

National Park Service
U.S. Department of the Interior

Missouri National Recreational River
Nebraska – South Dakota



FIRE MANAGEMENT PLAN 2009

AND ENVIRONMENTAL ASSESSMENT



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Summary

When approved, this document will serve as the Fire Management Plan for the Missouri National Recreational River. Major components include:

Implementation of Director's Order #18 Wildland Fire Management. USDI, NPS. 2005

Wildland fire suppression with no use of wildland fire

Use of prescribed fire to reduce fire hazard and to attain vegetation management objectives

Implementation of fire policy established in (1) [*Interagency Policy Guidance \(Prescribed Fire, Wildland Fire Use\)*](#), (2) [*Fire Program Analysis \(FPA\)*](#), (3) [*Interagency Standards for Fire and Fire Aviation Operations \(Red Book\)*](#), (4) [*Federal Wildland Fire Policy \(1996\)*](#), and (5) [*Federal Wildland Fire Management Policy and Program Review Implementation Action Plan Report \(2001\)*](#)

Further implementation of updated policies under the (1) [*2001 Federal Wildland Management Policy and Program Review \(USDA/USDI 2001\)*](#); (2) [*Managing Impacts of Wildland fires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy \(USDI/USDA\)*](#); and (3) [*A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan*](#).

This plan is written to provide guidelines for appropriate wildland fire suppression and use of prescribed fire programs at Missouri National Recreational River. Prescribed fires may be used to reduce hazard fuels; replace natural processes that have been controlled or suppressed by humans, but that were critical to the local disturbance regime; restore the natural vitality and variability of the ecosystem; remove or reduce alien species; and potentially conduct research into fire effects in disturbed land restoration.

The effects of fire control as well as land use changes and flood abatement have caused changes to natural patterns of fluvial geomorphology, and to vegetation succession that occurred in fire dependent ecosystems and ecosystems dependent on floodplain connectivity. The long-range goals of Missouri National Recreational River are

Reduce hazard fuels and manage them in the long-term,

Ensure the health and safety, and protect property around and within MNRR, and

Create a sustainable native vegetation community that is in congress with the setting, the MNRR purposes, the cultural landscape, and the surrounding land uses in an area where the natural processes have been altered.

This document and its development is an instrument by which Missouri National Recreational River [*partners*](#) can work collaboratively to attain goals in health, safety, and property protection. It will open a dialogue that will result in Memorandum of Understanding documents being developed with local Rural Fire Districts and other agencies or groups not currently active in MNRR partnerships.



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Missouri National Recreational River
Fire Management Plan 2009



I. Introduction

A. Reasons for Developing This Plan

This Fire Management Plan (FMP) outlines actions that will be taken by Missouri National Recreational River (MNRR or Missouri NRR) in meeting fire management goals. This plan satisfies the requirement asserted in *Director's Order 18* (DO-18) that “each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to MNRR’s natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities.” Missouri NRR currently has approximately 250 acres of fee-simple land (parkland) that falls into this directive. The FMP broadly covers land outside of direct control of the National Park Service (NPS), but is administered by partner agencies and individuals.

The FMP serves as a detailed program of action by providing specific guidance and procedures for accomplishing wildland fire management objectives. It addresses wildland fire suppression, where protection of structures, cultural resources, and neighboring properties is paramount.

B. Collaborative Processes towards Management Planning

Missouri NRR is a collection of parks, wildlife management areas, other state, federal, tribal, and local agency lands, and private lands along both sides of the Missouri River in northeastern Nebraska and southeastern South Dakota, as well as the lower portions of the Niobrara River and Verdigre Creek in northeastern Nebraska (Figure 1). In concert with other bureaus, the National Park Service takes responsibility for the fire management planning and develops policies, guidance, and standards for fire management on its own parkland. Missouri NRR will utilize an adaptive management process to plan, implement, and evaluate the fuels management program. This process will consider the effectiveness of planning and collaborative processes. The adaptive management process is an example of how a park can communicate, collaborate, and coordinate with concerned and interested parties.

Missouri NRR boundary contains a mix of private property and local, federal, and state jurisdictions (see list in [Consultation and Coordination](#)). The consequently varying jurisdiction has resulted in varied management strategies. Agencies currently work together by consulting with each other on specific programs and actions. This FMP provides more opportunity to strengthen working relationships and to develop cooperative agreements with more entities within the MNRR boundary. This FMP will be offered to the partners as a fire management guide that could be adopted and implemented throughout MNRR.

Missouri NRR established and followed a process for communication, collaboration, and coordination for the planning, preparation, implementation, and evaluation of fire management. This process has involved participation by adjoining and affected federal, state, tribal, and local agencies, and private landowners. Part of this collaboration was used to analyze environmental impacts for the Environmental Assessment accompanying this document ([Appendix D](#)). This provided a forum for raising and resolving issues, exchanging skills and resources, monitoring and evaluating accomplishments, and providing for communication among affected parties.



The principle collaborators in fire management activities are the land management agencies and private landowners in the legislative boundary of MNRR. Missouri NRR will invite several of the local Rural Fire Districts (RFDs) ([Appendix E](#)), whose firefighters are the first responders to wildland fire on parkland, to enter into cooperative agreements (MOU) with NPS as a result of collaboration during the FMP process. Additionally, agencies with natural resource responsibilities have assisted in development and reviewed the fire management activities and planning. The [State Historic Preservation Offices](#) (SHPOs) and the [Tribal Historic Presentation Offices](#) (THPOs) have remained an ongoing consultant in the preservation of MNRR cultural resources and assisted with the FMP.

C. Implementation of Federal Fire Management Policy

This plan allows MNRR to manage natural resources in the most effective and efficient manner, which includes the use of prescribed fire. It will implement fire management policies and help achieve resource management and fire management goals as defined in:

- (1) [2001 Federal Wildland Management Policy and Program Review](#) (USDA/USDI 2001); (2) [Managing Impacts of Wildland fires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy](#) (USDI/USDA); and (3) [A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.](#)

D. Compliance

This document complies with National Environmental Protection Act (NEPA) and requirements of both the South Dakota and Nebraska State Historic Preservation Office. An Environmental Assessment (EA) that analyzed impacts to resources has been developed as part of the environmental planning process for the FMP and is included in this plan ([Appendix D](#)). This FMP serves to fulfill the requirements of DO-18, while meeting the need for adaptive management strategies on parkland.

Nebraska State Historic Preservation Office (NSHPO) and South Dakota State Historic Preservation Office (SDSHPO) [consultation](#) is documented in the EA, and meets Section 106 of the [National Historic Preservation Act](#) (NHPA) requirements. Prescribed fire preparations will include consultation with the SHPOs. This will be completed in periodic meetings, teleconferences, and other communications between the SHPOs and MNRR staff in which activities and undertakings are reviewed.

Constant vigilance on the part of MNRR staff and reports from the [Northern Great Plains Network Inventory and Monitoring Program](#) will allow MNRR to employ adaptive management in the implementation of this FMP. In the event that environmental conditions change over the course of FMP implementation, consideration will be given to revising or amending this document and developing a new EA.

E. Authorities for Implementing this Plan

The Organic Act of the National Park Service (August 25, 1916, Section 102) provides the authority for implementation of this plan. This act states that the primary goal of the National Park Service (NPS) is to preserve and protect the natural and cultural resources found on lands under its management in such manner as will leave them unimpaired for future generations.



The NPS management policies ([*DO-18*](#), and [*Reference Manual 18*](#), [*RM-18*]) provide guidance for FMP development and implementation. The most recent approved versions of these documents should be referenced to check for changes and updates. A new version of *RM-18* was released after initiation of this FMP and all references to *RM-18* in this FMP should be checked and updated during the required annual reviews of the plan. Missouri NRR's fire management objectives conform to the referenced documents. Servicewide fire management policy is expressed in the current revisions of the Director's Orders and attendant Reference Manual, and [*Wildland Fire Use Implementation Procedures Reference Guide*](#) (May 2005 - Minor Revisions March/April 2006), and is incorporated herein by reference.

Authorities to enter into agreements with other federal bureaus and agencies; with state, county, and municipal governments; and with private companies, groups, corporations, and individuals are cited in [*Director's Order #20: Agreements*](#) (DO-20, USDI 1999). Federal wildland fire policy is established in

[*Interagency Policy Guidance \(Prescribed Fire, Wildland Fire Use\)*](#)

[*Fire Program Analysis \(FPA\)*](#)

[*Interagency Standards for Fire and Fire Aviation Operations \(Red Book\)*](#)

[*Federal Wildland Fire Policy \(1996\)*](#)

[*Federal Wildland Fire Management Policy and Program Review Implementation Action Plan Report \(2001\)*](#)

Statutes cited below authorize and provide the means for managing wildland fire on lands under the jurisdiction of the Department of the Interior, or lands adjacent thereto.

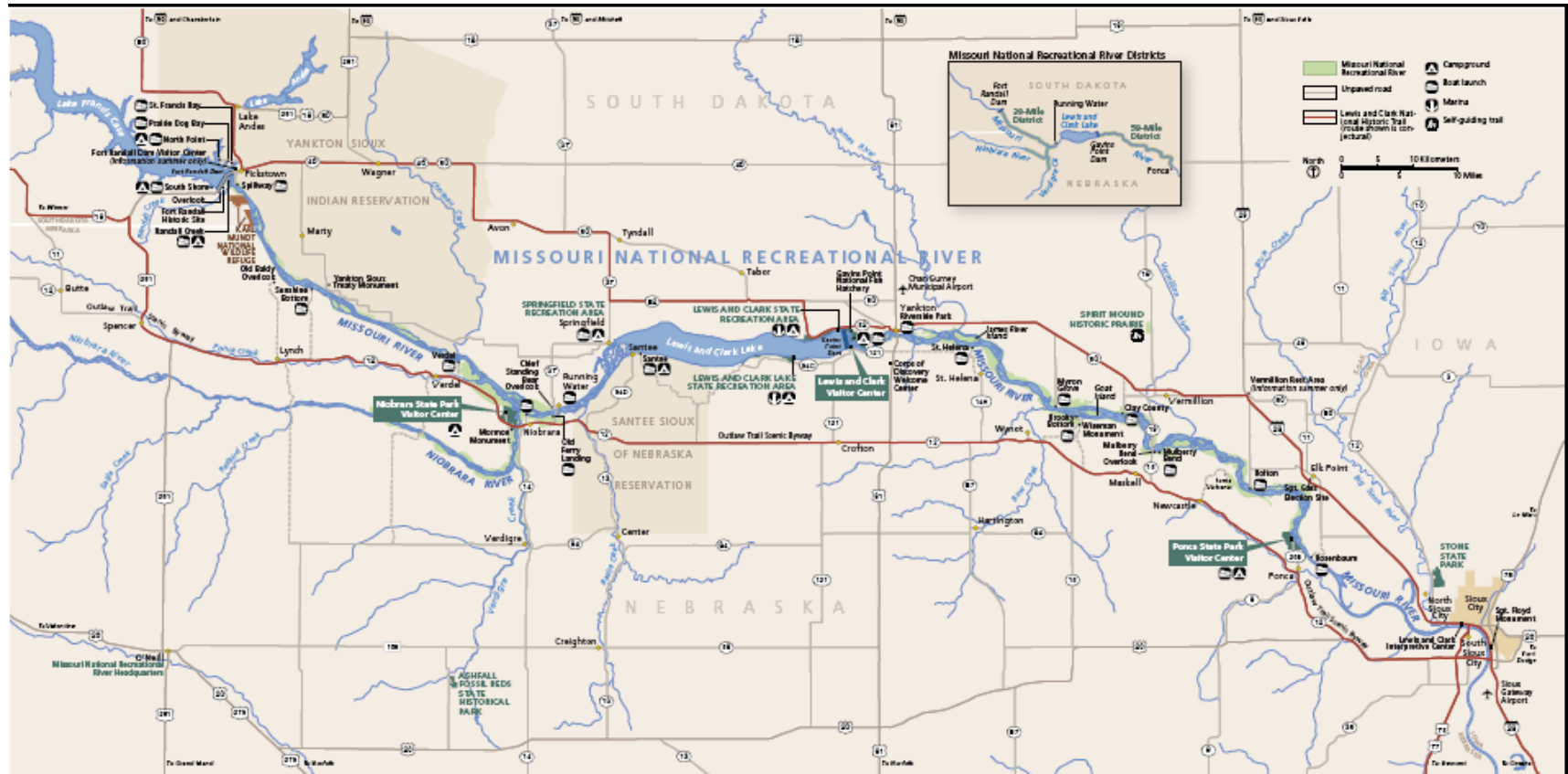
- Organic Administration Act of June 4, 1897 (16 U. S. C. 551)
- U.S. Code, 16 U.S.C. Chapters 1 and 3
- Weeks Law, Act of March 1, 1911 (16 U. S. C. 563)
- National Park Service Act of 1916 as amended (67 Stat. 495; 16 U.S.C. 1 et seq.)
- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C. 594)
- Clark-McNary Act of 1928 (45 Stat. 221; 16 U. S. C. 487)
- McSweeney-McNary Act of 1928 (45 Stat. 221; 16 U.S.C. 487)
- Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535)
- Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315)
- Oregon and California Act of August 28, 1937 (50 Stat. 875; 43 U.S.C. 1181e)
- Bankhead-Jones Farm Tenant Act of July 22, 1937 (7 U. S. C. 1010 - 1011)
- Federal Property and Administrative Service Act of 1949 (40 U.S.C. 471; et seq.)
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856a)
- Clean Air Act of July 14, 1955, as amended (42 U. S. C. 7401 et seq.)
- Multiple-Use Sustained Yield Act of 1960 (16 U. S. C. 528)
- Wilderness Act of 1964 (16 U. S. C. 1131 - 1132)
- National Wildlife Refuge System Administration Act of 1966 as amended (80 Stat. 927; 16 U.S.C. 668dd through 668ee)
- National Environmental Policy Act of 1969 (42 U. S. C. 4321)
- Alaska Native Claims Settlement Act of 1971 (85 Stat. 688; 43 U.S.C. 1601)
- Endangered Species Act of 1973 (16 U. S. C. 1531 - 1544)
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121)
- Federal Fire Prevention and Control Act of 1974 (88 Stat. 1535; 15 U.S.C. 2201)



- National Forest Management Act of 1976 (16 U. S. C. 1600 et seq.)
- Federal Land Policy and Management Act of 1976 (90 Stat. 2743)
- Federal Grant and Cooperative Agreement Act of 1977 (P.L. 950224, as amended by P.L. 97-258, September 13, 1982 (96 Stat. 1003; 31 U.S.C. 6301 thru 6308)
- Alaska National Interest Lands Conservation Act of 1980 (94 Stat. 2371)
- Supplemental Appropriation Act of September 10, 1982 (96 Stat. 837)
- Wildland fire Suppression Assistance Act of 1989 (P.L. 100-428, as amended by P.L. 101-11, April 7, 1989), 42 U. S. C. 1856
- Indian Self-Determination and Education Assistance Act (PL 93-638) as amended
- National Indian Forest Resources Management Act (P. L. 101-630 November 28, 1990)
- Tribal Self-Governance Act of 1994 (P.L. 103-413)
- Department of the Interior and Related Agencies Appropriations Act, Fiscal Year 1995 (P.L. 103-332)
- National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57)
- Federal Financial Assistance Management Act of 1999 (P.L. 106-107)
- Healthy Forest Restoration Act of 2003 (P.L. 108-18, 117 Stat. 1887)
- Tribal Forest Protection Act of 2004 (P.L. 108-287)
- Department of the Interior, Departmental Manual; Part 620: Wildland Fire Management; Chapter 4: Fuels Management and Wildland-Urban Interface Community Assistance
- Department of Agriculture, US Forest Service Manual; FSM 5100: Fire Management; Chapter 5140: Fire Use
- National Historic Preservation Act (1966 as amended)
- 31 USC 665 (E) (1) (B), authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.



Figure 1: General map of MNRR





II. Relationship to Land Management Planning and Fire Policy

Wildland fire once maintained the prairies of Nebraska and South Dakota and prevented the succession of prairie and oak-hickory savanna to deciduous forests. Forest cover occurred in floodplains, where moisture content excluded wildland fire, but forest did not persist in areas of the floodplain that were subject to long periods of flooding or frequent perturbation by ice jams and scouring. Prairie and savanna or upland forest predominated in the upland landscape during the 8,000 years prior to settlement by Euro-Americans in the mid-1800s. A succession of sedges (*Carex* spp.) and grasses occurred on the lowest bench along the river, because of the frequent disturbance from fluvial activity. Cottonwood (*Populus deltoides*), willow (*Salix* spp.), and other wet site tolerant species grew in the riparian area where ice scouring was not a frequent occurrence.

Human activities have caused ecological change to the Missouri River over the past century. The amount of natural habitat, and the native species abundance and diversity have decreased in the main channel and floodplain. These changes began in the 1800s with habitat disturbance and introductions of non-native fish and game. They have culminated with structural changes to ensure navigation and for flood control (Committee on Missouri River Ecosystem Science 2002). On the landscape level, other changes have had a subtle effect on the river and its ecosystems. These changes include land use, population growth, and suppression of fire.

Natural disturbance in a river floodplain is an unpredictable event that disrupts structure or function at the ecosystem, community, or population level (Sparks, et al. 1990). It can result in changes in community makeup or shifts of ecosystems from one type to another. Six dams, Gavins Point being the last downstream dam, have nearly eliminated the river's natural disturbance from the annual floods. Additionally, these dams have contributed to the degradation of the river by interrupting the accretion of sediments that occurs with floods. This removal of natural processes and subsequent lowering of the water table have resulted in extreme, irreparable alteration to the riparian ecosystem.

It is the policy of the NPS to allow natural processes to occur to the extent practical while meeting park unit and Management Zone objectives. The goal of fire management in the NPS system is to restore fire to park ecosystems where appropriate and possible. Wildland fire has been defined as any non-structure fire that occurs in the wildland. Three distinct types of wildland fire have been defined: unwanted wildland fire, wildland fire use, and prescribed fire. Wildland fire use is the employment of naturally ignited wildlands to meet management objectives. Prescribed fire is purposefully ignited fire intended to meet management objectives.

Wildland fire will be met with immediate [Appropriate Management Response](#) (AMR), suppression or containment, in MNRR because of private lands contained within the MNRR boundary and adjacent to MNRR land. Wildland fire use will not be employed at MNRR because of the risk to the local infrastructure and property that compose the Wildland Urban Interface (WUI) and the lack of on-site fire personnel to monitor and respond to wildland fire. The small acreage of the NPS parklands allows any fire started within the boundary to burn outside of the parkland in less than one operational period. Therefore, there are no suitable areas for wildland fire use. Prescribed fire will be used as an important management tool to control exotic weeds and woody vegetation in accordance with [Executive Order 11987](#) (restrictions on exotic species in a natural area) and [Management Policies 2006](#) (4.4.2.4):



“restoring natural processes and conditions to areas disturbed by human activities such as fire suppression”

and

“maintaining open areas and meadows in situations in which they were formerly maintained by natural processes that now are altered by human activities.”

Prescribed fire will serve as a tool to maintain native herbaceous plant diversity, while reducing undesirable species of woody plant cover, principally eastern red cedar (*Juniperus virginiana*), on National Park Service owned land, and prescribed fire is recommended as a tool for partners to use on neighboring lands, where appropriate. Native herbaceous plant cover at the riverbanks improves recreational and interpretive experiences. Keeping the shoreline accessible and open complies with the General Management Plan (GMP) desired conditions for both districts, which include maintaining scenic qualities as seen from the river and maintenance or enhancement of natural resources. The visitor experience emphasizes the continuation of high-quality wildlife observation, hunting, fishing, and boating experiences. The interpretive theme emphasis is on the Missouri River’s natural history, cultural history, and recreational use. Prescribed fire will effectively help attain and maintain desired conditions.

Many of the natural resources will be managed and protected by private property owners and state park and wildlife agencies within the MNRR boundary by the sheer fact that most of the land area is in the control and jurisdiction of those entities. Inventory and monitoring remain the cooperative responsibility of the partners, and fire effects monitoring on NPS parkland will remain the responsibility of the NPS. The GMPs state that natural resource management would involve activities by the U.S. Army Corps of Engineers (USACE), in consultation with U.S. Fish and Wildlife Service (FWS), Department of Interior, the NPS, and the states of Nebraska and South Dakota. Tribes, other agencies, and private organizations and individuals will be involved in planning for resource management.

Fire is used by other agencies and local jurisdictions to enhance conditions inside and adjacent to MNRR. Fire has been shown to control some invasive plants effectively by creating a disturbance regime similar to that which existed in the open meadow areas of the riparian zone prior to flood control. Fire also is critical to restoration of prairie in upland regions. It prepares the seedbed for natural and supplemental propagation of prairie plants, enhances seed germination in some prairie species, and reduces competition from some invasive plants. Fire contributes to the health of the native plant community by returning nutrients to the soil and by discouraging succession of woody plants.

A. NPS Management Policies Concerning Fire Management

Principal considerations in MNRR fire management programs, as stipulated in [*Reference Manual-18*](#) (RM-18), include

- protection of human life, both employee and public
- protection of facilities and cultural resources
- perpetuation of natural resources and their associated processes

These considerations apply to MNRR parkland and the surrounding properties within MNRR. The presence of people and human development in and around MNRR require that protection of life and property be a primary concern in fire management. Prescribed fire reduces the presence of combustible fuels in the native landscape and may prevent loss of life or damage to resources inside and adjacent to MNRR.



This plan complies with the [Management Policies 2006](#), Chapter 4, Natural Resource Management, by guiding a program that

- responds to MNRR's natural and cultural resource objectives;
- provides for safety considerations for MNRR visitors, employees, residents, partners, and developed facilities;
- addresses potential impacts on public and private neighbors and their property within and adjacent to MNRR; and
- protects public health and safety.

All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options as guided by this FMP. Human-ignited fires managed to achieve resource management and fuel treatment objectives, and the smoke they produce, will both be managed to comply with applicable local, state, and federal regulations. The FMP will provide a systematic decision-making process to determine the most appropriate management strategies for all unplanned ignitions and for management-ignited fires that are no longer meeting resource management objectives.

B. Enabling Legislation and Purpose

Missouri NRR is split into two districts commonly referred to as the 39-mile District and the 59-mile District. The 59-mile District includes the Missouri River from Gavins Point Dam near Yankton, South Dakota to Ponca, Nebraska, and was designated as a National Recreational River in 1978 (Public Law 95-625). The 39-mile District was added to MNRR in 1991 (Public Law 102-50) and includes the Missouri River from Fort Randall Dam near Pickstown, South Dakota to Running Water, South Dakota. The lower 20 miles of Niobrara River from the Knox County line to the confluence with the Missouri River, and the lower 8 miles of Verdigre Creek from the Village of Verdigre to the confluence with Niobrara River are also included in the 39-mile District.

The purposes of MNRR include:

- Preserve the river in a free-flowing condition and protect it for the enjoyment of present and future generations.
- Preserve the significant recreational, fish and wildlife, and historic and cultural resources of the Missouri River corridor.
- Provide for a level of recreation and recreational access that does not adversely influence the river's significant natural and cultural resources.

Rivers in the Wild and Scenic Rivers system are classified as wild, scenic, or recreational based on the amount of access, development, and river diversions/impoundments existing at the time of designation. The 59-mile District and 39-mile District are considered recreational rivers because of their ready access by road and development along the shorelines. The two districts are managed under two different General Management Plans, although the management implementation is similar because of their shared recreational designation.

C. General Management Plan as It Relates to Wildland Fire

General Management Plans generally delineate zones or districts that correspond to management prescriptions in an area-specific context. The MNRR GMPs do not have specific [Management Zones](#) with different prescriptions for resource conditions, visitor experience, and appropriate management activities. Land use and land cover for MNRR



is determined using the 2001 National Land Cover Dataset (Table 1), and guidelines are set for land use management in accordance with the GMP. Fire management activities in this FMP predominantly refer to the natural lands within or adjacent to MNRR boundaries with specific reference to NPS owned land (Figure 2). Fire activities will be used to remove hazard fuels and restore native plant communities where appropriate to attain or maintain desired conditions.

Table 1: Land Use/Land Cover¹

Land Use/Land Cover Category	Total (acres)
Open Water	31,169
Developed	1,384
Barren Land	724
Deciduous Forest	5,414
Evergreen Forest	278
Shrub/Scrub	48
Grassland Herbaceous	4,709
Pasture/Hay	501
Cultivated Crops	6,011
Wetlands	18,927

[Fundamental Resources and Values](#) and [Other Important Resources and Values](#) are important MNRR values to be protected in this FMP. Although these have not been officially identified in a [Foundation for Planning](#) document for MNRR, there are resources and values that have been identified in the GMPs in conjunction with desired conditions. These will be discussed in subsequent sections of the FMP as special considerations and values to protect.

Desired conditions are a qualitative description of the integrity and character for a set of resources and values, including visitor experiences, which the NPS has committed to achieve and maintain. Area-specific desired conditions include these qualitative

descriptions as well as guidance on visitor experience opportunities and appropriate kinds and levels of management, development, and access (modes of transportation) for each area of MNRR. The entire MNRR is in one recreational management zone. The Resource Management section of the GMPs state:

"The primary goal of resource management . . . would be to protect and enhance Missouri River values as a relatively natural ecosystem with the following objectives:

- in accordance with the Master Water Control Manual and Operating Plan, allow for the seasonal high river flows necessary for maintaining important river habitats and species*
- protect biologically valuable habitats essential to the river ecosystem through private and public means*
- maintain the present scenic qualities as seen from the river with minimal change*
- educate visitors about threatened and endangered species, protection and enhancement of biologic values, river processes, and the cultural resources and events that tell the story of the river*
- provide for low levels of visitor use in harmony with the special nature of this river and its inherent hazards*
- provide for recreational home development in harmony with the above objectives through local means and appropriate standards."*

The achievement and maintenance of these goals is the focus of MNRR management, with the desired conditions for MNRR resources as the objectives of a cultural and natural resource stewardship program, as stated in the GMPs:

¹ As determined by MNRR GIS Program Office



- to maintain viable populations of native plants and animals well distributed throughout their geographic range
- to maintain genetic variability in and among populations of native species
- to maintain representative examples of the full spectrum of ecosystems, biological communities, habitats, and their ecological processes
- to implement management solutions at the landscape level that integrate human activities with the conservation of biologic resources

D. Resource Stewardship Strategy and Fire Management Objectives

The NPS is in the process of adopting a new park program document for resource management called the [Resource Stewardship Strategy](#) (RSS). The RSS nests within the authority of the GMP and relates directly to resource management on the site. It will replace the [Resource Management Plan](#), which has been the program guidance for resource stewardship.

The MNRR GMPs established desired conditions that serve as the cornerstone for RSS development. Comprehensive Strategies in an RSS are consistent with the GMP and provide the best science- and scholarship-based approaches to achieving and maintaining desired conditions. Park-level strategic planning remains critical to decision-making on the allocation of MNRR financial and human resources.

While a GMP describes the desired conditions that are to be ultimately achieved, the RSS provides 10- to 20-year Comprehensive Strategies for a logical, long-term investment in achieving and maintaining those desired conditions. The activities comprising these Comprehensive Strategies inform the sequence, duration, and association of actions to be considered during park strategic and [implementation planning](#).

The FMP is an implementation plan that defines the actions and undertakings that will be used to attain and maintain desired conditions. Once an RSS is developed for MNRR, fire management goals will be guided by the quantitative expression of desired conditions provided by the RSS. The FMP writing and updating schedule will be included in a [Comprehensive Strategy](#) and accomplishments under this implementation plan will be noted in the annual review of the RSS.

Until that time, this FMP will strive to reach the objectives of the MNRR GMPs. The success of the FMP in meeting resource goals will be checked and measured by the fire-monitoring program. When development of an RSS is eventually undertaken by MNRR, the superintendent and resource manager will ensure that the FMP remains consistent with program planning.

E. How the FMP will Help Meet GMP and Resource Management Program Goals

Implementation of the FMP will support MNRR by

- reducing the fuel load through prescribed fire and thus reducing the opportunity for wildland fire threats to human life and cultural resources in and around the site;
- protecting and conserving the natural and historic resources, including archeological resources; and
- attaining and maintaining the desired conditions

Implementation of the FMP will also contribute to meeting goals specified in the Strategic Plan, as part of the requirements of the [Government Performance and Results](#)



Act. Prescribed fire is one of the management tools that can assist in achieving resource management goals. Specifically, fire will improve conditions by

- shifting species composition from exotic species (cool season grasses) to native plant species;
- restoring the mosaic pattern of plant communities associated with different soil and moisture conditions, and different ecotypes;
- using a natural process that effectively and efficiently contributes to native community management;
- replacing a large-scale disturbance (flooding) that is no longer available to the landscape with a different small-scale disturbance (Romme, et al. 1998)²; and
- reintroducing a natural process and force that shaped the vegetation guilds on a landscape scale

Prescribed fire is effective in removing eastern red cedar (also referred to as cedar), which although native, is extremely invasive and has greatly altered the landscape. Prescribed fire is used by MNRR partners as a treatment on natural sites and it complements the use of chemical treatment and mechanical/manual removal presently used by MNRR. Prescribed fire is recognized as an important tool in achieving desired conditions in fire dependent landscapes. Until a Cultural Landscape Report is completed, MNRR will use prescribed fire to promote an open landscape of prairie or meadow in areas where physical conditions are altering the previous cover-type or where non-native cover predominates. Missouri NRR will also maintain healthy forests, where they occur, and return fire to the fire dependent mesic bur oak system.

² This is consistent with the NPS Management Policy 2006, Chapter 4.1.5, 4.4.1, and 4.4.2.4.



Figure 2A: General MNRR map showing public lands in 39-mile District.

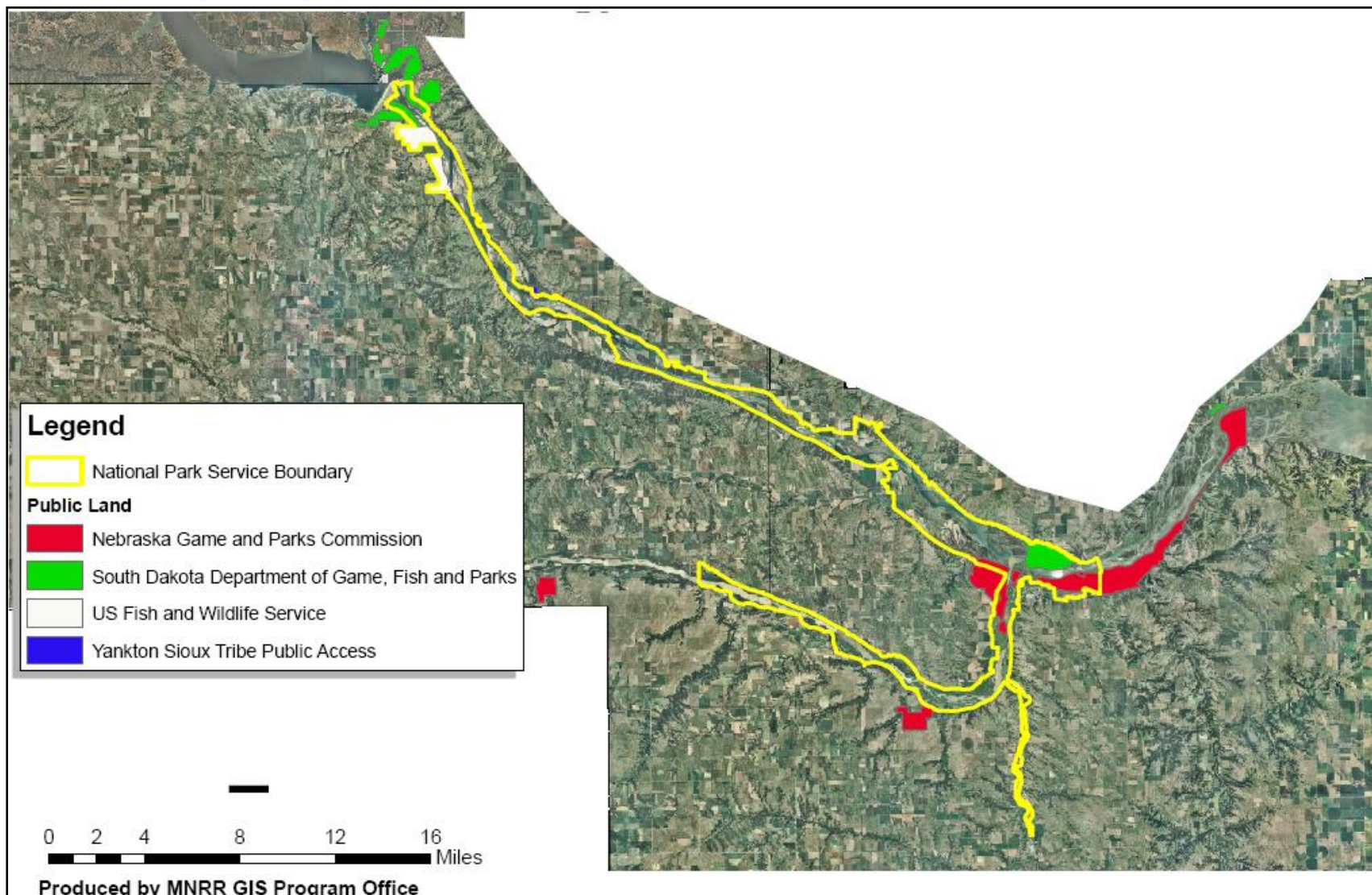
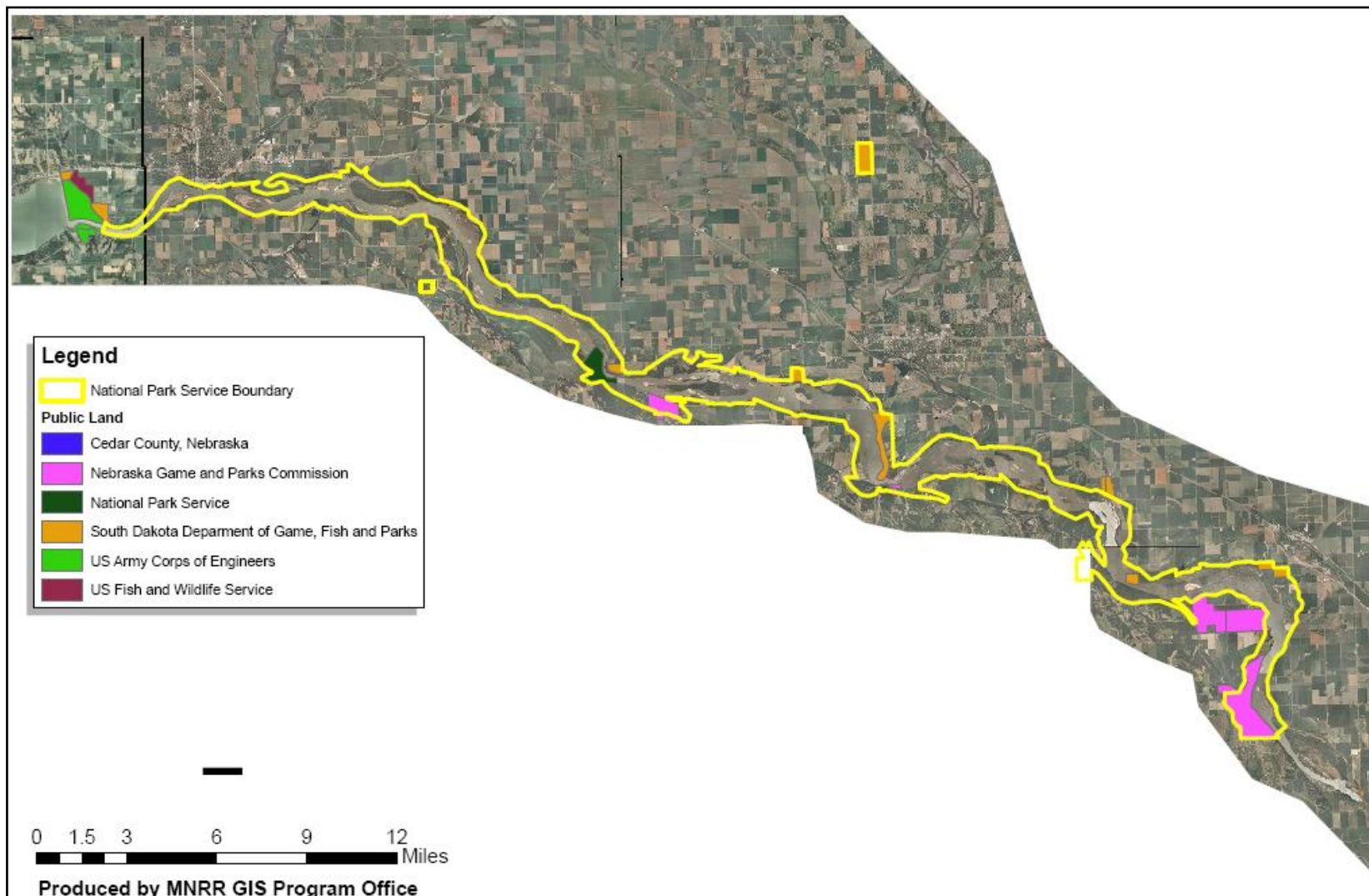




Figure 2B: General MNRR map showing public lands in 59-mile District





II. Wildland Fire Management Strategies

The [*2006 Interagency Prescribed Fire Burn Planning and Implementation Procedures Reference Guide*](#) stipulates key points for wildland fire policy. Using these points, NPS policies, and park planning documents, the following goals and objectives describe the scope of a wildland-fire management program for MNRR.

A. General Management Considerations

Fire management activities fall under the oversight of the Midwest Region (MWR) Fire Management Office (FMO) and are implemented with assistance from the MWR Fire Staff. Interagency coordination and cooperation is essential for successful implementation of the fire management program at MNRR. The Midwest Region (MWR) Fire Staff coordinates these cooperative agreements and activities. Additionally, MNRR coordinates agreements for firefighting, protection of structures, and traffic control during fire operations.

1. Appropriate Management Responses should seek to

- Immediately suppress wildland fire throughout MNRR -- due to the size of MNRR parklands and other burnable acres, and the close proximity of adjacent private holdings, immediate suppression or containment of wildland fires through an [*AMR*](#) and [*Minimum Impact Suppression Tactics*](#) (MIST) is necessary.
- Limit fire size and contain it within the natural area affected.

2. Moreover, responses should be based on:

- Public and firefighter safety
- Cost expenditures that are commensurate with values to be protected
- Protection of cultural, historic, and natural resources
- MIST protocol
- Limiting fire line construction through use of existing barriers such as roads
- Protection of improvements (buildings, roads, etc.)
- Preventing fire spread onto private lands or public lands outside of NPS management jurisdiction.

B. Wildland Fire Management Goals

Goal: *Make firefighter and public safety the highest priority of every fire management activity.*

Objective: *Ensure all wildland fire and prescribed fire operations cause no injuries to the public and limit injuries to firefighters to be consistent with NPS Strategic Plan goals for employee safety.*

Protection of human life is reaffirmed as the first priority in wildland fire management. Property and natural/cultural resources jointly become the second priority, with protection decisions based on values to be protected and other considerations.

Strategies:

- Qualified individuals will carry out fire management operations with the safe and skillful application of fire management strategies and techniques, consistent with DO-18 requirements.
- All personnel involved in fire management operations will receive a safety briefing describing known hazards and mitigating actions based on [*Lookouts*](#).



[Communication, Escape Routes, Safety Zones](#) (LCES), current fire season conditions, and current and predicted fire weather and behavior. Only properly trained and certified personnel will be working on a fire. Other personnel will contribute with crowd control, smoke detection, weather condition assessment, and other aspects that can be accomplished in specified safe zones.

- Missouri NRR neighbors, visitors, and the local residents will be notified of all planned and, when possible, unplanned fire management activities on NPS parklands that have the potential to affect them. A comprehensive list of contacts to be made prior to prescribed burn will be included with each Prescribed Fire Burn Plan ([Appendix E, Table E2](#)). Partner agencies and private landowners will be encouraged to make notification of similar actions on their lands.
- Portions of MNRR may be closed to the public when fire activity poses a threat to human safety (at the discretion of the MNRR superintendent or other jurisdictional administrators). The river way will remain open. Safe zones will be established for landed visitors during prescribed fires. If the situation should warrant, safe zones will be closed to visitors and visitors will be removed from any potentially dangerous location.
- Missouri NRR will emphasize the importance of firefighter and public safety when working with its partners in land management activities. All NPS employees and volunteers will meet appropriate qualifications for their role in fire activities. Missouri NRR will strongly encourage partners to require their personnel to meet appropriate standards as stated in [1995 Fire Policy](#) and as implemented through the [Interagency Guides Redbook 2008](#), Chapter 13.

Goal: Manage prescribed and wildland fires in concert with federal, state, and local air quality regulations.

Objective: Ensure air quality thresholds for National Ambient Air Quality Standards are not exceeded and visual quality is not reduced in adjacent air sheds due to fire use activities.

Visibility on highways may not be significantly reduced from smoke.

Strategies:

- Air quality objectives will be incorporated into each Prescribed Fire Burn Plan.
- Particular attention will be given to the hazards associated with the highways located near the fires. Every consideration will be made to limit smoke impacts on the highways, to local rural residents, and within cities. This includes go/no go decisions and decisions to extinguish fires if wind conditions alter after ignition.
- Smoke impact mitigation measures will be implemented for prescribed burn and all wildland fire actions.



Goal: Suppress all unwanted wildland fires regardless of ignition source to protect the public, to check fire spread onto other agency and private property, and to protect the natural and cultural resources within the MNRR boundary.

Objective: Contain 95% of wildland fires at less than 50 acres in size on NPS parkland and 80 acres on other agency and private lands within the MNRR boundary, wherever suppression will not result in compromising public and firefighter safety or fire suppression will not result in damage that would exceed potential fire damage.

Strategies:

- Prioritize suppression actions on fires or portions of fires that threaten to damage public or private property.
- Ensure that eligible MNRR staff is trained in wildland fire operations.
- Ensure that NPS staff responsible for fire operations understands fire policy.
- Identify potential sources of unwanted fire in MNRR, particularly on MNRR land, and take steps to mitigate their potential impacts.
- Offer a good working relationship with local RFDs and partner agencies that includes cooperative opportunities for wildland fire training.

Goal: Manage wildland fires so that resources (natural, cultural, and improvements) are protected from damage by suppression actions and fire.

Objective: Manage suppression actions so that rehabilitation costs are less than 10% of suppression costs.

Strategies:

- Primary fire suppression responders, usually local RFDs, will be given opportunity for training in [*MIST*](#). Partner agencies will be encouraged to receive MIST training if it is not already part of their training. Every attempt will be made to implement MIST in wildland-fire suppression operations.
- Ensure that fire operations personnel, including the local firefighters, are briefed on the MNRR resources and potential damage from fire and suppression actions.
- Have a resource advisor present on all suppression actions.

Goal: Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.

Objective: Annually review and modify, as necessary, agreements with the organizations responsible for wildland fire suppression and collateral public safety duties.

Strategies:

- Coordinate with the following entities:
 - Rural Fire Districts
 - Agencies for public safety: County Sheriffs, Nebraska State Patrol, South Dakota Highway Patrol, and Police Departments
 - Agencies with similar responsibilities for wildland fire, such as Department of Natural Resources in Nebraska (NDNR) and the Department of



Environment and Natural Resources in South Dakota (SDDENR), USACE, FWS, and others

- Develop cooperative agreements for reciprocal fire assistance where no agreements are yet in place. This will necessitate developing numerous new agreements with communities, RFDs, and agencies along the length of both the 59-mile and 39-mile Districts of MNRR.
- Encourage the use of MIST protocol and assist with firefighter training in techniques used within MNRR whenever appropriate and feasible. Make firefighters aware of the known archeological resources on NPS property and elsewhere in MNRR.
- Cooperate with adjacent landowners to prevent wildland fire on adjacent lands.

Goal: Use prescribed fire where and when appropriate as a tool to meet resource management objectives consistent with NPS policies. Maintain or restore the primary natural resources of the riparian and upland areas, and provide natural processes that replace the disturbance regime by which they were maintained.

Objective: Focus the use of fire to target specific restoration issues within MNRR (e.g., woody plant control, cool season grass control, rejuvenation of grasslands, etc.)

Strategies:

- Attain fire use in 90% of the fire-dependent ecosystems within MNRR parkland during the next five years to attain and maintain desired conditions, and encourage use of fire in fire dependent ecosystems among partners.
- Use fire as a natural disturbance in the riparian corridor to maintain open areas and meadows or grasslands, when possible/practical.
- Achieve resource objectives in accordance with the [Management Policies 2006, Chapter 4.4](#), such as
 - Reduce woody plant cover
 - Reduce invasive/exotic grasses and forbs relative cover
 - Increase native plant diversity
- Implement hazard fuel reduction burns throughout MNRR parkland and partner lands to reduce intensity of subsequent unwanted wildland fires.
- Monitor the effects of fire on the ecosystem.

Goal: Reduce wildland fire hazard around developed areas, along interface boundary areas, and adjacent to values to be protected.

Objective: Ensure fire does not destroy development, nor incur costly damage (rehabilitation costs greater than \$10,000) to structures or landscape. Ensure that fire does not escape from NPS parklands and damage other lands within or adjacent to MNRR boundary. Cooperate in the protection of values within and adjacent to partner jurisdictions.

Strategies:

- Apply mechanical/manual hazard fuel reduction around suppression zones to reduce fire intensity and severity and recommend the same for land not under NPS jurisdiction.



- Apply mechanical/manual hazard fuel reduction around vulnerable developed sites for protection from fire damage and recommend the same for land not under NPS jurisdiction.
- Employ fire wise landscaping, ground maintenance techniques wherever practical, and recommend the same for land not under NPS jurisdiction.

C. Wildland Fire Management Options

1. Wildland Fire

Missouri NRR will suppress all wildland fires that are not purposefully set according to an approved burn prescription. Any prescribed fire that deviates from its prescription will be suppressed. Manual fuel reduction along the boundary, via mowing and removal of brush may reduce fire intensities and the chance that fire will exceed the boundaries. The NPS will create firebreaks as needed on parklands.

a. *Wildland Fire Suppression*

All wildland fires will be suppressed using [*Initial Attack*](#) actions and using AMR. Management responses to specific wildland fires will be determined through evaluation of public and firefighter safety, fire behavior, values at risk, potential suppression damage, and availability of fire management resources. They will vary from fire to fire and sometimes even along the perimeter of a fire. All available MNRR and local firefighting resources will be utilized, as necessary, to limit damage to values at risk, protect private and public lands inside and along the MNRR boundary, and provide for the health and safety of firefighters and the public. Appropriate Management Response options range from containment and monitoring to intense suppression actions on all perimeters of the fire.

b. *Wildland Fire Use*

One management strategy not available to MNRR is wildland fires managed for resource benefits (wildland fire use). Wildland fire use is a strategy for allowing naturally ignited wildland fires to burn as long as the fire meets pre-stated resource management objectives and prescriptive parameters are not exceeded. Due to patchwork of land ownership within MNRR and the surrounding values, a wildland-fire use program will not be implemented. It is unlikely that fire use will ever be an option for park units like this one, where an ignition could leave the NPS parkland in less than one operational period, immediately affecting values owned by other entities both inside and outside of the NPS boundary.

2. Prescribed Fire

Prescribed fires are intentionally ignited under predetermined weather and fuel-moisture conditions allowing managers to exert substantial influence over the spread and intensity of the fire. Managers ignite these fires to accomplish resource management objectives and subsequently reduce hazard fuel as well. All prescription parameters, acceptable ranges, and objectives are clearly stated in a Prescribed Fire Burn Plan for each prescribed fire conducted.

a. *Hazard Fuel Reduction*

Missouri NRR managers will use fire for hazard fuel reduction within parkland as needed and will cooperate with partners in fuel reduction activities. Parkland projects will be documented with a written plan approved by the MNRR superintendent. Each plan will describe the fuel hazard and the values at risk.



The plan will specify proposed mitigation action with scope of work to be completed, and cost breakdown associated with the mitigation. Firefighter, public, and visitor safety associated with private property, public use areas, and travel corridors will be of highest priority, followed by protection of public and private property.

Managers may use fire to meet objectives for hazard-fuel management activities outside of developed areas, while maintaining the fire dependency of the ecosystem treated. Managers may select mechanical/manual removal of hazard fuel in areas with excess fuel loads and in areas outside of those designated as appropriate for prescribed fire. This program will reduce hazard fuel to levels that limit the probability of accidental ignition of fuels and that enable wildland-fire suppression forces to control fires with minimal loss of values to be protected, should fire occur.

Although hazard fuel reduction is one objective for prescribed fire, if the landscape is properly managed for ecological values, hazard fuel reduction will not become a pressing need. Mechanical/manual hazard fuel reduction may be necessary near sensitive areas, or where woody fuels present a control problem, prior to prescribed fire. It may also be necessary before the first prescribed fire in a previously untreated area to reduce fuels to a level manageable by the fire crew.

b. Plant Community Management

Prescribed fire will be used in support of vegetation management to maintain and restore plant communities, increase plant diversity, cycle nutrients, and reduce or remove exotic and invasive plants. Resource managers intend to maintain open areas and meadows in situations in which they were formerly maintained by natural processes that now are altered by human activities. They will also restore natural processes and conditions to the upland areas that were disturbed by human activities such as fire suppression. Using natural processes will ensure that the landscape will continue to progress toward desired conditions established in the General Management Plans.

Managers will use fire in conjunction with other techniques to maximize benefits for native plant restoration in MNRR. Literature suggests that prescribed fire is not effective in removal of some exotic or invasive species (FEIS³). The Northern Great Plains Exotic Plant Management Plan (EPMT, NPS 2005) will assist MNRR with exotic plant control. They have identified the most effective techniques with the fewest detrimental impacts (NPS 2005). The EPMT plan includes using

- Cultural Treatments (Prevention, Reseeding and Planting, Irrigation)
- Manual and Mechanical Treatments
- Biological Control
- Chemical Treatments
- Prescribed Fire Treatments

³ FEIS, Fire Effects Information System, <http://www.fs.fed.us/database/feis/index.html>



Prescribed fire treatments were assessed in the Environmental Assessment section of the EPMT plan (NPS 2005). The preferred alternative describes the use of prescribed fire treatments as follows:

“Under this alternative, fire would be applied to a predetermined area or unit to reduce the growth of exotic plants and to increase the growth of desirable plants. Prescribed fires are most effective when the exotic plant is more susceptible to the effects of fire when compared with intermingled native plants (CNAO 2000). Prescribed fire may also be used to control exotic cool-season plants. . . . Exotic plant management objectives for each prescribed fire treatment would be defined in a project-specific prescribed fire plan.”

Missouri NRR is a member of the Northeast Nebraska Weed Management Area (WMA), a consortium of agencies cooperatively addressing weed management. The WMA facilitates management and control of exotic plants, coordinates resources and records, assists landowners’ efforts through cost sharing, develops local resources, conducts mapping, and employs a weed management coordinator. The WMA will promote Best Management Practices in conjunction with Integrated Pest Management.

Prescribed fire is not effective on all targeted exotic species at MNRR (Table 2). Other invasive species, such as cedar and exotic cool-season grasses, are suppressed or killed by fire. Combinations of fire, chemical treatment, and mechanical/manual treatment ([*Integrated Pest Management*](#)), can be more effective in suppressing difficult to control species than fire alone.

Table 2: Exotic plant management priorities⁴

Common Name	Scientific Name	Effectiveness of fire treatment ⁵
Common reed	<i>Phragmites australis</i>	90% top-kill, but little effect on rhizomes; chemical treatment recommended
Leafy spurge	<i>Euphorbia esula</i>	top-kill only and may increase density; chemical treatment followed by fire may help control; may reduce seed germination with spring burns; biological control recommended
Musk thistle	<i>Carduus nutans</i>	variable; severe fire kills, but may enhance colonization
Purple loosestrife	<i>Lythrum salicaria</i>	little data, but believed to not burn readily and to resprout from roots; biological control recommended
Russian olive	<i>Elaeagnus angustifolia</i>	top-kill in trees less than 2-inches DBH; resprouting from roots and root-crown reported
Spotted knapweed	<i>Centaurea maculosa</i>	top-kill and stress, but perennial taproot is likely to survive
Tamarisk	<i>Tamarisk spp.</i>	top-kill; severe fire may kill root crown; seeds have high heat tolerance

⁴ Species identified in Table 1-1, Northern Great Plains Exotic Plant Management Plan and Environmental Assessment, March 2005

⁵ Fire effects taken from Fire Effects Information System, USDA Forest Service, <http://www.fs.fed.us/database/feis/>



Other exotic species of concern to MNRR managers are Canada thistle (*Cirsium arvense*) and bull thistle (*Cirsium vulgare*), and plumeless thistle (*Carduus acanthoides*) (NPS 2005). Although fire may have some immediate effects on bull thistle, it will only top-kill Canada thistle. Therefore, fire is not a good singular treatment to reduce some of the most problematic exotic-invasive species of concern targeted by the Northern Great Plains Exotic Plant Management Plan.

Localized areas of exotic species include cool season grasses that are the result of pasturing. In [*Best Management Practices*](#), managers must time prescribed fire with care when the intention is to reduce populations of cool season grasses. Other species of annuals and biennials are associated with disturbed lands that have been under agricultural use. Fire suppresses annuals if seasonal timing is correct also. Proper timing must be employed when fire is used to control biennials so as not to burn in either a regular even year or regular odd year pattern that would control one year-class of the biennial and allow the other to flourish.

Additionally, managers are concerned about native plants that can become invasive and degrade a matrix with multiple plant [*guilds*](#). Cedar has aggressively colonized areas that were once northern floodplain forest. Traditionally, American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), and eastern cottonwood trees were important constituents of the northern floodplain forest along the Missouri River (Sullivan 1995). The wettest areas supported eastern cottonwood. With the advent of damming and subsequent degradation of the river (e.g., approximately 15 feet of degradation near Gavins Point Dam), the water table elevation dropped accordingly (Nebraska DNR 2006). However, because of river degradation, and a lack of flooding and ice flow events, cedar has flourished in the cottonwood understory resulting in a generalized cottonwood-eastern red cedar forest type. The resulting cedar stands are dense and do not contribute to habitat, recreational value, or historical story of the land. With eastern cottonwood in decline, managers wish to rehabilitate the NPS parkland to meadows on the lower tables of the floodplain. Cedar is very susceptible to fire and may be eliminated from a site following winter or spring prescribed burning. Fire is associated with maintaining meadows and grasslands, and in some cases, emergent wetlands.

The upper tables of the floodplain resemble the conditions appropriate for mesic burr oak (*Quercus macrocarpa*) forest. Mesic burr oak occurs here and can be enhanced by use of fire to discourage undesirable interspecies competition, reduce sapling basal area, and open the understory to herbaceous cover.

The uplands consist largely of abandoned pastureland that could be restored to tallgrass prairie. Fire is a principle management tool in prairie plant communities (Brown 2000). It reduces the invasion of woody plants, enhances germination of some forb species, reduces interspecific competition from cool season plants, and recycles nutrients from dead biomass to the soil.

Managers will control woody plants where they are unwanted, using prescribed fire coupled with other treatments, such as mechanical/manual removal and chemical application as necessary. This combination has been effective and Northern Great Plains Exotic Plant Management Plan has recommended its use. Managers will rely less on costly mechanical/manual removal and chemical



application by utilizing prescribed fire regularly as a management tool for invasive plant control.

Managers must consider the needs of wildlife, such as herpetofauna, birds, insects, and threatened and endangered species that may be impacted by prescribed fire (Smith 2000). Generally, there is a concern that prescribed fires not be set too late in the spring as to damage insect, bird, and herpetofauna populations. Every river mile located along both the 39-mile and the 59-mile Districts of MNRR, excluding only Verdigre Creek, is designated piping plover critical habitat. Piping plovers and interior least tern prefer open, sparsely vegetated sand or gravel bars as nesting sites. They nest near water, outside of the areas that would carry fire during prescribed fire.

D. Description of Wildland Fire Management Strategies by Fire Management Unit

Fire Management Units (FMUs) are functional areas defined by their uniquely differing fire management objectives. These objectives are consistent with the [management prescriptions](#) falling within parameters established in the GMPs for appropriate use of the area. For this FMP, only one Fire Management Unit will be used. Overall management will have two basic tenets: (1) Appropriate Management Response will result in immediate suppression or containment of unwanted wildland fire, and (2) prescribed fire will be used as a tool for hazard fuel reduction and for plant community management in designated areas. These areas may change as private land stewards and other agencies choose to incorporate fire management actions into their practices. Records of additional areas will be kept as part of the annual review process. At this time, MNRR intends to subject all NPS parkland, where fire is appropriate as a management tool, to prescribed fire. Crews would also burn slash and debris piles on NPS parkland.

Missouri NRR collectively encompasses approximately 69,000 acres, of which NPS currently owns approximately 250 acres. The 250 acres owned by the NPS include two separate tracts -- Mulberry Bend Overlook and Bow Creek Recreation Area. There are state owned parks, recreation areas, and wildlife management areas (Nebraska Game and Parks Commission and South Dakota Department of Game, Fish and Parks; federal properties (Karl Mundt National Wildlife Refuge, Gavins Point Project, and Fort Randall Project – all USACE); and tribal properties (Ponca, Santee Sioux, and Yankton Sioux) inside or adjacent to the MNRR boundary. However, the majority of the recreational river area is privately owned.

Wildland fire that was not purposefully ignited under a prescribed fire plan will be suppressed or contained. Basic information on the ecology, physical characteristics, and fire behavior are similar across the FMU and between the two districts. Management differences within the FMU are based most often on anthropogenic boundaries, and not natural boundaries.

1. Description of physical and biotic characteristics

Northeastern Nebraska/southeastern South Dakota are positioned at a transition from the Eastern Deciduous Forest, which extends into the Northern Floodplain Forest, and both the mixed-grass and tallgrass communities. Within the FMU, there are minor differences between the 59-mile District and the 39-mile District. Tall grasses in dry uplands are complemented by the oak of the mesic sites and cottonwoods of the Northern Floodplain Forest in the east. This correlates roughly with the 59-mile District of MNRR. Mixed grass prairie occurs above the Northern Floodplain Forest in the west. This area correlates roughly to the 39-mile District of MNRR.



Within these two Districts lie several ecoregions (Figure 3, Kuchler 1975). These ecoregions contain geographically distinct assemblages of plant and animal communities. The ecoregions have unique characteristics that render them unlike one another. This is particularly noticeable at Level III. For the purposes of this FMP, the Level III and Level IV Ecoregions will be lumped into the 59-mile and 39-mile Districts, which approximate the 47 Western Corn Belt Plains/46 Northern Glaciated Plains and the 42 Northwestern Glaciated Plains, respectively.

The FMU contains both developed land and undeveloped land. Vegetation cover ranges from formal landscaped urban to rural agricultural and forests or grassland. Cover types included in this unit are (see Table 1 for acreages)

- Open water
- Developed land
- Barren land
- Cultivated Crops
- Deciduous Forest
- Evergreen Forest
- Shrub-scrub
- Grassland-herbaceous
- Pasture-hay
- Wet



Figure 3: Level IV Ecoregions of South Dakota and Nebraska



Produced by MNRR GIS Program Office



Fire History and Fire Ecology

Pre-settlement fires would probably have occurred throughout the year. They would have started naturally or been set by accident in dry seasons. They may have been initiated by native people to promote greening in spring, clear lands for planting or security, or other reasons during other times of the year (Pyne 1982).

Wind without rain can accompany lightning during April through September. In general, dry lightning fires appear to be more common in drought years. Historically, many landscape scale fires may have originated outside of what is now MNRR boundary and run into the Missouri River floodplain. The fires would usually be stopped by the expanse of water and the moist riparian conditions.

Fires occur less frequently and are smaller than prior to modern land use and fire suppression. Additionally, fires encounter barriers, such as roads, fallow cropland, and other human influences. Reduction in the biomass of fine fuels because of land use practices, such as development, row cropping, and livestock grazing has changed the nature of wildland fires.

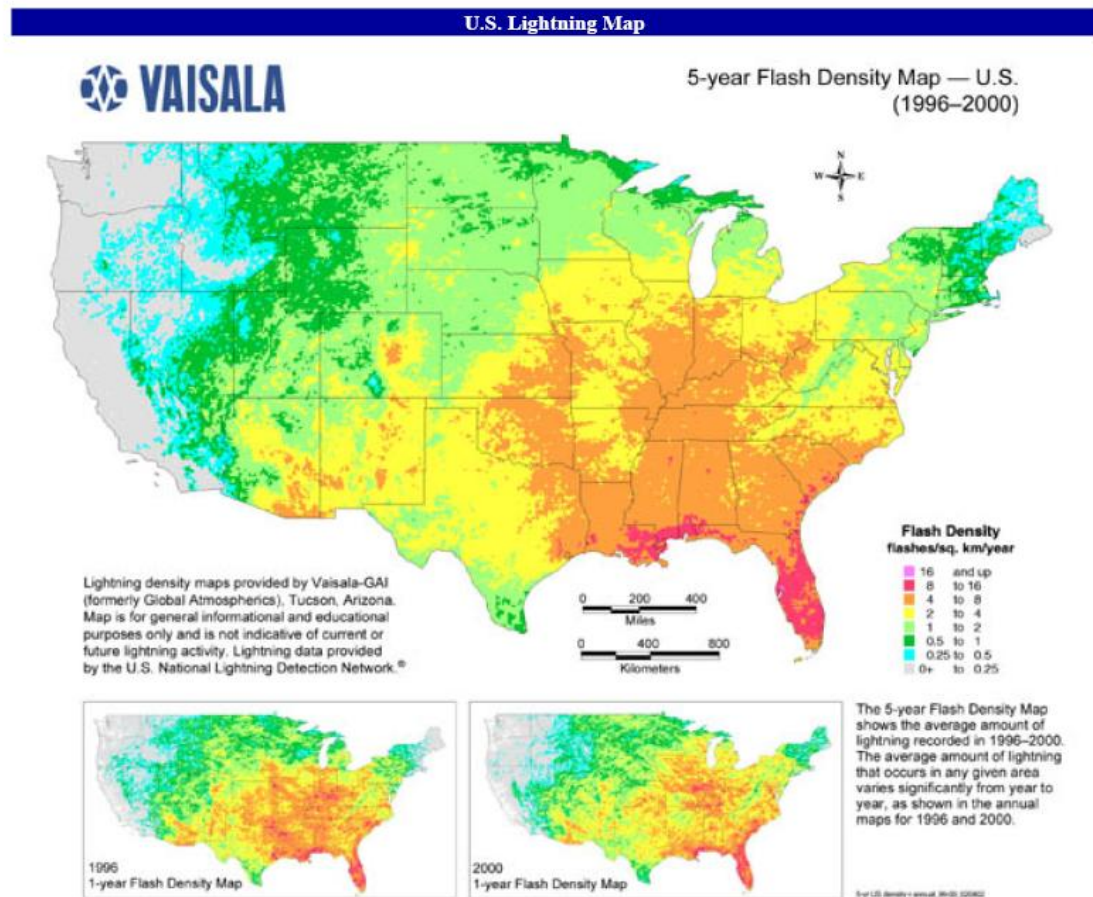
Although the lack of trees in this area has resulted in fewer studies of historic fire in the Great Plains than in other locations, fire modeling is being used in northeast Nebraska around the Niobrara and Missouri Rivers through the Great Plains Cooperative Ecosystems Studies Unit. At this time, we know that historically fires burned large areas with few fuel breaks and no suppression. Fine fuels would have carried fire unimpeded for many miles.

Even now, few natural fuel breaks occur along the long axis of the river course and floodplain, particularly where bluffs raise high above the river. Winds can drive fire through the light fuels, particularly in the upland areas. The lowland areas are usually moist enough to have a relatively low wildland fire danger. This may be changing as the river degradation has disconnected the floodplain from the river hydrology and potential climate change may affect water availability. A 20-50% decline in forest cover has been estimated as a response to the potentially hotter, drier weather associated with climate change in Nebraska (EPA 1998). This significant alteration in environmental conditions may influence wildland-fire size and frequency in the future.

The fire season, as determined by the Fire Management Information System (FMIS), begins April 1 and lasts to October 30 (Central Niobrara Watershed FMP 2005). However, wildland fires can occur at any time. They can spread swiftly, particularly when fanned by wind. The only wildland fire recorded by the National Weather Service near MNRR between January 1950 and October 2007 occurred on April 3, 2005. Local jurisdictions have handled small-scale fires annually. Lightning strike rates are quite low at one to two flashes/square kilometer/year (Figure 4). Therefore, most fire starts are probably caused by humans.



Figure 4: Lightning map for 1996-20006



Air and water quality:

Federal regulation of air quality began with the [1990 Clean Air Act](#). This legislation sets requirements for attaining National Ambient Air Quality Standards (NAAQS) and protects areas where air quality is better than the standards from significant deterioration of air quality. The NAAQS are established for carbon monoxide, lead, sulfur dioxide, particulate matter less than 10 microns in diameter (PM10), particulate matter less than 2.5 microns in diameter (PM2.5), ozone, and nitrogen dioxide. The standards are expressed as ambient air concentrations averaged over a specific period of time that is relevant to the pollutant being measured.

In general, the area in and around MNRR is in attainment of NAAQS and is classified as a Class II air quality area. The contribution of pollutants from distant locations, such as large cities to the west, is unknown. The principle concern is that local air quality does not deteriorate significantly from its current levels. Visibility for scenic views is important to MNRR management objectives.

⁶ http://www.lightningsafety.noaa.gov/lightning_map.htm



Because of the rural nature of this region, chemical pollutant levels (CO, NO₂, ozone, sulfur oxides) are very low. Visibility and particulate concentrations are the two areas of concern, although no problems exist at this time. Smoke can greatly affect air quality by raising concentrations of particulates, which in turn affects visibility. The Class II designation of this area determines the maximum allowable increase in concentrations of pollutants, such as particulates, as established in the 1963 Clean Air Act.

Climatic conditions

Detailed weather and climate information can be found at http://www.weather.gov/climate/local_data.php?wfo=fsd. Fire weather can be found at <http://www.crh.noaa.gov/fsd/firewx/>

Eastern Nebraska and South Dakota have a continental climate with average annual precipitation near 24 inches. There are small differences in weather statistics between the two Districts (Table 3). These statistics indicate that the 39-mile District is a little drier. This creates the conditions for mixed grass prairie, while the 59-mile District climate supports tallgrass prairie. The average number of frost-free days is 188.

Table 3: Weather statistics for the two Districts

District	Mean temperature (F)	Average Precipitation (inches)	Average annual Max/Min temperatures (F)
39-mile District	46.4	23	59.7/33.1
59-mile district	51.6	25	NA

There appears to be a tendency toward milder winters than the norm. Temperatures in recent years have been warmer than normal during summer months as well.

Maximum precipitation occurs in summer. Drought years, when annual precipitation is below 19 inches, are unpredictable and typical of summer during the last several years. Generally, severe thunderstorms start in April, but are starting earlier in this decade than considered normal from 113 years of record keeping. Precipitation can come as severe weather with large hail and strong thunderstorm wind gusts. A sign of abnormally mild winters recently is that 2006 saw the 5th wettest and 9th warmest December on record and a significant portion of the precipitation was rain, not snow (Table 4⁷).

Table 4: Precipitation and winds for 59-mile District

Year	Total	DEPARTURE FROM NORM	SNOW-FALL	DEPARTURE FROM NORM	MAX WIND GUSTS		
					DIREC-TION	MPH	DATE
2000	26.11	PLUS 2.25	46.5	PLUS 8.4	NW	621	APR 5
2001	30.18	PLUS 6.32	43.6	PLUS 5.5	E	56	JUN 12
2002	24.07	MINUS 0.62	36.4	MINUS 4.9	NW	77	AUG 11
2003	21.81	MINUS 2.88	45.1	PLUS 4.5	NW	55	NOV 12
2004	30.92	PLUS 6.23	36.0	MINUS 4.6	N	56	AUG 3

⁷ National Weather Service, <http://www.weather.gov/climate/index.php?wfo=abr>



Year	Total	DEPARTURE FROM NORM	SNOW- FALL	DEPARTURE FROM NORM	MAX WIND GUSTS		
					DIREC- TION	MPH	DATE
2005	31.71	PLUS 7.02	49.7	PLUS 9.1	NW	60	MAR 10
2006	26.74	PLUS 2.05	16.4	MINUS 24.2	NW	53	JUN 20

Topography, geology, and soils:

This description of geological resources is taken from the MNRR General Management Plan Environmental Impact Statement (NPS 1999a:72):

Missouri NRR is located between the glaciated and unglaciated portions of the Missouri Plateau, in the Great Plains Province of the Interior Plains. The floodplain consists of sandy soils deposited since the Pleistocene. The area combines nearly flat to gently rolling glaciated till with hilly loess. Sloping bluffs bound the north side of the river, while steep bluffs rise on the south. Exposed bedrock consists of limestone of the Niobrara Formation and shale of the Pierre Formation derived from Mesozoic Era deposition. Sand, gravel, clay, and chalk have been extracted from along the bluffs. No hard rock mining or oil and gas fields exist within the MNRR boundary. Elevation is approximately 1,250 feet (381 meters) at the Nebraska-South Dakota line.

Vegetation, upland:

Natural vegetation along the river is composed of two major plant communities, the floodplain forest of willow and cottonwood, and the elm and oak (*Quercus* spp.) woodland typical of the bluffs that border the floodplain in Nebraska. Varying stages of floodplain succession are evident throughout the park.

Upland vegetation is a combination of pasture/hay field, small areas of restored prairie, mesic bur oak forest, and mixed deciduous forest. Cedar is competing with all natural vegetation cover types in the uplands, except where haying occurs. Potential exists for conversion of abandoned fields to high quality tallgrass (in 59-mile District) or mixed-grass (in 39-mile District) prairie. The present potential vegetation in the uplands includes fire-adapted communities, based on prior existing vegetation communities reported by Lewis and Clark's descriptions and numerous studies (Kuchler 1975).

Bluffs support hardwood forests. The slopes of the bluffs support dense stands of oak, ash, mulberry (*Morus alba*), and walnut (*Juglans* spp.), with bur oak as the dominant species. There is a stable understory of shrubs with species of dogwood and sumac where grazing has been limited. Near hilltops, the soil contains less moisture and the forest is replaced by native grass mixed with yucca (*Yucca glauca*) on south and west exposures.

Vegetation, exotic/invasive:

Leafy spurge, spotted knapweed, Canada thistle, plumeless thistle, and musk thistle are widely distributed and are designated as state or local noxious weeds by Nebraska and South Dakota. Purple loosestrife is spreading rapidly throughout the park where it forms dense stands on several hundred acres of wetlands along the bottomlands and islands. Russian olive has invaded much of the scrubland and bottomland forest, especially those areas subject to heavy grazing. Tamarisk has been documented in MNRR and, while not found in large patches, it is found throughout the park. Hybrid cattails are widespread in



the wetlands. Smooth brome (*Bromus inermis*) is widespread in both the upland and bottomlands.

Native invasive species, such as eastern red cedar, are spreading into grassland and bottomland forest, because of the fire suppression and alteration of the river hydrology. In the uplands, fire suppression has allowed other woody species, including green ash and smooth sumac (*Rhus glabra*), and exotic Siberian elm (*Ulmus pumila*) to encroach onto native grassland.

Water resources

Water in the Missouri River originates from mountain snowmelt, plains snowmelt, and seasonal rainfall. A large portion of MNRR is listed in the National Wetland Inventory. The Missouri and Niobrara rivers, and Verdigre Creek provide important riverine and riparian habitat. Missouri NRR is among the last representative parts of the middle Missouri River that is not dammed or channeled. The river is a dynamic system with shifting sandbars, multiple channels, and islands.

The USACE's Ft. Randall and Gavins Point Dams ([U.S. Army Corps of Engineers website](#)) influence river hydrology at MNRR. Each dam is operated somewhat differently with Ft. Randall dam functioning as a power-peaking facility and Gavins Point dam providing a steady flow of water downstream. Channel degradation caused by the dams has isolated the river from its floodplain. These changes in hydrology and morphology of the river have affected fish and wildlife associated within the riverine and riparian habitat (Committee on Missouri River Ecosystem Science 2002; Barclay 1980; Boldt, et al. 1979).

The reservoirs created by dams have served as sinks, preventing downstream movement of organic constituents and sediment. Sediment-free water leaving the reservoirs once again seeks a load to carry, and the result is channel bed deepening, severe bank erosion and drainage of remnant backwaters (Committee on Missouri River Ecosystem Science 2002).

Water quality

The Missouri River is no longer the 'Big Muddy.' Prior to damming, the river carried large amounts of sediment, which created the dynamic of accretion, and erosion that created meanders. Erosion is no longer a function of meander, but of channel bed deepening. Water clarity has improved since dam closure. Water quality effects are derived mostly from water releases from moderate to deep levels of reservoirs and are most pronounced immediately below dams.

Although water quality in the three rivers is generally good, the river carries some agricultural chemicals and fecal-indicator bacteria. Missouri NRR water-quality screening by the National Park Service (NPS 1998) found 21 groups of parameters exceeded Environmental Protection Agency (EPA) criteria at least once within their study area and period. Dissolved oxygen, pH, chlorine, antimony, cadmium, copper, lead, mercury, selenium, zinc, and heptachlor epoxide exceeded their respective EPA criteria for the protection of freshwater aquatic life. Fecal-indicator bacteria concentrations (total coliform and fecal coliform) and turbidity exceeded the NPS-Water Resources Division (WRD) screening limits for freshwater bathing and aquatic life, respectively. The occasional high levels of fecal coliform have not limited the river's recreational uses.



Loss of connectivity with the floodplain has resulted in a reduction of nutrients important in fish and wildlife habitat. Enrichment of soils by deposition of carbon and nutrient laden water has all but ceased.

Wetlands, riparian zones, and floodplain (including vegetation):

Flood control has reduced wetland habitat and dissociated the floodplain from the river. Table 5 shows the distribution of vegetation types in the floodplain. These vegetation types affect fuel type and availability, and fire behavior.

Table 5: Wetland and riparian acreages for both segments of MNRR

(U.S. Army Corps of Engineers 2004, as taken from Weeks, et al. 2005)

WETLAND/RIPARIAN TYPE	39-mile District (acres)	59-mile District (acres)
Emergent	1682	2461
Scrub-shrub	454	2517
Forested	889	187
Exposed shore	297	545
Riparian Forest	4536	3949
Riparian Shrub	196	874
Riparian Grass	564	1595
Total Acres	16,073	27,599

The 59-mile District resembles the pre-dam natural river more than any other reach of the Missouri River and displays the greatest density of wetlands, about 90 acres per mile (U.S. Army Corps of Engineers, 2004). Wetland acreage has declined because of channel degradation.

Thirteen lacustrine, palustrine, and riverine wetland community types have been identified, mapped, and further classified into wetland community types based on their habitat similarities and associations with rare, threatened, and endangered species. The MNRR river segment is identified as a wetland complex that qualified for acquisition consideration under the National Wetlands Priority Conservation Plan. Wetlands were created by changes in channels shaped and maintained by periodic flooding. Lack of flooding has changed the species composition of wetlands.

Wetlands generally are composed of an even mix of emergent and scrub shrub. Scrub-shrub wetlands typically occur as dense stands of young sandbar willow (*Salix hindsiana*) with peachleaf willow (*Salix amygdaloides*) and cottonwood in more mesic areas. Most emergent wetlands consist of reed canary grass or a mix of hydric and mesic species. Expansive areas of cattail (*Typha sp.*), often mixed with softstem bulrush (*Scirpus sp.*) along with exotic species such as purple loosestrife occur in old channels, backwaters, and near islands. Areas of exposed shore are not common but occur throughout the Park and are associated with sandbars, eroding banks, developing islands, and areas exposed because of degradation of the riverbed. Annual weeds, short-lived grasses, sedges, seedling willow, and cottonwood grow on the sandbars and newly deposited accretion land.

Riparian forest vegetation along the three rivers includes cottonwood, as the dominant species, mixed with other deciduous trees, such as green ash, elm, and boxelder (*Acer negundo*). Other woody species associated with riparian area include Russian olive,



eastern red cedar, mulberry (*Morus* spp.), roughleaf dogwood (*Cornus drummondii*), smooth sumac, peachleaf willow, false indigo, and American basswood (*Tilia americana*). Herbaceous understory species include a variety of natives such as sand dropseed (*Sporobolus cryptandrus*), switchgrass (*Panicum virgatum*), poison ivy (*Toxicodendron rydbergii*), and scouring rush (*Equisetum variegatum*), as well as non-natives such as Kentucky bluegrass (*Poa pratensis*), and smooth brome. The riparian vegetation has been reduced by agricultural practices and development pressure. For example, agricultural conversion of wetland and riparian forest has eliminated more than 60 percent of the natural areas within 0.6 miles of the river. Open areas are usually grazed or farmed.

The regeneration of cottonwood forests is restricted because this species requires a moist, bare substrate for establishment (Reily and Johnson 1982; Wilson 1970). Cottonwood forest regeneration currently appears largely restricted to narrow shoreline zones, sandbars, or the upstream end of deltas. The decreased frequency of over bank flooding, perhaps compounded by lowered water tables, is possibly causing the reduced vigor and high mortality observed in mature riparian forests of this area (Brinson, et al. 1981).

Wildlife

One of the desired conditions for MNRR is to preserve the significant recreational opportunities, fish, and wildlife of the Missouri River corridor. The NPS Management Policies 2006 also set a desired condition that

“as parts of the natural ecosystems of parks, all native plants and animals are maintained.”

Terrestrial wildlife resources are taken directly from MNRR’s Final General Management Plan, Environmental Impact Statement (NPS 1999a: 75 & 76). Wildlife is plentiful in and along MNRR. Recent surveys have identified 48 species of mammals. Small mammals, including mice, rats, and voles (Muridae); bats (Vespertilionidae); moles (Talpidae); and squirrels (Sciuridae), made up roughly 60 percent of represented species. White-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) are the only large mammals in MNRR. Coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and badger (*Taxidea taxus*) are common. Other small, fur-bearing animals include raccoon (*Procyon lotor*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), plains spotted skunk (*Spilogale* spp.), beaver (*Castor canadensis*), rabbit (*Sylvilagus floridanus*), and bobcat (*Lynx rufus*). For mammals as well as reptiles, this species composition has not changed significantly from early historic times, except for the loss of the grizzly bear (*Ursus arctos*) and large herbivores like American bison (*Bison bison*) and elk (wapiti, *Cervus elaphus*). [See [Appendix C](#)] Captive elk and bison herds are located along MNRR along with a reintroduced, free roaming elk herd on the western limits of MNRR near Ft. Randall dam.

The number of species of birds that occur in MNRR varies seasonally. The river’s bottomland serves as wintering, feeding, breeding, and staging grounds. The river corridor is home year-round to 25 species. An additional 58 species commonly nest in the areas, while another 15 species are common winter residents. The Missouri River is a significant pathway for migratory birds. More than 115 species regularly use the corridor during spring migration and 110 return during fall migration. Loss of habitats has affected bird numbers.



The mainstem dams have controlled flooding, and development has encroached into the old erosion zone near the river, where habitat was best for wildlife. Agriculture, industry, and private dwellings have slowly replaced the forest-grassland community. Forested habitat is considered a "wildlife value" for the MNRR and deserving of protection.

Rare, threatened, and endangered species:

Habitat within the MNRR corridor supports at least 44 federal- and state-listed species of management concern, including the endangered pallid sturgeon (*Scaphirhynchus albus*), interior least tern (*Sterna antillarum athalassos*), and threatened piping plover (*Charadrius melodus*). The bald eagle (*Haliaeetus leucocephalus*) is no longer federally listed, but is protected under the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#). They are year-round residents and nest in large cottonwood trees.

Cultural resources:

One of the desired conditions for MNRR is to

"Preserve the significant recreational, fish and wildlife, and historic and cultural resources of the Missouri River corridor."

Cultural resources include historic and prehistoric archeological sites, historic architectural and engineering features and structures, and resources of significance to Native Americans. Important cultural resources include the Indian Hill, Schulte, and Wiseman archaeological sites, ethnic settlements and farms, sunken steamboats, and landscape features noted by Lewis and Clark (e.g., Spirit Mound and Old Baldy) along what is now the Lewis and Clark National Historic Trail.

A comprehensive inventory of cultural resources has not been completed for MNRR, but archeological resources located at Mulberry Bend Overlook are the only cultural resources documented as occurring on NPS parklands. Archeology will be further described in the FMU descriptions.



Figure 5A: Land cover in 39-mile District

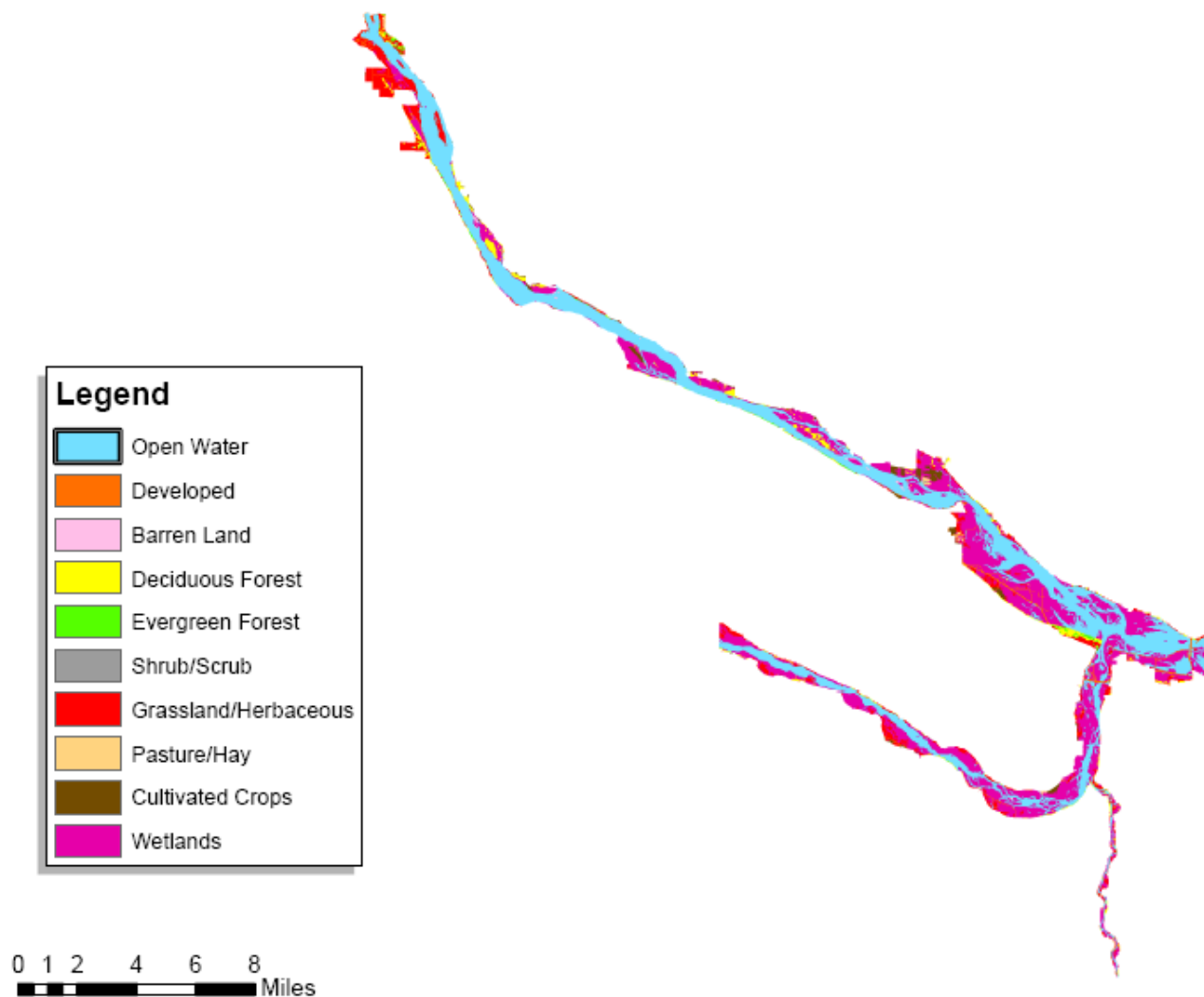
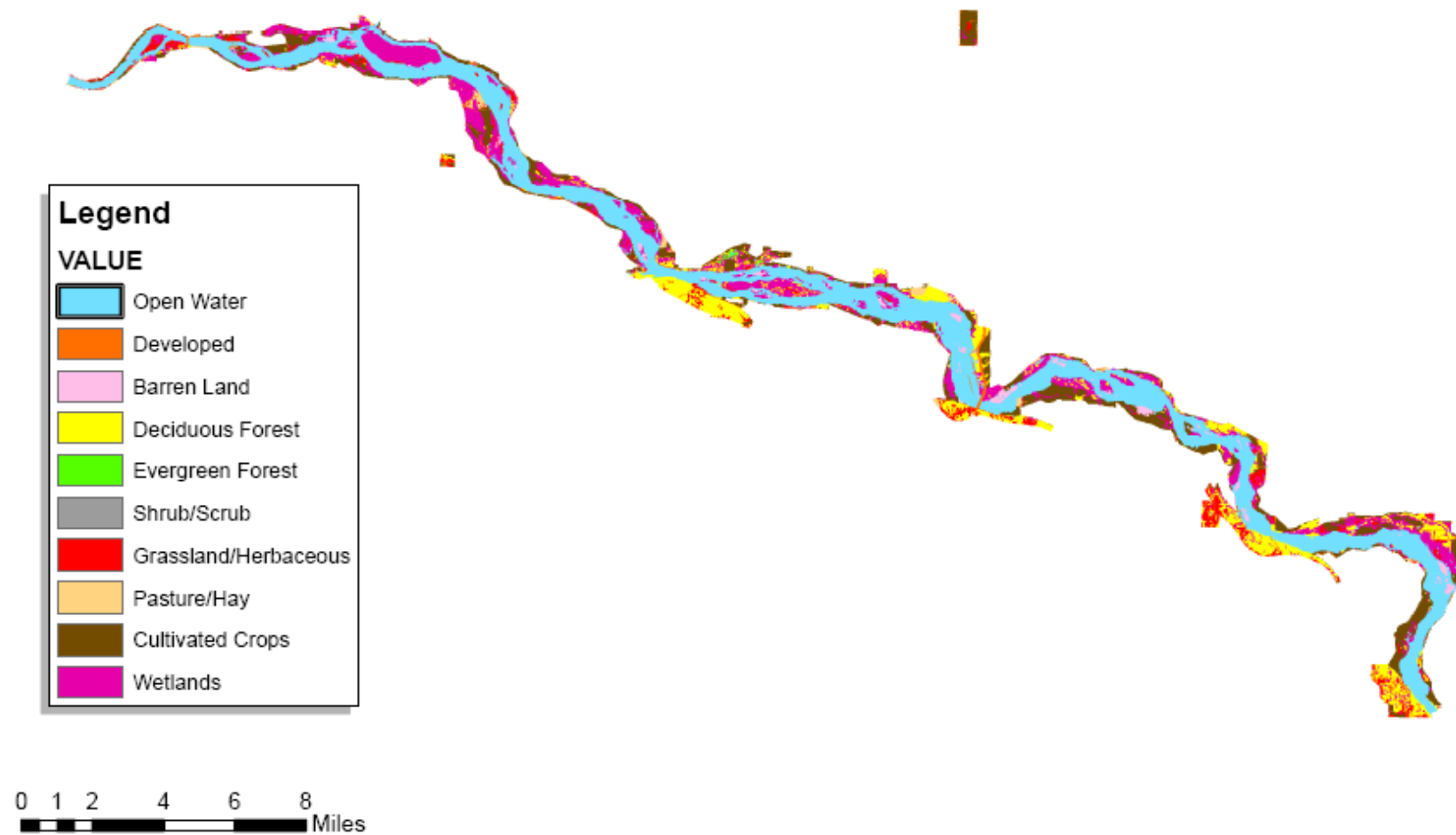




Figure 5B: Land cover in 59-mile District



Produced by MNRR GIS Program Office



2. Description of active project areas

General information relating to prescribed fire

The 59-mile District is primarily the Northeastern Nebraska Loess Hills and South Dakota Loess Plains of the Western Corn Belt Plains (Figure 3). It was once covered with tallgrass prairie, but now 75 percent of this region is devoted to cropland agriculture. Much of the remaining 25 percent is pasture for livestock. Average annual precipitation is 24 – 35 inches with much of it falling in the growing season. Topsoil created by years of tallgrass prairie cover created fertile soils, which have become the most productive areas of corn and soybean agriculture in the world.

The 59-mile District maintains some of the original characteristics of the middle Missouri River. The river corridor averages about two miles wide. Sections of the river have little or no development visible from the water. Inventories indicate a rather diverse assemblage of plants, wildlife, and fish ([Appendix C](#)).

The 39-mile District, often called the Northwestern Glaciated Plains Ecoregion, is transitional between the fairly flat and moist region of the Western Corn Belt Plains and the dry, rough terrain of the Northwestern Great Plains that lies to the west and southwest. Continental glaciations extended from the east to the western boundary of this region. Rainfall averages 23 inches annually. The native vegetation was predominantly mixed grass prairie.

Areas currently proposed for prescribed fire treatment

Bow Creek Recreation Area in the 59-mile District, NPS (Figure 6)

Bow Creek Recreation Area is located along Bow Creek and the Missouri river near Wynot, Nebraska in Cedar County. The NPS purchased the property north of Bow Creek in 2004 and acquired the southern tract in 2008.

The north portion occupies approximately 125 acres plus accretions, and it is bordered by water on all sides except the western edge that is bordered by privately owned farmland. Several wetlands are found throughout the north unit, along with a mix of open meadow, smooth brome pasture, and riparian forest comprised of cottonwood, boxelder, mulberry, eastern red cedar, and peachleaf willow.

NPS management activities have focused on the north portion of the property, including converting 30 acres of farmland into native prairie, which began in fall 2004. In addition to the prairie restoration, Russian olive trees were cut and treated in 2004 and the majority of eastern red cedars that occur throughout the property were mechanically removed between 2004 and 2007. Treatment of noxious weeds is ongoing with Canada, bull, and plumeless thistles, leafy spurge, Russian olive, and purple loosestrife the focus of efforts. Planned restorations include converting the smooth brome pastures into native prairie and utilizing prescribed fire in the management regime.

The south portion includes approximately 95 acres plus accretions, and it borders privately owned upland mesic-bur oak forest on all sides with the exception of the northern border of water (Bow Creek and Missouri River). In 2008, the NPS cleared approximately six acres of eastern red cedars that have encroached on the native prairie.



Figure 6A: Bow Creek overview





Figure 6B: Mulberry Bend overview



Mulberry Bend in the 59-mile District, NPS (Figure 6B)

Mulberry Bend is located along the Missouri River in Dixon County, Nebraska near the Vermillion-Newcastle Bridge. The property was acquired by Nebraska



Department of Roads as mitigation for bridge construction impacts, and subsequently was transferred to the NPS in 2003.

Nebraska Highway 15 bisects the parkland with a low area on the west and a maintained scenic overlook on the east. The overlook area is bordered on the west by Highway 15, county gravel road on the north, and privately owned bur oak forest on the east and south borders. The overlook area includes approximately 8 acres of maintained landscape consisting of native plantings, wayside exhibits, and concrete sidewalks. The remaining 20 acres of the overlook are mesic bur oak forest community.

The parkland west of the highway includes approximately five acres and is predominantly a smooth brome pasture with eastern red cedar and deciduous trees along the north and south borders. A county gravel road borders this tract on the north and west sides. Nebraska Highway 15 borders the east and privately owned woodland with a building structure lies to the south. Ground disturbance on the low area has been limited because of a registered archeology site along the northern border.

Treatment of noxious weeds, select thinning of encroaching eastern red cedars, and establishment of native plantings have been the primary management activities at the Mulberry Bend site. Future vegetation management will include expanding the mechanical treatment of eastern red cedar and may include the restoration of native plantings where the non-native, smooth brome pasture currently provides ground cover.

Should the NPS acquire interest in additional land, then descriptions of each parcel with burn units defined will be added as addenda to this plan. Other land that will be burned or is already treated by prescribed fire is under the jurisdiction of other agencies or individuals. As these agencies become partners in this FMP, descriptions of their lands will be added as addenda to this plan.

b. Strategic Management Objectives

All wildland fires will be suppressed using an AMR with the intent of confining the fire to the smallest area. The first priority during these suppression actions will be the safety of personnel and the public, including adjacent landowners. Management is designed to meet the following FMP objectives:

- Firefighter and public safety have the highest priority in all fire management activities. Wildland fire and prescribed fire operations will cause no injuries to the public and will limit injuries to firefighters to be consistent with NPS Strategic Plan goals for employee safety.
- Appropriate Management Response for all unplanned wildland fires will be rapid containment and suppression to protect the public, check fire spread onto private property and protect the natural, cultural, and historic resources of MNRR. Ninety-five percent of unwanted wildland fires will be contained at less than 50 acres of size on parkland. Fire suppression actions will be consistent with MIST and will ensure that rehabilitation costs are less than 10% of suppression cost.
- Prescribed fire will be used to re-establish the dominance of native species and preserve natural processes. Prescribed fire will be applied to 100% of the reconstructed upland prairie on NPS parkland on a three to five year cycle. Prescribed fire, together with other management practices, will contribute to



attaining target values for prairie community diversity and exotic plant relative cover to meet desired conditions on NPS parkland.

- Prescribed fire will be used to suppress invasive cedar as it develops in the understory. Manual removal of cedar may be necessary prior to prescribed fire to reduce hazardous fuels and minimize potential for damage to the overstory.
- Prescribed fire will be applied to 100% of the bur oak forest and other deciduous forests on NPS parkland that would benefit from fire. Prescribed fire will be used as a disturbance on NPS parkland to establish native prairie or meadows in areas where vegetation is changing (Rood, et al. 2007) in response to river degradation and invasive species competition. It will be used, in conjunction with other restoration efforts, to convert cool-season grass pastures to native prairie and transitional land cover to open meadow or savanna.
- Hazard fuel management will be given important consideration, because of the adjacent cultural and historic values. Prescribed fire and, to a lesser extent, mechanical/manual treatment will be used to reduce hazard fuel build-up, facilitating protection of values at risk. Mechanical/manual hazard fuel reduction will be applied to borders of burn units to create firebreaks and eliminate hot spots. If fuel loadings are high enough to make control of prescribed fires difficult then a two-stage process will be considered, such as mechanical/manual treatment followed by prescribed fire.
- Prescribed fires will be accomplished under a prescription that minimizes escape possibilities. They will be accomplished in a manner that ensures 100% compliance with National Ambient Air Quality Standards.
- Emphasis will be placed on working relationships with pertinent fire management entities, such as the Rural Fire Districts. Cooperative emergency service arrangements will be encouraged.

c. Management Considerations

- All fire management activities will consider safety of personnel and the public as the highest priority.
- Park neighbors, park visitors and the local residents will be notified of all fire management activities that have the potential to affect them.
- Fire management operations will not be initiated until all personnel involved receive a safety briefing. The briefing will describe known hazards and mitigating actions using Lookouts, Communication Escape Routes, Safety Zones (LCES), current fire season conditions, and current and predicted fire weather and behavior.
- Smoke management procedures for open burning will be followed for all prescribed fire operations (Nebraska State Statute 81-520.01, South Dakota State Statute §34A-1-18, both ceding control to local jurisdiction)
- MIST will be employed with a 5% tolerance for mature tree mortality in adjacent areas.
- No bulldozer or grader use will be allowed unless approved by park superintendent.
- Protection mitigation measures for known historic, biological, and cultural resource sites, in or near the project area, must be assured before a prescribed fire is initiated.
- All park closures will be at the discretion of MNRR superintendent.



- Qualified individuals will carry out fire management operations that promote the safe and skillful application of fire management strategies and techniques.
- d. Restrictions and special concerns by management area – Due to extensive water resources in the park, the following special restrictions will apply with regard to aerially applied retardant and foam use:

Retardant – No retardant drops within 400 feet of open water.

Foam (aerial delivery) – Aerial delivery of foam requires park Superintendent approval on a case-by-case basis. When approved, the following guidelines apply:

- Foam concentrate will only be injected into the holding tank after the water pick-up operation has been completed.
- Drops from aviation resources– no drops within 300 feet of open water.

Foam (ground delivery with motorized pumps):

- No application within 25 feet of open water when using small pumps (waterbug, Mk 26, Shindawa, etc.)
- No application within 50 feet of open water when using Mk III or equivalent pumps.
- All foam concentrate used for injection will be located in impermeable containment basins, i.e. visqueen (plastic sheet) spread over rocks or logs to form a catch basin.

Foam (ground delivery with backpack pumps):

- No application within 10 feet of open water.
- All backpack pumps will be filled minimum of 10 feet from open water. A separate, uncontaminated container must be used to transport water from source to backpack pump. This container must be kept uncontaminated by concentrate.

e. Historic Role of Fire

This FMU does not allow for wildland fire use, even though fire was important to the health of the ecosystem. Managers will rely on prescribed fire to mimic the effects of historic wildland fire and to create a disturbance regime that suppresses succession. Suppression of succession is necessary to control invasive species that would dominate the vegetation cover.

Prairie/grasslands

Historically, the prairie experienced repeated natural fires with frequency of five to 10 years (Wright and Bailey 1982). Most wildland fire occurred in late summer, before the fall rains, when fuel was dry from summer heat and grasses were going into dormancy. A second fire season occurred in late winter and early spring during dry years.

Pyne (1982) suggested that pre-settlement fires were started by aboriginal people to refurbish the grasslands for game species. These fires were set in late winter or early spring to promote early greening. Aboriginal people accidentally started



wildland fires also. Fires set purposefully and accidentally and natural fire, collectively, maintained the prairie ecosystem.

Northern floodplain forest

Fire is rare in northern floodplain forest in humid climates. However, occasionally fire probably influenced presettlement northern floodplain forests during dry conditions. Fires would sweep into the forests from the surrounding grasslands, but would not carry as far or as well as they did in the grasslands. The fire would not have greatly affected large trees, those over 10 centimeters diameter breast height, but would remove small understory shrubs and saplings. The lack of recruitment to the overstory kept the forests open with light penetration to the floor (Wilson 1970).

Mesic bur oak forest

Oak savanna depends on fire for its maintenance. Fire removes saplings that would compete for light if allowed to enter the overstory. Bur oaks are very fire tolerant because of the fire-resistant form (thick bark, deep roots) and the resprouting ability when top-killed. Damaged branches are able to resprout from adventitious buds protected by the bark on the branches (Packard and Mutel 1997).

Fire was an important process in the bur oak forest as well, where it may not have been as frequent as in the open savanna. Shade-tolerant species will replace oaks in natural succession of the forest. Fire suppressed succession by destroying the shade-tolerant species that do not have a fire-resistant form. The perpetuation of bur oak forest suggests that fire historically occurred on a 10-20 year cycle. The current state of the bur oak forest exemplifies the effects of fire suppression with a developed understory and competition preventing bur oak recruitment.

Wildland Fire Management Situation

Historical weather

On average, July is the warmest month of the year, but it is also the fifth wettest month. The highest recorded temperature for Knox County was 105 °F in 1995. January is the coolest month and can have temperatures as low as -28 °F (1989). May is the wettest month. The last recorded drought on the Nebraska side of the river as listed by the National Weather Service occurred in November of 1999. Southeastern South Dakota saw drought conditions in November 1999, February – April 2000, July – August 2006. Recent years have been drier and hotter than normal.



Fuel characteristics and fire behavior

Table 6A: Extreme conditions fuel models for fire behavior (Anderson 1982) and National Fire Danger Rating System (NFDRS) Fuel Models

Extreme Conditions ⁸				
Vegetation	Fuel Model	Rate of Spread (chains/hr)	Flame Length (feet)	Fire Characteristic
<i>Mixed Grass (stubble and hay)</i>	1 (NFRDS A,L,S)	242	7	Fine fuels increase rates of spread.
<i>Tallgrass</i>	3 (NFDRS N)	264	19	Direct attack is impossible. High intensity and very fast spread.
<i>Shrub-scrub</i>	5	17	3	Materials are volatile, but require wind to spread.
<i>Eastern Red Cedar</i>	6	75	9	Volatility of cedar causes torching and spotting.
<i>Floodplain forest (with eastern red cedar)</i>	8	4	1.5	Slow moving, but occasionally hitting jackpot.
<i>Burr oak</i>	9	25	4.7	Autumn conditions increase rate of spread, leaves rolling and blowing in understory.
<i>Mixed upland forest with eastern red cedar</i>	9	25	4.7	Cedar may cause torching, spotting, and crowning.

⁸ Extreme is for 1 hour fuel moisture of 7% and midflame wind speeds of 10 mph



Table 6B: Normal conditions fuel models for fire behavior (Anderson 1982) and National Fire Danger Rating System (NFDRS) Fuel Models

Normal Conditions ⁹				
Vegetation	Fuel Model (NFRDS)	Rate of Spread (chains/hr)	Flame Length (feet)	Fire Characteristic
<i>Mixed Grass (stubble and hay)</i>	1 (A, L, S)	78	4	As wind speed increases, this model develops faster rates of spread than model 3.
<i>Tallgrass</i>	3 (N)	104	12	Fires in this fuel model will move extremely fast and have short residence times as these fuels are consumed rapidly. Direct attack is impossible
<i>Shrub-scrub</i>	7 (D)	18	4	Not very intense, running at surface and shrub strata.
<i>Eastern red cedar</i>	6 (F, Q)	32	6	Materials are volatile, but require wind to spread.
<i>Floodplain forest (with eastern red cedar)</i>	8 (H, R)	1.6	1	Slow moving, but occasionally hitting jackpot.
<i>Burr oak</i>	9 (E, P, U)	7.5	2.6	Faster moving than model 8 with high winds increasing rate of spread.
<i>Mixed upland forest with eastern red cedar</i>	9 (E, P, U)	7.5	2.6	Cedar may cause torching, spotting, and crowning.

Fuel characteristics

Model 1: Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Grass fuels vary from heavily grazed grass to sparse natural grass.

Model 3: Fire will carry in winter when snow does not appear on the ground. Winds dry standing, dormant vegetation at this time. As winter progresses, fuels are knocked-down and less likely to burn because of ground level humidity. Fire can carry in the spring, when there has been no rain for several days with clear skies, and wind to dry the dormant vegetation. Once greening begins, fire will not carry well in the grasses, unless substantial fuels have accumulated. Fire is unlikely during most of the summer months, unless dry conditions have persisted

⁹ Normal is for 1 hour fuel moisture of 10% and mid-flame wind speeds of 5 mph



for several weeks. Prairie grasses and forbs are adapted to drought, and will not senesce unless soil moisture is very low and Fire Danger Class is very high to extreme. During dry summers, the Keetch-Byrum Drought Index (KBDI, Keetch and Byrum 1968) can be in the 500-700 range and the Palmer Drought Index at the moderate to severe drought stage. Fire can carry well in fall before the autumn rains begin, particularly once warm season grasses enter dormancy.

Model 6: Fires carry through the shrub layer where the foliage is flammable, such as with cedar. Fire requires greater than 8 MPH winds at mid-flame height. Fire will drop to the ground at low wind speeds or in openings.

Model 7: Fires burn through the surface and shrub strata with equal ease and can occur at higher dead fuel moisture contents because of the flammability of live foliate and other live material.

Model 8: Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Only during severe weather, involving high temperature, low humidity, and high wind, will fuels pose fire hazards.

Model 9: Fires run through the surface litter faster than model 8 and have longer flame height. Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Fall fires in hardwoods are predictable, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves.

Current drought and fire danger levels can be found at

<http://lwf.ncdc.noaa.gov/oa/climate/research/dm/weekly-DM-animations.html>

Fire regime alteration

The pre-European settlement fire regime can be characterized as frequent/low severity. Natural fire returned at intervals of about 5-10 years in the uplands, eliminating most of the young woody species that had established since the previous fire and rejuvenating perennial grasses and forbs. This return rate supported and maintained the bur oak savannas. Fires may have had a return rate of 15-20 years in some of the mixed mesic hardwoods.

Fire has been suppressed locally since the early 1900s. Suppression of fire resulted in the increase of woody and herbaceous fuels, thus shifting the natural fire regime to an infrequent/high severity regime.

Control problems

Control problems can be expected when fires burn during peak fire season, or when fuels have accumulated over many years. Fires will spread rapidly and be intense when environmental conditions are warm, dry, and windy.

Cedar's fine foliage contains volatile oils that make it ignite and burn easily. Its growth form brings the flammable foliage close to the grounds where grass fire can ignite it. It behaves as a ladder fuel in forests, where it can carry fire into the canopy. The resin-rich wood sends embers into the air that can cause spot fires and increase the rate of fire spread.

Access into many parts of the park is complicated by steep bluffs. Many parts of the riparian floodplain are only accessible by water. Although roads access the bluff tops at frequent intervals the terrain between access points can be rough.



Combined, overlapping, and uncertain jurisdiction over land areas may complicate response to wildland fire. To date, the RFDs have worked effectively and in a complementary manner to respond to wildland fires. Good communication and cooperation must continue for effective response to fire. Additionally, the RFDs need opportunities to train in wildland fire fighting and MIST. The NPS could be a conduit for this training.

Values to be protected and special concerns

Several known archeology sites exist within MNRR, one of which is located at Mulberry Bend Overlook, a proposed prescribed fire site. The Mulberry Bend Overlook site is an Earth Lodge/Habitation dating from prehistoric St. Helena phase. It consists of a minimum of three depressions near Deer Creek, overlooking the Missouri River. Testing produced lithic tools and flakes, fire-cracked rock, rim and body shards, and faunal material and confirmed the habitation during the St Helena phase.

Other sites clustered along Deer Creek contain Earth Lodge Habitations and scattered artifacts. These sites appear on a map of archeology available from the resource manager. Soil disturbance should be avoided and MIST implemented near these sites during wildland fire suppression/control activities. No soil disturbance will be permitted during planned prescribed fire activities.



IV. Wildland Fire Management Program Components

A. General Implementation Considerations

At MNRR, the fire management situation requires suppression or containment of all unplanned wildland fires regardless of cause. The NPS Policy requires a [Wildland Fire Implementation Plan](#) (WFIP) Stage 1 Initial Fire Assessment be completed for each fire on NPS land, it is the basis for decision making in fire incidents. This can be complex in parks where suppression is not the only AMR. In a suppression/containment FMU, the process is simplified. Since the FMU at this park unit requires suppression/containment as the only AMR, the requirement for a decision checklist as part of the Stage I analysis is met. Subsequently, the Stage I analysis is satisfied at the programmatic level by the completion of a Strategic Fire Size-Up or “Size-Up Report”, a form taken directly from the appendix section of [Interagency Standards for Fire and Fire Aviation Operations 2008 Edition](#) (“Red Book”) and included as Appendix E in this document. The Size-Up Report consists of a information on the fire size, behavior, environmental conditions, fuels, terrain features, existence of special hazards or threats to persons or improvements, and any other factors observed which could affect fire behavior and suppression efforts etc.

Specific WFIP requirements are outlined in Chapter 4 of the [Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide](#). Ultimately, the superintendent will be responsible for completing the WFIP Stage I, this task can be delegated to any personnel at MNRR. At MNRR, a resource manager will complete the Size-Up Report.

Water Availability

Water sources for fighting fires are available within MNRR boundary. RFDs are equipped with water access and some have pumpers that allow direct use of river or pond water.

Equipment

Missouri NRR does not have heavy equipment for use in wildland fire or prescribed fire. A cache of Personal Protective Gear and hand tools does not exist. Generally, staff will not take an active role in fire fighting. During fire, the superintendent may authorize the use of supporting agencies’ vehicles/equipment for firefighting needs (i.e. mowers, brush cutters etc.).

Personnel

Missouri NRR has no firefighters meeting minimum [National Wildland fire Coordinating Group](#) (NWCG) qualifications at this time. No staff members have training at levels qualifying them for initial attack on a wildland fire. Local fire departments will respond to wildland fire.

B. Wildland Fire Suppression

1. Range of Potential Fire Behavior

Fire in MNRR can be fast moving on the surface in light fuels. Fire may jump to cedars and other flammable scrub-shrub plants. Refer to the fire behavior descriptions for more detailed discussion.



2. Preparedness Actions

a. Prevention/wildland fire use educational activities

Fire prevention includes all activities designed to reduce the number of human-caused wildland fires that occur in MNRR. The objective of the program will be to minimize preventable fires. Prevention activities will consist of prevention signs and reminders, prevention messages through interpreters and staff, and vigilance during periods of very high fire danger.

Fire prevention will be discussed at a selected staff safety meeting in the early spring to make sure all members are aware of concerns and procedures regarding response to fires and actions related to fires in MNRR. Missouri NRR may participate in fire prevention and safety fairs at local schools so that the public is aware of the importance of fire prevention. Missouri NRR will provide educational messages through local media that explains prescribed fire and provide wildland fire prevention in conjunction with prescribed fire management education.

During periods of high fire danger, the general public and park visitors will be informed of conditions through press releases, and interpretive media.

b. Annual Training

Annual training will consist of annual firefighter safety-refresher training, first aid, and other safety training for appropriate individuals. Basic safety, awareness, and prevention training will occur during staff meetings.

c. Annual Preparedness Activities

- Complete all Prescribed Fire Burn Plans for upcoming season and have approved by park superintendent
- Check the established Midwest Regional Office procedure for utilizing suppression support accounts.
- Review Step-up Plan and emergency preparedness accounts
- Prepare prescribed fire briefing messages for public notification
- Perform prescribed fire treatment as planned (spring or fall)
- Implement fire prevention activities as needed
- Monitor fire potential
- Analyze fire season including all fire management activities (i.e. wildland fire suppression, prescribed fires and mechanical/manual fuel treatment, prevention, etc.)
- Evaluate individual performance of staff to correct deficiencies and recommend personnel for training throughout the year.
- Annual review and update of FMP every year (comprehensive review and rewrite due every five years)

If MNRR develops a fire program that includes certified staff and equipment:

- Complete fire fighter training
- Coordinate with Midwest Region FMO to request appropriate annual Firefighter Medical Exam for each firefighter.
- Administer pack test to fire personnel annually, as per standards in RM-18.
- Pack tests may not be administered until the firefighter gains medical clearance.



- Update and submit fire training and experience records to the Midwest Region FMO for entry into the Incident Qualifications and Certification System (IQCS) and for a new CY Red Card printout.
- Inventory fire equipment, order needed supplies and update equipment list
- Inspect fire cache and ensure that equipment is ready

d. Fire Weather and Fire Danger

Preparedness activities during the fire season will be based on the outputs from the Fire Danger Maps, a product of the Wildland Fire Assessment System. Currently, the Wildland Fire Assessment System is found on the Internet at http://www.wfas.net/component/option,com_frontpage/Itemid,1/. The assessments are based on the National Fire Danger Rating System (NFDRS).

Emergency preparedness describes actions to provide extra capability during times of extreme or unusual fire danger caused by meteorological influences on MNRR's wildland fuel. Drought indices assist the manager in determining fire danger. They can be found at

<http://lwf.ncdc.noaa.gov/oa/climate/research/dm/weekly-DM-animations.html>.

Fire danger should be monitored when the Palmer Index

(<http://lwf.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>)

reaches moderate drought levels; the Keetch-Byrum Drought Index

(<http://www.wfas.us/content/view/32/49/>) reaches 400; or the Fire Danger Class

(<http://www.wfas.us/content/view/17/32/>) reaches high.

Activities will be based on Burning Index (BI) outputs, as calculated by the National Fire Danger Rating System (NFDRS). The NFDRS is a set of computer programs and algorithms that allow land management agencies to estimate fire danger for today or tomorrow in a given rating area. The NFDRS characterizes fire danger by evaluating the approximate upper limit of fire behavior in a fire danger rating area during a 24-hour period. The bottom line of the NFDRS in the day-to-day operation of a fire prevention and suppression program is the staffing class.

The Burning Index (BI) is a measure of fire intensity and a determinant in staffing class needs. The BI combines the Spread Component and Energy Release Component to relate the contribution of fire behavior to the effort of containing a fire. The BI has no units, but in general, it is 10 times the flame length of a fire. The 90th percentile BI for MNRR is based on Fuel Model "L" (sub-humid with rainfall deficient during the summer). The area falls into the NFDRS climate class #2.

Missouri NRR utilizes outputs of the National Weather Service (NWS) for Fire Weather.

Weather conditions contributing to local fire danger can be monitored through Remote Automated Weather Stations (RAWS) located nearby and/or within similar environmental conditions. These RAWS sites can be found at <http://raws.wrh.noaa.gov/roman/>, or NWS and RAWS stations are posted together at <http://www.met.utah.edu/mesowest/> for

South Dakota:

<http://www.met.utah.edu/cgi-bin/droman/mesomap.cgi?state=SD&rawsflag=3>

- Yankton, SD (Chan Gurney Municipal Airport), National Weather Service,



- Lake Andes, SD, RAWs (RLAS2)
- Sioux City, IA (KSUX) -- NWS
- Loess Hills State Forest, IA -- RAWs
- Loess Hills TNC <http://www.raws.dri.edu/cgi-bin/rawMAIN.pl?sdILBK>

Nebraska:

<http://www.met.utah.edu/cgi-bin/droman/mesomap.cgi?state=NE&rawsflag=3>

- Wayne, NE Municipal Airport – NWS

Iowa: (east of MNRR)

- Loess Hills State Forest, IA -- RAWs

Loess Hills “TNC Broken” <http://www.raws.dri.edu/cgi-bin/rawMAIN.pl?sdILBK>

Information from several stations enhances understanding of weather-fuel interaction, and data should be compared to local weather station data to determine application to MNRR.

Depending on the BI derived from the daily NFDRS data, predicted fire danger is classified as low, moderate, high, very high, or extreme. A set of staffing classes, which have a corresponding set of actions that MNRR will initiate to meet potential fire danger, has been developed and is presented in Table 7 below as the Step-up Plan.

e. Step-up Staffing Plan

The staffing classes relate to the expected severity of fire conditions. Missouri NRR superintendent or Midwest Region FMO may choose to increase preparedness-staffing class by one level for unusual events that would increase the potential for wildland fire. Preparedness actions are based on the latest adjective rating and the next day forecast.

Table 7: Staffing levels as determined by the NFDRS

National Fire Danger Rating System staff class levels		
Fire Dangers Level	Staffing Class	Burning Index
Low	I	0 - 5
Moderate	II	6 - 10
High	III	11 – 20
Very High	IV	21-30
Extreme	V	31 and over

Fire conditions that typify each staffing class and the corresponding preparedness actions required are as follows:

Staffing Classes I and II (Low/Moderate)

Funding for preparedness at this level is taken from park operating costs.

Conditions

Fires will present a low to moderate level of control difficulty. Fires occurring at this level will be controlled with existing forces in RFDs. Wind speed and direction will determine speed of fire spread. Fine fuels will be drying.

Preparedness Actions

Fire weather reviewed daily.



Suppression Actions

- One employee will depart within five minutes for the fire location to confirm location and report size-up.
- Attack forces (primarily RFD) will be dispatched after size-up and upon request of MNRR or other officials.
- If necessary, assistance will be requested at the discretion of the attack force.

Staffing Class III (High)

Funding for preparedness at this level is taken from park operating costs.

Conditions

Fires will present a moderate level of control difficulty. Light fuels are becoming dry. Heavy fuels are drying. Mop-up will be more difficult and time-consuming.

Preparedness Actions

All actions specified for Staffing Class I and II days will be conducted.

Suppression Actions

All suppression actions indicated for Staffing Classes I and II will be taken.

Staffing Classes IV and V (Very High/Extreme)

Funding for preparedness at this level is taken from operating funds with assistance from the regional office through the “Step Up” request process. During Step up Staffing during Class IV and V days, a Step Up account can be approved by the MWR and set up to cover overtime and miscellaneous costs directly associated with the enhanced duty schedule. See RM-18, Chapter 7 for specific information.

Conditions

Fire will present a moderate to high level of control difficulty. Initial attack and reinforcing crews may have difficulty controlling a fire at this level. All fuels are dry. Air temperature is high and humidity is low. Strong gusty winds are possible. Spotting may occur.

Preparedness Actions

- All actions specified for Staffing Class III will be conducted.
- Fire Situation reports will be entered into the NIFC daily before 9:30 A.M.
- Personnel will alert the public to fire hazards.
- Interpretive activities will include a fire safety message.
- Emergency preparedness funds (PWE obtained from regional office) may be used to bring staff to required levels. However, regularly scheduled personnel will be used to the extent possible. Any staffing funded in this manner will have to be approved by the Midwest Region FMO
- It is recognized that both nonessential routine activities and project work may be postponed during Staff Class IV and V.
- Fire danger notices will be posted.
- Jurisdictions within MNRR may close areas to preserve the safety of visitors.
- Detection staffing is allowed.

Suppression Actions

All actions specified for Staffing Class III days will be taken.



3. Pre-attack Plan

[Annual Preparedness Activities](#) section, other pre-attack activities

4. Initial Attack

Initial attack is an aggressive suppression action consistent with firefighter and public safety and values to be protected. Initial attack will be carried out by the local RFD with guidance concerning public safety and values to be protected from resource management staff and the superintendent.

a. Priority setting during multiple fire occurrences

The following will be used to set the priorities:

- Cultural and historic resource map
- Facility map, displaying values to be protected and access roads

Information that should be used to set incident priorities:

- Restrictions in areas of special concern
- Social and political concerns
- Decision criteria matrix or flowchart including the risk assessment process
- Complexity decision process for transition from Initial Attack to extended action

b. Criteria for appropriate Initial Attack response consistent with objectives:

- Public and firefighter safety
- Protection of cultural, historic, and natural resources
- Protection of improvements and private property
- Minimum fire line construction and MIST will be recommended to firefighters
- Available suppression resources and response times
- Fire danger as determined by fuels, weather, and topography
- Mechanized equipment use only where necessary to support above-listed criteria

c. Confinement as an Initial Attack suppression strategy

Confinement strategy may be implemented as the Initial Attack action as long as it is not used to meet resource objectives. Confinement is selected to maximize firefighter safety and suppression resource availability and to minimize suppression costs, during high fire danger or if highly valued areas are threatened. Confinement strategy may be considered as an element of an AMR.

d. Typical fire response times

Typical fire response times will vary depending on availability of local firefighters. During fire season when no other fire activity is occurring and staffing is available, firefighters can respond to the closest road access to fires within 15-20 minutes. Reinforcements from outside the area can arrive within 30-40 minutes after request.

e. Restrictions and special concerns

Initial attack should be aggressive in order to contain the fire as quickly as possible and to keep fires from crossing boundaries and damaging private property. Minimum Impact Suppression Tactics will be recommended in efforts to contain wildland fires. Priority would be given to [Wildland Fire Interface](#) (WUI) areas in the event of multiple fires. Chainsaw and earth moving equipment use requires permission of MNRR superintendent



f. Special issues

Every reasonable effort will be made to encourage and to obtain wildland firefighter training for the RFD, including the use of MIST. The highest priority of the RFD will be to protect firefighter and public safety with protection of park resources as its second priority. Park resource managers and superintendent will recommend tactics and strategies to be used and may select the use of confinement rather than aggressive direct attack as suitable to protect resources.

5. Extended Attack and Large Fire Suppression

a. Extended attack needs will be determined by considering the following:

- Threats to life, property, and park resources
- Availability of suppression forces
- Current and expected fire behavior

b. Implementation plan requirements - WFSA development

Follow guidance in *Wildland and Prescribed Fire Policy Implementation Procedures Reference Guide* and *RM-18*, in coordinating firefighting efforts by RFDs.

c. Complexity decision process from Initial Attack to Extended Attack

Follow guidance in *RM-18*, Initial and Extended Attack in coordinating firefighting efforts by RFDs.

6. Exceeding existing Wildland Fire Implementation Plan

If a wildland fire cannot be controlled during the initial suppression response action, or it otherwise exceeds the first operational period, the RFD will employ a second strategy that meets their protocol with the approval of the superintendent. The superintendent will recommend actions that are consistent with the WFSA.

7. Minimum Impact Suppression Tactics (MIST)

All fire management activities will rely on tactics that incur a minimum amount of resource damage while maintaining the safety of firefighters, personnel, and the public as the highest priority. Park superintendent approval is needed for bulldozers and mechanized equipment. Complete minimum impact guidelines are listed in [RM-18, Chapter 9, Exhibit 2](#). During wildland fire suppression, park resource managers and superintendent will coordinate RFD actions in a manner consistent with MIST.

8. Rehabilitation

Park staff will recommend actions that ensure suppression activities will be carried out in a manner that results in the least amount of resource damage. After the fire is declared out, park maintenance crews will remove litter, refill dug lines and install erosion control devices if necessary. Maintenance crews will flush cut stumps and remove logs and brush. The severity of the burn and its resultant impact will be considered in determining the need to seed or otherwise re-establish native plant species and cultural landscape. Such efforts regarding landscaping and plants will be in full compliance with NPS [Management Policies 2006](#) and given prior approval of the regional director. A rehabilitation plan, outlining what species are to be planted, techniques to be used, locations and cost estimates will be prepared before any action is taken, according to the guidance in [RM-18, Chapter 12](#), Burned Area Emergency Rehabilitation.



9. Records/Reports

a. [*Wildland Fire Implementation Plan*](#) (WFIP)

A WFIP will be prepared for every wildland fire and will be the responsibility of the superintendent to have completed. At this park, the task is delegated to the resource management specialist. As noted earlier in this document, at this park the WFIP requirement will be satisfied at the programmatic level by the completion of a Strategic Fire Size-Up or "Size-Up Report." An acceptable version is included in [*Appendix E*](#).

b. Individual Fire Reports (DI-1202)

The basic report for documenting a wildland fire is the [*Individual Fire Report*](#) (DI-1202). Reports are eventually entered electronically into the [*Wildland Fire Management Information System*](#) (WFMI) maintained by the Bureau of Land Management in Boise, Idaho. The report is valuable in providing a historical record of the fire regime for MNRR. These reports are critical because they influence decisions that are made as to where and when to allocate fire resources. It is important that this form document all fires occurring within the boundaries. This includes fires that go out unassisted when the location is known. Incidents, known as Support Actions, where personnel respond to fires outside MNRR (including out of state), are reported on this form.

Documenting the fires aids in fire management planning, for example in allocating of resources or in monitoring of trends. Fire reports for fires that occur at MNRR should be compiled by the superintendent or his/her delegate. All wildland fire incidents must be documented by an Individual Fire Report. The completed report must be input to the fire reporting program within 10 working days after the fire has been declared extinguished. The MWR Fire Staff will input MNRR's fire reports into the system. Fire reports will be sent to the Wildland Fire Specialist at the MWR so that the report can be reviewed and entered into the WFMI system as a support action by the MWR.

c. A complete fire report will include the following attachments, if applicable:

- any written policies, guidelines or authority statements signed by MNRR superintendent
- copy of the Size-Up Report
- copies of equipment purchased or personnel request orders
- all situation maps
- personnel lists (including Emergency Time slips)
- press clippings
- accident reports
- all weather data reports and records
- documentation of financial charges
- rehabilitation plan

d. Fire Experience and Qualifications

The [*Incident Qualifications and Certification System*](#) (IQCS) is the current system for maintaining the fire qualifications of personnel. Records for MNRR personnel are updated at the MWR. Experience and qualifications should be



submitted on an *IQCS Individual Employee Update* form before the end of January each year to allow for data updates before the next fire season starts.

e. Daily Situation Reports

Formal Daily Situation Reports are not required, but communication between MNRR and the MWR is encouraged on those days when the Fire Danger Rating is very high and MNRR moves into Staging Classes IV and V. If fire funds are being allocated for increased staffing, or if a fire has occurred or is ongoing, communication between MNRR and the regional office should be occurring. The conditions necessitating Staffing Classes IV and V and the need for fire funds should be logged.

f. Smoke Management Reports

Smoke Management reports are not required by the states of Nebraska and South Dakota. The local fire marshal should be contacted about special requirements within the jurisdiction.

g. Report of Fire

When a report of a fire is received, the following information should be collected from the reporting party:

- Name of reporting party
- Address
- Phone number
- Location of fire and extent
- If fire is reported in person, ask if the reporting party is willing to show the investigating ranger the location, otherwise, determine if the person can be re-contacted if there are additional questions.

h. Resource Order Form, NFES 1470

All assistance requests must be documented on the *Resource Order Form*, NFES 1470. These forms are designed for verbal transmission over the telephone. The order form is, in essence, an obligating procurement document. If an out-of-park incident management team is ordered, MNRR superintendent must provide a written limited delegation of authority and a briefing package to the incoming Incident Commander. The NPS [*RM-18*](#) contains examples and outlines.

i. Year-end Accomplishment

Completion of year-end accomplishment reports is the responsibility of MNRR personnel with collateral FMO duties and will be coordinated by the chief of resource management.

C. Wildland Fire Use

The resource management objectives do not promote or permit management techniques that will maintain desired natural systems within MNRR through unplanned wildland fire use. Even though fire is an integral component of the prairie and savanna ecosystems, the limited size, on-site cultural resources, proximity to cities, and the adjacent land values will preclude wildland fire use.



D. Prescribed Fire

Planning and execution of this prescribed fire management program will use qualified personnel and will follow the guidelines stated in document [RM-18](#).

Prescribed fire is an important tool to manage vegetation communities and to achieve resource management objectives of MNRR. The prairie and open woodlands contribute to the interpretive setting, particularly to the Lewis and Clark story.

The vastly altered riparian ecosystem has presented a challenge to resource managers. Degradation of the river channel has lowered the water table, making the conditions unsuitable for the floodplain forests that historically resided there. Invasive cedar is replacing the slowly deteriorating cottonwood stands. Cedar presents a greater fire hazard than the traditional native cover and alters the landscape to a cover type that was never abundant in the region.

Flooding, ice-jams, and other river caused disturbance created areas of open meadow and occasionally removed floodplain forests (Wilson 1970). The disturbance regime kept access points to the river open and created viewsheds from the river. Use of prescribed fire will replace a disturbance regime that no longer exists on the river and floodplain. Fire was a process that shaped the upland landscape of MNRR prior to development and fire suppression. Returning fire to the upland will restore the oak forests, savanna, prairie, and other fire-dependent vegetation.

Prescribed Fire Management Objectives

Prescribed fire may be used to accomplish hazard fuel reduction and to assist in meeting natural resource management objectives.

Prescribed Fire Priority Area –prairie and woodlands

Fire is the most effective way to restore and maintain upland prairie and oak forest or savanna. It will also help in the restoration of the riparian floodplain from a highly disturbed, unstable community to a riparian grassland community.

1. Prescribed Fire Burn Planning and Documentation

a. Annual Activities Needed to Implement the Prescribed Fire Program

Missouri NRR superintendent must approve Prescribed Fire Burn Plans prior to burn ignition. Prescribed fire unit boundaries are created to utilize the ample natural features, natural fuel breaks (creeks and wet areas), and existing roads and trails for perimeter control. Perimeter control will also include removal of fuels prior to a prescribed fire. Construction of perimeter fire control lines is discouraged due to impacts to natural resources.

b. Long-term strategy

Table 8 suggests a prescribed fire schedule based on spatial distribution and need for invasive plant suppression. Firing will be conducted primarily with a drip torch. Ignition will occur in spring and autumn. Creating a burn mosaic within the burn unit is desirable to stratify the vegetation. Therefore, in most cases, no special efforts will be expended to ensure 100% burn coverage. Refer to map in Figure 7 or [Appendix F](#) for burn unit locations.



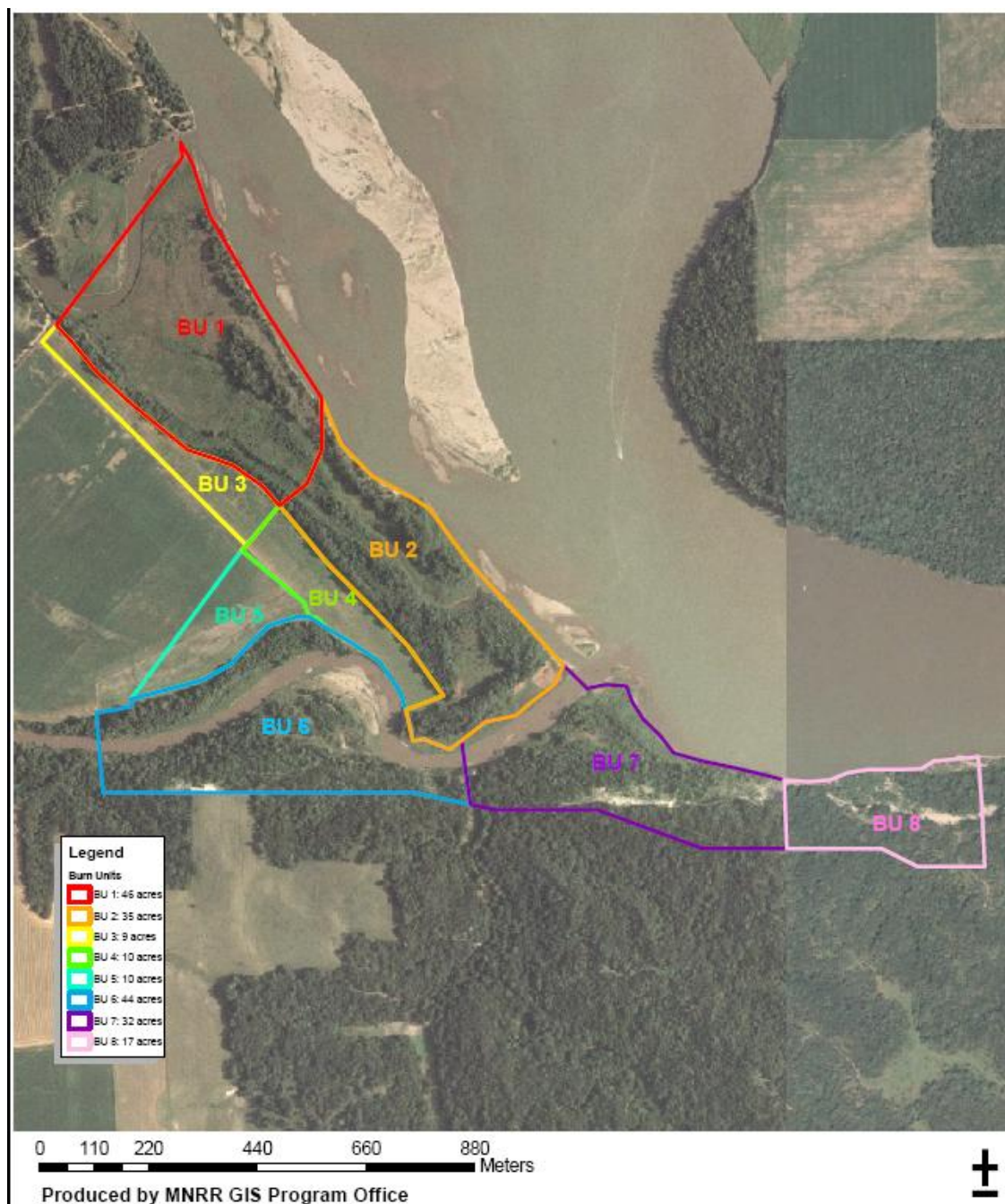
Table 8: Prescribed fire schedule

Year	Unit	Acres	Objectives
2009	Bow Creek BU 3	9	Control eastern red cedar hazard fuels. Control exotic and invasive vegetation in native grass and wildflower establishment
2009	Bow Creek BU 4	10	Control eastern red cedar hazard fuels. Control exotic and invasive vegetation in native grass and wildflower establishment
2009	Mulberry BU 1	5	Control eastern red cedar hazard fuels. Suppress exotic cool season grasses
2010	Bow Creek BU 5	10	Control eastern red cedar hazard fuels. Control exotic and invasive vegetation in native grass and wildflower establishment
2010	Mulberry BU 2	8	Control eastern red cedar hazard fuels. Control exotic and invasive vegetation in native grass and wildflower establishment
2010	Bow Creek BU 7	32	Reduce and control eastern red cedar hazard fuels in bluffland. Maintain open prairie and oak woodland. Areas to be burned have been mechanically cleared.
2011	Bow Creek BU 6	44	Reduce and control eastern red cedar hazard fuels in bluffland. Maintain open prairie and oak woodland. Areas to be burned will have been mechanically cleared.
2012	Bow Creek BU 8	17	Reduce and control eastern red cedar hazard fuels in bluffland. Maintain open prairie and oak woodland. Areas to be burned will have been mechanically cleared.
2012	Bow Creek BU 1	46	Control eastern red cedar hazard fuels. Control exotic and invasive vegetation in native grass and wildflower establishment. Native grasses and wildflowers will be drilled in 2011.
2012	Bow Creek BU 2	35	Control eastern red cedar hazard fuels. Control exotic and invasive vegetation in native grass and wildflower establishment. Native grasses and wildflowers will be drilled in 2011.
2013	Mulberry BU 3	20	Reduce and control eastern red cedar hazard fuels. Maintain upland prairie and oak woodland.

This schedule will be adjusted as hazard fuel and prairie plant monitoring indicates appropriate. Although the objectives remain consistent throughout burn units, division into burn units allows managers to alter frequency of fire for differing management needs.



Figure 7A: Bow Creek burn units





Burn Unit Descriptions and Objectives

Bow Creek Burn Unit 1, 46 acres: Majority of unit consists of smooth brome. The smooth brome pasture is targeted for restoration beginning in 2009. Some native grasses are present in addition to wetlands and riparian forest. The riparian forest is dominated by cottonwood and has been mechanically treated to remove invasive eastern red cedar from the understory.

Bow Creek Burn Unit 2, 35 acres: Majority of unit consists of smooth brome. The smooth brome pasture is targeted for restoration beginning in 2009. Some native grasses are present in addition to wetlands and riparian forest. The riparian forest is dominated by cottonwood and has been mechanically treated to remove invasive eastern red cedar from the understory.

Bow Creek Burn Unit 3, 9 acres: Unit was taken out of row crop production in 2004 and seeded with native grasses in spring 2005. Wildflowers were inter-seeded in spring 2008. Maintenance mowing has been conducted to suppress cool season grasses and invasive plants.

Bow Creek Burn Unit 4, 10 acres: Unit was taken out of row crop production in 2004 and seeded with both native grasses and wildflowers in fall 2004. Maintenance mowings have been conducted to suppress cool season grasses and invasive plants.

Bow Creek Burn Unit 5, 10 acres: Unit was taken out of row crop production in 2004 and seeded with native grasses in spring 2005. Wildflowers were inter-seeded in spring 2008. Maintenance mowing has been conducted to suppress cool season grasses and invasive plants.

Bow Creek Burn Unit 6, 44 acres: Much of this unit is located in the low terrace near Bow Creek. The upland area includes areas where eastern red cedar has invaded historic upland prairie. Eastern red cedar removal began in 2008 and will continue in 2009. Bur oak woodland is also present.

Bow Creek Burn Unit 7, 32 acres: Approximately half of this unit is located in the low terrace near Bow Creek and the Missouri River. The upland area includes areas where eastern red cedar has invaded historic upland prairie. Eastern red cedar removal began in 2008 and will continue in 2009. Bur oak woodland is also present.

Bow Creek Burn Unit 8, 17 acres: Approximately half of this unit is located in the low terrace along the Missouri River. The upland area includes areas where eastern red cedar has invaded historic upland prairie. Eastern red cedar removal began in 2008 and will continue in 2009. Bur oak woodland is also present.



Figure 7B: Mulberry Bend burn units



Mulberry Bend Burn Unit 1, 5 acres: Predominantly a smooth brome pasture with sporadic eastern red cedar and deciduous trees along the north and south border. A registered archeology site is located along the northern boundary where the vegetation transitions from pasture to scrub. Prescribed fire objective is to suppress invasive vegetation

Mulberry Bend Burn Unit 2, 8 acres: The overlook area is a maintained landscape consisting of native plantings, wayside exhibits, and associated



concrete sidewalks. A portion of the burn unit includes some deciduous trees and sporadic eastern red cedar.

Mulberry Bend Burn Unit 3, 20 acres: Vegetation consists of mesic, bur-oak forest and associated species. Terrain is steep.

c. *Personnel Needed to Plan and Execute the Prescribed Fire Program*

Planning and execution of this prescribed fire management program will use qualified personnel and will follow the guidelines stated in document [RM-18](#). Refer to RM-18 for guiding all aspects related to implementing this prescribed fire program.

Midwest Region FMO will coordinate assistance in planning and implementing each of the prescribed fires.

d. *Prescribed Fire Behavior, Weather, Monitoring*

Prescribed fire behavior must support resource management objectives within the individual burn unit. A range of fire intensities will be required to meet burn unit objectives and vary according to site conditions. Extreme fire behavior may be needed to achieve tree and shrub mortality, especially in areas with sparse surface fuels. Moderate fire behavior may be appropriate in areas with more surface fuels.

Prescribed fires in the spring months target cool-season exotic grasses before warm season grasses have developed. Spring fire also adversely affects woody plants as they are flushing. Obtaining conditions that are within prescription is difficult because of spring rains. Wind conditions must be monitored closely in the spring, as extremely windy conditions are associated with weather systems at this time of year.

Prescribed fire in the fall months replicates the natural fire in the prairie ecosystem and targets cool-season plants coming out of dormancy, seed production of certain exotic species, and seedling destruction. Local restoration specialists feel that fall prescribed fire can be useful to manage certain problems, such as biennial weed propagation. Prairie fuels are dry at this time of year and weather conditions can be favorable for prescribed fire. Winds are generally predictable and moderate. September and October begin to experience rain events, but windows of dry weather occur between storms.

The Great Plains Network, Inventory and Monitoring Program may evaluate prescribed fire outcomes based on stated objectives through their long-term vegetation monitoring. The protocol for this monitoring is under development and will be available at

<http://science.nature.nps.gov/im/units/ngpn/monitor/plants/plants.cfm>.

Monitoring is essential for adaptive management, where qualitative and quantitative changes to resources are measured and used as a tool to guide modifications for subsequent prescription treatments and burn objectives.

e. *Prescribed Fire Critique Format*

The Burn Boss shall convene an After Action Review for any prescribed fire. A report detailing the actual burn can include any recommendations or changes to the program identified. The report will be submitted to the superintendent, the Regional Fire Management Officer via the Regional Fuels Management



Specialist. The following items, as a minimum, will be reviewed following each prescribed fire operation.

- What worked well?
- What could have been improved?
- Were any unsafe acts noted?
- Were burn objectives met within an acceptable range of results?
- What should be done differently to obtain desired results or get better results?
- Was there any deviation from plan? If so, then why were there deviations?
- Was prescription appropriate?
- Were weather changes a factor?

There are no requirements for prescribed fire critiques. However, it is recommended that a critique be completed annually and/or for any prescribed fire with significant problems (escapes, failure to meet objectives, accidents and/or near misses, etc.). When conducting a critique, ensure that representatives of all participating agencies and divisions are invited. Provide an outline of critique topics to all participants prior to holding the critique. Focus the critique on identification of problems and not persons. Solicit suggestions for improvements to planning and implementation of future prescribed burns.

f. Documentation and Reporting Requirements

See [RM-18 Chapter 10](#), page 39 - 41, and [2006 Interagency Prescribed Fire Burn Planning and Implementation Procedures Reference Guide](#). The Midwest Region FMO completes documentation.

See [RM-18 Chapter 10, page 42](#). The Burn Boss completes these reports.

g. Historic Fuel Treatment

Fire has not been used as a fuel treatment on NPS parklands. Mechanical removal of cedar has been done at Bow Creek Recreation Area.

h. Prescribed Fire Burn Plan

All prescribed fires require, by existing policy, a Prescribed Fire Burn Plan, which is a specific type of implementation plan, completed and approved prior to ignition. The implementation plan is the design and definition of all the activities, resources, limitations, and contingencies required for successful wildland fire management. The Prescribe Fire Burn Plan follows the policies of the National Park Service and Interagency Policy Guidance. They will contain the elements outlined in [RM-18, Chapter 10](#) from the [Interagency Prescribed Fire Burn Planning and Implementation Guide 2006](#). This includes, but is not restricted to

- (1) Signature page
- (2) GO/NO-GO Checklists
- (3) Complexity Analysis
- (4) Description of the Prescribed Burn Area
- (5) Goals and Objectives
- (6) Funding
- (7) Prescription
- (8) Scheduling
- (9) Pre-burn Considerations



- (10) Briefing
- (11) Organization and Equipment
- (12) Communication
- (13) Public and Personnel Safety
- (14) Test Fire
- (15) Ignition Plan
- (16) Holding Plan
- (17) Contingency Plan
- (18) Wildland fire Conversion
- (19) Smoke Management and Air Quality
- (20) Monitoring
- (21) Post-burn Activities

Appendices:

1. Maps
2. Technical Review Checklist
3. Complexity Analysis
4. Job Hazard Analysis
5. Fire Behavior Modeling Documentation or Empirical Documentation (unless empirical documentation is included in the fire behavior narrative in the Element 7, Prescription)

The Prescribed Fire Burn Plan is continually evaluated and tested to assure objectives are being met. If the objectives are not being met the Contingency Plan, a required component of the Prescribed Fire Burn Plan, is implemented. If the Contingency Plan is successful at bringing the project within the scope of the Prescribed Fire Burn Plan, then the project continues. If contingency objectives are not met, the prescribed fire is converted to a wildland fire and Initial Attack is implemented.

2. Exceeding Prescribed Fire Burn Plan

When burn prescription parameters are exceeded during ignition, containment actions must be taken. In some cases, the best containment strategy will be to complete firing of the unit or employ unit check-lines to avoid rapid runs at the unit boundary lines.

If the burn is declared an "escaped fire" and continues into the next operational period, then a Wildland Fire Situation Analysis (WFSA) must be completed and the AMR will be utilized. Spot fires may not constitute an escape if they are contained within standards that are identified in the burn plan.

Decision Criteria Checklist

Refer to [Wildland and Prescribed Fire Management Policy, Implementation Procedures Reference Guide](#) page 43.

Selection of New Strategies

When any of the following conditions occur, the WFSA process will be completed:

- Fire is projected to leave NPS jurisdiction, and the adjoining jurisdiction will not/cannot accept management of the fire.
- Regional Fire Management Officer, with the concurrence of the responsible agency administrator, determines that regional and/or national conditions



outweigh potential benefits of the fire and appropriate suppression action is warranted.

Information used to set incident priorities

Priorities for action if a fire requires a new strategy should be based first on safety of the public and firefighters. Secondary priorities include protection of private property and park resources and improvements. Rangers and maintenance staff should identify safety hazards.

The following maps will be available to burn bosses for setting priorities in the event a prescribed burn escapes:

- Map of MNRR
- Facility map showing values to protect and access roads
- Cultural and historic resource map
- T&E critical habitat

Implementation Plan Requirements

Use the incident action plan or Prescribed Fire Burn Plan to develop organization. Use strategy and tactics that have been successful in the past. Take care to ensure MIST is not forgotten in the efforts to suppress fire. Appropriate organizational levels will be identified through the WFSA process or by evaluation of in-park capabilities.

3. Air Quality and Smoke Management

a. Pertinent Air Quality Issues

One potential source of controversy for prescribed fires is smoke, as all fires produce airborne particles that contribute to material normally found in the atmosphere. However, fire was part of the pre-settlement environment. With the use of prescribed fires, the time and place can be chosen so that fuel characteristics, atmospheric moisture, velocity and direction of wind, and other weather conditions will cause a minimal impact on nearby communities.

b. Smoke Management Planning and Implementation Measures

The fire management program at MNRR will seek to minimize adverse environmental effects and will comply with state air-quality provisions and any permit requirements in addition to applicable provisions of the Clean Air Act (P.L. 88-206), and related federal regulations. The following smoke management guidelines will be adhered to during all phases of the above program.

- No management fires will be ignited during air pollution alerts, or temperature inversions.
- Fire weather forecasts will be used to predict smoke dispersal upon ignition.
- Burning will be conducted only when conditions will result in rapid smoke dispersal, as reflected in the wind components of the burn prescription.

Smoke will be monitored for effects. News media will be informed about fire conditions and air movement predictions, and how both may affect areas around MNRR.



c. Burn Permits for Nebraska

In accordance with State Statute 81-520.01 “(1) There shall be a statewide open burning ban on all bonfires, outdoor rubbish fires, and fires for the purpose of clearing land.” The State Fire Marshal’s office requires an Open Burn Permit. The state’s fire departments issue permits in accordance with state law. Before any open burning is done, a permit must be obtained from the local fire chief or his/her designee on a form prescribed by the State Fire Marshal. Fire chiefs may call (402) 471-2027 to obtain a pad of Open Burn Permits. When obtaining a burn permit, also contact the [Department of Environmental Quality](#) regarding their requirements affecting open burns and any additional required forms.

d. Burn Permits for South Dakota

Under §34A-1-18, the State Board of Minerals and Environment established emission control and open burning requirements to control air pollution. Requirements vary and they are administered locally. Prescribed fires to manage ecosystems are open burning and fall under the jurisdiction of the local government. The state cedes jurisdiction for control of open burning to the National Park Service, State Park Service, National Forest Service, or State Forest Service for public lands.

Even though the state cedes authority for burning on NPS parkland to the NPS, it is advisable to obtain any permit required by the local jurisdiction. This will ensure that NPS sponsored prescribed fire does not have a cumulative impact on air quality, should other entities in the area burn at the same time.

The website <http://www.state.sd.us/DENR/DES/AirQuality/openburn.htm> provides detailed guidelines for open burning. The state requires government and private entities conducting wildland or prescribed fires to develop a Smoke Management Plan to minimize air quality impacts.

E. Non-Fire Fuel Treatment Applications

As long as prescribed fire is used as a means of maintaining the fire dependent systems, fuel will not accumulate. Mechanical removal of fuels may be necessary before the first use of prescribed fire to reduce fuel loads in some locations. Mechanical treatment of fuels will include the mowing of firebreaks and the removal of excess debris in preparation for prescribed fire. Mechanical/manual treatment of invasive species may be done for resource management objectives also.

F. Emergency Rehabilitation and Restoration

Park staff will recommend actions that ensure suppression activities will be carried out in a manner that results in the least amount of resource damage. After the fire is declared out, park maintenance crews will remove litter, refill disturbed soil and install erosion control devices if necessary. Maintenance crews will flush cut stumps and remove logs and brush. The severity of the burn and its resultant impact will be considered in determining the need to seed or otherwise re-establish native plant species and cultural landscape. Such efforts regarding landscaping and plants will be in full compliance with [NPS Management Policies 2006](#) and given prior approval of the regional director. A rehabilitation plan, outlining what species are to be planted, techniques to be used, locations and cost estimates will be prepared before any action is taken, according to the guidance in [RM-18, Chapter 12](#).



Additionally, guidance in the [Interagency Burned Area Emergency Response Guidebook](#) will be followed in the rehabilitation of the disturbed parkland. The purpose of the *Interagency Burned Area Emergency Response Guidebook* is to provide general operational guidance for emergency stabilization activities after a wildland fire. In conjunction with Departmental and agency policy, it is designed to provide agency administrators and emergency stabilization specialists with sufficient information to

- Understand emergency stabilization policy, standards, and procedures
- Assess wildland fire damage and develop a cost effective plan or report
- Assess and report accomplishments

It consolidates and provides an interagency interpretation of emergency stabilization policies, procedures, objectives, and standards where there is Departmental and agency agreement. Individual agency policy and procedure manual guidance can be more, but not less restrictive than that presented in the guidebook.

V. Fire Management Organization and Responsibilities

A. Organizational Structure of Park Fire Management Program

Much of the responsibility for the fire management operations has been delegated as a collateral duty to the resource management division. The FMO from the Midwest Region provides oversight and assistance as needed. The Midwest Region FMO (located in Omaha) was established to provide guidance and technical support for participating national park units.

B. NPS FIRE PROGRAM FUNDING

The FMO stationed at MWR manages all NPS fire funding for MNRR. Funding is available for personal protective gear for firefighters and training funds (on an as-needed and available basis) as well as for prescribed fire projects. Missouri NRR does not have any NPS fire funded positions at this time. The FMO funds approved fire and hazard fuel projects. Funding is authorized for fire training, preparedness, suppression, and personal protection equipment, and for burned area emergency stabilization and rehabilitation projects. Missouri NRR may request funding from the Midwest Region FMO.

The FIREPRO analysis, the software package associated with budgeting fire funds, may be phased out in the future and be replaced by an interagency system, the [Fire Program Analysis \(FPA\)](#) system. The purpose of FPA is to provide managers of cooperating federal land management agencies with a common interagency process for fire management planning and budgeting to evaluate the effectiveness of alternative fire management strategies through time, in order to meet land management goals and objectives. FPA will reflect fire objectives and performance measures for the full scope of fire management activities. FPA may be the source of fire program funding analysis during the life span of the plan.

C. Fire Management Organization in Relation to Park Organization

The superintendent at MNRR or designee is responsible for coordinating the fire management program. This entails coordinating with Midwest Region FMO on fire and resource management objectives, and all prescribed and wildland fire implementation actions. The superintendent or designee gives final approval for Prescribed Fire Burn Plans and other actions as outlined within this FMP. Whenever the superintendent or designee travel away from MNRR, he or she is encouraged to brief and delegate



personnel acting authority to approve and execute burn plans in his or her absence. This will avoid situations where prescribed fire windows are missed because personnel are away from MNRR. Responsibilities that affect fire activities are as follows:

Park Superintendent

- Responsible for overall operation and management of MNRR, ensures that Department, Service and park policies are maintained and followed.
- Responsible for overall fire prevention within MNRR
- Ensures that all park divisions support the team effort to maintain a fire management program
- Develops and implements cooperative fire management agreements with other federal, state, and local agencies and with the local landowners.
- Approves Fire Management Plan and all burn plans
- Responsible for implementation of the Fire Management Plan

Chief of Resource Management

- Has overall supervisory responsibility for park-related law enforcement and emergency operations.
- Supports the fire program by making personnel available for park fire operations
- Annually reviews and revises (as necessary) this Fire Management Plan prior to commencement of the normal year fire season, to ensure that the planned actions and activities support and implement MNRR's resource objectives. Coordinates, with the MWR Fire Management Officer, fire prevention activities, wildland fires, prescribed fires, and post-fire activities occurring within MNRR. Completes and submits the WFIP Stage I requirement of a fire SIZE-Up Report.
- Ensures all documentation for parkland fires (including DI-1202 reports) is completed and provided to MWR FMO for input into the national database.
- Coordinates with the MWR Fuels Management Specialist to plan and implement prescribed fires under the Fire Management Plan; assists MWR Fuels Management Specialist in writing prescribed fire plans.
- Coordinates park personnel dispatches for in- and out-of-park fire assignments with Midwest Region FMO and the Missouri-Nebraska Interagency Coordination Center (MO-MOC).
- Ensures that all NEPA documentation is up-to-date annually

Chief of Interpretation

- Provides basic fire program information to park staff and visitors
- Ensures that accurate information is incorporated into park publications, interpretive ranger programs, and exhibits

D. Park Superintendent's Responsibility for Periodic Assessment Signature

Missouri NRR superintendent is not required to approve by signature periodic assessments for continued wildland fire use because wildland fire will be met with AMR at MNRR and because of multiple factors listed previously in this plan it is most likely that wildland fire use will never be appropriate for this park unit. See [Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide](#) and [RM-18, Chapter 9](#) for additional information.

E. Interagency Coordination

Interagency coordination and cooperation is essential for successful implementation of the fire management program at MNRR. All wildland and prescribed fires will require



interagency cooperation. Missouri NRR relies primarily on Midwest Region Fire Staff to coordinate those cooperative actions. Missouri NRR will coordinate with the local RFD throughout the year in order to foster an effective professional working relationship.

F. Key Contacts

Table 9: Interagency contacts and phone numbers

Name	Phone Number
Cedar County Sheriff's Office	402 254 6884
Dixon County Sheriff's Office	402 755 5608
Nebraska State Patrol	402 370 3456
Yankton County Sheriff's Office	605 668 3567
Clay County Sheriff's Office	605 677 7100
South Dakota State Patrol	605 367 5700
Wynot Fire Department	402 357 2401
Newcastle Fire Department	402 355 2370
Vermillion Fire Department	605 677 7097

G. Fire Related Agreements

No agreements are currently in place.



VI. Monitoring

A. Monitoring Requirements

The goal of fire effects monitoring is to determine if the short-term burn objectives and the long-term resource management objectives are achieved. This is generally accomplished through the installation and sampling of permanent vegetation plots. Plots are installed in a burn unit and read prior to a prescribed fire. Following the fire, the plots are typically read at the following intervals: immediately following the fire, one year, two years, and ten years after the fire. Monitoring variables are chosen based on objectives outlined in the FMP or monitoring plan. Statistical techniques are used to evaluate whether changes in these monitoring variables are significant. If objectives are not being met, adaptive management is used to determine if burn prescriptions or alternative techniques should be employed, or if the objectives should be modified.

The Northern Great Plains Network Inventory and Monitoring Program (NGP) will have an established protocol for vegetation monitoring that will capture long-term changes in vegetation by December 31, 2008. The network will engage in long-term vegetation monitoring as soon as it is in full implementation.

B. Fire Monitoring Handbook (FMH) and Deviations from FMH

Fire Monitoring Handbook is the program guide used throughout much of NPS to measure fire effects. Deviations from this protocol are allowed under certain circumstances. The NGP monitoring protocol has been peer-reviewed and accepted by the NPS. Missouri NRR will seek support for fire effect monitoring by the NGP from the FMO.

C. Missouri NRR Monitoring Plan

Due to staff size, MNRR will rely on the sampling, processing, and interpretation done by the NGP for their long-term fire effects monitoring.



VII. Fire Research

A. Previous and Ongoing Restoration Research at Missouri NRR

Fire modeling is being used in northeast Nebraska around the Niobrara and Missouri Rivers through the Great Plains Cooperative Ecosystems Studies Unit. This information will be directly used by MNRR to adjust their fire frequency and timing.

B. Fire Research Needs and Opportunities

Despite the amount of research conducted on fire in the prairie and savanna, much is unknown on this subject. The questions that are most pertinent to fire in MNRR are:

- What was the historic vegetation composition of the local prairies, savannas, and forests?
- What was the historic community structure of the savannas and forested areas locally?
- Will fire present a disturbance regime that effectively maintains desirable vegetation communities in the riparian zone?
- What are the fire effects on fauna (birds, reptiles, amphibians, butterflies) locally?
- What are the best, most efficient and effective, techniques of controlling invasive species using a combination of fire, herbicides, and mechanical/manual treatments that can be sustained by a small staff with limited fiscal resources?

Implementation of this FMP should not be contingent on completion of research of the local vegetation composition. A large body of literature indicates that fire is a beneficial process within these communities and will place the available native plants into a dynamic balance. Although this research was accomplished in other geographic areas, the results may be applied to MNRR, taking care to identify site differences and any subtle effects that those differences might cause. The fire modeling being done by the Great Plains Cooperative Ecosystems Studies Unit will also provide insight into these issues.



VIII. Public Safety

A. Public Safety Issues

Wildland and prescribed fires can present a hazard to firefighters, the public visiting MNRR, and adjacent landowners. The safety of all people in the area is the primary concern of the Incident Commander. The business and residential sections of the cities create Wildland Urban Interface concerns for wildland fire. Safety issues go beyond the actual fire to the impacts of smoke on visibility and health. Prescribed fires are not planned in populated areas, but if that changes, great care must be taken to protect the health and safety of the public. Air quality is a safety concern for everyone, especially those with diminished lung capacity or other respiratory problems. Particulate matter from fires can contribute to breathing difficulty.

B. Procedures for Mitigating Safety Issues

When adequate numbers of firefighters are available, the entire perimeter of the fire is easily monitored and it is unlikely that fire will spread. The public must be kept out of the immediate fire area, so that they will not hinder the suppression activities. This should not be difficult in areas where access to the fire is limited. Under no circumstance will anyone be permitted near a fire without the appropriate training and personal protective equipment.

In the case of a wildland fire that has potential for rapid spread, there will be a possibility that park visitors will be in areas of danger. Visitors will be informed through local public service announcements (radio, TV, newspaper, and other contact points). It is critical that area outfitters are aware of fires in the park so that they can warn those renting boats of the fire danger. The state conservation officers and other law enforcement on the water must be kept informed about wildland fire along the river. Law enforcement and fire officials will also canvass at risk areas and inform visitors, residents, and anyone in the area of the danger of a spreading wildland fire.

The sheriff may choose to close roads if visibility is significantly impaired. Temporary closure of the parkland or a portion may be needed when fire behavior has potential to endanger visitor and employee safety. When a fire threatens to escape from the park or has the potential to do so, adjacent authorities will be given as much advance notice as possible in order to take appropriate action. The RFDs would be fighting wildland fire and they contact surrounding fire departments through mutual aid agreements.

Prescribed fire activities are always preceded by announcements within the community. Residents are encouraged to place contact information on the call list for people in the immediate vicinity with sensitivity to smoke. The local people listed on the call list will be contacted on the night before or the day of a prescribed fire so that they can take precautions.



IX. Public Information and Education

A. Public Fire Information Capabilities and Needs

As with all park activities, the presence of an informed public can go far in providing support for the fire management program at MNRR. A concerted effort will be made to educate the public about fire concerns at MNRR, including fire danger messages during periods of drought. Fire management messages will be introduced into interpretive programs where appropriate.

Missouri NRR will coordinate its fire education program with partner agencies, such as the USACE, and state agencies, by providing static displays and conducting interpretive programs at area visitor centers. Missouri NRR will also cooperate with other land management agencies on wildland fire notification and education.

Missouri NRR will participate in fire education activities in the community, including demonstrations of firefighting equipment and safety. Park visitors will be made aware of regulations regarding the use of fire on NPS parkland. High fire danger notices will be posted at the park headquarters office and park's partners' visitor centers. The local media will be informed of fire prevention concerns through news releases, when appropriate. Media access to fire scenes will be facilitated when it is safe to do so. When interest is warranted, a staff member will be designated as the contact person for all information requests.

Notification of intent to use prescribed fire is sent to media through a news release. These news releases contain an educational element in the "why" of the "what" "where" "when" and "why" approach to successful news release writing.

B. Step-up Plan Information Actions

Refer to Step-Up Plan in Section IV, C, 2d.



X. PROTECTION OF SENSITIVE RESOURCES

A. Archeological Sites and Cultural Resources

One archeological site has been recorded at the Mulberry Bend. The site is a Central Plains Tradition, St. Helena phase habitation site with several house depressions. It was recorded in 1994 prior to the road realignment and bridge construction. It has been recommended as eligible to be listed on the National Register of Historic Places by the Nebraska State Historical Society (Bozell and Ludwickson 1994).

Other archeological sites and cultural resources exist within MNRR, outside of NPS parkland. These are under the jurisdiction of other private and public stewards, which have their own laws, regulations, and requirements relative to preservation. Missouri NRR will cooperate with these other jurisdictions to ensure the protection of these resources, where they are known to exist.

B. Natural Resources

The principle threatened and endangered species within MNRR are located in areas where fire is unlikely. Piping plovers and interior least terns can escape fire and their nests are located near the water on gravel and sand bars. The aquatic species are not vulnerable to fire, but could be vulnerable to the disturbance created by fire fighting (pumping water from the river) and to the changes in water quality that could occur after deforestation caused by fire. Rehabilitation of large burned areas will be necessary to preserve water quality.

C. Modern Infrastructure and Developments

Urban-interface mitigation techniques should be applied to prevent or reduce negative impacts to modern developments within the MNRR boundaries.



XI. Fire Critiques and Annual Plan Reviews

Each affected NPS unit is required to review and update its fire management plan annually. An annual review is essential to ensure that the Fire Management Plan continues to conform to current laws, objectives, procedures, and strategies. A plan revision, and NEPA compliance review, is required every five years.

A. Critiques

All wildland fires occurring within MNRR will receive a review by those involved to evaluate such topics as the initial response, “hotline” (on-going fire incident) review, control methods used, and safety concerns. This review will be conducted by one of the following: the Incident Commander, the Fire Management Officer, or the official who has designated fire program responsibilities. The purpose of this review is to recognize and document actions that were successful and identify and rectify actions that were unsafe or ineffective.

Missouri NRR superintendent will conduct closeout meetings with Incident Management Teams to ensure a successful transition of the incident back to MNRR and to identify and evaluate incomplete fire business. Refer to [RM-18, Chapter 13, Exhibit 1](#) for a sample closeout.

A regional or national level fire review may be conducted if one of the following occurs:

- Fire crosses MNRR boundary into another jurisdiction without the approval of landowner or agency.
- Fire resulted in adverse media attention.
- Fire involved serious injury or death, significant property damage, or has the potential to do so.
- Fire results in controversy involving another agency.

Refer to [Chapter 13, Exhibits 2 & 3 of RM-18](#).

All entrapments and fire shelter deployments will be reported and investigated as soon as possible after the deployment incident. Refer to [Chapter 13, Exhibit 4 & 5 of RM-18](#) for review directions and written outline format.

B. Plan Reviews

An informal fire management program review will be conducted annually to evaluate current procedures and identify any needed changes to the FMP. Changes identified will be documented in the required annual FMP review. Fire effects monitoring information will be used to determine the need for adaptive management. A formal fire management review will be conducted every five years.

Missouri NRR superintendent must approve significant changes to the body of this plan. The only exceptions to this procedure will be grammatical corrections, minor procedural changes, deletions, corrections, and additions to the appendices. Copies of all changes will be promptly forwarded to the Fire Management Program Center. Changes requiring approval and concurrence will be submitted with a new cover sheet for signature and dates, which will replace the original cover sheet upon receipt by MNRR superintendent.



XII. Consultation and Coordination

Interdisciplinary Team:

George Berndt, chief interpreter, Missouri National Recreational River

Nick Chevance, regional environmental coordinator, Midwest Region

Sherry Middlemis-Brown, biologist, Midwest Region, NPS

Stuart Schneider, chief ranger, Niobrara National Scenic River

Dugan C. Smith, park ranger (interpretation), Missouri National Recreational River

Anne Vawser, archeologist, Midwest Archeological Center

Wayne Werkmeister, resource management specialist, Missouri National Recreational River

Stephen K. Wilson, resource management/GIS specialist, Missouri National Recreational River

Persons consulted:

State Historic Preservation Office, Nebraska

State Historic Preservation Office, South Dakota

U.S. Army Corps of Engineers, Department of Defense

U.S. Fish and Wildlife Service, Department of Interior

South Dakota Department of Game, Fish and Parks

Nebraska Game and Parks Commission

South Dakota Department of Environment and Natural Resources

Nebraska Department of Environmental Quality

Ponca Tribe

Santee Sioux Tribe

Yankton Sioux Tribe

Local municipalities, counties, and other governmental service agencies involved:



List of Appendices

- A. References Cited
- B. Acronyms Used and glossary
- C. Species Lists
- D. NEPA compliance and NHPA compliance
- E. Unit Specific information

Fire call up lists

- 1. *Fire reporting form for state of Nebraska*
 - 2. *Preparedness inventory*
 - 3. *Agreement with Rural Fire District*
 - 4. *Signatories to this FMP*
 - 5. *Size-Up Report*
- F. Site Maps
- G. Long-term Prescribed Fire and Hazard Fuel Reduction Plan



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Appendix B. Acronyms Used and Glossary

AMR—Appropriate Management Response

BI – Burning Index

CWA – Clean Water Act of 1972 (Federal Water Pollution Control Act of 1972, as amended)

DI-1202 – Individual Fire Report form

DO-18 – Director’s Order 18

DOD—Department of Defense

EA – Environmental Assessment

EMS—Emergency Medical Services

EPMP-- Northern Great Plains Exotic Plant Management Plan

ESA – Endangered Species Act of 1973

FIREPRO – National Park Service Fire Program

FMH -- Fire Monitoring Handbook

FMO -- Fire Management Office

FMP -- Fire Management Plan

FMU – Fire Management Unit

FPA—Fire Program Analysis

FWS – U.S. Fish and Wildlife Service, Department of Interior

GMP – General Management Plan

IQCS—Incident Qualifications Certification System

KBDI—Keetch Byram Drought Index

LAL – Lightning Activity Level

LCES – Lookouts, Communication, Escape Routes, and Safety Zones (the 4 Fire Orders)

MIST – Minimum Impact Suppression Tactics

MWR – Midwest Region



NAAQS -- National Ambient Air Quality Standards

NEPA – National Environmental Policy Act

NHPA—National Historic Preservation Act

NIFC -- National Interagency Fire Center

NFDRS – National Fire Danger Rating System

NPS – National Park Service

NWCG – National Wildfire Coordinating Group

PIO -- Public Information Officer

RAWS -- Remote Automated Weather Station

RFD – Rural Fire District

RM-18 – Reference Manual 18

RMP – Resource Management Plan

RSS – Resource Stewardship Strategy

SHPO – State Historic Preservation Office

USACE – US Army Corps of Engineers, Department of Defense

USDA-United States Department of Agriculture

USDI-United States Department of the Interior

WFIP - Wildland Fire Implementation Plan

WFMI-- Wildland Fire Management Information (System)

WFSA - Wildland Fire Situation Analysis

WUI – Wildland Urban Interface



Term	Definition
39-mile District	In 1991, three river segments were added to MNRR: 39 miles of Missouri River below Fort Randall Dam to Running Water, South Dakota, 20 miles of the lower Niobrara River, and the last eight miles of Verdigre Creek before its confluence with Niobrara River.
59-mile District	Fifty-nine miles of Missouri River, downstream of Gavins Point Dam to Ponca, Nebraska
Adaptive Management	Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable ecosystems.
Appropriate Management Response (AMR)	The objective of putting the fire dead out by a certain time has been replaced by the need to make unique decisions with each fire start to consider the land, resource, and incident objectives, and to decide the appropriate management response and tactics that result in minimum cost and minimum resource damage. Fire management requires the fire manager and firefighter to select management tactics commensurate with the fire's existing or potential behavior while causing the least possible impact on the resource being protected.
Archeological Resources	Any material remains or physical evidence of past human life or activity that contribute to the understanding and appreciation of prehistoric and historic cultural development.
Archeological Site	A locus of any surviving evidence of past human activity, including the record of the effect of the activity on the environment.
Bald and Golden Eagle Protection Act.	Bald Eagle Protection Act of 1940 as amended (16 U.S.C. 668-668d, 54 Stat. 250) as amended -- Approved June 8, 1940, and amended by P.L 86-70 (73 Stat. 143) June 25, 1959; P.L. 87-884 (76 Stat. 1346) October 24, 1962; P.L. 92-535 (86 Stat. 1064) October 23, 1972; P.L. 95-616 (92 Stat. 3114) November 8, 1978. This law provides for the protection of the bald eagle (the national emblem) and the golden eagle.



Term	Definition
Best Management Practices	Effective, practical, structural or nonstructural methods, which prevent or reduce the movement of sediment, nutrients, pesticides, and other pollutants from the land to surface or ground water, or which otherwise the environment from potential adverse effects of human activities. These practices are developed to achieve a balance between environmental protection and the production within natural and economic limitations.
Clean Air Act	1990 Clean Air Act is the most recent version of a law first passed in 1970 to clean up air pollution.
Comprehensive Strategy	A logically-organized and tracked sequence of activities designed to achieve and/or maintain the desired conditions established in MNRR's GMPs.
Consultation	A discussion, conference, or forum in which advice or information is sought or given, or information or ideas are exchanged. Consultation can take place on an informal basis in some cases, but formal consultation requirements for compliance with some regulations, such as section 106 of NHPA as published in 36 CFR Part 800, demand written documentation of the process. Consultation with recognized tribes is done on a government-to-government basis, according to NPS Management Policies, 2006, p. 256. Consultation is also a part of NEPA with consultation commonly involving Section 7 of the Endangered Species Act and the Clean Water Act (Federal Water Pollution Control Act of 1972, as amended).
Cultural Landscape	A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.
Desired Conditions	The optimal state of a resource or visitor experience; a description of the "ideal" resource conditions or visitor experience opportunities to be achieved in a specific portion of a park (desired conditions are found in MNRR's GMPs).
Ecosystem	An interacting system of interdependent organisms



Term	Definition
Ecosystem management	The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity and desired conditions over the long term.
Endangered Species Act (ESA)	Endangered Species Act of 1973, as amended
Environmental Assessment (EA)	Under NEPA, a risk assessment aimed at protecting human health and the environment.
Ethnographic Resources	Objects and places, including sites, structures, landscapes, and natural resources with traditional cultural meaning and value to associated peoples. Research and consultation with associated people identifies and explains the places and things they find culturally meaningful.
Federal lands	NPS fee-simple lands and those lands under the management and jurisdiction of other federal agencies that accept the use of this FMP relative to their fire management actions.
Federally listed species	Federal list of endangered and threatened wildlife and plants, under the authority of the Endangered Species Act of 1973, as amended.
Fire Management Plan (FMP)	A strategic plan that defines a program to manage wildland and prescribed fires, and documents the fire management program in the approved land use plan.
Fire Management Unit (FMU)	Any land management area definable by objectives, topographic features, values-to-be-protected, fuel types, or major fire regimes, that sets it apart from management characteristics of another unit.
Fire regime	The pattern of fire across a landscape, characterized by frequency, intensity, and type and size of typical fire events, resulting from a unique combination of climate and vegetation.



Term	Definition
Fundamental Resources and Values	Those resources identified in the foundation of planning and management that are critical to achieving MNRR's purpose and maintaining its significance. They may include systems, processes, features, visitor experiences, stories, scenes, sounds, smells or other resources and values.
Fuel	The materials burned in a fire: duff, litter, grass, dead branch wood, snags, logs, stumps, weeds, brush, foliage, and, to a limited degree, live vegetation.
Foundation for Planning and Decision-making (or Management)	A statement clearly defining the legal and policy requirements that mandate MNRR's basic management responsibilities, including the identification and comprehensive analysis of those resources and values determined to be critical to achieving MNRR's purpose and maintaining its significance, or to be otherwise important to park planning and management.
GMP, General Management Plan	General management planning results in a shared understanding among NPS managers and the public about the kinds of resource conditions and visitor experiences that will best fulfill the purpose of MNRR.
GPRA, Government Performance and Results Act 1993	To provide for the establishment of strategic planning and performance measurement in the Federal Government, and for other purposes.
Guild	A group of species that exploits the same class of environmental resources in a similar way.
Hazard fuels	Fuels which, when ignited, threaten: public safety, structures and facilities, cultural resources, natural resources, natural processes, or any other social, political, or economic value. In addition, fuels that permit the spread of wildland fires across administrative boundaries except as authorized by agreement.
Implementation Plan	Implementation plans tier off MNRR's general management plan, program plans, and strategic plan and describe in detail the high-priority actions that will be taken over the next several years to help achieve the desired conditions for MNRR.



Term	Definition
Initial Attack	Wildland fires that are identified for suppression must receive appropriate initial attack action (IA) as defined in the fire management plan. The goal in all IA actions is to limit damage to values to be protected and to prevent the escape of the fire.
IPM, Integrated Pest Management	A decision-making process that coordinates knowledge of pest biology, the environment, and available technology to prevent unacceptable levels of pest damage, by cost-effective means, while posing the least possible risk to people, resources, and the environment. Each exotic plant's natural history is evaluated before developing management strategies.
LCES, Lookouts, Communication, Escape Routes, Safety Zones	Part of a checklist of safety actions that ensure firefighters have someone "looking out" for them, a method of "communicating" fire conditions, and an "escape route" to a "safety zone."
Management Prescription	Description of the desired conditions and visitor experience opportunities to be achieved in each Management Zone (management prescriptions are found in MNRR's GMPs).
Management Zone	A geographically delineated overlay of management goals or themes, based on MNRR foundation documents (management zones are found in MNRR GMPs)
Migratory Bird Treaty Act of 1918 (as amended)	(16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956
Minimum Impact Suppression Tactics (MIST)	The use of the minimum amount of forces necessary to achieve the fire management protection objectives consistent with land and resource management objectives. It implies a greater sensitivity to the impacts of suppression tactics and their long-term effects when determining how to implement an appropriate suppression response.



Term	Definition
Mitigation actions	Mitigation actions are considered those on-the-ground activities that serve to check, direct, or delay the spread of unwanted wildland fire and minimize threats to life, property, and resources. Mitigation actions may also refer to actions taken to protect values during suppression or in prescribed fire planning and implementation.
National Environmental Policy Act of 1969 (NEPA)	Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982. An Act to establish a national policy for the environment, to provide for the establishment of a Council on Environmental Quality, and for other purposes.
National Fire Danger Rating System (NFDRS)	A system to predict several measures of fire probability and resistance to control.
National Historic Preservation Act of 1966, As amended through 2000 (NHPA)	This Act became law on October 15, 1966 (Public Law 89-665, October 15, 1966; 16 U.S.C. 470 et seq.). Since enactment, there have been 22 amendments. The NHPA and its implementing regulations are the primary Federal historic preservation laws and regulations outlining the historic preservation responsibilities of the agencies.
National Interagency Fire Center (NIFC)	Mission is to serve as a focal point for coordinating the national mobilization of resources for wildland fire and other incidents throughout the United States.
National Interagency Coordination Center (NICC)	The nation's logistical support center.
Natural Resource Inventory and Monitoring Program (Vital Signs)	Natural resource inventory and monitoring provides site-specific information needed to understand and identify change in complex, variable, and imperfectly understood natural systems and to determine whether observed changes are within natural levels of variability or may be indicators of unwanted human influences. The monitoring is often referred to as “Vital Signs” monitoring, because it focuses on quantifying changes in indicators of ecosystem health.



Term	Definition
Nuisance smoke	US Environmental Protection Agency defines it as the amount of smoke in the ambient air that interferes with a right or privilege common to members of the public, including the use or enjoyment of public or private resources (EPA 1990).
Other Important Resources and Values	Significant resources and values that are not directly linked to MNRR purpose, but that support the Fundamental Resources and Values of MNRR or are part of resource stewardship because of policy, statute, or regulation, and are determined to be important to park planning and management.
Park Purpose and Significance	Statements of why, within a national, regional, and system wide context, MNRR's resources and values are important enough to warrant national park designation.
Parkland	MNRR fee-simple land; owned by and under the jurisdiction of NPS
Partner	An agency, organization, or individual with whom the NPS has a documented agreement
Prescribed Fire	Purposefully ignited fire intended to meet management objectives.
Prescribed Fire [Burn] Plan	Sets the objectives for and parameters by which a prescribed fire may be used to meet management objectives. Parameters include weather conditions, air quality objectives, holding actions, techniques and other specifics associated with a project implementation plan.
Program Plan or Program Management Plan	Park managers and staffs conduct various kinds of program planning to identify and recommend the best strategies for achieving the desired conditions and/or visitor experiences related to each particular program area (resource management, visitor use, facility management, etc.). Park-level program plans are not decision-making documents.
Resources	See Fundamental Resources and Values and Other Important Resources



Term	Definition
Resource Management Plan (RMP)	A program plan that detailed specific resource management activities and actions. This plan will be retired by each park upon approval of MNRR's resource stewardship plan.
Resource Stewardship Strategy (RSS)	This 15-20 year program management document provides a clear linkage between the qualitative desired conditions prescribed in the General Management Plan and the measurable performance outcomes and implementing actions identified in park strategic planning. These linkages include specific science- and scholarship-based Comprehensive Strategies that provide park managers with a logical sequence of activities necessary to achieve or maintain MNRR's desired conditions.
Rural Fire Assistance (RFA)	Intended to increase local firefighter safety and enhance the fire protection capabilities of Rural Fire Departments by helping RFDs meet accepted standards of wildland fire qualifications, training, and performance for initial and extended attack at the local level.
Scoping	To identify the key issues of concern at an early stage in the planning process; usually involves public input.
Section 106	National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Section 106 defines procedures for consultation and Review.
Special Mandates	Legal, regulatory, and policy requirements specific to MNRR or to the National Park Service generally Protection of habitat for an endangered species in a park not set aside for that purpose exemplifies a special mandate.
State Historic Preservation Officer (SHPO)	State Historic Preservation Officers (SHPOs) administer the national historic preservation program at the State level, review National Register of Historic Places nominations, maintain data on historic properties that have been identified but not yet nominated, and consult with Federal agencies during Section 106 review. SHPOs are designated by the governor of their respective State or territory.



Term	Definition
State listed species	State list of endangered and threatened wildlife and plants under the authority of state statute
Stakeholders	An individual, group, or other organization that can place a claim on our attention, resources, or output, or is affected by that output; in other words, a stakeholder has a stake in what we do and can exert significant influence on park or program mission and strategies. Examples include citizens, higher-level managers, special interest groups, and governing bodies (e.g., Congress).
Structure (as a cultural resource)	A constructed work, usually immovable by nature or design, consciously created to serve a human activity
Suppression	An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration while minimizing loss of resource values, economic expenditures, and the use of critical firefighting resources.
Tribal Historic Preservation Officer (THPO)	In the Context of RSS efforts, the office that engages in the consultation for those tribes that have assumed SHPO responsibilities on their tribal lands and have been certified pursuant to Section 101(d)(2) of the NHPA. THPOs would be consulted in lieu of the SHPO, while non-certified tribes would be consulted in addition to the SHPO.
Vital Signs (Vital Signs Monitoring)	A set of indicators that, as with medical vital signs, give a general measure of ecosystem health
Wildland Fire	Any non-structure fire, other than prescribed fire, that occurs in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.
Wildland fire management program	The full range of activities and functions necessary for planning, preparedness, emergency suppression operations, and emergency rehabilitation of wildland fires; prescribed fire operations; and non-fire fuels management to reduce risks to public safety and achieve resource management goals.



Term	Definition
Wildland Fire Situation Analysis (WFSA)	The decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives. Also, the paperwork documenting this process.
Wildland fire use (WFU)	The management of naturally ignited wildland fires to accomplish specific, pre-stated, resource management objectives in pre-defined geographic areas outlined in Fire Management Plans. It is not authorized in this FMP.
Wildland-urban interface (WUI)	An area or zone where structures and other human development occur next to or within undeveloped wildland fuel complexes



Appendix C. Species Lists

Plant Species List

Due to the length of the list, the reader is encouraged to access the list at
<http://inp2300fcspeco1/Portal/SpeciesReport.mvc/showCertifiedSpeciesQuery>

Breeding bird list

Due to the length of the list (249 entries), the reader is encouraged to access the list at
<http://inp2300fcspeco1/Portal/SpeciesReport.mvc/showCertifiedSpeciesQuery>

Fish Species List

Due to the length of the list, the reader is encouraged to access the list at
<http://inp2300fcspeco1/Portal/SpeciesReport.mvc/showCertifiedSpeciesQuery>

Table C1: Mammal inventory

Data Migrated as of October 3, 2008

Certified as of September 23, 2005

Records in Search Results: **50**

<u>Order</u>	<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Occurrence</u>	<u>Abundance</u>	<u>Residency</u>	<u>Nativity</u>
Artiodactyla	Bovidae	Bos bison	American bison, bison	Present in Park	Uncommon	Breeder	Native
Artiodactyla	Cervidae	Cervus elaphus	elk, wapiti	Present in Park	Uncommon	Breeder	Native
Artiodactyla	Cervidae	Odocoileus hemionus	mule deer	Present in Park	Unknown	Breeder	Native
Artiodactyla	Cervidae	Odocoileus virginianus	white-tailed deer	Present in Park	Common	Breeder	Native
Carnivora	Canidae	Canis latrans	Coyote	Present in Park	Common	Breeder	Native
Carnivora	Canidae	Urocyon cinereoargenteus	common gray fox	Probably Present	NA	NA	Native
Carnivora	Canidae	Vulpes vulpes	Red Fox	Present in Park	Common	Breeder	Native
Carnivora	Felidae	Lynx rufus	Bobcat	Probably Present	NA	NA	Native
Carnivora	Felidae	Puma concolor	Cougar, mountain lion, Puma	Present in Park	Rare	Unknown	Native
Carnivora	Mephitidae	Mephitis mephitis	striped skunk	Present in Park	Unknown	Unknown	Native
Carnivora	Mustelidae	Lontra canadensis	North American River Otter	Probably Present	NA	NA	Native
Carnivora	Mustelidae	Mustela frenata	long-tailed weasel	Probably Present	NA	NA	Native
Carnivora	Mustelidae	Mustela nivalis	least weasel	Probably Present	NA	NA	Native
Carnivora	Mustelidae	Mustela vison	American Mink	Present in Park	Common	Breeder	Native



Missouri National Recreational River
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<u>Order</u>	<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Occurrence</u>	<u>Abundance</u>	<u>Residency</u>	<u>Nativity</u>
Carnivora	Mustelidae	Taxidea taxus	American badger	Present in Park	Unknown	Breeder	Native
Carnivora	Procyonidae	Procyon lotor	common raccoon	Present in Park	Common	Breeder	Native
Chiroptera	Vespertilionidae	Eptesicus fuscus	big brown bat	Present in Park	Common	Breeder	Native
Chiroptera	Vespertilionidae	Lasionycteris noctivagans	silver-haired bat	Present in Park	Unknown	Unknown	Native
Chiroptera	Vespertilionidae	Lasiurus borealis	eastern red bat	Present in Park	Uncommon	Breeder	Native
Chiroptera	Vespertilionidae	Lasiurus cinereus	hoary bat	Present in Park	Uncommon	Breeder	Native
Chiroptera	Vespertilionidae	Myotis lucifugus	little brown bat	Present in Park	Uncommon	Breeder	Native
Chiroptera	Vespertilionidae	Myotis septentrionalis	northern long-eared bat	Present in Park	Common	Breeder	Native
Chiroptera	Vespertilionidae	Nycticeius humeralis	evening bat	Probably Present	NA	NA	Native
Chiroptera	Vespertilionidae	Pipistrellus subflavus	eastern pipistrelle	Present in Park	Unknown	Unknown	Native
Didelphimorphia	Didelphidae	Didelphis virginiana	Virginia opossum	Present in Park	Uncommon	Breeder	Unknown
Lagomorpha	Leporidae	Lepus californicus	black-tailed jack rabbit	Present in Park	Uncommon	Breeder	Native
Lagomorpha	Leporidae	Sylvilagus floridanus	Eastern Cottontail	Present in Park	Common	Breeder	Native
Rodentia	Castoridae	Castor canadensis	American beaver	Present in Park	Common	Breeder	Native
Rodentia	Dipodidae	Zapus hudsonius	meadow jumping mouse	Probably Present	NA	NA	Native
Rodentia	Erethizontidae	Erethizon dorsatum	common porcupine	Present in Park	Unknown	Unknown	Native
Rodentia	Geomyidae	Geomys bursarius	plains pocket gopher	Present in Park	Abundant	Breeder	Native
Rodentia	Heteromyidae	Chaetodipus hispidus	hispid pocket mouse	Present in Park	Rare	Breeder	Native
Rodentia	Heteromyidae	Dipodomys ordii	Ord's kangaroo rat	Unconfirmed	NA	NA	Native
Rodentia	Heteromyidae	Perognathus flavescens	plains pocket mouse	Present in Park	Uncommon	Breeder	Native
Rodentia	Muridae	Microtus ochrogaster	prairie vole	Present in Park	Uncommon	Breeder	Native
Rodentia	Muridae	Microtus pennsylvanicus	meadow vole	Present in Park	Uncommon	Breeder	Native
Rodentia	Muridae	Mus musculus	house mouse	Probably Present	NA	NA	Non-Native
Rodentia	Muridae	Ondatra zibethicus	muskrat	Present in Park	Common	Breeder	Native
Rodentia	Muridae	Peromyscus leucopus	white-footed mouse	Present in Park	Abundant	Breeder	Native



Missouri National Recreational River
Fire Management Plan 2009

<u>Order</u>	<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Occurrence</u>	<u>Abundance</u>	<u>Residency</u>	<u>Nativity</u>
Rodentia	Muridae	Peromyscus maniculatus	deer mouse	Present in Park	Abundant	Breeder	Native
Rodentia	Muridae	Rattus norvegicus	Norway rat	Present in Park	Uncommon	Breeder	Non-Native
Rodentia	Muridae	Reithrodontomys megalotis	western harvest mouse	Present in Park	Common	Breeder	Native
Rodentia	Sciuridae	Marmota monax	woodchuck	Present in Park	Common	Breeder	Native
Rodentia	Sciuridae	Sciurus niger	eastern fox squirrel	Present in Park	Common	Breeder	Native
Rodentia	Sciuridae	Spermophilus franklinii	Franklin's ground squirrel	Present in Park	Uncommon	Breeder	Native
Rodentia	Sciuridae	Spermophilus tridecemlineatus	thirteen-lined ground squirrel	Present in Park	Unknown	Breeder	Native
Soricomorpha	Soricidae	Blarina brevicauda	mole shrew, northern short-tailed shrew	Present in Park	Common	Breeder	Native
Soricomorpha	Soricidae	Sorex cinereus	common shrew, masked shrew	Present in Park	Common	Breeder	Native
Soricomorpha	Soricidae	Sorex hoyi	American Pygmy Shrew	Probably Present	NA	NA	Native
Soricomorpha	Talpidae	Scalopus aquaticus	eastern mole, topos	Present in Park	Unknown	Breeder	Native

Table C2: Amphibian Species List

Data Migrated as of October 3, 2008

Certified as of February 1, 2006

Amphibian Records in Search Results: 10

<u>Order</u>	<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Occurrence</u>	<u>Abundance</u>	<u>Residency</u>	<u>Nativity</u>
Anura	Bufonidae	Bufo cognatus	Great Plains Toad	Present in Park	Unknown	Unknown	Native
Anura	Bufonidae	Bufo woodhousii	Woodhouse's Toad	Present in Park	Unknown	Unknown	Native
Anura	Hylidae	Acris crepitans	Northern Cricket Frog	Present in Park	Unknown	Unknown	Native
Anura	Hylidae	Hyla chrysoscelis	Cope's Gray Treefrog	Present in Park	Unknown	Unknown	Native
Anura	Hylidae	Pseudacris triseriata	Striped/ Western Chorus Frog	Present in Park	Unknown	Unknown	Native
Anura	Ranidae	Rana blairi	plains leopard frog	Present in Park	Unknown	Unknown	Native
Anura	Ranidae	Rana catesbeiana	American Bullfrog	Present in Park	Unknown	Unknown	Native
Anura	Ranidae	Rana pipiens	Northern Leopard Frog	Present in Park	Unknown	Unknown	Native
Anura	Scaphiopodidae	Spea bombifrons	Plains Spadefoot	Present in Park	Unknown	Unknown	Native
Caudata	Ambystomidae	Ambystoma tigrinum	Tiger Salamander	Unconfirmed	NA	NA	Native



Missouri National Recreational River
Fire Management Plan 2009

Table C3: Reptile Species List

Data Migrated as of October 3, 2008
Certified as of February 1, 2006

Reptilian Records in Search Results: **22**

<u>Order</u>	<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Occurrence</u>	<u>Abundance</u>	<u>Residency</u>	<u>Nativity</u>
Squamata	Colubridae	Coluber constrictor	Racer	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Diadophis punctatus	Ringneck Snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Elaphe vulpina	Fox Snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Heterodon nasicus	Western Hog-nosed Snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Heterodon platirhinos	Eastern Hog-nosed Snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Lampropeltis triangulum	Milk Snake	Unconfirmed	NA	NA	Native
Squamata	Colubridae	Nerodia sipedon	Northern Water Snake	Unconfirmed	NA	NA	Native
Squamata	Colubridae	Pituophis catenifer	Bullsnake, Gopher Snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Storeria occipitomaculata	Red-bellied Snake	Unconfirmed	NA	NA	Native
Squamata	Colubridae	Thamnophis radix	plains garter snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Thamnophis sirtalis	Common Garter Snake	Present in Park	Unknown	Unknown	Native
Squamata	Colubridae	Tropidoclonion lineatum	Lined Snake	Unconfirmed	NA	NA	Native
Squamata	Scincidae	Eumeces fasciatus	Five-lined Skink	Unconfirmed	NA	NA	Native
Squamata	Scincidae	Eumeces septentrionalis	Prairie Skink	Present in Park	Unknown	Unknown	Native
Squamata	Teiidae	Cnemidophorus sexlineatus	six-lined racerunner	Present in Park	Unknown	Unknown	Native
Squamata	Viperidae	Crotalus viridis	Prairie/ Western Rattlesnake	Present in Park	Unknown	Unknown	Native
Testudines	Chelydridae	Chelydra serpentina	common snapping turtle	Present in Park	Unknown	Unknown	Native
Testudines	Emydidae	Chrysemys picta	Painted Turtle	Present in Park	Unknown	Unknown	Native
Testudines	Emydidae	Graptemys pseudogeographica	False Map Turtle	Present in Park	Unknown	Unknown	Native
Testudines	Emydidae	Terrapene ornata	ornate box turtle, Western Box Turtle	Present in Park	Unknown	Unknown	Native
Testudines	Trionychidae	Apalone mutica	smooth softshell turtle	Present in Park	Unknown	Unknown	Native
Testudines	Trionychidae	Apalone spinifera	spiny softshell, spiny softshell turtle	Present in Park	Unknown	Unknown	Native



Appendix D. NEPA and NHPA compliance

(please see the following Environmental Assessment)



Appendix E. Unit Specific Information

1. Fire call-up lists

Table E1: Fire call-up list

Name	Bow Creek Burn Unit	Mulberry Bend Burn Unit	Phone Number
Cedar County, NE Sheriff's Office	X		402 254 6884
Dixon County, NE Sheriff's Office		X	402 755 5608
Nebraska State Patrol	X	X	402 370 3456
Yankton County, SD Sheriff's Office	X		605 668 3567
Clay County, SD Sheriff's Office		X	605 677 7100
South Dakota State Patrol	X	X	605 367 5700
Wynot Fire Department	X		402 357 2401
Newcastle Fire Department		X	402 355 2370
Vermillion Fire Department		X	605 677 7097

Table E2: Call-up list for prescribed fire (include in prescribed fire plan)

Generally, at the time the burn permit is issued the local fire marshal calls in the burn information to local dispatch. Any incoming phone calls would likely be intercepted before a local volunteer fire department responds. However, the NPS will call the following contacts to ensure that everyone is aware of the prescribed fire. This list shall be reviewed annually as neighbors and contact information may change.

Name	Bow Creek Burn Units	Mulberry Bend Burn Units	Phone Number
Cedar County, NE Sheriff's Office	X		402 254 6884
Dixon County, NE Sheriff's Office		X	402 755 5608
Nebraska State Patrol	X	X	402 370 3456
Yankton County, SD Sheriff's Office	X		605 668 3567
Clay County, SD Sheriff's Office		X	605 677 7100
South Dakota State Patrol	X	X	605 367 5700
Wynot Fire Department	X		402 357 2401
Newcastle Fire Department		X	402 355 2370
Vermillion Fire Department		X	605 677 7097
Jerome Boeckman (neighbor)	X		402 357 2201
Richard Boeckman (neighbor)	X		402 357 3578
Marlin Roth (neighbor)	X		
Matt Weinandt (neighbor)	X		402 357 2397
Craig Ebberson (neighbor)	X		402 283 9204
Rod Hoesing (neighbor)		X	402 355 2307
Peter Attema (neighbor)		X	402 355 9234
Lowell Rahn (neighbor)		X	402 355 2595
Lavern Walton (neighbor)		X	402 692 3305
Dana Rosener (neighbor)		X	402 692 3324
Steve Rosener (neighbor)		X	402 692 3116



2. *Preparedness inventory*

No preparedness inventory exists.

3. *Agreement with Rural Fire Districts*

No agreements are in place.

4. *Agencies and Private Landowners Partnering with NPS*

The attached signatories wish to accept this FMP as the principle fire management document applying to the land for which they are stewards. These signatories approve and accept the plan and will implement it in their fire management activities. This document is an instrument for creating fire management collaboration within the boundaries of MNRR.

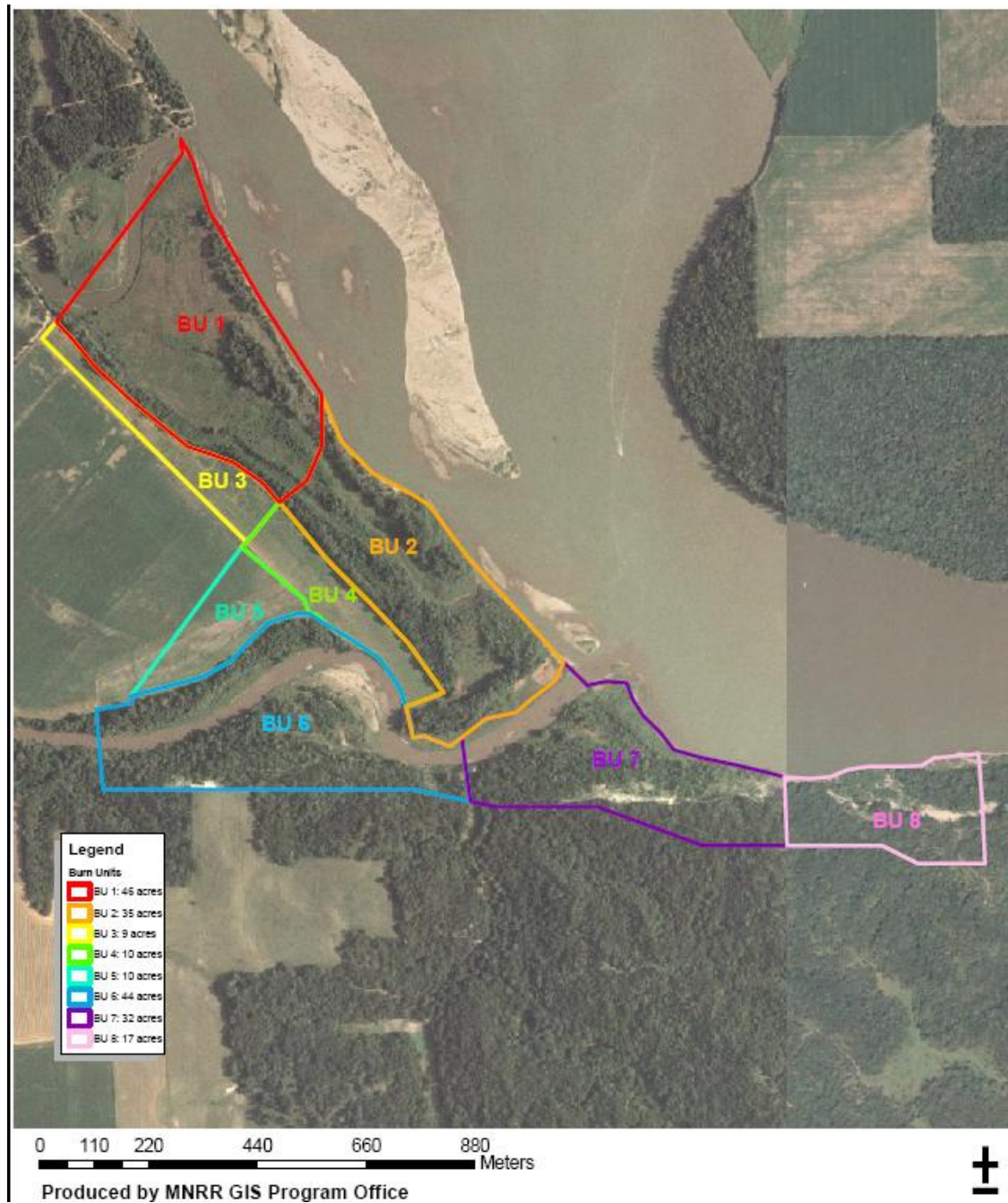
5. *Size Up Report*

- ☐ Incident Name – All incidents
- ☐ Incident Commander – All incidents
- ☐ Incident Type – Wildland fire, vehicle accident, hazardous materials (HazMat), search and rescue, etc.
- ☐ Incident Status – Fire-creeping, running, spotting, crowning: Vehicle-blocking road, over side, etc.
- ☐ Location – Use landmarks, legal, or lat/long.
- ☐ Jurisdiction – Agency with jurisdiction
- ☐ Radio Frequencies – All incidents
- ☐ Incident Size – Fire and HazMat
- ☐ Fuel Type – Fire incidents only
- ☐ Wind Speed and Direction – All incidents
- ☐ Slope and Aspect – Fire and HazMat
- ☐ Best Access – All incidents
- ☐ Special Hazards or Concerns – For air and ground units
- ☐ Additional Resource Needs – Personnel and equipment



Appendix F: Site Maps

Bow Creek Units





Mulberry Bend Units





Appendix G. Long-term Prescribed Fire and Hazard Fuel Reduction Plan

1. Multi-year prescribed fire schedule (see Appendix F for maps)

Table G1: Prescribed fire schedule

Year	Unit	Acres	Objectives
2009	Bow Creek BU 3	9	Control exotic and invasive vegetation in native grass and wildflower establishment.
2009	Bow Creek BU 4	10	Control exotic and invasive vegetation in native grass and wildflower establishment.
2009	Mulberry BU 1	5	Suppress exotic cool season grasses.
2010	Bow Creek BU 5	10	Control exotic and invasive vegetation in native grass and wildflower establishment.
2010	Mulberry BU 2	8	Control exotic and invasive vegetation in native grass and wildflower establishment.
2010	Bow Creek BU 7	32	Maintain open prairie and oak woodland free of invasive eastern red cedar. Areas to be burned have been mechanically cleared.
2011	Bow Creek BU 6	44	Maintain open prairie and oak woodland free of invasive eastern red cedar. Areas to be burned have been mechanically cleared.
2012	Bow Creek BU 8	17	Maintain open prairie and oak woodland free of invasive eastern red cedar. Areas to be burned have been mechanically cleared.
2012	Bow Creek BU 1	46	Control exotic and invasive vegetation in native grass and wildflower establishment. Native grasses and wildflowers will be drilled in 2011.
2012	Bow Creek BU 2	35	Control exotic and invasive vegetation in native grass and wildflower establishment. Native grasses and wildflowers will be drilled in 2011.
2013	Mulberry BU 3	20	Maintain upland prairie and oak woodland.



2. *Hazard Fuels reduction areas and schedule*

Table G2: Hazard fuel reduction schedule

Year	Unit	Acres	Justification
2009	Bow Creek BU 7	32	Burn eastern red cedar slash piles created by 2008 hazard fuel clearing.
2009	Bow Creek BU 6 and 8	61	Remove eastern red cedar trees from historic open prairie and oak woodland and burn associated slash piles.
2009	Mulberry BU 2	8	Remove eastern red cedar trees from deciduous woodland and open prairie hillside.
2009	Bow Creek BU 3 and 4	19	Eliminate seedling and sapling eastern red cedar hazard fuels and other woody plants through prescribed fire.
2009	Mulberry BU 1	5	Eliminate seedling and sapling eastern red cedar hazard fuels and other woody plants through prescribed fire.
2010	Bow Creek BU 5	10	Eliminate seedling and sapling eastern red cedar hazard fuels and other woody plants through prescribed fire.
2010	Mulberry BU 2	8	Eliminate seedling and sapling eastern red cedar hazard fuels and other woody plants through prescribed fire.
2010	Bow Creek BU 7	32	Control eastern red cedar hazard fuels in mechanically cleared open prairie and oak woodland.
2011	Bow Creek BU 6	44	Control eastern red cedar hazard fuels in mechanically cleared open prairie and oak woodland.
2012	Bow Creek BU 8	17	Control eastern red cedar hazard fuels in mechanically cleared open prairie and oak woodland.

3. *Rx-Fire History*

None at this time



2009

Fire Management Plan Review and Update For Missouri National Recreational River

This annual review of the Fire Management Plan (FMP) is a requirement of NPS *Reference Manual #18* (Wildland Fire Management), as specified in the Fire Management Plan chapter, stating that “an annual review is essential to ensure that the FMP continues to conform to current laws, objectives, procedures, and strategies.” In addition, the 2007 Interagency Standards for Fire and Fire Aviation Operations states that MNRR superintendent will “identify resource management objectives to maintain a current FMP that identifies an accurate and defensible normal year readiness of funding and personnel”. The activities defined in the FMP will be implemented in accordance with agency and departmental policy, including recent procedural updates contained in the following documents [*update the effective date of the following references annually as appropriate*]:

- Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (September 2006)
- Wildland Fire Use Implementation Procedures Reference Guide (May 2005, as amended in March 2006)
- Interagency Standards for Fire and Fire Aviation Operations (January 2007)
- Federal Fire and Aviation Operations – 2007 Action Plan (Spring 2007)

The review and update process is intended to keep the FMP as current as possible. Changes in the step-up plan, terminology, cooperative agreements, and adjustments to the multi-year fuels treatment plan are examples of appropriate revisions to a FMP using this review and update format. The updates identified in this document will become effective upon signature by MNRR superintendent.

Directions. Please review the following items from the FMP. If no updates are required, please check “no update”; if updates are required, please check “update included here,” and identify the specific update(s) in the space provided. Some items may require discussions with park resources management personnel. The updated information should be incorporated into the FMP and records kept in MNRR files. Send an e-copy of the document, as well as a fax copy of the signature page only, to: *Midwest Region FMO or regionally identified contact, and National FMO at the Fire Management Program Center in Boise.*



Step-up Plan (Section IV)

The Step-up Plan should include:

- Accurate break-points between preparedness (staffing) levels
- Description of actions to be taken at each preparedness (staffing) levels

☐ No update

☐ Update included here:

Multi-year Fuels Treatment Plan (Appendix)

☐ No update

☐ Update included here:

Organizational Responsibilities (Section V)

☐ No update

☐ Update included here:

Pre-attack Plan

Missouri NRR should ensure the following documents are in place for 2008:

- Rental Equipment Agreements (including Service and Supply Plan)
- Contracts for Wildland Fire Suppression and Prescribed Fire Resources
- Fire Call-up list
- Agreements, Annual Operating Plans, and related local interagency coordination documents
- Delegation of Authority (as specified on page 03-2 in Interagency Standards for Fire and Fire Aviation Operations) from MNRR superintendent to Appropriate Individual(s) for wildland fire activities and operations

☐ No update

☐ Update included here:

Compliance

Confirm that the following three (3) environmental compliance documents are still valid:

- | | |
|--|--|
| • NEPA | <input type="checkbox"/> Concurrence letter from SHPO |
| <input type="checkbox"/> CE, EA, or EIS | • ESA |
| <input type="checkbox"/> Decision Document (CE, FONSI, or ROD) | <input type="checkbox"/> Section 7 |
| • NHPA | <input type="checkbox"/> Concurrence letter from USFWS for informal consultation or signed Biological Opinion from USFWS for formal consultation |
| <input type="checkbox"/> Section 106 | |



Communications and Education Plan

Missouri NRR should ensure that the contacts and protocol procedures are updated annually

NOTE: If major changes in the wildland fire and/or fuels management program have occurred that do not conform to the existing environmental compliance documents, then these projects, or changes, should be suspended and a new compliance process completed for them.

☐ No update

☐ Update included here:

20[XX]

Fire Management Plan Review and Update

Prepared by: _____
Fire Management Officer Date

Approved by: _____
Superintendent Date