vegetation and invasive grasses and forbs, excessive growth of vegetation, and excessive accumulation of litter (FWS 2010e). Timing is important because fire can have short-term negative effects but, in the long term, can also be beneficial to Sprague's pipit.

There are large tracts of old-growth forest on the western half of the refuge that have not burned in the last 75–100 years (Douglas-fir and ponderosa pine). If a late-season, wind-driven wildfire were to occur in these areas, as has occurred throughout the central section of the refuge during the past decade, these old-growth forests would be practically eliminated, possibly forever. The refuge fire staff will evaluate these areas for possible reduction of hazardous fuel and treat identified areas with prescribed fire or mechanical thinning, or both.

Strategies for Prescribed Fire Objectives 1–8

- In cooperation with universities, partner scientists, and staff biologists, evaluate suitable areas for using prescribed fire as a habitat management tool to promote the abundance and viability of focal species.
- Enhance the fire organization with an increase of fire staff and prescribed fire competency: two prescribed fire burn bosses (type 1 and type 2), 15 prescribed fire seasonal employees, and one prescribed fire specialist (the seasonal employees and prescribed fire specialist will be additions to the current staff). These individuals will write burn plans and carry out an aggressive prescribed fire program. If increased money through the fire program is not available, work to secure funding through the refuge program to hire the above fire staff.
- Using research, fire-history data, and fire-scar evidence, conduct an inventory of sites that have exceeded average fire intervals. Set priorities for a burn rotation of hazardous fuel in these areas, taking into account habitat and wildlife objectives.
- Evaluate critical habitat across the refuge and provide the fire management officer with a detailed map of the critical habitat to be protected within 1 year of plan approval.
- Evaluate old-growth forest areas that have a fire frequency of 75–100 years for possible fuel reduction and treat identified areas with fire or mechanical thinning.
- Contract a fire planner to develop plans for the use of wildland fire that covers all burnable acres on the refuge.
- With the use of historical photos, aerial photos, Geographic Information System (GIS), and onsite evaluation, identify areas where conifer encroachment into grasslands has been the greatest. Manage these areas with fire or mechanical treatment.
- Using the refuge's 2005 Hazardous Fuels Assessment and, in cooperation with USACE and local cooperators and private landowners, carry out fuel reduction projects in wildland–urban interface areas including the Pines, Hell Creek, Rock Creek, and Nelson Creek Recreation Areas. Support the acquisition of community assistance grants for mechanical treatment of wildland–urban interface areas.
- Manage the landscape with a coordinated program of prescribed fire (patch burns) and livestock grazing to restore historical fire-return intervals and the fire–grazing interaction. This includes concentrated herbivory (grazing and fire) coupled with long periods of abandonment and reduced selectivity for important sentinel species.
- In cooperation with universities, partner scientists, and staff biologists, evaluate areas with declining sentinel plant species due to lack of fire for the feasibility of using prescribed fire as a habitat management tool to promote the abundance and viability of sentinel plant species.
- Use prescribed fire to establish a seminatural mosaic of burned patches that (1) reestablish a more natural fire–browsing–grazing interaction, (2) promote long-distance animal movement, (3) cause long periods of abandonment from grazing and browsing ungulates, (4) reduce the selectivity for sentinel species by all ungulates, (5) increase landscape species and structural heterogeneity, and (6) improve habitat for focal bird species (refer to “Bird Objectives” in section 4.2 above).

WILDFIRE OBJECTIVES

Wildfire ignitions are unplanned, such as fire started by lightning or an unauthorized or accidental fire started by humans. The response to a natural ignition fire is based on an evaluation of risks to firefighter and public safety and the circumstances under which a fire occurs including weather and fuel conditions, natural and cultural resource management objectives, values to be protected, and protection priorities.

The Service will work with partners to address wildland–urban interface areas at the Pines Recreation Area and other USACE recreation areas. In

adherence with an approved fire management plan and using historical fire frequency data and current fire conditions, the Service will evaluate each wildfire to determine the management response and whether the wildfire could be used in the patch-burning program.

Through a reciprocal agreement between the Service and DNRC, the Service will aggressively suppress all wildfires that occur on State school-section lands within the boundary of the refuge.

WILDFIRE OBJECTIVE 1. Within 2 years, revise the fire management plan using the most current information. Incorporate a full spectrum of fire management actions for response to wildfire, knowing that managing fire is a dynamic process, including management of wildfire for resource benefit.

WILDFIRE OBJECTIVE 2. After revision of the fire management plan, evaluate a full range of fire management options and carry out appropriate actions on natural ignition fires on the north side of the Missouri River. Within 5–7 years, evaluate the suitability of various fire management options to consider for all ignitions within the refuge boundary.

WILDFIRE OBJECTIVE 3. Within 5 years, identify the locations with the highest valued resources, such as houses or wellheads, and ensure those values are not lost. Additionally, develop databases with maps that are readily available for managers to use in making sound decisions.

WILDFIRE OBJECTIVE 4. Within 5 years, identify areas where perimeter control is needed to preserve public safety and to protect both natural and human-made values at risk. Categorize these as hazardous fuel reduction areas, which will protect them as high-value resources (often called “point protection”).

WILDFIRE OBJECTIVE 5. After revision of the fire management plan, use a full spectrum of management responses on natural ignitions and, in general, control the southern perimeter of fires south of the Missouri River that have the potential of escaping refuge lands. Initiate a full suppression response in the wildland–urban interface areas, which are the highest priority for hazardous fuel reduction.

WILDFIRE OBJECTIVE 6. Within 2 years, update and execute cooperative agreements with neighboring agencies—BLM, DNRC, the six counties, nongovernmental organizations, and neighboring landowners—for consideration of all fire management options when determining the management response to wildfires.

WILDFIRE OBJECTIVE 7. Within 1 year, identify areas of critical habitat for endangered species and species of concern that will be adversely impacted by fire. Fully suppress fires in these areas.

Rationale for Wildfire Objectives 1–7. Consideration of the full spectrum of management response to wildfire does not replace, supersede, or give emphasis to any one particular strategy or tactic. Instead, the Service will consider all available strategies and tactics to form a calculated response based on the circumstances of a particular fire at a particular time with particular characteristics. There is often more than one way to respond to a set of circumstances. (Northern Rockies Coordinating Group [NRCG] 2008).

Practices included here give the refuge the tools needed to manage wildfire for achieving multiple objectives. Fire has a role in maintaining the characteristics of an ecosystem (The WILD Foundation 2006) and in sustaining species. Sentinel plants and fire-return intervals have been studied on the refuge, showing that both have been interrupted by human activity (Frost 1998). Using the proper fire management actions to manage wildfire will help return natural processes to the Missouri River Breaks ecosystem. Wildfire management, in concert with a monitoring program and aggressive use of prescribed fire, will ensure the protection of areas with higher fire-return intervals.

The Service will use intensive suppression strategies where perimeter areas are threatening to burn off the refuge. While not all of the refuge’s neighbors and cooperators share the Service’s vision for wildfire, the refuge staff will continue to explore opportunities to incorporate the full range of fire management strategies on lands next to the refuge where there is no mutual agreement between the Service and landowner.

Strategies for Wildfire Objectives 1–7

- Take necessary actions, according to an approved fire management plan, to maintain public and firefighter safety above all else.
- Using historical fire frequency data, evaluate the full range of fire management options and apply appropriate actions to use wildfire as a naturally occurring component of the patch-burn program, in adherence with an approved fire management plan.
- Monitor the effects of fire on habitat and wildlife populations.
- Use natural wildfire occurrence within the scope of a full range of fire management options and an approved fire management plan to improve, enhance, and restore native wildlife habitat.
- Over 15 years, increase public awareness in surrounding communities and refuge users about the full range of fire management options and how the Service evaluates and identifies strategies to manage wildfire and prescribed fire to increase sentinel plants and reduce catastrophic wildfire risk.



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Large wildfires like the King Island fire in 2006 affect air quality, visual resources, soils, and habitat.

- Over 15 years, monitor the response of sentinel plants to both wildfire and prescribed fire; adjust fire management as needed to meet habitat objectives. Use monitoring data to update map databases and fire information for future planning.
- Within 5 years, increase staff qualifications to include a strategic operational planner, field observer, and incident commander. Increase fire staff to include 5–7 new permanent employees and 50- to 60-percent more seasonals, based on 2009 personnel.
- Within 5–7 years, contract the development of a GIS overlay of the refuge for use in producing fire management strategies for each habitat unit.
- Within 3–5 years, work with cooperators to fully coordinate the determination of management responses to wildfires using historical fire occurrence data to delineate areas that may be right for each of the various fire management options.

4.6 GOAL for PUBLIC USE and EDUCATION

Provide all visitors quality education, recreation, and outreach opportunities that are appropriate and compatible with the purpose and goals of the refuge and the mission of the National Wildlife Refuge System while maintaining the remote and primitive experience unique to the refuge.

The Service will emphasize quality (versus quantity) wildlife-dependent uses and experiences and secure access to the refuge, as described below. Quality experiences are based on criteria defined in the Service's policy for wildlife-dependent recreation (FWS 2006c):

- promotion of safety
- compliance with laws
- minimizing conflicts with other policies or adjacent landowners
- promotion of accessibility and availability to a broad spectrum of visitors

- promotion of resources stewardship and conservation
- provision of reliable and reasonable opportunities to experience wildlife
- provision of facilities that are accessible and blend into the natural setting

The Service will continue to prohibit collection of shed antlers.



OBJECTIVES for PUBLIC USE and EDUCATION

HUNTING OBJECTIVES

Hunting is permitted on the refuge for elk, mule deer, white-tailed deer, pronghorn, bighorn sheep, coyotes, waterfowl, and upland gamebirds. It is used both as a management tool for improving habitat conditions and as an appropriate and compatible wildlife-dependent recreational activity (refer to the hunting compatibility determination in appendix D).

Pursuant to Service policies and Federal laws and regulations, the Service will cooperate with MFWP to provide hunting experiences that maintain big game species and other game species at levels that sustain ecological health and improve habitat but that also provide opportunities for quality experiences including diverse male-age structures provided by appropriate population objectives. When formulating population management objectives, the Service will consider natural densities, social structures, and population dynamics at the refuge level as well as guidance found in national policies, such as the biological integrity policy. In some areas of the refuge, big game hunting seasons and harvest quotas on the refuge could be more restrictive than State regulations. All other wildlife is protected.

The Service will consider allowing additional opportunities for limited, compatible, and appropriate hunting. Currently, trapping is not allowed, and

recreational shooting of prairie dogs is prohibited. If monitoring and population data indicated a potential for trapping specific furbearers or small predators, a proposal (hunt plan) could be prepared that includes a justification with population status, determination of harvest levels, and monitoring results. Proposals are subject to additional public input and National Environmental Policy Act compliance.

HUNTING OBJECTIVE 1. Within 2–5 years, develop a visitor services plan that includes a hunting plan.

Rationale for Hunting Objective 1. Hunting has long been an important cultural and social component to the lands that make up the refuge. It is also an important tool for managing wildlife populations.

Interest in experiencing the natural and wild wonders of the area has been focused in large part on participating in a variety of hunting opportunities. The refuge will continue to provide for many quality and diverse hunting experiences.

Strategies for Hunting Objective 1

- Continue to respond to inquiries and provide information about current refuge hunting opportunities.
- Continue yearly review of refuge hunting regulations to ensure clarity and to address any emerging issues or concerns, and give the pub-

lic an opportunity to review and comment on any changes.

- Continue to publish and update the refuge hunting regulations brochure to inform the public of hunting opportunities, including accessible opportunities, and refuge-specific regulations.
- Distribute the refuge brochure more widely.
- Through visitor contact and hunting information, encourage hunters to walk in to hunt.
- Increase outreach about the refuge’s accessible hunting opportunities by developing a one-page tearsheet that explains the accessible hunting opportunities and facilities. Post information on the Web site.

HUNTING OBJECTIVE 2. Over 15 years, continue to facilitate the hunting program by allowing access on open refuge roads, camping as designated under refuge rules, and boat access.

Rationale for Hunting Objective 2. The refuge is isolated and many hunters feel that camping is necessary to ensure a quality hunt. Camping is allowed; however, efforts will be made to minimize any habitat and wildlife disturbances that result from camping.

Strategies for Hunting Objective 2

- Continue to permit minimally disturbing, pack-in and pack-out, backcountry camping throughout the entire refuge.
- Within 5 years, designate the most popular public use areas for camping and harden those sites to minimize erosion and negative effects on habitat.
- Allow vehicle access to camping areas, by the shortest route, within 100 yards of numbered roads except where closed. Do not allow off-road vehicle access to campsites in proposed wilderness areas, designated wilderness, where habitat effects warrant closing a site with a “No Vehicle” sign, and administrative areas that are posted as closed.
- If an area is overly affected by camping, make temporary closures or create hardened access points.
- Define current camp areas along the river to prevent campground “creep” into the riparian habitat.
- Continue working with USACE to restrict boat camping on islands in the river.
- Continue to permit camping within 100 yards of roads to facilitate harvest opportunities.
- Continue to monitor boat use for accessing hunting areas along the river to ensure that wildlife species using the habitat along the river are not negatively affected over the long term.
- Working with USACE and others, begin monitoring the amount of boat access occurring in popular hunting areas. If monitoring shows that



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Hunting is one of the most popular activities on the refuge.

increased access is negatively affecting wildlife populations using river bottoms, make recommendations and work with users to reduce the negative effects (for example, limit motor size or number of boats allowed on river).

- Allow boat camping along the beaches of the lake-shore.

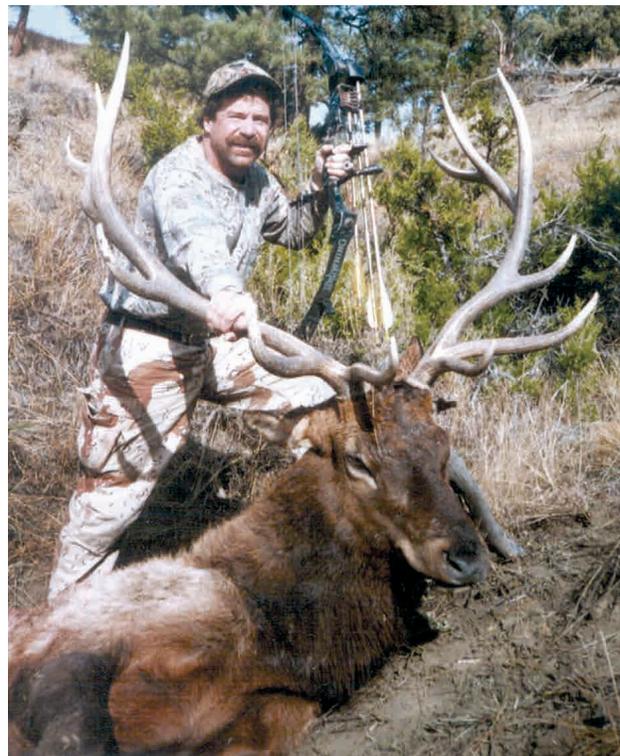
HUNTING OBJECTIVE 3. Within 5 years, work with MFWP and other partners to create diverse, quality, hunting opportunities on the refuge including harvesting big game animals of all age classes. Within 10 years, 65–75 percent of hunters report a reasonable harvest opportunity and satisfaction with the overall experience.

Rationale for Hunting Objective 3. Under the Service's wildlife-dependent recreation policy (FWS 2006c), providing for quality experiences is highlighted as an important component of a hunting program (605 FW1, 605FW2). Safety, reasonable opportunities for success, and working collaboratively with the State wildlife agencies are important elements that should be considered. A quality experience could mean participants could expect reasonable harvest opportunities, uncrowded conditions, fewer conflicts between hunters, relatively undisturbed wildlife, and limited interference from, or dependence on, mechanized aspects of the sport.

Big game hunting is popular on the refuge and, as a result, at times crowding is becoming an issue that potentially affects the quality of the hunting experience. Too many hunters in some areas could lead to unsafe hunting conditions and compromised harvest opportunities. With a growing number of private property acres off-limits to hunting, pressure is intensifying on Service lands. To ensure a quality hunting experience, it is essential to maintain healthy populations of resident wildlife and migratory birds (FWS 2006b), in part by achieving the habitat objectives identified previously. There is interest in new opportunities such as the expansion of bighorn sheep populations for more hunting opportunities.

Strategies for Hunting Objective 3

- Adopt MFWP hunting seasons and regulations for those species for which harvest is currently allowed (except for mule deer) on the refuge (elk, white-tailed deer, and pronghorn). Continue with the 3-week mule deer season, or consider other options until the buck-to-doe ratio as identified in wildlife objectives is achieved.
- Work with MFWP to figure out the appropriate level of hunting permits for elk for achieving habitat objectives related to herd populations and herd composition. Take into account both biological integrity and landowner tolerance when setting permit levels for elk.



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The Service will work with MFWP to set the number of elk permits that will meet habitat objectives related to herd populations and composition.

- Evaluate hunting district 652 (special-draw area for mule deer bucks) for mule deer home ranges, hunting district size, harvest strategy, permit numbers, habitat quality, and access and assess effects on management objectives.
- Initiate an annual tooth survey to evaluate age structure for all hunted species.
- Evaluate motorized access for hunting and decide where seasonal road closures may be needed to promote walk-in opportunities for quality hunting or where roads could remain open for retrieval to promote harvest in remote areas.
- If necessary due to increasing hunting pressure and overharvest of certain species, use a refuge permit system to control the number of hunters.
- Work with the State to establish and coordinate hunter days or events for hunters with special needs.
- Work cooperatively with MFWP to conduct law enforcement patrols at the refuge to ensure compliance.
- Develop a policy for addressing the use of tree stands. Address the number of stands permitted and the timeframe they can be up (how many days before, during, and after a hunt).
- Require nontoxic shot for all bird hunting to reduce the incidental poisoning of nontarget wildlife.

- Continue to prohibit most predator hunting, except permit limited coyote hunting mid-October through March 1.
- Within 2–5 years, complete a survey on user preferences, and include questions needed to evaluate big game harvest on the refuge.
- Use annual wildlife surveys, car count data, and trail-cams to monitor and evaluate hunting use.

HUNTING OBJECTIVE 4. Within 5 years, evaluate the demand for more access for hunters with mobility impairments. If warranted, within 10 years, provide one additional hunting access for hunters with mobility impairments.

Rationale for Hunting Objective 4. There is demand for hunting opportunities that are accessible to hunters with special needs, such as hunters with mobility impairments. Currently, there is one accessible blind on the west end of the refuge and USACE has an accessible campground downstream of the dam.

Strategies for Hunting Objective 4

- Work with partners (such as Wheeling Sportsmen and Wilderness on Wheels) to improve the current accessible blind in the Sand Creek Unit.
- Identify where potential accessible sites are needed and where they could be developed if the demand arises.

HUNTING OBJECTIVE 5. Within 4 years, working with MFWP and within the State’s hunting-season framework, expand opportunities for young people to hunt with at least one new hunt that is available to only young hunters.

Rationale for Hunting Objective 5. It is important to engage young people in wildlife-dependent recreation and engender enthusiasm and support for hunting, wildlife conservation, and the Refuge System to build a conservation ethic. Early season or preseason hunts are best suited for youth because these seasons provide the best harvest opportunities. These programs will spark interest in hunting and hopefully lead to recruitment of more young refuge supporters.

Strategy for Hunting Objective 5

- Work with the State of Montana to establish a special, permitted, weekend hunt for elk and deer in all hunting districts covering the refuge that is available to only young hunters.

HUNTING OBJECTIVE 6. Over 15 years, work with MFWP to consider the opportunity for limited hunting of furbearers and mountain lion, provided monitoring of wildlife and habitat indicates stable and growing populations.

Rationale for Hunting Objective 6. There is interest of implementing new opportunities such as a hunt for

mountain lions. The Service will consider allowing for limited, quality-oriented hunting opportunities of furbearers or mountain lion provided the populations are stable.

For mountain lion, there will likely be a special drawing and only a few licenses will be issued. To open the refuge for a mountain lion hunt, a proposal (hunt plan) needs to be prepared that includes a justification including the population status, determination of harvest levels, and monitoring results. A proposal needs to comply with the National Environmental Protection Act (refer to “Big Game Objectives” in section 4.2 above and to section 3.2 in chapter 3).

Strategy for Hunting Objective 6. Refer to strategies for Hunting Objective 3.

FISHING OBJECTIVES

Fishing is allowed on the refuge. The Service will cooperate with other agencies to enhance fishing opportunities while maintaining game species and other species. Anglers often catch catfish, walleye, northern pike, sauger, perch, small mouth bass, bullhead, paddlefish, and lake trout.

USACE is responsible for providing recreation on their primary lands and waters. The Service works cooperatively with USACE to manage the lands, waters and public recreation opportunities within the Fort Peck Lake Project and the refuge boundary. The Service will continue to cooperate with USACE and the State to ensure that a quality fishing program exists within the refuge.

FISHING OBJECTIVE 1. Over 15 years, continue to follow State fishing regulations.

Rationale for Fishing Objective 1. Fishing within the refuge has centered on several types of opportunity: the fishery within the Fort Peck Reservoir and some opportunities associated with game fish–stocked reservoirs scattered throughout the upland part of the refuge. Fisheries resources have been primarily managed by MFWP (refer to “Fishing” under section 3.4 in chapter 3), and the refuge has participated in a partnership capacity when opportunities have occurred. There is a combination of interest in both introduced species of game fish as well as a native fish component that provides for a well rounded set of opportunities for the angler. In particular, native fisheries management associated with the free-flowing Missouri River has seen increasing emphasis in management in recent years, by both MFWP and the Service. This management focus will continue into the future and will provide for an increased diversity of opportunities for anglers to gain understanding of the importance of native fisheries while taking part in angling activities.

Strategies for Fishing Objective 1

- Work with USACE on maintaining and extending boat ramps that are critical as the lake recedes due to prolonged periods of drought.
- Follow State regulations for establishment of permanent and portable ice-fishing houses.
- Continue to enforce no driving on the shoreline.

FISHING OBJECTIVE 2. Within 5 years, monitor the effects of fishing on the surrounding resources. Cooperate and collaborate with MFWP to ensure that paddlefish fishing remains a compatible use.

Rationale for Fishing Objective 2. Paddlefish fishing is very popular with anglers across Montana. In Montana, the Slippery Ann area is one of a few important paddlefish fishing areas along the Missouri River. Historically paddlefish fishing was open to all, and hundreds of anglers packed into accessible areas from Kipp Recreation Area to Rock Creek boat ramp along the Missouri River. Law enforcement officers remained busy keeping order and preventing resource damage from camping and bank fishing. In recent times, MFWP has placed limits on paddlefish fishing (MFWP 2009c). The Service will work closer with MFWP to develop more strategies to ensure that paddlefish fishing, in particular, remains a sustainable and compatible use. The popularity of paddlefishing has resulted in some shoreline areas becoming heavily impacted from users who come to camp and fish.

Strategies for Fishing Objective 2

- Work with MFWP to figure out an acceptable number of paddlefish permits, dates, and harvest strategies to limit conflicts among anglers, wildlife habitat, and other refuge visitors.
- Work with MFWP and build on the research and data collection (creel surveys) already being conducted.
- Work with MFWP to identify important spawning areas.

FISHING OBJECTIVE 3. Over 15 years, work with MFWP, USACE, and other partners to maintain current access for sport fishing in the Missouri River and Fort Peck Reservoir.

Rationale for Fishing Objective 3. In 2006, about 60,100 fishing visits were recorded out of 233,000 visits to the refuge. Anglers spent more than 2 million dollars in expenditures, making it third highest ranking wildlife-dependent recreational use of the refuge (Carver and Caudill 2007). A popular activity, ice fishing is currently allowed on the Missouri River and Fort Peck Lake. Fishing contributes to the local economies through the rental of hotel rooms, eating at restaurants, buying of supplies and fuel.

Strategies for Fishing Objective 3

- If needed, improve access to the lake and river.
- Within 5 years, establish clear access points for ice fishing to minimize effects on upland habitat from vehicles.
- Explore opportunities for creating more motorized access for ice fishing during winter (Elk Hole or the Big Swirl) by providing access from the south side of the river or Timber Creek. Prohibit access from the river or shoreline.
- Work with USACE on maintaining and extending boat ramps that are critical as the lake recedes due to prolonged periods of drought.
- Follow State regulations for establishment of permanent and portable ice-fishing houses.
- Seek partnerships to develop accessible facilities such as piers or platforms that accommodate anglers with disabilities.
- Work with the State to maintain healthy fish populations.
- Work with counties to maintain existing gravel roads to the lake for fishing.
- Identify roads that provide direct access to the lake including ATV access.
- Continue to enforce no driving on the shoreline.

FISHING OBJECTIVE 4. Within 5 years, evaluate and establish for young people an additional fishing opportunity or event at one additional area as part of Montana's free fishing weekend.

Rationale for Fishing Objective 4. The opportunity to expand and develop a closer partnership with MFWP and others will benefit the refuges' goal to introduce youth to the Refuge System.

Strategy for Fishing Objective 4

- Work with MFWP and USACE to sponsor a fishing event for young anglers in the Fort Peck area that is associated with the fishing education program at the Fort Peck interpretive center.

FISHING OBJECTIVE 5. Within 2–4 years, have a mechanism or agreement in place to ensure that Refuge System permit requirements are added to or incorporated with USACE- or State-issued permits.

Rationale for Fishing Objective 5. The refuge has provided little to no oversight of the commercial harvest of fish in the past because most fish management falls under the primary jurisdiction of USACE and MFWP. However, Federal regulations governing the Refuge System state that "fishery resources of commercial importance on wildlife refuge areas may be taken under permit in accordance with Federal and State law and regulations" (50 CFR Part 31.13). Other regulations govern all commercial uses on refuges. USACE and State currently manage commer-

cial fishing within the refuge boundary. The Service recognizes these agencies has having primary jurisdiction for management of these activities and will work cooperatively when requested.



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Paddlefish

Fishing tournaments are popular on the Fort Peck Lake and on thus within the refuge. Care must also be taken to safeguard sensitive habitats or fish and wildlife areas within the refuge. Because fishing tournaments are a use of the refuge, they are subject to regulations governing uses on national wildlife refuges. The refuge has not provided any oversight to tournaments in the past, deferring to the State, and at USACE's regulatory and permitting processes. The Service recognizes these agencies has having primary jurisdiction for management of these activities and will work in a cooperative nature to ensure that public fishing opportunities are not negatively affected by these activities.

Strategies for Fishing Objective 5 (commercial fishing)

- Recognize the State and USACE as having primary responsibility for managing commercial fishing within Fort Peck Lake and work with these agencies to ensure the fisheries resources of the lake are not negatively affected.
- Work with MFWP to establish a method of sharing permittee and catch information for the refuge.

WILDLIFE OBSERVATION, PHOTOGRAPHY, and INTERPRETATION OBJECTIVES

Environmental education and interpretation programs will incorporate the Service's conservation goals in the themes, messages, and activities. The Service will provide opportunities for wildlife observation and photography across diverse habitats that show the full spectrum of plant and animal species found in the area.

The refuge provides several facilities for participating in wildlife viewing, photography, and learning about and appreciating the refuge's resources. These include the auto tour route, signs, kiosks, nearly 670 miles of road, the Fort Peck Interpretive Center that the Service cooperates with USACE for operation, and contact stations at Sand Creek and Jordan Field Stations.

Interpretation consists of self-guided trails, interpretive panels, and brochures as well as staff-dependent exhibits, tours and special events. Interpretation plays a key role in a visitor's experience and environmental awareness and helps foster an appreciation, support, and understanding of the refuge-specific topics and the Refuge System as a whole.

Freeman Tilden (1957) stated, "Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile." Similarly, the Service's Visitor Services Handbook (FWS 2011g) suggests, "Interpretation on refuges connects the hearts and minds of visitors with the places, objects, and resources we protect." The ref-

uge offers excellent opportunities to interpret the wildlife resource, paleontological discoveries, the Refuge System, western settlement history and the large intact landscape of the Missouri River Breaks in meaningful ways for visitors. To achieve this end, more interpretive programs and facilities are needed to orient and educate visitors and elicit “revelation upon information” (Tilden 1957).

Self-guided interpretive opportunities allow visitors to learn independently. Interpretive tools for these self-guided opportunities will include exhibits, programs, trails, brochures, Web site, and signage.

Each of these wildlife-dependent recreational activities requires different programming elements. Because these are nonconsumptive activities (not hunting or fishing), and they are often closely interrelated (for example, a visitor may observe and photograph wildlife while participating in an interpretive program), the objectives have been combined for all.

WILDLIFE OBSERVATION, PHOTOGRAPHY, and INTERPRETATION OBJECTIVE 1. Within 5 years, develop and complete a visitor service plan that identifies specific programming elements in addition to interpretive themes, messages, and audiences for wildlife observation, photography, and interpretation to support objectives 4 and 5 (see table 23 in section 4.10 below about stepdown plans).

WILDLIFE OBSERVATION, PHOTOGRAPHY, and INTERPRETATION OBJECTIVE 2. Within 5 years and as part of objective 1 above, conduct a visitor experience survey to obtain an accurate estimate of visitors and their desired needs and experiences for wildlife observation.

WILDLIFE OBSERVATION, PHOTOGRAPHY, and INTERPRETATION OBJECTIVE 3. Within 5 years, hire an outdoor recreation planner for the refuge. (Refer to “Refuge Operations Objectives” in section 4.9 below.)

WILDLIFE OBSERVATION, PHOTOGRAPHY, and INTERPRETATION OBJECTIVE 4. Over 15 years, increase participation in wildlife observation, photography, and interpretive activities by about 15–25 percent (approximately 6,000–10,000 more visits annually).

WILDLIFE OBSERVATION, PHOTOGRAPHY, and INTERPRETATION OBJECTIVE 5. Over 15 years, improve the quality and increase the number of wildlife observation, photography, and self-guided and staff-dependent interpretive programs or facilities by approximately 15–25 percent. Base this on the visitor services plan and possibly include observation blinds or facilities, trails, signs, a science and interpretive center at Sand Creek Field Station, or other programs and facilities.

Rationale for Wildlife Observation, Photography, and Interpretation Objectives 1–5. The refuge provides a beautiful and remote setting for wildlife observation and photography. While the extensive road system

provides access to areas that are rich with wildlife and are picturesque, many observation areas are not promoted nor signed. With the exception of the elk-viewing areas, visitors may have difficulty locating overlooks and other areas that lend themselves to photography and observation. The large number of vehicles using the elk-viewing area in the fall raises concerns about overcrowding.

Habitat improvements to uplands, river bottoms, riparian areas, and shorelines could increase opportunities for viewing and photographing wildlife. The Service will seek to increase by a moderate amount the number of visitors participating in these activities, subsequently adding programs or facilities (for example, observation blinds and a science and interpretive center at Sand Creek Field Station) as needed, but will provide for quality-based experiences. Although quality is difficult to define precisely, and it means something different for every visitor, developing an experienced-based approach that provides for the diverse interests of visitors, while operating within the capabilities of the resources (Manfredo 2002), will achieve this goal. Experience-based management proposes that recreation opportunities be described in terms of the experience, setting, and the activity. Some visitors have a great experience if they observe a lot of wildlife, regardless of how many other people are around. For others, a quality experience could mean seeing less wildlife but being around fewer people (Manfredo 2002).

Increasing visitation by 15–25 percent will require a moderate investment in facilities and programs. A critical component for implementation is the development of the visitor services plan, completing a visitor experience survey, and the addition of two outdoor recreation planners to carry out and oversee the program. Constructing more facilities for wildlife watching such as blinds, trails, or designating another road on the refuge will draw in visitors who are seeking that opportunity. It will be important that new and expanded wildlife observation and photography facilities complement the natural settings within the refuge.

Strategies for Wildlife Observation, Photography, and Interpretation Objectives 1–5

- Maintain the existing wildlife-viewing area.
- Recruit volunteers for the Christmas bird count and other birding events.
- Identify observation areas to the public through signage and maps.
- Develop Web site-based observation materials such as bird lists and information, maps, and Webcams.
- At Fort Peck Interpretive Center, provide a computer kiosk where visitors can access birding information such as bird songs (for example, using Thayer birding software).

- Incorporate the refuge as a stop on the Montana birding trail and regional birdwatching trails or routes. Provide support materials at the refuge, headquarters, and online to guide visitors through the State and direct them to key birding spots.
- Explore new areas to promote for wildlife observation and photography opportunities, such as expansion of elk-viewing opportunities.
- Where possible, establish universally accessible observation blinds.
- Start grouse-viewing programs and provide accessible blinds that allow visitors to view grouse on leks after peak hen attendance (peak attendance of male grouse occurs toward the end of the breeding season, providing visitors quality viewing experiences while minimizing disturbances to actual breeding activity).
- Develop at least one additional (three total), accessible, nonmotorized trail system for families and people with disabilities.
- Develop 2–5 miles of primitive hiking trails including one on the east side at Sand Arroyo (see figure 41).
- Consider the State section north of Slippery Ann for facilities.
- Maintain exhibits at the Fort Peck Interpretive Center.
- Identify gaps in interpretative materials or programs and additional themes to expand through improved programming.
- Develop more interpretive exhibits and materials.
- Update the wildlife and bird lists.
- Continue to print and distribute the refuge’s general brochure.
- Develop a bird guide map to target birder audiences and provide more sophisticated, quality interpretive opportunities.
- Update the refuge history brochure.
- Improve visitor contact areas at the Sand Creek, Fort Peck, and Jordan Field Stations by providing more interesting and informative information.
- Routinely update the Web site and incorporate changing interpretive content into the design.
- Increase the elk-viewing bus tours to include other communities.
- Work with Phillips County to use their buses for interpretive activities and tours.
- Incorporate a stewardship message into interpretive facilities and programs to instill in visitors greater support for the refuge and its resources.
- Continue to place interpretive signs at public access and overlook points (for example, Crooked



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Refuge staff help visitors identify wildlife species.

Creek) in cooperation with various agencies and units of government.

- Inventory, maintain, and replace signs, as needed.
- Maintain the auto tour route.
- Inventory all facilities, identify audiences for outreach efforts, and update the inventory annually.
- Design two, short, accessible, hiking trails with interpretive signage and brochures for visitors of all needs at the Fort Peck and Sand Creek Field Stations.
- Continue to cosponsor special events related to wildlife and habitat conservation.
- Actively publicize and take part in one national event such as National Wildlife Refuge Week and Migratory Bird Day.

ENVIRONMENTAL EDUCATION OBJECTIVE

The purpose of environmental education is to advance public awareness, understanding, appreciation, and knowledge of key fish, wildlife, plant, and resource issues through formal, curriculum-based programs tied to national and State education standards. Environmental education may be geared toward children or adults, and it is key for changing attitudes and behavior, which affect the refuge through off-refuge land use decisions and on-refuge conduct and use. Only through understanding and appreciation will people be moved to personal and collective action to ensure a healthy refuge for the future.

ENVIRONMENTAL EDUCATION OBJECTIVE. Within 5–10 years, expand the quantity of the environmental education programs (on- and off-refuge) offered by the refuge by about 10 percent (identify program elements in the visitor services plan). (See table 23 in section 4.10 below about stepdown plans.)

Rationale for the Environmental Education Objective. The Service is committed to connecting people with nature through initiatives such as “Children in Nature” (FWS 2009c). Books like *Last Child in the Woods* (Louv 2005) have highlighted the importance of connecting children with nature. Louv contends that the lack of nature in the lives of today’s wired generation (Louv refers to it as “nature-deficit”) contributes to disturbing childhood trends, such as rises in obesity, attention disorders, and depression.

There will be a moderate increase in the environmental education program, with an emphasis on quality. The programs will primarily focus on the Service’s conservation goals as well as biological diversity, biological integrity and the ecological processes that shape the refuge, but other topics including climate change and ranching history will be included.

Similar to the objectives for wildlife observation, the first action is to develop the visitor services plan that identify the elements of an environmental education program at the refuge and hire an outdoor recreation planner. Existing curricula will be modified to highlight these issues and at least one new curriculum will be developed in compliance with State standards. Because environmental education is curriculum-based and labor intensive, initial efforts will be limited to Fort Peck and Lewistown Field Stations when an outdoor recreation planner is hired.

Strategies for the Environmental Education Objective

- Develop an environmental education program as part of the visitor services stepdown plan.
- Identify gaps in environmental education materials and programs, conduct a visitor experience survey, and identify additional themes to expand through improved programming.
- Promote teacher-taught and refuge-taught programming that incorporates the “Children in Nature” initiative in both structured and unstructured ways. Encourage family visits and family awareness of the refuge and the Refuge System. Promote programs to get all ages of children outdoors (for example, the “Lets go Outside” initiative).
- Respond to requests for technical assistance for curriculum-based environmental education (for example, Range Days, Bio-Blitz, Envirothon, and Field Days).
- Use the refuge Web site to promote environmental education; include a downloadable podcast.
- Within 5–7 years, provide refuge-taught environmental education programming at no less than two school visits per year.
- Over 15 years, work with partners to modify existing environmental education curricula tailored to the refuge (for example, BLM, USACE,



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Refuge staff member conducting an outreach field trip.

State, Project Wild, Project Wet, Nature Learning, and Project Learning Tree.) Include potential topics such as prairie streams, prairie plants and wildlife, climate change, and invasive plants.

- Align teacher- and refuge-taught school programs with State and local educational standards.
- Annually offer two to four teacher workshops to all interested school districts in central and eastern Montana promoting refuge-based (local community) and regional-based information.
- Over 15 years, work with partners to create up to two environmental education curricula unique to the refuge, with potential topics including prairie streams, use of fire, prairie plants and wildlife, invasive plants, climate change, and ecology of the Missouri River Breaks with emphasis on sentinel plants.
- Hire two outdoor recreation planners (as part of public use program).

OUTREACH OBJECTIVES

Outreach efforts help educate people about the refuge and its needs. It involves communication between the refuge and interested groups and the public such as local communities and city, county, State, and Federal officials. Outreach may include formal meetings or informal discussions with visitors or landowners, as well as news releases, organized programs, tours, and presentations.

OUTREACH OBJECTIVE 1. Within 2 years, build greater awareness and appreciation for the Service and refuge resources, with a resulting 5- to 10-percent increase in requests for information, visitation, and Web site hits.

OUTREACH OBJECTIVE 2. Within 5 years, engage outside audiences such as interested groups, the public, and potential visitors in at least three meetings, presentations, or open houses per year. Provide information to audiences about the importance of the refuge goal of restoring ecological processes and increasing the resiliency of refuge habitat to nonclimate stressors and climate change stressors.

Rationale for Outreach Objectives 1–2. Outreach will focus on the refuge’s goal of restoring ecological processes and increasing the resiliency of refuge habitat to nonclimate stressors as well as climate change stressors. Outreach will communicate wildlife and habitat goals and the increasing visitation to the refuge.

The refuge will increase its outreach efforts through participation in local events and meetings or by developing a Friends group (a nongovernmental organization that specifically works on behalf of furthering the refuge or Refuge System’s goals).

Improving the quality and content of the refuge’s Web site is one way for the refuge to reach out to a larger audience. Recent data suggests that “hits” (visits to the Web site <<http://fws.gov/cmr>>) are seasonal and likely due to a visitor’s particular interest, for example, hunting or development of the refuge’s CCP. Before hunting season, hits to the Web site increase from all over the United States as well as residents in Montana.

Strategies for Outreach Objectives 1–2

- Occasionally take part in State and local events such as State, county, and school career fairs.
- Conduct three information-sharing events (such as interviews, public service announcements, and writing articles) with the media (newspaper, television, and radio), chambers of commerce, congressional contacts, and tourism outlets per year.
- Make presentations as requested.
- Recruit volunteers to support staff.
- Seek grants in partnership with others to fund special events or programs.
- Use the Internet to keep the public informed about refuge programs and activities.
- Actively take part in one State and local events such as State, county, and school career fairs.
- Investigate developing a Friends group for the refuge within 2 years of CCP approval.
- Improve the refuge’s Web site by adding at least two of the following:
 - Photographs of the refuge.
 - Videos of elk in rut, prairie dog towns, and sage-grouse and sharp-tailed grouse leks.
 - Increased Webcam feeds.
 - Blogs with refuge-specific information on a prairie dog town or the elk-viewing area. Include a downloadable podcast.
 - Information on travel conditions for roads.
 - Downloadable versions of all refuge brochures.
- Develop an outreach plan as part of the visitor services plan (see table 23 in section 4.10 below about stepdown plans).
- Work with the Montana tourism department to promote the refuge and its resources.

ACCESS OBJECTIVES

There are nearly 670 miles of road found on the refuge. Hard-surfaced, all-weather roads are limited to U.S. Highway 191 on the western end of the refuge and several highways around Fort Peck. Several graveled roads provide direct access to the refuge. All other roads are passable only in dry weather.

Refuge access will be primarily managed to benefit natural processes, but some improvements will



The 670 miles of roads that crisscross the refuge affect the physical, biological, and public environment.

be made to provide quality visitor experiences. Initially, the Service will close about 21 miles of roads, implement a seasonal closure along 2.4 miles of road 315, and designate 13 miles of roads on the northeast side of the refuge as game retrieval roads where seasonal closures will be applied. Other closures or modifications could be necessary after further review of the refuge's road program. This will encourage free movement of wildlife, permit prescribed fire or wild-fire suppression activities, and increase effective harvest of wild ungulates.

The Service will upgrade about 5 miles of roads to all-weather access (gravel), allow more winter fishing access, and expand opportunities for quality wildlife observation, interpretation, and environmental education through added facilities (trails, viewing blinds, and a science interpretive center).

Bicycles will be restricted to numbered roads only including seasonally closed roads. The Service will provide facilities and services that enable people of all abilities to enjoy the educational and recreational opportunities available on the refuge.

Properly licensed snowmobiles are allowed only on the frozen surface of Fort Peck Reservoir. Bicycles may be used only on numbered roads including seasonally closed roads.

Boating is allowed on the refuge although special regulations apply on the western edge, which is part of the National Wild and Scenic River System (refer to hunting objectives for more discussion about monitoring boat access). Working with USACE and other agencies, the Service will monitor boat use along the Missouri River to determine use levels and whether wildlife disturbance, particularly during hunting season, was an issue. The Service will then work with cooperators and users to manage access where needed to limit disturbance to wildlife along the river corridor. Motorized vehicle use will be monitored on numbered trails and man-

aged if there is documented disturbance to wildlife or visitors.

Aircraft may not land on the uplands of the refuge. Landing sites for seaplanes will continue to be allowed under the provisions of the Seaplane Landing Plan (USACE 1995). Landing and taxiing of fixed-wing aircraft on the surface of Fort Peck Reservoir is allowed in designated landing locations.

Several special regulations for public access on the refuge will continue to apply. This includes, among others, the requirement for ATVs and motorcycles to be street-legal. In addition, all vehicles must stay on established routes. The Service will continue to allow for access to private inholdings or State lands. The Service will develop a stepdown management plan for transportation.

ACCESS OBJECTIVE 1. Within 3 years, evaluate access points and determine improvements that can be made to enhance ecological processes on the refuge.

ACCESS OBJECTIVE 2. Within 3–5 years, work with partners to develop a comprehensive travel management plan.

ACCESS OBJECTIVE 3. Over 15 years, work with counties to reconfigure the refuge road system. Initially close 21 miles of roads and seasonally close 15 miles of roads (designate 13 miles on the northeast part of the refuge as game retrieval roads, and seasonally close road 315 from its junction with road 838) as needed to encourage free movement of animals, permit prescribed fire activities, harvest wild ungulates, provide for quality wildlife-dependent recreation, or allow other activities that contribute to overall improved ecological health (see figure 41). Once the transportation plan is completed, close or modify more roads as necessary.

ACCESS OBJECTIVE 4. Within 5 years, identify safety hazards and partners to routinely maintain the refuge road system.

Rationale for Access Objectives 1–4. With more than 670 miles of road crisscrossing the refuge, there are few places that cannot be accessed within a mile of a road (refer to “Access” under section 3.4 in chapter 3). Most of the roads are primitive and not heavily traveled except during hunting season; nonetheless, the number and extent of the road system is cause for concern from a wildlife management, law enforcement, and road maintenance perspective.

Some refuge roads have become severely rutted and braided, particularly during wet seasons, and there is little money to maintain or patrol all the roads. Roads and invasive plants go hand in hand on most public lands in the United States (USFS 2003), as roads are a known vector for carrying weed seeds. The full extent of the problem is unknown at the ref-

uge because invasive species mapping has not been done for all upland areas, but invasive weeds are of considerable concern in many areas (for example, north fork of Rock Creek and Big Dry Arm (see figure 20 in chapter 3). The Service has worked with refuge users, particularly during hunting season, to reduce the transport of invasive species by vehicles by running the weed wash station.

Roads also can result in wildlife disturbance and habitat fragmentation. Habitat fragmentation has been shown to exacerbate the problem of habitat loss for grassland birds. While understanding the effects of habitat fragmentation is complex and not easy to assess, it is critically important to do so in making decisions about grassland management (Johnson 2001).

The objectives will provide the improved access that some refuge users desire—along with managing big game populations to improve habitat and meeting MFWP harvest objectives—while ensuring the access plan enables the Service to restore ecological processes. To achieve the overall habitat and public use objectives, other road closures could be needed, but this will be assessed in consideration of harvest strategies and other public uses and will be identified during development of the transportation plan. There will be moderate increases in providing for nonconsumptive uses, and improved access and facilities could be important in facilitating these activities. The Service will consider allowing motorized access on some closed roads (outside of wilderness areas) for game retrieval only. If conditions warrant, other improvements or closures will be considered.

The following roads (by road number) will be closed based on the criteria listed (some roads meet multiple criteria and appear more than once below):

- for protection of wilderness values—306 and 311
- to increase blocks of undisturbed habitat or reduce negative wildlife effects—320
- to address safety or maintenance issues—374 (part of) and 825
- where there is no defined legal public access—353, 355, 365, 476, 479, 488, 489, 609, 616, 617, and 618
- where the area is easily accessible from off the refuge or from another road—320, 616, and 618

Seasonal closures will be carried out on roads 315, 440, 331, 332, 333 to improve wildlife security, reduce displacement of wildlife due to motor vehicle use, and provide optimum winter habitat for wildlife.

Strategies for Access Objectives 1–4

- Direct money and staff to the evaluation of all forms of access (including motor boat) and its effects on various wildlife populations. Use this information to make final recommendations for closing access (roads) seasonally or permanently

or restricting boat motors to reduce the disturbance to wildlife.

- Within 2–5 years, assess the use of mountain bikes on all numbered routes, seasonally closed roads, and closed roads.
- Study the effects of recreation in proposed wilderness and wilderness along with closed, seasonally closed, and numbered roads to evaluate current restrictions and the effects of recreation on wildlife and habitat.
- Work with private landowners, counties, USACE, BLM, and MFWP to identify roads that provide legal public access on or off the refuge. Acquire legal access where needed and feasible.
- Remove all roads that provide exclusive access to the refuge because of inaccessible private lands within or outside the refuge.
- By 2014, produce a GIS road layer and public use “Guide Map” that shows legal public access on the refuge; designates all-weather roads, dirt “two tracks,” and roads that end at waters edge; and shows fences and gates to accommodate horse users.
- Consider opening or closing numbered routes seasonally or permanently.
- Consider restricting all access during some times of the year and allowing it at other times such as with seasonal closures.
- Work with partners to improve the elk-viewing area and reduce congestion by enlarging the area.
- Evaluate the demand for multimodal accessibility.
- Determine the extent of road use and the types of use.
- Reduce undesignated vehicle trails off system roads, i.e., road stems.
- Maintain directional signage and improve the wayfinding system as needed.
- Develop road management systems to compete for national funds.
- Perform “hot spot” road safety audits (for example, such problem areas as Knox Ridge and Sandy Creek Road).
- Perform an audit of the 100–200 series of roads within 3 years.
- Consider money and staff needed for opening and closing roads (including seasonally closed roads), developing more access points, or making changes in access.
- Designate parts of roads 440, 331, 332, and 333 as game retrieval roads (opened for set hours during hunting season for game retrieval only). Designate road 315 as seasonally closed from the

junction with road 838 to its end (from the end of August to March 1).

- Consider ways to improve opportunities for visitors to take part in nonconsumptive uses such as by providing viewing areas.
- Consider improving Knox Ridge Road for all-weather access (gravel).
- Work with other agencies and partners to restrict access or expand roadless areas if needed to facilitate ecological processes.
- Institute seasonal closures at beaches to protect nesting endangered species.
- Decrease access to roads to minimize invasive species (for example, the north fork of Rock Creek and Big Dry Arm).
- Replace structures that are barriers to aquatic organisms (for example, use fish-friendly culverts).
- Restrict access to proposed wilderness units to meet biological objectives.

RECREATION SITE OBJECTIVE

Facilities will be upgraded and designed to meet accessibility standards. Camping needs will be evaluated as use changes on the refuge, and adaptive management (see figure 42 in section 4.11) will be used to address camping demand, for example, harden the frequently used sites to minimize erosion and effects on habitat. Camping will be limited to within 100 yards of numbered routes.

There are two primary types of recreation areas found on the refuge: (1) developed areas that have amenities such as campsites, running water, and boat ramps and are managed by USACE or outgranted to MFWP or BLM; and (2) primitive areas that only have vault toilets and are managed by the Service. Additionally, there are a few more primitive areas with no facilities that were outgranted to the Service in the Enhancement Act (refer to section 1.9 in chapter 1). The following objectives address areas that the Service manages.

RECREATION SITE OBJECTIVE. Within 5 years, work with USACE to further define or improve existing Service recreation areas.

Rationale for the Recreation Site Objective. Current Service-managed recreation areas are primitive (vault toilet) compared to USACE or other agency managed recreation areas around the refuge. More visitors are using these areas for hunting, fishing, and elk viewing. These areas provide a site for visitors to gather and enjoy the Breaks while participating in wildlife-dependent recreational activities. Without these designated areas, the natural resources will be affected largely due to visitors being dispersed across a wider area.

Strategies for the Recreation Site Objective

- Harden all sites to define the current recreation area boundary to prevent future expansion into habitat.
- Work with USACE to evaluate the site potential for improving camping within the designated USACE recreation areas.
- Coordinate accessible and usable campsites that will meet the needs of those requiring special accommodations.
- Evaluate current recreational facilities and restrictions for user friendliness and ecological effects.
- Consider improving existing facilities to improve the overall refuge experience.

COMMERCIAL RECREATION OBJECTIVE

A commercial use is any economic use of a national wildlife refuge such as cooperative farming, haying, timber harvest, and grazing. Commercial fishing and outfitting are examples of commercial recreation.

The Service will only permit commercial recreation when it benefits natural ecological processes or habitats. For example, commercial activities could be allowed in roadless areas to facilitate big game harvest for meeting wildlife and habitat objectives.

All commercial uses must be appropriate and compatible with the mission of the Service and the Refuge System and the purpose for the refuge was established. Commercial uses that are not appropriate and compatible are not allowed and if they are occurring, they must be stopped or modified to be compatible.

COMMERCIAL RECREATION OBJECTIVE. Within 5 years and in collaboration with MFWP and USACE, implement a consistent process for issuing permits for persons conducting for-hire outfitter hunting and wildlife observation activities.

Rationale for the Commercial Recreation Objective. Commercial guiding and outfitting services have been and will continue on the refuge under a special use permit. These activities primarily are associated with hunting. All commercial activities on the refuge require a permit as identified by Title 50 CFR.

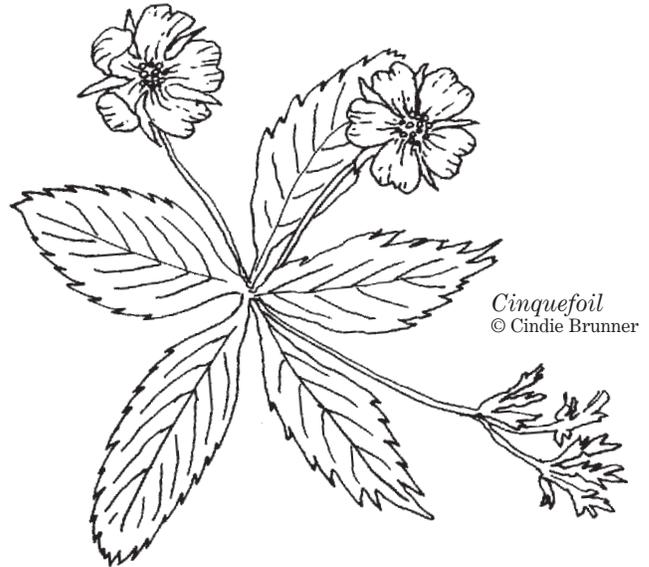
Currently, fishing outfitting, fishing tournaments, and commercial fishing are not covered by special use permit. Commercial fishing including tournaments are a popular activity on Fort Peck Lake where USACE has primary jurisdiction. The refuge has little to no oversight of commercial fishing harvest, deferring to the State's expertise and experience as well as USACE's primary jurisdiction.

The Service will look to work with MFWP and USACE to better understand the fishery resources and the levels of harvest. The refuge participated in

the development of the Fort Peck Reservoir Fisheries Management Plan (MFWP 2002a) that addressed fishing tournaments and commercial fishing. MFWP is in the process of rewriting the 10-year plan and the refuge will request to be a cooperating agency.

Strategies for the Commercial Recreation Objective

- Evaluate all commercial uses on the refuge for possible effects on wildlife populations.
- Continue to prohibit commercial outfitting for coyote hunting.
- Evaluate the current intensity of outfitting to find out if public use is being affected as a result.
- With the above information, make adjustments as necessary to ensure commercial uses are compatible with refuge missions and purposes.
- Evaluate the numbers of animals harvested by commercial outfitters. Require outfitters to project expected harvest levels in permit application each year.
- Determine the net-client hunter-use days and harvest success rates for each outfitter and outfitter-sponsored client numbers.
- Work with the State, BLM and USACE to develop capacity parameters within the refuge for various types of guiding operations (parameters aim to minimize competition or conflict with the public engaged in hunting, fishing, and wildlife observation; minimize conflicts between guides; and ensure a viable economic opportunity for existing guiding businesses).
- Conduct a public information effort through news releases and media contacts.
- Provide proactive enforcement with the refuge's and other agencies' law enforcement officers.
- Consider implementing outfitter permits for guiding and retrieval in the proposed wilderness if cow elk continue to increase or are causing negative effects on vegetation in the area.



4.7 GOAL for WILDERNESS

Conserve, improve, and promote the wilderness character and associated natural processes of designated and proposed wilderness areas and wilderness study areas within the refuge for all generations.

The 20,819-acre UL Bend Wilderness in the UL Bend Refuge and all proposed wilderness units (see figure 41) will be protected in accordance with the 1964 Wilderness Act and the Service's Wilderness Stewardship Policy (FWS 2008c).

About 155,288 acres of proposed wilderness within 15 units of the Charles M. Russell Refuge (see figure 41) will be managed in accordance with Service policy. Roads in proposed wilderness units will

remain closed except for roads that provide access to private lands within the refuge.

The Service will expand or adjust the existing proposed wilderness units by 19,942 acres in Alkali Creek, Antelope Creek, Crooked Creek, East Seven Blackfoot, Mickey Butte, Wagon Coulee, Sheep Creek, and West Hell Creek to promote and conserve wilderness qualities and characteristics and minimize negative effects on existing access. These expansions or adjustments are called wilderness study areas (see figure 41 and appendix F).

Within 2 years, the Service will complete the study of all units that meet the wilderness criteria (refer to appendix F) and submit final recommendations to the Service directorate and Secretary of the Department of the Interior.

OBJECTIVES for WILDERNESS

WILDERNESS OBJECTIVE 1. Over 15 years, continue to manage the 20,819-acre UL Bend Wilderness as a class I air shed.

WILDERNESS OBJECTIVE 2. Within 2 years, complete the wilderness study and submit recommendations to the Service Directorate and Secretary for the Department of the Interior.

WILDERNESS OBJECTIVE 3. Over 15 years, expand or adjust the existing proposed wilderness units by 19,942 acres in Antelope Creek, Crooked Creek, Alkali Creek, East Seven Blackfoot, West Hell Creek, Sheep Creek, Wagon Coulee, and Mickey Butte to promote and conserve wilderness qualities and characteristics while minimizing impacts to access outside of the units. Refer to any expansion or adjustment as a wilderness study area until formally transmitted to Congress (see figure 41 and appendix F).

Rationale for Wilderness Objectives 1–3. The UL Bend Wilderness (Public Law 94–557) and the proposed wilderness units are managed according to the Wilderness Act of 1964. The Service's wilderness policy (FWS 2008c) describes how the refuge manager preserves the character and qualities of designated wilderness while managing for the establishing purposes of the refuge. This policy, like the Wilderness Act, states that wilderness is maintained with outstanding opportunities for solitude and a primitive and unconfined type of recreation. Visitors to the UL Bend Wilderness and the proposed wilderness units are primarily hunters and hikers seeking big game hunting and wildlife observation opportunities.

The management emphasis is to restore the biological diversity, integrity, and environmental health of the refuge while providing for quality wildlife-dependent uses. By keeping the wilderness designation and closing some roads, there will be more security for wildlife, less habitat fragmentation, fewer invasive species infestations, and other positive wildlife benefits, which are important considerations in restoring ecological processes.

The refuge manager conducts a "minimum requirements analysis" before taking any action that may affect wilderness character. In general, the manager will not modify habitat, species population levels, or natural ecological processes in refuge wilderness unless doing so will maintain or restore ecological integrity that has been degraded by human influence or is necessary to protect or recover threatened and endangered species.

Eight units totaling 19,942 acres will be expanded because they possess the outstanding wilderness tangible and intangible aspects as described in the Service's wilderness policy.

Strategies for Wilderness Objectives 1–3

- Continue to allow game retrieval carts in proposed wilderness units.
- Inform and educate the public about wilderness on the refuge by adopting some or all of the interpretive themes identified for wilderness education in the wilderness stewardship policy.
- Implement wilderness character monitoring protocols (developed in 2011).

4.8 GOAL for CULTURAL and PALEONTOLOGICAL RESOURCES

Identify, value, and preserve the significant paleontological and cultural resources of the refuge to connect refuge staff, visitors, and the community to the area's prehistoric and historic past.

OBJECTIVES for CULTURAL and PALEONTOLOGICAL RESOURCES

CULTURAL RESOURCE OBJECTIVES

The refuge contains hundreds of prehistoric and historic resources (more than 50 years old). There are numerous old homestead cabins, cemeteries, and Native American sites. Remnants of old river towns such as Carroll and Rocky Point, which sprung up in the 1820s and 1860s to serve the fur trade and steamboat traffic have been washed away by the mighty Missouri River. Other homestead sites were lost when Fort Peck Dam was completed and the lush river bottoms were flooded by the reservoir.

Cultural resources will be identified, and significant resources will be protected in accordance with the National Historic Preservation Act and other relevant laws. Some old homesteads will continue to be maintained but others will not. Known gravesites will be protected and the cultural resource inventory will be maintained. A refuge history brochure will be provided.

The Service will create a sensitivity model for cultural resource locations and conduct surveys in areas with a moderate or high potential for resources. A comprehensive cultural resource overview and step-down plan will be completed. Oral histories will be collected to help understand and interpret the history of some of the structures on the refuge. Opportunities to work with partners to fund and carry out preservation projects will be explored, and any artifact collections will be located and properly curated.

CULTURAL RESOURCE OBJECTIVE 1. Over 15 years, continue to identify and protect cultural resources in accordance with Federal laws and policies.

CULTURAL RESOURCE OBJECTIVE 2. Within 5 years, develop a stepdown plan for the preservation and protection of cultural resources on the refuge.

CULTURAL RESOURCE OBJECTIVE 3. Within 5 years, identify areas with a high or moderate likelihood of having historic properties.

Significant cultural and paleontological resources will be protected and managed. Individual projects may require more consultation with the State of Montana's Historic Preservation Office, Tribal Historic Preservation Offices, and other interested parties. The Service will maintain closures of roads through sensitive areas. In addition, there will be increased protection of cultural and paleontological sites through law enforcement and public education.

CULTURAL RESOURCE OBJECTIVE 4. Within 10 years, survey the moderate and high areas for cultural resources to identify most of the historic properties.

CULTURAL RESOURCE OBJECTIVE 5. Over 15 years, compile a comprehensive cultural resource overview that describes the nature and extent of past cultural resource investigations, the types of resources known at the refuge, and the interpretive context for these resources.

CULTURAL RESOURCE OBJECTIVE 6. Over 15 years, develop interpretive materials that explain the refuge's cultural resources.

CULTURAL RESOURCE OBJECTIVE 7. Over 15 years, develop a system for archiving historic items (including documents, photographs, maps and artifacts) in accordance with Department of the Interior policies.

CULTURAL RESOURCE OBJECTIVE 8. Beginning in year 2, locate individuals with knowledge about the general history of the refuge, the location of sites, or alterations to various buildings and structures.

Rationale for Cultural Resource Objectives 1–8. Federal laws and policies mandate the identification and protections of cultural resources on Federal lands. Specifically, section 106 of the National Historic Preservation Act requires all Federal agencies to consider effects on cultural resources before any Federal action.

The refuge contains many historical structures, many of which have not yet been properly surveyed. Additionally, the Missouri River Breaks has a rich history of Native American and Euro-American presence. Identifying sensitive cultural areas and resources will allow staff to better consider cultural resources in planning and will establish the priorities for cultural resource surveys. A cultural resource survey is the best tool available for finding cultural resources at the refuge. Using surveys, both his-

toric and prehistoric resources are identified and key information is gathered that helps for evaluation, planning, research, and educational outreach. There is limited knowledge about cultural resources at the refuge because less than 1,000 acres have been professionally surveyed. Although there are 363 known cultural resource sites, many have very limited documentation.

The overview will outline specific threats to the resources and the ability of future studies to address regional research questions. It will also serve as a planning tool to help encourage consideration of cultural resources during project planning.

To increase the public's appreciation and encourage support for the cultural and paleontological resources, staff needs to interpret the resources. Cultural artifacts and historic structures can provide valuable insight into the settlement of the Missouri River Breaks and the development of the refuge through time and provide the public with a link to the past.

Long-term and past employees, in addition to local residents and members of regional historic societies, can be a wealth of information about the history of the refuge and the location of specific resources.

Strategies for Cultural Resource Objectives 1–8

- Within 10 years, establish photo documentation and GPS mapping for known significant sites.
- Continue cultural resource reviews of undertakings.
- Improve the Service's ability to conduct thorough and timely reviews including more comprehensive consultation.
- Develop a programmatic agreement with Montana State Historic Preservation Office.
- Create a comprehensive list and map of known historic sites.
- Identify historic homesteads to maintain.
- Protect all known gravesites, and maintain the cultural resource inventory.
- Monitor the condition of the resources on a regular basis using a cultural resource professional and, when possible, mitigate adverse effects that are compromising the integrity of the resource.
- Provide staff with access to information on historic properties and request updated information on resource condition when they are in the area.
- Create a sensitivity model for cultural resource locations based on previous surveys on the refuge and the surrounding areas, in consultation with the State Historic Preservation Officer, the Tribal Historic Preservation Office, and other professionals.
- Make the cultural resources sensitivity model available to appropriate staff.
- Ground-truth the cultural resources sensitivity model when possible.
- Update and refine the cultural resources sensitivity model on a regular basis.
- Conduct cultural resource surveys of areas with a moderate to high potential for cultural resources.
- Work with partners such as other agencies, colleges, and universities to conduct surveys and share resources.
- Notify the region 6 archaeologists when unrecorded cultural resources are located.
- Identify cooperative opportunities with colleges and universities.
- Secure grants to complete the resources overview.
- Develop a cultural and paleontological resource fact sheet for distribution to refuge visitors.
- Create more cultural resource educational and interpretive materials.
- Develop brochures and kiosks that interpret cultural resources.
- Conduct a comprehensive inventory of historic items and an assessment of their condition. Determine the informational and artifact value of the items. Determine the best strategy to make the information and artifacts useful and available.
- Protect and store historic items of value in archiving-stable materials under environmentally appropriate conditions.
- Work with current staff and area residents to develop a list of individuals who may have information about the refuge's history.
- Conduct field trips or interviews with people identified as having knowledge of the history at the refuge.

PALEONTOLOGICAL RESOURCE OBJECTIVES

Many paleontological resources have been excavated from the refuge. Among the most recognizable dinosaur fossil finds to come from the refuge are *Tyrannosaurus rex*, *Triceratops*, *Albertosaurus*, *Mosasaurus*, and hadrosaurs (refer to section 3.6 in chapter 3). Several collections are on display at the Fort Peck Interpretive Center. Collection of any fossils is not allowed without a special use permit.

The Service will continue to issue permits to institutions that investigate paleontological resources from a scientific perspective. Permits will not be issued for recreational paleontology requests that do not follow a scientific study design. All permits will continue to meet compatibility requirements and the regulations for the Paleontology Resource Protection Act.

The refuge will develop a stepdown plan with Montana State University and USACE for these resources. The number of education permits for universities for excavation of paleontological resources could be decreased if necessary to increase protection.

PALEONTOLOGICAL RESOURCE OBJECTIVE 1. Over 15 years, continue to issue permits to the Museum of the Rockies or others for collecting paleontological resources and prohibit recreational digging.

Rationale for Paleontological Resource Objective 1. Currently, the Museum of the Rockies in Bozeman, Montana, has a permit to dig for fossils on the refuge, and providing they met the terms of the permit, this will continue.

Strategy for Paleontological Resource Objective 1

- Monitor an operator to ensure compliance with terms of the permit, and monitor and investigate any reports of illegal digging.

PALEONTOLOGICAL RESOURCE OBJECTIVE 2.

Within 5 years, in cooperation with the Museum of the Rockies and the USACE,

develop a stepdown plan for paleontological resources. Ensure the plan specifies guidelines for uniform permitting of paleontological research to credible research facilities across the refuge.

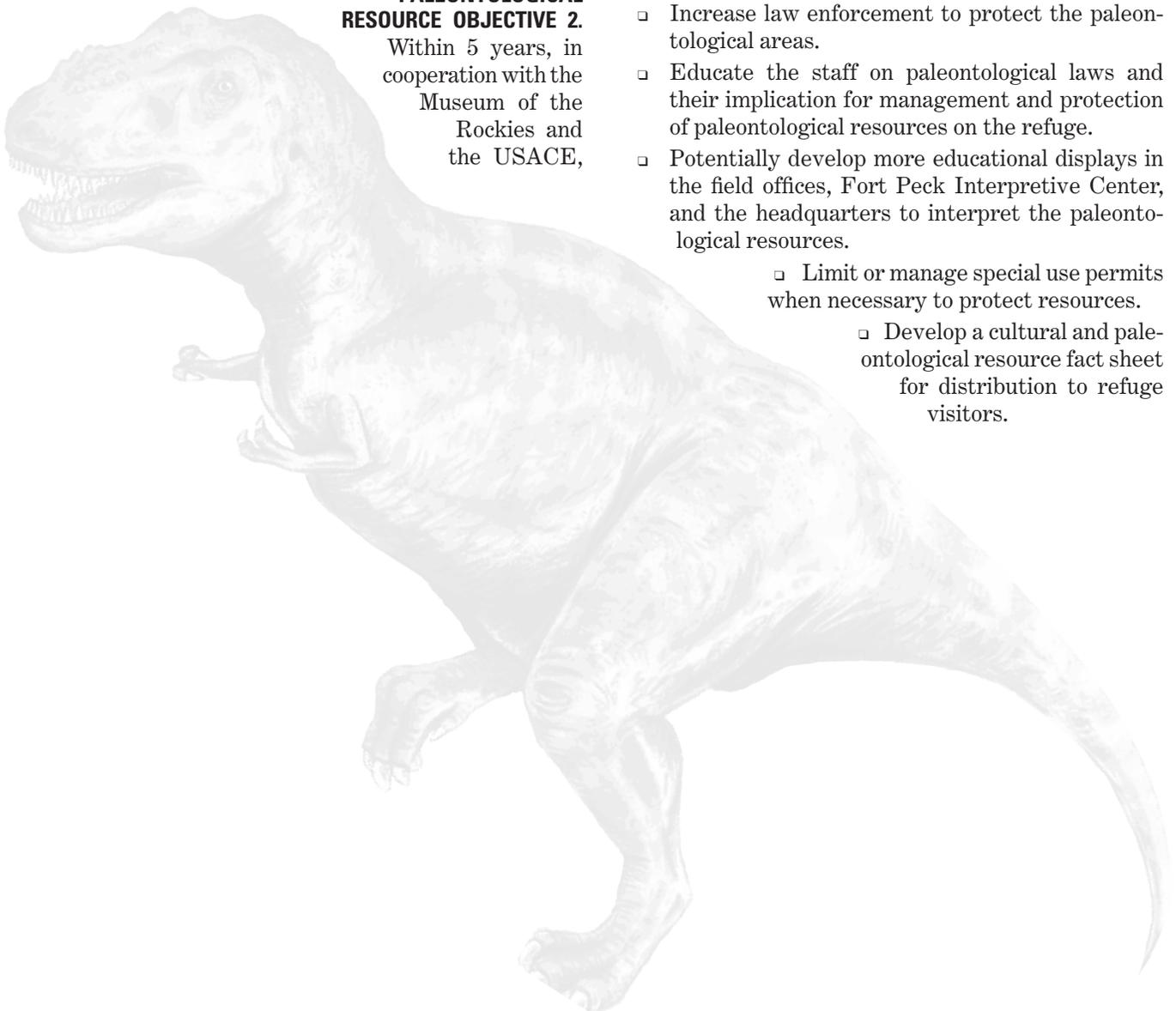
PALEONTOLOGICAL RESOURCE OBJECTIVE 3. Within 5 years, interpret and promote the national natural landmarks on the refuge. At a minimum, post the plaque and announce the designation.

Rationale for Paleontological Resource Objectives 2–3. Montana State University is evaluating paleontological resources and working on the stepdown plan. The plan will include guidelines to decide when and how to issue permits for science and education. Montana State University is the official repository for paleontological resource collected from the refuge.

Two areas on the refuge have been designated as national natural landmarks, the Bug Creek Fossil Area and the Hell Creek Fossil Area.

Strategies for Paleontological Resource Objectives 2–3

- Increase law enforcement to protect the paleontological areas.
- Educate the staff on paleontological laws and their implication for management and protection of paleontological resources on the refuge.
- Potentially develop more educational displays in the field offices, Fort Peck Interpretive Center, and the headquarters to interpret the paleontological resources.
 - Limit or manage special use permits when necessary to protect resources.
 - Develop a cultural and paleontological resource fact sheet for distribution to refuge visitors.



4.9 GOAL for REFUGE OPERATIONS and PARTNERSHIPS

Through effective communication and innovative use of technology and resources, the refuge uses funding, personnel, partnerships, and volunteer programs for the benefit of natural resources while recognizing the social and economic connection of the refuge to adjacent communities.

OBJECTIVES for REFUGE OPERATIONS and PARTNERSHIPS

REFUGE OPERATIONS OBJECTIVES

Refuge operations include management of facilities, structures, and other land or water use. The refuge relies on personnel, equipment, and facilities to carry out both day-to-day operations and long-term programs such as land acquisition.

The Service will increase personnel to include an outdoor recreation planner at each of the Fort Peck and Lewistown Field Stations, a full-time law enforcement officer at Fort Peck Field Station, a manager at the UL Bend Refuge, two maintenance employees, and a fire specialist on the east end of the refuge.

The Service will maintain existing facilities at the refuge. Facilities will be expanded at Jordan Field Station and more office space will be provided at the Jordan and Sand Creek Field Stations. A bunkhouse will be built at Fort Peck Field Station. The Service will collaborate with others to develop a science and interpretive center at Sand Creek Field Station.

The mineral withdrawals for locatable minerals (diatreme gems) on the UL Bend Refuge (permanent) and the Charles M. Russell Refuge (20-year withdrawal) will remain in effect. The Service will seek permanent withdrawal of all minerals including oil and gas and other leasable and saleable minerals on all refuge lands and future acquisitions.

The below objectives describe how the Service will use money and staff to meet the refuge goals.

REFUGE OPERATIONS OBJECTIVE 1. Continue mineral withdrawal on all refuge lands until 2013, and work to renew mineral withdrawal or acquire minerals. Seek permanent withdrawal from Congress of all minerals, including oil and gas and other leasable and locatable minerals on all refuge lands and future acquisitions.

Rationale for Refuge Operations Objective 1. Public Land Order 6997 (1993) withdrew minerals for all the

The vision and goals will be met through proportionate refuge operations and the refuge's collaboration with many partners.

The Service will look to facilitate the exchange of State lands within the refuge boundary where feasible. Working with willing sellers, the Service will buy priority lands within the authorized boundary as money is available. The Service will cooperate with USACE to transfer jurisdiction of lands not needed by USACE to meet its legal mandates.

refuge until 2013. The Service will continue to renew and seek to purchase minerals on future acquisitions. This will not include private or State lands where this is exempted.

The Service will seek a permanent withdrawal for minerals from Congress (only Congress can order this designation) to permanently protect refuge resources. Current techniques for extraction of leasable and locatable minerals including oil and gas are not compatible with the primary purposes of the refuge.

Strategies for Refuge Operations Objective 1

- Seek to purchase minerals on fee acquisitions.
- Adhere to legal rights-of-way obligations for access to private and State lands including those for oil and gas extractions.

REFUGE OPERATIONS OBJECTIVE 2. Over 15 years, work within the Service to adjudicate and define water rights.

Rationale for Refuge Operations Objective 2. The United States holds Federal reserved water rights on the refuge (refer to section 3.1 in chapter 3), and the United States is in the process of quantifying these reserved rights with the Montana Reserved Water Rights Compact Commission.

Strategy for Refuge Operations Objective 2

- Maintain select stock ponds.

REFUGE OPERATIONS OBJECTIVE 3. Over 15 years, maintain existing public use facilities (refer to section 3.4 in chapter 3).

REFUGE OPERATIONS OBJECTIVE 4. Improve facilities as identified under the strategies and as part of implementing the public use objectives identified above.

Rationale for Refuge Operations Objectives 3–4. Specific improvements and additions will be made to public

use facilities as part of implementing the objectives for public use and development of the visitor services stepdown plan. The exact number of facilities, length of trail, and location will need to be determined based on projected visitor numbers and after more detailed programming occurred with the visitor services plan.

Strategies for Refuge Operations Objectives 3–4

- Maintain the auto tour route, elk-viewing area, accessible hunting blind, and interpretive kiosks.
- Continue to work with USACE to manage the boat ramps.
- Ensure refuges are signed and that directional signage is in place. Collaborate with the highway department to develop and position signage.
- Remodel restrooms associated with campgrounds (Slippery Ann) to be made accessible.
- Construct more facilities (blinds, trails, or tour routes) including a lek blind for sage-grouse and sharp-tailed grouse as identified in the visitor services plan.
- Design and map birdwatching trails for public use.
- Evaluate the possibility of constructing a science and interpretive center at the Sand Creek Field Station in cooperation with various nongovernmental organizations.
- Develop interpretive signage at certain historic properties such as Rocky Point.
- Design and map birdwatching trails for public use.
- Develop displays in the field offices and the headquarters to interpret the paleontological resources.
- Develop displays in the field offices and the headquarters to interpret the paleontological resources.

REFUGE OPERATIONS OBJECTIVE 5. Within 5–10 years, add the needed staff for full-time and seasonal positions and volunteers to fully carry out the CCP as identified in table 25 (section 4.13 below).

Rationale for Refuge Operations Objective 5. There will be a need to increase personnel by seven to eight positions to meet habitat and public use objectives and one trainee position will be eliminated.

Strategies for Refuge Operations Objective 5

- With an increase in fire money and through the Refuge Operations Needs System database, continue to work toward increasing permanent and seasonal firefighting personnel by 50 percent.
- Hire a career-conditional position that is knowledgeable in planting crops to start work on the first river bottom on the list.

- Hire staff to conduct new monitoring across the refuge.
- Hire seasonal employees for fence removal, and hire professional fence builders for boundary fence construction of remaining fences.
- Hire two visitor services personnel (outdoor recreation planners) at Lewistown Field Station and Fort Peck Field Station (top priority).
- Hire staff and graduate students to complete habitat inventories.
- Hire two maintenance employees for UL Bend Refuge.
- Staff the interpretive center at Fort Peck Field Station with refuge personnel.
- Add more law enforcement personnel for Fort Peck Field Station.

PARTNERSHIP OBJECTIVES

The refuge and its resources are within a larger landscape that is important to the conservation of the natural and cultural resources at the refuge. Partnerships, including agreements with landowners next to the refuge and other interested agencies and groups, are essential to meeting refuge goals.

The Service will carry out actions in the CCP through cooperation and collaboration with existing partnerships with Federal and State agencies, counties, conservation districts, adjacent private landowners, local communities, and others. The Service will review the refuge's partnerships and adapt them as needed based on new management direction.

The Service will collaborate with USACE in accordance with established agreements. As an example, operation of the Fort Peck Interpretive Center and Museum is a cooperative effort between USACE, the Service, and Fort Peck Paleontology Incorporated. Staff will coordinate with USACE on lands that could be transferred to the Service for primary jurisdiction.

The Service will continue to explore opportunities to collaborate with partners on wildfire suppression, use of prescribed fire, and habitat manipulation. Staff will seek more partnerships and money to support endeavors such as increased control of invasive species or for initiation of a Friends group. The Service will cooperate with partners to provide comparable accessible opportunities for all.

Many opportunities exist near the refuge to continue existing partnerships or establish new ones, including the following:

- Federal agencies including BLM, USDA, USGS, USACE, National Oceanic Atmospheric Administration, Federal Highways Administration, and many others

- MFWP and DNRC on wildlife and habitat management and other State agencies
- conservation districts, county commissioners, fire wardens, fire districts, weed districts, and sheriffs departments
- nongovernmental organizations including Rocky Mountain Elk Foundation, World Wildlife Fund, American Prairie Reserve, The Conservation Fund, The Nature Conservancy, Montana Wildlife Federation, Wildlife Conservation Society, Yellowstone Valley Audubon Society, Ranchers Stewardship Alliance, Defenders of Wildlife, National Wildlife Federation, grazing associations, the Wilderness Society, Prairie Wildlife Research, and Stockgrowers Association
- adjacent private landowners and local communities

PARTNERSHIP OBJECTIVE 1 (land management). Over 15 years, work cooperatively with USACE to acquire jurisdiction around the lake to enforce regulations.

PARTNERSHIP OBJECTIVE 2 (land management). Over 15 years, maintain existing partnerships and agreements with Federal, State, county, conservation districts, adjacent private landowners, and local communities.

PARTNERSHIP OBJECTIVE 3 (land management). Over 15 years, continue working with agencies (USACE; BLM; MFWP; DNRC; counties of Fergus, Petroleum, Garfield, McCone, Phillips, and Valley; and tribal governments), conservation organizations (World Wildlife Fund, American Prairie Reserve, Ranchers Stewardship Alliance, and The Nature Conservancy), and private landowners to manage large free-ranging wildlife (elk, mule deer, and pronghorn), sage-grouse, species of concern (prairie dogs and black-footed ferrets), and sentinel plants.

PARTNERSHIP OBJECTIVE 4 (land management). Within 2 years, sign a memorandum of understanding with the above groups that outlines habitat conservation strategies across the landscape for the species mentioned in Partnership Objective 3.

PARTNERSHIP OBJECTIVE 5 (land management). Over 15 years, promote healthy populations of all plants and associated prairie-wildlife lands adjoining the refuge partners' focus areas.

Rationale for Partnership Objectives 1–5 (land management). The Service will continue to work cooperatively with many agencies and jurisdictions. The agreements in place will continue.



USFWS

Sharp-tailed grouse is a focal species for upland habitat.

Many prairie wildlife species require large tracts of undisturbed prairie. Often these species have large home ranges that cover hundreds of square miles and cross multiple landownership. Several species (for example, prairie dogs and sage-grouse) are in peril due to a combination of factors including loss of habitat, disease, and landowner tolerance. Cooperation among adjoining landowners and managers to provide all the seasonal habitat needs is necessary for these species to survive.

Loss of grassland-nesting cover, winter habitat foods, and economic pressures (converting grassland to crops) are a few of the habitat limitations that negatively affect these sentinel species. Monitoring sentinel plants and the heterogeneity of habitats with associated wildlife will help the Service manage for these species.

Conservation incentives from government agencies or conservation groups will help to foster cooperative conservation practices such as supporting level 1 prairie dog town of 5,000 acres, preserving sage-grouse nesting and winter habitat, and promoting heterogeneity of habitats to support the needs of grassland-obligate birds and other species.

The habitats of the northern glaciated plains evolved with pyric herbivory influences. Hundred years of fire suppression and constant grazing pressure has affected the health and relative presence of numerous plants (sentinel plants) including skunk-bush, winterfat, golden currant, and buffaloberry. By improving the health and distribution of these sentinel plants the overall health of various wildlife species will be improved as well. By restoring pyric-herbivory processes and managing for total ungulate populations, the overall health of these plants and habitats will improve and contribute to the overall biological health and ecological integrity. Land management by private landowners and conservation organizations around the refuge affect plant and wildlife distribution on the refuge.

Strategies for Partnership Objectives 1–5 (land management).

- Conduct a pyric herbivory study and management program on the refuge as a demonstration site for other interested land managers and landowners.
- Enter into a memorandum of understanding with interested partners to manage lands for sentinel plants and natural ecological processes such as historical fire occurrence.
- Manage sentinel wildlife such as prairie dogs to support the full suite of wildlife that rely on prairie dogs or prairie dog towns.
- Secure outside funding (Cooperative Conservation Partnership Initiative and Conservation Innovation Grants) for long-term monitoring

projects to measure progress of increasing the health and relative abundance of sentinel plants.

PARTNERSHIP OBJECTIVE 6 (volunteers and friends). Within 5 years, develop a volunteer program and Friends group aimed at meeting the refuge’s biological and public use objectives.

PARTNERSHIP OBJECTIVE 7 (volunteers and friends). Over 15 years, maintain and build partnerships with agencies, communities, and organizations to support and grow public use programs on and off the refuge.

Rationale for Partnership Objectives 6–7 (volunteers and friends). In 2008, about 39,765 volunteers gave 1.5 million hours in support of Service activities including 3,338 volunteers in region 6 who contributed 131,169 hours (FWS 2008d). People volunteer for a variety of reasons, but they play an important role in helping the Service meet its mission. Friends groups are important allies for the Service, often advocating for a field stations by giving information to local community and elected officials. There are more than 200 Friends groups across the Service (FWS 2008d). To carry out the refuge’s habitat and public use objectives, the Service will establish an active volunteer program and Friends group to advance the refuge’s programs and establish partnerships with the local communities.

Strategies for Partnership Objectives 6–7 (volunteers and friends)

- Begin to recruit volunteers.
- Advertise the Friends group and volunteer opportunities on the Web site, in surrounding communities, and within refuge visitor facilities.
- Develop partnerships with wildlife groups and organizations such as Yellowstone Valley Audubon Society and others to market available birding and wildlife opportunities at the refuge.
- Create new partnerships and maintain and expand existing partnerships with hunters to increase awareness of the importance of bird and habitat conservation.
- Create new partnerships and maintain and expand existing partnerships with conservation groups and the public to increase public awareness of nonconsumptive bird recreation and bird conservation.
- Seek out partners to establish and promote bird-watching trails or routes.
- Work with partners and volunteers to establish mountain bluebird trails.
- Work with partners to develop an outreach plan as part of the visitor services plan.
- Work with the Montana tourism department to promote the refuge and resources.

- Over 15 years, develop partnerships with photography clubs to provide two nature photography workshops on the refuge.
- Over 15 years, collaborate with other groups to provide one additional Web-based camera or video camera to local schools.
- Work with partners to continue to seek grants to fund events and programs.

4.10 STEPDOWN MANAGEMENT PLANS

Where the CCP provides overall direction in the form of goals and objectives for the refuge, each stepdown management plan describes the details of carrying out the strategies to meet the objectives. Table 23 identifies the stepdown plans needed to fully implement the CCP.

Table 23. Stepdown management plans for the Charles M. Russell and UL Bend Refuges, Montana.

<i>Plan</i>	<i>Year to be completed</i>
Cultural resources	2017
Fire management	2014
Habitat management	2015–19
Invasive plant management	2015
Paleontological resources	2017
Public use	2017
hunting and fishing	
fishing and mussels	
wildlife observation, photography, and interpretation	
environmental education	
Transportation	2017
Wilderness stewardship	2015

4.11 MONITORING and EVALUATION

Adaptive management is a flexible approach to long-term management of biotic resources. Adaptive management is directed, over time, by the results of ongoing monitoring activities and other information. More specifically, adaptive management is a process by which projects are carried out within a framework of scientifically driven experiments to test the predictions and assumptions outlined within the CCP (see figure 42).

To apply adaptive management, specific survey, inventory, and monitoring protocols will be adopted for the refuge. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches and find out how effectively the objectives are being accomplished. Evaluations will include participation by Service personnel and other partners. If monitoring and evaluation indicate undesirable effects for target and nontarget species or communities, alteration to the management projects will be made. Subsequently, the CCP will be revised.

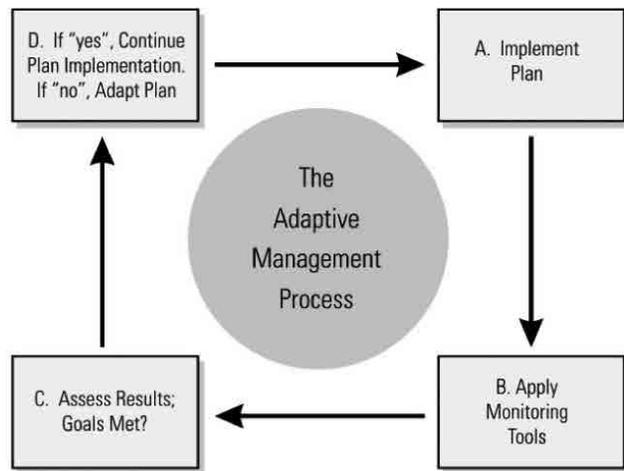


Figure 42. Adaptive management process.

4.12 PLAN AMENDMENT and REVISION

The CCP will be reviewed annually to determine the need for revision. A revision will occur if and when significant information becomes available, such as a change in ecological conditions. Revisions to the CCP and subsequent stepdown management plans will be subject to public review and compliance with the National Environmental Policy Act. At a minimum, this plan will be evaluated every 5 years and revised after 15 years.

4.13 FUNDING and PERSONNEL

Refuge budgets generally include ongoing operations funds for personnel, maintenance, and utility needs. It is estimated that it will cost about \$76.7 million over 15 years to carry out this plan. There will be a one-time cost of about \$20.4 million and a salary cost of about \$56.3 million. Table 24 displays the details used to develop the costs.

Table 24. Cost analysis for implementing the comprehensive conservation plan for the Charles M. Russell and UL Bend Refuges, Montana.

<i>Management cost item</i>		<i>Cost (\$1,000s)</i>
HABITAT	uplands	598
	river bottoms	490
	riparian areas and wetlands	258
	shorelines	51
CLIMATE CHANGE		95
INVASIVE SPECIES		120
FIRE	prescribed fire	2,100
	wildfire	1,190
WILDLIFE MANAGEMENT	big game	475
	furbearers	400
	threatened and endangered species	215
	American bison	80
	other wildlife	97
	birds	121
PUBLIC USE	hunting	330
	fishing	163
	observation, interpretation, and photography	346
	environmental education	47
	outreach	20
	commercial uses and outfitting	32
	recreation sites	90
access	210	
WILDERNESS		15
CULTURAL RESOURCES		110
REFUGE OPERATIONS	stock ponds and maintenance	172
VOLUNTEERS and FRIENDS		32
PRIORITY LAND ACQUISITIONS		4,000
INTERPRETIVE CENTER	building	8,000
	exhibits	500
Subtotal of one-time costs over 15 years		20,356
Salaries over 15 years		56,351
Total cost		76,707

Table 25 shows the personnel needed to implement the plan. Projects required to carry out the CCP will be funded through two separate systems, as follows: (1) the refuge operations needs system is used to document requests to Congress for money and personnel needed to carry out projects above the existing base budget; and (2) the Service asset maintenance management system is used to document the equipment, buildings, and other existing properties that require repair or replacement.

Table 25. Personnel needed to implement the comprehensive conservation plan for the Charles M. Russell and UL Bend Refuges, Montana.*Headquarters (Lewistown, Montana)*

Project leader GS¹-14
 Deputy project leader GS-13
 Pilot and wildlife biologist GS-12
 Outdoor recreation planner GS-9
 Maintenance worker WG¹-8
 Maintenance worker WG-7
 Supervisory wildlife biologist² GS-13
 Wildlife biologist GS-12
 Wildlife biologist GS-9
 Wildlife biologist GS-9
 Refuge complex fire management officer GS-13
 Administrative officer GS-11
 Administrative assistant GS-6
 Administrative assistant (term) GS-4
 Outdoor recreation planner GS-11

Fort Peck Field Station

Station manager GS-12
 Assistant station manager GS-9
 Biological technician GS-6
 Outdoor recreation planner GS-7/9
 Law enforcement officer GS-7/9
 Range technician GS-5/6

Jordan Field Station

Station manager GS-12
 Assistant station manager GS-7/9
 Range technician GS-6/7

Sand Creek Field Station

Station manager GS-12
 Assistant station manager GS-9
 Assistant fire management officer GS-11
 Biological technician GS-6
 Law enforcement officer GS-9
 Range technician GS-7
 Maintenance worker WG-8
 Outdoor recreation planner GS-7/9

UL Bend National Wildlife Refuge

Station manager GS-9/11
 Technician GS 5/6
 Maintenance worker WG-7/8

Seasonal Employees

(Fill to meet needs)

¹ GS=General Schedule employee by pay grade; WG=Wage Grade employee by pay grade.

² Many of the existing staff have expertise and education in range management. They would qualify as range conservation specialists and could be put into that position series. Monitoring for range health generally involves looking at the dominant community plants, mostly grasses, and determining if they are viable, versus the refuge's wildlife habitat monitoring program, which includes looking at all the plants that comprise the community and ensuring that they are healthy, vibrant, and able to reach maturity.

