

**Draft Environmental Assessment for
the *Wetland Enhancement Project* on
Swan Lake National Wildlife Refuge,
Sumner, Missouri**



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

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1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Fish and Wildlife Service (USFWS or Service) has prepared this Environmental Assessment (EA) to evaluate the effects associated with converting agricultural fields to moist soil and prairies, improving moist soil management capabilities, and improving the connectivity of wetlands with adjacent floodplains at Swan Lake National Wildlife Refuge (Swan Lake NWR or Refuge). This EA 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 EA complies).

The activities described within this document are associated with the conversion and enhancement of these Refuge habitats.

1.2 LOCATION

The Proposed Action would occur in Chariton County, located near the town of Sumner, Missouri, on Swan Lake NWR (see Figure 1). Specifically, the proposed action would affect 1,890 acres of habitat on Swan Lake NWR.

1.3 BACKGROUND

Swan Lake National Wildlife Refuge is managed by the U.S. Fish and Wildlife 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 (CCPs) 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.

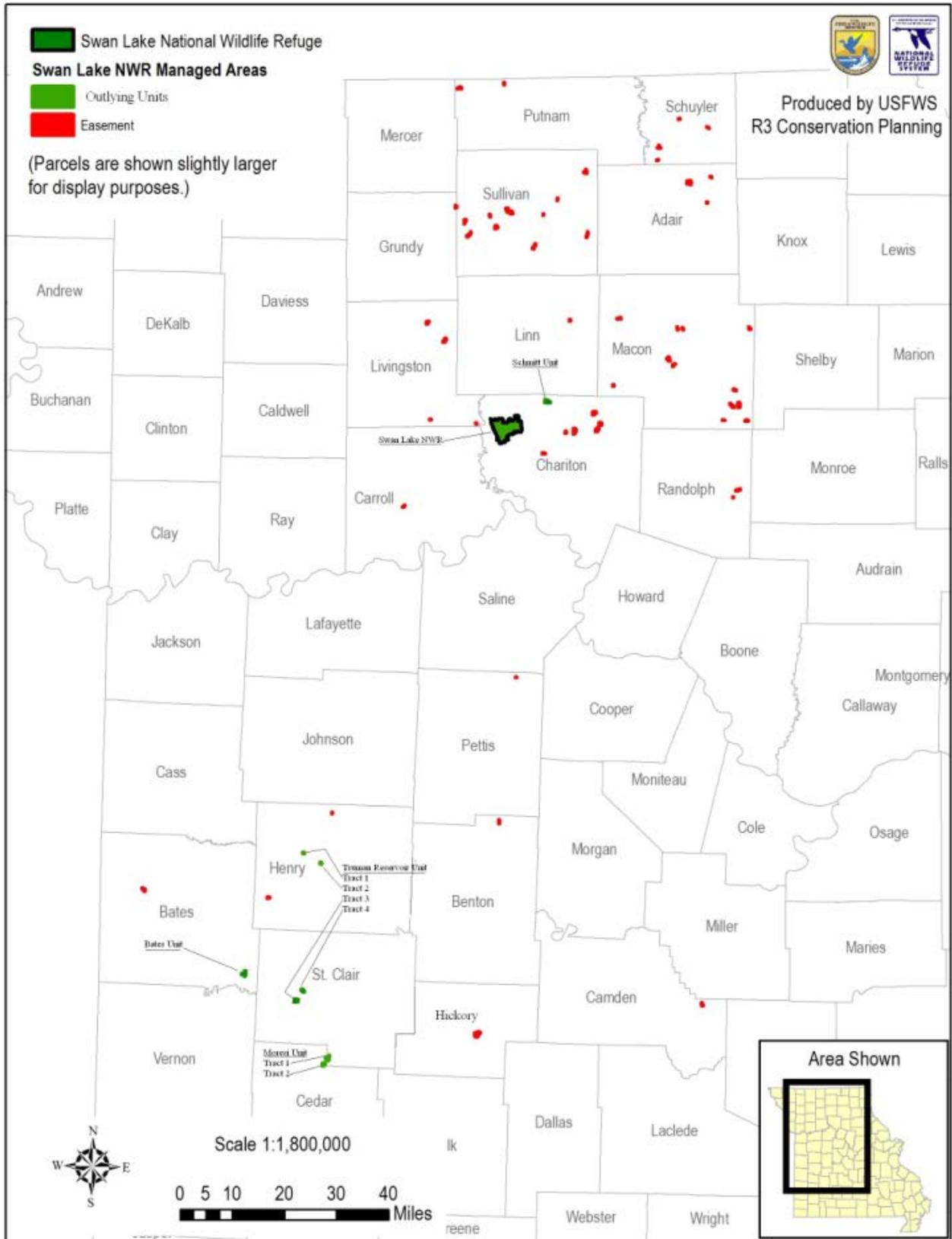


Figure 1: Location of Swan Lake National Wildlife Refuge, Sumner, MO

The National Wildlife 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.

Swan Lake National Wildlife Refuge Purposes and Objectives:

Swan Lake National Wildlife Refuge was established in 1937 by Franklin D. Roosevelt through Executive Order 7563. The legal mandates that established or describe the purposes of the Refuge include:

- “as a refuge and breeding ground for migratory birds and other wildlife” (Executive Order 7563, dated Feb. 27, 1937)
- “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” 16 U.S.C. § 715d (Migratory Bird Conservation Act)
- “... particular value in carrying out the national migratory bird management program.” 16 U.S.C. § 667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife)

The Refuge is responsible for managing 12,031 acres of fee title property. The largest portion consists of 10,670 acres of contiguous land that is the original Swan Lake National Wildlife Refuge first established in 1937, located in Chariton County of north-central Missouri.

The Refuge is also responsible for managing four “Outlying Units” consisting of 8 tracts totaling 1,361 acres. These tracts were transferred to the Service from the Farm Service Agency (formerly the Farmer's Home Administration) in the 1990's and are scattered across five southwestern Missouri counties.

Operational Goals:

The Refuge developed a Comprehensive Conservation Plan (CCP) to provide a 15 year

management plan that is consistent with Service policy and legal mandates. The CCP was completed in 2011 and established new operational goals and objectives for wildlife, habitat, and public use. A Hydrogeomorphic Evaluation for the floodplains in the Lower Grand River Region of Missouri (LGRHGM) was completed in 2011 through a partnership of the Missouri Department of Conservation and the U.S. Fish and Wildlife Service. The current project is in compliance with the Swan Lake CCP and compatible with the recommendations put forth in the LGRHGM.

1.4 PURPOSE

The U.S. Fish and Wildlife Service (USFWS) is proposing to restore habitat on Swan Lake National Wildlife Refuge through a partnership with Ducks Unlimited. This project will affect 1,890 acres of habitat on Swan Lake NWR. This includes restoration of 780 acres (487 acres of wetlands and 293 acres of native grasslands) and enhancement of 1,110 acres of existing wetlands (918 acres in South Pool and 192 acres in M-15). The 918 South Pool acres include approximately 352 of seasonal wetlands and 566 of shrub scrub. The project will also alleviate prolonged flooding on bottomland hardwood forests that is located in the upper ends of South Pool (Unit M-14).

1.5 NEED FOR PROPOSED ACTION

Work completed under this proposal will add new wetland acres and will improve habitat and management capability. It will increase and improve wintering, breeding, and migration habitat available to migratory birds by: restoring 780 acres, including 487 seasonal wetlands intermixed with wet meadow and 293 acres of native grassland, and enhancing 1,110 acres of palustrine emergent wetland habitat, including 544 acres of seasonal wetlands and 566 acres of shrub scrub. Completion of the project will support the Refuge's CCP of managing water levels and adding native habitat for the benefit of wildlife.

1.6 DECISION TO BE MADE

This EA 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 EA, 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 EA 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 EA 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 convert 780 acres of agricultural ground to grasslands and moist soil units (MSU), no addition of a spillway would be built, and water management capabilities would not be improved in South Pool (MSU 14) and MSU 15. Instead, the USFWS would continue to rely on the existing structures to facilitate water management on the Refuge.

Reliance upon the current infrastructure would force the Refuge to continue suboptimal 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 due to the inability to adequately manage and remove floodwaters, and the infrastructure would further degrade.

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...*” and not follow the Refuge’s CCP. In addition, there are anticipated economic and societal benefits associated with the installment of the Proposed Action, which would not occur under the No Action alternative.

2.2 ALTERNATIVE B—CONVERSION OF AGRICULTURAL LAND TO MOIST SOIL AND GRASSLANDS, AND WATER MANAGEMENT IMPROVEMENT (PREFERRED ALTERNATIVE)

Under this alternative, 1,890 acres of habitat will be affected on Swan Lake NWR. This includes

conversion of 780 acres (487 acres of wetlands and 293 acres of native prairie) and enhancement of 1,110 acres of existing wetlands (918 acres in South Pool and 192 acres in M-15). South Pool contains approximately 352 of seasonal wetlands and 566 of shrub scrub and the project will also alleviate prolonged flooding on bottomland hardwood forests that is located in the upper ends of South Pool. See Figure 2 for map of the targeted habitat enhancement locations.

The 780 acres of conversion will require the removal, or breaching, of some existing flood control and interior levees and the construction of low levees with water control structures in appropriate locations for water management. Five new wetland units will be shaped around existing contours. The result will be the conversion of agricultural fields and some opportunistic moist soil units into wetlands which will support a much greater suite of wildlife species. This work will not only improve habitat diversity, but it will improve the hydraulic connection with the adjacent Yellow Creek and Grand River floodplain. Important side benefits will include increased management efficiency, and lower operations and maintenance costs. The new wetland units will be designed along contours and constructed swales, rather than ditches, and will be designed to more naturally improve water management and drainage while increasing habitat diversity. An existing roadway will be reconfigured to fit the topography of the new wetland units. The desired habitat condition of the new wetlands will be seasonal wetlands intermixed with wet prairie depending upon weather cycles. The management goal for at least one unit of 35 acres is to be maintained as wet prairie during most years. The higher elevation portions of this area will be restored to native grasslands. A native grass mix using local genotype seed will be used. Water will be supplied to the seasonal wetlands by gravity feed from the Silver Lake impoundment. An existing water distribution ditch from Silver Lake to the Swan Lake basin will be modified and water control structures will be added to provide water to the newly created wetland units. The establishment of swales that emulate natural floodplain scours will be designed to enhance water delivery and drainage from the seasonal wetland units.

Since there are approximately 293 acres of native prairie being established in this area it will require the removal of some remnant strips of trees that is located between the current agricultural fields, Figure 3 identifies the location of these trees that might potentially be removed during construction of this project and during the restoration of the native prairie areas. A Section 7 Endangered Species Consultation for this project has been conducted and approved by the Columbia Ecological Services Field Office, see attachment.

The 1,110 acres of enhanced wetlands will include an average of 544 acres of seasonal wetlands (352 South Pool and 192 MSU 15 acres) and 566 acres of shrub scrub (South Pool). The enhancement will be accomplished by widening the South Pool spillway and installing a water control structure between South Pool and the MSU 15 unit. This will increase the hydraulic connection between wetlands within South Pool and the nearby Yellow Creek and Grand River floodplains and will result in quicker and more “natural” dewatering of the area following high water events. This will benefit mature bottomland forests that are located in the upper portions of South Pool as flood duration during the growing season will be lessened. The structure will allow efficient water delivery and management of the MSU 15 wetland unit.

Additionally, construction of a new spillway will occur in the same vicinity as the previously decommissioned spillway (See Figure 2). The property is within the Refuge boundary and owned

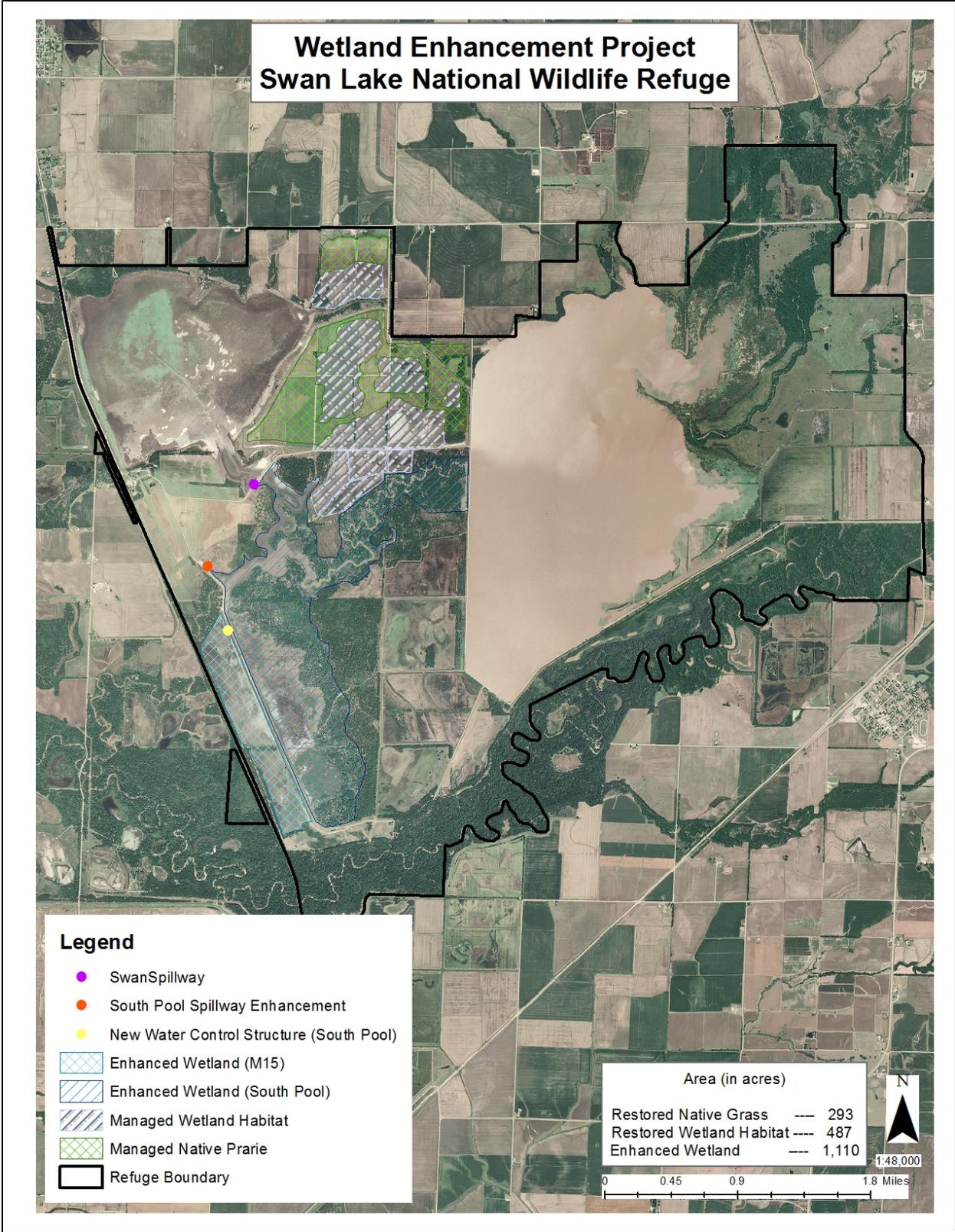


Figure 2: Location of Proposed Habitat Enhancement on Swan Lake NWR

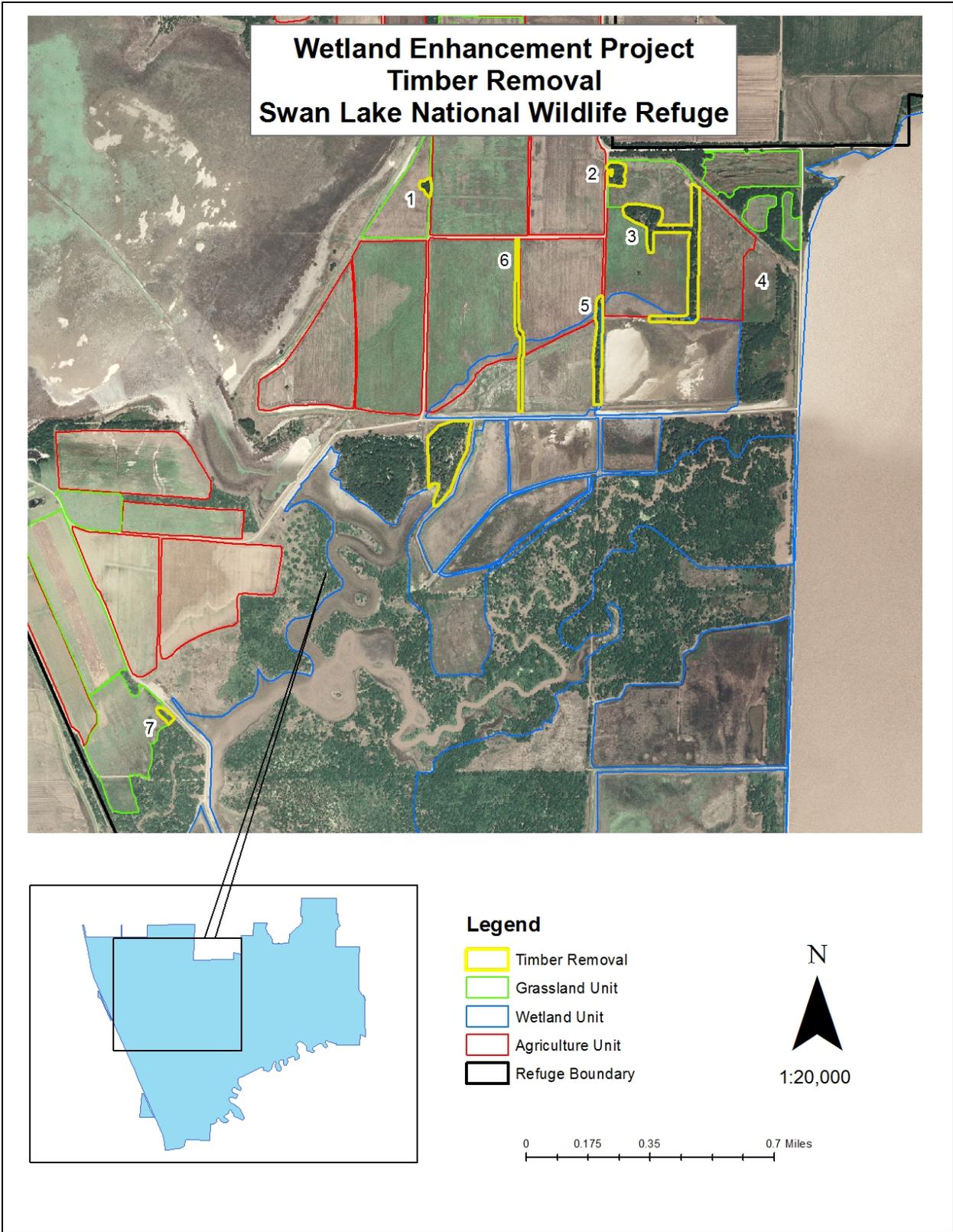


Figure 3: Locations of Timber Removal within the Proposed Project Area

by USFWS. The proposed spillway would be 270 ft. wide and with an invert elevation of 659 ft. MSL (NAVD 1988). The spillway would be designed to maximize the ability to manage floodwaters at Swan Lake NWR and placed at an elevation to facilitate floodwater connectivity and drainage inside the Swan Lake levee. See Figure 4 below for a cross section of the spillway design. The new spillway would be built to allow water to backflow into Swan Lake during times of flooding, reducing the pressure and risk of down-cutting on the levee system. The spillway will also allow these same floodwaters to efficiently flow out of Swan Lake as downstream water levels recede, thereby reducing the duration of inundation to Swan Lake habitats and surrounding lands. The new spillway would be built into the existing levee top and roadway to allow vehicular traffic across the spillway when not flooded.

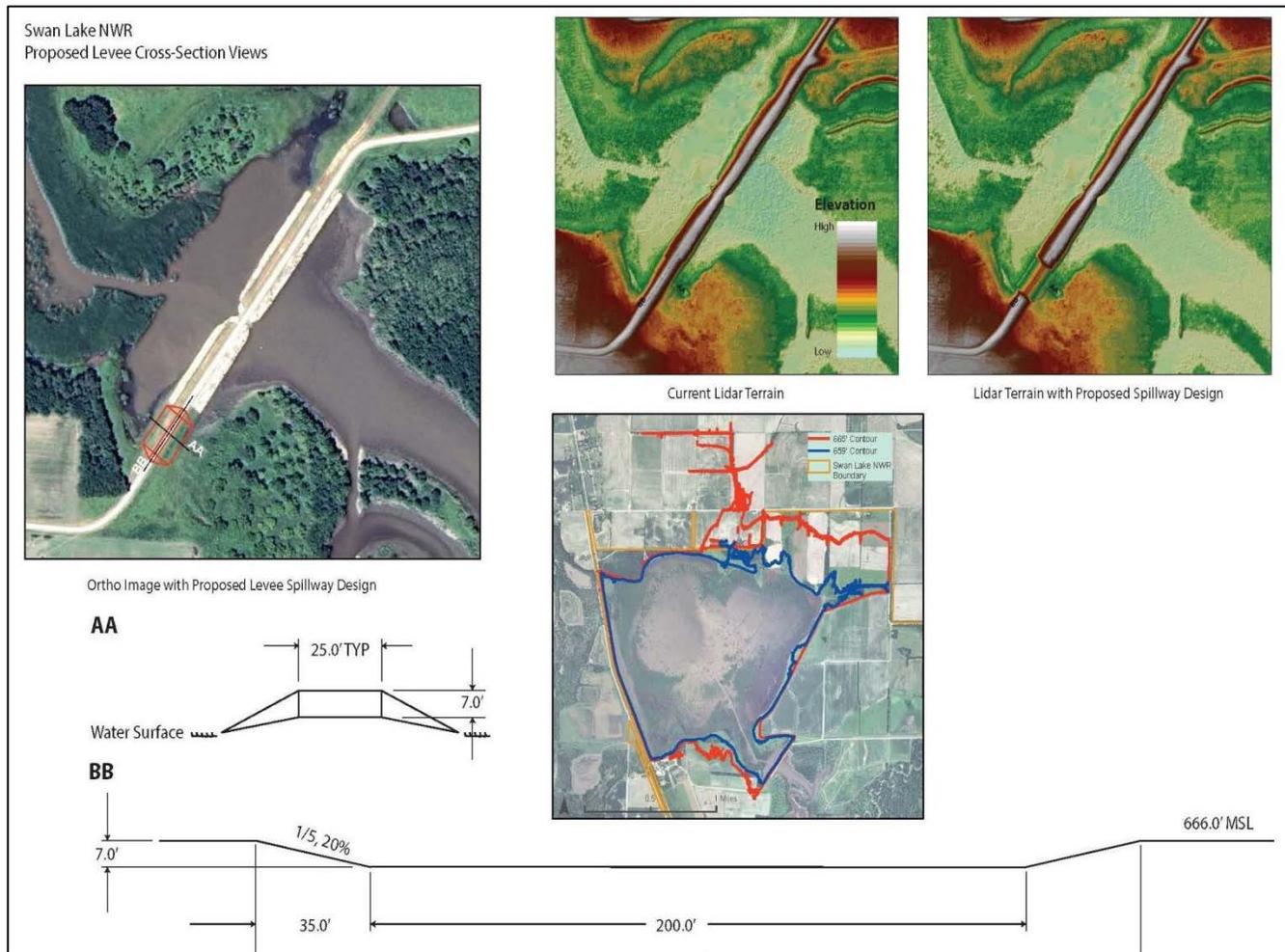


Figure 4: Aerial Image and Cross Section of Proposed Spillway

2.3 ALTERNATIVE C— COMPLETE RESTORATION TO HISTORIC CONDITIONS

Under Alternative C, all levees and water management infrastructures, in the proposed area, would be removed, allowing for restoration to historic conditions of the proposed area prior to the establishment of Swan Lake NWR. Removal of the levees would restore the floodplain to

complete connectivity with Elk Creek, Turkey Creek, and the Grand River, and the Refuge would have no water management capabilities of the area. The habitat would be modeled after pre-settlement conditions as those described from the Hydrogeomorphic Evaluation. Those historic conditions were wet prairie due to the silty clay loams associated along Yellow Creek and the Lower Grand River Region. Depending on extent of flooding, the habitat would be native prairie and bottomland forest, containing dominant trees, such as pin oak; shrubs and vines, buttonbush and raccoon grape; and herbaceous groundcover of sedges, smooth ruellia, and rice cutgrass.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED

Various other project alternatives were considered at a preliminary level. Conversion of croplands to prairies, while leaving South Pool and MSU-15 as they are, was considered. This alternative was deemed problematic because of concerns regarding flood flow connectivity. Additionally, it did not enhance the capacity of Swan Lake NWR to promote waterfowl habitat, as no wetland acres were added and water management capabilities were not increased in the short or long-term.

Adding a variety of additional water control structures was evaluated, including a combination of slide gates and stop log structures. These alternatives were deemed problematic from either a cost perspective and/or from concerns associated with design limitations. These include limitations in flood-flow connectivity and capacity. These alternatives were not as feasible for allowing water to freely flow through infrastructure on both the rising and falling limbs of large flood events.

Another alternative that was considered was to have the spillway at a lower or higher elevation than the proposed elevation of 659 ft. MLS (NAVD 1988). These were not further developed as neither would effectively achieve our purpose of the Proposed Action. By having the spillway at a lower elevation it would limit water management capabilities and increase the frequency of flooding on Swan Lake that would be counterproductive to management purposes for migratory birds. By constructing the spillway at a higher elevation it would not achieve our purpose of increasing flood-flow connectivity and decreasing the inundation period of the impounded waters following flood events.

3.0 AFFECTED ENVIRONMENT

3.1 PHYSICAL ENVIRONMENT

Swan Lake National Wildlife Refuge (Refuge) is located in Chariton County, Missouri near the town of Sumner. It encompasses almost 11,000 acres of bottomland forest, grasslands, and wetlands within the Grand River floodplain. Highways and gravel roads border the north, east, and west sides of the Refuge. Land use around the Refuge is predominantly agriculture, with soybeans, corn, and wheat as the major crops, and beef cattle and hogs as the principal livestock.

3.1.1 Water Resources

The Refuge presently contains three major impoundments and 14 smaller moist soil units. The largest impoundment, Silver Lake, has a surface area of 2,387 acres at full pool and is fed by a drainage area of 110 square miles (70 square miles from Turkey Creek and 40 square miles from Elk Creek). Silver Lake waters can be drained to South Pool, Swan Lake, and other moist soil units on the Refuge. Additional local drainage adds 13 square miles to the drainage area of South Pool (918 acres at full pool) and approximately 5 square miles to the drainage of Swan Lake (987 acres at full pool).

Flooding is a frequent occurrence at many locations within the Grand River Watershed. The Refuge is subject to flooding from local intermittent streams, the Grand River, and Yellow Creek. Two broad factors affect the flood intensity and duration within any watershed: precipitation characteristics and the physical characteristics of the basin or watershed. Precipitation characteristics describe the supply of water to a basin and include the amount, duration, intensity, and distribution. The watershed shape, topography, and soils are determined by geologic factors and are in many cases literally set in stone. Land use is the primary basin characteristic controlled by humans. Modifications to the landscape by practices such as deforestation, mining, and farming, as well as structures such as dams, levees, bridges, channels, and pavement all affect runoff and flooding. There are many such modifications within the Grand River Watershed that both speed and impede surface runoff. All of these factors interact and contribute to flood frequency and duration within the watershed.

Two modifications that are prevalent in the Grand River Watershed are channelization and levee construction. Channelization includes straightening natural stream meanders, clearing the banks, and widening and deepening the channel (Funk and Ruhr 1971). This results in a loss of stream habitat, increased bank erosion, and lower ground water levels (Funk and Ruhr 1971). Levee construction separates the stream from its floodplain. Flood water can no longer spread out and is concentrated within the channel, causing further stream bank erosion. Many landowners consider channelization and levee construction legitimate stream management practices. Several streams within the basin have been channelized for over one-half their length. A substantial portion of the streams in the basin are confined by levees.

3.1.2 Soils / Landforms / Geology

The Refuge lies in the glacial till plain of north-central Missouri. Underlying bedrock is primarily shale and coal with occasional limestone. The topography is relatively flat with elevations ranging from 653.91 feet to 741.56 feet. Soil types of the Refuge are listed in Table 1 below.

3.2 BIOLOGICAL RESOURCES/ENVIRONMENT

3.2.1 Vegetative Communities

With the exception of the small hills on the north east side of the Refuge, most of the area is

Table 1: Swan Lake NWR Soil Types by Acreage

Soil Type	Acreage	Percent
Carlow silty clay, 0 to 2 percent slopes, rarely flooded	0	0.00%
Shannondale silt loam, 0 to 2 percent slopes	10	0.10%
Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded	10	0.10%
Gifford silty clay loam, 2 to 9 percent slopes, eroded, rarely flooded	35	0.30%
Grundy silt loam, 2 to 5 percent slopes	38	0.30%
Speed silt loam, 0 to 2 percent slopes, occasionally flooded	151	1.40%
Lagonda silt loam, 2 to 5 percent slopes, eroded	168	1.50%
Blackoar silt loam, 0 to 2 percent slopes, occasionally flooded	217	2.00%
Triplett silt loam, 0 to 2 percent slopes, rarely flooded	367	3.30%
Dockery silt loam, 0 to 2 percent slopes, frequently flooded	419	3.80%
Tice silt loam, 0 to 2 percent slopes, frequently flooded	440	4.00%
Tina silt loam, 0 to 2 percent slopes, rarely flooded	797	7.20%
Carlow silty clay, 0 to 2 percent slopes, occasionally flooded	1125	10.20%
Water	2782	28.50%
Tuskeego silty clay loam, 0 to 2 percent slopes, occasionally flooded	4110	37.30%
Totals	11,025	100.00%

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 and management practices carried out by refuge staff. Eight community types are delineated within the Refuge based on dominant species, elevation, and inundation.

Bottomland Forest-There are more than 3,100 acres of bottomland forest on the Refuge, with the largest contiguous block found along Yellow Creek. This cover type consists of bottomland closed-canopy hardwood forest generally occurring on wet soil and in floodplains. It is dominated by pin oak, silver maple, swamp white oak, and shagbark hickory with green ash, elm, black willow, river birch, and honey locust. The understory varies from open areas dominated with sedges and woodland forbs to denser areas with a shrub layer composed of Missouri gooseberry (*Ribes missouriense*), Western snowberry (*Symphoricarpos occidentalis*), and common prickly ash (*Zanthoxylum americanum*). These areas are subject to seasonal flooding.

Emergent Wetland-There is over 2,000 acres of emergent wetland habitat on the Refuge. Emergent wetlands, commonly referred to as marshes and sloughs, are characterized by erect, rooted water plants that are present for most of the growing season in most years. These wetlands normally contain standing water, though at times they will dry up. Common perennial plants found in emergent wetlands include cattail, bulrushes, arrowheads, and sedges. Presently more than 800 acres of this habitat are managed using moist soil practices in which water levels are manipulated to create optimum wetland habitat conditions for migratory birds.

Open Water-Silver Lake contains nearly all of the more than 2,100 acres of open water on the Refuge. This cover type is defined as having less than 4 percent visible vegetation, which is either floating or submerged.

Agricultural Fields-There is 1,365 acres of agricultural fields on the Refuge. These are cultivated areas that consist of a variety of grasses and forbs or row crops such as wheat, corn or annual/perennial mixtures mowed for hay. Some of these areas are subject to occasional flooding.

Native Prairie-The Refuge contains approximately 1,000 acres of native prairie. These areas were either rarely or never cultivated in the past. Flooding and surface water is often present during much of the year. Native prairie sites are grassy fields dominated by reed canary grass, sedges and native grasses with a small number of scattered shrubs and small trees.

Wet Meadow-Wet meadow habitat occurs on about 110 acres of the Refuge. It is a type of wetland that commonly occurs in poorly drained areas such as shallow lake basins, low-lying farmland, and the land between shallow marshes and upland areas. Wet meadows often resemble grasslands, but are typically drier than other marshes except during periods of seasonal high water. For most of the year wet meadows are without standing water, though the high water table allows the soil to remain saturated. A variety of water-loving grasses, sedges, rushes, and wetland wildflowers proliferate in the highly fertile soil of wet meadows.

Shrub Swamp-There are approximately 410 acres of shrub swamp habitat on the Refuge, most of which occurs along the perimeter of open water and emergent wetland habitats. Shrub swamp is dominated by deciduous woody vegetation less than 20 feet in height. Dominant species are mostly buttonbush (*Cephalanthus occidentalis*) and willow *Salix* spp. with an underlying mix of sedges and grasses and/or emergent vegetation, depending on water depth. The shrub layer varies from mostly open (25 percent) to closed (80 percent) and may contain scattered trees.

Old Fields-The 240 acres of old field habitat occurs on disturbed soils and is dominated by reed canary smooth brome, quackgrass and weedy herbaceous species. These areas are usually drier than those of wet meadow habitats and were once regularly cultivated for crops but now are left fallow. They are subject to occasional flooding.

3.2.2 Fish and Wildlife

Birds

A variety of birds are year-around residents of Swan Lake NWR, including many waterfowl. During the spring and fall migrations, there is a great diversity of migrants due to its location between two major migratory bird corridors, the Central Flyway and the Mississippi Flyway. It is not uncommon for the Refuge to host up to 100,000 ducks, comprised mostly of dabblers, during the fall migration. The Eastern Prairie Population (EPP) of Canada Geese used Swan Lake NWR as their main wintering grounds until the late 1980s. In recent years winter distribution of the EPP flock has shifted farther north, but thousands of geese still winter on the Refuge. Wintering waterfowl also attract Bald Eagles. The Refuge also provides habitat for thousands of migratory shorebirds and is designated as a regionally important site under the Western Hemisphere Shorebird Reserve Network. The shallow water wetlands and moist soil units on the Refuge provide critical habitat for many species of waterfowl, shorebirds, and marsh birds while the grasslands, forested wetlands, and farmland provide habitat for a variety of passerine birds.

Mammals

There are 46 mammals documented as occurring on the Refuge. The mammals include the federally listed endangered Indiana bat as well as the White-tailed deer, a species popular for hunting and wildlife viewing. Seven mammal species: plains pocket gopher, Franklin's ground squirrel, Eastern chipmunk, hispid cotton rat, Norway rat, Eastern spotted skunk, and gray fox are known to have occurred but have not been documented in recent years.

Amphibians and Reptiles

A variety of salamanders, toads, turtles, lizards, frogs, and snakes inhabit the Refuge including the western massasauga rattlesnake, listed as endangered in Missouri. Swan Lake NWR is one of only three sites left in the state of Missouri where the rattlesnakes are known to be present.

Fish and Other Aquatic Species

A 2007 fisheries survey of Silver Lake found 15 species including white crappie, freshwater drum, flathead catfish, and shortnose gar. Flood events affect the number and composition of the Silver Lake fishery each year. An earlier survey of Silver Lake, conducted in 1996, identified 16 fish species, but only 9 of the species were reported again in the 2007 survey. No fisheries surveys have been conducted on other Refuge waters. Eleven mussel species have also been documented within Refuge waters including the Flat Floater (*Anodonta suborbiculata*), a species listed as imperiled within Missouri.

Invertebrates

No comprehensive survey of invertebrates has been completed on the Refuge, but 20 species of butterflies and 24 species of dragonflies are documented as occurring on the Refuge.

3.2.3 Threatened & Endangered Species

A number of Species of Concern, within the state of Missouri, are documented within the Refuge including: Least Bittern, Sora, Common Moorhen, and Franklin's Ground Squirrel.

Presently, two species listed as federally endangered, interior Least Tern and Indiana bat, have been documented as occurring on the Refuge. The Interior Least Tern uses the Refuge as migratory stopover habitat and the Indiana bat uses the bottomland hardwoods of the Yellow Creek Research Natural Area as breeding habitat. The Refuge is also one of the few places where the eastern massasauga rattlesnake, a candidate for federal listing, is known to occur.

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*), Piping Plover (*Charadrius melodus*), and the Least Tern (*Sternula antillarum*).

The presence of a reproductively active female Indiana bat was documented on the Refuge in 2003. Several additional summertime sightings have been made of these bats roosting in dead and decaying trees in the bottomland forest around Yellow Creek. Mist netting surveys were conducted by the Columbia Ecological Services staff in July 2013 in which no Indiana Bats were observed. There are no documentations of Indiana Bats hibernating on the Refuge and it is highly unlikely they do.

The Interior Least Tern is an uncommon visitor to the Refuge during spring and early fall migration. It prefers habitats in or near wide and open river channels and nests in sandy or graveled beaches and sandbars with sparse vegetation. These types of habitats do not occur on Swan Lake NWR and Interior Least Terns have never been sighted on the Refuge during the open season dates for deer and goose hunting, including the conservation order light goose season.

A Section 7 Consultation was completed for this project with a “May Effect but Not Likely to Adversely Affect” determination.

3.3 SOCIOECONOMIC CONSIDERATIONS

A comparison of socioeconomic information for Chariton County and the state of Missouri is presented in Table 2 (2015: United States Census Bureau <http://quickfacts.census.gov/qfd/states/29/29041.html>).

Table 2: Socioeconomic Information for Chariton County and the State of Missouri

Measure, Date	Chariton County	Missouri
Population, 2014 estimate	7,694	6,063,589
Population, 2010 (April 1) estimates base	7,827	5,988,923
Population, percent change - April 1, 2010 to July 1, 2014	-1.7%	1.2%
Population, 2010	7,831	5,988,927
Persons under 5 years, percent, 2014	6.3%	6.2%
Persons under 18 years, percent, 2014	22.4%	23.0%
Persons 65 years and over, percent, 2014	22.5%	15.4%
Female persons, percent, 2014	50.3%	50.9%
White alone, percent, 2014 (a)	96.2%	83.5%
Black or African American alone, percent, 2014 (a)	2.3%	11.8%
American Indian and Alaska Native alone, percent, 2014 (a)	0.3%	0.5%
Asian alone, percent, 2014 (a)	0.2%	1.9%
Native Hawaiian and Other Pacific Islander alone, percent, 2014 (a)	0.0%	0.1%
Two or More Races, percent, 2014	0.9%	2.1%
Hispanic or Latino, percent, 2014 (b)	1.0%	4.0%
White alone, not Hispanic or Latino, percent, 2014	95.5%	80.1%
Housing units, 2014	4,141	2,735,742
Homeownership rate, 2009-2013	76.2%	68.4%
Housing units in multi-unit structures, percent, 2009-2013	7.4%	19.7%
Median value of owner-occupied housing units, 2009-2013	\$74,700	\$137,000
Households, 2009-2013	2,958	2,360,131
Persons per household, 2009-2013	2.53	2.47
Per capita money income in past 12 months (2013 dollars), 2009-2013	\$19,481	\$25,649
Median household income, 2009-2013	\$39,385	\$47,380
Persons below poverty level, percent, 2009-2013	16.5%	15.5%
<i>(a) Includes persons reporting only one race.</i>		
<i>(b) Hispanics may be of any race, so also are included in applicable race categories.</i>		

3.3.1 Cultural Resources/Environment

North-central Missouri contains archeological evidence for the earliest suspected human presence in the Americas, the Early Man cultural period prior to 12,000 B.C.; and extending through the Paleo-Indian, Archaic, Woodland, Mississippian, and historic Western cultures. Although a complete cultural survey of the Refuge has not been performed, earlier partial surveys have located 30 historical and archeological sites.

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. Silver Lake and surrounding areas are popular fishing sites.

4.0 ENVIRONMENTAL CONSEQUENCES ALTERNATIVES A, B (Preferred Alternative), and C

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 EA 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 nonfederal 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 following large floods, or in such a manner to meet its habitat objectives.

Alternative B--Proposed Action

It is anticipated that the Proposed Action will have direct effects upon the landscape of the project area. Specifically, 780 acres of agricultural ground (487 acres of wetlands and 293 acres of native grasslands) will be restored to wetlands and prairies through the construction and removal of a number of levees.

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 widening a spillway on the South Pool levee and adding a new water control structure between South Pool and MSU 15. One indirect result of this improved connectivity will be an enhanced ability for the Refuge to manage water levels in South Pool and MSU 15, as dictated by management considerations. Specifically, the refuge will have the ability to deal with high water events more rapidly, resulting in less prolonged flooding on the Refuge. 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 water and de-water areas in a more timely fashion during the fall and spring water manipulation periods in MSU 15 as a result of the new water control structure being installed.

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.

Alternative C—Restoration to Historic Conditions:

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.

There are two primary long-term, indirect impact of restoring historic conditions for water management. First, there would be increased connectivity with the Yellow Creek and Grand River watersheds. This would increase the rate at which water would flow out of the Refuge following a flood event, resulting in less prolonged flooding. Second, the ability of Refuge staff to manage the flow of water around the Refuge would be greatly reduced, as water management structures would be eliminated.

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/landforms/and geology will be the long inundations of flood water and lands located inside South Pool that far exceed what naturally occurs from large flood events. Additionally, soils will continue to be disturbed yearly by in order to continue to plant crops in the current agricultural units.

Alternative B—Proposed Action:

The primary direct impact to the soil resources of the project area will be associated with the construction of new levees in the project area and the widening of the South Pool spillway. This will include excavation of soil, at a depth of multiple feet, for the construction of levees and the widening of the spillway.. The long-term impacts of this alternative would be decreased length of flood inundation in South Pool, and decreased soil disturbance yearly in agricultural units that would now be moist soil habitat.

Alternative C—Restoration to Historic Conditions:

The primary direct impact to the soil resources of the project area will be associated with the removal of existing levees in Swan Lake NWR. Long-term impacts of this alternative would be left to nature as seasonal flooding would dictate changes to the landforms.

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 systems of buttonbush and cypress stands. Another immediate and long-term effect of no action would be the continued yearly tilling and planting of croplands that would continue to prevent the growth of any native species in these areas.

Alternative B—Proposed Action:

A direct impact would be associated with construction activities, and would largely be temporary in nature. Vegetation will return to the area once the new levees and widened spillway have been 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 more moist soil acreage and significantly improved water management capacity. The increased ability to manage water levels in the South Pool and MSU 15 wetland units, as well as the new 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. Additionally, by transitioning from croplands to moist soil units and

prairies, a greater diversity of native plants will be able to grow on the Refuge. All of these impacts would be considered indirect in nature.

Alternative C—Restoration of Historic Conditions:

A direct impact would be associated with construction activities, and would largely be temporary in nature for all disturbed vegetation. Vegetation will return to the area after disturbances have ceased, but the vegetation types will change drastically in cases where wetland management was promoting and discouraging specific types of plants. While some vegetative communities will benefit, vegetative communities associated with moist soil management will be harmed by the restoration of historic conditions.

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 more flood tolerable species. 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 and willow stand. 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. Since similar habitat is abundant on Swan Lake NWR more generally, 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.

Similarly, with the installation of the new wetlands, prairies, water control structure, and widened spillway it is expected that wildlife will benefit from the increased habitat diversity and ability of the staff to manage water at desirable levels. This will result in improved habitat conditions and a reduction in the stressful period associated with prolonged flooding.

The possible decline in wildlife numbers during construction 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 the expansion and enhancement of wetland and grassland habitats that are directly and indirectly facilitated by this alternative. 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 desired wetland 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 migration route). This ability to provide increased habitat for waterfowl is particularly important because it allows Swan Lake NWR to better achieve its institutional objectives, as defined by Executive Order 7563.

Alternative C—Restoration of Historic Conditions:

As a direct consequence of this action, small mammals, birds, and associated wildlife likely will be temporarily displaced during construction. Because restoring the Refuge to historic conditions would fundamentally alter the current landscape, it seems likely such animals would not quickly return. Additionally, because the restoration of historic conditions would eliminate the ability of Refuge staff to manage water levels, habitat for migrating waterfowl would be greatly reduced. Consequently, this alternative would likely indirectly lead to a drastic reduction in the amount of waterfowl utilizing the Refuge. Consequently, the ability of Swan Lake NWR to fulfill its mission as defined by Executive Order 7563 would be reduced.

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 and Northern Long-eared bats on the refuge at this time. The Piping Plover and Least Tern rarely utilize the Refuge therefore this alternative would have not impact upon these species.

Alternative B—Proposed Action:

It is anticipated that there would be a no adverse direct impact to threatened and endangered species as a result of this construction activities. The majority of the construction will take place on grounds currently under agricultural cultivation with minimal impact to habitat.

On the whole, the project is expected to have a negligible effect on the endangered Indiana and Northern Long-eared bat. With improved water management, the rate of tree die-off will be slowed to a more natural rate, providing a long-term source for roost trees. The Piping Plover and Least Tern rarely utilize the Refuge but when they do they tend to be found in the wetland habitats, therefore this alternative could potentially have a positive impact upon these species with the addition of wetland habitats.

Alternative C—Restoration to Historic Conditions:

This Alternative might potentially have long term impacts on Indiana and Northern Long-eared Bats as there would be more forest added to the refuge in the long term which could produce more roosting habitat for these species. This would be pretty negligible as most of this forested habitat would not be provide the proper class of forest to create snag trees for years and potentially decades and would not provide much more of this type of habitat than other areas on the Refuge already provide.

This Alternative would provide overall negative benefits to the Piping Plover and Least Tern and there would be a decrease of habitats utilized by these species on the Refuge. This impact would be negligible in the long term as these species rarely utilize the Refuge anyway.

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 new soil disturbance would occur. As such, there would be no potential to affect historic properties.

Alternative B—Proposed Action:

Under the Proposed Action, there would be no anticipated direct or indirect impacts to the cultural environment. Alternative B would remove some levees and restore cultivated fields. These are areas that have been already disturbed in the past. Therefore, these activities have no potential to affect historic properties.,

Alternative C—Restoration to Historic Conditions:

This Alternative would remove all levees and allow the area to go back to natural patterns. The levees are built from disturbed soil so their removal would have no potential to affect historic properties.

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 continue to impound water for longer periods of time inside the Swan Lake Levee, which keeps the refuge auto tour route closed for longer periods of time and the Township Road (Refuge Road) that is located off of the refuge closed for longer periods of time. 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 that creates viable wildlife viewing and hunting opportunities on and around the refuge.

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,

wildlife viewers, wildlife photographers, and other members of the public interested in the range of outdoor experiences offered by and around the Refuge. In particular, by increasing the amount of acreage under moist soil management and improving the acreage already in moist soil management waterfowl numbers are expected to increase in the future. This would indirectly support waterfowl hunting opportunities at Swan Lake and in the surrounding area.

A minor, negative direct effect would be that the area would be closed to the public during construction. Once the spillway is replaced it will close parts of the refuge auto tour route more frequently, but periodic closures are currently common during periods of flooding.

Overall then, while short-term visitations to the Refuge could decrease as a result of area closures, this alternative would likely result in a positive economic impact to the local area from increased visitation to the Refuge and surrounding locations 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 fewer repair costs for the Refuge and surrounding landowners following a flood event.

Alternative C—Restoration of Historic Conditions:

Under this alternative, there will be an expected decrease in recreational opportunities for fishermen, waterfowl hunters, wildlife viewers, wildlife photographers, and other members of the public interested in the range of outdoor activities currently available at Swan Lake NWR. In particular, opportunities to fish at the Refuge would be diminished, as Silver Lake would no longer hold a suitable amount of water to act as a fishing location. Further, with the decrease in the acreage of wetlands currently managed for moist soil units, it is reasonable to conclude that waterfowl numbers at Swan Lake would be decreased by this alternative. This would indirectly hamper waterfowl hunting opportunities at Swan Lake NWR and in the surrounding area. Moreover, wildlife viewing and photography opportunities involving waterfowl and marsh birds would also be diminished by the decrease in acreage being managed as moist soil habitat.

Another indirect effect of this alternative would be the improved for water to run off the Refuge following 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 indirectly result in fewer repair costs for the Refuge and surrounding landowners following a flood event.

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).

Table 3: Summary of Environmental Consequences by Alternative

Environmental Resource	Alternative A: No Action	Alternative B: Proposed Action	Alternative C: Restore Historic
Water Resources: Water management	Continuation of suboptimal management	Improvement over control of management	No control over management
Water Resources: Water quality	Continuation in trend of current conditions	Immediate minor negative effect of suspended soil in water	Same as Alternative B
Soils/Landforms/Geology	Minor disturbances in soil seasonally for agriculture, long term transformation from long inundations of flood water	Immediate change in landform from construction of new levees, decrease periods of flood inundation	Immediate change from removal of existing levees, seasonally flooding would dictate changes in landforms
Biological Resources: Vegetation	Continuation of transformation into less desirable vegetation	Short term minor loss of vegetation, long term positive growth of desirable vegetation	Short term disturbance of vegetation, long term decrease in wetland specific vegetation
Biological Resources: Wildlife and fish	Continuation of unfavorable habitat for all wildlife and weak floodplain connectivity	Short term, displacement of wildlife, long term favorable conditions for all wildlife and increased floodplain connectivity	Short term displacement of wildlife, long term unfavorable conditions for wildlife, increase in floodplain connectivity
Biological Resources: Special status species	Short term benefits for bat habitat, overall long term decrease in bat habitat	Long term positive effect to bat habitat	Same as Alternative B
Cultural and Historic Resources	No Potential to Affect	No Potential to Affect	No Potential to Affect
Economic/Public Use/Recreation	Long term minor closures of auto tour route	Long term increase of recreational opportunities	Long term decrease of recreation opportunities

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 as well as the land management on private lands surrounding the refuge. Further, this alternative would not address the Refuge's and surrounding communities' concerns and abilities associated with water removal during large 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. 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 two of its major wetland management units (Swan Lake and South Pool). 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 on public and private property. 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.

Alternative C--Restoration of Historic Conditions

This alternative would affect the ability of Refuge staff to manage water on the Refuge. The loss of wetland habitat management on the Refuge would result in fewer use days of migratory birds, especially those wetland species that depend upon wetland resources being available during critical migration periods. Water bird use at Swan Lake NWR contributes to goals and objectives of various state, regional, and flyway management plans for waterbirds. Currently

Swan Lake NWR averages between 3 and 6 million Waterbird Use Days annually by providing intensively managed wetlands. By losing the ability to manage water impoundments on Swan Lake NWR the Refuge would not be able to provide habitats for these waterbirds that utilize them along their spring and fall migration routes.

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

6.1 AGENCIES AND INDIVIDUALS CONSULTED FOR THE PREPARATION OF THIS DOCUMENT

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6.2 DOCUMENT PREPARATION

Document prepared by U.S. Fish and Wildlife Service's Swan Lake National Wildlife Refuge staff, Sumner, MO.

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7.0 PUBLIC COMMENTS

The Service solicited public comments for the Draft Environmental Assessment Spillway Improvement and Replacement Project on Swan Lake NWR. A 30-day comment period began on February 18, 2016 and ends on March 18, 2016. Copies of the document were posted on the Refuge website and were available at the Chillicothe Public Library, Brunswick Public Library, Carrolton Public Library, Brookfield Public Library, and the Swan Lake NWR Visitor Center. A link to the document was also placed on the Swan Lake NWR Facebook page. News releases, website and social media were used to notify the public of this event. A letter was sent to the Chariton County Commission on February 18, 2016.

Upon closing of public comment period comments will be listed and addressed on final Environmental Assessment.