

U.S. Fish & Wildlife Service

**Environmental Assessment of the Habitat  
Management Plan  
For  
Cypress Creek National Wildlife Refuge  
Ullin, Illinois**

U.S. Fish & Wildlife Service  
7/24/2012

**Abstract:** This Environmental Assessment addresses the implementation of the Habitat Management Plan for Cypress Creek National Wildlife Refuge (Refuge). Once approved for implementation, the Habitat Management Plan will guide management of Refuge habitat for the next 15 years. The Refuge is located in southern Illinois in Alexander, Johnson, Pulaski and Union counties. Goals and objectives in the Habitat Management Plan follow guidance set forth in the Refuge Comprehensive Management Plan (USFWS, 1991), however, some changes are being proposed in the way agricultural lands are being managed on the Refuge. This environmental assessment evaluates 4 possible alternatives for habitat management of existing agricultural lands as well as any agricultural lands that may be acquired in the future: Alternative A: Maintain farming on approximately ten percent of Refuge land (No Action). Alternative B: Eliminate farming on Refuge land, with active restoration. Alternative C: Eliminate farming on Refuge land, with passive restoration. Alternative D: Maintain farming on approximately 200 acres on the Bellrose Waterfowl Reserve (Preferred alternative).

Alternative (D) is the preferred alternative based on the Refuge's goal to provide food for migrating/wintering waterfowl within a historically important migration corridor. Farming assists in achieving the habitat management goals and objectives of the Refuge in three ways. First, in managed moist soil habitat, the use of agriculture provides an effective means of controlling undesirable woody or perennial noxious weeds that invade these areas; this type of renovation within the moist soil units is usually implemented on a 3-4 year rotation. Second, while farming provides a means to renovate moist soil impoundments, at the same time agricultural crops provide high energy foods for waterfowl as well as upland species such as deer, turkey, and quail. And third, areas slated for reforestation are maintained by annually planting crops in order to prevent the invasion of exotic or undesirable species (fescue, multiflora rose, sericia lespedeza, autumn olive, Japanese honey suckle, etc.) until restoration with native hardwoods is possible.

At Refuge establishment, agricultural lands within the Refuge acquisition boundary totaled 22,026 acres. To date, the Refuge includes approximately 16,000 acres, of which, 7934 acres (approximately 50%) were originally in agriculture (corn, beans, milo). Many of these tracts (approximately 6,364 acres) included highly erodible lands or floodplain fields which were taken out of production and restored to forest, wetland, or moist soil wetlands. Currently, approximately 1000 acres of the Refuge is in row crop for the above mentioned reasons. This is consistent with the Refuge EA (1990), which states "approximately 10% of the most suitable and productive upland areas within Refuge ownership, could remain in agriculture to support Refuge habitat management goals". Until restoration can take place, agriculture through the cooperative farming has been used as an important tool to enhance and maintain wildlife habitat.

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# **CHAPTER 1. PURPOSE AND NEED FOR ACTION**

## **1.1 Introduction**

This environmental assessment reviews and evaluates the alternatives and environmental effects of implementing a Habitat Management Plan on Cypress Creek National Wildlife Refuge (Refuge). The Habitat Management Plan proposes changes to how farming practices are currently used on the Refuge as a habitat management tool to support establishing purposes of Cypress Creek National Wildlife Refuge as well as the Refuge System's mission.

Refuge System lands are managed consistent with a number of federal statutes, regulations, policies, and other guidance. The National Wildlife Refuge System Administration Act of 1966, as amended, (NWRS Administration Act, 16 U.S.C. 668dd-668ee) is the core statute guiding management of the National Wildlife Refuge System. The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) made important amendments to the NWRS Administration Act, and created comprehensive legislation spelling out how the Refuge System would be managed and how it could be used by the public. All of the alternatives evaluated in this EA are consistent with the Improvement Act:

- Wildlife conservation comes first on national wildlife refuges.
- The Service will adhere to biological integrity, diversity and environmental health of the Refuge System.
- Compatibility determinations will guide uses of Refuge System lands.
- Six wildlife-dependent recreational uses are priority public uses of the Refuge System: hunting, fishing, wildlife observation and photography, environmental education and interpretation.
- A comprehensive conservation plan will be prepared for every refuge and wetland management district.

Comprehensive conservation planning and the associated step down plans such as the Cypress Creek National Wildlife Refuge Habitat Management Plan has required field stations to assess their current farming program and establish objectives for the future.

This assessment will be used by the U.S. Fish and Wildlife Service (Service) to encourage public involvement in the Refuge planning process and to determine whether the implementation of a Habitat Management Plan would have significant environmental consequences. This environmental assessment is part of the Service's decision-making process in accordance with the National Environmental Policy Act.

## **1.2 Proposed Action**

The Service proposes to implement a Habitat Management Plan that would change the way the existing agricultural lands on the Refuge are managed.

### **1.3 Purpose**

The purpose of this Environmental Assessment is to review and evaluate current and alternative actions that use farming as a habitat management tool to support establishing purposes of Cypress Creek National Wildlife Refuge as well as the Refuge System's mission, and to then select an alternative. Each alternative is evaluated based on the environmental consequences, including physical, biological and socioeconomic impacts, in accordance with the National Environmental Policy Act. Alternatives are also evaluated based on how effectively they support the purposes for which Refuge System lands were established and the mission of the Refuge

### **1.4 Need**

At Refuge establishment, farmed, or agricultural (land on which row crops such as corn, beans, wheat, or milo are grown) land within the Refuge acquisition boundary totaled 22,026 acres. To date, the Refuge includes approximately 16,000 acres. Of the 16,000 acres currently in ownership, 7934 acres (approximately 50%) were originally agricultural. Approximately 80% of the purchased agricultural land included highly erodible lands or floodplain fields which were taken out of agricultural production and restored to forest, wetland, or moist soil wetlands. Currently, 919 acres of the Refuge is farmed (this acreage will change as agricultural land is acquired).

The impetus for this change is that the Refuge needs to ensure that it is managing consistent with Service Policy which precludes the maintenance of non-native plant communities unless it is essential to meeting Refuge Purposes (U. S. Fish and Wildlife Service 2001). Farming is a management tool that helps the Refuge reach long-term habitat goals of restoring land to native forests and providing food for migrating and wintering migratory waterfowl. Service policy calls for maintaining or restoring refuge habitats to historic conditions if doing so does not conflict with refuge purposes

### **1.5 Decisions That Need To Be Made**

This Environmental Assessment is prepared to evaluate the environmental consequences of restoring these agricultural tracts to forest, wetland, or moist soil wetlands. Three alternatives are presented in this document:

**Alternative A:** Maintain farming on approximately ten percent of Refuge land. (No Action).

**Alternative B:** Eliminate farming on Refuge land, with active restoration.

**Alternative C:** Eliminate farming on Refuge land with passive restoration.

**Alternative D:** Maintain farming on approximately 200 acres of land on the Bellrose Waterfowl Reserve, with active restoration of the remainder of existing Refuge farm land. (Preferred Alternative)

The U.S. Fish and Wildlife Service's (Service) Regional Director, is the official responsible for determining the action to be taken in the proposal by choosing an alternative. This individual will also determine whether this Environmental Assessment (EA) is adequate to support a Finding of No Significant Impact (FONSI) decision, or whether the preparation of an Environmental Impact Statement (EIS) is needed.

## **1.6 Background**

Farming assists in achieving the habitat management goals and objectives of the Refuge in three ways. First, in managed moist soil habitat, the use of agriculture provides an effective means of controlling undesirable woody or perennial noxious weeds that invade these areas; this type of renovation within the moist soil units is usually implemented on a 3-4 year rotation. Second, while farming provides a means to renovate moist soil impoundments, at the same time agricultural crops provide high energy foods for waterfowl as well as upland species such as deer, turkey, and quail. And third, areas slated for reforestation are maintained by annually planting crops in order to prevent the invasion of exotic or undesirable species (fescue, multiflora rose, sericia lespedeza, autumn olive, Japanese honey suckle, etc.) until restoration with native hardwoods is possible.

The majority of the existing agricultural land on the Refuge exists to control invasive noxious weeds and prepare land for future habitat restoration. An additional 213 acres, at the Bellrose Waterfowl Reserve, is used to enhance moist soil production and provides food resources for migratory and wintering waterfowl. This is consistent with the Refuge EA (1990), which states "approximately 10% of the most suitable and productive upland areas (within Refuge ownership) could remain in agriculture to support Refuge habitat management goals".

Approximately 50% of the land acquired by CCNWR includes a history of agricultural production; many of these acres include highly erodible lands. Since Refuge establishment, many of these Highly Erodible Lands that were farmed have been removed from production and restored to forest or wetlands. Currently, the CCNWR Cooperative farm program includes approximately 900 acres and 8 cooperative farmers.

## **CHAPTER 2: PROPOSED ACTION AND ALTERNATIVES**

### **2.1 Alternatives not Considered for Analysis**

No alternative was eliminated from analysis

## **2.2 Alternatives Carried Forward for Analysis**

**2.2.1 Alternative A (No Action)** Maintain farming on approximately ten percent of Refuge land. Under Alternative A, Farming would continue to be used for multiple objectives, including but not limited to the following: habitat management, supplemental food for wildlife, attracting wildlife for viewing and photography. Currently, the farming program on the Refuge involves a third party, or “cooperator,” who farms under the terms and conditions of a cooperative farming agreement. The terms and conditions typically include a provision for leaving some percentage of the crops in the field as food for wildlife, primarily migrating birds. The farming activities have been found to be compatible through a compatibility determination. Refuge staff work with farming cooperators to use best management farming practices to improve soils, reduce pest issues, lessen impacts to wildlife, and to prevent sediment, chemical and nutrient runoff. These practices include crop rotation, cover crops, no-till planting, and use of herbicides with low environmental impact. Crop type is determined by the Refuge manager and is based on wildlife needs, soil types, integrated pest management, and economic viability. The most commonly planted crops are corn, soybeans, and winter wheat. Farming would continue to be allowed using either conventional farming techniques or no-till (conservation) farming. Mechanical equipment such as tractors, plows, disks, harrows, and seeders would typically be used on a parcel several days each year. Farming activities could include: soil preparation, planting, nutrient management, pest management, and harvesting. Conditions outlined in the Service’s Special Use Permit would be followed.

**2.2.2 Alternative B:** Eliminate farming on Refuge land with active restoration. All land that is currently being farmed would be actively restored to either forest or wetland. Approximately 100 acres will be restored each year, following the timeline presented below. Until restoration can take place, agriculture through the cooperative farming program will be used as an important tool to enhance and maintain wildlife habitat.

**Table 1. Tentative timeline for restoration of agricultural fields on Cypress Creek National Wildlife Refuge**

<b>Year</b>	<b>Tract Number</b>	<b>Acres</b>	<b>Total Acres per year</b>
<b>2012</b>	113, 13,	84, 7	91
<b>2013</b>	91A, 93, 29	52, 23, 40	115
<b>2014</b>	36, 79	36, 79	115
<b>2015</b>	13 A, 55	31, 87	118
<b>2016</b>	274, 10b, 170a	61, 41, 43	145
<b>2017</b>	170a. 135	43, 72	115
<b>2018</b>	255, 274	91, 58	149
<b>2019</b>	274	80, 22, 30, 23	155
<b>2020</b>	255a, 274	23,16, 55,18, 29	141
<b>2021</b>	274	52,23,61	136

Restoration of cropland to bottomland forest will increase forest connectivity and acreage of interior forest. Eliminating all farmland will further protect and maintain larger corridors of contiguous bottomland forest with linkages between upland and bottomland habitat.

**2.2.3 Alternative C** Eliminate all farming on Refuge land with passive restoration. All farming practices would be discontinued immediately and natural succession would be allowed to take place.

**2.2.4 Alternative D: (Preferred Action)** Under this alternative, all land with the exception of 200 acres within the Bellrose Waterfowl Reserve would be restored to either forest or wetland. As in Alternative B, restoration of cropland to forest will increase forest connectivity and acreage of interior forest. Restoring forest and wetlands will further protect and maintain large corridors of contiguous bottomland forest with linkages between upland and bottomland habitat.

Farming would continue on approximately 200 acres of land within the Bellrose Waterfowl Reserve under Alternative C. Farming would continue to be used for habitat management and to provide supplemental food for wildlife. Refuge staff would work

with farming cooperators to use best management farming practices to improve soils, reduce pest issues, lessen impacts to wildlife, and to prevent sediment, chemical and nutrient runoff. These practices include crop rotation, cover crops, no-till planting, and use of herbicides with low environmental impact. Crop type would be determined cooperatively by the Refuge staff and is based on wildlife needs. The most commonly planted crops would be corn, milo, and winter wheat. Farming would continue to be allowed using either conventional farming techniques or no-till (conservation) farming. Mechanical equipment such as tractors, plows, disks, harrows, and seeders would typically be used on a parcel several days each year. Farming activities could include: soil preparation, planting, nutrient management, pest management, and harvesting. Conditions outlined in the Service's cooperative agreement would be followed.

## **CHAPTER 3. AFFECTED ENVIRONMENT**

The affected environment, including vegetation, fish, and wildlife resources, and cultural resources is described in detail in Chapters 2 and 3 of the Habitat Management Plan.

### **3.1 Physical Characteristics**

Cypress Creek National Wildlife Refuge was established on June 26, 1990 under the Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901 b, 100Stat.3583, PL 99-645). The Refuge is located in southern Illinois approximately 7 miles north of the confluence of the Ohio and Mississippi Rivers. It is situated along forty miles of the Cache River and its tributaries in Alexander, Johnson, Pulaski and Union counties. The Refuge is also part of a larger boundary delineated by the Cache River Wetlands Joint Venture Project; this includes 60,000 acres shared by the Refuge, Illinois Department of Natural Resources (at Cache River State Natural Area and Horseshoe Lake Fish & Wildlife Area), and The Nature Conservancy.

### **3.2 Biological Environment & Habitat/Vegetation**

Despite changes that have occurred over the years, the Refuge provides valuable habitat for migratory birds as well as numerous species of resident mammals, birds, reptiles, amphibians, and fish. Because of significant natural values and the potential for wetlands restoration, the Refuge was identified as a high priority for acquisition under the New Madrid Wetlands Project – a component of the Lower Mississippi Valley Joint Venture of the NAWMP. In 1994 the area, along with the Cache River State Natural Area was designated a "Wetland of International Importance" by the Ramsar Convention (1994) and an "Important Bird Area" by Audubon. The area also features a number of ecologically sensitive species and includes eight federally listed and 102 state listed threatened and endangered species. Broad habitat types within CCNWR include: wetlands, bottomland forests, and upland forests.

The Refuge is located in the Lower Cache River watershed, and is comprised of four overlapping physiographic regions; the Upper East Gulf Coastal Plains, Ozarks, Mississippi River Alluvial Plain, and the Interior Low Plateau, contains unique plant and animal species influenced and molded by the habitat and environmental conditions within

the specific region. When these regions overlap, species from each region can be found together. These conditions create an area of unusual species abundance and diversity.

The Cache River area is composed primarily of wetlands, bottomland forest, upland forest, and agricultural lands. Five general categories of wetlands occur on CCNWR area: 1) swamp; 2) shrub swamp; 3) open water; 4) wet floodplain forest; and 5) successional fields (wet farmland). The swamp and shrub swamp areas are dominated by cypress and tupelo trees with varying amounts of buttonbush scrub thicket. Water in these areas stands at a depth of approximately two feet when full. The bottomland hardwood forest (wet floodplain forest) represents the transition zone between permanent water areas and uplands. Soils range from areas that are saturated throughout most of the growing season to sites where soil saturation may last a week or month out of the growing season. In this area, the cypress and tupelo become increasingly less frequent while sweet gum, swamp cottonwood, oak, elm, ash, sugarberry, hickory, and maple become more common.

### **3.2.2 Listed, Proposed, and Candidate Species**

Cypress Creek follows recovery plan guidelines for the management of the following federally threatened and endangered species.

**Indiana Bat (*Myotis sodalis*)** forage on flying insects typically along the shorelines of rivers and lakes, in the canopy of trees in floodplains, and in upland forests. In summer, habitat consists of wooded or semi-wooded areas, mainly along streams. Females bear their offspring in hollow trees or under loose bark of living or dead trees. Trees standing in sunny openings are attractive because of warmer air spaces and crevices under the bark. Maternity sites have been reported in riparian areas, floodplain forests, and upland habitats. Limestone caves with pools are preferred for hibernacula during winter.

The Refuge is used by two, large maternity colonies of the Indiana bat. The forested wetlands also provide high quality foraging habitat for the bats. Additionally, the area is located within 5-miles of the large Indiana bat winter hibernacula at Magazine Mine. Forested areas, in particular forested wetlands provide foraging and roosting habitat for both male and female Indiana bats during the critical fall swarming period (personal communication USFWS).

**Gray Bat (*Myotis grisecens*)** occurs in several Illinois and Missouri counties where it inhabits caves both during summer and winter. This species forages over rivers and reservoirs adjacent to bottomland forested tracts.

There are no caves on the Refuge at the present time, though this may change with subsequent acquisitions.

**Interior Least Tern (*Sterna antillarum*)** historic breeding range includes the Mississippi River system (USFWS 1990). Surveys of the Mississippi River have found the majority of breeding colonies occur south of Cairo, IL. However, breeding birds have been found in Scott and Mississippi counties. The characteristics required for suitable breeding grounds include “bare alluvial islands or sandbars”, food, and appropriate water regime.

Least terns arrive at breeding grounds in late April and the breeding season is complete by early September (USFWS 1990).

**Pallid Sturgeon (*Scaphirhynchus albus*)** are found in the Mississippi River downstream of its confluence with the Missouri River. Pallid Sturgeon forage for fish along the bottom of large rivers. Pallid Sturgeon are most frequently caught over a sand bottom, which is the predominant bottom substrate within the species' range on the Mississippi River. Recent tag returns have shown that the species may be using a range of habitats in off-channel areas and tributaries of the Mississippi River.

### **3.2.3 Other Wildlife Species**

The Refuge and associated Cache River wetlands are known for diversity and outstanding wildlife values. Waterfowl, shorebirds, wading birds, raptors, songbirds, reptiles, amphibians, furbearers and other mammals use the area (Illinois Department of Natural Resources, 2005).

**Birds** - Nearly 250 species of resident and migratory bird species use CCNWR throughout the year. Migrational counts number in the thousands and include ducks, geese, shorebirds, wading birds, and countless other avian species. Wide arrays of other avian species use the Refuge due to the diversity of habitats. The Bald Eagle is a fairly common migrant and winter resident along the Ohio, Mississippi and Cache Rivers, and 3 pairs of birds are currently nesting on the Refuge. State listed endangered species which often use the Refuge include Northern Harrier, Little Blue Heron, and Barn Owls.

**Mammals** –Cypress Creek Refuge includes 47 species of mammals. A few of the resident species include white-tailed deer, squirrel, raccoon, swamp rabbits, bobcat, and river otter.

**Reptiles and amphibians** – The Refuge and the surrounding wetland includes 54 species of reptiles and amphibians. Of the 20 species of frogs and toads in the state, 18 have been recorded in the watershed.

### **3.3 Land Use**

Agriculture has played a significant role in the Cache River watershed. The predominant land use in the basin is agriculture with more than 70% of the watershed (345,000 acres) in production. The small remnants of vast wetlands in the basin only make up about 4% of the watershed (20,000 acres).

### **3.4 Cultural Resources**

There are no known cultural resources on any of the agricultural tracts on the Refuge (Kullen, 1996).

### **3.5 Local Socio-economic Conditions**

The 919 acres currently farmed on the Refuge is a minimal part of the agricultural land within the watershed. Agriculture has played a significant role in the Cache River watershed. The predominant land use in the basin is agriculture with more than 70% of the watershed (345,000 acres) in production. The small remnants of wetlands in the basin only make up about 4% of the watershed (20,000 acres).

The Refuge and associated Cache River Watershed in southern Illinois is a major attraction for hunters and outdoor enthusiasts. Recreational opportunities throughout the Refuge provide benefits to the local economy through the sale of food, gas, supplies or lodging. According to research on economic effects, recreation on the Refuge resulted in significant expenditures for both travel-related goods and services and activity related equipment purchases (Caudill, 2003).

## **Chapter 4. ENVIRONMENTAL CONSEQUENCES**

Chapter 4 discusses and analyzes the environmental impacts expected to occur from the implementation of Alternatives A, B and C as described in Chapter 2. Direct, indirect, and cumulative impacts are described where applicable for each alternative. Alternative A (no action) is the continuation of maintaining 10% of Refuge lands in agricultural crops and serves as the baseline against which Alternatives B, and C are compared.

<b>Table 2. Comparison of Impacts by Issue</b>				
<b>Issues</b>	<b>Alternative A</b> Maintain farming on approximately ten percent of Refuge land. (No Action).	<b>Alternative B</b> Eliminate farming on Refuge land. Active Restoration	<b>Alternative C</b> Eliminate farming on Refuge land. Passive Restoration	<b>Alternative D</b> Maintain farming on approximately 200 acres on the Bellrose Waterfowl Reserve. (Preferred Alternative)
Physical Environment	Limited negative effects due to soil disturbance, herbicide and fertilizer use. Not consistent with USFWS Policy.	Positive effects due to reduction of sedimentation and erosion. Consistent with USFWS Policy.	Positive effects due to reduction of sedimentation and erosion. Consistent with USFWS Policy.	Positive effects due to reduction of sedimentation and erosion and supplemental food for wildlife. Consistent with USFWS Policy.
Biological Resources	Negative effects to native vegetation and wildlife. Not entirely consistent with USFWS Policy.	Positive effect to native vegetation and wildlife. Consistent with USFWS Policy.	Positive effect to native vegetation and wildlife. Consistent with USFWS Policy.	Positive effect to native vegetation and wildlife. Consistent with USFWS Policy.
Social and Economic	Positive effect on agricultural community but negative effect on recreational community	Negative effect on agricultural community, Positive effect on recreational community	Negative effect on agricultural community, Positive effect on recreational community	Negative effect on agricultural community. Positive effect on recreational community

#### **4.1 Direct and Indirect Impacts to the Physical Environment**

**4.1.1 Alternative A (no action):** Under this alternative, farming would be maintained on approximately 10% of the Refuge. This would result in limited negative effects due to soil disturbance and continued use of herbicide and fertilizers. The existing drainage ditches, associated with these farmed areas, increase sediment loads and run-off into

tributary streams such as Cypress Creek and Big Creek as well the Cache River. Adherence to the conditions outlined in the Service's cooperative farming agreement, which outline the best management practices designed to protect soil and water, and to manage pest and nutrients will keep many of these disturbances to a minimum. Erosion and sedimentation from agricultural lands cause the majority of the water quality problems in the Cache River, especially during periods of moderate to high flows (IDNR 1997). This alternative is not as compatible with USFWS Policy such as the National Wildlife Refuge System Improvement Act of 1997, as either of the other two alternatives.

**4.1.2. Alternative B:** Converting Refuge cropland to forest and wetland would result in positive effects to the water and soil. Reduction of cropland and increased restoration of forests and wetlands coupled with the blocking of drainage ditches associated with these fields will help reduce erosion and sedimentation as well as fertilizer and herbicide use in the Cache River Watershed. This alternative is more compatible with USFWS Policy such as the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) which spells out how the Refuges should be managed and how they could be used by the public.

**4.1.3. Alternative C:** Converting Refuge cropland to forest and wetland would result in positive effects to the water and soil. Reduction of cropland and increased restoration of forests and wetlands will help reduce erosion and sedimentation as well as fertilizer and herbicide use in the Cache River Watershed. This alternative is more compatible with USFWS Policy such as the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) which spells out how the Refuges should be managed and how they could be used by the public.

**4.1.4. Alternative D: (preferred alternative):** Similar positive effects to Alternative B would occur with this alternative. Some level of herbicide, and fertilizer use would still occur on approximately 200 acres left for farming; however, the most highly erodible lands will be removed from the farming program. The increased restoration of forests and wetlands coupled with the blocking of drainage ditches associated with the restored fields and reductions in fertilizer, herbicide, and pesticide use in the Cache River Watershed will help reduce local sediment loads into the Cache River, and its associated tributaries. This will in turn result in these particular sites being wetter and more productive. This alternative is more compatible with USFWS Policy such as the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) which spells out how the Refuges should be managed and how they could be used by the public.

## **4.2. Direct and Indirect Impacts to the Biological Resources**

### **4.2.1. Vegetation Impacts**

**Alternative A:** Under this alternative, farming would be maintained on approximately 10% of the Refuge. Farming has a great impact on biodiversity and impacts ecosystems by replacing natural habitats with vegetation that is nearly monotypic. These practices result in a negative effect to the native vegetation not only within the farmed areas but in the forested areas and wetlands adjacent to these areas. The extensive ditching practices related to farming has resulted in these sites being “drier” now than historically, which is less compatible with USFWS Policy such as the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) which spells out how the Refuges should be managed and how they could be used by the public.

### **4.2.2. Alternative B:**

This alternative would have positive effects on vegetation because it would a) restore more acres of native forest in order to increase forest connectivity and acreage of interior forest. (interior forest is any forest greater than 500 meters from cropland, pasture, grassland, urban, and suburban areas) b) protect and maintain large corridors of contiguous forest with linkages between upland and bottomland habitat in order to sustain and promote viable populations of forest interior birds and other wildlife species such as the copperbelly water snake. c) Provide wetland and forest complexes at desired spatial scales, and d) further forest habitat management objectives on the Refuge by managing for a healthy and diverse forest with complex vertical structure and species diversity, and conserving examples of rare and declining natural systems.

This alternative would result in greater protection of priority species and important habitats leading to increased conservation and ability to maintain healthy, functioning bottomland forest communities associated with the Cache River and its tributaries. This alternative is more compatible with USFWS Policy such as the National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57) which spells out how the Refuges should be managed and how they could be used by the public.

**4.2.3 Alternative C** Effects from the implementation of Alternative C would be the similar to the positive effects for alternative B. (see 4.2.2 above). In a fragmented landscape such as the Refuge, however, lack of a seed source or large distances to seed sources can reduce the rate of forest recovery and result in a landscape dominated by low diversity and early successional vegetation ( Hodges 1997, McClanahan and Wolfe 1993).

**4.2.4. Alternative D (Preferred Alternative):** Effects from the implementation of Alternative D would be the similar to the positive effects for alternative B. (see 4.2.2 above)

### **4.3. Wildlife Impacts**

**4.3.1. Alternative A:** While some species in the Midwest have readily adapted to the large scale conversion of native habitats to cultivated farmland, most wildlife species have been negatively impacted by farming. Farming has a great impact on biodiversity and impacts ecosystems by replacing natural habitats with vegetation that is nearly monotypic, decreasing primary production, and using pesticides and fertilizers on a scale that influences ecosystem functioning, and directly affect plants and animals (Firbank et al. 2008, Tilman et al. 2001). The Service has long recognized the importance of natural habitat to wildlife. Approximately half of the Refuge System lands in the Midwest were being farmed before they became part of the Refuge System. Currently, however, only 1.6 percent of Refuge System lands are farmed (USFWS 2011). Croplands do provide food for migrating waterfowl, especially for geese. Most of the year, however, croplands are of limited value to wildlife.

**4.3.2 Alternative B:** This alternative would result in greater protection of priority species and important habitats leading to increased wildlife habitat. Effective restoration and management of all forests on CCNWR will provide important habitat for migrating birds, as well as amphibians, reptiles, fish and other wildlife. The existing bottomland hardwood forests on CCNWR provide important habitat for several high priority species of migrating waterfowl and nesting forest birds, in addition to serving as potential roosting areas for the federally endangered Indiana Bat and the state endangered Rafinesque's big-eared bat. It is important to maintain a system of forested wetlands that will continue to provide habitat for species of various life stages such as hibernation, reproduction, and migration.

Forest song birds have been negatively affected by forest fragmentation, resulting in reduced populations and lower reproductive success. In addition, forest bird species richness has been positively correlated with forest patch size (Hoover et. al. 1995). In small patches, forest birds are subjected to: (1) more competition with other species (2) increased parasitism from brown-headed cowbirds ( Robinson and Wilcove 1994, Hoover et. al. 1995), (3) increased likelihood of predation (Andrén and Angelstam 1988; Marzluff and Restani, 1999), (4) greater disturbance from human activities (Knight and Gutzwiller, 1995), and (5) increased isolation and inhibition of dispersal (Doak et al. 1992).

In addition reptile and amphibian species such as the state-threatened copperbelly water snake congregate in shallowly flooded bottomland forest during the breeding season (March-June) and then require a matrix of wooded or vegetated corridors in order to migrate to other wetlands as seasonal wetlands become dry. Providing wetland and forest complexes at desirable spatial scales is important for the conservation of these species (Petranka et al., 2006).

**4.3.3. Alternative C:** : Effects from the implementation of Alternative C may be similar to as those of Alternative B, which would result in moderate positive effects (see 4.3.2 above). In areas where a seed source was available to naturally regenerate the forest,

the short term positive effects of Alternative C may be higher as all farm land would be converted to a natural state immediately as opposed to restoration taking place over a period of years. During that time period of farming an area until the funding can be allocated for active restoration (such as under Alternative B), significant opportunities will be missed to provide habitat for Neotropical migratory birds (Twedt and Portwood 1997) and other wildlife (Wesley et al. 1981).

**4.3.4. Alternative D:** Effects from the implementation of Alternative D would be the similar to as those of Alternative B, which would result in moderate positive effects (see 4.3.2 above). In addition to those positive effects listed above, this alternative will supplement the natural food resources available to migrating waterfowl as part of the Refuge's waterfowl management program. Cultivated grains are often used in waterfowl management because agricultural seeds tend to have greater energy than many natural seeds (Kaminski et al. 2003) and agricultural crops have higher yield per unit area than natural wetland plants. Some waterfowl biologists recommend providing unharvested grain fields and natural wetlands for migrating and wintering waterfowl because seed resources are low in harvested agricultural fields. The Bellrose Waterfowl Reserve was established to support populations of waterfowl or migratory birds. Providing food for large populations of waterfowl is often accomplished by managing natural wetlands, moist soil impoundments, and cultivated grains.

#### **4.4. Social and Economic Impacts**

**4.4.1 Alternative A (no action):** Under this alternative, there would be not be any negative effect on the cooperative farmers, or social perceptions by the local farming community because no farming opportunities would be lost under this alternative.

There would be less opportunities for recreational use of the Refuge such as hiking and photography under this alternative as well as an increased chance that there may be negative social perceptions on the part of various recreational and wildlife groups who may question the use of farming practices on the Refuge and how they fit into the mission of the Service.

**4.4.2 Alternative B:** Under this alternative more opportunities for recreational activities would be available with restoration focused on forest and wetlands. Increased recreational areas might result in more people visiting the Refuge and greater public understanding of the bottomland forest ecosystem and the mission of the National Wildlife Refuge System.

This alternative may in turn have negative social effects on the local farming community's perception of the Service because the Refuge establishment Environmental Assessment states that up to 10% of Refuge Land could remain in agriculture. This expectation by the local community may remain and therefore cause negative reactions to this alternative.

This alternative will have direct and indirect impacts on cooperative farmers because all cooperative farmers would lose farming opportunities under this alternative.

This alternative would have direct and indirect negative economic impact on the Refuge as it will cost close to \$ 500,000 (approximately \$ 500/acre) over the next 10 years to actively restore the existing agricultural lands on the Refuge.

**4.4.4 Alternative C: This alternative would have similar impact to Alternative B (see 4.4.3 above).**

This alternative would have direct and indirect positive economic impact on the Refuge as it would cost close to \$ 500,000 (approximately \$ 500/acre) over the next 10 years to actively restore the existing agricultural lands on the Refuge.

**4.4.4 Alternative D (preferred alternative):** Under this alternative, all but 200 acres of farm lands are converted to natural habitats over the next 15 years. Under this alternative more opportunities for recreational activities would be available with restoration focused on forest and wetlands. Increased recreational areas might result in more people visiting the Refuge and greater public understanding of the bottomland forest ecosystem and the mission of the National Wildlife Refuge System.

This alternative has more direct, negative economic impacts on cooperative farmers because most farmers would lose farming opportunities under this alternative.

## **4.5. Environmental Justice**

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Clinton on February 11, 1994. Its purpose was to focus the attention of federal agencies on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities’ access to public information and participation in matters relating to human health or the environment. None of the management alternatives described in this EA would disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations.

## 4.6 Cumulative Impacts Analysis

The phrase “cumulative impacts” refers to the overall effect of the proposed action or a series of similar actions in a landscape or regional setting.

### 4.6.1 Cumulative Impacts to the Physical Environment

**Alternative A:** Agriculture has played a significant role in the Cache River watershed. The predominant land use in the basin is agriculture with more than 70% of the watershed (345,000 acres) in production. Within the Refuge acquisition boundary of 35,320 acres, there are approximately 17,000 acres that are currently in agricultural production. If the Service acquired the entire acreage within the Refuge acquisition boundary, there could potentially be over 3500 acres of cropland maintained on the Refuge and 13,000 acres of cropland restored to forest and wetland within the Cache River Watershed, (just under 4% of the cropland within the watershed). Limited levels of cumulative negative effects due to soil disturbance and continued use of herbicide and fertilizers would result over time from the continued use of farming practices on up to 3,500 acres of Refuge land. The existing drainage ditches, associated with these farmed areas, increase sediment loads and run-off into tributary streams such as Cypress Creek and Big Creek as well the Cache River.

**Alternative B:** Within the Refuge acquisition boundary of 35,320 acres, there are approximately 17,000 acres that are currently in agricultural production. If the Service acquired the entire acreage within the Refuge acquisition boundary, this entire acreage (5% of the cropland within the watershed) would be restored to forest and wetland. Eliminating farming on the Refuge is likely to have significant positive cumulative impacts on the physical landscape with this type of increase in natural landscape (including forests, wetlands, and the wildlife dependent on these habitats) because there is so much less of this type currently within the landscape. Within the current acquisition boundary there are only 6,595 acres of forest, and 2,475 acres of wetland. Restoring approximately 17,000 acres of forest and wetland would almost double the amount of these habitats within the watershed, and therefore result in significant positive cumulative effects.

**Alternative C:** The cumulative effects of this alternative would be very similar to Alternative B (see alternative B above). There would be no significance to the cumulative effects of farming 200 acres within the Bellrose Waterfowl Reserve because this acreage is only a small percentage of the agricultural land within the Acquisition boundary as well as the watershed. This acreage would either remain the same or decrease, but it would not increase over time with additional land acquisitions.

### 4.6.2 Cumulative Impacts to the Biological Resources

**Alternative A:** Under this alternative, farming would be maintained on approximately 10% (as much as 3500 acres potentially) of the Refuge. Farming has a great impact on

biodiversity and impacts ecosystems by replacing natural habitats with vegetation that is nearly monotypic, as well as the continual use of herbicide and fertilizers. This would result in limited cumulative negative effects over time.

While some species in the Midwest have readily adapted to the large scale conversion of native habitats to cultivated farmland, many wildlife species have been negatively impacted by farming. Farming has a great impact on biodiversity and impacts ecosystems by replacing natural habitats with vegetation that is nearly monotypic, decreasing primary production, and using pesticides and fertilizers on a scale that influences ecosystem functioning, and directly affect plants and animals (Firbank et al. 2008, Tilman et al. 2001).

**Alternative B:** Restoration of a potential of up to 17,000 acres of natural habitat such as forest and wetland will almost double this type of habitat within the Cache River Watershed. Restoring natural wildlife habitat, as proposed in alternatives B and C, is generally considered to have positive environmental consequences. This project restores and protects native bottomland forests, which have experienced dramatic losses, as well as their associated streams and riverine communities, thus benefitting the wildlife that depend on these habitats. Complementary past conservation efforts include creation of the Refuge and the State's Cache River Natural Area. Any time newly forested acres are added to existing forested areas, it benefits species that are sensitive to edge habitat. The restoration of lost or degraded forests and wetlands in particular will have an overall positive impact on the surrounding region and the human environment, including water quality downstream.

**Alternative C:** There would be no significance to the cumulative effects of farming 200 acres within the Bellrose Waterfowl Reserve because this acreage is only a small percentage of the agricultural land within the Refuge acquisition boundary, and within the watershed. This acreage would either remain the same or decrease, but it would not increase over time with additional land acquisitions.

#### **4.6.3 Cumulative Impacts to the Social and Economic Resources**

**Alternative A:** Agriculture has played a significant role in the Cache River watershed. The predominant land use in the basin is agriculture with more than 70% of the watershed (345,000 acres) in production. Within the Refuge acquisition boundary of 35,320 acres, there are approximately 17,000 acres that are currently in agricultural production. If the Service acquired the entire acreage within the Refuge acquisition boundary, there could potentially be over 3500 acres of cropland maintained on the Refuge and 13,000 acres of cropland restored to forest and wetland within the Cache River Watershed, (just under 4% of the cropland within the watershed). It would seem that the land currently farmed on the Refuge is such a minimal part of the agricultural land within the watershed that this alternative would have minimal cumulative impacts on the farming economy when approached from a watershed or regional scale.

The cumulative social impacts would likely be minimal because under this alternative, the Service would be remaining consistent with the Refuge EA (1990), which states “approximately 10% of the most suitable and productive upland areas within Refuge ownership, could remain in agriculture to support Refuge habitat management goals. Until restoration can take place, agriculture through the cooperative farming has been utilized as an important tool to enhance and maintain wildlife habitat.

**Alternative B:** Under this alternative more opportunities for recreational activities would be available with restoration focused on forest and wetlands. Increased recreational areas might result in more people visiting the Refuge and greater public understanding of the bottomland forest ecosystem and the mission of the National Wildlife Refuge System.

This alternative may have negative social effects on the local farming community’s perception of the Service because the Refuge establishment EA states that 10% of Refuge Land will remain in agriculture. This perception by the local community may remain and therefore cause negative social impacts under this Alternative.

**Alternative C:** The cumulative effects of this alternative would be very similar to Alternative B (see alternative B above). There would be no significance to the cumulative effects of farming 200 acres within the Bellrose Waterfowl Reserve because this acreage would remain the same over time.

## **CHAPTER 5 REGULATORY COMPLIANCE**

The National Wildlife Refuge Improvement Act of 1997 established for the first time a singular conservation mission for the National Wildlife Refuge System: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans”.

Purposes of a refuge are those specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or a refuge sub-unit.

The relationship of the System mission and the purpose(s) of each refuge are defined in Section 3 of the FWS Director Order No. 132 which states:

“We view the System mission, goals, and unit purpose(s) as symbiotic; however, we give priority to achieving a unit’s purpose(s) when conflicts with the System mission or a specific goal exist.” Section 14 of this order indicates “When we acquire an addition to a unit under an authority different from the authority used to establish the original unit, the addition also takes on the purpose(s) of the original unit, but the original unit does not take on the purpose(s) of the addition”.

Cypress Creek National Wildlife Refuge was established in 1990 for the following purposes:

...the conservation of wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions... 16 U.S.C., Sec. 3901 (b) (Emergency Wetlands Resources Act of 1986)

Cypress Creek National Wildlife Refuge's purpose and importance to migratory birds, particularly waterfowl, were further described in the Service's Environmental Assessment for the proposed establishment of CCNWR (1990) and Approval Memorandum for refuge establishment:

1) to protect, restore and manage wetlands and bottomland forest habitats in support of the North American Waterfowl Management Plan; 2) to provide resting, nesting, feeding and wintering habitat for waterfowl and other migratory birds; 3) to protect endangered and threatened species and their habitats; 4) to provide for biodiversity; 5) to protect a National Natural Landmark, 6) and to increase public opportunities for compatible recreation and environmental education.

The legislation requires that the mission of the System and purposes of the individual refuges are carried out. Refuges must first address their establishing purposes, while at the same time contributing to the broader System and ecosystem needs.

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## **CHAPTER 7 PUBLIC COMMENTS ON DOCUMENTS**

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Figure 1. Cypress Creek National Wildlife Refuge: Cache River Watershed

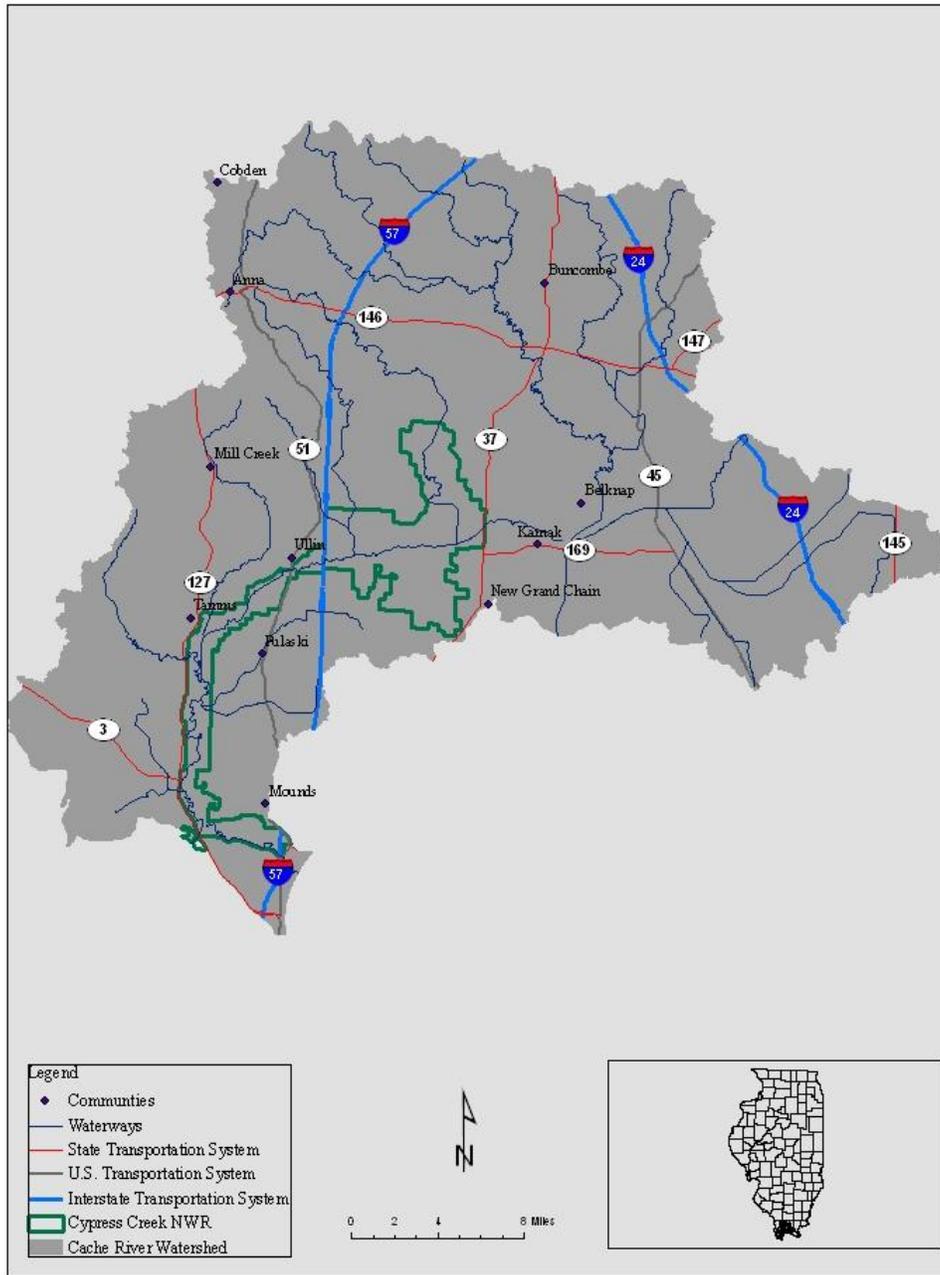


Figure 2. Potential Reforestation Land Suitability Model

