ENVIRONMENTAL ASSESSMENT

to the

WILDLAND FIRE MANAGEMENT PLAN

For

Big Muddy

NATIONAL FISH & WILDLIFE REFUGE

December 2011

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Environmental Assessment
for the
Big Muddy NFWR Fire Management Plan

Abstract

The U.S. Fish and Wildlife Service (Service) is proposing to implement a Fire Management Plan (FMP) for Big Muddy National Fish and Wildlife Refuge (Refuge) located along the lower Missouri River between Kansas City, MO and Saint Louis, MO. This plan will specify a fire management direction for Big Muddy National Fish and Wildlife Refuge (NFWR) as described in detail through a set of goals, objectives, and strategies. This Environmental Assessment (EA) considers the biological, environmental, and socio-economic effects that implementing the FMP (the preferred alternative) and other management alternatives will have on the most significant issues and concerns identified during the planning process.

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Chapter 1

Purpose and Need for the Proposed Action

Purpose:

The purpose of the Environmental Assessment is to consider various alternatives for managing wildland fire at the Big Muddy National Fish and Wildlife Refuge. This management direction is described in detail through a set of goals, objectives, and strategies in the Fire Management Plan (FMP). The action is needed to address current management issues and to establish what action will be taken in regard to future use of fire as a management tool and fire suppression efforts.

This Environmental Assessment (EA) was prepared using the guidelines of the National Environmental Policy Act of 1969. The Act requires us to examine the effects of proposed actions on the natural and human environment. In the following sections, alternatives for future Refuge fire management, the environmental consequences of each alternative, and the preferred management direction are described.

Need:

This action is necessary to meet several important management needs on the refuge. The Big Muddy NFWR is developing an environmental assessment of the potential effects of wildland fire activities on the refuge in conjunction with a refuge FMP. The FMP will guide any management decisions related to wildland fire. In order to meet Federal and specifically FWS regulations, an approved fire management plan must be in place before any prescribed burning may take place.

The 1995 Final Report of the Federal Wildland Fire Management Policy and Program Review provides guiding principles that are fundamental to the success of the Federal wildland fire management program and implementation of review recommendations. These recommendations include Federal wildland fire policies in the areas of safety, planning, wildland fire, prescribed fire, preparedness, suppression, prevention, protection priorities, interagency cooperation, standardization, economic efficiency, wildland/urban interface, and administration and employee roles. The 2001 Federal Fire Management Policy update addresses 17 distinct items, the foremost being safety; all FMPs and fire management activities must reflect this commitment.

The Federal Wildland Fire Management Policy that now governs wildland fire management provides for a full range of responses and the opportunity for wildland fires to be managed for resource benefits. This policy represents a significant departure from past fire management practices. All ignitions occurring in wildland areas are now classified as wildland fires or prescribed fires. Wildland fires include any non-structure fire, other than prescribed fire, that occurs in the wildland, regardless of whether the origin is natural (generally lightning) or human (accident or arson). All wildland fires will receive a suppression response. Prescribed fires include any fire ignited by management actions to

meet specific objectives. Prior to the ignition of prescribed fires, a written, approved prescribed fire plan must exist, and NEPA requirements must be met. This EA constitutes the requisite NEPA documentation and compliance for the FMP. Specific needs include:

• Wildland fires are managed with the appropriate response as directed by the FMP and analysis of the specific situation.

• Minimize burned area due to high values to be protected, threats to life or property, or other social, political, and economic considerations that outweigh potential environmental benefits.

• Implement a wildland fire suppression decision-making process that evaluates and compares alternative strategies with respect to safety, environmental, social, economic, political, and resource management objectives.

• Meet current Departmental and Service policies as well as Congressional direction regarding need for consistent, up-to-date FMPs.

• Plan for use of prescribed fire to restore the historic role of fire to fire dependent or fire adapted habitats.

• Use prescribed fire or other appropriate tools to reduce hazardous fuels to protect both Refuge improvements and reduce risk of fire escape to adjacent land ownerships.

Background:

Big Muddy National Fish and Wildlife Refuge

The Big Muddy NFWR was established under the authority of the Fish and Wildlife Act of 1954 and currently consists of nine units. The Refuge was established on September 9, 1994, "…for the development, advancement, management, conservation, and protection of fish and wildlife resources…" (16 U.S.C. 742f(a)(4)). The Refuge's intention is to fill a public need to preserve and restore natural river floodplain, manage fish and wildlife habitats, and provide for compatible use.

The Refuge currently consists of nine units totaling approximately 16,700 acres, including Jackass Bend, Cranberry Bend, Baltimore Bottoms, Jamison Island, Lisbon Bottoms, Overton Bottoms, St. Aubert Island, Boone's Crossing, and Cora Island. Approximately 60,000 acres of floodplain land may eventually be purchased or protected. A refuge of this size will contribute to river ecosystem conservation and restoration, threatened and endangered species recovery, neotropical migrant bird conservation, biological diversity, and public outdoor recreation opportunities.

Decision Framework:

The Regional Director for the Great Lakes-Big Rivers Region (Region 3) of the U.S. Fish and Wildlife Service will use this Environmental Assessment to select one of the alternatives and determine whether the alternative selected will have significant environmental impacts, requiring preparation of an Environmental Impact Statement (EIS). It is recommended that the reader refer to the Fire Management Plan (FMP) for the Big Muddy NFWR when reviewing this Environmental Assessment.

An FMP is needed to address current management issues, propose a plan of action, and meet current policy which the Service and its partners can use to achieve the future vision for the refuges and District.

Policy, Authority, Legal Compliance, and Compatibility:

The National Wildlife Refuge System includes Federal lands managed primarily to provide habitat for a diversity of wildlife species. The purpose(s) for which a particular refuge is established are specified in the authorizing document for that refuge. These purposes guide the establishment, design, and management of the refuge.

Additional authority delegated by Congress, Federal regulations/guidelines, Executive Orders and several management plans guide the operation and the management of the Refuge and provide the framework for the U.S. Fish and Wildlife Service's proposed action. The key statutes and orders that guide Big Muddy NFWR are summarized in the following section and under Authorities for FMP Development, page 2, of the FMP.

Lacey Act of 1900, as amended (16 U.S.C. 701)
Under this Law, it is unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants taken, possessed, transported, or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken possessed or sold in violation of State or foreign law.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711)
Migratory Bird Treaty Act of 1978 (40 Stat. 755)
The original 1918 statute implemented the 1916 convention between the U.S. and Great Britain (for Canada) for the protection of migratory birds. The 1978 Act amended the MBTA to authorize forfeiture to the U.S. of birds and their parts illegally taken, for disposal by the Secretary as he deems appropriate. Public Law 95-616 also ratified a treaty with the former Soviet Union specifying that both nations will take measures to protect identified ecosystems of special importance to migratory birds against pollution, detrimental alterations, and other environmental degradations.

Migratory Bird Conservation Act (1929), as amended (16 U.S.C. 715-715s)
The Act of 1929 established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of Interior for acquisition with Migratory Bird Conservation Funds. The Secretary of Interior is authorized to cooperate with local authorities in wildlife conservation and to conduct investigations, to publish documents related to North American birds, and to maintain and develop refuges.

Refuge Improvement Act (1997)
This Act calls for managing the National Wildlife Refuge System to conserve biological diversity by applying the latest scientific information and methods to refuge management and its evaluation, and by expanding the system through planned land acquisition. The Act also addresses how to determine the compatibility of each activity or "use" allowed on a refuge with the purpose of the refuge and the "wildlife first" mission of the National Wildlife Refuge System. It also requires each refuge to develop a 15-year comprehensive conservation plan.

Fish and Wildlife Coordination Act (1934), as amended (16 U.S.C. 661-666).
The Act of 1934 authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with Federal and State agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. In addition, this Act authorizes the preparation of plans to protect wildlife resources, the completion of wildlife surveys on public lands, and the acceptance by the Federal agencies of funds or lands for related purposes, provided that land donations received the consent of the State in which they are located.

Refuge Recreation Act, as amended, (Public Law 87-714.76 Sta. 653; 16 U.S.C. 460k 4 September 28, 1962).
This Act authorized the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes.

National Wildlife Refuge System Administration Act of 1966 (U.S.C. 668dd-668ee).
This Act provides guidelines and directives for administration and management of all areas in the system, including "wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas."

Fish and Wildlife Conservation Act of 1980 (Public Law 96-366, dated September 29, 1980). ("Non-game Act") (16 U.S.C. 2901-2911; 94 Stat. 1322).
Public Law 96-366 authorized the Service to monitor and assess migratory non-game birds, determine the effects of environmental changes and human activities, identify those likely to become candidates for endangered species listing, identify appropriate actions, and report to Congress 1 year from enactment. It also requires the Service to report at 5 year intervals on actions taken.

The National Wilderness Preservation Act of 1964 Public Law 88-577 (16 U.S.C. 1131-1136)
Established a National Wilderness Preservation System for the permanent good of the whole people, and for other purposes. From this Act, Wilderness Areas are designated.

The Protection of Timber Act of 1922 (42 Stat.857; 16 U.S.C. 594)
Provides basic authority for the Secretary of the Interior to protect timber of lands under the Department's jurisdiction from fire, disease, and insects.

The Federal Noxious Weed Act Public Law 93-629 (7 U.S.C. 2801 et. Seq.; 88Stat. 2148)
Established a program to control the spread of noxious weeds.

Fish and Wildlife Act of 1956, as amended [16 U.S.C. ss 742f (a) (4) (5)].
This Act is the specific law granting authority for acquiring lands for national wildlife refuges. Under this Act, the Secretary of the Interior is authorized to take steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources including but not limited to research, development of existing facilities, and acquisition by purchase or exchange of land and water or interests therein. The Act also authorizes the Service to accept gifts of

real or personal property for its benefit and use in performing its activities and services. Such gifts qualify under Federal income, estate, or gift tax laws as a gift to the United States.

Land and Water Conservation Fund Act of 1965.
This Act provides funding through receipts from the sale of surplus Federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the Fund may be used for matching grants to the states for outdoor recreation projects and for land acquisition by various Federal agencies, including the Service.

The Refuge Revenue Sharing Act of 1935, as Amended.
This Act established procedures for making payments to counties in which national wildlife refuges are located. Such payments come from revenues derived from the sale of products and privileges from national wildlife refuges, supplemented by Congressional appropriations. The revenues are deposited in a special Treasury account, and net receipts from this are distributed to counties or other units of local government to help offset their loss of tax revenue that occurs when land for national wildlife refuges is acquired by the Federal Government and removed from tax rolls. Three formulas are used to determine payments.

Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands).
These Executive Orders prohibit any significant changes to the natural and beneficial values of the floodplain or wetland and require avoidance of direct and indirect support of floodplain development.

Executive Order 12996 (Management and Public Use of the National Wildlife Refuge System).
This order defines a conservation mission for the Refuge System to "preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plants of the United States for the benefit of present and future generations." Six compatible Wildlife- dependent recreational activities (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) are defined as priority uses. The order also provides for the identification of existing wildlife-dependent uses that would continue to occur as lands are added to the system. The order defines four guiding principles for management: habitat conservation, public use, partnerships, and public involvement.

National Environmental Policy Act of 1969, as Amended.
Established a National policy for the environment. Preparation of this EA is a part of the Service's compliance.

Executive Order 12372 (Intergovernmental Review of Federal Programs).
In compliance, copies of this EA will be sent to the Minnesota Clearinghouse.

Clean Water Act, as Amended.
Section 404 of this Act requires that a U.S. Army Corps of Engineers permit be obtained prior to dredging or filling in waters of the United States.

Endangered Species Act of 1973, as Amended
Provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, through Federal and State actions. A consultation pursuant to Section 7 of the Endangered Species Act was conducted as part of this project to ensure that the proposal would not affect the continued existence of any endangered or threatened species in the project area or result in destruction or adverse modification of their critical habitats.

National Historic Preservation Act.
Section 106 of the Act of 1966 requires Federal agencies to consider the effects of their undertakings on properties meeting the criteria for the National Register of Historic Places. The regulations in 36 CFR, Part 800, describe how Federal agencies are to identify historic properties, determine effect on significant historic properties, and mitigate adverse effects. Section 110 of the 1966 Act codifies the salient elements from Executive Order 11593, "...to ensure that historic preservation is fully integrated into the ongoing programs and missions of Federal agencies." Section 110 also requires each Federal agency to establish a program to inventory all historic properties on its land.

Archaeological Resources Protection Act.
Section 14 of this Act of 1979 requires an inventory program of all Federal lands. It applies to the protection of all archeological sites more than 100 years old (not just sites meeting the criteria for the National Register) on Federal land and requires archaeological investigations on Federal land be performed in the public interest by qualified persons.

The Native American Graves Protection and Repatriation Act of 1990.
This Act directed Federal agencies to protect Native American human remains and associated burial items located on or removed from Federal land.

Chapter 2

Management Alternatives

Introduction:

The following alternatives are viable management alternatives developed with input from knowledgeable individuals and scrutinized by impartial professionals. **The alternatives are:**

Alternative A: ***(Preferred) Prescribed burning would be utilized as a management tool. All wildland fires will be suppressed.***

Alternative B: ***(No Action) No prescribed burning will be used. All wildland fires will be immediately suppressed.***

Alternative C: ***No prescribed burning will be used. All wildland fires will be monitored and managed accordingly.***

Descriptions of Alternatives
Alternative A: (Preferred) Prescribed burning would be utilized as a management tool. All wildland fires will be suppressed.

This alternative would allow for flexibility when considering management options. There are many benefits to the use of prescribed burning which, when combined with other management techniques such as mechanical and chemical treatments, allows for the best habitat management results. A considerable amount of effort will be expended in restoring native vegetation and habitat within the refuge. The use of prescribed fire will allow for the successful re-establishment and restoration of native habitat. Not only can time and money be saved, but the effects of fire management will meet habitat objectives in these fire adapted ecosystems better than any other method.

All wildland fires will be suppressed. Without the proper site preparation and pre-ignition controls involved in prescribed burning, wildland fires will have a greater likelihood of adversely affecting life, personal property, facilities, infrastructure and/or endangered species. Wildland fires will be suppressed utilizing Minimum Impact Suppression Techniques (MIST).

Alternative B - (No Action) No prescribed burning will be used. All wildland fires will be immediately suppressed.

This alternative prevents the use of prescribed burning as a management tool. Other, less effective and less efficient measures will be used to accomplish management objectives. All wildland fires will be suppressed immediately. The wetlands and open water that are interspersed throughout the refuge would act to help contain wildland fires and reduce the occurrence of ignition. Without the proper site preparation and pre-ignition controls involved in prescribed burning, wildland fires have greater likelihood of affecting life, personal property, facilities, infrastructure and/or endangered species. Wildland fires will be suppressed utilizing Minimum Impact Suppression Techniques (MIST).

Alternative C - No prescribed burning will be used. All wildland fires will be monitored and suppressed accordingly.

This alternative prevents the use of prescribed burning as a management tool. Wildland fires would be allowed to burn in all areas of the refuge, as long as they meet the following criteria:
• must not endanger human life or health.
• must not endanger private or government-owned property.
• benefits must outweigh damage to natural resources.
• must not have any negative impact on endangered, threatened, or rare species.
• must be capable of being easily brought under control with the resources immediately available.
• are subject to a daily review of fire behavior and conditions in a Wildland Fire Implementation Plan.

Wildland fires will be suppressed utilizing Minimum Impact Suppression Techniques (MIST).

Table 1

Summary of Management Alternatives

	Alternative A	Alternative B	Alternative C
Wildland Fire	Full Suppression	Full Suppression	Monitored and Managed
Prescribed Fire	Fire applied as necessary	No prescribed fire applied	No prescribed fire applied
Other Management Tools	Allows the use of mechanical or chemical treatments as needed	Use of mechanical or chemical treatments is imperative	Use of mechanical or chemical treatments is imperative
Habitat Management Results	Results likely met	Results likely not met	Results likely not met
Cost Effectiveness	Most effective	Least effective	Variable
Management Control	Maximum	Minimum	Moderate

Chapter 3

Affected Environment

General:

The Big Muddy NFWR currently consists of approximately 16,700 acres of bottomland and upland habitat. There are nine refuge units spread along the lower Missouri River between Kansas City, MO and Saint Louis, MO. The terrain of the refuge is characterized by steeply sloping hillsides or bluffs that connect higher elevation uplands to the river floodplain. The refuge is subject to large seasonal variation in river flow and precipitation. These dynamic conditions result in a diversity of floodplain habitat, including sloughs, chutes, owbow lakes, sandbars, deep pools, marshes, seasonally-flooded bottomland forest, and wet prairies.

Climate

The climate of Missouri features mild winters and warm summers. Normal precipitation at Kansas City is 37.62 inches and at St. Louis is 37.51 inches. Kansas City reports a normal maximum temperature for January of 35° Fahrenheit (F) and a normal minimum of 17° F; and for July, a normal maximum of 89° F and normal minimum of 68° F. St. Louis reports a normal maximum temperature for January of 38° F and a normal minimum of 21° F; and for July, a normal maximum of 89° F and a normal minimum of 70° F. Extreme temperatures for Kansas City range from a high of 109° F to a low of -23° F while St. Louis reports extremes of 107° F to -18° F.

Physical Features

The refuge lands are located along the lower Missouri River and within the Central Dissected Till Plains and Ozark Highlands Eco regions. The Central Dissected Till Plains Eco region is characterized by moderately dissected glaciated plains that slope toward the Missouri and Mississippi Rivers. This Eco region covers almost all of Missouri north of the Missouri River and extends into southern Iowa, and prairie portions of Kansas, Illinois, and Nebraska. In Missouri, this Eco region is blanketed with Pleistocene loess over glacial till that varies in thickness from complete absence in peripheral regions to over three hundred feet thick in northern Missouri. The Ozark Highlands Eco region is a distinct biogeographic region that includes most of southern Missouri and much of northern Arkansas and small parts of Illinois. Geologically, the Ozark Highlands is a low structural dome of essentially horizontally bedded strata that has been undergoing erosion and weathering for a quarter billion years into a thoroughly dissected plateau. The exceptional length of geologic erosion, coupled with a central geographic location in North America and tremendous physiographic diversity, has created a region of unique ecosystems (Nigh and Schroeder 2002).

Vegetation

The majority of the lands on the Big Muddy NFWR consist of floodplain forest, upland forest, savannas/woodlands, and open grasslands. From 1826 to 1972 the Missouri River floodplain forest coverage between Kansas City and St. Louis decreased approximately 63 percent (Bragg, T.B., and A.K. Tatshi 1977). This reduction has adversely affected wildlife species that depend on forest for shelter, feeding, and breeding habitat. Floodplain forest along the lower Missouri River are characterized by cottonwood (*Populus deltoids*), black willow (*Salix nigra*), silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*), and box elder (*Acer negundo*). Upland forest,

woodlands, and savannas are dominated by a suite of oak and hickory species as well as walnut, maple, and elm. Grasslands within the refuge include dry, mesic, and wet prairie. Drier grassland are characterized by Indian grass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), while wetter sites contain prairie cordgrass (*Spartina pectinata*), sedges (*Carex spp.*), and smartweed (*Polygonum spp.*).

Wildlife

Over 300 species of birds have been observed on Big Muddy NFWR since its inception. Refuge lands are important for a variety of migratory birds including waterfowl and neotropical migrants. There are over 100 species of fish that are known to occur in the lower Missouri River, including the federally endangered pallid sturgeon (Grace and Pflieger 1985, Hooker 1996, Kubisiak 1996, Funk and Robinson 1974). The refuge supports over 40 species of mammals including white-tailed deer, coyote, red fox, raccoon, muskrat, striped skunk, meadow vole, mink and bobcats. There are 133 known species of butterflies and moths, including the regal fritillary. Over 80 species of reptiles and amphibians occur on the refuge with some of the more common species including northern leopard frog, tiger salamander and American toad. Snapping turtle, western painted turtle, softshell turtle, and timber rattlesnakes are a few of the reptiles that can be found using the refuge. See Appendix G of the Big Muddy FMP for a complete species list.

Threatened, Endangered, and Candidate Species

The lower Missouri River provides habitat for six federally endangered species (See Appendix H). They include the Interior Least Tern, Piping Plover, Gray Bat, Indiana Bat, Pallid Sturgeon, and Decurrent False Aster. Neither the Gray Bat, Indiana Bat, nor Decurrent False Aster has been found on Big Muddy NFWR.

The three federally listed threatened or endangered species that are known to occur on the refuge include the Least Tern, Piping Plover, and Pallid Sturgeon. All three of these species are associated with riverine or floodplain habitat and would not be directly affected by fire activities. Least Terns and Piping Plovers utilize emergent sandbar habitat as nesting sites when river levels drop and expose portions of the floodplain. Pallid Sturgeon are a fish species endemic to the Missouri and lower Mississippi Rivers. Pallid Sturgeon rely on slow-moving side channels of the river for spawning grounds.

Appendix G of the Big Muddy Fire Management Plan lists Federally and State Threatened and Endangered species present in Missouri.

Archeology

Archeological sites are reported in every county in which refuge lands are located. However, very few archeological sites have been identified on the refuge. Some loss of resources can occur as a result of erosion or other natural processes, or from unauthorized collecting and vandalism. Native American remains and cultural objects found on the refuge are subject to repatriation to descendents and culturally affiliated tribes. At this time, culturally affiliated tribes include the Missouri, Osage, and Kansas tribes. Other artifacts, including any Native American remains and cultural objects not repatriated, collected from refuge lands will be preserved in approved repositories. At this time the approved repository for service lands in Missouri is the University of Missouri at Columbia. Collection and excavation of archeological material on refuge lands is permitted only when conducted

in the public interest. The regional director regulates collection and excavation through the issuance of permits.

Chapter 4

Environmental Consequences

Impacts Common to All Alternatives

There are potential impacts common to all of the proposed alternatives. They are found as follows and not repeated in the individual alternatives.

Cultural Resources

Impacts to archeological resources by fire may vary. Preparation for prescribed fire or activities to control wildfire are subject to Section 106 of the National Historic Preservation Act. Rather than repeat the protocols and procedures followed within Region 3 of the U.S. Fish and Wildlife Service here, the accepted methodology is described in detail and found in Appendix A of the Big Muddy NFWR Fire Management Plan.

The alternatives described and considered for selection are as follows:

Alternative A: (Preferred) Prescribed burning would be utilized as a management tool. All wildland fires will be suppressed.

Habitat Impacts

This alternative would allow for flexibility when considering management options, particularly in restoration and maintenance of fire adapted plant communities. Prescribed fire will allow for the control of undesirable grasses and encroaching woody vegetation within grassland habitat. The transition of previously farmed agricultural lands to restored grasslands is best accomplished and maintained with the use of prescribed fire.

Fire may also be used as a tool to enhance and restore upland woodlands and savannas. Low intensity fire has been shown to have a positive effect on oak and hickory recruitment. Prescribed fire will also trigger the germination of many fire adapted herbaceous plants within a woodland or savanna.

Biological Impacts

Conversion of senescent agricultural fields that are dominated by non-native plants to desirable native vegetation will provide higher quality habitat for wildlife. A landscape that is a matrix of varying habitat types at different seral stages will provide the greatest potential for biodiversity.

Listed Species

It is not anticipated that any listed species will be affected by prescribed fire activities. The three federally endangered species know to occur on the refuge, the interior least tern, piping plover and pallid sturgeon, are all associated with riverine habitats. Prescribed fire activities on the refuge will be

limited to upland sites and will have no direct effect on any listed species known to occur on the refuge.

Since this alternative allows for control over the timing of burns and suppression of ill-timed wildland fires, it is considered the alternative that best meets the needs of management to restore and maintain habitat that benefits wildlife species.

Administration
Prescribed burning is generally more cost-effective than other management tools. Without the use of prescribed burning, heavy equipment and chemicals will be required to accomplish management goals of habitat restoration. Heavy equipment is time consuming and expensive to operate. Chemical use for controlling undesirable vegetation is costly, demands strict oversight, and may pose unknown risks to the environment. Further, unlike fire, these two methods are not natural to the ecosystem.

Health and Safety
There is some risk of visitors being near an area where wildland fire or prescribed fire operations are ongoing. Mitigation of this risk involves the use of closures, signage and patrol by refuge staff. Employees would be at some risk during all fire operations including prescribed fire application.

Cumulative Impacts
There are several potential impacts that may be considered cumulative. One is the effect of smoke from either wildland or prescribed fires on visibility within the refuge area. Proper planning of prescribed fire operations would mitigate a large percentage of this impact over the immediate area. Prescribed fire smoke effects on regional haze and impact on visibility in the area is not known but can be expected to add to haze levels on burn days. Smoke from wildland fire would also have an effect on regional haze, but is considered a natural event under EPA air quality regulations.

A second cumulative effect of prescribed fire under this alternative is the restoration and maintenance of fire adapted plant communities. Continued loss of native habitat due to the exclusion of fire within the refuge would cease.

A third potential effect is the enhancement wildlife populations with improved habitat conditions. Prescribed fire planning would address issues of timing to reduce conflicts with nesting and fledging seasons. Additionally, grasslands are recognized by many as the most imperiled ecosystem worldwide. The avian assemblages associated with grasslands also are at risk, since grassland bird populations have shown steeper, more consistent, and more geographically widespread declines than any other guild of North American species (Department of the Interior 1996). Breeding Bird Survey (BBS) data from 1966-1993 indicate that almost 70 percent of 29 grassland bird species adequately surveyed by BBS data had negative population trends; more than half of these were statistically significant (Northern Prairie Wildlife Research Center, USGS). Restoration of prairie communities would increase the acreage of this valuable and currently reduced cover type so important to grassland birds.

Alternative B - (No Action) No Prescribed burning will be used. All wildland fires will be immediately suppressed.

Habitat Impacts
Under this alternative, refuge habitats can be managed successfully; however, management is much more costly and labor intensive. Without the ability to conduct prescribed burns on the refuge, habitat conditions will continue to deteriorate for area wildlife. Increased encroachment of undesirable invading woody species and undesirable plants would likely continue in the absence of fire, and management options for dealing with these plants, and proliferating native vegetation will be limited to mechanical and chemical means.

Biological Impacts
Nearly every species which relies upon the grasslands or open woodlands would be potentially negatively impacted should management lose the ability to properly utilize prescribed fire as a management tool.

Listed Species
In the absence of fire, chemical and mechanical treatments would be needed to simulate the disturbance caused by fire. Chemicals would have to be applied carefully to avoid collateral damage to desirable plant species. Care would also have to be taken to ensure that chemical runoff into aquatic habitats is avoided. Management practices involving mechanical site disturbances to control undesirable vegetation may leave soils barren and exposed to the elements, increasing surface erosion, and possibility of being colonized by non-native plant species.

Administration
Heavy equipment and chemicals will be required to accomplish management goals. Heavy equipment is expensive to acquire and maintain, time consuming to operate, and requires specialized operator training. Mechanical methods of controlling vegetation are costly and labor intensive. The use of chemicals is costly, demands strict supervisory oversight, and may pose unknown risks to the environment. Mechanical and chemical treatments on a regular basis are not as cost effective as prescribed fire application.

Health and Safety
The use of chemicals for the control of undesirable vegetation can pose a health risk to the applicator. There is some risk to refuge visitors under this alternative from wildland fire but none from prescribed fire operations. Wildland fire suppression risk to employees is identical to the risk under Alternative A. Since prescribed fire operations are not to be used, there is no risk to employees.

Cumulative Impacts
There are several potential impacts that may be considered cumulative. One is the effect of smoke from wildland fires on the visibility within the refuge area. Smoke from wildland fire would also have an effect on regional haze, but is considered a natural event under EPA air quality regulations. Prescribed fire is not an issue under this alternative.

The second cumulative effect is related to restoration of native plant communities from their current condition by chemical or mechanical means. Chemical and mechanical methods are much more costly to implement than prescribed fire. Under this alternative, a loss of, or reduction in funding to support

equipment and chemical costs could potentially cause a loss of habitat on the refuge, and thus the species that depend on it.

The loss of fire coupled with ill-timed mechanical and chemical treatments could result in a loss of critical habitat for species of concern.

Alternative C - No Prescribed Burning will be used. All wildland fires will be monitored and managed accordingly.

Habitat Impacts
Restoring and maintaining native plant communities using chemical and mechanical means will be less effective than fire, but may still meet the objectives. Without the ability to conduct prescribed burns on refuge lands, conditions will deteriorate for area wildlife. In the absence of fire, grasslands and open woodlands may deteriorate and become more susceptible to invasion by undesirable plants and woody species. Management options for dealing with undesirable plants while enhancing native vegetation are limited to mechanical and chemical options.

Biological Impacts
Without the effective use of fire, grasslands and open woodlands will likely experience invasion by undesirable vegetation, forcing wildlife to look for suitable habitat elsewhere. Wildland fires would be allowed to burn as long as they weren't posing a threat to private, government, historical, or economically important properties. Under this Alternative, whole sections of upland forests and woodlands could potentially be destroyed. This could cause a major shift in habitat types and wildlife usage, and could also potentially threaten wildlife populations on refuge lands. In addition, depending on the time of occurrence of the wildfire, ground nesting birds could be severely impacted through the loss of active nests.

Management would be principally through mechanical and chemical means. Mechanical and chemical treatments would have to be timed so as not to conflict with nesting and fledging birds. The natural maintenance of native, fire adapted plant communities through the use of prescribed fire would not occur. This would have long term implications regarding degradation of critical habitat.

Listed Species
In the absence of fire, chemical and mechanical treatments would be needed to simulate the disturbance caused by fire. Chemicals would have to be applied carefully to avoid collateral damage to desirable plant species. Care would also have to be taken to ensure that chemical runoff into aquatic habitats is avoided. Management practices involving mechanical site disturbances to control undesirable vegetation may leave soils barren and exposed to the elements, increasing surface erosion, and possibility of being colonized by non-native plant species. Wildland fire, if allowed to burn at the wrong time, may also contribute to destruction of critical habitat.

Administration
Mechanical methods of restoring and maintaining vegetation are costly and labor intensive. The use of chemicals is costly and demands strict supervisory oversight. Fire is the most cost-effective means for accomplishing management goals and needs.

Health and Safety

The use of chemicals for the control of undesirable vegetation can pose a health risk to the applicator and the environment. There is some risk to visitors under this alternative from wildland fire but none from prescribed fire operations. Wildland fire monitoring risk to employees is similar to the risk under Alternative A. Since prescribed fire operations are not to be used there is no risk to employees.

There is some risk to visitors near an area where wildland fire use operations are ongoing. Mitigation of this risk involves the use of closures, signage, and patrol by refuge staff.

Cumulative Impacts

There are several potential impacts that may be considered cumulative. One is the effect of smoke from wildland fires on the visibility of the refuge airshed. Smoke from wildland fire would also have an effect on regional haze, but is considered a natural event under EPA air quality regulations. Monitored fires are likely to be longer duration events.

The second cumulative effect is related to restoration of native plant communities from their current condition by chemical or mechanical means. Under this alternative, a loss of, or reduction in funding to support equipment and chemical costs could potentially cause a loss of habitat on the refuge, and thus the species that depend on it.

The lack of fire, or ill-timed fire, mechanical, or chemical treatment could result in a loss of critical habitat, possible migration of many species to less desirable areas, a decrease in biodiversity, a decline in migratory bird usage. These declines could result from reduced habitat and water quality, along with reduced diversity.

Matrix – Table 2

Summary of Environmental Consequences by Alternative

Impact	**Alternative A** - Full Wildland Fire Suppression, Prescribed fire applied as necessary. May Include the use of mechanical fuels treatments as needed.	**Alternative B** - Full Wildland Fire Suppression, No prescribed fire applied (No Action Alternative)	**Alternative C** - Wildland Fire Monitored and Managed Accordingly, No Prescribed Fire Applied.
Environmental Justice	No Environmental Justice Issues identified	No Environmental Justice Issues identified	No Environmental Justice Issues identified
Cultural Resources	Wildland Fire Impacts expected to be minimal	Wildland Fire Impacts expected to be minimal	Wildland Fire Impacts expected to be minimal
Habitat	Habitat Improved quality.	Potential decline in habitat quality.	Potential decline in habitat quality.
Biological	Improvement	Low possibility of any improvement	Potential decline in biological quality and diversity.
Listed Species	No Change	No Change	No Change
Administrative	Reduced Management Impacts	Higher costs for management are likely	Higher costs for management are likely
Health and Safety	Some increased risk in prescribed fire operations. No change to public safety.	No improvement in employee risk. No change to public safety.	Some decrease to employee safety. Potential elevated risk to public safety.
Cumulative	Improvement of overall habitat quality. Greatly improved habitat for ground nesting birds.	No meaningful change	No meaningful change

Chapter 5

List of Preparers

Tim Hepola, Regional Fire Ecologist, Ft. Snelling

Jeff Gosse, Regional NEPA Coordinator, Ft. Snelling

Tom Bell, Refuge Manager, Big Muddy NFWR

Jestin Clark, Wildlife Refuge Specialist, Big Muddy NFWR

Chapter 6

List of Agencies, Organizations, and Persons Contacted

Elected Federal Officials

Federal Agencies

City/County/Local Governments

U.S. Post Office

Public Libraries

Organizations

Chapter 7

Public Comments and Responses

This Fire Management Plan and Environmental Assessment were opened for a 30 day public review and comment period starting on December 16, 2011. The news release is found on the next page.

A copy of both the Fire Management Plan and Environmental Assessment were made available for public viewing at http://www.fws.gov/midwest/Fire/.

U.S. Fish and Wildlife Service Seeks Public Comment on draft Fire Management Plan for the Big Muddy National Fish and Wildlife Refuge

The U.S. Fish and Wildlife Service is seeking public comment on a draft Fire Management Plan for Big Muddy National Fish and Wildlife Refuge. Once approved, the plan will direct the use of fire for managing habitats and responding to wildfires on the refuge for the next five years.

The draft Fire Management Plan follows recommendations established in the approved Environmental Assessment and Interim Comprehensive Management Plan written for Big Muddy National Fish and Wildlife Refuge in January 1999. The draft plan is available on the Internet at: http://www.fws.gov/midwest/Fire/. Printed copies can also be obtained by calling Big Muddy National Fish and Wildlife Refuge at 573-876-1826; by faxing a request to 573-876-1839; or by writing to Big Muddy National Fish and Wildlife Refuge, 4200 New Haven Road, Columbia, MO 65201. Written comments on the FMP can be mailed to Jestin Clark at Big Muddy National Fish and Wildlife Refuge, faxed to the fax number above, or sent via e-mail to jestin_clark@fws.gov. Comments should be received by the Refuge by the close of business January 20, 2012.

The Big Muddy NFWR currently consists of 16,700 acres of bottomland and upland habitat. There are nine refuge units spread along the lower Missouri River between Kansas City, MO and Saint Louis, MO. The terrain of the refuge is characterized by steeply sloping hillsides or bluffs that connect higher elevation uplands to the river floodplain. The refuge is subject to large seasonal variation in river flow and precipitation. These dynamic conditions result in a diversity of floodplain habitat, including sloughs, chutes, owbow lakes, sandbars, deep pools, marshes, seasonally-flooded bottomland forest, and wet prairies.

The U.S. Fish and Wildlife Service is the principal federal agency responsible for conserving, protecting and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people. The Service manages the nearly 100-million-acre National Wildlife Refuge System, which encompasses 548 national wildlife refuges and 37 wetland management districts that contain thousands of small wetlands and other special management areas. It also operates 70 national fish hatcheries, 71 Fishery and Wildlife Management Resource offices, and 81 ecological services field stations. The agency enforces federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, and helps foreign governments with their conservation efforts. It also oversees the Federal Assistance program, which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

Written comments received in response to the 30 day public review period for the Big Muddy NFWR FMP

Chapter 8

References Cited

Bragg, T.B. and A.K. Tatshi. 1977. Changes in floodplain vegetation and land use along the Missouri River from 1826 to 1972. Environmental Management 1(4).

Funk, J.L. and J.W. Robinson. 1974. Changes in the channel of the lower Missouri River and effects on fish and wildlife. Aquatics Series No. 11. Missouri Department of Conservation.

Grace, T.B. and W.L. Pflieger 1985, Fish Survey of the Missouri and Mississippi River. Missouri Department of Conservation.

Hooker, J.B., Fish use of lower Missouri River scour holes for reproduction of larval nursery. 1995-Annual Progress Report. Univeristy of Missouri, Columbia, MO.

Kubisiak, J. 1996. Fish use of lower Missouri River scour holes as nursery and the influence of connectivity. 1995-Annual Progress Report. University of Missouri, Columbia, MO.

Mingo National Wildlife Refuge Environmental Assessment to the Fire Management Plan

Nigh, T.A. and W.A. Schroeder 2002, Atlas of Missouri Ecoregions. Missouri Department of Conservation.

Union Slough Wildlife Refuge Final Environmental Assessment to the Fire Management Plan (FMP)

Chapter 9

Intra-Service Section 7 Biological Evaluation Form
Region 3

Originating Person: _____ Telephone Number: _____

Date Submitted: _____

For assistance with section 7 reviews, go to Region 3's Section 7 Technical Assistance website:
http://www.fws.gov/midwest/endangered/section7/s7process/

I. **Service Program and Geographic Area or Station Name**:
II. **Location**: Location of the project including County, State and TSR (township, section & range):

III. **Species/Critical Habitat**: List federally-listed, proposed, and candidate species or designated or proposed critical habitat that may occur within the action area. :

IV. Project Description: Describe proposed project or action, including all conservation elements. If referencing other documents, prepare an executive summary. Include map and photos of site, if possible. (Attach additional pages as needed):

V. Determination of Effects
A. Description of Effects Describe how the action(s) will affect the species and critical habitats listed in item III. Your rationale for the Section 7 determinations made below (in VB.) should be fully described here.

B. Determination: Determine the anticipated effects of the proposed project on species and critical habitats listed in item III. Check all applicable boxes and list the species (or attach a list) associated with each determination**. For assistance with making appropriate Section 7 determinations, go to Region 3's Section 7 Technical Assistance website: http://www.fws.gov/midwest/endangered/section7/s7process/**

Mark all that apply

No Effect: This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. No concurrence from ESFO required.

List species/critical habitat:

May Affect but Not Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects to individuals and designated critical habitat. Concurrence from ESFO required.

List species/critical habitat:

May Affect and Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to adversely impact individuals of listed species or designated critical habitat of such species. Concurrence from ESFO required.

List species/critical habitat:

Not Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project is not expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. Concurrence from ESFO required.

List species/critical habitat:

Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. Concurrence from ESFO required.

List species/critical habitat:

Signature [Supervisor at originating station]

Date

Reviewing Ecological Services Office Evaluation (check all that apply):

A. Concurrence _____ **Non-concurrence** _____
Explanation for non-concurrence:

B. Formal consultation required _____
List species or critical habitat unit(s):

C. Conference required _____
List species or critical habitat unit(s):

Name of Reviewing ES Office: _____

_____

Signature Date

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JSzymanski\19 June 2002