

**DRAFT**  
**Environmental Assessment for the *Spillway*  
*Replacement and Improvement Project* on Mingo  
National Wildlife Refuge, Puxico, Missouri**

U.S. Department of the Interior  
Fish and Wildlife Service  
Mingo National Wildlife Refuge



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## **1.0 PURPOSE AND NEED FOR ACTION**

### **1.1 Introduction:**

The United States Fish and Wildlife Service (Service) has prepared this Draft Environmental Assessment (DEA) to evaluate the effects associated with replacing and rehabilitating the Mingo National Wildlife Refuge (Mingo NWR; Refuge) main spillway structure for the Refuge. This DEA complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (516 DM 8) and Service (550 FW 3) policies (see Section 1.7 for a list of additional regulations with which this DEA complies).

The activities described within this document are associated with the improvement to the Refuge's ability to control the amount, duration and associated sedimentation of water on the Refuge, and its subsequent management of its water-dependent habitats. It is expected that the construction project associated with this of improvement will benefit the management of water both on the refuge and surrounding lands.

### **1.2 Location:**

The Proposed Action would occur in Stoddard County, Missouri, within the Mingo Basin on Mingo NWR (see Figure 1).

### **1.3 Background**

Mingo National Wildlife Refuge (Refuge) is managed by the U.S. Fish and Wildlife Service (Service) under the Department of the Interior and is a unit of the National Wildlife Refuge System (NWRS).

#### **National Wildlife Refuge System Mission and Goals:**

The mission of the National Wildlife Refuge System is (National Wildlife System Administration Act of 1966, as amended [16 U.S.C. 668dd668ee]):

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

The National Wildlife Refuge System Improvement Act of 1997 established several important mandates aimed at making the management of national wildlife refuges more cohesive. The preparation of comprehensive conservation plans is one of those mandates. The legislation directs the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.



Figure 1. Location of Mingo National Wildlife Refuge, Puxico, MO.

The Refuge System's Mission is to:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

### Mingo National Wildlife Refuge Purposes and Objectives:

Beginning in 1944, land was acquired for Mingo NWR with the approval of the Migratory Bird Conservation Commission. The purpose of the Refuge derives from the Migratory Bird Conservation Act, "... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (16 U.S.C. 715d). In acquiring the first tract for the Refuge, the land was identified as "urgently needed for the protection and conservation of migratory waterfowl and other wildlife." In a 1954 presentation to the Migratory Bird Conservation Commission, the Refuge was described as an "important unit in the Mississippi Flyway" and "an important wintering ground for many species of waterfowl."

One tract of the Refuge was acquired with Bureau of Outdoor Recreation funds. The purpose associated with this funding derives from the Refuge Recreation Act and includes lands "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 (Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended).

An additional purpose was acquired when Congress designated the 7,730 acre Mingo Wilderness in 1976. The establishing legislation for the Wilderness (Public Law 94-557) states that "wilderness areas designated by this Act shall be administered in accordance with the applicable provisions of the Wilderness Act...." The purposes of the Wilderness Act are additional purposes of that part of the Refuge that is within the Mingo Wilderness. The purposes of the Wilderness Act are to secure an enduring resource of wilderness, to protect and preserve the wilderness character of areas within the National Wilderness Preservation System (NWPS), and to administer the NWPS for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness.

## Operational Goals:

The Refuge developed a Comprehensive Conservation Plan (CCP) to provide 15 year management plan that is consistent with Service policy and legal mandates. The CCP was completed in 2007 and established new operational goals and objectives for wildlife, habitat, and public use. The current project is in compliance with the Mingo CCP.

### 1.4 Purpose

The U.S. Fish and Wildlife Service (USFWS) is proposing to remove the existing spillway structure and construct and operate a new spillway structure at Mingo National Wildlife Refuge located on the southern portion of the refuge. A new structure would be approximately 50' wide and placed with a flow line elevation of 325' MSL. The new spillway would provide better management of the water on the refuge, reduce sedimentation, and reduce flooding on both the refuge and surrounding lands.

### 1.5 Need for Proposed Action

The purposes of the proposed action are to provide better hydrologic management both on and off of the refuge, reduce sedimentation, and reduce flooding.

The Refuge is currently utilizing an older concrete structure that is undersized, ageing and placed at an elevation that is 5-6' too high.

The current structure is 28.5' wide and consists of two 12' radial gates set in a concrete structure that is used as both an automotive bridge and water control structure. The current flow capacity of this structure is 1600 CFS and serves as the only outlet for the roughly 28,000 acre basin.

Due to the current size of the structure, adequate drainage of the Mingo Basin cannot be achieved. This results in slower than desired drainage of the refuge and surrounding area and can result in changes in desired habitat conditions. The reduced size also limits the ability of water to flow off of the refuge and surrounding areas during high rainfall events and can result in prolonged high water conditions.

The current structure is positioned 5-6' higher than what is needed to prevent sedimentation of the ditch system at Mingo NWR. The current structure acts as a sediment trap and results in the need to clean sediment out of the ditch system throughout the refuge.

### 1.6 Decision to be made:

This DEA will include an evaluation of the environmental effects of the action alternatives and provide information to help the Service fully consider environmental impacts. Using the analysis in this DEA, the Service will decide whether there would be any significant effects associated with the alternatives that would require the preparation of an environmental impact statement or whether the Proposed Action should be adopted.

### 1.7 Regulatory Compliance:

This DEA was prepared by the Service and represents compliance with applicable Federal statutes, regulations, Executive Orders, and other compliance documents, including the following:

- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996).
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470).
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*).
- Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*).
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*).
- Executive Order 12898, Federal Action Alternatives to Address Environmental Justice in Minority Populations and Low Income Populations, 1994.
- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 *et seq.*).
- Floodplain Management (Executive Order 11988).
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*).
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*).
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*).
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*).
- Protection and Enhancement of the Cultural Environment (Executive Order 11593).
- Protection of Wetlands (Executive Order 11990).
- National Pollutant Discharge Elimination System, as amended (33 U.S.C. 1251 *et seq.*).

Further, this DEA reflects compliance with applicable State of Missouri and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered plants and animals, and cultural resources.

## **2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION**

### **2.1 Alternative A—No Action**

Under the no action alternative the USFWS would not construct the proposed spillway at any location and would continue to rely on the existing structure to facilitate water management on the Refuge.

Reliance upon the current infrastructure would force the Refuge to continue sub-optimal management of its water resources. It is anticipated that the quality of the Refuge's water-dependent habitats will likely continue to decline over time as the water delivery infrastructure further degrades. Therefore, taking no action would lead to the increasing inability of the Refuge to fulfill its purpose as a "*refuge and breeding area for migratory birds and other wildlife...*". In addition, there are anticipated economic and societal benefits associated with the Proposed Action moving forward that would not occur under this No Action alternative.

## 2.2 Alternative B—Construction and Operation of a new spillway on the south side of Mingo NWR (Preferred Alternative)

Under Alternative B, USFWS would remove the existing spillway and construct a new spillway at the same location (See Figure 1). The property is within the Refuge boundary and owned by USFWS. The proposed spillway would be 50' wide and placed at a flow line elevation of 325' MSL. The spillway would be designed to maximize the ability to manage water at Mingo NWR and placed at an elevation to reduce or eliminate sedimentation in the ditches.

The new spillway would be built to allow approximately 3200 CFS of water to exit the refuge via the Mingo Ditch. The four 11' gates would consist of two 11' double slide gates and two 11' single slide gates. The new spillway would be built to allow vehicular traffic across the top of the structure for both the public and refuge staff (See Figure 2).

## 2.3 Alternatives considered but not analyzed

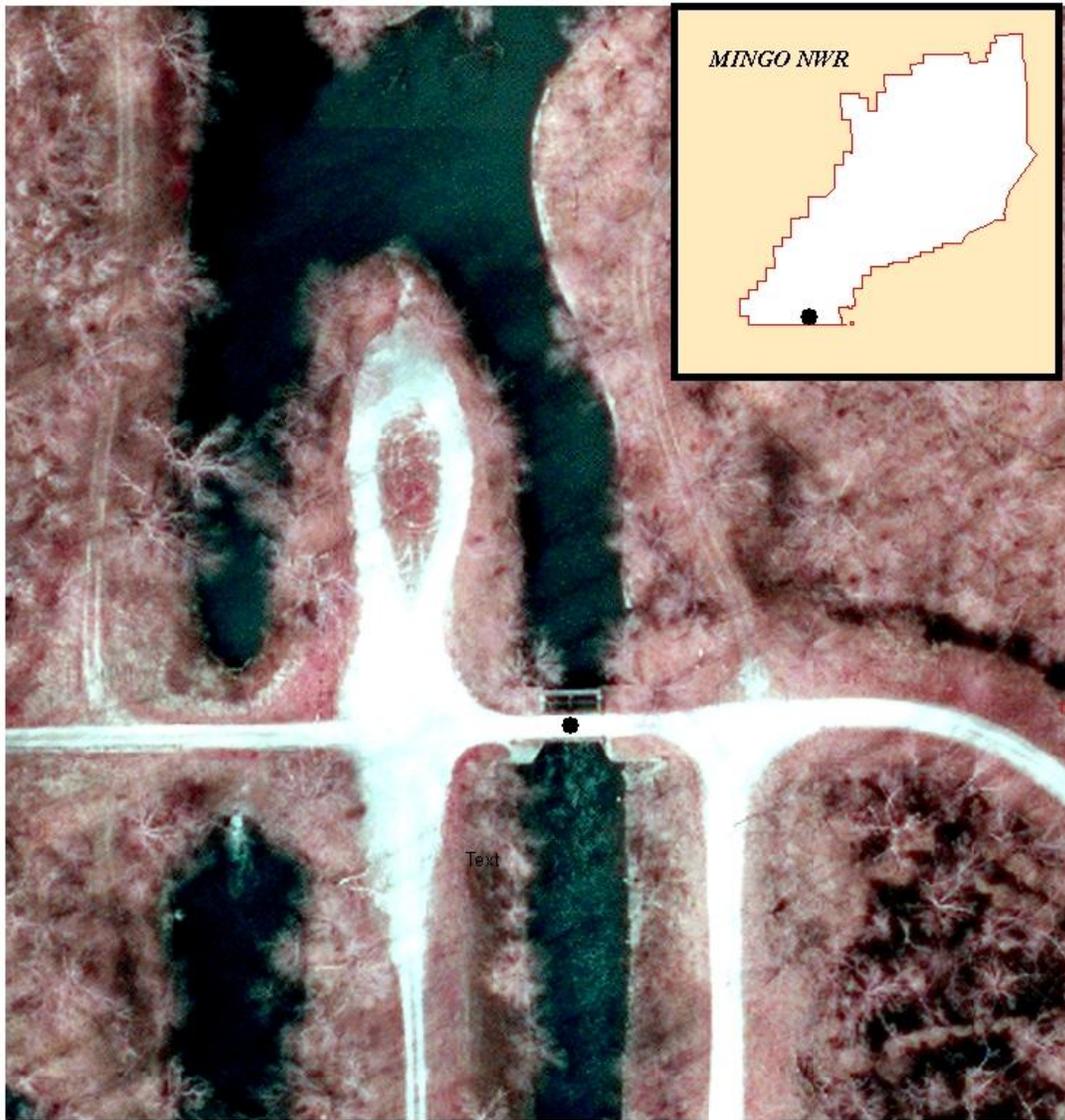
Various other project alternatives were considered at a preliminary level. A variety of different water control structures were evaluated, including a combination of slide gates and stop log structures, a 50' Obermeyer, and three 14' radial gates. These alternatives were deemed problematic from either a cost perspective and/or from concerns associated with design limitations. These include the inability to set desired water elevations, maintenance concerns, and/or long term function.

Another option reviewed was installing a new spillway where the existing Ditch 10 screw gate is located and leaving the existing structure. This alternative was removed from further considerations due to concerns associated with the longevity of the existing spillway and the inability to replace it in the future. This alternative may have led to continued sedimentation issues due to the existing structure's elevation.

Another alternative that was considered, but not selected for in-depth analysis, entailed the removal of the existing spillway and construction of a new spillway south of the current location. This alternative was not analyzed due to the placement of existing infrastructure and the lack of compatibility of that infrastructure with that placement. The current Refuge road that serves as part of the Ozark Highland Auto tour would have required a dangerous set of curves be used to connect the new structure.



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LAND STATUS CURRENT TO: 05/2012  
MAP DATE: 5/7/2012  
BASEMAP: 2010CIR  
FILE: Spillway EAMap

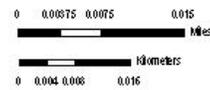


Figure 2. Aerial Image of Existing Spillway and Location of Preferred alternative.

## **3.0 AFFECTED ENVIRONMENT**

### **3.1 Physical Environment**

Mingo National Wildlife Refuge protects a remnant of the bottomland hardwood and cypress-tupelo swamp ecosystem that once formed a 2.5 million-acre contiguous natural landscape throughout the Mississippi River basin. The 21,592-acre Refuge represents the largest area in southeast Missouri of remaining habitat for numerous native and threatened plant and animal species. The Refuge touches the southeast boundary of the Ozark Plateau and slopes abruptly from an upland oak-hickory forest to bottomland hardwood forest, lower marsh, and expansive swamp and ditch system. Since the beginning of the 20th century, these lands have been drained and deforested for agricultural purposes, which has highly modified the natural landscapes and ecosystem functions.

Mingo National Wildlife Refuge lies at the northern tip of the Lower Mississippi River Ecosystem where it meets the Ozark Plateau Ecosystem. The forested wetlands found across the Mingo basin are characteristic of the Lower Mississippi River Ecosystem, while the upland forests found along the bluffs are characteristic of the Ozark Plateau Ecosystem.

The Lower Mississippi River Ecosystem was a 25-million-acre complex of forested wetlands that extended along both sides of the Mississippi River from Illinois to Louisiana. The extent and duration of seasonal flooding from the Mississippi River fluctuated annually, recharging aquatic systems and creating a diversity of dynamic habitats that supported a vast array of fish and wildlife. Today less than 20 percent of the bottomland hardwood forest remains and most is fragmented or in scattered patches throughout the region.

#### **3.1.1 Water Resources:**

Accumulation, movement, and drainage of water drive the ecology of Mingo NWR. The Refuge is within the lower portion of the St. Francis River basin, and acts as a reservoir during periods of flooding. Water enters from all directions until runoff is complete and water levels stabilize. Water flow within the Refuge is complex and varies depending on water depths within each of the pools. Poor drainage within the basin is slowed further by the dikes, levees, and ditches across the Refuge. Water exits the Refuge and flows south to the St. Francis River.

The St. Francis River flows 225 miles from Iron County in Missouri to the Arkansas/Missouri border, and another 207 miles through Arkansas until it joins with the Mississippi River. Hydrology of the St. Francis River and entire Bootheel region has been drastically altered. Extensive networks of ditches and levees drain the floodplain, and control seasonal flooding that once predominated.

#### **3.1.2 Soils / Landforms / Geology:**

The most extensive soil type is Waverley Silt Loam, with a grayish brown silt loam surface layer and gray silt loam subsoil that is mottled throughout. A poorly drained acidic soil formed under wet conditions and a high water table, it occupies approximately 50 to 60 percent of the Refuge.

Falaya Silt Loam occupies a small part of the bottom in areas such as Stanley Creek and Lick Creek. It also borders the upland and the channel of Mingo Creek. Falaya soils have brown silt loam surface layers over grayish brown silt loam underlain at about 40 inches by fine silty clay loam. This soil is somewhat poorly drained, acidic, and subject to flooding or ponding. Organic soils occupy 800 to 900 hundred acres in Rockhouse and Monopoly marshes and consist of dark colored soils derived from organic matter. They were formed under wet marshy conditions in some of the lowest elevations.

## 3.2 Biological Resources/Environment

### 3.2.1 Vegetative Communities

With the exception of the bluffs on either side of the Refuge, most of the area is subject to seasonal flooding and is wet during at least a portion of each year. Vegetation varies along a narrow elevation gradient that corresponds to duration of flooding. Four community types are delineated within the Refuge based on dominant species, elevation, and inundation.

**Terrace Bottoms Community** – Terrace or second bottoms are located at the base of lower slopes, flat banks, and watercourse margins. These well-drained and rarely flooded transitional areas support a mixture of upland and flood plain woody species. Species include: Sugar Maple (*Acer saccharum*), Northern Red Oak (*Quercus rubra*), Shagbark Hickory, Bitternut Hickory (*Carya cordiformis*), Sweetgum (*Liquidambar styraciflua*), American Elm (*Ulmus americana*), Hackberry (*Celtis occidentalis*).

**Oak Hardwood Bottoms Community** – The most extensive bottomland forest type is the Oak Hardwood Bottoms. These Pin Oak flats occupy shallowly inundated areas along the banks between drainage ditch levees, and the low floodplains surrounding Rockhouse and Monopoly Marshes. Species include: Pin Oak (*Quercus palustris*), Willow Oak (*Quercus phellos*), Overcup Oak (*Quercus lyrata*), Green Ash (*Fraxinus pennsylvanica* var. *subintegerrima*), Slippery Elm (*Ulmus rubra*), Persimmon (*Diospyros virginiana*).

**Mixed Soft-Hardwood Levees Community** – This community type exists along drainage ditch levees, stream margins, roadside embankments, and other watercourse borders. Species include: Black Willow (*Salix nigra*), Cottonwood (*Populus deltoides*), Silver Maple (*Acer saccharinum*), Sycamore (*Platanus occidentalis*), River Birch (*Betula nigra*).

**Shallow Swamp Community** – This community type occupies inundated areas such as Monopoly Marsh, Rockhouse Marsh, Mingo Creek, and Stanley Creek. Species include: Bald Cypress (*Taxodium distichum*), Swamp Blackgum (*Nyssa sylvatica* var. *biflora*), Swamp Cottonwood (*Populus heterophylla*), Red Maple (*Acer rubrum*), Pumpkin Ash (*Fraxinus tomentosa*), Black Willow, Water Locust (*Gleditsia aquatica*), Green Ash, Water Hickory (*Carya aquatica*).

### 3.2.2 Fish and Wildlife

A total of 279 resident and migratory bird species use Refuge habitats throughout each year. Tens of thousands of Mallards, Canada Geese, and other migrating waterfowl use Refuge wetlands as stopover or wintering habitat. Hooded Mergansers and Wood Ducks are resident

breeders on the Refuge. Monopoly Marsh draws Wood Ducks from a five-state area during molting season. Bald Eagles, Least Bitterns, and Mourning Doves are among the 108 bird species that regularly breed on the Refuge.

Thirty-eight mammal species are found within the Refuge. White-tailed deer, a species popular for hunting and viewing, are abundant at a population density of up to 35 per square mile. There is a wide diversity of small mammals including three species of squirrels, two species of bats, and various mice, rats, and voles. The Refuge is one of the few places in Missouri where the swamp rabbit, a larger relative of the eastern cottontail rabbit, is known to occur. Unlike other rabbits, the swamp rabbit regularly takes to the water to move about and avoid predators.

Amphibians and reptiles are abundant on the Refuge with more than 30 species of frogs, toads, salamanders, and snakes including the venomous western cottonmouth, southern copperhead, and timber rattlesnake. Many of these species hibernate within the cracks and crevices of the bluffs along the perimeter of the Refuge.

At least 46 species, including channel catfish, white crappie, spotted bass, and green sunfish, are known to occur in the ponds and ditches of the Refuge.

### 3.2.3 Threatened & Endangered Species

Special status species found within the project area that are listed as being either *threatened* (T), *endangered* (E) or as *candidates* (C) for being listed include: Indiana bat (*Myotis sodalis*).

## 3.3 Socioeconomic Considerations:

### 3.3.1 Cultural Resources/Environment

The refuge has completed archeological surveys for almost 7,200 acres on the refuge, including the Mingo Job Corps campus prior to its transfer to the U.S. Forest Service. The surveys and other sources have identified more than 140 cultural resources sites on the refuge. Recorded archeological sites on the refuge represent all Midwest United States cultural periods from the earliest Paleo-Indian through 20th century Western, a period of about 12,000 years.

Nevertheless, evidence shows no human presence in the refuge and vicinity at the time Europeans first entered the region. One standing structure on the refuge, the Patrol or Sweet's Cabin from the early 20th century, is representative of Depression era homesteads in the region, it is historically significant and may be eligible for the National Register. As of September 2003, Stoddard and Wayne counties listed seven properties on the National Register of Historic Places, probably not indicative of the kinds of historic places that exist in the two counties. The refuge contains one of the National Register properties, the Mingo National Wildlife Refuge Archeology District.

The North American Consultation Database run by the Park Service to assist Federal agencies responding to the requirements of the Native American Graves and Protection and Repatriation Act lists no tribes with identified interests in Stoddard and Wayne counties. The database,

however, is not a comprehensive list, being based on a limited number of legal sources. Cherokee, Choctaw, Creek, Delaware, Miami, Mingo (Iroquois), Osage, Quapaw, Seneca, and Shawnee may have had limited historic period interest in the refuge area, the Chickasaw and Tunica may have had protohistoric period interest, and the antecedent Pawnee and Wichita may have had prehistoric interest. Other interest groups that might have a cultural resources concern about the refuge have not yet been identified.

Cultural resources are important parts of the nation's heritage. The Service preserves valuable evidence of human interactions with each other and the landscape. Protection is accomplished in conjunction with the Service's mandate to protect fish, wildlife, and plant resources.

### 3.3.2 Economic/ Public Use/Recreation

The Refuge is tied to the local economy largely through the public's use of the Refuge for recreational opportunities. These opportunities typically come in the form of fishing, hunting, wildlife viewing and sightseeing. The project site and surrounding areas are popular fishing sites.

## 4.0 Environmental Consequences (Alternatives A, and B)

This section reviews and documents the potential direct, indirect, and cumulative effects that implementation of each of the alternatives described in Section 2.0 of this DEA would likely have upon the physical, biological, and social aspects of the human environment (as described in Section 3.0 of this document).

**Direct effects** are considered to be impacts that would be caused by the alternative at the same time and place as the action, whereas **indirect effects** are impacts that occur later in time or at a distance from the triggering action. **Cumulative effects** are incremental impacts that result from other past, present, and reasonably foreseeable future actions, including those taken by federal and non-federal government agencies, as well as those undertaken by private groups and individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time.

### 4.1 Effects to Physical Environment

#### 4.1.1 Water Resources--Discussion of Direct and Indirect Effects

##### Alternative A--No Action:

Under this alternative, there will be a continuation of existing conditions and trends, which is anticipated to entail further degradation of the Refuge's water-dependent wildlife resources. An indirect effect of the No Action alternative is anticipated to be the Refuge's inability to lower water levels to a desired point in a timely fashion, or in such a manner to meet its habitat objectives. This No Action alternative would also indirectly result in a continuation of the Refuge's chronic challenge of siltation in ditches. While the No Action alternative is not anticipated to have any direct short-term impacts, it is anticipated that negative trends such as forest communities continuing to transition into less desirable stands, flooding both on and off refuge will continue and sedimentation of the ditch system will continue.

##### Alternative B--Proposed Action:

It is anticipated that the Proposed Action will have both direct and indirect effects upon the project area's water resources. A direct effect of the Proposed Action entails replacing a concrete structure within a ditch on the refuge. One indirect result of this improved efficiency will be an enhanced ability for the Refuge to manage the water levels, as dictated by management considerations. It is important to note that any changes in water level management associated with the Proposed Action's improved water infrastructure mandates serious analysis and further collection of information, which are future activities and are not directly associated with this proposed action.

Other indirect effects upon water resources resulting from the Proposed Alternative are anticipated to be beneficial to refuge habitat management. The refuge will gain greater ability to de-water areas in a more timely fashion during the spring drawdown. The refuge will also have the ability to deal with high water events more rapidly, resulting in less prolonged flooding both on and off of the refuge. Sedimentation within the ditch system will be reduced by placing the new structure at an appropriate elevation and reducing its ability to serve as a sedimentation trap. This will result in fewer ditch cleaning efforts.

Further, it is expected that there would be possible short-term direct impacts to water quality in the project area during the construction phase and for a short period of time afterwards (on the order of weeks or several months). This potential adverse impact would come from soils that are disturbed and mobilized from construction activities and may be washed into the marsh, thus increasing suspended sediment levels for a short period of time.

#### 4.1.2 Soil \ Landforms \ Geology -- Discussion of Direct and Indirect Effects

##### Alternative A--No Action:

There are no expected short-term direct or indirect impacts to soils, landforms or geology associated with this alternative. The long-term impacts to soil/sediment will be the continued siltation of the ditch systems in the Refuge and the reduced functions of these systems over time.

##### Alternative B--Proposed Action:

The primary direct impact to the soil resources of the project area will be associated with the construction of a new structure at the site location. There would be direct and negative impact to soils associated with the construction of the water control structure. This will include excavation of soil, at a depth of multiple feet, for the installation of the structure.

## 4.2 Biological Resources/Environment:

### 4.2.1 Vegetative Communities--Discussion of Direct and Indirect Effects:

#### Alternative A--No Action:

Under the No Action alternative, forest communities would continue to transition into less desirable stands. Forest stands would continue to die due to prolonged flooding and would transition into lowland system of buttonbush and cypress stands. The increased ability to manage water levels in Monopoly and Rockhouse Marshes, as well as the moist soil units would

result in the ability to control less desirable species by allowing a greater window of time following a drawdown in the spring. All of these impacts would be considered indirect in nature.

#### Alternative B--Proposed Action:

A direct impact would be associated with construction activities, and would largely be temporary in nature. Trees will return to the area once the new spillway is installed and disturbance has ceased. In contrast, there is expected to be a long-term indirect beneficial impact to the productivity of the Refuge's forest communities, marshes, and moist soil units from the Proposed Action, as relates to the Refuge having significantly improved water management capacity. The increased ability to manage water levels in Monopoly and Rockhouse Marshes, as well as the moist soil units would result in the ability to control less desirable species by allowing a greater window of time following a drawdown in the spring. All of these impacts would be considered indirect in nature.

#### 4.2.2 Wildlife--Discussion of Direct and Indirect Effects:

##### Alternative A--No Action:

If the No Action alternative is taken, an indirect impact is expected as forest stands are converted to cypress/buttonbush. While this will help some species in the short-term such as cavity nesters and shrub related species, over the long-term the die-off areas will lose their standing dead trees and convert to purely a buttonbush stand. Negative impacts to aquatic species will continue as ditches will have to be dewatered and cleaned over time for their continued use. Marsh and moist soil units will potentially have a reduced ability to produce forage for wildlife due to a limited window for the manipulation needed to produce food resources each year.

##### Alternative B--Proposed Action:

As a direct consequence of this action, small mammals, birds, and associated wildlife likely will be temporarily displaced during construction of the water infrastructure improvements. Since similar habitat is abundant in the general area, impact to wildlife is expected to be minimal and short lived, as wildlife are expected to return over much of project area upon completion of construction activities.

Another direct consequence of this action would be expected for the portion of the project area where vegetation would be permanently removed (e.g., water control structures, the concrete-lined canal and adjacent roads), as there would be a permanent loss of habitat, and associated loss of common terrestrial wildlife in the final footprint of the new canal. However, it is anticipated that the area is small enough and the surrounding area similar enough to have minimal impacts to those species.

Similarly, with the installation of the new water control structure it is expected that wildlife will benefit from the increased ability of the staff to manage water at desirable levels. This will result from improved habitat conditions, a reduction in the stressful period associated with prolonged flooding, and a reduction in the amount of area and time the ditches are impacted for sediment removal.

The possible decline in wildlife numbers is not expected to be enough to affect the area's overall wildlife populations and is expected to be outweighed by the expected wildlife benefits associated with enhancement of native habitat (which will largely be based on future actions, but that will be strongly facilitated by this proposed action). Therefore, it is anticipated that the net effect of the Proposed Action on wildlife will be positive since the increased ability to control and distribute water will allow the Refuge to manage for increased acreages and productivity of native vegetative communities (that provide habitat for many species of native wildlife such as neotropical migrants that nest on the Refuge or use the Refuge as a stopover on their migratory route).

#### 4.2.3 Threatened and Endangered Species--Discussion of Direct and Indirect Effects:

##### Alternative A--No Action:

Under the No Action alternative, more trees will continue to die due to high water conditions on the refuge. This would improve the Refuge's ability to create or improve roost trees for the endangered Indiana bat. This however may be a relatively short-term benefit as an abnormal amount of these trees die over a shorter period of time compared to a more natural rate of decline for these trees over the longer time period associated with a more managed water regime. It is also believed that roost trees are not a limiting factor for Indiana bats on the refuge at this time.

##### Alternative B--Proposed Action:

It is anticipated that there would be a minor and short-term adverse direct impact to threatened and endangered species as a result of this project's removal of trees during construction activities. It is expected that this impact would be addressed to a large degree by mitigating when trees are removed at the project site and by limiting impacts during construction.

On the whole, the project is expected to have a negligible effect on the endangered Indiana bat. With improved water management, the rate of tree die-off will be slowed to a more natural rate and provide a long-term source for roost trees. An indirect benefit of the project will be the reduction in the amount of time ditches are drained for sediment removal. These ditches serve as a potential forage area and the species would benefit from fewer disturbances to these areas.

#### 4.3 Socioeconomic Effects:

##### 4.3.1 Cultural Resources/Environment--Discussion of Direct and Indirect Effects:

##### Alternative A--No Action:

Under this alternative, there are no anticipated direct or indirect impacts to the cultural environment, as current conditions would be maintained, and no soil disturbance would occur.

##### Alternative B--Proposed Action:

Under the Proposed Action, there may be impacts to cultural resources, if any archeological sites

are found within the project area associated with construction and soil disturbance. The Service is in the process of conducting a cultural resources survey of the project area to better define any potential impacts to these important resources. Further, the Service will encourage and support whatever level of tribal participation is desired on the part of the tribes (for instance, if one of the tribal governments is interested in monitoring the construction activities).

#### 4.3.2 Economic/Public Use/Recreation--Discussion of Direct and Indirect Effects:

##### Alternative A--No Action:

The current economic role that the Refuge plays in the local economy would continue. There would be no immediate changes expected regarding fishing and wildlife viewing opportunities. The No Action alternative would be expected to have no direct impacts in the short-term. There is anticipated to be a moderate and long-term adverse indirect impact associated with this alternative, owing to the Refuge's reduced ability to manage its lands in a way that promotes healthy environmental conditions.

##### Alternative B--Proposed Action:

As the Proposed Action is anticipated to improve the conditions for fish and wildlife, it is expected to lead to an increase in recreational opportunities for fishermen, waterfowl hunters and other members of the public interested in the range of outdoor experiences offered by the Refuge. A minor, negative direct effect would be that the area would be closed to the public during construction. Overall, this alternative could result in a positive economic impact to the local area from increased visitation to the Refuge by the public upon completion.

Another indirect effect of this alternative would be the improved ability to remove water during a high water event resulting in fewer disturbances to infrastructure both on and around the Refuge. This reduction in the impacts to roads and farmland adjacent to the refuge may result in an improved economic condition during flood events.

#### ***4.4 Summary of Environmental Consequences by Alternative: TABLE 1***

<b>Environmental Resource</b>	<b>Alternative A: No Action Alternative</b>	<b>Alternative B: Proposed Action</b>
Water Resources: Water management	Long-term moderate negative impact	Long-term beneficial impact
Water Resources: Water quality	Long-term moderate negative impact	Long term impacts, both minimally negative and beneficial impacts
Soils/Landforms/Geology	No short-term impact; Minimal long-term negative impact	Minor short-term negative & long-term beneficial impact

Biological Resources: Vegetation	Continuing trend of ecosystem modification; long-term negative impacts	Short-term minor negative & long-term beneficial impacts
Biological Resources: Wildlife and fish	Moderate long-term negative impacts	Moderate short-term negative & beneficial long-term impacts
Biological Resources: Special status species	Moderate long-term negative impacts; minor short-term beneficial impacts	Moderate short-term negative & beneficial long-term impacts
Cultural and Historic Resources	No impact	Minor short-term negative impacts
Economic/Public Use/Recreation	Moderate long-term negative impacts	Both moderate negative & positive impacts (short- and long-term); minor short-term negative

#### 4.5 Assessment of Cumulative Effects by Alternative

A cumulative impact is defined as an impact on the environment that results from the incremental impact of a [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can “accumulate” spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially cancelling out each other’s effects on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource.

##### Alternative A--No Action:

As detailed in the preceding analysis, it is anticipated that maintaining the current condition through the No Action alternative would involve a continuation and deepening of many of the challenges the Refuge faces in its management of its water-dependent natural resources. The No Action alternative would be expected to contribute to further degradation of the Refuge’s habitat and water resources and likely increase the rate of ditch siltation and loss of desired forest stands. Further, this alternative would not address the Refuge’s and surrounding communities’ concerns and abilities associated with water removal during floods.

In addition, other conservation activities on the Refuge are considered unlikely to offset the expected negative trend associated with the loss of desired forest stands. Moreover, if ditches continue to sediment at the current rate due to the elevation of the existing structure, there may

be a time in which the ditches cease to function on the Refuge. This may result in more trees dying due to the inability to remove water. These factors sum to make the No Action alternative one that would reduce the cumulative benefit of the Refuge's habitats over a period of time.

#### Alternative B--Proposed Action:

Conversely, it is expected that implementation of the Proposed Action would effectively address many of the water related environmental management challenges faced by the Refuge and its ability to manage water levels on it. The Proposed Action is expected to relieve the Refuge's challenge of not being able to manage its water levels and thereby having negative impact to multiple habitats on the Refuge. As much of the activities on the Refuge are driven by water management capabilities this proposed action would, over time result in improved habitat for species on the refuge.

Similarly, in a cumulative context of what the Proposed Action alternative represents, it is anticipated that other governmental and private entities, and the public at large, will be supportive of the purpose of this project and the rationale for its implementation. This is expected as the project addresses shared concerns related to loss of habitat and impacts from flooding. In that light, the Proposed Alternative significantly improves the Refuge's ability to respond to systemic conditions such as high water events and habitat conversion, as well as any result of climate change-induced environmental changes. Additionally, the Proposed Alternative is expected to lead to improved recreational opportunities for fishermen, waterfowl hunters and other members of the public interested in the outdoor experiences offered by the Refuge. This could result in a positive economic impact to the local area from increased visitation to the Refuge by the public.

## **5.0 Environmental Justice**

No one group or Tribe represented in the community would be disproportionately impacted by building the administrative facility on the parcel. Thus, Alternatives A, or B would not result in any environmental justice issues.

## **6.0 CONSULTATION, COORDINATION AND DOCUMENT PREPARATION**

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## 6.2 Document Preparation:

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