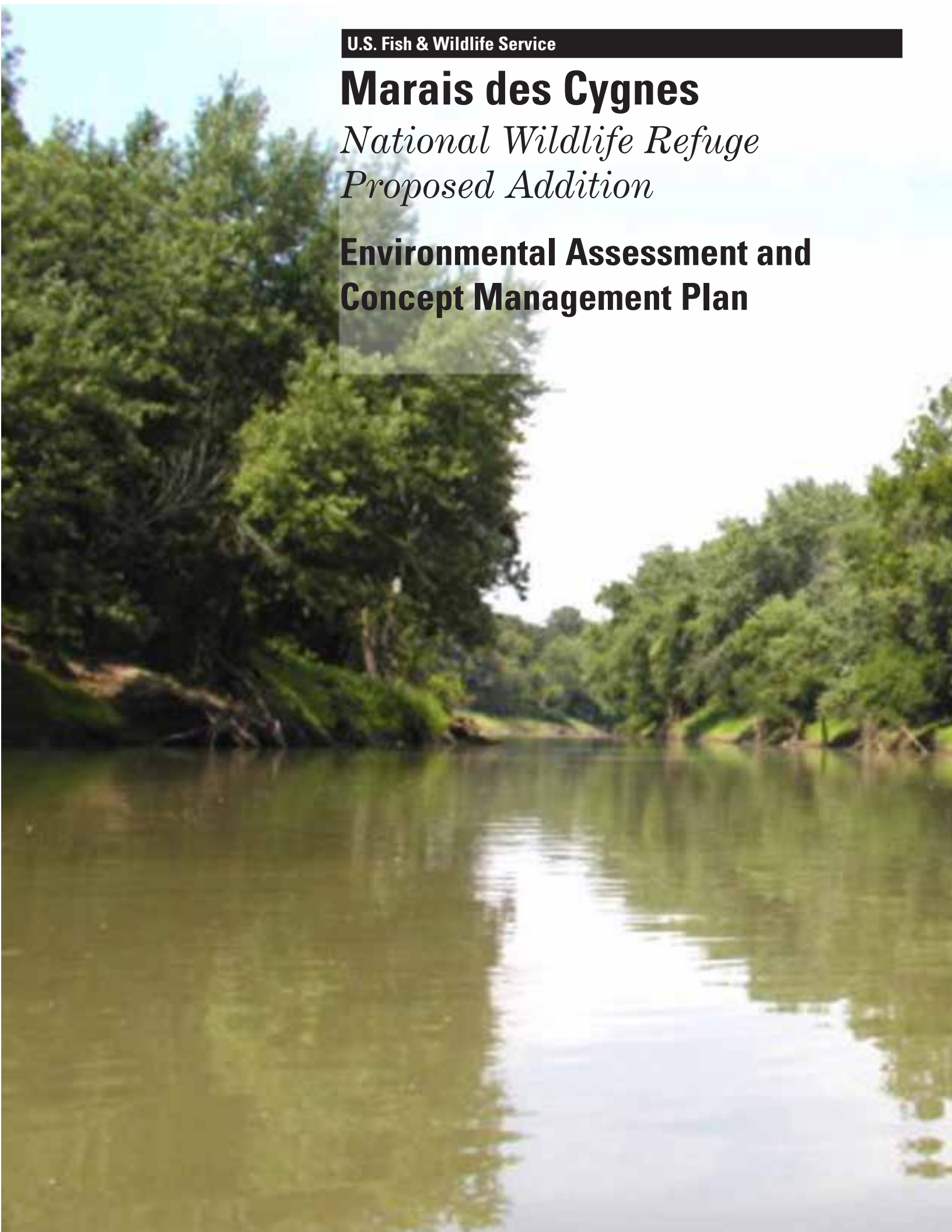
U.S. Fish & Wildlife Service

Marais des Cygnes

National Wildlife Refuge
Proposed Addition

Environmental Assessment and Concept Management Plan



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Chapter 1.0 – Purpose And Need For Action

1.1 Introduction

This Environmental Assessment (EA) provides the public and agency decision-makers with an analysis of the range of options to restore, enhance, and protect wetland and upland habitats within a proposed new addition (Addition) to an existing national wildlife refuge. The Addition is proposed for Marais des Cygnes National Wildlife Refuge, which is located in Linn County, Kansas (Figure 1). The Addition would occur in Bates County, Missouri, and includes parts of Homer and Walnut townships (Figure 2). The proposed Addition could eventually restore and protect a landscape of 5,255 acres of floodplain hardwood forest with associated shallow and deepwater wetlands, 5,890 acres of tallgrass prairie and savannah, 7.2 miles of large streams, and 8.8 miles of river.

"Oxbow Wetland" along Marais des Cygnes River

The EA also publicly discloses the direct, indirect, and cumulative effects of each strategy on the quality of the human environment, as required by the National Environmental Policy Act of 1969 (P.L. 91-190), as amended). The Interim Comprehensive Conservation Plan found in Appendix A presents a blueprint for management practices and public recreational opportunities on the proposed addition to Marais des Cygnes National Wildlife Refuge (Refuge).

1.2 Purpose

An Addition to the Refuge is being proposed by the U.S. Fish and Wildlife Service (Service) as a means of preserving and restoring floodplain hardwood forest, wetlands, tallgrass prairie, and riverine habitats for the fish and wildlife species dependent on them. Protection of the area would meet goals of the North American Waterfowl Management Plan which in 1998 identified the need to restore and protect an additional 8,030 acres of wetland within the mid and upper reaches of the Marais des Cygnes River. In a 1998 assessment of the West Osage River Basin, the Missouri Department of Conservation stated "Expansion of this refuge [MDC NWR] into Missouri should be given a high priority". This assessment was based largely on the area's importance to reproduction of paddlefish (Dent et al. 1998). The Nature Conservancy in 2000 identified the reach of the Marais des Cygnes River along the Kansas/Missouri State Line as one of 177 areas in the Great Plains that should be protected . The areas it identified only encompass 14 percent of the Great Plains and are considered to be ecologically functioning landscapes of biological significance. The mid reach of the Marais des Cygnes River was specifically identified by the Nature Conservancy as a "High Quality River System" (TNC 2000).

Figure 1: Marais des Cygnes NWR and Study Area for Proposed Addition

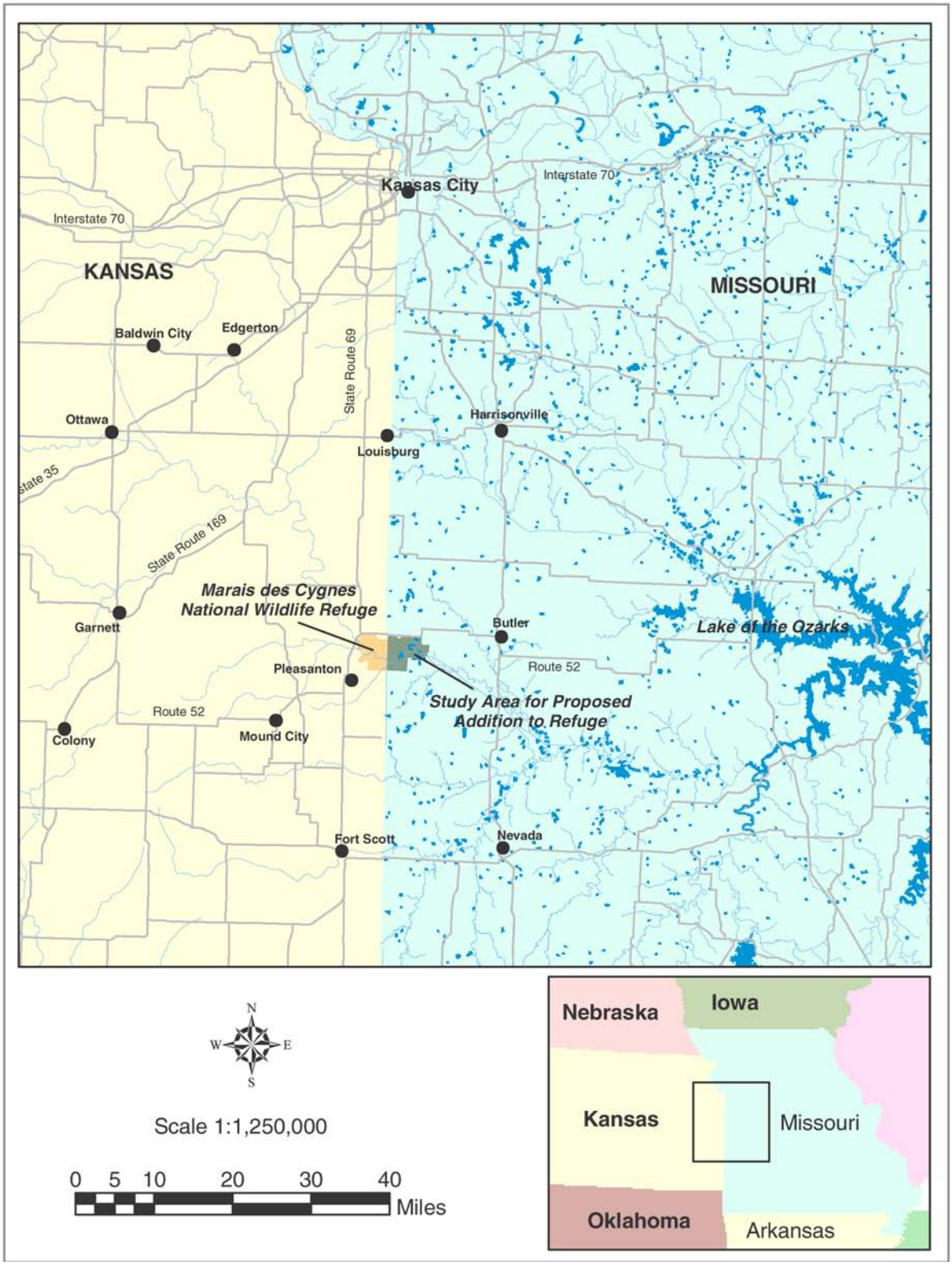
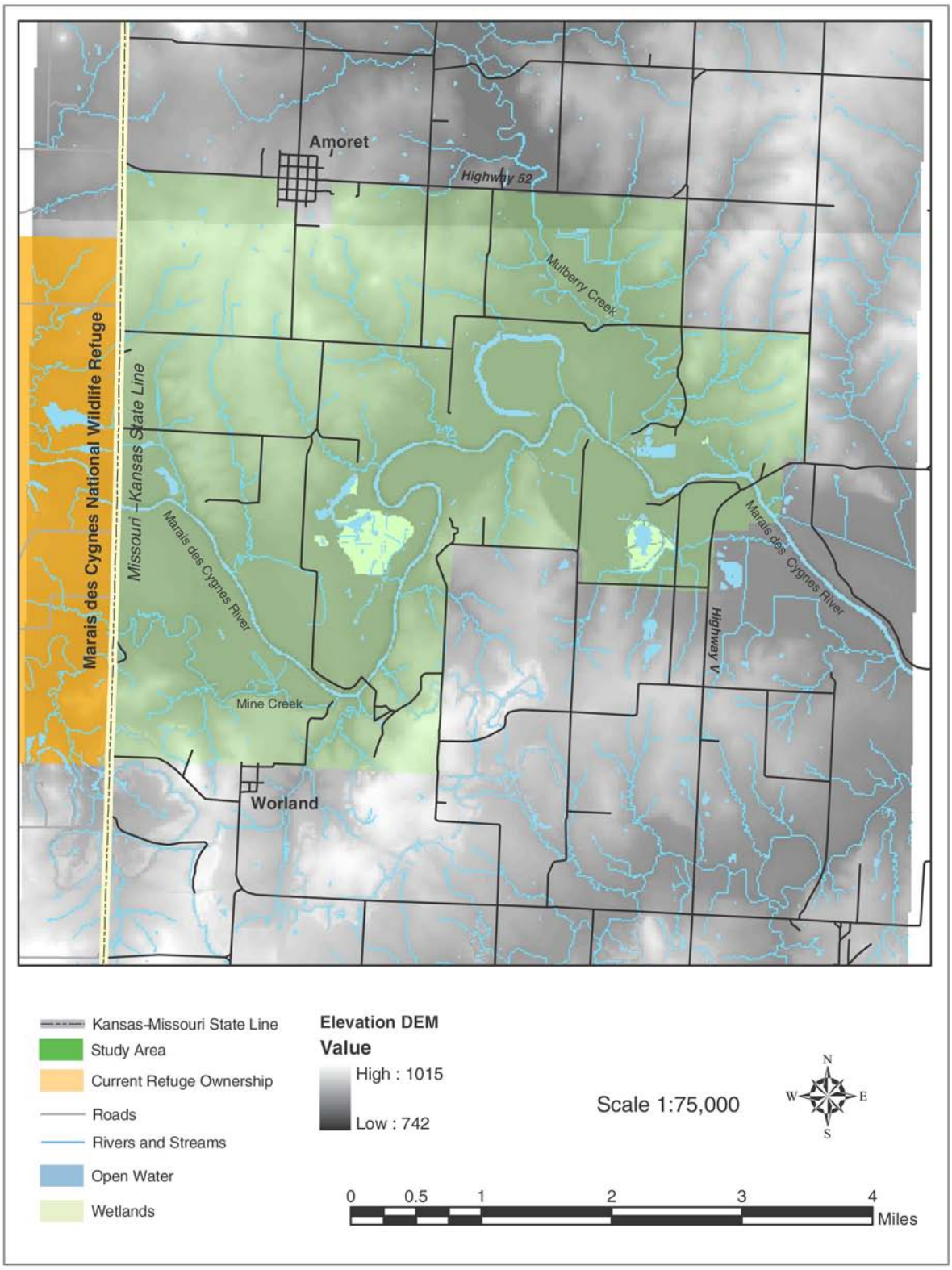


Figure 2: Study Area for Proposed Addition to Marais des Cygnes NWR



1.3 Need for Action

There is a need to prevent further fragmentation and degradation of the rare habitats found in this area in as large of contiguous blocks as possible, benefiting the species that depend upon them. Many species of Service interest are sensitive to the impact of other competing species due to the "edge effect" of small habitat blocks.

Native prairie has declined by 99.67 percent in Missouri, and there is a critical need to protect and restore the remnant prairie found on the Refuge. Protection of the Addition area in Missouri, in conjunction with the adjacent Marais des Cygnes National Wildlife Refuge and Marais des Cygnes Wildlife Area in Kansas, and with successful land acquisition, could protect a continuous block of 27,000 acres of wildlife habitat and 27 miles of river.

There is a need to protect large blocks of floodplain hardwood forests and their associated wetlands, which are critical habitat for trust species such as the Red-shouldered Hawk, the Cerulean Warbler and the broadhead skink. The Red-shouldered hawk and the Cerulean Warbler are rare/declining species and habitat degradation has been identified as a factor contributing to their decline.

Prairie rivers throughout the Midwest have lost many species of fish and mussels due to changes in hydrology, siltation, and pollution. There is a need to protect relatively unmodified prairie rivers from further habitat degradation.

Floodplain hardwood forest along Mine Creek.

1.4 Background

Quality floodplain hardwood forest, wetlands, tallgrass prairie, and riverine habitat are critical for a host of migratory birds, waterfowl, and indigenous species. These highly productive habitats should be protected or restored whenever possible. The proposed Addition is within the Osage Plains Region, an area dominated by open rangeland and forested streams and known for its rich diversity of prairie and forest wildlife. Much of the floodplain hardwood forests and native prairies in the region have been converted to other uses including fescue pasture and cropland. Existing tracts of floodplain hardwood forest continue to be threatened by conversion to these uses. Remaining tracts of prairie are threatened by conversion to non-native grasses, forestation, and noxious weeds. Many of the prairie streams and rivers in the region have been dammed and/or levees placed along their banks to prevent flooding of the floodplain. Remaining rivers, such as the Marais des Cygnes, with few of these impacts harbor a rich diversity of mussels and migratory fish.

The southern edge of the Kansas City metropolitan area of 1.6 million people is within 45 miles of the proposal area. Fragmentation of wildlife habitat is occurring rapidly as retirement homes and hobby farms are built throughout the

region. River bottoms are increasingly under pressure for timber harvest and construction of levees to prevent flooding and create "higher value" land.

Species of grassland and forest birds that require large tracts of native grassland or mature floodplain forest are declining throughout their range. Many species of migratory fish and mussels found in prairie rivers are also declining rapidly. Recent research has shown that large blocks of grasslands and floodplain hardwood forest habitats, such as those located within the proposed Addition, may be very important to reversing the downward trend. Large prairie rivers with annual flood events and an unobstructed floodplain, as is found in the proposal area, are also uncommon and biologically important.

The Fish and Wildlife Service is the primary federal agency responsible for conserving migratory species and appears to be the only entity available to acquire these lands for permanent resource protection. Many other organizations and agencies agree with the concept of protection but are not able to make the long-term financial and management commitment necessary to effect protection.

The following paragraphs describe the habitat concerned in this Environmental Assessment.

1.4.1 Wetlands

The majority of wetlands in the proposed Addition area would be located within the forested floodplain. The most common type of wetlands are characterized by many small depressions less than 5 acres in size and less than 2 feet deep. These wetlands are often filled by local rain events. Large portions of the floodplain are inundated by an average of 4 feet of water two to three times per year (Gleason 2000). Deeper oxbow wetlands up to 7 feet deep are also present and rarely go dry.

In Missouri, as of 1990, it was estimated that 13 percent of natural, pre-settlement wetlands remained (Dahl 1990). Most of the 87 percent of wetlands that were lost were located along forested streams and rivers.

Many floodplain wetlands have been leveed/ditched to prevent river flooding and carry off local rains for agricultural production. Others have been either flooded (upstream) or flooding has been eliminated (downstream) by reservoirs.

Today, there is a new understanding of the valuable role wetlands play in ecology. Wetlands provide a host of direct benefits to humans including acting as natural filters for pollution and reducing the extent of flooding. In addition to being key habitat for migratory birds, wetlands also serve as nurseries for a variety of fish and mussel species.

The wetlands of the restored Addition area would provide feeding and/or nesting areas for local waterfowl such as the Wood Ducks, Hooded Merganser, Mallard, and Canada Goose. Most waterfowl use would occur during spring and fall migration with as many as 25 different species migrating through the area. Wintering populations of waterfowl would largely consist of mallard and Canada Geese. Other wetland-dependent wildlife, such as Great Blue and Green Heron, egrets, otter, young paddlefish, and flat floater mussels would also gain additional habitat.

1.4.2 Floodplain Hardwood Forest

Stands of floodplain forest are largely comprised of pecan, pin oak, shellbark hickory, green ash, and American Elm. These forests are extremely important for the Cerulean Warbler, Red-shouldered Hawk, and broadhead skink, which are dependent on large stands of mature floodplain forest

Flooding frequency and duration are extremely important in determining the composition of floodplain forests. Reductions in flooding allow the invasion of upland species while increased flooding kills mast species and allows the invasion of more water-tolerant species such as silver maple, cottonwood, and willow. Flooding in the proposed Addition area, based on observance of natural regeneration, still appears to favor the dominance of hardwoods.

1.4.3 Tallgrass Prairie

Native prairie has declined by 99.67 percent in Missouri (Taney and Auckley 1987). Grassland bird species have shown steeper, more consistent, and geographically more widespread declines than any other group of North American birds (Knopf 1994). Fifty-five grassland plants or animal species in the U.S. are threatened or endangered (Samson and Knopf 1994).

Tallgrass native prairie near Amoret, Missouri.

The need for tallgrass prairie habitat preservation and restoration has become more critical each year as remaining native grasslands are lost and populations of many grassland bird species continue to decline throughout their range. Native tallgrass prairie habitats in Missouri can contain 200 to 300 species of plants. Many of our most endangered plant and animal species reside on remaining prairie fragments. Remnant prairies within the Addition area likely contain populations of the threatened Mead's milkweed. Missouri and Kansas are believed to be the only two remaining states that harbor viable populations of this once widely distributed prairie plant.

1.4.4 Prairie River

Prairie rivers throughout the Midwest have lost many species of fish and mussels due to changes in hydrology, siltation, and pollution. Few if any large prairie rivers remain that have not suffered at least some adverse impacts. Remaining rivers with fewer impacts, such as the mid reach of the Marais des Cygnes River, which bisects the proposed Addition area, harbor a host of increasingly uncommon species including paddlefish and many species of mussels.

Several mussel beds on the adjacent national wildlife refuge each harbor over 10,000 mussels. A total of 30 different mussel species have thus far been documented to occur in the River and adjacent floodplain wetlands. The gravel beds that support the mussels likewise are believed to be important natural spawning sites for paddlefish and walleye (Dent, et al. 1997).

1.4.5 Trust Species

1.4.5.1 Migratory Birds

The original floodplain hardwood forests and tallgrass prairies of western Missouri were important habitats for countless migratory birds. However, the State of Missouri has lost 99.67 percent of its original, pre-settlement prairies and over 87 percent of its wetlands.

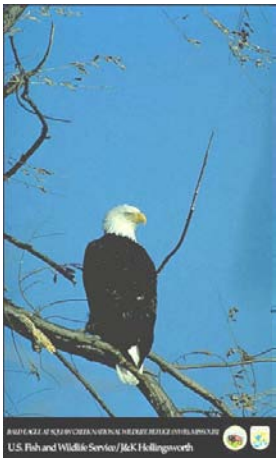
To varying degrees, grassland bird species have adapted to and co-existed with agriculture for most of the past century. However, grassland bird populations are steadily declining in Missouri and other Midwest states due to continued habitat fragmentation and degradation.

The following migratory bird species are listed as Resource Conservation Priorities by Region 3 of the U.S. Fish and Wildlife Service and will benefit from the proposed project: Bald Eagle, Wood Thrush, Piping Plover, Least Tern, Loggerhead Shrike, Grasshopper Sparrow, and Dickcissel. Other birds known to use the area include Cerulean Warbler, Bell's Vireo, Red-shouldered Hawk, American Bittern, American Woodcock, Henslow's Sparrow, Scissor-tailed Flycatcher, and Short-eared Owl.

The landscape of the region has subtly changed from one dominated by native prairie and forested streams to one dominated by cool season grass pastures surrounded by forested fence rows and wooded draws. Many floodplain forests have been cleared to provide cropland and pasture. The fragmentation of grassland and floodplain forest habitats is strongly correlated with declines in most grassland bird populations as well as many forest birds throughout the Midwest.

1.4.5.2 Migratory Fish

Populations of paddlefish, walleye, and white bass, in addition to many other fish species, annually migrate from Truman Reservoir and the Osage River to the middle reach of the Marais des Cygnes River on both sides of the Kansas/Missouri state line. This section of river is largely free of levees with a floodplain of mostly natural vegetation and receives floods frequently enough to provide fish access to valuable floodplain food resources and nursery habitat for young. River gravel bars provide important spawning habitat for paddlefish and walleye and more than 20 species of mussels.



American Bald Eagle

1.4.5.3 Federally Listed Threatened/Endangered Species

Bald Eagle, Least Tern, Piping Plover, and Meads's milkweed have been observed on Marais des Cygnes NWR and Marais des Cygnes Wildlife Area and would benefit by continued protection and restoration efforts.

Scale shell mussel, American burying beetle, western prairie fringed orchid, and running buffalo clover may also occur in the area but have not been recently confirmed. Populations of these species could possibly be restored to the area.

1.5 The U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service as we know it today has evolved slowly with changes in the country's use of natural resources and growing respect for the environment. Today the Service is the primary federal agency responsible for conserving, protecting, and enhancing fish and wildlife species and their habitats.

Specific responsibilities include managing the National Wildlife Refuge System, enforcing federal wildlife laws, managing migratory bird populations, restoring nationally significant fisheries, administering the Endangered Species Act, and restoring wildlife habitats such as wetlands.

The Service's mission is: "To work with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people."

1.6 The National Wildlife Refuge System

The National Wildlife Refuge System is the world's largest and most diverse collection of lands set aside specifically for wildlife. The Refuge System began in 1903 when President Theodore Roosevelt designated 3-acre Pelican Island, a pelican and heron rookery in Florida, as a national bird sanctuary.

The National Wildlife Refuge System mission is to administer a network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Today, over 530 national wildlife refuges have been established from the Arctic Ocean to the South Pacific, from Maine to the Caribbean. Varying in size from half-acre parcels to thousands of square miles, they encompass more than 92 million acres of the Nation's best wildlife habitats. The vast majority of these lands are in Alaska, with the remainder spread across the rest of the United States and several U.S. territories.

Like Pelican Island, many early wildlife refuges were created for herons, egrets, and other water birds. Other refuges were set aside for large mammals like elk and bison. But by far the most have been created to protect migratory waterfowl. This is a result of the United States' responsibilities under international treaties for migratory bird conservation and legislation such as the Migratory Bird Conservation Act of 1929.

National wildlife refuges offer the public a wide variety of wildlife-dependent recreational and educational opportunities. Many refuges have fishing and hunting programs, visitor centers, hiking trails, and environmental education programs. Nationwide, some 34 million visitors annually hunt, fish, observe, and photograph wildlife or participate in interpretive activities on national wildlife refuges.

1.7 Public Involvement

Involvement by local government officials, organizations, landowners and other interested citizens is integral to planning for any new national wildlife refuge. Proposals that involve land acquisition by a government agency can be controversial, though establishment of Marais des Cygnes NWR in Kansas received minimal controversy.

Open communication with all parties is essential throughout the planning process. Starting in April 2002 the Service began providing information about the proposed project through news releases, interviews, open house events, group presentations, letters to landowners and one-on-one discussions.

1.7.1 Background

A Preliminary Project Proposal (PPP) for a refuge (or later addition to an existing adjacent Refuge) within the study area was developed by Service biologists to brief the Director of the U.S. Fish and Wildlife Service about the resource conservation opportunities of the area and to obtain permission to conduct a study of the merits of the proposal. The proposal was approved by the Director on April 4, 1991. Later, an amendment was approved on January 22, 1992.

Early in 1999, the Team Leader of the Lower Missouri River (LMR) Ecosystem proposed that the ecosystem team review the merits of expanding Marais des Cygnes NWR into Missouri as indicated in a 1992 PPP. A letter indicating ecosystem team support and requesting consideration for the project was prepared by the team and submitted to the Regional Director on August of 1999. Members of the LMR Ecosystem Team and Region 3 Realty visited the Refuge and PPP area in May of 2000. A slide presentation introducing the Refuge and PPP area to other LMR Ecosystem Team members and members of the Ozark Plateau Ecosystem Team was presented at Swan Lake NWR in February of 2001. Both Ecosystem Teams unanimously agreed to support the Refuge expansion proposal. A slide presentation introducing the Refuge and PPP area to the Great Lakes/Big Rivers Regional Management Team in Minneapolis, Minnesota, was presented in August 2001. A short while later the Regional Director indicated that a Decision Document should be prepared.

1.7.8.1 Issues, Opportunities and Concerns

Some common concerns brought up at an April 18, 2002, Focus Group meeting and a May 21, 2002, Open House meeting were: potential loss of taxes resulting from lands being transferred from private to public ownership, potential impacts to neighboring lands from public land uses, use of Eminent Domain to acquire land, and the possibility of road closures. Also addressed in this EA are how the various alternatives impact the Refuge management goals and what the consequences of each alternative are related to such socioeconomic interests as recreational opportunities, the local economy, and taxes. The issues of landowner rights, Service land acquisition policies, revenue sharing, relocation benefits, cultural resources, effects on current drainage patterns, water pumping, crop depredation, Refuge administration impacts on public roads, cumulative impacts, and environmental justice will be discussed. These issues are addressed in detail in Chapter 4, Section 4.2, "Environmental Consequences Related to the Socioeconomic Environment."

1.8 Public Comments

A focus group meeting was conducted on April 18, 2002, at the Refuge Office to help identify local concerns and prepare for an upcoming open house. Twelve people representing seven local organizations attended the meeting. Organizations represented were: Bates County, City of Butler, Bates County Farm Bureau, Bates County Cattlemen's Association, Kansas Dept. of Wildlife and Parks, Missouri Dept. of Conservation, and Missouri Dept. of Natural Resources.

On May 21, 2002, an Open House was conducted at the Butler Senior Center in Butler, Missouri. A total of 29 people attended the meeting, 15 of whom represented land ownerships (nine different ownerships) within the boundary of the proposed Addition area.

In addition to these meetings, Refuge staff received several phone calls and visits by concerned citizens.

Issues brought up by these discussions are identified in the above section and addressed in Chapter 4, Section 4.2, "Environmental Consequences Related to the Socioeconomic Environment."

All written and verbal comments received by the Service are summarized in Appendix B.

1.9 Decisions

This Environmental Assessment is the first step in the Service's formal decision-making process. In compliance with the National Environmental Policy Act, the Regional Director, Great Lakes/Big Rivers Region, will consider the information presented in this document to select one of the alternatives.

The Regional Director will determine whether the preferred alternative will or will not have a significant impact on the quality of the human environment and issue a Finding of No Significant Impact or a Decision of Significant Impact. A Finding of No Significant Impact (FONSI) means that the preferred alternative is accepted and can be implemented in accordance with other laws and regulations. If the Regional Director decides that there would be projected impacts, the project would either be dropped or a Notice of Intent to prepare an Environmental Impact Statement would be published in the Federal Register. All proposals to establish new refuges or expand the boundaries of existing refuges must also be approved by the Director of the Fish and Wildlife Service in Washington D.C.

1.10 Legal Compliance

The Service planning process, land acquisition, and management are done in accordance with authority delegated by Congress and as interpreted by Department of the Interior and agency regulations and guidelines. Land acquisition authority includes the Endangered Species Act, Emergency Wetlands Resources Act, and the Fish and Wildlife Act, as amended. Land management authority,

including comprehensive conservation planning, is directed primarily by the National Wildlife Refuge System Improvement Act of 1997. Other relevant Acts and Executive Orders are listed in Appendix C.

1.10.1 Establishing Authority

Lands acquired by the Service for the proposed addition to Marais des Cygnes NWR would be purchased under the authority of the Fish and Wildlife Act of 1956 and the Emergency Wetland Resources Act of 1986.

Chapter 2 – Description of Alternatives

This chapter describes the range of options (alternatives) to restore, enhance, and protect existing floodplain hardwood forest, native prairie, wetlands, and riverine areas within the proposed Addition Area of Marais des Cygnes National Wildlife Refuge. How the study area boundary and alternatives were formulated, identification of the preferred alternative, and an explanation of why some alternatives were eliminated from further study are also discussed.

2.1 Formulation of Study Area Boundary and Alternatives

The boundaries of the study area were formulated by the identification of a reach of the Marais des Cygnes River that is believed able to meet the above habitat goals. The study area targets one of the last remaining reaches of the Marais des Cygnes River floodplain that is not greatly impacted by drainage ditches, levees, and loss of native vegetation. Some of the items reviewed were: flooding characteristics, presence of floodplain hardwood and native prairie, restoration potential, presence of cropland, levees, and drainage ditches, habitat requirements of desired wildlife species, location of public roads, and comments received from the public. It is Service policy to acquire the least interest in land necessary to meet refuge goals.

Development of Alternatives was guided by the following goals:

- Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on floodplain hardwood and tallgrass prairie habitats.
- Conserve, manage, and restore the diversity and viability of native fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat, as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.
- Restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions.
- Work in partnership with others, including private landowners, to restore or enhance floodplain hardwood, tallgrass prairie, and other unique plant communities.
- Protect and restore federally listed and state-listed threatened and endangered species.
- Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.

2.2 Alternatives Considered but Eliminated from Detailed Study

The following alternatives were considered early in the planning process. These alternatives were discussed by the planning team but were not considered to be viable alternatives.

2.2.1 East Highway V Addition

Extend the boundary east of Highway V to include the downstream reach of the River that is transected by the portion of the Bates County Drainage Ditch, which was not dug deep enough to carry River flows except during flood events. This reach includes 3 miles of drainage ditch and 6 miles of River. While this reach of River does have wildlife values, flood events are impacted by the drainage ditch and extensive levees. Much of the floodplain is in cropland and little native vegetation remains. Restoration of this reach of the River would be both controversial and expensive.

2.2.2 Mulberry Creek Addition

Extend the boundary north of Highway 52 along Mulberry Creek. This area contains floodplain hardwood and fescue pasture. It is not impacted by levees or drainage ditches and little cropland is present. While habitat values are significant, the floodplain is very narrow. Flooding from the Marais des Cygnes River rarely backs into this area and Mulberry Creek does not have a large enough watershed to routinely flood, thus wetland values are limited.

2.2.3 East Worland Addition

Extend the boundary south to include a large forested area east and south of Worland. This area is a very rugged terrain created by turn-of-the-century open-pit mining. Most of the area is covered by oak-hickory forest and mine ponds. This type of habitat is often purchased throughout eastern Kansas and western Missouri as wildlife habitat by both private and state interests. However, it does not lend itself well to meeting the above goals. It is also a habitat that is not under great threat.

2.3 Explanation of Alternatives

2.3.1 Alternative A: No Action

Marais des Cygnes NWR operations would continue at the current level, entirely in the State of Kansas. The 7,500 acres of current holdings could be expanded by acquiring additional lands within the original approved acquisition boundary encompassing 9,300 acres. Management efforts would be directed toward achieving existing resource goals in Kansas.

2.3.2 Alternative B: Protect and Restore Habitat in the Marais des Cygnes Floodplain in Missouri Through Land Acquisition

Purchase additional lands, fee title, only in the floodplain, in order to expand the Refuge capability to protect, restore and preserve floodplain habitat associated with the Marais des Cygnes River by extending the Refuge into the Marais des Cygnes/West Osage River Basin of Missouri (Figure 3).

Figure 3: Alternative B, Proposed Addition to Marais des Cygnes NWR

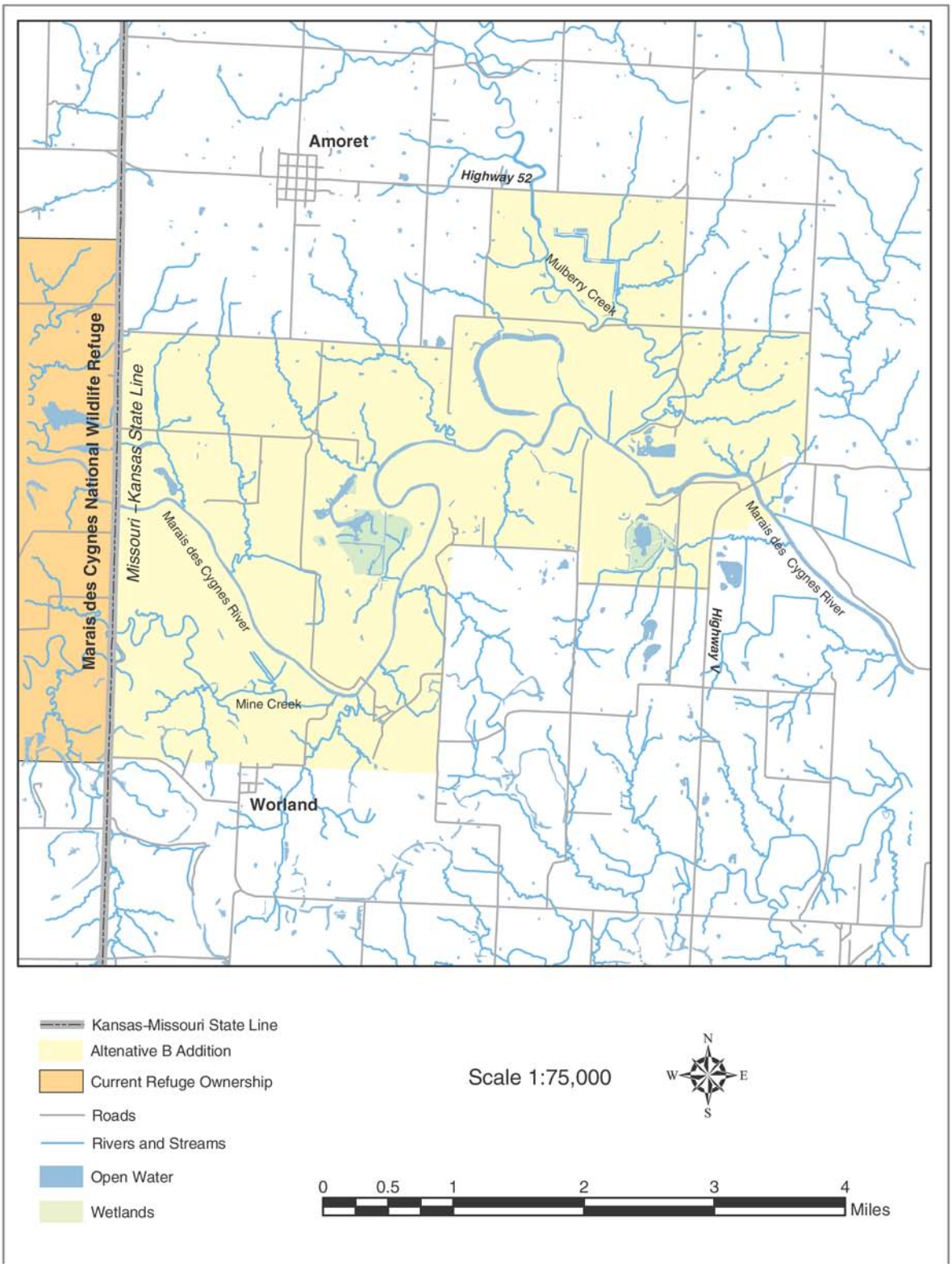
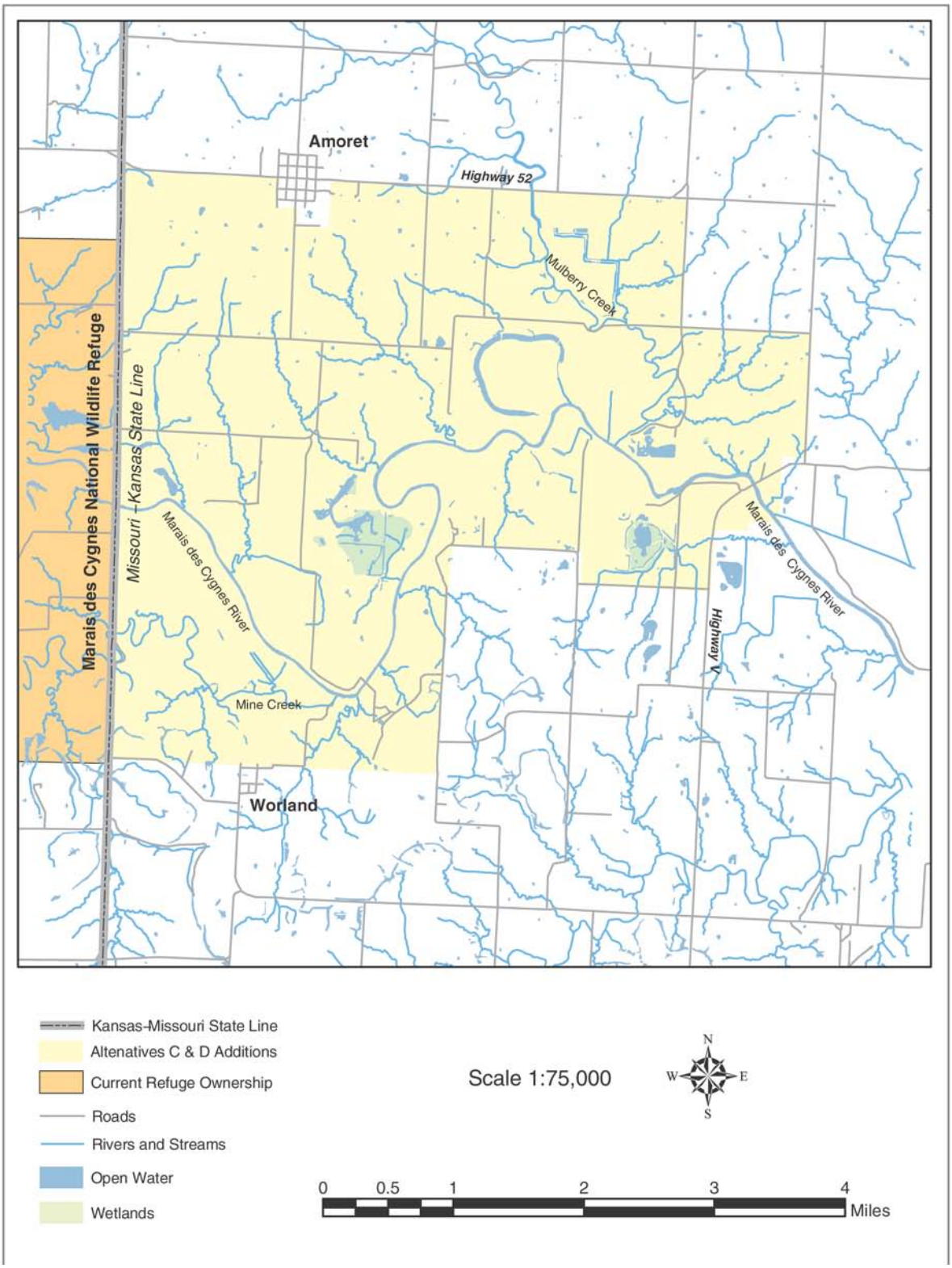


Figure 4: Alternatives C and D, Proposed Addition to Marais des Cygnes NWR



2.3.3 Alternative C: Protect and Restore Floodplain and Adjacent Upland Habitat Along Missouri Reaches of the Marais des Cygnes River by Acquiring Additional Lands (Preferred Alternative)

Purchase additional lands, fee title, in order to expand the Refuge capability to protect, restore and preserve floodplain, wetland, and native prairie habitat on lands adjacent to and nearby the Marais des Cygnes River in Marais des Cygnes/West Osage Basin of Missouri (Figure 4).

The main difference between Alternative C and Alternative B is that Alternative B primarily targets the floodplain with restoration of wetlands and floodplain hardwoods as primary goals while Alternative C includes these goals as well as the protection and restoration of native prairie on the uplands adjacent to the floodplain.

2.3.4 Alternative D: Protect and Restore Additional Floodplain and Adjacent Uplands through Long-term Easements and Private Land Programs

Expand the Refuge's capability to protect and restore floodplain and upland habitat on private lands entirely through easements and agreements with land owners (Figure 4).

Table 1: Summary of Effects of Alternatives A, B, C and D on USFWS Habitat, Wildlife, and Public Use Goals and Their Associated Management Priorities

Land Management Priorities	Alternative A No Action	Alternative B Protect and Restore Floodplain Through Purchase of Land.	Alternative C Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Goal: Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on floodplain hardwood and tallgrass prairie habitats. *Goal: Conserve, manage and restore the diversity and viability of native fish, wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.* *Goal: Restore, enhance and protect water quality and quantity that approaches natural hydrologic functions.* *Goal: Work in partnership with others, including private landowners, to restore or enhance floodplain hardwood, tallgrass prairie, and other unique plant communities.*				
Manage bottomland forests to provide mature stands of hardwoods.	On most large stands, mature timber likely to be harvested when large enough to provide lumber or firewood.	Mature timber left to provide habitat for species which require large and standing/ fallen dead trees.	Mature timber left to provide habitat for species which require large and standing/ fallen dead trees. Little forested land would occur on the uplands.	Could have similar effects as Alternative B and C, depending on availability of programs and landowner interest. Easements would need to be periodically checked for compliance, especially when land changes ownership.
Manage grasslands to provide a variety of cover heights.	Other than on CRP, grassland cover likely to be generally short, mostly benefitting bird species which require little cover for nesting and brood rearing.	Grassland cover short to rank with many stands having litter from previous years to provide cover for ground nesting birds. Little grassland cover would be located in the floodplain.	Grassland cover short to rank with many stands having litter from previous years to provide cover for ground nesting birds. Most grassland cover would be located in the uplands.	CRP program may provide rank grass cover. Much landowner involvement and probably monetary incentives would be necessary to convert fescue pastures to native grasses/forbs and create a variety of cover heights and density.

Table 1: Summary of Effects of Alternatives A, B, C and D on USFWS Habitat, Wildlife, and Public Use Goals and Their Associated Management Priorities (Continued)

Land Management Priorities	Alternative A No Action	Alternative B Protect and Restore Floodplain Through Purchase of Land.	Alternative C Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Manage croplands to benefit wildlife and reduce soil erosion.	Crop fields likely to be disced in the fall. Use of terraces and grass waterways variable depending on landowner interest and budget.	Crop fields not disced until spring to provide food for wildlife. Use of terraces and grass waterways on all fields which require it. Most floodplain cropland planted to trees.	Crop fields left unworked until spring. Use of terraces and grass waterways on all fields which require it. Much cropland in upland planted to native grasses and floodplain to trees.	Much landowner involvement and possibly monetary incentives would be necessary to leave fields unworked through the winter and install soil conservation methods. WRP perpetual easement program available to restore wetlands.
Protect river-floodplain interaction.	Levees could be constructed to prevent the floodplain from flooding.	Levees would not be constructed to prevent the floodplain from flooding. This would help restore and preserve a more natural floodplain hydrology.	Same as Alternative B.	WRP perpetual easement program available to restore wetlands. Program does not allow construction of levees. Landowner interest in program likely limited due to management restrictions. Protection of all of floodplain from levees unlikely.
Protect and restore bottomland hardwood forests.	Floodplain fields would likely remain in crops or hay fields.	Most floodplain crop fields would be planted to pecan, pin oak, shellbark hickory and other hardwoods.	Same as Alternative B.	WRP perpetual easement program available to restore forested wetlands. CRP program may be available to restore forest on some sites. Landowner interest in programs likely limited due to program restrictions.

Table 1: Summary of Effects of Alternatives A, B, C and D on USFWS Habitat, Wildlife, and Public Use Goals and Their Associated Management Priorities (Continued)

Land Management Priorities	Alternative A No Action	Alternative B Protect and Restore Floodplain Through Purchase of Land.	Alternative C Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Protect and restore floodplain wetlands.	Existing wetlands likely to remain. Most wetlands managed to harvest waterfowl. Little restoration of wetland sites which cannot readily be dewatered to grow waterfowl food in the summer and then pumped in the fall for waterfowl hunting.	All historic wetlands would be restored if possible. Wetlands would vary greatly in size, depth, and seasonal availability of water. Many species would be benefitted including breeding waterfowl, wading birds, shorebirds, frogs, turtles, crayfish, etc. Wetland restoration would help restore the natural floodplain hydrology. Wetlands provide excellent spawning and nursery habitat for young fish.	Same as Alternative B.	WRP perpetual easement program available to restore forested wetlands. Landowner interest in programs likely limited. Most wetlands managed to harvest waterfowl. Little restoration of wetland sites which cannot readily be dewatered to grow waterfowl food in the summer and then pumped in the fall for waterfowl hunting.
Protect and restore native prairie grasslands.	Most native prairie would remain as pasture. Protection of plant diversity variable depending on landowner interest and budget. Little restoration would occur except on CRP sites.	Existing native prairie would be carefully managed to protect diversity. Broadcast spraying of invading noxious weeds would be unlikely. Most upland fields would gradually be planted to a wide variety of native grasses and forbs.	Many opportunities available on uplands. Most crop fields would be planted to native grass and forbs.	CRP program could restore some sites, depending on landowner interest, site eligibility, and availability of program funding. CRP sites restricted to crop fields with no grazing or haying allowed.

Table 1: Summary of Effects of Alternatives A, B, C and D on USFWS Habitat, Wildlife, and Public Use Goals and Their Associated Management Priorities (Continued)

Land Management Priorities	Alternative A No Action	Alternative B Protect and Restore Floodplain Through Purchase of Land.	Alternative C Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Control invasive animals and plants such as Sericea lespedeza.	Control variable depending on landowner interest and budget.	Control a high priority with annual expenditures of man power and funds.	Similar to Alternative B. Greater efforts required to control noxious weeds as more species of noxious weeds occur on upland grasslands.	Control variable depending on landowner knowledge and availability of time and funding necessary for control methods. Similar goals and cooperation among adjacent landowners needed for effective control.
Goal: Protect and restore federally and state-listed threatened and endangered species.				
Increase the abundance of Federal and State Threatened and Endangered Species and abundance and diversity of migratory birds.	Abundance and diversity would largely remain the same or slowly decrease over time as forest invades upland grassland pastures and bottomland forest is cleared.	Occurrence and abundance of species which require or use large stands of mature timber and forested wetlands would increase. Species include paddlefish, cerulean warbler, red shouldered hawk, bald eagle, piping plover, American bittern, wood duck, and hooded merganser.	Same values as alternative B. In addition, grassland species likely to increase with restoration and management of upland grasslands. Species include Mead's milkweed, barn owl, and northern harrier.	CRP and WRP are the primary programs available. Increases possible depending on landowner knowledge and availability of time and funding necessary to implement land management techniques. Similar goals and cooperation among adjacent landowners needed for species requiring large blocks of habitat.

Table 1: Summary of Effects of Alternatives A, B, C and D on USFWS Habitat, Wildlife, and Public Use Goals and Their Associated Management Priorities (Continued)

Land Management Priorities	Alternative A No Action	Alternative B Protect and Restore Floodplain Through Purchase of Land.	Alternative C Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Manage floodplain to benefit paddlefish and other fish, protect spawning and mussel beds, and improve river water quality.	Paddlefish spawning and mussel beds could be permanently damaged if levees were constructed near the river. Water quality would largely remain the same or slowly degrade over time.	Spawning for paddlefish, an interjurisdictional fish, and mussel beds would not be threatened by levees. Water quality would increase due to reductions in cropland and increase in forested cover which reduces transport of soil and chemicals. The increase in quality would largely be local.	Similar to Alternative B. More improvement in local water quality as uplands would largely be taken out of crops and put into grass. Pastures grazed less to provide more ground litter which would further reduce erosion.	CRP and WRP are the primary programs available. Increases in water quality possible depending on landowner interest and funding. Similar goals and cooperation among adjacent landowners needed to make a significant difference.
Goal: Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the national wildlife Refuge System.				
Provide quality opportunities for hunting, fishing, wildlife observation, and other wildlife-dependent uses.	Quality outdoor opportunities would be limited to current landowners and their guests.	Quality outdoor opportunities would be available to the public. Possibility of limitations (drawings) for some activities to maintain hunting quality. Periodic flood events would occasionally limit some activities. Provides excellent spawning and nursery habitat for a number of sport fish (walleye, white bass, perhaps paddlefish), benefiting the Truman Lake fishery for sport anglers.	Similar to Alternative B but more opportunities available as uplands do not flood and additional habitats of grassland and ponds are available. Uplands also easier to access.	Quality outdoor opportunities would be limited to current landowners and their guests. Possibility exists for the Service to lease hunting and/ or fishing rights, thus these programs may be possible.

Table 1: Summary of Effects of Alternatives A, B, C and D on USFWS Habitat, Wildlife, and Public Use Goals and Their Associated Management Priorities (Continued)

Land Management Priorities	Alternative A No Action	Alternative B Protect and Restore Floodplain Through Purchase of Land.	Alternative C Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Provide for environmental education and research and protect and interpret archaeological and historic sites.	Opportunities variable depending on landowner interest. Identification, protection, and interpretation of archaeological and historical sites also variable depending on landowner interest and funding.	Activities encouraged and opportunities generally available. Identification, protection, and interpretation of archaeological and historical sites a priority.	Similar to Alternative B but more opportunities available as uplands do not flood and additional habitats of grassland and ponds are available. Uplands also easier to access and likely to contain most archaeological and historic sites.	Opportunities variable depending on landowner interest. Identification, protection, and interpretation of archaeological and historical sites variable depending on landowner interest and funding.

Chapter 3 – The Affected Environment

3.1 Introduction

The proposed Addition area is located in west-central Missouri in Bates County, approximately 10 miles west of Butler, Missouri. The area contains 11,145 acres between the Missouri state line and County Highway V. Marais des Cygnes NWR (9,300-acre acquisition area) and Marais des Cygnes Wildlife Area (7,500 acres) are located immediately west of the Addition area.

Mussels collected on Marais des Cygnes NWR

The Addition area is located within the Osage Cuestas subdivision of the Osage Plains Physiographic region. The Osage Cuestas are characterized by forested southwest-northeast trending limestone ridges with valleys (Bare 1979) containing high quality tracts of prairie scattered amid expanses of fescue pasture. River and stream valleys in the region are dominated by cropland and pasture with scattered tracts of floodplain hardwood forest.

The Marais des Cygnes River, which meanders through the study area, is a major tributary of the Osage River which in turn is a tributary of the Missouri River. Floodplains within the mid reach of the River are generally 1.5 miles in width. Numerous oxbow wetlands of various depth were historically found throughout much of the floodplain. Many of the wetlands in the Addition area have been either fully or partially drained. Original wetlands still exist throughout portions of the floodplain, however. The largest wetlands in the area are 20-30 acres in size.

Prior to 1911, the Missouri portion of the Marais des Cygnes River was 52 miles in length. In 1911 the Bates County Drainage Ditch was constructed. The ditch traverses the Marais des Cygnes River valley from just downstream of the Addition area to its confluence with the Osage River, a distance of 23 miles. The reach of river along the drainage ditch was previously 43 miles long. The drainage ditch shortened the River by 17 miles (Dent et al. 1998). This shortening, along with significant channel downcutting and construction of levees, has significantly reduced flooding of the floodplain along this reach of the River and has facilitated the presence of a number of corporate farming operations. Today, the Missouri portion of the Marais des Cygnes River is comprised of 15 miles of the original river and 20 miles of drainage ditch (the first 3 miles of the drainage ditch do not carry water except during high flows).

Historically, much of the uplands of the study area were dominated by tallgrass prairie with savannah groves in areas less prone to fire. The floodplains of the

Marais des Cygnes River and larger tributaries were dominated by floodplain hardwood forest with wet prairie on more moist and fire prone sites.

The Osage Cuestas region once supported large populations of free-roaming bison, elk, waterfowl and prairie chickens. Forests of pin oak, pecan, Shumard oak, and shellbark hickory provided winter cover and protection from prairie fires for large ungulates as well as habitat for wolves and black bear.

Today, bison and elk herds, wolves and black bear are gone and little remains of this vast prairie/forest complex. Remnant tallgrass prairies found on portions of the study area are now grazed by cattle or hayed. Osage orange, persimmon, and plum have established themselves along fencelines throughout the area. Post oak and blackjack oak savannahs, located on some of the drier hilltops, have largely become woodlands.

Despite these changes, many prairie and forest species still exist in the Addition area. Large expanses of native tallgrass prairie in the Kansas Flint Hills, to the west of the study area, and large expanses of oak-hickory forest in the Missouri Ozarks, to the east of the study area, offer significant opportunities for natural recolonization by prairie and forest species not currently found in the area.

3.2 Climatic/Geologic Features

3.2.1 Temperature

Bates County has a continental climate typical of the interior of a large land mass in the middle latitudes. Such a climate is characterized by large daily and annual variations in temperature. Winters are cold because of the frequent southerly flows of air from the polar regions. Winter lasts only from December through February. Warm summer temperatures last for about 6 months every year, and the transition seasons, spring and fall, are fairly long. Temperature data recorded at Mound City, Kansas, is characterized by a winter (January) average daily temperature of 34.4 degrees Fahrenheit (F) and a summer (July) average daily temperature of 77.4 degrees F (U.S. Department of Agriculture 1981).

3.2.2 Precipitation

Bates County is in the path of a fairly dependable current of moisture-laden air from the Gulf of Mexico. Precipitation is heaviest late in spring and early in summer. Much of it occurs as late-evening or nighttime thunderstorms. Although the total precipitation is generally adequate for any crop, its distribution may cause problems in some years. Prolonged dry periods of several weeks duration are common during the growing season. A surplus of precipitation often produces muddy fields and a delay in planting and harvesting. Precipitation averages 38.53 inches per year, with the highest monthly amounts occurring in spring and fall (U.S. Department of Agriculture 1981).

3.2.3 Growing Season

Elevations in the study area are approximately 800 feet above sea level. The combination of elevation and latitude gives the area a fairly long growing season that will exceed 200 days in most years (U.S. Department of Agriculture 1981).

3.2.4 Geology

The topography of the region is characterized by southwest-northeast trending limestone ridges with gently rolling valleys. The limestone ridges are largely comprised of Pennsylvanian and Permian limestone and shale (Bare 1979). The region has not been glaciated. Soils in the region were produced from the weathering of limestone and shale.

3.2.5 Soils

Predominant upland soil types in the study area are the Kenoma-Hartwell-Deepwater Association. This soil association is generally suited for row crops with appropriate conservation measures such as terraces and grassed waterways on sloping fields. Predominant floodplain soil types are the Osage-Verdigris Association. This association is suited for row crops though flooding is generally a problem without significant landscape alterations including levees and ditches (U.S. Department of Agriculture 1995).

3.2.6 Minerals

Mineral resources are present in the proposal area. Limestone is quarried in Bates County and is used as concrete aggregate and building stone, or is crushed for use as agricultural lime, riprap, and road surfacing. No operating pits are present in the proposal area.

Mineral production in Bates County has been primarily centered around coal production. Coal deposits exist throughout the western portion of the county and retrievable deposits are present throughout the proposal area. The coal seam is within 30 to 40 feet of the surface and ranges from 24 to 38 inches thick.

Pittsburg and Midway Coal Mining Company had a large active open pit mining operation on their ownership adjacent to, and within the northwest corner, of the proposal area. The company discontinued operation in 1989 when the LaCygne Power Plant, the company's main customer, terminated its purchase agreement. The company no longer owns land within the Addition area. A small open pit coal mine was recently in operation 1.5 miles south of the proposal area but is no longer in operation. It is currently conducting reclamation activities. Marketability of coal in the region is limited due to a number of factors, including coal quality, overburden depth-coal seam width ratio, and availability of local markets.

In 1977, the 95th Congress passed legislation regulating the coal industry in its operation of surface mines. Public Law 95-87, known as the "Surface Mining Control and Reclamation Act of 1977" (Act), further regulates the industry by designating certain areas as unsuitable for coal mining operations. Title V, Section 522(e)(1) of the Act states in part: "...no surface mining operations...shall

be permitted -- on any lands within the boundaries of units of...the National Wildlife Refuge System...". The exclusion of Refuge System lands is subject to valid existing rights (VER) (U.S. Fish and Wildlife Service 1992).

3.2.7 River Hydrology

The Marais des Cygnes River is a sub-basin of the Osage River, which flows into the Missouri River near Jefferson City, Missouri. The mainstem of the Marais des Cygnes River is approximately 177 river miles in length from the Kansas-Missouri state line to its headwaters west and south of Topeka, Kansas. An additional 35 miles of the River occur in Missouri for a total length of 221 miles. Upstream from the state line, it drains an area of approximately 3,300 square miles with an average discharge of 2,033 cfs or 1,473,000 acre-feet per year. Major tributaries of the River are Big Sugar Creek, Big Bull Creek, Pottawatomie Creek, Dragoon Creek, Hundred and Ten Mile Creek, Mine Creek, and Mulberry Creek.

Marais des Cygnes River

The natural flow of the River has been significantly affected by construction of several major impoundments by the U.S. Army Corps of Engineers that include Pomona Lake, Melvern Lake, and Hillsdale Lake as well as La Cygne Lake, which was constructed by Kansas City Power and Light. These dams control 23 percent of the watershed (Dent et al. 1998). Another factor affecting flows is retention of overbank flows in wildlife refuge ponds at Marais des Cygnes Wildlife Management Area, operated by the State of Kansas. Retention in these ponds amounts to 5,500 acre-feet annually. In addition, the flows are affected by power developments and numerous small diversions for stock ponds and irrigation (U.S. Fish and Wildlife Service 1992)).

The effects the dams have had on river flows are difficult to determine. While upstream dams have reduced flows, construction of upstream levees, drainage of wetlands, and increased runoff from towns have increased flows. In general, it is believed that flood events are more frequent, attain greater heights, and are of shorter duration compared to events that occurred prior to settlement of the area by Europeans.

A U.S. Geological Survey river gauge near Trading Post, Kansas, and approximately 7.5 miles upstream from the Addition area, has been recording river flow information since 1929. Review of this information indicates that the dams have had a much greater impact to river flows during drought events than during flood events. While the River frequently ceased to flow for weeks at a time prior to dam construction, no-flow events (< 5 cubic feet/second) now rarely occur and are of much shorter duration (Gleason 2001).

Flood events generally occur every 8 out of 10 years for the years 1960-2000. Average flood frequency at the gauge for this period is two to three times per year. The greatest number of flood events per year was eight. The average

depth of water above the riverbank was 4 feet with a high of 10 feet (Gleason 2001). Flooding is also caused by numerous highway and railroad causeways that constrict the floodplain of the rivers and streams in the Marais des Cygnes River basin.

Features of the major upstream reservoirs are as follows:

1. Pomona Reservoir – The 3,885-acre reservoir was completed in October 1963 for the purposes of flood control and recreation. The Reservoir is approximately 20 miles south of Topeka, near the towns of Vassar and Michigan Valley. The Reservoir is formed by a compacted earthfill dam and has a total capacity of 498,500 acre-feet at elevation 1,025 feet msl. Normal spill elevation is 974 feet msl. The Reservoir is supplied by the 322-square-mile watershed of Hundred and Ten Mile Creek, a tributary of the Marais des Cygnes River.

2. Melvern Reservoir – The 6,877-acre reservoir was completed in July 1972 for the purposes of flood control, irrigation and recreation. The Reservoir extends approximately 12 miles westerly from the Town of Melvern to the Town of Reading. The Reservoir is formed by a compacted earthfill dam and has a total capacity of 920,600 acre-feet at elevation 1,073 feet msl. Normal spill elevation is 1,036 feet msl. The Reservoir is supplied by the 349-square-mile watershed of the upper Marais des Cygnes River.

3. Hillsdale Reservoir – The 4,566-acre reservoir was completed in September 1981 for the purposes of flood control, water supply, water quality control, fish and wildlife, and recreation. The Reservoir is 3 miles north and west of Hillsdale near Highway I-35. The Reservoir is formed by a compacted earthfill dam and has a total capacity of 315,600 acre-feet. Normal spill elevation is 917 feet msl. The Reservoir is supplied by the 144-square-mile watershed of Big Bull Creek, a tributary of the Marais des Cygnes River.

4. La Cygne Reservoir – La Cygne Reservoir is the first large Kansas reservoir designed as a cooling pond for power generation. Kansas City Power and Light Company and Kansas Gas and Electric constructed the fossil-fuel generating facility and reservoir to supply electricity for eastern Kansas and western Missouri. The Reservoir covers an area of 2,420 acres and has a storage capacity of 40,000 acre-feet. Its maximum depth is 40 feet and average depth is 15.4 feet. Normal spill elevation is 840 feet msl. Through cooperative agreements, Kansas Department of Wildlife and Parks and Linn County manage 2,000 acres of wildlife land and a 1,000-acre county park surrounding the reservoir area. The Reservoir is supplied by waters of Elm Creek and Sugar Creek, a tributary of the Marais des Cygnes River.

The Bates County drainage ditch was completed in 1911. The ditch traverses the Marais des Cygnes River valley from the east edge of the Addition area to its confluence with the Osage River. Although the ditch is 23 miles in length, the first 3 miles do not carry water except during high flows. This reach of the River was 43 miles in length prior to construction of the 23-mile-long drainage ditch that shortened the River by 17 miles (Dent et al. 1998).

The drainage ditch likely had an immediate and dramatic impact on local and downstream hydrology. The removal of 17 miles of river greatly increased the transport of water from the area and likely made nearby cropland much easier to farm, while downstream farmland likely flooded much more frequently.

Channel downcutting also occurred until bedrock was reached. One result of this downcutting is significant bank erosion and downstream deposition of silt. Bank erosion will continue until the 17 miles of river that were removed are once again reclaimed (Dent et al. 1998).

The impacts of the drainage ditch on the Addition area are much less extreme. The first 3 miles of the drainage ditch do not carry water except during high flows because the presence of bedrock prevented excavation to the required depth. Upstream headcutting likely occurred shortly after drainage ditch construction but not to the same degree as the downcutting within the drainage ditch. Current levels of bank erosion and changes in hydrology are probably influenced much more by upstream factors than lingering effects of the drainage ditch.

3.2.8 River Water Quality

Erosion and sedimentation from agricultural lands do cause water quality problems in the Marais des Cygnes River, especially during periods of moderate to high flows. During low flow periods in the summer and winter River clarity increases dramatically. The quality of water in the River may perhaps best be determined by a close study of the River's mussel population. Currently, 23 species have been found living in the River at Marais des Cygnes NWR.

Acid mine drainage and high iron and sulphate levels occur in portions of Mulberry Creek, a tributary located within the Addition area. However, the stream is not considered acidified. Mining ceased within the watershed in 1989 and, as a result of this, water quality is expected to improve with time (Dent et al. 1997).

3.3 Description of Habitat

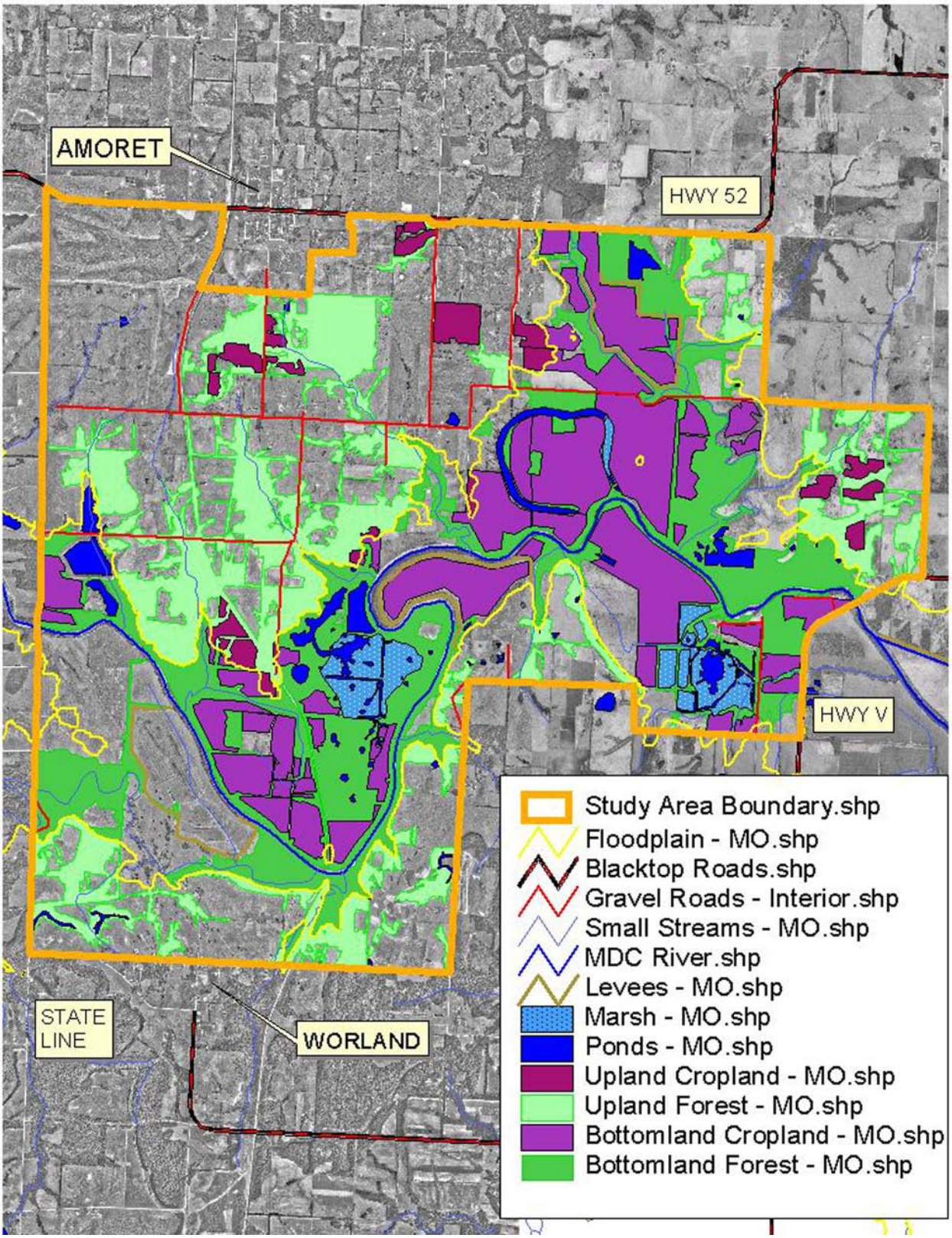
3.3.1 Wetlands

Wetlands are largely confined to the floodplain of the Marais des Cygnes River and two of its larger tributaries, Mine Creek and Mulberry Creek. Shallow wetlands are found throughout floodplain hardwood forest tracts. These wetlands are quickly recharged by local rain events. Oxbow wetlands are much deeper and rarely go dry. Large open wetlands are generally created by man-made dikes for waterfowl hunting.

Wetlands within floodplain cropland can often be restored by plugging ditches or the construction of a series of shallow dikes along the end of a field which has been W-ditched. W-ditches occur where a field's flat topography is made to appear in cross-section as a W to provide high spots for crops and low spots for water.

Approximately 370 acres of oxbow wetlands and wetlands managed for waterfowl hunting occur in the Addition area. (Figure 5 illustrates all cover types found within the area of the proposed addition.)

Figure 5: Cover Types of Proposed Area Superimposed Upon an Aerial Photograph



3.3.2 Floodplain and Upland Forests

Young floodplain forests are generally composed of sycamore, green ash, cottonwood, and silver maple while more mature stands include pecan, Shumard oak, pin oak, shellbark hickory, and American elm.

Young upland forests are frequently composed of osage orange, honey locust, and persimmon while more mature forests are often comprised of red oak, bur oak, chinquapin oak, post oak, hackberry, and shagbark hickory.

Natural forest regeneration in abandaned floodplain crop field.

Some of the upland forests are very open and have a grass understory. A number of these open forests may be restorable to oak savannah.

Pecan orchards are found throughout the region. A number of local harvesters purchase nuts from private landowners, process the nuts, and sell them in the national marketplace.

Abandoned cropland in the bottoms rapidly reverts to forest. While floodplain forest tracts are generally small throughout the area, they are also frequent.

Seed sources abound and flood events bring in seed from upstream forests. Rapidity of reforestation and species composition varies greatly depending on distance to seed sources and kinds of trees closest to the site. Most abandoned sites will appear as a young forest within 4 to 5 years.

Approximately 35 percent of the original floodplain hardwood forest acreage still occurs within the floodplain of the Addition area. The area contains approximately 1,675 acres of upland forest and 1,840 acres floodplain forest. Forests cover approximately 32 percent of the Addition area.

3.3.3 Tallgrass Prairie and Other Grasslands

Much of the tallgrass prairie in the Addition area has been replaced by forest, cropland, and fescue pasture. Remaining tracts are generally less than 40 acres in size, are grazed or hayed, and vary in quality from poor to high. High quality tracts contain 100 to 200 species of plants. Common prairie species are Indian grass, big bluestem grass, gama grass, compass plant, pale purple coneflower, and prairie blazing star. Examples of dry rock prairie, mesic prairie, and wet prairie can all be found in the area.

Fescue pasture is the predominant cover type on the uplands. This non-native grass is able to withstand tremendous grazing pressure and therefore was widely planted to replace native grasslands that had become dominated by annual weeds due to season-long grazing. Some fescue grasslands harbor a great diversity of native prairie plants and can be returned to native prairie with careful management. Other fescue stands must be farmed or sprayed if fescue is not desired. The largest fescue stands occur in the northwestern portion of the Addition area where they were planted after the area was mined and reclaimed.

Figure 6: Floodplain Cover Types

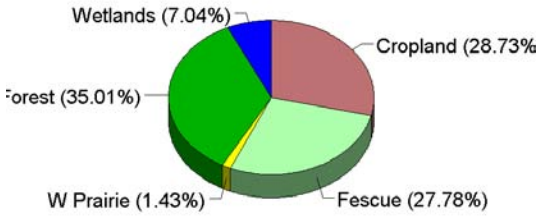
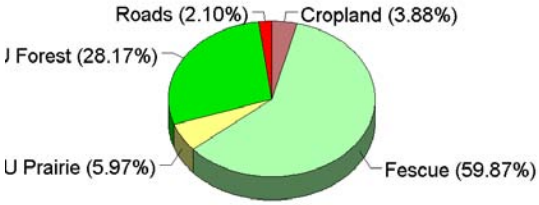


Figure 7: Upland Cover Types



The area contains 430 acres of tallgrass prairie (estimate) and 5,020 acres of fescue and other grasses. Grasslands cover 49 percent of the Addition area.

3.3.4 Cropland

Crops commonly grown in the area include corn, milo, soybeans, and winter wheat. Crops provide food and cover for many species of wildlife but only during certain times of the year.

Most cropland within the floodplain is not protected by levees and is thus subject to river flooding. A number of corporate farming operations are located immediately downstream of the Addition area where the Bates County Drainage Ditch and levees have reduced the likelihood of flooding.

Approximately 1,740 acres of cropland occur in the addition area, of which 230 acres occur on the uplands and 1,510 occur in the bottoms. The percentage of croplands is 2 percent of the uplands, 29 percent of the floodplain, and 16 percent of the Addition Area (see Figure 6 and Figure 7).

3.3.5 Prairie River

An 8.8-mile reach of the Marais des Cygnes River and the last 3.7 miles of Mine Creek and 3.5 miles of Mulberry Creek travel through the Addition area. The River contains three rock riffles with associated gravel bars, which are believed to be important for paddlefish and walleye spawning (Dent et al. 1997) as well as mussel habitat. Approximately 1.5 miles (20 percent) of the 8.8-mile reach of the River contains exposed rock substrate in and along the River. The area provides excellent spawning and nursery habitat for a number of sport fish (walleye, white bass, perhaps paddlefish) that migrate out of Truman Lake and into the river to spawn. The young of these fish are recruited to the Truman Lake fishery to maintain a quality fishery for sport anglers.

One levee, 2.1 miles long, occurs along a portion of the south bank of the Marais des Cygnes River within the Addition area. The bank opposite of this levee exhibits significant erosion, probably in part due to the presence of the levee but also because all streamside forest has been removed. Another levee is located along the lower reach of Mine Creek and is 1.9 miles in length. This levee does not prevent flooding from the Marais des Cygnes River, however. The land behind the levee is in fescue pasture. Mulberry Creek also has one levee along it that is 2.2 miles in length. The total area of floodplain behind levees is 444 acres, 8 percent of the floodplain.

Two dams, Bagnell (1931) and Truman (1979), are located downstream of the Addition area. These reservoirs do not impact flooding of the area but nevertheless have significant impacts on aquatic species, especially mussels. A severe drought, even if it occurs only once or twice a century, could easily reduce or

eliminate some populations in the upper watershed as there is no longer a means for downstream populations, whose young disperse by attaching to fish, to recolonize above the dams. However, upstream reservoirs have greatly lessened the intensity, frequency, and duration of low water events (< 5 cfs) (Gleason 2001) and therefore have to some degree mitigated the negative effects of downstream dams.

3.4 The Current Ecological Condition

3.4.1 Fish and Wildlife

3.4.1.1 Mammals

The proposed Addition area supports a variety of resident mammals including white-tailed deer, opossum, raccoon, wood and cotton rat, gray, fox, and flying squirrel, red and gray fox, coyote, otter, bobcat, and nine-banded armadillo. A total of 41 mammal species are likely to occur in the addition area (U.S. Fish and Wildlife Service 1998).

Reports of wild hogs and mountain lions occur occasionally. No populations are believed established in the area. However, the Schell-Osage Wildlife Area, 30 miles southeast of the Addition area, enacted an eradication program in 2000 to prevent a small population of wild hogs from becoming established in the area.

At the time of European settlement in the early 1800s the area was home to herds of elk and bison. Bison skulls and bones are still commonly found along river bars. See Appendix D for area mammals species list.

3.4.1.2 Birds

A Comprehensive Conservation Plan for Marais des Cygnes NWR lists the presence of 317 species of birds including 31 waterfowl and 36 warbler species. A total of 109 species of birds nest on the Refuge.

Wetlands are important stopover sites in the spring and fall for many migratory birds. Puddle ducks, including Mallards, Wood Ducks, Gadwall and Blue-winged Teal, and Canada Geese are frequently observed where wetlands are available. Resident Canada Geese (giant) use open water wetlands for nesting. Canada Geese and Mallards concentrate in large numbers on river riffles that remain open throughout the winter. These sites provide hunting opportunities for people and Bald Eagles.

In general, fall waterfowl populations at Marais des Cygnes Wildlife Area average 30,000 with peaks of 60,000 (Karl Karrow, personal communication). Waterfowl populations at August A. Busch Four Rivers Wildlife Area generally average 75,000 with peaks of 100,000 (Josh Cussimanio, Personal communication). Most waterfowl use is by ducks, particularly mallards. Waterfowl migrate back and forth between these two areas and can be expected to readily utilize any wetlands that are restored in the Addition area. Marais des Cygnes Wildlife Area is located 4 miles west of the Addition area and Four Rivers Wildlife Area is located 20 miles southeast of the Addition area.

A number of Great Blue Heron rookeries are located along the mid reach of the Marais des Cygnes River. Nests are generally located in large sycamores. The number of nests in a rookery are generally less than 100.

Greater Prairie Chickens are occasionally seen in the area. The nearest active dancing grounds, or leks, occur 25 miles to the southwest of the Addition area near Blue Mound, Kansas, and 30 miles to the southeast of the Addition area near Nevada, Missouri. The leks are gathering sites where male Prairie Chickens display to attract females during the breeding season.

The following migratory bird species are listed as Resource Conservation Priorities by Region 3 of the U.S. Fish and Wildlife Service, and would benefit from the proposed project: Bald Eagle, Wood Thrush, Piping Plover, Interior Least Tern, Loggerhead Shrike, Grasshopper Sparrow, and Dickcissel.

The following additional bird species listed as Endangered by the State of Missouri would also benefit from the project: Barn Owl, Northern Harrier, King Rail, American Bittern, Snowy Egret, and possibly the Greater Prairie Chicken (Missouri Department of Conservation websites).

Other birds also likely to benefit include Cerulean Warbler, Bell's Vireo, Red-shouldered Hawk, Henslow's Sparrow, Scissor-tailed Flycatcher, Short-eared Owl, and Painted Bunting. See Appendix D for area bird species list.

Spectacle Case Mussel

3.4.1.3 Fish and Mussels

A total of 48 species of fish have been collected from the Marais des Cygnes River and tributaries in Missouri since 1986 (Dent et al. 1998). Walleye, white bass, and paddlefish migrate to river gravel bars located within the Addition area to spawn. The spawning sites for paddlefish that occur within Marais des Cygnes NWR and the Addition area may be among the most important within the West Osage River Basin (Dent et al. 1998). The paddlefish is listed on a "Watch List" in Missouri.

Limited surveys conducted since 1998 at Marais des Cygnes NWR have documented a total of 30 species of mussels living within the Marais des Cygnes River and adjacent floodplain wetlands. Based on recent discoveries of non-relict shells and upstream discoveries, additional species will likely occur.

Non-relic shells of spectacle case mussel (*Cumberlandia monodonta*) indicate a recently (estimates range from 25 years to 75 years) extirpated population on a rocky reach of river within Marais des Cygnes NWR (Brian Obermeyer and Ed Miller, personal communication). The possibility of undiscovered specimens or populations within the River still exists. The species has been proposed for federal listing and is on a "Watch List" in Missouri.

Flat floater mussels (*Anodonta suborbiculata*) are uncommon in both Kansas and Missouri but are relatively common within the mid reach of the Marais des Cygnes River. These mussels are largely confined to floodplain wetlands that are periodically flooded by a nearby river. The species is listed as "endangered" in Kansas.

Rock pocketbook mussels (*Arcidens confragosus*) are also uncommon in Kansas and Missouri. A population was discovered in 2000 in Pottawatomie Creek, an upstream tributary of the Marais des Cygnes River in Kansas, by Dr. Robert Angelo, Kansas Department of Health and Environment. The species is listed as "threatened" in Kansas and "rare" in Missouri.

Black sandshell (*Ligumia recta*) mussels have not been observed live in Kansas since 1912. In August 2002, a live Black sandshell mussel was found in the Marais des Cygnes River on the Refuge (Angelo 2003).

Winged mapleleaf (*Quadrula fragosa*) is another federally listed endangered species that may occur on the Refuge. A shell discovered on the Refuge in 2001 was confirmed by Dr. David Stansbery, Ohio State University, to be *Quadrula fragosa*. Dr. Stansbery urged further exploration for this rare mussel.

Mussel bed on the Marais des Cygnes River (above) and mussels (below).

Pink mucket (*Lampsilis abrupta*) is a federally listed endangered species that was discovered live in the Sac River in Missouri in 2001 by Dr. Chris Barnhart, Southwest Missouri State University. The Sac River is a tributary of the Osage River. No dams obstruct movement of fish and mussels between the Marais des Cygnes River and the Sac River.

Scaleshell mussel (*Leptodea leptodon*) was federally listed as an endangered species in 2001. An extant population of this species was discovered downstream of Bagnall Dam in 2001 in the Osage River. Historic records within the West Osage River Basin indicate the possibility that the species may occur within Marais des Cygnes NWR and the Addition area (Brian Obermeyer, personal communication).

See Appendix D for a list of area fish and mussel species.

3.4.1.4 Reptiles and Amphibians

Approximately 58 species of snakes, lizards, frogs, salamanders, and turtles are likely to occur in the Addition area (Marais des Cygnes NWR CCP) of which 16 are amphibians and 42 are reptiles. The northern crawfish frog and great plains skink are two species that are likely in the Addition area and are uncommon in Missouri. See Appendix D for area reptile and amphibian species list.

3.4.1.5 Threatened and Endangered Species

Ten federally listed threatened or endangered species may occur in the Addition Area, four of which – Bald Eagle, Interior Least Tern, Piping Plover, and Mead's milkweed – have been observed within or near the Addition area. Pink mucket mussel, winged mapleleaf mussel, scaleshell mussel, American burying beetle, western prairie fringed orchid, and running buffalo clover historically occurred in the area and may still occur or be restored to the area.

A population of Mead's milkweed occurs at Marais des Cygnes NWR within a short distance of the Addition area and likely occurs within existing prairie areas in the Addition area.

Mead's Milkweed

Bald Eagles are common winter visitors along the Marais des Cygnes River, especially where rock riffles keep water open and attract large concentrations of geese and Mallards. Active Bald Eagle nests occur 40 miles upstream (northwest) of the Addition area at Hillsdale Reservoir, Kansas, and 30 miles downstream (southeast) at Schell-Osage Wildlife Area, Missouri.

Thirteen species listed as endangered in Missouri may occur within the Addition area, 10 of which have been observed within or near the Addition area. Bald Eagle, Barn Owl, Northern Harrier, King Rail, American Bittern, Snowy Egret, Interior Least Tern, Greater Prairie Chicken, black tailed jackrabbit, and Mead's milkweed have been observed within or near the Addition area. American burying beetle, western prairie fringed orchid, and running buffalo clover may occur in the area but have not been recently observed (Missouri Department of Conservation websites). See Appendix D for a listing of area federal and state-listed endangered species.

3.4.2 Biological Diversity

Biological diversity is the variety of life and its processes. This variety may occur at the species, community, and ecosystem level. Bio-diversity supports the stability and resilience of ecological systems that provide the "ecosystem services" upon which we depend, such as soil building, erosion control, and hydrologic cycles. The loss of this diversity threatens the function of ecosystems everywhere (U.S. Fish and Wildlife Service 2001), including the State of Missouri.

The Addition area contains a tremendous variety of plants and animals for an area of its size. Located within the transition zone of two biomes, tallgrass prairie and the eastern deciduous forest, and between two high quality representatives of these biomes, the tallgrass prairie of the Flint Hills of Kansas and the oak-hickory forest of the Ozarks of Missouri, the region has tremendous potential, with management, to increase in diversity. The presence of the Marais des Cygnes River and its associated floodplain further adds to the diversity of the area.

A total of 317 species of birds, 41 mammals, 58 reptiles and amphibians (Marais des Cygnes NWR CCP), 48 fish (Dent et al. 1998), and 30 mussels (Marais des Cygnes NWR staff) occur in the area for a total of 494 different animal species. This number includes a tremendous variety of aquatic, forest, and prairie species all within a short distance of each other, such as Cerulean Warbler and Red-shouldered Hawk in forests, Loggerhead Shrike and Scissor-tailed Flycatcher in shrubland/savannah, Henslow's Sparrow and Short-eared Owl in grasslands, flat floater mussels and Green Herons in wetlands, and paddlefish and Hooded Merganser along the River.

Plant community diversity is equally great with examples of prairie and woodland sites containing dry, mesic, and wet species associations. Some representative prairie species of each community association include prickly pear cacti on dry sites, big bluestem on mesic sites, and cordgrass on wet sites. Some repre-

sentative woodland species of each community association include black jack oak on dry sites, shagbark hickory on mesic sites, and pin oak on wet sites. American lotus, an emergent, and Potamogeton spp., a submergent, are some representative aquatic species.

Many typically southern species occur at their northern limits in the region including pecan, persimmon, and paw paw. Other species that are commonly found farther north, such as bur oak, occur as a southern subspecies. The southern subspecies of bur oak is readily recognized from the northern subspecies by its location in wet rather than dry sites and by the much larger nut size. See Appendix D for area Missouri rare species list.

3.5 Archaeological and Cultural Resources

Artifacts found on Refuge land.

The Addition area is located within a region identified to contain archaeological sites dating to the Archaic Period, circa 3500 B.C. Settlement patterns for both Archaic and Ceramic periods were in sheltered lowlands along major and minor drainages. However, seasonal upland camps have been identified dating to the Archaic and Early Ceramic periods.

A prehistoric campsite assigned to the Early Ceramic Temporal Period (A.D. 1 to A.D. 1000) is located 1 mile west of the Addition area. The site covers approximately 7 acres and is located within the floodplain of the Marais des Cygnes River. The potential for similar sites along the River is high (Marais des Cygnes NWR CCP). Evidence of old homesteads and small family coal mines are also present in the area.

An archaeological review, conducted for Pittsburgh and Midway Coal Mining Company prior to excavation within the northwest portion of the Addition area, identified two prehistoric archaeological sites. Both sites were believed to be of temporary use as no middens (prehistoric dumps) were identified. Both sites contained chipped stone fragments and tools such as scrapers (Schmits 1986).

Plant and mollusc fossils, mammoth teeth, and bison, elk, and camel bones are occasionally discovered along the Marais des Cygnes River.

Chapter 4.0 – Environmental Consequences

4.1 Environmental Consequences Related to Natural Resource Concerns

4.1.1 Alternative A: No Action

Marais des Cygnes NWR operations would continue to operate at the current level, entirely in the State of Kansas. The 7,500 acres of current holdings could be expanded by acquiring additional lands within the original approved acquisition boundary encompassing 9,300 acres. Management efforts would be directed toward achieving existing resource goals in Kansas.

The consequences of Alternative A are described for each of the following land management priorities and project goals.

Fescue grassland near Mulberry Creek.

Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on bottomland hardwood and tallgrass prairie habitats.

Diversity of the proposed Addition area would likely decrease over time as native prairies are replaced by fescue, noxious weeds, and forest. Bottomland forest would continue to decrease as it is replaced with cropland or waterfowl hunting marshes. Whether future conversion of bottomland forests will largely be to cropland, or to hunting marshes, is difficult to determine. Many variables including waterfowl populations, the economy, weather patterns, and farm programs greatly influence land use patterns in the area.

Croplands do provide food for migrating waterfowl, especially for geese. Most of the year, however, croplands are of little value to wildlife. Waterfowl marshes in the region are used by waterfowl and other wetland birds when they are flooded. Waterfowl marshes are generally flooded from September through February and drained in March. Sometimes they are allowed to grow native marsh plants. Other times they are planted to crops. The values of waterfowl marshes to wildlife diversity varies greatly depending on how the marshes are managed.

While a few hunting marshes may add to the wildlife diversity of the area, many such marshes, particularly if bottomland hardwood forest or wet prairie are eliminated to create them, would decrease wildlife diversity.

Forest sites that are not converted to other uses may be logged as trees become mature. Most grasslands would likely continue to be grazed season-long and

thus not provide a variety of plant species and vegetation heights. The continued sparsity of old mature timber and variety of grassland cover heights would likely prevent further increases in abundance and diversity of wildlife in the area.

Conserve, manage, and restore the diversity and viability of native fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat, as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.
In general, the diversity and abundance of native, non-migratory wildlife would likely decrease over time for the same reasons as discussed in the above section about migratory bird and waterfowl species. Quail populations would likely continue to decline as upland brushland becomes forest and fescue continues to dominate grasslands. Some species, such as turkey and white-tailed deer, would likely remain at current levels or even increase over time as upland forest habitat increases.

Fish and mussel abundance and diversity would decrease greatly if levees are constructed along the River and bottomland forests are replaced with cropland. Levees would prevent access by fish to the floodplain. The floodplain provides an important aquatic food resource and floodplain wetlands provide nursery habitat for many aquatic species including paddlefish.

Restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions.
If levees are constructed, river hydrology would change greatly. Floodplain areas without levees would experience more severe flooding. The River would also scour the riverbed much more vigorously, which would remove some mussel beds and fish spawning beds and reduce the fine rock particles in others, resulting in degraded habitat.

If existing grassland and forest areas are converted to cropland, increased sediment would be deposited into the River. This sediment would negatively impact mussel beds and fish spawning beds.

Refuge staff will work with responsible parties within the existing laws and ?? to ensure that unreclaimed strip mines do not contribute to acidity runoff and heavy metals contamination of the watershed.

Work in partnership with others, including private landowners, to restore or enhance bottomland hardwood forest, tallgrass prairie, and other unique plant communities.
Little effort would be made by Refuge staff to deliberately contact private landowners and encourage specific management practices. Landowners requesting assistance would be assisted, however.

Private lands biologists with the Fish and Wildlife Service and Missouri Department of Conservation as well as Natural Resource Conservation staff could provide assistance and information about specific conservation programs. These personnel have been providing assistance throughout the region for many years and will likely do so in the future as well.

Protect and restore federally listed and State-listed Threatened and Endangered Species.
The number and abundance of endangered species would likely decrease over time. Impacts would vary greatly depending on the species. Bald Eagles, particularly wintering populations, would be less impacted while Mead's milkweed, a prairie plant, would be greatly impacted. The kinds of impacts to habitat that are likely to occur are the same as those discussed in the above section.

Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.
Service action would not result in improved recreational opportunities on Marais des Cygnes NWR. Opportunities for wildlife-dependent activities such as hunting, fishing and wildlife observation would be limited to those provided by private landowners. Without the availability of environmental education programs, any activities that do occur would be less effective in increasing public understanding of the tallgrass prairie ecosystem.

4.1.2 Alternative B: Protect and Restore Habitat in the Marais des Cygnes Floodplain in Missouri through Land Acquisition

Purchase additional lands, fee title, only in the floodplain, in order to expand the Refuge capability to protect, restore and preserve floodplain habitat associated with the Marais des Cygnes River by extending the Refuge into the Marais des Cygnes/West Osage River Basin of Missouri.

The main difference between Alternative B and Alternative C (next section) is that Alternative B primarily targets the floodplain with restoration of wetlands and bottomland hardwoods as primary goals while Alternative C includes these goals as well as the protection and restoration of native prairie on the uplands adjacent to the floodplain.

The consequences of Alternative B are described for each of the following land management priorities and project goals.

Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on bottomland hardwood and tallgrass prairie habitats.
Bottomland cropland and grassland sites would be planted to bottomland hardwood forest or restored to wetland. Fescue grassland sites that were wet prairie, according to the 1857 land survey, would be restored to wet prairie. Most of the bottomland was not historically wet prairie, therefore wet prairie restoration would be limited.

The forests of the bottomland would change from a fragmented landscape of many small forests of mostly young trees to a landscape of large tracts of forest with many mature trees. The forests would be interspersed with many shallow, depressional wetlands and deeper oxbow wetlands.

Wetlands would not be routinely filled in the fall and drained in the spring, as most duck marshes are, which would provide summer breeding habitat for many species of marsh and shorebirds birds.

Species requiring expansive tracts of bottomland forest and mature trees will increase, including Red-shouldered Hawk and Cerulean Warbler. Many other species such as, broad-head skink, flat-floater mussel, Wood Duck, and Hooded Merganser would also benefit.

Conserve, manage, and restore the diversity and viability of native fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat, as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.
Resident forest and wetland species including Turkey, white-tailed deer, gray fox, otter, flat floater mussel, and broad head skink would increase as forest and wetland habitats become more available.

Increases in habitat for resident wildlife in the area would likely increase wildlife populations on adjacent private land, which currently provides limited types of cover needed by wildlife such as nesting, brood, escape, feeding, and winter cover. This alternative would provide excellent spawning and nursery habitat for a number of sport fish (walleye, white bass and perhaps paddlefish) that migrate out of Truman Lake and into the river to spawn. The young of these fish are recruited to the Truman Lake fishery to maintain a quality fishery for sport anglers.

Restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions. Reduction of cropland and restoration of forests and wetlands would reduce local sediment loads into the Marais des Cygnes River. The blocking of drainage ditches and W-ditches, in addition to restoring wetlands, would also help to decrease sediment loads and slow run-off into streams and the River. These measures, as well as the installation of rock and/or concrete structures on small streams, could stop head-cutting of tributary streams. All of these actions would result in a much more wet floodplain, which would allow shallow marshes to hold water for longer periods of time and allow bottomland hardwood forest species to out compete upland forest species throughout more of the floodplain.

Removal of levees within the study area would make more floodplain habitat available for terrestrial and aquatic wildlife, lessen the scouring effect on river mussel and spawning beds, and decrease the duration and heights of floods immediately upstream of the levees.

Refuge staff will work with responsible parties within the existing laws and regulations to ensure that unreclaimed strip mines do not contribute to acidity runoff and heavy metals contamination of the watershed.

Work in partnership with others, including private landowners, to restore or enhance bottomland hardwood, tallgrass prairie, and other unique plant communities.
Private landowners adjacent to and within an approved acquisition boundary would be encouraged to conduct restoration of bottomland hardwood forest, wetlands, and wet prairie. Efforts would especially concentrate on sites where restoration would create large tracts of forest.

Protect and restore federally listed and State-listed Threatened and Endangered Species.
Species that use wetlands and bottomland forest would benefit. Bald Eagles, both breeding and migratory birds, would have an increased number of wetlands available for feeding, even in the summer, when most duck marshes are dry. Large mature trees used for nesting and perching would be available near most feeding sites.

Populations of Piping Plover and Least Tern migrate through the area in the spring and fall. During dry periods, exposed areas along the River and adjacent to wetlands could provide a limited amount of habitat.

Western prairie fringed orchid may occur in wet prairie sites. Wet prairie sites that are currently hay meadows would likely be hayed less often and burned more often. Lands adjacent to the sites that are not currently wet prairie but were wet prairie historically would be restored. These restored lands would act as a buffer where forest and noxious weed invasion could be controlled with less impact to the native prairie.

The scale shell mussel may occur in mussel beds in the Marais des Cygnes River. Management activities that reduce silt loads and improve habitat for fish species used by the scale shell mussel for dispersal should help the species.

Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.
More wildlife-dependent recreation would be available to the public. Hunting would be safer and more enjoyable for participants because the Refuge would monitor participation and, if necessary, limit participation. Other activities would be encouraged and programming would contribute to increasing visitors' understanding of the tallgrass prairie ecosystem and the mission of the National Wildlife Refuge System. Flooding may sometimes limit recreational activities.

4.1.3 Alternative C: Protect and Restore Floodplain and Adjacent Upland Habitat along Missouri Reaches of the Marais des Cygnes River by Acquiring Additional Lands (Preferred Alternative)

Purchase additional lands, fee title, in order to expand the Refuge capability to protect, restore and preserve bottomland, wetland, and native prairie habitat on lands adjacent to and nearby the Marais des Cygnes River in Marais des Cygnes/West Osage Basin of Missouri.

The main difference between Alternative C and Alternative B is that Alternative B primarily targets the floodplain with restoration of wetlands and bottomland hardwoods as primary goals while Alternative C includes these goals as well as the protection and restoration of native prairie on the uplands adjacent to the floodplain.

This alternative is preferred by the U.S. Fish and Wildlife Service because it provides the broadest and most permanent form of protection to natural resource values of the targeted reach of the Marais des Cygnes River in Missouri.

The consequences of Alternative C are described for each of the following land management priorities and project goals. The consequences regarding the floodplain were described in Alternative B and are the same for Alternative C, therefore, only consequences regarding the uplands are discussed below.

Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on bottomland hardwood and tallgrass prairie habitats.
Fescue grasslands would be managed to lessen or remove fescue in favor of native prairie species. Management efforts could include short-term farming, early spring herbicide application, late spring burns, and intense spring-fall grazing. The types of management actions taken would largely depend on the plant and animal diversity present on the site.

Restored grasslands would likely be managed with a combination of grazing and prescribed fire. Grazing would likely be rest-rotational, which would allow a diversity of grassland heights and density and prevent individual species of native plants from being eliminated from an area due to grazing pressure. Haying would not be frequently employed.

Trees along fence rows and draws would be removed to reduce perches for avian predators and grassland fragmentation. Large patches of upland forest would not likely be removed but may be restored to savannah if species such as bur oak and post oak are present.

The increase in native plant diversity, diversity of grassland heights and density, and reduction of grassland fragmentation should greatly increase the abundance and diversity of grassland birds.

Some of the migratory bird species likely to be benefitted are: Barn Owl, Short-eared Owl, Northern Harrier, Swainson's Hawk, Loggerhead Shrike, Upland Sandpiper, Bell's Vireo, Henslow's Sparrow, Grasshopper Sparrow, Dickcissel, and Scissor-tailed Flycatcher.

Conserve, manage, and restore the diversity and viability of native fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat, as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.
Black-tailed jack rabbit, Greater Prairie-chicken, and Northern Bobwhite would benefit from grassland restoration efforts. All of these species are in serious decline in the region. Many factors may be affecting population declines. However, the dominance of fescue grass, increased presence of trees and mature upland forest, and fragmentation of grasslands are likely major factors affecting these and other native grassland species.

Efforts to restore native prairie, reduce the presence of upland trees, and eliminate grassland fragmentation should help native grassland species.

This alternative would provide excellent spawning and nursery habitat for a number of sport fish (walleye, white bass and perhaps paddlefish) that migrate out

of Truman Lake and into the river to spawn. The young of these fish are recruited to the Truman Lake fishery to maintain a quality fishery for sport anglers.

Restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions.
Grasslands would be managed to leave more litter on the ground, which would lessen erosion. Crop fields would be planted to grass, which would further reduce erosion. Additional improvement in water quality will be realized by converting cropland to grass which will reduce fertilizer, herbicide, and pesticide use in the watershed of the Marais des Cygnes River. Refuge staff will work with responsible parties within the existing laws and regulations to ensure that unreclaimed strip mines do not contribute to acidity runoff and heavy metals contamination of the watershed.

Work in partnership with others, including private landowners, to restore or enhance bottomland hardwood, tallgrass prairie, and other unique plant communities.
Private landowners adjacent to and within an approved acquisition boundary would be encouraged to conduct restoration of native prairie. Efforts would especially concentrate on sites where restoration would create large tracts of grassland.

Protect and restore federally listed and State-listed Threatened and Endangered Species.
Mead's milkweed likely occurs on some of the native prairie sites. The greatest threats to these populations are invasion by Sericea lespedeza, an aggressive noxious weed, and subsequent control with broadcast application of herbicide. Management efforts would strive to identify all Mead's milkweed populations and carefully spot-spray Sericea plants near the sites with an approved herbicide such as Garlon. Other threats to sites are herbicide drift from adjacent pastures or crop fields and invasion by forest. All Mead's milkweed sites would be protected with large buffers of restored prairie.

American burying beetle and running buffalo clover likely occurred in the area historically. No populations are known to exist in the area. Restoration of these species would be periodically evaluated as prairie restoration efforts advance.

Several state-listed threatened and endangered species occur in the area and would be benefitted by grassland restoration efforts. Many of these are migratory species identified in the previous section.

Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.
With less potential for flooding, Alternative C offers the greatest benefits for wildlife-dependent recreation. More opportunities for recreational activities would be available with restoration focused on grasslands and ponds. Access to the Refuge would also be greater, which might result in more people visiting the Refuge and greater public understanding of the tallgrass prairie ecosystem and the mission of the National Wildlife Refuge System.

4.1.4 Alternative D: Protect and Restore Additional Floodplain and Adjacent Uplands through Long-term Easements and Private Land Programs

Expand the Refuge's capability to protect and restore floodplain and upland habitat on private lands entirely through easements and agreements with land owners.

The consequences of Alternative D are described below for each of the following land management priorities and project goals. However, a short discussion regarding easements precedes these descriptions.

The Wetland Reserve Program (WRP) and Conservation Reserve Program (CRP) are two programs administered by the Natural Resource Conservation Service (NRCS), U.S. Dept. of Agriculture, which benefit wildlife. Both WRP and CRP sites exist in the study area

Wetland Reserve Program agreements are long-term easements that occur only in the floodplain and result in areas being restored to wetland and planted to wet prairie and bottomland forest. The program provides excellent habitat for bottomland wildlife. However, a number of factors make the program unattractive to many landowners. Draw-down or discing of wetlands for waterfowl management purposes requires written permission, which is sometimes difficult or not possible to obtain. Harvest of pecans and firewood is prohibited. Future construction of roads and buildings is prohibited. The purchase of these easements is little different than outright purchase of the land in that the cost of the easements is often very close to the appraised value of the property and nearly all property rights are owned by the government other than public access.

The CRP program involves short-term easements, generally 10 years in length, which mostly occur on uplands. Most often, uplands are planted to native grasses and forbs. The program has been a boon to grassland wildlife, especially species requiring dense grassland cover. However, no grazing is allowed on CRP sites and many are not burned, which results in serious invasion by trees on some sites. In areas where CRP sites are prevalent, the landscape is more diverse, however, grasslands are generally dominated by either very short grass or very tall rank grass with little in between in regard to density or heights. This limits the ability of the grassland landscape to increase wildlife diversity.

Other easement options could be developed by the Service to complement WRP and CRP. While these options may be more attractive to some landowners, there will always be landowners who don't want to be encumbered by easements and would simply prefer to sell their land.

While easements offer a tremendous opportunity to improve wildlife habitat across broad landscapes, they are of much less value when targeting a specific area where many tracts of land must be similarly managed to create landscape goals such as reduction in habitat fragmentation. Also, most easements with habitat goals do not provide access to the public.

Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on bottomland hardwood and tallgrass prairie habitats.
Easements would increase wetland and grassland restoration throughout the area and thus increase the abundance of migratory bird and waterfowl species. Specific management practices – timing and application method of herbicides to control weeds and trees or timing and frequency of burning – would vary greatly depending on landowner interest and funding. These differences would affect the diversity and abundance of wildlife on a given site. Ways to encourage rest-rotational grazing to provide a diversity of grassland heights and density would be the most difficult obstacle to overcome.

Conserve, manage, and restore the diversity and viability of native fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat, as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.
The consequences to native wildlife would be much the same as those discussed in the above section regarding migratory birds and waterfowl.

Restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions.
Water quality would likely improve but would be limited by the interest in landowners to take cropland out of production, reduce grazing levels, and restore wetlands, prairie, and bottomland forest.

Work in partnership with others, including private landowners, to restore or enhance bottomland hardwood, tallgrass prairie, and other unique plant communities.
Vigorous effort would be made to encourage landowners to restore grassland and bottomland hardwood forest, and available habitat restoration programs would be thoroughly explained. However, only one-third of the landowners in the proposed Addition area reside in Bates County. Nearly half of the landowners do not reside in Missouri. Because of the high number of absentee landowners, the ability or interest of landowners to more aggressively manage their land to benefit wildlife will naturally be limited. In many cases a tenant makes most of the land management decisions. Tenants who graze or farm generally have little interest in taking cropland out of production, reducing grazing levels, or spot spraying rather than broadcast spraying noxious weeds.

Protect and restore federally and state-listed threatened and endangered species.
Many landowners are very uncomfortable about having endangered species on their property and are unlikely to favor restoration or re-introductions on their property for fear of government interference in their management of the land or outright condemnation of their property.

Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.
With restoration focused on private land programs, opportunities for wildlife-dependent recreation would be subject to landowners' willingness to participate.

Under this alternative, the Refuge would not gain opportunities to increase public understanding of the tallgrass prairie ecosystem and the mission of the National Wildlife Refuge System.

4.2 Consequences of Alternatives Related to the Socioeconomic Environment

This section examines the alternatives regarding their respective ability to address the following social goals:

1) Provide for compatible wildlife-dependent recreational uses by the public.

2) Emphasize increased public understanding of bottomland hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.

This section also examines the potential effects on some key issues, including tax revenue and the local economy, that may result from the acquisition, operation, and maintenance of a national wildlife refuge in the study area.

Alternatives B and C require land acquisition and Alternatives B, C, and D require the need for Refuge administration. For this reason, all of the alternatives are addressed together within this section. Alternative A, No Action implies, with a few noted exceptions, that the local economy and taxes will follow current trends.

4.2.1 Recreational Opportunities

Alternatives A and D do not require land acquisition. Under these alternatives public use within the Addition area would likely be quite limited. Permission from private landowners would be required to hunt, fish, and visit lands within the area. Granting of permission would likely be highly variable depending on the type of desired use, time of year, and the individual landowners' tolerance of public visitors.

Alternatives B and C require land acquisition. Under these alternatives much of the land within the Addition area, following purchase by the Service, would likely be available for wildlife-dependent recreation and interpretation. Alternative C, which includes both bottomland and upland areas, would provide more opportunities than Alternative B, which only includes bottomlands, as there are few roads into the bottoms, roads are generally poor, and the bottoms often flood during the spring and fall, which is when most people wish to visit the area.

The opportunity for wildlife-dependent public recreational uses would increase under alternatives B and C. The Refuge Improvement Act of 1997 identifies six priority uses as wildlife-dependent recreational activities: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. These uses are encouraged on refuges when they are compatible with the purposes of the refuge. All lands acquired for refuges are closed to all public uses unless specifically opened. Prior to, or soon after lands are purchased of

sufficient size and location to allow public uses, appropriate management plans and the Refuge Comprehensive Conservation Plan will be amended to include the Addition area. It is anticipated that all six priority uses will be allowed as soon as a sufficient land base is acquired within the Addition area. Public recreational uses are currently permitted on Marais des Cygnes National Wildlife Refuge in Kansas.

4.2.2 Taxes

Alternative D proposes to expand the Refuge's capability to protect and restore floodplain and upland habitat on private lands through the Private Lands Program, and would therefore have no impact on local taxes. Land acquisition under Alternatives A, B and C would likely occur over 20 years or more. The extent of fee ownership by the Service is difficult to predict as it depends on the landowner's desire to sell land and whether buildings are included. It is also difficult to predict future tax assessments over such a long period. Any lands acquired in fee/full title by the Service will no longer be on the local taxing jurisdiction's property tax rolls. However, Refuge Revenue Sharing, which is further explained in Section 4.3.3, should provide tax revenues equal or greater than current revenues.

The Refuge Revenue Sharing Act authorizes payments based on the greatest return to the county and is calculated under one of three formulas: 1) 75 cents per acre; 2) 25 percent of the net revenue from sales of local Refuge products; or 3) three-quarters of 1 percent of the appraised value of the property. Appraised value is evaluated on the type of land use at the time of purchase by the Service and is re-evaluated every 5 years. If the land was being hayed or grazed at the time of purchase it will always be re-evaluated as that land use, regardless of the use the Service makes of the land.

Recent Revenue Sharing payments made to counties on Service lands at Big Muddy National Wildlife Refuge near Columbia, Missouri, consistently presented payments greater than what was previously received when the land was in private ownership, even on leveed crop fields (Tom Bell, Refuge Manager).

The conversion of existing agricultural lands to native wetlands and prairie will require little or no new local government services. The tax burden for road construction or repair may be reduced by the presence of a wildlife refuge and could help eliminate any future tax shortfall.

4.2.3 The Local Economy

Alternatives A and D would likely have little or no impact on the local economy. Under Alternative A, the Refuge would be authorized to purchase approximately 2,200 acres to the original boundary of 9,300 acres. Because the land purchased would be minimal and would occur over time as people decided to sell property, any change to the economy would be minimal. Alternative D focuses on the Service's Private Lands Program, with no impacts to the local economy anticipated.

The local economy can experience some changes during the formation of a new national wildlife refuge. Under Alternative B and Alternative C, the proposed Addition would likely create increased spending in the area by visitors to the

Refuge, reduced agricultural production comparable to the Conservation Reserve Program, and increased expenditures by the Service to build and maintain Refuge facilities. In addition, the new Addition would likely require additional staff, equipment, and facilities.

The Addition area would likely be developed over the course of 20 years or more. During that time, funds would be needed for engineering and construction. Several hundred thousand dollars would be expended returning the lands to wetlands, bottomland hardwood forest, and native prairie. This money would be expended locally for items such as native grass seed, fuel, and contracts with heavy equipment operators for wetland restorations.

National wildlife refuges are recognized by many wildlife recreationists, including hunters and bird watchers, as desirable destinations and many go out of their way to visit refuges. Under Alternative A and Alternative B, such non-resident and regional visitors to the Addition area will contribute a positive level of spending to the local economy. The communities of Amoret and Butler, Missouri, would very likely see an increase in visitors seeking food and lodging accommodations.

The Addition area is within 45 miles of the southern edge of the Kansas City metropolitan area, which has a population of 1.6 million people. It is also within 10 miles of two major north-south U.S. highways, U.S. 69 located 4 miles to the west and U.S. 71 located 10 miles to the east. U.S. 71 is a four-lane freeway and U.S. 69 is scheduled to be a four-lane freeway by 2007. The proximity of both a major metropolitan area and major highways could encourage extremely high visitation levels. The amount of visitation to the area would likely need to be controlled to prevent over-use. Control activities could be by many means, including drawings for some hunts or limitations on access. The amount of visitation desired and ways to control visitation would be discussed in public meetings and outlined in appropriate management plans prior to any lands being opened for public use.

Approximately 60-80 percent of visitors to Marais des Cygnes National Wildlife Refuge in Kansas come from the Kansas City metropolitan area. Most visitors come to hunt and fish, however, development of Refuge trails and wildlife viewing areas is gradually encouraging many other kinds of visitors to come to the Refuge.

Most hunting and fishing visitors to the Refuge come from Kansas, largely due to the expense of out-of-state licenses. Most hunting and fishing visitors to the Addition area, for similar reasons, are expected to come from Missouri. Interest by the public in visiting the Addition area in Missouri is expected to be similar to that at the Refuge in Kansas.

Bates County has many retirees and city commuters who desire easy access to a major metropolitan area yet wish to live in a rural setting. The presence of the Addition area under Alternative A or Alternative B would likely encourage more movement of citizens into the county. Most new residents would likely live in nearby communities.

In summary, the Addition proposed to Marais des Cygnes National Wildlife Refuge under alternatives B and C would likely have a net positive effect on county-level economic activity and could generate considerable social benefits. No change in economic activity is expected with either Alternative A or Alterna-

tive D. The value of natural areas, such as wildlife refuges, to people and their quality of life is difficult to measure in conventional economic terms. National wildlife refuges enhance the regional, state and the nation's stock of natural assets and provide important, but less tangible, benefits to its citizens, including clean water, natural beauty and abundant wildlife, fish and plants. Nevertheless, the Service recognizes that potential changes in the local and regional economy are important considerations.

4.3 Consequences of Alternatives Related to Local Land Use Including Land Acquisition, Cultural Resources, Refuge Management and Administration

This section examines potential effects on landowners and local residents that may result from the acquisition, operation and maintenance of a national wildlife refuge in the study area. All of the alternatives, except the No Action Alternative, include the need for future refuge administration. For this reason, all of the alternatives are addressed together within this section. More detail can be found regarding management of purchased lands in Appendix A, the Interim Comprehensive Conservation Plan (ICCP). The ICCP provides general guidelines for the future management and administration of the proposed Addition.

4.3.1 Landowner Rights Adjacent to Refuge Lands

If an Addition to the Refuge is established, the Service would have no more authority over private land within or adjacent to the boundaries of the Refuge than any other landowner. Landowners within a project boundary retain all of the rights, privileges, and responsibilities of private land ownership. The presence of refuge lands does not afford the Service any authority to impose restrictions on any private lands. Control of access, land use practices, water management practices, hunting, fishing, and any other general use is limited to those lands in which the Service has purchased a real estate interest or rights.

Owning land adjacent to Service land does not change any regulations that currently apply and does not impose any new regulations on private property. Enforcement of regulations pertaining to pesticides, drainage, pollution, hunting, fishing, trapping, etc., on private land would continue to be enforced as they were prior to establishment of an Addition to the Refuge. The Service also abides by local regulations the same as any other landowner. In addition, land managed by the Service will be posted in order to avoid trespass on private land by Refuge visitors.

4.3.2 Service Land Acquisition Policies

Service policy is to buy land only from willing sellers. No land or rights to land would be acquired without the willing participation of the individual or individuals owning land or rights to the land, including appropriate just-compensation for

those rights. The Service is required to make purchase offers based on fair market value, which can be described as matching the price of comparable land in the same area.

It is also Service policy to seek the least amount of land ownership necessary to meet resource protection goals. Alternatives B and C would include primarily land acquisition. Alternative D includes voluntary land protection, stewardship, and other private conservation measures as options for landowners.

Condemnation of land is another frequent issue. The policy of the Fish and Wildlife Service is to purchase lands from willing sellers only. Condemnation has not been used to acquire any lands for the Marais des Cygnes National Wildlife Refuge in Kansas, which has been purchasing lands for 10 years.

4.3.3 Revenue Sharing Payments

The Refuge Revenue Sharing Act authorizes payments based on the greatest return to the county and is calculated under one of three formulas:

1) 75 cents per acre;

2) 25 percent of the net revenue from sales of local refuge products; or

3) Three-quarters of 1 percent of the appraised value of the property. Appraised value is evaluated on the type of land use at the time of purchase by the Service and is re-evaluated every 5 years.

Funding for these payments comes from two sources: (1) net receipts from the sale of products from National Wildlife Refuge System lands (oil and gas leases, timber sales, grazing fees, etc.) and (2) annual Congressional appropriations.

The amount of a Revenue Sharing payment is directly tied to the appraised market value of a property. In some cases, annual payments to local governments exceed what the local tax, based on assessed value, would have been if the land was still in private ownership. In other cases, Revenue Sharing payments and supplemental Congressional appropriations fall short of the local assessed property tax revenue. Some members of Congress have recognized this fact and have introduced various bills to remedy the situation. These bills have contained provisions for full funding of the Refuge Revenue Sharing Act. The proposed source of funds would be federal offshore oil and gas lease revenues. However, to date none of these bills have been passed into law.

4.3.4 Relocation Benefits Policies

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended, provides for certain relocation benefits to home owners, businesses, and farm operators who are displaced as a result of Federal acquisition. The law provides for benefits to eligible owners and tenants in the following areas:

- Reimbursement of reasonable moving and related expenses;
- Replacement housing payments under certain conditions;

- Relocation assistance services to help locate replacement housing, farm, or business properties, and;
- Reimbursement of certain necessary and reasonable expenses incurred in selling real property to the government.

4.3.5 Cultural Resources

Refuge establishment and subsequent land acquisition proposed under Alternative A, Alternative B and Alternative C generally will have no effect on archeological resources. Traditional cultural properties and sacred sites of concern to Indian tribes and other ethnic and cultural groups receive increased protection to the extent the Service can obtain information about them. However, in some cases buildings and other structures may not receive increased attention under Service versus private ownership. The high cost of maintaining and preserving some buildings may prohibit acquisition or future use of some building sites. In general however, cultural resources receive increased protection from loss because of the several Federal laws that apply to property owned and administered by the Federal government. Alternative D would not increase the potential for archeological resources to be lost or damaged, however there would be no increased federal protection because lands would remain in private hands.

The Service might affect some cultural resources when it develops Refuge land for wildlife habitat, administrative facilities or public use areas. The potential for Refuge activities to affect prehistoric and historic resources, Native American human remains and cultural objects, and traditional and sacred sites will be determined early in project planning. The Refuge manager, with the assistance of the Regional Historic Preservation Officer, will review all proposed projects and conduct surveys prior to any construction activities, if such actions are deemed necessary. The requirements of several cultural resources laws, executive orders, Federal regulations, policies and standards specified in the Fish and Wildlife Service Manual 614 FW 1-5 apply in all cases.

Archeological investigations and collecting are performed only in the public interest by qualified archeologists working under an Archaeological Resources Protection Act or Antiquities Act permit issued by the Regional Director. Refuge personnel take steps to prevent unauthorized collecting by the public, contractors, and Refuge personnel. Violations are reported to the Regional Historic Preservation Officer.

A number of historic family cemeteries likely occur in the Addition area. Access to these cemeteries would not change with the purchase of lands surrounding these cemeteries.

4.3.6 Effects on Current Drainage Patterns

The Service would not cause any artificial increase of natural water levels or flows without ensuring that the impact would be limited to lands in which the Service has acquired an appropriate real estate interest from a willing seller such as fee title ownership, flowage easement, or cooperative agreement. Thus, none of the alternatives would have negative impacts on drainage from neighboring lands. If Service activities inadvertently create a water-related problem

for any private landowner (flooding, soil saturation or deleterious increases in water table height, etc.), the problem would be corrected at the Service's expense.

4.3.7 Water Pumping

No pumping or artificial filling of wetlands is planned. Refuge goals are to restore the natural hydrology of the area. The presence of the Addition Area, when fully restored , should lessen the severity of flooding and increase the duration of flows off of the land during other times of the year. This is expected because natural vegetation and wetlands should slow flood waters and keep soils more moist, thus providing for a higher water table and making water available for a longer period of time.

4.3.8 Crop Depredation

In general, crop depredation would not be expected to increase throughout most of the area. In instances where small fields become surrounded by forest, depredation from deer could increase. However, most bottomland fields are not small and Refuge goals on uplands would be to plant areas into prairie grassland. Wetland development would not likely increase depredation by geese. Goose populations in the area are not limited by the availability of water but by the availability of crops. Only increases in cropland would cause appreciable increases in the goose population. In addition, most restored wetlands would be small and/or forested, which are not preferred by geese. Geese prefer large open wetlands.

4.3.9 Invasive Species

We will strive to prevent the introduction of invasive plant species, detect and control populations of invasive species, and foster the restoration of native species and habitat conditions in invaded ecosystems. We will develop integrated invasive species control strategies that incorporate the most effective combination of mechanical, biological and chemical controls while considering environmental health. Invasive species management will be consistent with "Fulfilling the Promise" recommendations and will be consistent with ecosystem and National Wildlife Refuge System priorities.

4.3.10 Refuge Administration

Any acquired lands would become part of the National Wildlife Refuge System. These lands would be administered by staff at Marais des Cygnes National Wildlife Refuge. The administration office for the Refuge is located along State Highway 52, 3 miles west of Amoret, Missouri, and the Addition area. As the land base increases and the complexity of habitat management and administration increases, additional staff would likely be hired, and management facilities would be constructed within the Addition area. Speaking very generally, a fully staffed refuge of this size would have about seven staff members and an annual operating budget of approximately $700,000. See Appendix A for more details about potential future Refuge management activities.

4.3.11 Impact on Public Roads

The Service does not close roads without approval from the appropriate managing authority, i.e. township, county, or state. Generally, closures are sought only if a road is landlocked by Service property and is a dead end. The current road system would remain the same unless access requires modification sometime in the future. Coordination with state, county, and township officials and residents would be required for any road closure.

4.3.12 Fence Maintenance and Cropland Loss

We would not expect any changes in fence maintenance for private property owners. Fencing built by the U.S. Fish & Wildlife Service would be maintained at the Service's expense.

During scoping for this refuge addition we heard from some people who are concerned about the loss of cropland. Under the No Action Alternative (Alternative A), we would expect cropland loss due to development pressure. Under Alternative B, we would expect that floodplain cropland would be reduced as forest is restored. Under the preferred alternative (Alternative C), both floodplain and upland cropland would be reduced as forest, wetland and prairie are restored. Under Alternative D, there would be some cropland loss as natural habitat is restored by individuals on private land.

4.4 Cumulative Impacts

The phrase "cumulative impacts" refers to the overall effect of the proposed action or a series of similar actions in a landscape or regional setting. Restoring natural wildlife habitat, as proposed in alternatives B, C, and D, is generally considered to have positive environmental consequences. This project restores and protects native prairies and bottomland forests, both of which have experienced dramatic losses, as well as their associated streams and riverience communities, thus benefiting the wildlife that depend on these habitats.

Complementary past conservation efforts include creation of the Refuge and the State's Marais des Cygnes Wildlife Area. Any time acres are added to conservation areas, it benefits species that are sensitive to edge habitat. The restoration of lost or degraded wetlands in particular will have an overall positive impact on the surrounding region and the human environment, including water quality for downstream municipalities.

The southern edge of the Kansas City metropolitan area of 1.6 million people is within 45 miles of the proposal area. Fragmentation of wildlife habitat is occurring rapidly as retirement homes and hobby farms are built throughout the region. River bottoms are increasingly under pressure for timber harvest and construction of levees to prevent flooding and create "higher value" land. Without this project, it is likely that fragmentation will continue and habitat will be lost, resulting in less wildlife. While the August A. Busch at Four Rivers Conservation Area is growing, the Conservation Area is located 20 miles downstream of the Marais des Cygnes NWR and is not likely to contribute to wildlife benefits in the immediate project areas. We are not aware of any future conservation project that would negate the need for this project.

4.5 Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed by President Bill Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities access to public information and participation in matters relating to human health or the environment.

In 1998, U.S. Census Bureau figures showed that 18 percent of the population of Bates County lived below the poverty level. In 2000, the population of Bates County was 16,653. A total of 445 people (3 percent) were reported as a racial minority.

Few minority or low income people are likely to live in the Addition area, as the area is sparsely populated due to flooding of nearly half of the area. However, management activities on Refuge lands would be expected to increase the quality of life of those people living in the area by providing better water quality and increased recreational opportunities, including hunting and fishing.

4.6 Summary of Issues and Consequences by Alternative

The issues identified through public scoping and internal Service discussions and how each alternative addresses or is impacted by each issue is shown in Table 2.

Table 2: Summary of Issues and Consequences by Alternative

Issue	Alternative A: No Action	Alternative B: Protect and Restore Floodplain Through Purchase of Land	Alternative C: Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D: Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Accomplishing habitat and wildlife management goals	Little or no benefit.	Significant benefit	Significant benefit	Slight benefit
Recreational opportunities	Limited public opportunities	Expanded public opportunities	Expanded public opportunities	Limited public opportunities
Taxes	No change	Decrease balanced by Refuge Revenue Sharing	Same as Alternative B	No change
Local economy	No change	Benefit	Benefit	No change
Landowner rights	No change	No change	No change	No change
Service land acquisition	None	Fee and easement acquisition plus voluntary agreements	Same as Alternative B	None
Refuge Revenue Sharing	None	Likely to exceed current taxes	Likely to exceed current taxes	None
Relocation benefits	None	Available	Available	None
Cultural Resources	No change	Neutral to slight improvement in protection	Same as Alternative B	No change
Private drainage	No change	No change	No change	No change
Water pumping	No change	No change	No change	No change
Crop depredation	No change	Decreased goose depredation; possible static or slight increase in deer depredation	Same as Alternative B	No change
Cropland loss	Loss due to development	Floodplain cropland reduced as forest and wetland restored	Cropland in upland and floodplain reduced as forest, wetland and prairie restored	Loss of cropland due to development and natural habitat restoration
Fence maintenance	No change	No change; Refuge-initiated fencing at Service expense	Same as Alternative B.	No change

Table 2: Summary of Issues and Consequences by Alternative (Continued)

Issue	Alternative A: No Action	Alternative B: Protect and Restore Floodplain Through Purchase of Land	Alternative C: Protect and Restore Floodplain and Adjacent Uplands Through Land Purchase (Preferred Alternative)	Alternative D: Protect and Restore Floodplain and Adjacent Uplands Through Perpetual Easements and Private Land Programs
Refuge administration	None	Staff, salaries and operating funds phased in over time	Same as Alternative B	None
Public Roads	No change	No change without approval of entity controlling roads	Same as Alternative B	No change
Cumulative impacts	No change	Positive impact on the social and natural environment	Same as Alternative B	Same as Alternative B
Environmental Justice	No change	Benefit	Benefit	No change
Cemetery access	No change	No change	No change	No change

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Chapter 6 – Consultation and Coordination With the Public and Others

Preparation of this EA included many contacts and discussions with local residents, elected officials, State employees and others. Public involvement, including review of the Draft EA, was key to a full evaluation of this project. A description of public participation in the process can be found in Chapter 1, V. Public Involvement, and Appendix B – Letters of Comment.

The entire EA is available on the Service Internet Web site: (http://midwest.fws.gov/planning/maraisdescygnestop.htm).

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Appendices

Appendix A – Comprehensive Management Plan

Appendix B – Letters of Comment and Other Correspondence

Appendix C – Legal Compliance

Appendix D – Lists of Species

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Appendix A: Concept Management Plan

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Appendix A – Concept Management Plan

Introduction

The following Concept Management Plan (CMP) was developed as a general guideline for how the proposed Addition to Marais des Cygnes National Wildlife Refuge would be managed over the course of the next several years until a full plan can be completed. The CMP does not present extensive detail about where facilities would be located, the timing of restoration actions, hunting opportunities, etc. All of these details would be a part of a future Comprehensive Conservation Plan developed with public input and in compliance with the National Environmental Policy Act and Service policies. However, this CMP does attempt to answer some basic questions that may be posed by area landowners and others about future Refuge management. Please see the Environmental Assessment for more details about the study area and existing land uses.

The proposed 11,145-acre Addition to Marais des Cygnes National Wildlife Refuge could eventually protect and restore 5,255 acres of floodplain hardwood forest and nearly 5,890 acres of tallgrass prairie habitat. These lands could provide increased habitat for migratory birds found in floodplain hardwoods and prairies, including nearly 30 species of warblers, as well as waterfowl. Upland and big game would also benefit. The project would also increase and enhance nursery habitat and water quality for local fisheries.

Goals

The goals of the proposed Addition to Marais des Cygnes National Wildlife Refuge are as follows:

- Protect and increase the diversity and abundance of migratory bird and waterfowl species dependent on floodplain hardwood and tallgrass prairie habitats.
- Protect and restore federally and state-listed threatened and endangered species.
- Conserve, manage, and restore the diversity and viability of native fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat, as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie.
- Work in partnership with others, including private landowners, to restore or enhance floodplain hardwood, tallgrass prairie, and other unique plant communities.
- Restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions.
- Provide for compatible wildlife-dependent recreational uses by the public, emphasizing increased public understanding of floodplain hardwood forest and tallgrass prairie ecosystems and the mission of the National Wildlife Refuge System.

Refuge Management

Refuge management refers to all aspects of Refuge operations including habitat restoration, equipment and personnel management, facility maintenance, and visitor services.

A. Floodplain Management

Floodplain vegetation includes floodplain forest, cropland, managed and unmanaged wetlands, shrubland, and grassland. Primary management objectives would be to restore the floodplain to floodplain forests and wetlands.

Hardwood trees including pecan, pin oak, bur oak, and shellbark hickory would be planted as nuts or seedlings on sites that were historically forest as indicated by the 1856 Land Survey. Small crop fields surrounded by forest would not be planted but would be allowed to revegetate naturally. Wetland restoration would vary depending on site characteristics and possible impacts to neighboring lands but would likely include plugging of ditches and construction of shallow depressions. Removal or lowering of existing levees or construction of low level dikes may also be desired on some sites. Use of grade control structures and other stream bank stabilization practices will be evaluated as possible means to reduce excessive bank erosion and sediment transport to the Marais des Cygnes River and streams on the proposed expansion area.

Currently, floodplains are dominated by forest (35 percent), cropland (29 percent), and grassland (28 percent). Remaining areas include wet prairie and open wetlands.

Croplands are generally planted to soybeans and corn. Most cropfields would likely be planted to trees or restored to wetland. Croplands would be leased until restoration efforts could be undertaken, a process that would be undertaken with much care and likely take many years. Generally leases are offered in a priority order of: 1) previous landowner 2) current lessee 3) neighbors 4) others. Restrictions on some aspects of farming such as kinds of herbicides allowed for use and prohibition of fall tilling are likely but are compensated for by lower rental rates.

Grasslands would also be leased in a similar manner as cropland. Restoration efforts would differ from cropland. Only large sites heavily dominated by fescue would require active forestation efforts. Other sites would be allowed to naturally convert to forest.

B. Upland Management

Uplands found within the proposed Addition area include grassland, shrubland, cropland, and forest. Maintaining existing native prairie and restoring fescue grassland to prairie will be a primary management focus. Habitat diversity will also be addressed to ensure healthy populations of wildlife, especially the declining species of grassland birds and animals. A mosaic of habitats comprised mostly of restored native prairie grasslands with smaller scattered sites of shrubland and woodlands will provide a diversity of wildlife with food, water, and cover.

Grasslands are generally restored by planting a mixture of native grass seeds and forbs. This mixture may include species such as big and little blue stem, switchgrass, side-oats gramma, Indian grass, black-eyed susans, cone flowers and prairie clover. Burning, haying and grazing are all common methods used to maintain a native prairie grassland. Prescribed fire is an especially useful tool to stimulate native prairie grasses and reduce woody and undesirable vegetation. Grazing, haying, and prescribed fire would be used to increase native vegetation and decrease non native vegetation such as fescue. These tools would also be used to provide a diversity of grass heights and density. This is generally done by managing the duration and seasonal timing of these management activities. Season-long grazing, annual spring burning, and annual haying of sites are generally not undertaken. Rest-rotational grazing, burning during different times of the year, and infrequent haying are often the norm.

Currently, uplands are dominated by fescue pasture (60 percent) and woodland (28 percent). Remaining areas include native prairie and croplands. Some fescue pastures are largely a monoculture while others contain a great diversity of native plants. Diverse fescue pastures can often be managed to increase the abundance and diversity of native plants. Woodlands vary from young dense stands to very open stands with a grass understory. Prescribed fires can be used to prevent brush sites from turning into forest sites and to maintain or create open woodlands with a grass understory, often referred to as "savannah."

Croplands are generally planted to soybeans, wheat, and milo. Most cropfields would likely be planted to prairie. The conversion of cropland to prairie would likely take a number of years. However, only a small portion of the uplands are cropland so conversion would not be a major undertaking. Although most Refuge uplands would be managed as grassland, some shrub and tree cover would remain on the landscape.

C. Water Management

The natural hydrology and ecological dynamics of the study area have changed throughout the last 100 years, largely to facilitate agricultural production. Reservoirs, levees, and conversion of native prairie to forest and cool season grasses have likely changed the frequency, intensity, and duration of flood events. Despite theses changes, the floodplain still supports important and uncommon natural communities.

The Service supports the goal of trying to restore the natural hydrology of the area. Achieving this goal will require the efforts of many organizations and individuals throughout the watershed, particularly in Kansas. However, Service efforts within the much smaller Addition Area would nevertheless be important by providing habitats that are rare or no longer present throughout the larger watershed and by showcasing alternative land management methods.

The Service proposes to eventually restore all of the natural wetlands within the Addition Area boundaries. Restoration work that has the potential to impact adjacent landowners will actively involve those landowners to prevent negative impacts. Restorations may also occur on adjoining private land with the permission of landowners or through a cooperative effort. Restoration of floodplain hydrology by removing, setting back, or breaching existing levees to increase over bank flooding and resulting recharge of wetlands are among the options that will be considered.

D. Fire Management and Suppression

Fire has been a part of natural ecosystems since the origin of plant communities on earth. Fire management is a useful tool for managers to stimulate native prairie grasses and reduce woody and undesirable vegetation. Safety aspects of using prescribed fire are uppermost on everyone's minds. For this reason, refuge staff are well trained and equipped to conduct prescribed fires. Fire management plans specify who, when, why, where, and how prescribed fires will be conducted. Smoke management and contingency plans are described in detail. Every effort for the protection of life and property is made during planning and fire activities.

Wildfires, which are unplanned fires caused by lightening strikes, railroads, humans, etc. are put out as soon as they are discovered. Natural firebreaks such as roads and streams are often used as fire breaks unless a house or other structure prevents this use. A fire management plan would address wildfire initial attack and response. Cooperative agreements coordinated with local and volunteer fire departments are arranged as soon as possible.

E. Law Enforcement

Law Enforcement is a cooperative effort by several agencies. Some Service employees are trained and commissioned to conduct law enforcement duties on federal property and enforce certain federal laws. This enforcement activity is primarily focused on the protection of Refuge fish and wildlife resources, and on the protection of Refuge visitors and their possessions from disturbance or harm by other visitors or themselves. Two or more Refuge staff generally have law enforcement authority and work in close cooperation with state conservation officers, and other local enforcement agencies.

F. Refuge Administration

The proposed Addition Area would be administered by the current staff at Marais des Cygnes National Wildlife Refuge. As land purchases dictate, requests for additional staff would be made. The office site for the Refuge is located 3 miles west of Amoret, Missouri, on the south side of State Highway 52 and contains visitor information as well as staff during the week. A maintenance facility with land management equipment and tools is located adjacent to the office.

G. Public Use Opportunities and Management

The following are potential recreational opportunities that may be available to the public if the proposed Addition becomes a reality. Public use activities are not described in detail and exact locations of facilities or access points are not identified. Decisions about exact locations for facilities and programs will be made with public input, and will be described in detail in the future Comprehensive Conservation Plan. Before any public use can be allowed on the proposed Addition, the use must first be determined to be compatible with the Refuge's purposes. These use-specific compatibility determinations will be made as part of subsequent Refuge management plans.

National wildlife refuges are managed first and foremost for the conservation of fish, wildlife, and plants. However, through careful planning and regulation, refuges can also provide the public with a variety of diverse and rewarding opportunities for wildlife dependent recreation. Wildlife-dependent recreation, as defined by the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57), includes hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. These are the priority public uses of the National Wildlife Refuge System, and of the proposed Addition Area. Through participation in these activities, visitors to the Refuge will gain an appreciation for healthy habitats and the fish and wildlife populations they support.

1. Hunting and Trapping

A Refuge Hunt Plan would be prepared with input from the public and interested organizations, including the Missouri Department of Conservation. Following completion of a Refuge Hunt Plan, it is expected that hunting for small and big game would occur on much of the Addition Area. Hunter access parking lots would be located at several convenient and safe locations. Some restrictions would occur such as use of non-toxic shot for small game hunting. Other restrictions may occur if deemed necessary such as drawing hunts, limitations on use of rifles, "no shooting" zones near residences, etc.

Waterfowl hunting opportunities would likely be provided on much or all of the Addition Area. The Refuge Hunt Plan would identify which areas of the Refuge are open to migratory bird hunting. The progress of wetland restoration, hunter access, bird numbers and habitat use will ultimately determine the areas open to hunting.

A portion of the Addition Area may by closed to hunting and other public uses. "Closed Areas" occur on portions of most national wildlife refuges to provide waterfowl resting areas and undisturbed areas for public wildlife viewing and environmental education. Some "Closed Areas" are only closed during a portion of the year while others are closed all year. Some "Closed Areas" are only closed to waterfowl hunting while others are closed to all public entry. The size of "Closed Areas" varies tremendously depending on area goals and needs, adjacent land uses, and other characteristics of the area. "Closed Areas" encompassing 25 percent to 40 percent of a refuge are common, though some refuges are totally closed to public use while others are completely open to public use. Marais des Cygnes National Wildlife Refuge in Kansas has a "Closed Area" that closes 25 percent of the Refuge to all public use.

The need, and if applicable, size and location of "Closed Areas" are discussed in detail during the public planning process for the Refuge Hunt Plan. No necessities or possible locations for "Closed Areas" in the Addition Area have been discussed or actively considered during or as a part of the planning process for the Addition proposal.

Trapping is not considered a priority wildlife-dependent recreational activity and would not likely be allowed in the Addition Area. However, occasional problem situations, such as beavers flooding a road, may require the need for trapping. In these instances, free Special Use Permits may be given out to interested individuals.

2. Fishing

Most sport fishing opportunities would occur in the Marais des Cygnes River, which contains a popular fishery for paddlefish, walleye, and catfish (blue, flathead, and channel). Crappie, white bass, and black bass are also present. Numerous farm ponds, mine ponds, and river tributaries offer additional fishing opportunities. The restored shallow wetlands within the Addition area would probably not support large populations of game fish. A Refuge Sport Fishing Plan would be prepared in conjunction with the Refuge Hunt Plan to identify fishing opportunities, access, and management needs. We will invite the Missouri Department of Conservation fisheries management staff to assist in the preparation of the Refuge Sport Fishing Plan.

3. Wildlife Observation & Photography

The Addition Area contains scenic vistas of a vast prairie/woodland landscape. Wildlife inhabiting the area includes many interesting prairie and woodland species such as Scissor-tailed Flycatcher, Loggerhead Shrike, and Short-eared Owl in the grasslands and Kentucky Warbler, Prothonotary Warbler, and Red-shouldered Hawk in the forest. Waterfowl and wading birds, turkey and quail, and nearly 30 species of warblers are also present as well as species more unique to the Midwest such as woodrat, otter, bobcat, and armadillo. The combination of diverse wildlife and landscape beauty creates excellent wildlife observation and photography opportunities throughout the Addition Area.

Short hiking trails (with boardwalks as needed) and wildlife observation platforms and blinds could also be developed to immerse visitors into the tallgrass prairie and floodplain hardwood forest landscapes.

Refuge staff would work with local communities and private conservation groups to support or develop special public wildlife celebrations, like Earth Day, National Wildlife Refuge week, or Warbler Migration Day celebrations. These events would help build community awareness and pride in the Refuge and help provide an additional draw of visitors to the area.

4. Interpretation

The major interpretive themes for Marais des Cygnes National Wildlife Refuge and the proposed Addition Area include the concepts of: floodplain hardwood forest and tallgrass prairie ecosystems; Refuge habitat restoration and management; and the Refuge's place in the National Wildlife Refuge System. These themes are the core messages of the Refuge's interpretive program and will be included in different forms of interpretive signs, leaflets, and exhibits.

5. Visitor Contact Station

A visitor contact station currently exists 3 miles west of the Addition Area (and west of Amoret, Missouri) on the south side of Highway 52. This facility contains information and exhibits about the Refuge and serves as an office for Refuge staff. It will be the first stop for most first-time visitors. If land is purchased for the Addition Area east of Amoret, along Highway 52, an information kiosk with an orientation map, interpretive displays, and brochures could be constructed.

6. Interpretive Waysides

Interpretive signs could be provided at key wildlife observation areas and hiking trails. These signs would reinforce the Refuge's interpretive themes and provide site-specific information that will help the visitor appreciate the Refuge's resources.

7. Interpretive Trails

During a more thorough Refuge planning and site analysis, sites would be identified for the development of interpretive loop trails. These trails could include interpretive signs, or leaflets, keyed to landscape and wildlife features.

8. Environmental Education

Refuge staff would seek partnerships with local school districts and state and local organizations to provide site-based learning about conservation and the restoration of habitat for wildlife and people. Partnership projects could include hosting teacher workshops and youth leader programs. Activities would be coordinated closely with local schools to be sure any activities offered by the Refuge would assist the teachers/students with meeting graduation standards or required curriculum components.

9. Wilderness Review

Lands within the boundaries of the proposed Addition area have been reviewed for wilderness suitability as part of the CMP process. No lands were found suitable for designation as Wilderness as defined in the Wilderness Act of 1964. The study area does not presently contain 5,000 contiguous roadless acres to make it possible for any portion of it to be designated as Wilderness. The lands of the Refuge have been substantially affected by humans, particularly through agriculture.

10. Refuge Regulations and Enforcement

Marais des Cygnes National Wildlife Refuge and the proposed Addition is part of a national system of more than 500 refuges, where the needs of wildlife come first. However, some general public uses are allowed on many refuges. The following regulations are typical of most National Wildlife Refuges and are published in the Code of Federal Regulations:

- Vehicles allowed only on designated roads.
- Camping and open fires not allowed.
- Some wildlife-sensitive areas may be annually or seasonally closed to public entry and use.
- Horseback riding on refuge trails is not allowed.
- Possession or discharge of firearms is prohibited except during established hunting seasons in areas open to hunting.
- Dogs and pets must be kept on leash (except while hunting).
- Disturbing or collecting plants or animals is prohibited except under special permit.
- Searching for, or removal of objects of antiquity or historical importance is not allowed except under permit.

Appendix B: Letters of Comment and Other Correspondence

Appendix B – Letters of Comment and Other Correspondence

Scoping

No formal comment letters were received. A total of five written comments from three different individuals were received at the Open House. A total of six phone calls and five visits were received at the Refuge Office at Marais des Cygnes National Wildlife Refuge. The Focus Group Meeting, Open House, and Office visits/phone calls reached a total of 47 different people. Comments from these interactions are summarized below and were addressed in Chapter 4, Sections II and III, or in Appendix A, Interim Comprehensive Conservation Plan. In general, comments could be categorized as eight "Opposed", 23 "Concerned or Uncommitted", and 16 "In Favor or Unopposed" to the Proposed Refuge Addition.

The following written and verbal comments, questions, and concerns represent those received:

- Will private property be condemned?
- Don't want farm land taken out of production as world already doesn't have enough food.
- Will the public have access for hunting and fishing?
- Don't want land taken off of local tax rolls.
- Concerned about wildlife depredation of crops, especially from geese.
- Concerned about pumping of water from the river and effect on local water supplies.
- Concerned about increased flooding.Will private lands within the Refuge boundary have restrictions placed on them?
- Will public roads be closed?
- Why is more land needed, especially the upland?
- Will pastures continue to be grazed and hayed?
- Will the cemeteries be maintained?
- Don't like the way land is currently being managed on the Refuge in Kansas.
- Will tourism increase in the area?
- Presence of refuge will prevent future expansion of new roads.
- Who decides if the refuge will be expanded?
- Will the Service pay to help maintain fences adjacent to private property?
- Addition would be good for Butler businesses.
- Refuge presence would help prevent vandalism and trespass on nearby private property.
- Increase in area wildlife will improve hunting on nearby private property.
- Area is best suited to wildlife and outdoor recreation.
- Land values will increase which is good for area landowners.

Review of Draft Environmental Assessment

The Draft Environmental Assessment was released for public review and comment in March 2003. Copies of the document were provided to Department of Natural Resources and Department of Conservation officials in Missouri and Kansas, and copies were also distributed to people who had requested them. A 22-page summary of the Draft Environmental Assessment was distributed to the project mailing list. A 30-day comment period followed release of the draft document, and during this period it was available through a Service web page. An open house was held at the Marais des Cygnes NWR Headquarters on March 25, 2003, with 16 people attending.

The Service received written comments from individuals, the Missouri Department of Conservation, the Kansas Department of Wildlife and Parks, the Wildlife Society, the Wildlife Management Institute, the Audubon Society, the Kansas Department of Health and Environment, and the Kansas Biological Survey at the University of Kansas. We received 35 form letters supporting the proposed Refuge addition, many of them with individual notes expressing support and appreciation for habitat restoration and preservation. None of the comments we received opposed the Refuge addition project.

Both the Missouri Department of Conservation and the Kansas Department of Wildlife and Parks expressed support for the Refuge addition and the preferred alternative. The Missouri Department of Conservation offered several editorial revisions, and we incorporated these revisions in the final Environmental Assessment. The representative of the Kansas Department of Wildlife and Parks noted that "Perhaps the most exciting aspect of the existing refuge is the synergistic effect of the NWR and the Marais des Cygnes Wildlife Area. The combined effect of the two areas far exceeds the benefits that either agency or area could provide alone."

A representative of the Kansas Biological Survey expressed support for the preferred alternative and offered many editorial comments. The revisions he suggested have been incoporated in the final Environmental Assessment.

The following table lists the comments the Service received from members of the public and representatives of agencies.

Table 1: Summary of Public and Agency Comment and Changes Made in Response to Comments

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
USFWS Lower Missouri River Ecosystem	Supports proposed expansion of the Refuge into Bates County, Missouri.	Thank you for commenting.
35 individuals sent a form letter in support of expansion.	"I want to express my support for Alternative C of the Marais des Cygnes NWR Proposed Addition."	
Individual notes with the form letter		
	This is a wonderful opportunity to permanently protect these quality habitats and I hope their permanent protection can be accomplished much sooner than the projected 20 years. Maintaining and increasing biodiversity is so important to me that we are reconstructing prairie on about 40 of our 48 acres.	Thank you for commenting.
	I particularly support preserving prairies.	Thank you for commenting.
	I'm very pleased to hear about the MdCWR (sic) proposed addition and eagerly support Alternative C.	Thank you for commenting.
	Please protect our wildlife!	Thank you for commenting; we will continue to do our best to protect the nation's natural resources.
	We are working with our own small prairie restoration so certainly know how important this preservation is.	Thank you for commenting.
	Presettlement prairie must be protected for us, for our children, for our grandchildren. It is part of our heritage.	Thank you for commenting. The mission of the National Wildlife Refuge System reflects your concern for protecting the nation's resources for the benefit of present and future generations of Americans.
	We love the diversity of wildlife in the Refuge and encourage the expansion of this tract for them.	Thank you for commenting.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
Individual notes with the form letter (continued)	Having grown up in the country I really enjoy outdoor activities and appreciate wildlife.	Thank you for commenting.
	Along with the Fish & Wildlife Department (sic), I would like to support their efforts to preserve our natural resources.	Thank you for commenting.
	The continuous feature is important for the most environmental benefit.	Thank you for commenting.
	We need to preserve our prairie and continue to provide permanent habitat for our birds and plant life.	Thank you for commenting.
	It doesn't seem to me that what we are protecting here is a large enough area!	Wildlife always benefits from more habitat, but when adding land to the National Wildlife Refuge System we have to consider some basic constraints: what we can afford to buy, what we can afford to take care of, and the acceptance of the local community. The expansion area proposed reflects the acreage that we think accomplishes the purpose of the Refuge, meets the needs of wildlife, is something we can maintain, and does not create a hardship for the community.
	The area to be protected is so small! It should be the minimum that we can protect/ should protect in this beautiful state of ours!	Thank you for commenting. Again, in proposing this expansion area we sought balance the needs of wildlife and the community. We think that this proposal is sufficient to address identified wildlife needs.
	This land would be a wonderful gift to our great-grandchildren.	Thank you for commenting.
	I would like to see the current Refuge extended into Missouri.	Thank you for commenting.
	I have been to Marais des Cygnes in Linn Co. and hiked the trails. The people who helped me on the phone were very nice.	Thank you for commenting.
	It is important to preserve this land now for our children to enjoy in the future.	Thank you for commenting.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
	I'd love to visit this kind of area so close to KCMO.	Thank you for commenting.
	With cities spreading out it is even more important to protect the natural habitats we have left.	Thank you for commenting. We agree that urban sprawl is a serious concern nationwide.
Missouri Department of Conservation	Page 17: Add to columns for Alternative B & C, row titled Protect River-Floodplain Interaction: "Restore floodplain hydrology."	The text has been added as suggested.
	Page 18: Add to columns for Alternative B & C, row titled Protect and Restore Floodplain Wetlands: "Restore floodplain hydrology."	The text has been added as suggested.
	Page 18: Add to column for Alternative B, row titled Protect and Restore Floodplain Wetlands: "Wetlands provide excellent spawning and nursery areas for young fish."	The text has been added as suggested.
	Page 19: Under row titled Increase the Abundance of Federal and State Threatened and Endangered Species and Abundance and Diversity of Migratory Birds. In addition, page 20 under row titled Manage Floodplain to Benefit Paddlefish and Other Fish, Protect Spawning and Mussel Beds, and Improve River Water Quality: Would it be beneficial to mention the importance of paddlefish that are classified as an interjurisidictional fish species? Doing so would highlight importance of paddlefish and increase justification for the expansion's purchase and restoration of river habitat for the species.	Paddlefish have been added to the list of species that might benefit from the proposed action.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
Missouri Department of Conservation (continued)	Page 21: Add to columns for Alternatives B & C, row titled Provide Quality Opportunities for Hunting, Fishing, Wildlife Observation, and other Wildlife-dependent Uses: "Provides excellent spawning and nursery habitat for a number of sport fish (walleye, white bass, perhaps paddlefish) that migrate out of Truman Lake and into the river to spawn. The young of these fish are recruited to the Truman Lake fishery to maintain a quality fishery for sport anglers." This point is also relevant to the discussion on page 29, 3.3.5 Prairie River section.	Text has been added as suggested.
	Page 25, 3.2.7, River Hydrology, paragraph 3: Consider adding a sentence acknowledging that flooding is also caused by numerous highway and railroad causeways that constrict the floodplain of the rivers and streams in the Marais des Cygnes River basin.	Text has been added as suggested.
	Page 37, first full paragraph, third sentence: delete second "e" and note that in numerous places within the Draft EA the word turkey is capitalized and should not be (see second paragraph, same page).	These errors have been corrected.
	Page 41, seventh paragraph add: "Additional improvement in water quality will be realized by converting cropland to grass which will reduce fertilizer, herbicide, and pesticide use in the watershed of the Marais des Cygnes River." In addition, the EA should include strategies for improving water quality by reducing acidity and heavy metals and erosion from un-reclaimed strip mined lands in the proposed expansion area.	We have added the following text to alternatives B,C, and D in Chapter 4: Refuge staff will work with responsible parties within the existing laws and regulations to ensure that unreclaimed strip mines do not contribute to acidity runoff and heavy metals contamination of the watershed.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
	Page 65, add the following goal: "Protect and increase diversity and abundance of fish, mussels, and other aquatic life unique to a prairie river hydrology and habitat." You may want to reference the new U.S. Fish & Wildlife Service's draft strategic plan for *Conserving America's Fisheries*.	The third goal in the list was revised to read: "Conserve, manage, and restore the diversity and viability of native fish, mussels and other aquatic life unique to a prairie river hydrology and habitat as well as wildlife and plant populations associated with floodplain hardwood and tallgrass prairie."
	Page 66, A. Floodplain Management, add: "Use of grade control structures and other stream bank stabilization practices will be used to reduce excessive bank erosion and sediment transport to the Marais des Cygnes River and streams on the proposed expansion area."	The second paragraph under Floodplain Management has been revised to read: "Use of grade control structures and other stream bank stabilization practices will be evaluated as possible means to reduce excessive bank erosion and sediment transport to the Marais des Cygnes River and streams on the proposed expansion area."
	Page 67, C. Water Management add: "Restoration of floodplain hydrology will be conducted by removing, setting back, or breaching existing levees and to increase over bank flooding to recharge wetlands."	The last paragraph under Water Management has been revised to read: "Restoration of floodplain hydrology by removing, setting back, or breaching existing levees to increase over bank flooding and resulting recharge of wetlands."
	Page 70, 2. Fishing, last sentence: add reference that Missouri Department of Conservation fisheries management staff will be asked to assist in the preparation of the Refuge Sport fishing Plan.	The text has been included as suggested.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
Missouri Department of Conservation (continued)	Page 85-98, Appendix D. compilation of Area Wildlife Species: The geographical extent of the list of species is unclear and needs to be defined. It is unclear whether the appendix refers to the proposed expansion area, all of Kansas and Missouri, or the Marais des Cygnes River basin. Some of the species listed in the appendices do not seem correct (smallmouth bass do not occur in Marais des Cygnes River or tributary streams, spotted gar are only native to southeast Missouri, lemmings and mountain lion are mentioned for mammals, and so on). The Department suggest that only species known to exist within the immediate area (Refuge in Kansas and Missouri) be listed and that the title of the appendix reflect that geographic area.	This point has been made in other comments; please see the response there. The species list is taken from the Marais des Cygnes NWR CCP (1998). The CCP sites the Kansa Natural Heritage Inventory (KNHI) as the source, and the coverage for these lists is Linn County, Kan. The mussel list was compiled by Refuge staff and is based on findings of live specimens.
	Page 110, IV. Land Protection Priorities: The Department agrees with priorities for acquisition of bottomland, upland grassland, and lastly cropland. We urge the U.S. Fish & Wildlife Service to focus on immediate acquisition of the Marais des Cygnes River and streams frontage as a priority.	The river and floodplain areas are frontage a priority for Service land acquisition.
Karl K. Karrow Conservation Program Specialist Department of Wildlife & Parks State of Kansas	Mr. Karrow concurs with the EA's findings, "...particularly that Alternative C (Protect and Restore Floodplain and Adjacent Upland Habitat along the Missouri Reaches of the Marais des Cygnes River by Acquiring Additional Lands) is the preferred and most effective course of action." Mr. Karrow further states that: "Perhaps the most exciting aspect of the existing refuge is the synergistic effect of the NWR and Marais des Cygnes Wildlife Area. The combined effect of the two areas far exceeds the benefits that either agency or area could provide alone."	Thank you for commenting. The mission of the U.S. Fish & Wildlife Service is to work with others to conserve, protect and enhance fish, wildlife and plants and their habitats. We agree that this expansion has the potential to be an outstanding example of the effectiveness of joint conservation efforts.
Mark Sexson President, Kansas Chapter of The Wildlife Society	KCTWS concurs with the Service's proposal and that Alternative C ... is the preferred alternative for protecting habitat.	Thank you for commenting.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
Rob Manes Wildlife Management Institute	WMI supports Alternative C. "I would also assert that it is important to maximize hunting, fishing and other wildlife-associated recreational opportunities on both the new and existing refuge lands." "...I would also highlight the importance of emphasis on removing fescue and other cool-season exotic grasses and replacing them with native grass and forb mixes on all upland areas of the refuge."	Thank you for commenting. Wildlife-dependent recreation, including the activities you reference, are priority public uses on national wildlife refuges. Decisions about exact locations for facilities and programs will be made with public input. We have revised the text of the EA and the draft interim CCP to include the Service's interest in eliminating non-native plants and replacing them with native species.
Roger B. Willis, President Sperry Galligar Audubon	Supports the proposed addition to Marais des Cygnes NWR in Bates Co., Missouri.	Thank you for commenting.
Robert T. Angelo, Ph.D. Kansas Dept. of Health and Environment	Supports Service's pursuit of Alternative C.	Thank you for commenting.
Mary Deuser DeSoto, Kansas	Supports endeavor.	Thank you for commenting.
Robert J. Mangile Pittsburg, Kansas	Supports "...the purchase of some eleven thousand (11,000) acres of adjacent land on the Missouri side of the state line."	Thank you for commenting.
Liz Mangile Pittsburg, Kansas	"...I am very much in support of the Marais des Cygnes NWR receiving matching funds for the acquisition of the 11,000 acres of land on the Missouri side of the Kansas, Missouri line...Please consider this area and open it up for the public to use and enjoy."	Thank you for commenting. As lands are acquired, we will consider the potential for wildlife-dependent recreation.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
Chris Pistole Paola, Kansas	Supports expanding the Marais des Cygnes NWR. "I would also like to express my desire for greater accessibility to the refuge through more trails, trailheads, and places to put into the water, as well as more visitor amenities such as access to restrooms and water, and to have the headquarters open with access to maps and brochures, and a knowledgeable staff person such as a naturalist on duty."	Thank you for commenting. The availability of wildlife-dependent recreation on the Refuge will depend on how much contiguous land is acquired and where it is acquired. The availability of facilities like the ones you mention depend on how much funding the Refuge receives as well as the Service's ability to acquire enough land for these activities.
Michael Brooks	Fully supports the preferred alternative. "The Marais des Cygnes NWR expansion is essential for the State of Missouri and the State of Kansas."	Thank you for commenting.
Steve Ford McCune, Kansas	Supports the 11,000-acre expansion of the Marais des Cygnes NWR near Pleasanton, Kansas.	Thank you for commenting.

Source of Comment	Issue Raised During Public Review of Draft EA	Proposed Changes to the Preferred Alternative in Final EA
Tom Brandt Overland, Kansas	Supports Alternative C.	Thank you for commenting.
William H. Busby Associate Scientist Kansas Biological Survey University of Kansas	supports Alternative B. General comments: 1)Would like to see a table or appendix for looking up scientific names so there would not be ambiguity. Or, include the scientific name with the common name the first time the common name is used. 2)Hyphenate "Greater Prairie-chicken" 3)Inconsistent references, for example "Interior Least Tern and Least Tern; Bobwhite Quail and Northern Bobwhite 4)"Also, be consistent in capitalization of common names and do not capitalize non-standard names such as turkey and quail. 5)Check appendices for misspellings and other nomenclature problems. 6)What are the vertebrate and mussel species lists in appendix D based on? 7)Identify whether species records are for MDCNWR or, as the heading 'Area Wildlife Species' suggests, known from the general area. 8)Are all the bird species indicated as nesting known to nest, or are they considered probable nesters? (...when I see species like Cerulean Warbler listed as breeding and know how tough it is to confirm nesting for such species, I suspect nesting has not been confirmed but is rather that there is some evidence of it." 9)"If you are looking for further justifications for including upland tracts, I might play up potential benefits of prairie restoration for Henslow's Sparrow."	1) Scientific names of species referenced in the EA are listed in Appendix D. 2) The spelling of the Greater Prairie-chicken has been corrected. 3) The inconsistent references have been corrected. 4) The incorrect capitalization of non-standard names has been corrected. 5) We have corrected misspellings in the appendices. 6) The list is from the Marais des Cygnes NWR Comprehensive Conservation Plan, which was completed in 1998. 7) The bird list was compiled by local birders who frequent the MDC Wildlife Area, and it was later reviewed and revised by a professional ornithologist in Lawrence, Kansas. The coverage for the birding list is specific to the MDC Wildlife Area, which has habitat types similar to the Refuge. 8) The cerulean warbler is a probable nester. Most species listed as "nesting" are, for the most part, based upon the observance of male birds defending territories during the nesting season. 9) We agree that the project would certainly benefit the Henslow's Sparrow, and we make that point in section 4.1.3.
	Minor text edits	We appreciate your thorough review of the draft EA and we have made the edits you noted.

Appendix C: Legal Compliance

Appendix C: Legal Compliance

The following laws and executive orders apply to planning, land acquisition and management on national wildlife refuges:

Rivers and Harbor Act (1899) (33 U.S.C. 403): Section 10 of this Act requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States.

Antiquities Act (1906): Authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a Federal responsibility. This Act enables the setting of seasons, and other regulations including the closing of areas, Federal or non-Federal, to the hunting of migratory birds.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gift of areas approved by the Migratory Bird Conservation Commission.

Fish and Wildlife Coordination Act (1934) as amended: Requires that the Fish and Wildlife Service and State fish and wildlife agencies be consulted whenever water is to be impounded, diverted or modified under a Federal permit or license. The Service and State agency recommend measures to prevent the loss of biological resources, or to mitigate or compensate for the damage. The project proponent must take biological resource values into account and adopt justifiable protection measures to obtain maximum overall project benefits. A 1958 amendment added provisions to recognize the vital contribution of wildlife resources to the Nation and to require equal consideration and coordination of wildlife conservation with other water resources development programs. It also authorized the Secretary of Interior to provide public fishing areas and accept donations of lands and funds.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

Historic Sites, Buildings and Antiquities Act (1935) as amended: Declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. Provides procedures for designation, acquisition, administration, and protection of such sites.

Refuge Revenue Sharing Act (1935) as amended: This act requires revenue sharing provisions to all fee-title ownerships that are administered solely or primarily by the Secretary through the Service.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act (1948): Provides that upon a determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency

can be transferred without reimbursement to the Secretary of Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Wilderness Act (1964) as amended: Directed the Secretary of Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System, with final decisions made by Congress. The Secretary of Agriculture was directed to study and recommend suitable areas in the National Forest System.

Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus Federal land, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

National Wildlife Refuge System Administration Act (1966) as amended by the National Wildlife Refuge System Improvement Act (1997)16 U.S.C. 668dd668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and photography, or environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a Comprehensive Conservation Plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Historic Preservation Act (1966) as amended: Establishes as policy that the Federal Government is to provide leadership in the preservation of the nation's prehistoric and historic resources.

National Wildlife Refuge System Improvement Act of 1997: Considered the "Organic Act" of the National Wildlife Refuge System. The Act defines the mission of the System, designates priority wildlife-dependent public uses and calls for comprehensive refuge planning.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.
National Environmental Policy Act (1969): Requires the disclosure of the environmental impacts of any major Federal action significantly affecting the quality of the human environment.

Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970) as amended: This Act provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

Endangered Species Act (1973): Requires all Federal agencies to carry out programs for the conservation of endangered and threatened species.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal government to ensure that anybody can participate in any program.

Archaeological and Historic Preservation Act (1974): Directs the preservation of historic and archaeological data in Federal construction projects.

Clean Water Act (1977): Requires consultation with the Corps of Engineers (404 permits) for major wetland modifications.

Surface Mining Control and Reclamation Act (1977) as amended (Public Law 95-87) (SMCRA): Regulates surface mining activities and reclamation of coal-mined lands. Further regulates the coal industry by designating certain areas as unsuitable for coal mining operations.

Executive Order 11988 (1977): Each Federal agency shall provide leadership and take action to reduce the risk of flood loss and minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the floodplains.

Executive Order 11990: E.O. 11990 directs Federal agencies to (1) minimize destruction, loss, or degradation of wetlands and (2) preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.

Executive Order 12372 (Intergovernmental Review of Federal Programs): In compliance, the Service will send copies of the Environmental Assessment to Iowa State Planning Agencies for review.

American Indian Religious Freedom Act (1978): Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Fish and Wildlife Improvement Act (1978): This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out a volunteer program.

Archaeological Resources Protection Act (1979) as amended: Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources.

Federal Farmland Protection Policy Act (1981) as amended: The purpose of the Act is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.

Emergency Wetlands Resources Act (1986): The purpose of the Act is "To promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes."

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species, and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Native American Graves Protection and Repatriation Act (1990): Requires Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

Americans With Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

Federal Records Act of 1950.

Executive Order 13006 Use of Urban Historic Properties.

Executive Order 12898 (1994): Establishes environmental justice as a Federal government priority and directs all Federal agencies to make environmental justice part of their mission. Environmental justice calls for fair distribution of environmental hazards.

Executive Order 12996 Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the System.

Executive Order 13007 Indian Sacred Sites (1996): Directs Federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act (1998): Amends the Fish and Wildlife Act of 1956 to promote volunteer programs and community partnerships for the benefit of national wildlife refuges, and for other purposes.

National Trails System Act: Assigns responsibility to the Secretary of Interior and thus the Service to protect the historic and recreational values of congressionally designated National Historic Trail sites.

Appendix D: Lists of Species

Appendix D. Compilation of Area Wildlife Species

MAMMALS

Common Name	Scientific Name
Virginia opossum	*Didelphis virginiana*
Elliot's short-tailed shrew	*Blarina hylophaga*
Least shrew	*Cryptotis parva*
Eastern mole	*Scalopus aquaticus*
Little brown myotis	*Myotis lucifugus*
Big brown bat	*Eptesicus fuscus*
Nine-banded armadillo	*Dasypus novemcinctus*
Eastern cottontail	*Sylvilagus floridanus*
Black-tailed jackrabbit	*Lepus californicus*
Eastern chipmunk	*Tamias striatus*
Woodchuck	*Marmota monax*
Franklin's ground squirrel	*Spermophilus franklinii*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern fox squirrel	*Sciurus niger*
Southern flying squirrel	*Glaucomys volans*
American beaver	*Castor canadensis*
Fulvous harvest mouse	*Reithrodontomys fulvescens*
Western harvest mouse	*Reithrodontomys megalotis*
Plains harvest mouse	*Reithrodontomys montanus*
White-footed mouse	*Peromyscus leucopus*
Deer mouse	*Peromyscus maniculatus*
Hispid cotton rat	*Sigimodon hispidus*
Eastern woodrat	*Neotoma floridana*
Prairie vole	*Microtus ochrogaster*
Woodland vole	*Microtus pinetorum*
Common muskrat	*Ondatra zibethicus*
Southern bog lemming	*Synaptomys cooperi*
Meadow jumping mouse	*Zapus hudsonius*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Common gray fox	*Urocyon cinereoargenteus*
Common raccoon	*Procyon lotor*
River otter	*Lutra canadensis*
Long-tailed weasel	*Mustela frenata*
Least weasel	*Mustela nivalis*
Mink	*Mustela vison*
American badger	*Taxidea taxus*
Eastern spotted skunk	*Spilogale putorius*
Striped skunk	*Mephitis mephitis*
Mountain lion	*Felis concolor*
White-tailed deer	*Odocoileus virginianus*

AMPHIBIANS

Common Name	Scientific Name
Smallmouth salamander	*Ambystoma texanum*
Tiger salamander	*Ambystoma tigrinum*
Mudpuppy	*Necturus maculoslis*
Eastern newt	*Notophthalmus viridescens*
American toad	*Bufo americanus*
Woodhouse's toad	*Bufo woodhousii*
Blanchard's cricket frog	*Acris crepitans*
Spring peeper	*Hyla crucifer*
Cope's gray treefrog	*Hyla chrysoscelis*
Gray treefrog	*Hyla versicolor*
Western chorus frog	*Pseudacris triseriata*
Great Plains narrowmouth toad	*Gastrophryne olivacea*
Northern crawfish frog	*Rana areolata*
Plains leopard frog	*Rana blairi*
Bullfrog	*Rana catesbeiana*
Southern leopard frog	*Rana sphenocephala*

REPTILES

Common Name	Scientific Name
Common snapping turtle	*Chelydra serpentina*
Western painted turtle	*Chrysemys picta*
Common map turtle	*Graptemys geographica*
Quachita map turtle	*Graptemys pseudogeographica*
Three-toed box turtle	*Terrapene carolina*
Ornate box turtle	*Terrapene ornata*
Red-eared slider	*Pseudemys scripta*
Midland smooth softshell	*Trionyx muticus*
Western spiny softshell	*Trionyx spiniferus*
Western slender glass lizard	*Ophisaurus atttenuatus*
Eastern collared lizard	*Crotaphytus collaris*
Eastern fence lizard	*Sceloporus undulatus*
Southern coal skink	*Eumeces anthracinus*
Five-lined skink	*Eumeces fasciatus*
Broadhead skink	*Eumeces laticeps*
Great Plains skink	*Eumeces obsoletus*
Ground skink	*Scincella lateralis*
Prairie-lined racerunner	*Cnemidophorus sexlineatus*
Western worm snake	*Carprophis amoenus*
Eastern yellowbelly racer	*Coluber constrictor*
Prairie ringneck snake	*Diadophis punctatus*
Great Plains rat snake	*Elaphe guttata*
Black rat snake	*Elaphe obsoleta*
Eastern hognose snake	*Heterodon platirhinos*
Prairie kingsnake	*Lampropeltis calligaster*
Common kingsnake	*Lampropeltis getula*
Milk snake	*Lampropeltis triangulum*
Blotched water snake	*Nerodia erythrogaster*
Diamondback water snake	*Nerodia rhombifer*
Northern water snake	*Nerodia sipedon*
Rough green snake	*Opheodrys aestivus*
Bullsnake	*Pituophis melanoleucus*

Graham's crayfish snake	*Regina grahamii*
Texas brown snake	*Storeria dekayi*
Northern redbelly snake	*Storeria occipitomaculata*
Flathead snake	*Tantilla gracilis*
Western ribbon snake	*Thamnophis proximus*
Red-Sided garter snake	*Thamnophis sirtalis*
Lined snake	*Tropidoclonion lineatum*
Copperhead	*Agkistrodon contortrix*
Timber rattlesnake	*Crotalus horridus*
Massasauga	*Sistrurus catenatus*

FISH

Common Name	**Scientific Name**
Paddlefish	*Polyodon spathula*
Spotted gar	*Lepisosteus oculatus*
Longnose gar	*Lepisosteus platostomus*
Gizzard shad	*Dorosoma cepedianum*
Central stoneroller	*Campostoma anomalum*
Grass carp	*Ctenopharyngodon idella*
Common carp	*Cyprinus carpio*
Horneyhead chub	*Nocomis biguttatus*
Golden shiner	*Notemigonus crysoleucas*
Emerald shiner	*Notropis atherinoides*
Ghost shiner	*Notropis buchanani*
Rosyface shiner	*Notropis rusellus*
Sand shiner	*Notropis stramineus*
Suckermouth minnow	*Phenacosius mirabilis*
Bluntnose minnow	*Pimephales notatus*
Fathead minnow	*Pimephales promelas*
Bullhead minnow	*Pimephales vigilax*
Creek chub	*Semotilus atromaculatus*
Red shiner	*Cyprinella lutrensis*
Redfin shiner	*Lythrurus umbratilis*
Silver chub	*Macrhysopsis storeriana*
River carpsucker	*Carpiodes carpio*
White sucker	*Catostomus commerson i*
Smallmouth buffalo	*Ictiobus bubalus*
Bigmouth buffalo	*Ictiobus cyprinellus*
Black buffalo	*Ictiobus niger*
Golden redhorse	*Moxostoma erythrurum*
Shorthead redhorse	*Moxostoma macrolepidotum*
Blue catfish	*Ictalurus furcatus*
Channel catfish	*Ictalurus punctatus*
Stonecat	*Noturus flavus*
Tadpole madtom	*Noturus gyrinus*
Freckled madtom	*Noturus nocturnus*
Slender madtom	*Noturus exilis*
Flathead Catfish	*Pylodictis olivaris*
Black bullhead	*Ameiurus melas*
Yellow bullhead	*Ameiurus natalis*
Brown bullhead	*Ameiurus nebulosus*
Blackstripe topminnow	*Fundulus notatus*
Brook silverside	*Labidesthes sicculus*

Green sunfish	*Lepomis cyanellus*
Warmouth	*Lepomis gulosus*
Orangespotted sunfish	*Lepomis humilis*
Bluegill	*Lepomis macrochirus*
Longear sunfish	*Lepomis megalotis*
Smallmouth bass	*Micropterus dolomieu*
Largemouth bass	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Greenside darter	*Etheostoma blennioides*
Fantail darter	*Etheostoma flabellare*
Johnny darter	*Etheostoma nigrum*
Orangethroat darter	*Etheostoma spectabile*
Yellow perch	*Perca flavescens*
Logperch	*Percina caprodes*
Slenderhead darter	*Percina phoxocephala*
Walleye	*Stizostedion vitreum*
Freshwater drum	*Aplodinotus grunniens*

MUSSELS

Common Name	**Scientific Name**
Mucket	*Actinonaias ligamentina*
Threeridge	*Amblema plicata*
Flat floater	*Anodonta suborbiculata*
Purple pimpleback	*Cyclonaias tuberculata*
Asiatic clam	*Corbicula leana*
Butterfly	*Ellipsaria lineolata*
Spike	*Elliptio dilatata*
Wabash pigtoe	*Fusconaia flava*
Yellow sandshell	*Lampsilis teres*
White heelsplitter	*Lasmigona complanata*
Fragile papershell	*Leptodea fragilis*
Black sandshell	*Ligumia recta*
Pondmussel	*Ligumia subrostrata*
Washboard	*Megalonaias nervosa*
Threehorn wartyback	*Obliquaria reflexa*
Round pigtoe	*Pleurobema coccineum*
Pink heelsplitter	*Potamilus alatus*
Bluefer	*Potamilus purpuratus*
Pink papershell	*Potamilus ohiensis*
Giant floater	*Pyganodon grandis*
Monkeyface	*Quadrula metanevra*
Wartyback	*Quadrula nodulata*
Pimpleback	*Quadrula pustulosa*
Mapleleaf	*Quadrula quadrula*
Lilliput	*Toxoplasma parvus*
Pistolgrip	*Tritogonia verrucosa*
Fawnsfoot	*Truncilla donaciformes*
Deertoe	*Truncilla truncata*
Pondhorn	*Uniomerus tetralasmus*
Paper pondshell	*Utterbackia imbecillis*

BIRD SPECIES

The following list includes 321 bird species that have been seen in the area of the Refuge, including 117 species that nest on the Refuge (*). Also included are 6 species listed Federally Endangered or Threatened and 14 species listed as Endangered, Threatened, or Sensitive in Kansas.
SEASON CODES:
Sp= Spring (March - May)Su=Summer (June - August)F=Fall (September - November)W=Winter (December - February)

SEASONAL ABUNDANCE CODES:
a = abundantm occurring in large numbers; c = common, certain to be seen in suitable habitat; u = uncommon, present but not certain to be seen; o = occasional, seen only a few times during a season; r = rare, seen at intervals of 2 - 5 years; x = vagrant, accidental, straggler or out of normal range

	Sp	Su	F	W
LOONS				
Common Loon *Gavia immer*	u		u	r
GREBES				
Pied-billed Grebe* *Podilymbus podiceps*	c	o	c	o
Horned Grebe *Podiceps auritus*	u		u	o
Red-necked Grebe *Podiceps grisegena*	x			
Eared Grebe *Podiceps nigricollis*	o	r	o	
Western Grebe *Aechmophorus occidentals*			r	
Clark's Grebe *Aechmophorus clarkii*				
PELICANS				
American White Pelican *Pelecanus erythrorhynchos*	c	r	c	r
Brown Pelican *Pelecanus occidentalis*		x		
CORMORANTS and ANHINGA				
Neotropic Cormorant *Phalacrocorax brasilianus*		x		
Double-crested Cormorant* *Phalacrocorax auritus*	c	u	c	r
Anhinga *Anhinga anhinga*	x	x		
HERONS and BITTERNS				
American Bittern *Botaurus lentiginosus*	u	o	u	
Least Bittern* *Ixobrychus exilis*	o	r	o	
Great Blue Heron* *Ardea herodias*	a	c	a	o
Great Egret *Ardea alba*	u	c	c	
Snowy Egret *Egretta thula*	o	u	u	
Little Blue Heron* *Egretta caerulea*	u	c	c	
Cattle Egret *Bubulcus ibis*	u	o	o	
Green Heron* *Butorides virescens*	u	c	u	
Black-crowned Night-Heron *Nycticorax nycticorax*	u	o	o	
Yellow-crowned Night-Heron* *Nyctanassa violaceus*	u	o	o	
IBISES and STORKS				
White Ibis *Eudocimus albus*	x	x	x	
White-faced Ibis *Plegadis chihi*	x		x	
Wood Stork *Mycteria americana*		x		
NEW WORLD VULTURES				
Turkey Vulture* *Cathartes aura*	c	a	c	
DUCKS, GEESE, and SWANS				
Black-bellied Whistling-Duck *Dendrocygna autumnalis*	x			
Fulvous Whistling-Duck *Dendrocygna bicolor*		x		
Greater White-fronted Goose *Anser albifrons*	u		u	u
Snow Goose *Chen caerulescens*	a	r	a	u

	Sp	Su	F	W
Ross' Goose *Chen rossii*	r	r	r	r
Canada Goose* *Branta canadensis*	a	c	a	a
Brant *Branta bernicla*	x			
Trumpeter Swan *Cygnus buccinator*				x
Tundra Swan *Cygnus columbianus*	r		r	r
Wood Duck* *Aix sponsa*	c	c	a	u
Gadwall *Anas strepera*	a	o	a	u
American Wigeon *Anas americana*	a	r	a	u
American Black Duck *Anas rubripes*	o		o	u
Mallard* *Anas platyrhynchos*	a	u	a	c
Blue-winged Teal* *Anas discors*	c	o	a	r
Cinnamon Teal *Anas cyanoptera*	r	x	x	
Northern Shoveler *Anas clypeata*	c	o	c	r
Northern Pintail *Anas acuta*	a	r	a	u
Green-winged Teal *Anas crecca*	a	r	a	o
Canvasback *Aythya valisineria*	u		u	o
Redhead *Aythya americana*	u		u	o
Ring-necked Duck *Aythya collaris*	a		a	u
Greater Scaup *Aythya marila*	u		o	o
Lesser Scaup *Aythya affinis*	c		c	u
Surf Scoter *Melanitta perspicillata*			r	
White-winged Scoter *Melanitta fusca*			r	
Black Scoter *Melanitta nigra*			r	
Oldsquaw *Clangula hyemalis*			r	
Bufflehead *Bucephala albeola*	c		c	u
Common Goldeneye	u		u	c
Bucephala clangula				
Hooded Merganser*	u	o	u	o
Mergus merganser				
Common Merganser	u		u	o
Mergus merganser				
Red-breasted Merganser	u		u	o
Mergus serrator				
Ruddy Duck *Oxyura jamaicensis*	c		c	o
HAWKS, KITES, and EAGLES				
Osprey *Pandion haliaetus*	o		u	
Mississippi Kite	r		x	
Ictinia mississippiensis				
Bald Eagle *Haliaeetus leucocephalus*	o		o	u
Northern Harrier *Circus cyaneus*	c	r	c	u
Sharp-shinned Hawk	u		u	u
Accipiterstriatus				
Cooper's Hawk *Accipiter cooperii*	u		u	u
Northern Goshawk *Accipiter gentilis*			r	r
Red-shouldered Hawk* *Buteo lineatus*	u	u	u	u
Broad-winged Hawk*	u	r	u	
Buteo platypterus				
Swainson's Hawk* *Buteo swainsoni*	o	r	o	
Red-tailed Hawk* *Buteo jamaicensis*	a	a	a	a
Ferruginous Hawk *Buteo regalis*	r		x	
Rough-legged Hawk *Buteo lagopus*	o		u	c
Golden Eagle *Aquila chrysaetos*			r	r

	Sp	Su	F	W
FALCONS				
American Kestrel* *Falco spawverius*	c	u	c	c
Merlin *Falco columbarius*	r		r	r
Peregrine Falcon *Falco peregrinus*	r		r	r
Prairie Falcon *Falco mexicanus*	r			r
PHEASANTS, GROUSE, TURKEY, and QUAILS				
Ring-necked Pheasant* *Phasianus colchicus*	x	x	x	x
Greater Prairie-Chicken *Tympanuchus cupido*	x	x	x	x
Wild Turkey* *Meleagris gallopavo*	a	a	a	a
Northern Bobwhite* *Colinus virginianus*	a	a	a	a
RAILS, GALLINULES, and COOTS				
Yellow Rail *Coturnicops noveboracensis*	r		r	
King Rail* *Rallus elegans*	o	o	o	
Virginia Rail *Rallus limicola*	r	r	r	
Sora *Porzana carolina*	c	u	c	u
Purple Gallinule *Porphyrula martinica*	x			
Common Moorhen *Gallinula chloropus*	x			
American Coot* *Fulica americana*	a	?	a	u
CRANES				
Sandhill Crane *Grus canadensis*			r	
PLOVERS				
Black-bellied Plover *Pluvialis squatarola*	u		o	
American Golden-Plover *Pluvialis dominica*	u		o	
Snowy Plover *Charadrius alexandrinus*	r		r	
Semipalmated Plover *Charadrius semipalmatus*	u		u	
Piping Plover *Charadrius melodus*	o		r	
Killdeer* *Charadrius vociferus*	c	a	a	u
AVOCETS				
American Avocet *Recurvirostra americana*	r		r	
SANDPIPERS and PHALAROPES				
Greater Yellowlegs *Tringa melanoleuca*	c	o	c	
Lesser Yellowlegs *Tringa flavipes*	c	u	c	
Solitary Sandpiper *Tringa solitaria*	u	o	u	
Willet *Catoptrophorus semipalmatus*	o	r	o	
Spotted Sandpiper *Actitis macularia*	c	u	o	
Upland Sandpiper* *Bartramia longicauda*	u	u	o	
Whimbrel *Numenius phaeopus*	x			
Hudsonian Godwit *Limosa haemastica*	u		r	
Marbled Godwit *Limosa fedoa*	o		r	
Ruddy Turnstone *Arenaria interpres*	r			
Sanderling *Calidris alba*	o	r		
Semipalmated Sandpiper *Calidris pusilla*	c	u	c	
Western Sandpiper *Calidris mauri*	o	o	u	
Least Sandpiper *Calidris minutilla*	c	u	c	
White-rumped Sandpiper *Calidris fuscicollis*	u	o	u	
Baird's Sandpiper *Calidris bairdii*	c	o	u	
Pectoral Sandpiper *Calidris melanotos*	c	u	c	
Dunlin *Calidris alpina*	o		o	
Stilt Sandpiper *Calidris himantopus*	u	u	u	
Buff-breasted Sandpiper *Tryngites subruficollis*	r		r	
Ruff *Philomachus pugnax*	x			
Short-billed Dowitcher *Limnodromus griseus*	o		o	

	Sp	Su	F	W
Long-billed Dowitcher *Limnodromus scolopaceus*	u	r	u	
Common Snipe *Gallinago gallinago*	u	r	u	r
American Woodcock* *Scolopax minor*	o	o	o	r
Wilson's Phalarope *Phalaropus tricolor*	u		u	
Red-necked Phalarope *Phalaropus lobatus*	r		r	
GULLS and TERNS				
Laughing Gull *Larus atricilla*	x			
Franklin's Gull *Larus pipixcan*	c	o	a	r
Little Gull *Larus minutus*			x	
Bonaparte's Gull *Larus philadelphia*	u		u	
Ring-billed Gull *Larus delawarensis*	c	c	c	u
Herring Gull *Larus argentatus*	u	r	u	u
Glaucous Gull *Larus hyperboreus*				x
Caspian Tern *Sterna caspia*	u	o	u	
Common Tern *Sterna hirundo*	r		r	
Forster's Tern *Sterna forsteri*	u	o	u	
Least Tern *Sterna antillarum*	r		r	
Black Tern *Chlidonias niger*	u	o	u	
DOVES				
Rock Dove* *Columbia livia*	c	c	c	c
White-winged Dove *Zenaida asiatica*			x	
Mourning Dove* *Zenaida macroura*	a	a	a	u
CUCKOOS and ROADRUNNERS				
Black-billed Cuckoo* *Coccyzus erythropthalmus*	u	o	u	
Yellow-billed Cuckoo* *Coccyzus americanus*	c	c	c	
Greater Roadrunner *Geococcyx califorianus*			x	
OWLS				
Barn Owl* *Tyto alba*	o	o	u	o
Eastern Screech-Owl* *Otus asio*	c	c	c	c
Great Horned Owl* *Bubo virginianus*	c	c	c	c
Snowy Owl *Nyctea scandiaca*				r
Burrowing Owl *Athene cunicularia*	o	o		
Barred Owl* *Strix varia*	c	c	c	c
Long-eared Owl *Asio otus*	u	r	r	u
Short-eared Owl *Asio flammeus*	r		r	r
Northern Saw-whet Owl *Aegolius acadicus*				r
GOATSUCKERS				
Common Nighthawk* *Chordeiles minor*	c	c	c	
Common Poorwill *Phalaenoptilus nuttallii*	o		o	
Chuck-will's-widow* *Caprimulgus carolinensis*	u	u	c	
Whip-poor-will**Caprimulgus vociferus*	c	c	u	
SWIFTS				
Chimney Swift* *Chaetura pelagica*	c	c	c	
HUMMINGBIRDS				
Magnificent Hummingbird *Eugenes fulgens*			x	
Ruby-throated Hummingbird* *Archilochus colubris*	u	c	u	
KINGFISHERS				
Belted Kingfisher* *Ceryle alcyon*	u	o	u	o

	Sp	Su	F	W
WOODPECKERS and ALLIES				
Red-headed Woodpecker* *Melanerpes erythrocephalus*	c	c	c	c
Red-bellied Woodpecker* *Melanerpes carolinus*	c	c	c	c
Yellow-bellied Sapsucker *Sphyrapicus varius*	u	u	u	u
Downy Woodpecker* *Picoides pubescens*	c	c	c	c
Hairy Woodpecker* *Picoides villosus*	u	u	u	u
Northern Flicker *Colaptes auratus*	c	c	c	c
Pileated Woodpecker* *Dryocopus pileatus*	u	u	u	u
FLYCATCHERS				
Olive-sided Flycatcher* *Contopus cooperi*	o	r	o	
Eastern Wood-Pewee* *Contopus virens*	u	c	c	
Yellow-bellied Flycatcher *Empidonax flaviventris*	r	r		
Acadian Flycatcher* *Empidonax virescens*	c	c	u	
Alder Flycatcher *Empidonax alnorum*	o		o	
Willow Flycatcher *Empidonax traillii*	r	r	r	
Least Flycatcher *Empidonax minimus*	c		u	
Eastern Phoebe* *Sayornis phoebe*	c	c	c	
Great Crested Flycatcher* *Myiarchus crinitus*	c	c	c	
Western Kingbird* *Tyrannus verticalis*	c	c	u	
Eastern Kingbird* *Tyrannus tyrannus*	c	c	u	
Scissor-tailed Flycatcher* *Tyrannus forficatus*	u	u	u	
SHRIKES				
Loggerhead Shrike* *Lanius ludovicianus*	c	c	c	u
Northern Shrike *Lauius excubitor*				x
VIREOS				
White-eyed Vireo* *Vireo griseus*	u	u	u	
Bell's Vireo* *Vireo bellii*	u	u	o	
Yellow-throated Vireo* *Vireo flavifrons*	u	u	u	
Blue-headed Vireo *Vireo solitarius*	u		o	
Warbling Vireo* *Vireo gilvus*	c	c	c	
Philadelphia Vireo *Vireo philadelphicus*	o		o	
Red-eyed Vireo* *Vireo olivaceus*	c	c	u	
JAYS and CROWS				
Blue Jay* *Cyanocitta cristata*	c	c	a	c
Pinyon Jay *Gymnorhinus cyanocephalus*				x
Clark's Nutcracker *Nucifraga columbiana*	x			x
American Crow* *Corvus brachyrhynchos*	c	c	c	c
LARKS				
Horned Lark* *Eremophila alpestris*	u	o	u	c
SWALLOWS				
Purple Martin* *Progne subis*	c	c	c	
Tree Swallow* *Tachycineta bicolor*	c	u	c	
Northern Rough-winged Swallow* *Stelgidopteryx serripennis*	c	c	c	
Bank Swallow *Riparia riparia*	o	r	o	
Cliff Swallow* *Petrochelidon pyrrhonota*	u	u	u	
Barn Swallow* *Hirundo rustica*	c	c	c	
CHICKADEES and TITMICE				
Black-capped Chickadee* *Poecile atricapillus*	c	c	c	c
Tufted Titmouse* *Baeolophus bicolor*	c	c	c	c

	Sp	Su	F	W
NUTHATCHES				
Red-breasted Nuthatch* *Sitta canadensis*			r	r
White-breasted Nuthatch* *Sitta carolinensis*	c	c	c	c
Pygmy Nuthatch *Sitta pygmaea*	x			x
CREEPERS				
Brown Creeper *Certhia americana*	u		u	o
WRENS				
Rock Wren *Salpinctes obsoletus*			x	
Carolina Wren* *Thryothorus ludovicianus*	u	u	u	o
Bewick's Wren* *Thryomanes bewickii*	o	r	o	
House Wren* *Troglodytes aedon*	c	c	c	
Winter Wren *Troglodytes troglodytes*				r
Sedge Wren *Cistothorus platensis*	u	o	o	
Marsh Wren *Cistothorus palustris*	o	o	o	r
KINGLETS and GNATCATCHERS				
Golden-crowned Kinglet *Regulus satrapa*	u		u	o
Ruby-crowned Kinglet *Regulus calendula*	u		u	r
Blue-gray Gnatcatcher* *Polioptila caerulea*	c	c	c	
THRUSHES				
Eastern Bluebird* *Sialia sialis*	c	c	c	u
Mountain Bluebird *Sialia currucoides*				x
Townsend's Solitaire *Myadestes townsendi*				r
Veery *Catharus fuscescens*	o			
Gray-cheeked Thrush *Catharus minimus*	o		r	
Swainson's Thrush *Catharus ustulatus*	c		u	
Hermit Thrush *Catharus guttatus*	o		u	r
Wood Thrush* *Hylocichla mustelina*	u	u	o	
American Robin* *Turdus migratorius*	c	c	c	u
THRASHERS				
Gray Catbird* *Dumetella carolinensis*	u	u	u	r?
Northern Mockingbird* *Mimus polyglottos*	u	u	u	u
Brown Thrasher* *Toxostoma rufum*	c	c	u	
STARLINGS				
European Starling* *Sturnus vulgaris*	a	a	a	a
PIPITS				
American Pipit *Anthus rubescens*	u		u	
Sprague's Pipit *Anthus spragueii*	x		x	
WAXWINGS				
Cedar Waxwing *Bombycilla cedrorum*	u	o	u	u
WARBLERS				
Blue-winged Warbler *Vermivora pinus*	r	r	r	
Golden-winged Warbler *Vermivora chrysoptera*	o		o	
Tennessee Warbler *Vermivora peregrina*	c		u	
Orange-crowned Warbler *Vermivora celata*	c	r?	c	r?
Nashville Warbler *Vermivora ruficapilla*	c		c	
Northern Parula* *Parula americana*	c	c	u	
Yellow Warbler* *Dendroica petechia*	u	u	u	
Chestnut-sided Warbler *Dendroica pensylvanica*	u		u	
Magnolia Warbler *Dendroica magnolia*	o		r	
Cape May Warbler *Dendroica tigrina*	r			
Black-throated Blue Warbler *Dendroica caerulescens*	r		r	

	Sp	Su	F	W
Yellow-rumped Warbler*Dendroica coronata*	c		u	o
Black-throated Green Warbler *Dendroica virens*	u		u	
Blackburnian Warbler *Dendroica fusca*	o		r	
Yellow-throated Warbler* *Dendroica dominica*	r	r		
Pine Warbler *Dendroica pinus*	r			
Prairie Warbler *Dendroica discolor*	r			
Palm Warbler *Dendroica palmarum*	o		o	
Bay-breasted Warbler *Dendroica castanea*	r		r	
Blackpoll Warbler *Dendroica striata*	u		o	
Cerulean Warbler* *Dendroica cerulea*	u	u	o	
Black-and-white Warbler* *Mniotilta varia*	u	r	u	
American Redstart* *Setophaga ruticilla*	u	r	u	
Prothonotary Warbler* *Protonotaria citrea*	c	c	c	
Worm-eating Warbler *Helmitheros vermivorus*	r		r	
Ovenbird *Seiurus aurocapillus*	o		o	
Northern Waterthrush *Seiurus noveboracensis*	u		o	
Louisiana Waterthrush* *Seiurus motacilla*	u	o	r	
Kentucky Warbler* *Oporomis formosus*	u	u	u	
Connecticut Warbler *Oporomis agilis*	r			
Mourning Warbler *Oporomis philadelphia*	u		o	
Common Yellowthroat* *Geothlypis trichas*	c	c	c	r
Hooded Warbler *Wilsonia citrina*	r		r	
Wilson's Warbler *Wilsonia pusilla*	o		u	
Canada Warbler *Wilsonia canadensis*	o		o	
Yellow-breasted Chat* *Icteria virens*	u	o	o	
TANAGERS				
Summer Tanager* *Piranga rubra*	c	c	c	
Scarlet Tanager* *Piranga olivacea*	o	o	o	
SPARROWS and TOWHEES				
Eastern Towhee* *Pipilo erythrophthalmus*	u	o	u	r
American Tree Sparrow *Spizella arborea*	c		c	a
Chipping Sparrow* *Spizella passerina*	u	r	u	
Clay-colored Sparrow *Spizella pallida*	u		o	
Field Sparrow* *Spizella pusilla*	c	c	c	u
Vesper Sparrow *Pooecetes gramineus*	u		u	
Lark Sparrow* *Chondestes grammacus*	u	u	u	
Savannah Sparrow *Passerculus sandwichensis*	c		u	r
Grasshopper Sparrow* *Ammodramus savannarum*	o	u	o	
Baird's Sparrow *Ammodramus vairdii*	x		x	
Henslow's Sparrow *Ammodramus henslowii*	r	r	r	
Le Conte's Sparrow *Ammodramus leconteii*	u		u	
Nelson's Sharp-tailed Sparrow *Ammodramus nelsoni*	x		x	
Fox Sparrow *Passerelia iliaca*	u		u	o
Song Sparrow *Melospiza melodia*	c		c	u
Lincoln's Sparrow *Melospiza lincolnii*	u		u	r
Swamp Sparrow *Melospiza georgiana*	c		c	u

	Sp	Su	F	W
White-throated Sparrow *Zonotrichia albicollis*	c		c	u
Harris' Sparrow *Zonotrichia querula*	c		c	u
White-crowned Sparrow *Zonotrichia leucophrys*	c		c	u
Dark-eyed Junco *Junco hyemalis*	c		c	a
McCown's Longspur *Calcarius mccownii*			r	
Lapland Longspur *Calcarius lapponicus*			o	o
Smith's Longspur *Calcarius pictus*	r		r	
Chestnut-collared Longspur *Calcarius ornatus*	o		o	
Snow Bunting *Plectrophenax nivalis*				r
GROSBEAKS and BUNTINGS				
Northern Cardinal* *Cardinalis cardinalis*	c	c	c	c
Rose-breasted Grosbeak* *Pheucticus ludovicianus*	c	o	u	
Black-headed Grosbeak *Pheucticus melanocephalus*			x	
Blue Grosbeak* *Guiraca caerulea*	u	u	u	
Lazuli Bunting *Passerina amoena*	x			
Indigo Bunting* *Passerina cyanea*	c	c	c	
Painted Bunting* *Passerina ciris*	u	u	u	
Dickcissel* *Spiza americana*	c	c	c	
BLACKBIRDS and ORIOLES				
Bobolink *Dolichonyx oryzivorus*	r			
Red-winged Blackbird* *Agelaius phoeniceus*	c	c	c	a
Eastern Meadowlark* *Stumella magnac*	c	c	c	
Western Meadowlark *Stumella neglecta*	u	u	u	u
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*	o			
Rusty Blackbird *Euphagus carolinus*	o		o	
Brewer's Blackbird *Euphagus cyanocephalus*	o		o	
Common Grackle* *Quiscalus quiscula*	c	c	c	c
Great-tailed Grackle* *Quiscalus mexicanus*	o	u	o	
Brown-headed Cowbird* *Molothrus ater*	c	c	c	u
Orchard Oriole* *Icterus spurius*		c	u	u
Baltimore Oriole* *Icterus galbula*	c	u	u	
FINCHES				
Purple Finch *Carpodacus purpureus*	r		o	o
House Finch* *Carpodacus mexicanus*	x	x		
Red Crossbill *Loxia curvirostra*				x
Common Redpoll *Carduelis flammea*				x
Pine Siskin *Carduelis pinus*	o		o	u
American Goldfinch* *Carduelis tristis*	c	c	c	u
OLD WORLD SPARROW				
House Sparrow* *Passer domesticus*	a	a	a	a
368 321	**287**	**175**	**278**	**132**

Federally Listed Species That May Occur in the Study Area

Species		Regional Presence Confirmed	
Common Name	**Scientific Name**	**Yes**	**No**
Bald Eagle	*Haliaeetus leucocephalus alascensis*	X	
Interior Least Tern	*Sterna antillarum*	X	
Piping Plover	*Charadrius melodus*	X	
Scale shell mussel	*Leptodea leptodon*		X
Pink mucket	*Lampsilis abrupta*		X
Winged mapleleaf	*Quadrula fragosa*		X
American burying beetle	*Nicrophorus americanus*		X
Mead's milkweed	*Asclepias meadii*	X	
Western prairie fringed orchid	*Platanthera praeclara*		X
Running buffalo clover	*Trifolium stoloniferum*		X

Species Listed in Missouri as Endangered that May Occur in Study Area

Species		Regional Presence Confirmed	
Common Name	**Scientific Name**	**Yes**	**No**
Bald Eagle	*Haliaeetus leucocephalus alascensis*	X	
Barn Owl	*Tyto alba*	X	
Northern Harrier	*Circus cyaneus*	X	
King Rail	*Rallus elegans*	X	
American Bittern	*Botaurus lentiginosus*	X	
Snowy Egret	*Egretta thula thula*	X	
Interior Least Tern	*Sterna antillarum*	X	
Greater Prairie Chicken	*Tympanuchus cupido*	X	
Black-tailed jack rabbit	*Lepus californicus*	X	
American burying beetle	*Nicrophorus americanus*		X
Mead's milkweed	*Asclepias meadii*	X	
Western prairie fringed orchid	*Platanthera praeclara*		X
Running buffalo clover	*Trifolium stoloniferum*		X

Other Missouri or Nationally Rare Species That May Occur in the Study Area

Common Name	Scientific Name	Regional Presence Confirmed Yes	Regional Presence Confirmed No
Swainson's Hawk	*Buteo swainsoni*	X	
Red-shouldered Hawk	*Buteo lineatus*	X	
Sharp-shinned Hawk	*Accipiter striatus*	X	
Cooper's Hawk	*Accipiter cooperii*	X	
Short-eared Owl	*Asio flammeus*	X	
Sora Rail	*Porzana carolina*	X	
Little Blue Heron	*Egretta caerulea*	X	
Black-crowned Night Heron	*Nyciticorax nycitdcorax*	X	
Least Bittern	*Ixobrychus exilis exilis*	X	
Great Egret	*Ardea alba*	X	
Pied-billede Grebe	*Podilymbus podiceps*	X	
Upland Sandpiper	*Bartramia longicauda*	X	
Bell's Vireo	*Vireo bellii*	X	
Henslow's Sparrow	*Ammodramus henslowii*	X	
Chestnut-sided Warbler	*Dendroica pensylvanica*	X	
Cerulean Warbler	*Dendroica cerulea*	X	
Painted Bunting	*Passerina ciris ciris*	X	
Paddlefish	*Polyodon spathula*	X	
Plains harvest mouse	*Reithrodontomys montanus*	X	
Crawfish frog	*Rana areolata*	X	
Texas horned lizard	*Phrynosoma cornutum*	X	
Great Plains skink	*Eumeces obsoletus*	X	
Regal fritillary	*Speyeria idalia*	X	
Prairie mole cricket	*Gryllotalpa majo*	X	

Appendix E: Interim Compatibility Determination

Appendix E: Interim Compatibility Determination

I. STATION NAME: Marais des Cygnes National Wildlife Refuge

II. DATE ESTABLISHED: 1992

III. ESTABLISHING AUTHORITY: The Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j) and the Emergency Wetlands Resources Act of November 10, 1986 (16 U.S.C. 3901-3931)

IV. PURPOSE FOR WHICH ESTABLISHED: The primary purpose for the Refuge under the Fish and Wildlife Act of 1956 is "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..."

The primary purpose for the Refuge under the Emergency Wetlands Resources Act of 1986 is "... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..."

V. DESCRIPTION OF USE: Wildlife-dependent recreational activities currently are limited within the 11,145 acre study area. Existing agricultural uses include growing row crops and grazing livestock. The tilled and grazed land does not provide for concentrated use by wildlife. Wildlife observation, photography, environmental interpretation and hunting opportunities are available and occur on Marais des Cygnes NWR (9,300 acre acquisition area) and Marais des Cygnes Wildlife Area (7,500 acres), located immediately west of the addition area. Fishing opportunities exist in the area. The county and township roads provide access for local bird watchers. Annual visitation for the existing Refuge is estimated at 10,000 people for an average of about 27 visitors/day. The spring and fall are the busiest times of the year and mid summer is the slowest.

The same wildlife-dependent uses are being considered for lands acquired for the Refuge. Hunting will be conducted within the framework of applicable state and Federal regulations. Control of deer numbers through hunting will help minimize crop damage from increased wildlife numbers.

Existing wildlife-dependent uses will be continued and promoted to help realize the Refuge goal of increasing opportunities for outdoor recreation and education. All Refuge lands, except those sensitive communities identified as requiring exclusion of use, will be open to recreational uses year-round. Hunting and fishing would occur within state-established seasons. Wildlife recreational use will help promote understanding, appreciation and support for wetland and prairie restoration and other conservation efforts.

VI. ESTIMATE DEMAND FOR PRE-EXISTING WILDLIFE-DEPENDENT RECREATIONAL USE PLUS OTHER WILDLIFE-DEPENDENT RECREATIONAL USES CONSIDERED IF LANDS BECOME REFUGE DOMAIN: Demand for the existing wildlife-dependent recreational uses described above should increase significantly if subject lands are acquired for a refuge. The availability and increased accessibility of refuge lands is likely to be attractive to local users as well as those in the Kansas City area. Waterfowl and deer hunting opportunities and demand should increase as wetlands and grasslands are restored. There also should be a significant increase in the number of non-consumptive users for such activities as wildlife photography and wildlife viewing. Preserving and restoring a more pristine prairie/wetland environment will directly and indirectly improve conditions and demand for wildlife and related outdoor activity.

The completed project could attract 20,000 to 30,000 day visitors per year (based on current and projected visitation rates on the existing refuge area). Increased demands would result through local community organizations desiring additional tourism revenues. Partnerships between the Service and these organizations could be established to develop and promote compatible recreational opportunities.

VII. POTENTIAL IMPACTS OF PROPOSED USE/EXISTING USE ON REFUGE PURPOSE:
The continuation of existing wildlife-dependent recreational use is consistent with fish and wildlife management principals in that it recognizes, in the case of hunting, the concepts of harvestable surplus and carrying capacity. White-tailed deer and Canada goose numbers can increase to levels causing increased cropland damage without the control provided by hunting. The potential of floral and faunal degradation reduces biodiversity and negatively impacts other wildlife using the same habitat, including threatened and endangered species. The refuge goal to maintain diversity and increase abundance of waterfowl and other migratory bird species could be impaired without an active hunting program to manage big game and predator populations.

VIII. STIPULATIONS THAT WOULD MAKE PROPOSED USE/EXISTING USE COMPATIBLE WITH REFUGE PURPOSE:

- All hunting activities will be in conformance with applicable state and Federal regulations.

- Sensitive or rare plant communities may be excluded from consideration of public recreational use on limited acreage if that use would severely damage or extirpate the natural community type.

- Wildlife-dependent uses will be subject to modification if on-site monitoring uncovers unanticipated negative impacts to natural communities, wildlife species or their habitats.

IX. JUSTIFICATION: Recreation, including hunting and fishing, wildlife observation, photography, environmental education and interpretation has minimal impact on refuge resources and is a positive result of proper wetland, bottomland forest, and prairie restoration. These proposed wildlife-dependent recreational opportunities would generate increased public support for the Service's biological and land acquisition programs. People, when able to experi-

ence the outdoors, become more understanding and appreciative of habitat protection and restoration needs.

X. FUNDING OR STAFFING CONSTRAINTS TO IMPLEMENTATION: The Marais des Cygnes National Wildlife Refuge is administered by staff located at the existing refuge northeast of Pleasanton, Kansas. The expansion would be administered by this staff as well. Additions to the existing Refuge would occur gradually on a willing seller basis only, allowing incorporation of any additional costs in the normal refuge budgeting process.

Available from the Service? **Yes** No

Discussion: The need for increased refuge administrative funding is dependent on the pace of land acquisition and development. The initial costs to support wildlife-dependent uses should be low as wildlife habitats are slowly restored over time.

If no, is it available from Service partners? Yes No

Discussion: Partner matching grants and cooperatively funded projects and programs would be an integral part of implementation.

XI. DETERMINATION IF USE IS OR IS NOT COMPATIBLE WITH THE PURPOSE(S) FOR WHICH THE REFUGE WAS OR WILL BE ESTABLISHED:

IS IS NOT

XII. WILL THE USE BE ALLOWED AFTER ACQUISITION: YES NO

Discussion: See Sections V, VII & VIII.

Determined By (Project Leader):

_____

Bruce Freske Date

Reviewed By (Refuge Supervisor):

_____

Name Date

Concurred By (Chief, NWRS):

_____

Name Date

Appendix F: Land Protection Plan

Appendix F: Land Protection Plan

Land Protection Plan
Proposed Addition to Marais des Cygnes National Wildlife Refuge

Options for Fish and Wildlife Habitats

This Land Protection Plan presents habitat protection and restoration options available to the Service and landowners on public and private lands within the proposed refuge expansion boundary. A map of relative protection priorities for areas within the proposed refuge is included **(Figure 1)**.

I. Options for Land Protection

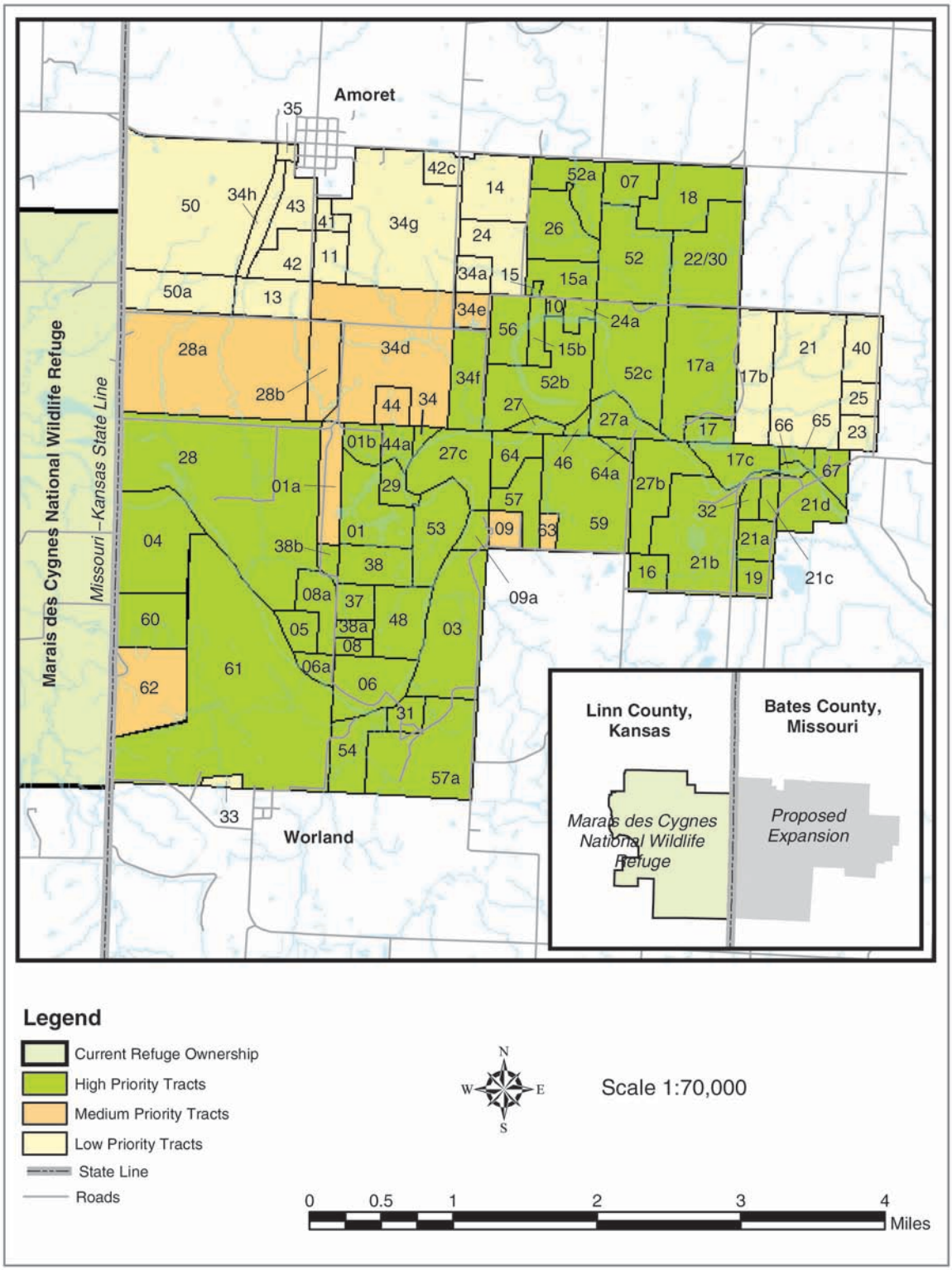
Land protection options vary from written agreements on land management to outright purchase of the land. Land may be acquired in fee title by several methods including exchange, purchase or donation. Conservation or non-development easements can also be purchased by the Service or donated by a landowner. Each parcel of land has unique resource values and circumstances that determine the desired level of protection.

Much of the public discussion and/or concern over a new refuge proposal centers on full acquisition of lands (fee title). However, land purchase is only one of many options for developing a wildlife refuge. Various options for habitat protection and restoration could be used in concert with fee title acquisition to achieve refuge goals.

Fee Simple Purchase: The Service could purchase land from willing sellers within the proposed refuge boundary. If separate mineral rights were held, we would seek to acquire those as well. The land would be appraised at market value and a written offer presented to a landowner. Full rights and title to purchased property would be vested with the United States as part of the National Wildlife Refuge System. Land acquisition funds are limited and allocated on a nationwide basis. Each Service Region must compete for appropriations from Congress under the Land and Water Conservation Fund and for Migratory Bird Conservation Fund (Duck Stamp) allotments. Annual land acquisition funding cannot be assured for each refuge requesting it.

Conservation Easements: Conservation easements are a popular method for land protection used by private individuals, land trusts and governments. Conservation easements involve the acquisition of specific land rights for the purpose of achieving defined habitat objectives. Easements can either prohibit or encourage certain practices. For example, wetland easements usually involve the right to drain, burn and fill a wetland. Grassland easements usually cover the right to place timing restrictions on hay mowing to benefit wildlife. Easements become part of the title to the property and are usually permanent. If a landowner sells the property, the easement continues as part of the title.

Figure 1: Tracts in the Proposed Expansion Area Identified by Tract Number and Priority for Acquisition



II. Options for Habitat Restoration

Partners for Fish and Wildlife: This program is administered by the U.S. Department of the Interior, Fish and Wildlife Service and offers technical and financial assistance to private landowners to voluntarily restore wetlands, native grasslands and other fish and wildlife habitats. The Service, along with a wide variety of partners, provides assistance and cost-sharing to complete work if the landowner agrees to maintain the area for a period of 10 years or more. Partners who contribute time and funds for these efforts include local conservation organizations, universities, businesses, school groups, other government agencies and private individuals.

Wetlands Reserve Program: The Wetlands Reserve program is administered by the U.S. Department of Agriculture, Natural Resources Conservation Service. The program focuses on providing financial incentives to landowners in exchange for wetland restoration or enhancements. Three options are available: permanent easements, 30-year easements, and restoration cost-share agreements for a minimum 10-year duration. The landowner retains title to the land and may lease it for hunting and fishing. Additional activities, such as haying, grazing or timber cutting, may be permitted if the uses are fully consistent with protection and enhancement of the wetland.

Technical Assistance: Several programs exist for people who want to improve wildlife habitat on their land. Financial assistance for habitat improvements is often available on a cost-sharing basis.

Wildlife Habitat Incentives Program: Participants work with the Natural Resource Conservation Service to prepare a wildlife habitat development plan in consultation with the local conservation district. The plan describes the landowner's goals for habitat improvement and sets a schedule for implementation. Cost-share agreements under this program generally last from 5 to 10 years.

Cooperative Agreements: The U.S. Fish and Wildlife Service can offer free technical assistance to neighboring property owners through a cooperative agreement. The Service can agree to develop wildlife or land management plans, or do wildlife surveys on private lands and provide detailed information to the landowners. These cooperative agreements are formal, written documents, and usually place no legally binding restrictions on the land. No money is involved and either party may cancel the agreement with adequate notice to the other party. A cooperative agreement would not affect the tax status of the land.

Private Conservation Efforts: In recent years, conservation organizations have been effective in promoting wildlife habitat improvement on private lands. Collectively, these local, regional or national organizations are a great source of financial and technical assistance for the private landowner who wishes to improve lands for wildlife. Some of the more popular organizations include The Nature Conservancy, The Conservation Fund, Fish and Wildlife Foundation, Izaak Walton League, Audubon, Trust for Public Lands, Ducks Unlimited, and Pheasants Forever.

In addition, local hunting, fishing, and conservation organizations often are willing to assist private landowners with wildlife habitat improvement projects.

Many of these organizations have substantial financial and technical resources and are often a dedicated source of energy for wildlife habitat improvement on both private and public lands.

III. Recommended Land Protection Levels

The draft Environmental Assessment recommends Alternative C (11,145 acres), which includes preservation of the core stream area and its associated bottomland forest and riparian wetlands as well as adjacent upland areas. The goal for the bottomland areas would be to gradually acquire fee or easements on the lands over time. Any fee or easement purchases would be from willing sellers only. If a landowner is not interested in a fee title sale, the Service would consider other options such as conservation easements or assistance with private conservation measures if these were of interest to the landowner.

The approach for the adjacent upland areas (Priority 2 and 3) area would be to acquire fee or permanent easements on most lands within the boundary over time. During the interim, a combination of easements, fee title or private conservation measures would be pursued based on each landowner's interest.

The surrounding Watershed Conservation (Priority 3) approach would include fee acquisition, but also a larger role for voluntary conservation measures and easement programs. Focus would be placed on the retirement of highly erodible lands where possible and encouraging conservation practices. The Service would seek to engage landowners in private conservation measures through existing programs and technical assistance. However, fee title purchase, based on funding availability, would still be possible for landowners interested only in that option.

IV. Land Protection Priorities:

Land protection priorities are listed in Table 1. The bottomland area is the Service's highest priority (Priority 1) for purchase and restoration with future available funding. The adjacent upland areas where there is existing upland forest or prairie would be the second highest priority for fee purchase and conservation easements (Priority 2). The upland parcels that are currently cropped would be the last priority for available land acquisition funds (Priority 3). Some of the tract ownerships extend outside the proposed Refuge boundaries, which accounts for the acreage totaling more than the 11,145 acre expansion.

Table 1: List of Tracts, Acreage, and Protection Priority within the Proposed Expansion Area

TRACT #	ACRES	PRIORITY
1	146.5	Higher
01a	86.4	Medium
01b	42.9	Higher
03	256.9	Higher
04	349.5	Higher
05	45.0	Higher
06	134.9	Higher
06a	28.5	Higher
07	67.4	Higher
08	21.3	Higher
08a	70.1	Higher
09	40.1	Medium
09a	32.4	Higher
10	10.9	Higher
11	53.8	Lower
13	91.0	Lower
14	140.5	Lower
15	3.9	Higher
15a	80.7	Higher
15b	37.9	Higher
16	43.2	Higher
17	38.9	Higher
17a	267.5	Higher
17b	147.3	Lower
17c	81.6	Higher
18	157.6	Higher
19	41.5	Higher
21	293.8	Lower
21a	46.8	Higher
21b	277.0	Higher
21c	26.8	Higher
21d	94.1	Higher
22/30	201.8	Higher
23	42.2	Lower
24	114.9	Lower
24a	25.7	Higher
25	39.0	Lower
26	125.1	Higher
27	20.5	Higher
27a	68.1	Higher
27b	143.9	Higher
27c	148.1	Higher
28	785.7	Higher
28a	590.7	Medium
28b	91.7	Medium
29	39.9	Higher
31	36.9	Higher
32	22.3	Higher
33	14.4	Lower
34	12.2	Higher

TRACT #	ACRES	PRIORITY
34a	39.3	Lower
34d	477.9	Medium
34e	39.3	Medium
34f	111.3	Higher
34g	435.1	Lower
34h	52.7	Lower
35	10.8	Lower
37	43.0	Higher
38	88.9	Higher
38a	20.6	Higher
38b	20.0	Higher
40	78.8	Lower
41	25.5	Lower
42	81.1	Lower
42c	38.4	Lower
43	77.4	Lower
44	41.2	Medium
44a	37.0	Higher
46	14.6	Higher
48	116.5	Higher
50	560.8	Lower
50a	135.8	Lower
52	191.3	Higher
52a	103.4	Higher
52b	250.9	Higher
52c	234.3	Higher
53	130.2	Higher
54	97.8	Higher
56	84.1	Higher
57	102.1	Higher
57a	270.3	Higher
59	293.6	Higher
60	188.4	Higher
61	934.6	Higher
62	184.7	Medium
63	20.4	Medium
64	64.8	Higher
64a	14.8	Higher
65	18.5	Higher
66	11.0	Higher
67	46.1	Higher
totals:	11567.1 91	