DRAFT COMPREHENSIVE CONSERVATION PLAN
AND ENVIRONMENTAL ASSESSMENT

HOLLA BEND NATIONAL WILDLIFE REFUGE

Pope and Yell Counties, Arkansas

U.S. Department of the Interior
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SECTION A. DRAFT COMPREHENSIVE CONSERVATION PLAN

I. Background

INTRODUCTION

This Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Holla Bend National Wildlife Refuge (NWR) was prepared to guide management actions and direction for the refuge. Fish and wildlife conservation will receive first priority in refuge management; wildlife-dependent recreation will be allowed and encouraged as long as it is compatible with, and does not detract from, the mission of the refuge or the purposes for which it was established.

A planning team developed a range of alternatives that best met the goals and objectives of the refuge and that could be implemented within the 15-year planning period. This Draft CCP/EA describes the Fish and Wildlife Service's (Service) proposed plan, as well as other alternatives considered and their effects on the environment. The Draft CCP/EA will be made available to state and federal government agencies, conservation partners, and the general public for review and comment. Comments from each entity will be considered in the development of the final CCP.

PURPOSE AND NEED FOR THE PLAN

The purpose of this Draft CCP/EA is to develop a proposed action that best achieves the refuge purpose; attains the vision and goals developed for the refuge; contributes to National Wildlife Refuge System (Refuge System) mission; addresses key problems, issues and relevant mandates; and is consistent with sound principles of fish and wildlife management.

Specifically, the Draft CCP/EA is needed to:

- Provide a clear statement of refuge management direction;
- Provide refuge neighbors, visitors, and government officials with an understanding of Service management actions on and around the refuge;
- Ensure that Service management actions, including land protection and recreation/education programs, are consistent with the mandates of the Refuge System; and
- Provide a basis for the development of budget requests for operations, maintenance, and capital improvement needs.

FISH AND WILDLIFE SERVICE

The Service traces its roots to 1871 and the establishment of the Commission of Fisheries involved with research and fish culture. The once-independent commission was renamed the Bureau of Fisheries and placed under the Department of Commerce and Labor in 1903.

The Service also traces its roots to 1886 and the establishment of a Division of Economic Ornithology and Mammalogy in the Department of Agriculture. Research on the relationship of birds and animals to agriculture shifted to delineation of the range of plants and animals so the name was changed to the Division of the Biological Survey in 1896.

The Department of Commerce, Bureau of Fisheries, was combined with the Department of Agriculture, Bureau of Biological Survey, on June 30, 1940, and transferred to the Department of the Interior as the Fish and Wildlife Service. The name was changed to the Bureau of Sport Fisheries and Wildlife in 1956 and finally to the Fish and Wildlife Service in 1974.

The Fish and Wildlife Service, working with others, is responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people through Federal programs relating to migratory birds, endangered species, interjurisdictional fish and marine mammals, and inland sport fisheries.

As part of its mission, the Service manages more than 540 national wildlife refuges covering over 95 million acres. These areas comprise the National Wildlife Refuge System, the world's largest collection of lands set aside specifically for fish and wildlife. The majority of these lands, 77 million acres, is in Alaska. The remaining acres are spread across the other 49 states and several United States territories. In addition to refuges, the Service manages thousands of small wetlands, national fish hatcheries, 64 fishery resource offices, and 78 ecological services field stations. The Service enforces federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

NATIONAL WILDLIFE REFUGE SYSTEM

The mission of the National Wildlife Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997 is:

> "...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."

The National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) established, for the first time, a clear legislative mission of wildlife conservation for the Refuge System. Actions were initiated in 1997 to comply with the direction of this new legislation, including an effort to complete comprehensive conservation plans for all refuges. These plans, which are completed with full public involvement, help guide the future management of refuges by establishing natural resources and recreation/education programs. Consistent with the Improvement Act, approved plans will serve as the guidelines for refuge management for the next 15 years. The Improvement Act states that each refuge shall be managed to:

- Fulfill the mission of the Refuge System;
- Fulfill the individual purposes of each refuge;
- Consider the needs of wildlife first;
- Fulfill requirements of comprehensive conservation plans that are prepared for each unit of the Refuge System;
- Maintain the biological integrity, diversity, and environmental health of the refuge system; and
- Recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation are legitimate and priority public uses; and allow refuge managers authority to determine compatible public uses.

The following are just a few examples of your national network of conservation lands. Pelican Island National Wildlife Refuge, the first refuge, was established in 1903 for the protection of colonial nesting birds in Florida, such as the snowy egret and the brown pelican. Western refuges were established for American bison (1906), elk (1912), prong-horned antelope (1931), and desert bighorn sheep (1936) after over-hunting, competition with cattle, and natural disasters decimated once-abundant herds. The drought conditions of the 1930s Dust Bowl severely depleted breeding populations of ducks and geese. Refuges established during the Great Depression focused on "waterfowl production areas" (i.e., protection of prairie wetlands in America's heartland). The emphasis on waterfowl continues today but also includes protection of wintering habitat in response to a dramatic loss of bottomland hardwoods. By 1973, the Service had begun to focus on establishing refuges for endangered species.

Approximately 38 million people visited national wildlife refuges in 2002, most to observe wildlife in their natural habitats. As the number of visitors grows, there are significant economic benefits to local communities. In 2001, 82 million people, 16 years and older, fished, hunted, or observed wildlife, generating $108 billion. In a study completed in 2002 on 15 refuges, visitation had grown 36 percent in seven years. At the same time, the number of jobs generated in surrounding communities grew to 120 per refuge, up from 87 jobs in 1995, pouring more than $2.2 million into local economies. The 15 refuges in the study were Chincoteague (Virginia); National Elk (Wyoming); Crab Orchard (Illinois); Eufaula (Alabama); Charles M. Russell (Montana); Umatilla (Oregon); Quivira (Kansas); Mattamuskeet (North Carolina); Upper Souris (North Dakota); San Francisco Bay (California); Laguna Atacosa (Texas); Horicon (Wisconsin); Las Vegas (Nevada); Tule Lake (California); and Tensas River (Louisiana)--the same refuges identified for the 1995 study. Other findings also validate the belief that communities near refuges benefit economically. Expenditures on food, lodging, and transportation grew to $6.8 million per refuge, up 31 percent from $5.2 million in 1995. For each dollar spent on the Refuge System, surrounding communities benefited with $4.43 in recreation expenditures and $1.42 in job-related income.

Volunteers continue to be a major contributor to the success of the Refuge System. In 2002, volunteers contributed more than 1.5 million hours on refuges nationwide, a service valued at more than $22 million.

The wildlife and habitat vision for national wildlife refuges stresses that wildlife comes first; that ecosystems, biodiversity, and wilderness are vital concepts in refuge management; that refuges must be healthy and growth must be strategic; and that the Refuge System serves as a model for habitat management with broad participation from others.

The Improvement Act stipulates that comprehensive conservation plans be prepared in consultation with adjoining federal, state, and private landowners and that the Service develop and implement a process to ensure an opportunity for active public involvement in the preparation and revision (every 15 years) of the plans.

All lands of the Refuge System will be managed in accordance with an approved CCP that will guide management decisions and set forth strategies for achieving refuge unit purposes. The CCP will be consistent with sound resource management principles, practices, and legal mandates, including Service compatibility standards and other Service policies, guidelines, and planning documents.

LEGAL AND POLICY CONTEXT

Legal Mandates, Administrative and Policy Guidelines, and Other Special Considerations

Administration of national wildlife refuges is guided by the mission and goals of the Refuge System, congressional legislation, presidential executive orders, and international treaties. Policies for management options of refuges are further refined by administrative guidelines established by the Secretary of the Interior and by policy guidelines established by the Director of the Fish and Wildlife Service. Select legal summaries of treaties and laws relevant to administration of the Refuge System and management of the Holla Bend NWR are provided in Appendix C.

Treaties, laws, administrative guidelines, and policy guidelines assist the refuge manager in making decisions pertaining to soil, water, air, flora, fauna, and other natural resources; historical and cultural resources; research and recreation on refuge lands; and provide a framework for cooperation between Holla Bend NWR and other partners, such as the Lower Mississippi Valley Joint Venture (LMVJV), private landowners, etc.

Lands within the Refuge System are closed to public use unless specifically and legally opened. No refuge use may be allowed unless it is determined to be compatible. A compatible use is a use that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge. All programs and uses must be evaluated based on mandates set forth in the Improvement Act. Those mandates are to:

- Contribute to ecosystem goals, as well as refuge purposes and goals;
- Conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- Monitor the trends of fish, wildlife, and plants;
- Manage and ensure appropriate visitor uses as those uses benefit the conservation of fish and wildlife resources and contribute to the enjoyment of the public; and
- Ensure that visitor activities are compatible with refuge purposes.

The Improvement Act further identifies six priority wildlife-dependent recreational uses. These uses are: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. As priority public uses of the Refuge System they receive priority consideration over other public uses in planning and management.

Biological Integrity, Diversity, and Environmental Health Policy

The Improvement Act directs the Service to ensure that the biological integrity, diversity, and environmental health of the Refuge System are maintained for the benefit of present and future generations of Americans. The policy is an additional directive for refuge managers to follow while achieving refuge purpose(s) and the Refuge System mission. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. When evaluating the appropriate management direction for refuges, refuge managers will use sound professional judgment to determine their refuges' contribution to biological integrity, diversity, and environmental health at multiple landscape scales. Sound professional judgment incorporates field experience, knowledge of refuge resources, refuge role within an ecosystem, applicable laws, and best available science, including consultation with others both inside and outside the Service.

NATIONAL AND INTERNATIONAL CONSERVATION PLANS AND INITIATIVES

Multiple partnerships have been developed among government and private entities to address the environmental problems affecting regions. There is a large amount of conservation and protection information that defines the role of the refuge at the local, national, international, and ecosystem levels. Conservation initiatives include broad-scale planning and cooperation between affected parties to address declining trends of natural, physical, social, and economic environments. The conservation guidance described below, along with issues, problems, and trends, was reviewed and integrated where appropriate into this Draft CCP/EA.

This Draft CCP/EA supports, among others, the Partners-in-Flight Plan, the North American Waterfowl Management Plan, the Western Hemisphere Shorebird Reserve Network, and the National Wetlands Priority Conservation Plan.

North American Bird Conservation Initiative. Started in 1999, the North American Bird Conservation Initiative is a coalition of government agencies, private organizations, academic institutions, and private industry leaders in the United States, Canada, and Mexico, working to ensure the long-term health of North America's native bird populations by fostering an integrated approach to bird conservation to benefit all birds in all habitats. The four international and national bird initiatives include the North American Waterfowl Management Plan, Partners-in-Flight, Waterbird Conservation for the Americas, and the U.S. Shorebird Conservation Plan.

North American Waterfowl Management Plan. The North American Waterfowl Management Plan is an international action plan to conserve migratory birds throughout the continent. The plan's goal is to return waterfowl populations to their 1970s levels by conserving wetland and upland habitat. Canada and the United States signed the plan in 1986 in reaction to critically low numbers of waterfowl. Mexico joined in 1994, making it a truly continental effort. The plan is a partnership of federal, provincial/state and municipal governments, non-governmental organizations, private companies, and many individuals, all working towards achieving better wetland habitat for the benefit of migratory birds, other wetland-associated species and people. Plan projects are international in scope, but implemented at regional levels. These projects contribute to the protection of habitat and wildlife species across the North American landscape.

Partners-in-Flight Bird Conservation Plan. Managed as part of the Partners-in-Flight Plan, the Ozark/Ouachitas physiographic area represents a scientifically based land bird conservation planning effort that ensures long-term maintenance of healthy populations of native land birds, primarily non-game land birds. Non-game land birds have been vastly under-represented in conservation efforts, and many are exhibiting significant declines. This plan is voluntary and non-regulatory, and focuses on relatively common species in areas where conservation actions can be most effective, rather than the frequent local emphasis on rare and peripheral populations.

U.S. Shorebird Conservation Plan. The U.S. Shorebird Conservation Plan is a partnership effort throughout the United States to ensure that stable and self-sustaining populations of shorebird species are restored and protected. The plan was developed by a wide range of agencies, organizations, and shorebird experts for separate regions of the country, and identifies conservation goals, critical habitat conservation needs, key research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face.

Northern American Waterbird Conservation Plan. This plan provides a framework for the conservation and management of 210 species of waterbirds in 29 nations. Threats to waterbird populations include destruction of inland and coastal wetlands, introduced predators and invasive

species, pollutants, mortality from fisheries and industries, disturbance, and conflicts arising from abundant species. Particularly important habitats of the southeast region include pelagic areas, marshes, forested wetlands, and barrier and sea island complexes. Fifteen species of waterbirds are federally listed, including breeding populations of wood storks, Mississippi sandhill cranes, whooping cranes, interior least terns, and Gulf Coast populations of brown pelicans. A key objective of this plan is the standardization of data collection efforts to better recommend effective conservation measures.

RELATIONSHIP TO STATE WILDLIFE AGENCY

A provision of the Improvement Act, and subsequent agency policy, is that the Service shall ensure timely and effective cooperation and collaboration with other state fish and game agencies and tribal governments during the course of acquiring and managing refuges. State wildlife management areas and national wildlife refuges provide the foundation for the protection of species, and contribute to the overall health and sustainment of fish and wildlife species in the State of Arkansas.

The Arkansas Game and Fish Commission (AGFC) is responsible for the control, management, restoration, conservation, and regulation of birds, fish, game and wildlife resources of the state. The mission of AGFC is "…to wisely manage all the fish and wildlife resources of Arkansas while providing maximum enjoyment for the people." AGFC oversees more than 280,000 acres of state-owned Natural Areas and Wildlife Management Areas, and more than 100 natural and man-made lakes. The agency manages habitat; stocks fish; develops management plans for important wildlife species; and fosters good stewardship through a variety of education programs, information products, and grants for conservation activities.

The state's participation and contribution throughout this planning process will provide for ongoing opportunities and open dialogue to improve the ecological sustainment of fish and wildlife in the State of Arkansas. An essential part of comprehensive conservation planning is integrating common mission objectives where appropriate.

II. Refuge Overview

INTRODUCTION

Holla Bend NWR is located about six miles southeast of the city of Dardanelle, in Pope and Yell Counties in west central Arkansas (Figure 1). The refuge is situated on a meander in the Arkansas River ("Holla Bend") that was cut off when the U.S. Army Corps of Engineers (USACE) straightened the channel in 1954. The boundaries of the 6,616-acre refuge are roughly defined by the main channel of the Arkansas River and the cutoff meander channel (Figure 2).

The principal focus of the refuge is on providing a wintering area for ducks and geese that use the Arkansas River corridor as they migrate along the Mississippi and Central Flyways. The number of waterfowl on the refuge in any given year varies depending on water levels and weather conditions further along the flyways. However, it is not uncommon for the refuge to host up to 100,000 ducks and geese at once during the winter months. Mallards are the most abundant, but at least 18 species of ducks and four species of geese have been observed on the refuge.

More than 40,000 people visited the refuge in 2006. Almost half of these visitors came to the refuge to watch wildlife, and the opportunity to view bald eagles is an important draw. The refuge also provides opportunities for environmental education, interpretation, and wildlife photography. There are opportunities for fishing and hunting as well, although these activities are limited to ensure that they are compatible with refuge purposes.

REFUGE HISTORY AND PURPOSE

In the early 1900s, some 65 families farmed the bottomland soils of the Holla Bend area. From the early 1920s through the Great Depression years, however, Arkansas farmers faced very difficult economic conditions. The disastrous multi-state Flood of 1927 was especially devastating for the farmers at Holla Bend because it destroyed the levee systems along the river and deposited a thick layer of sand on the cropland. A major drought in 1930-31 was followed by additional floods in subsequent years, and attempts to farm Holla Bend lands were largely abandoned by the mid-1930s.

Development of the Arkansas River for navigation and flood control was originally authorized under the Rivers and Harbors Act in 1946. However, the immense sediment load carried by the river was a major engineering obstacle because nearly continuous dredging would have been required to maintain a navigable channel. After several years of study, the USACE implemented a plan to make selected reaches of the channel narrower, deeper, and straighter so that the river would flow faster and sediments would be flushed downstream rather than being deposited. In 1954, the USACE excavated a new channel that cut through the neck of the Holla Bend meander. When the work was completed, the USACE transferred the 4,068-acre Holla Bend cutoff site to the Service and Holla Bend NWR was formally established in 1957. The refuge has acquired additional lands in the intervening 50 years, and the fee title boundary presently includes 6,616 acres. The refuge also manages 441 acres of a Migratory Bird Closure Zone outside the fee title boundary, for a total managed area of 7,057 acres.

Figure 1. Location of Holla Bend National Wildlife Refuge

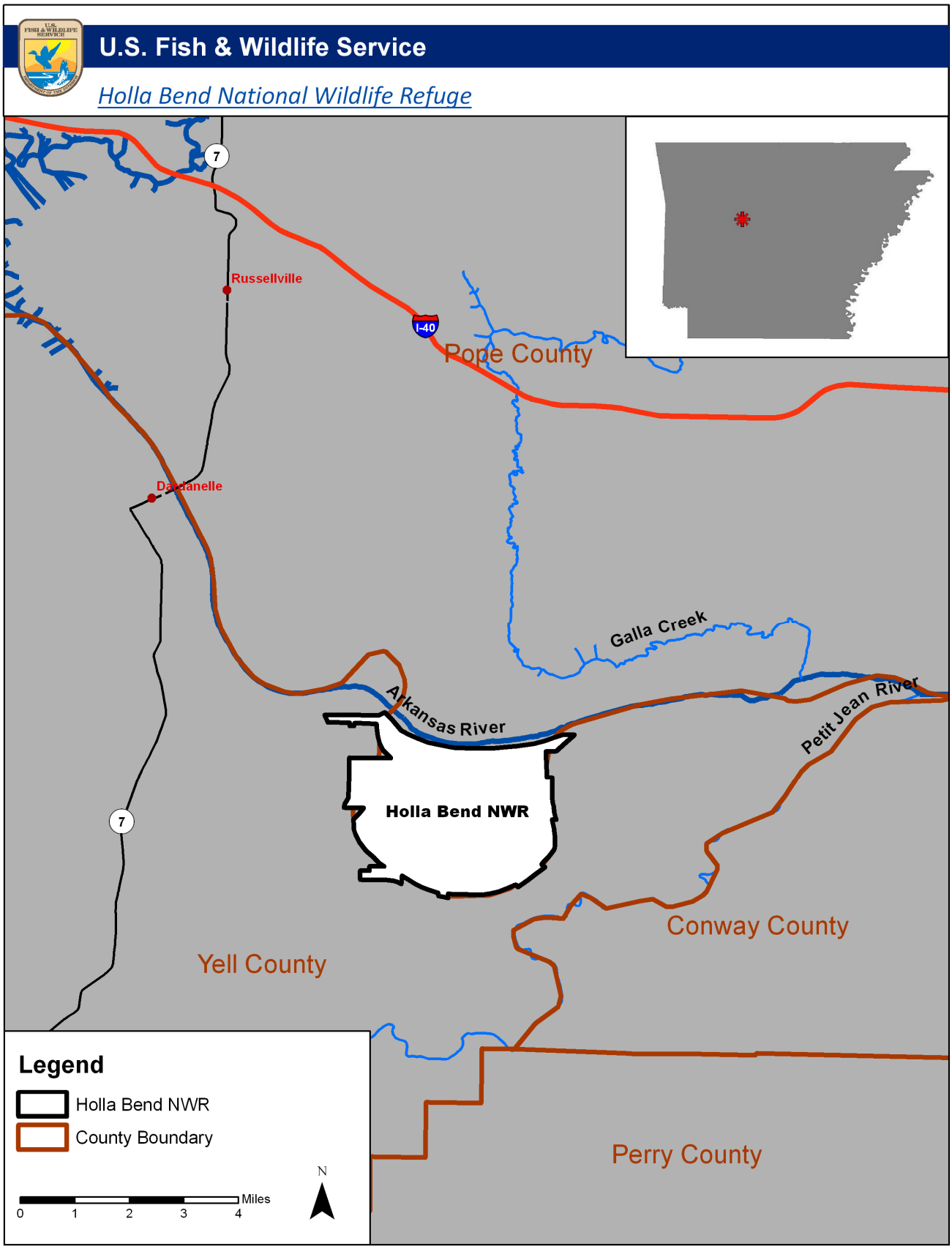
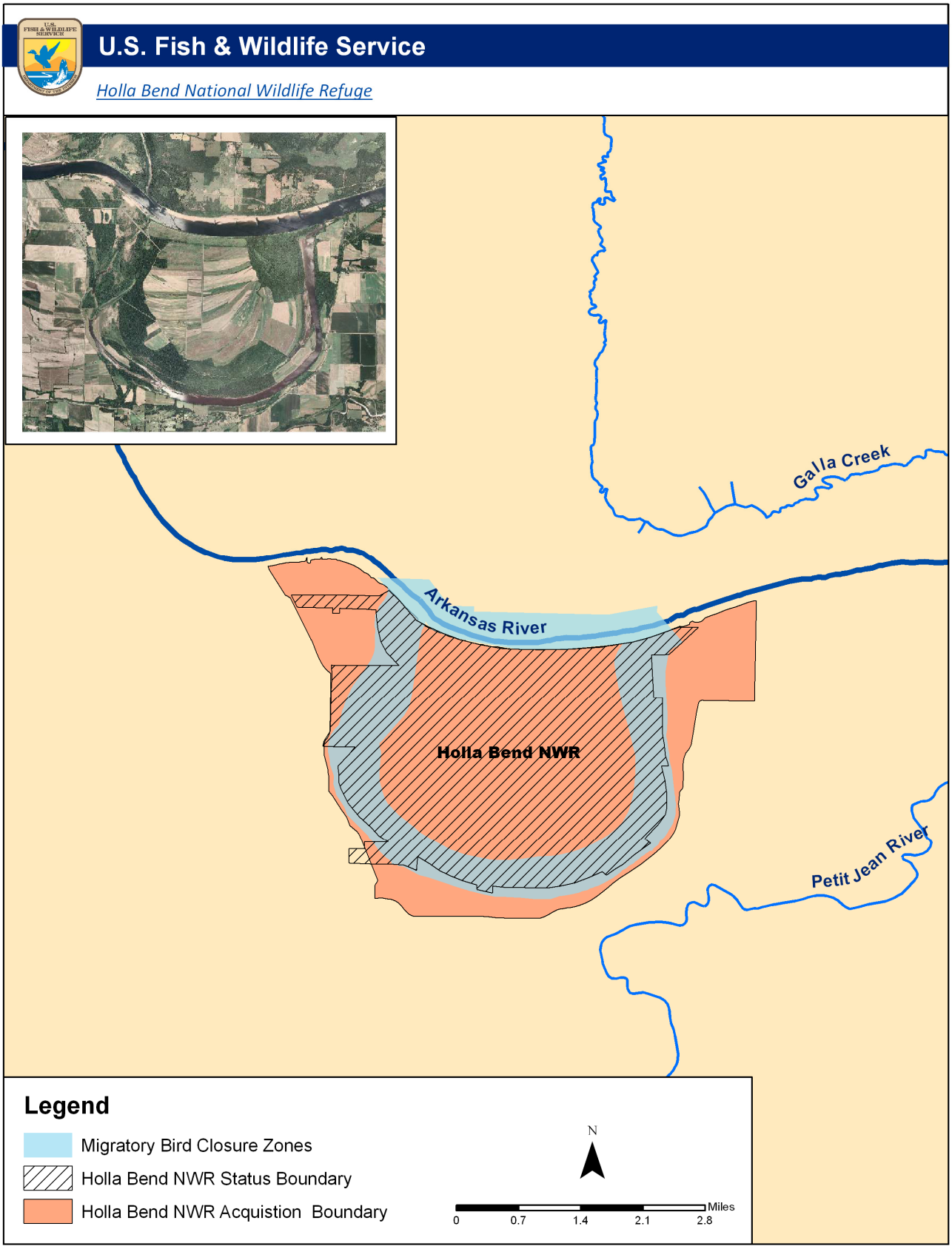


Figure 2. Holla Bend National Wildlife Refuge Boundary and Location of Migratory Bird Closure Zone



The purposes of Holla Bend NWR are identified in the legislation that authorized the acquisition of lands:

- "… particular value in carrying out the national migratory bird management program." (Transfer of Certain Real Property for Wildlife Conservation Purposes Act, 16 U.S.C. 667b);

- "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (Migratory Bird Conservation Act, 16 U.S.C. 715d);

- "…for the development, advancement, management, conservation, and protection of fish and wildlife resources…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services." (Fish and Wildlife Act of 1956, 16 U.S.C. 742f[a][4]); and

- "…suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species…" (Refuge Recreation Act, 16 U.S.C. 460k – 460k-4).

These purposes provide the basis for developing and prioritizing management goals and objectives within the Refuge System mission, and for determining which public uses are compatible with the refuge purposes.

SPECIAL DESIGNATIONS

Migratory Bird Closure Zone

In 1958, under the authority of the Migratory Bird Treaty Act of 1918, an area surrounding Holla Bend NWR was designated as closed to the hunting or taking of migratory birds. The Migratory Bird Closure Zone surrounded the original 4,068-acre area of the refuge and covered 2,732 acres along the Arkansas River and the cutoff channel (Figure 2). The refuge manages 441 acres of the closure zone that are outside the refuge fee title boundary.

Important Bird Area

The refuge is recognized by the National Audubon Society as an Important Bird Area (IBA) that supports a federally listed species (the bald eagle [*Haliaeetus leucocephalus*], which was federally listed as "Threatened" at the time that Holla Bend NWR was designated as an IBA; in July 2007, the bald eagle population of the lower 48 states was ruled to be "recovered" and the species was removed from the Federal List of Endangered and Threatened Wildlife), and an additional 23 species considered to be 'of conservation concern' at the state level. Audubon Arkansas also characterizes the refuge as an "outstanding stopover site" for migrating landbirds.

Hog Thief Research Natural Area

A 100-acre tract of cottonwood-dominated bottomland forest in the northeast corner of the refuge is formally designated as a Research Natural Area (RNA). The RNA serves as an experimental control for tracking the effects of forest management activities elsewhere on the refuge, and also provides an opportunity for researchers to document natural successional changes in this habitat as it matures.

There are no Biosphere Reserves, Wetlands of International Importance, National Wild and Scenic Rivers, Western Hemisphere Shorebird Reserve Network sites, or Federal Wilderness Areas on the refuge.

ECOSYSTEM CONTEXT

Ecosystem

In approaching its mission to conserve wildlife and their habitats throughout the country, the Service has found it useful to divide the United States into 53 distinct ecosystems, drawn primarily along watershed boundaries (Figure 3). Holla Bend NWR lies within the Arkansas/Red Rivers ecosystem (#15). This ecosystem covers the 245,000-square mile (mi^2) watershed of the Arkansas River and Red River basins and includes portions of eight states.

Ecoregion

The U.S. Environmental Protection Agency (EPA) uses a nested hierarchy to define ecoregions at different levels of spatial and ecological resolution, with Level I ecoregions delineated on the broadest geographic scale and Level IV ecoregions delineated on the most localized scale. The EPA ecoregion classification of the Holla Bend NWR area is as follows:

- Level I ecoregion = Eastern Temperate Forests;
- Level II ecoregion = Ozark, Ouachita-Appalachian Forests;
- Level III ecoregion = Arkansas Valley (Ecoregion 37); and
- Level IV ecoregion = Arkansas River Floodplain (Ecoregion 37b).

The Arkansas Valley (Ecoregion 37) is one of 15 Level III ecoregions included in the Arkansas/Red Rivers ecosystem. The Arkansas River Floodplain (Level IV Ecoregion 37b) covers 414 mi^2 in Arkansas and an additional 136 mi^2 in Oklahoma (Figure 3). The potential natural vegetation is southern floodplain forest, which includes bottomland hardwood forests of American sycamore, sweetgum, willows, eastern cottonwood, green ash, pecan, hackberry, elm, and some oaks. Remnants of bottomland hardwood forests tend to be restricted to areas that are frequently flooded or poorly drained. Most of the land has been cleared and drained for use as pasture or cropland. Important cultivated crops in this ecoregion include soybeans, corn, rice, wheat, sorghum, and alfalfa.

Local Land Cover and Land Use Patterns

Because Ecoregion 37b encompasses only a small portion of the four counties surrounding the refuge, larger scale land cover patterns should also be considered in wildlife conservation planning. As shown in Table 1, Pope and Yell Counties have similar land cover patterns, while Conway County has a higher proportion of cropland and Perry County has a higher proportion of forested land. Forage crops and soybeans dominate cropland usage in the counties surrounding the refuge (Table 2). Depending on rainfall, up to a third of the soybean acreage is irrigated.

The Arkansas River Valley region underwent a rapid expansion in the number of confined animal operations during the 1990s (ADEQ 2004). According to the 2002 National Census of Agriculture, Yell and Conway Counties ranked within the top 10 counties in the state in their inventories of broiler chickens, while Pope and Conway Counties ranked within the top 10 in their inventories of hogs and pigs (National Agricultural Statistics Service 2007).

Figure 3. Location of Arkansas Valley (Level III Ecoregion 37) and Arkansas River Floodplain (Level IV Ecoregion 37b) in Arkansas and Oklahoma

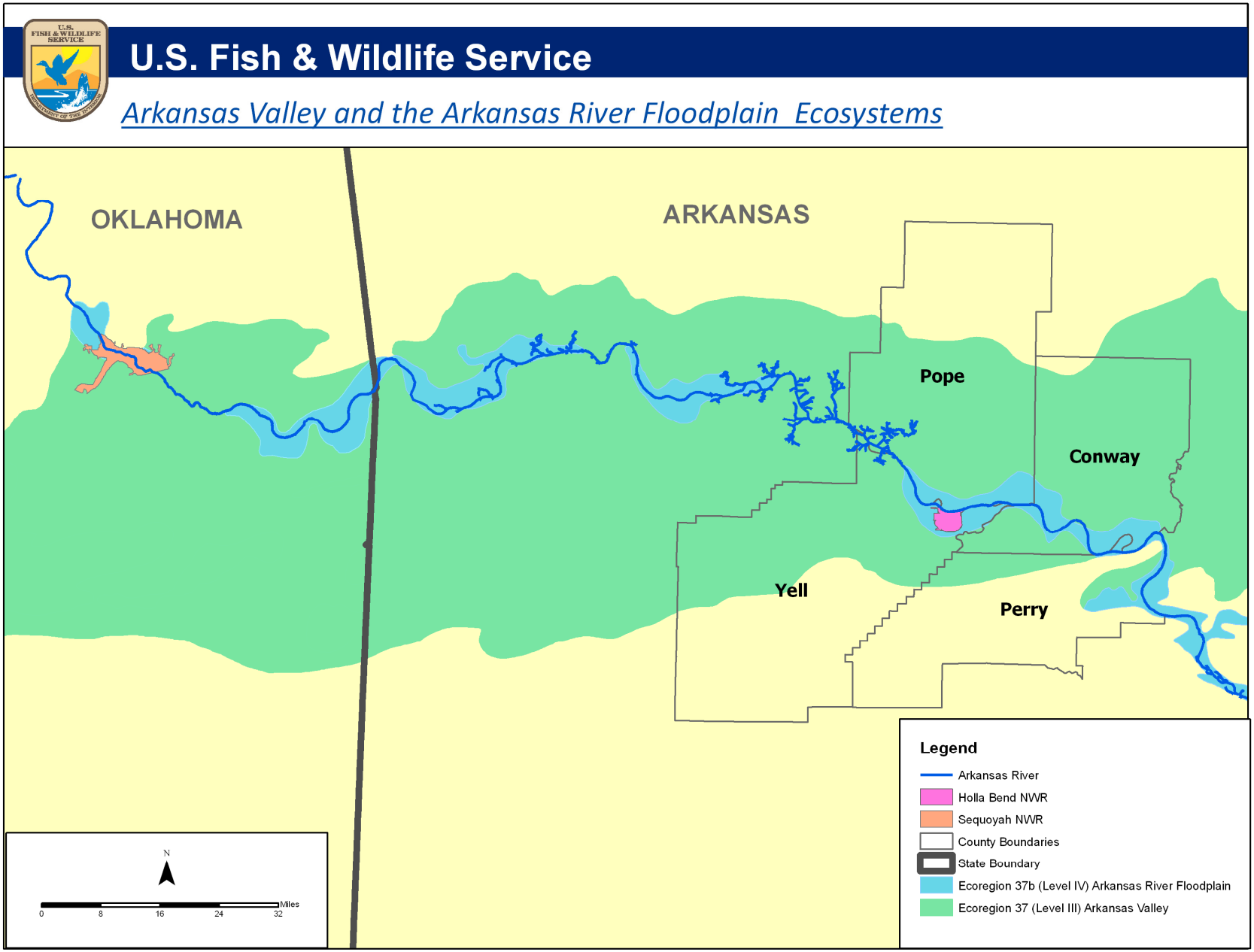


Table 1. Land cover patterns in the counties surrounding Holla Bend National Wildlife Refuge

Land Cover Type	Pope County	Yell County	Conway County	Perry County
Cropland (%)	16	15	29	12
Pasture (%)	7	7	8	3
Forest (%)	68	72	55	82
Other (%)	9	6	8	3
Total area (mi^2)	812	928	556	551

Sources: National Agricultural Statistics Service (2007); Fitzgerald and Pashley (2000)

Table 2. Agricultural land use in the counties surrounding Holla Bend National Wildlife Refuge

	Land Use	Pope Co.	Yell Co.	Conway Co.	Perry Co.
Distribution of farmland uses	Cropland	49%	49%	59%	60%
	Pasture	21%	24%	16%	15%
	Woodland	23%	23%	20%	18%
	Other	7%	3%	4%	7%
Cropland Area	Forage	38,284 ac	41,412 ac	40,977 ac	16,866 ac
	Soybeans	7,834 ac	8,417 ac	20,771 ac	3,129 ac
	Wheat	3,840 ac	2,516 ac	9,883 ac	750 ac
	Corn	~	3,405 ac	2,300 ac	~
	Rice	555 ac	1,039 ac	~	1,700 ac
	Sorghum	432 ac	~	1,708 ac	~
Livestock Inventory	Poultry	6,400,000	8,500,000	7,000,000	2,500,000
	Cattle and calves	40,000	36,000	35,000	14,000
	Hogs and pigs	22,000	7,000	17,000	4,000

Source: National Agricultural Statistics Service (2007)

Bottomland hardwood forests are a small component of total forested land in the counties surrounding the refuge. In general, upland forests north of the refuge tend to be oak-hickory in composition, while those south of the refuge are more often oak-pine or pine. National forest lands account for the largest percentage of the forested acreage in Pope and Yell Counties (Table 3). Most of the forested acreage in Conway County is privately owned, while the largest portion of forested land in Perry County is managed by the forest products industry. Only in Yell County are most of the timber resources in a relatively mature stage (i.e., sawtimber). Conway County is distinctive in terms of the large portion of its timber in the seedling or sapling stage.

Other Public Lands

The contribution of Holla Bend NWR to wildlife resource conservation can be influenced by the abundance and distribution of other protected areas in the surrounding ecosystem. Table 4 lists other public lands within a 25-mile radius of the refuge. Several of these areas (particularly the wildlife management areas) are notable for the variety of migratory waterfowl, wading birds, and shorebirds they support. In addition, Audubon Arkansas has designated Dardanelle Reservoir as an Important Bird Area in recognition of the variety of uncommon migratory bird species present.

There are nine other national wildlife refuges in the State of Arkansas (Bald Knob, Big Lake, Logan Cave, Cache River, Felsenthal, Overflow, Pond Creek, Wapanocca, and White River), but none are in the Arkansas Valley (i.e., Level III ecoregion 37). The only other national wildlife refuge that is the same Level III ecoregion (i.e., Arkansas Valley) and Level IV ecoregion (i.e., Arkansas River Floodplain) as Holla Bend NWR is Sequoyah NWR, which is in Oklahoma about 100 miles west of Holla Bend NWR (Figure 3).

REGIONAL CONSERVATION PLANS AND INITIATIVES

Holla Bend NWR lies within the focus area of a variety of regional or ecosystem-based conservation plans and cooperative initiatives.

Arkansas Wildlife Action Plan (Anderson 2006): This plan, developed by teams of wildlife professionals representing both public agencies and private organizations, provides a comprehensive strategy for determining priorities and effectively allocating funding for state wildlife grants.

The plan presents a list of “Species of Greatest Conservation Need” (SGCNs) and uses a standardized protocol to assign a “Species Priority Score” to each SGCN. For each species on the list of SGCNs, the plan summarizes information on habitat requirements, conservation problems and threats, data gaps and research needs, monitoring strategies, and recommended conservation actions. State-wide maps of reported occurrence and potential habitat are also provided for each SGCN.

Habitat management for SGCNs is approached on the basis of U.S. Environmental Protection Agency (USEPA) Level III ecoregions. For each ecoregion, the plan lists the SGCNs likely to be present, ranks the problems threatening the SGCNs, identifies the types of habitats that occur, and makes general recommendations on appropriate conservation actions. To support more detailed analyses, the plan also provides information on evaluating the status and quality of each of the individual habitat types. Species lists for Holla Bend NWR include 57 birds and 4 mammals that are designated as SGCNs in this plan.

Table 3. Forest characteristics in the counties surrounding Holla Bend National Wildlife Refuge

Forest Characteristics		Pope Co.	Yell Co.	Conway Co.	Perry Co.
Total forested area (ac)		**353,339**	**427,572**	**195,765**	**289,134**
Forest type	Planted pine (%)	3	11	0	13
	Natural pine (%)	17	34	22	43
	Oak-pine (%)	22	22	30	19
	Oak-hickory (%)	56	17	30	19
	Other (%)	2	16	19	6
Forest ownership	National Forest (%)	52	44	3	32
	Other Federal (%)	0	4	0	0
	State (%)	2	4	11	2
	Forest products industry (%)	0	15	7	49
	Private, farm (%)	14	9	22	13
	Private, non-farm (%)	32	24	57	4
Timber stage	Sawtimber (%)	45	55	37	44
	Poletimber (%)	46	33	22	34
	Sapling or seedling (%)	10	12	41	21

Source: Fitzgerald and Pashley (2000)

Table 4. Public lands within a 25-mile radius of Holla Bend National Wildlife Refuge

Type	Name	Size	Managing agency
State Wildlife Management Areas (WMAs)	Petit Jean River WMA	15,581 ac	AGFC
	Galla Creek WMA	3,293 ac	AGFC
	Ed Gordon/Point Remove WMA	8,730 ac	AGFC
	Dardanelle WMA	42,500 ac	AGFC
Natural Areas	Dardanelle Rock	10 ac	Arkansas Natural Heritage Commission
	Goose Pond	392 ac	Arkansas Natural Heritage Commission
Wilderness Areas	Flatside Wilderness	9,507 ac	USFS - Ouachita National Forest
National Forests	Ozark National Forest	>1 million ac	USFS
	Ouachita National Forest	>1 million ac	USFS
State Parks	Mt. Nebo State Park	3,783 ac	Arkansas Dept. of Parks and Tourism
	Petit Jean State Park	2,658 ac	Arkansas Dept. of Parks and Tourism
	Lake Dardanelle State Park	34,000 ac	Arkansas Dept. of Parks and Tourism
Federal Wild and Scenic Rivers	Big Piney Creek National Scenic River	45.2 mi	USFS - Ozark National Forest
USACE lands	Bona Dea Trails and Sanctuary	186 ac	USACE - Little Rock District

Arkansas/Red Rivers Ecosystem Plan (USFWS et al. 2000): This plan, developed by the Service with input from state fish and wildlife agency partners, is intended to guide the Service as it sets priorities, allocates resources, and conducts its activities and programs in the Arkansas/Red River Basins.

The plan presents strategies and action items for the following general objectives:

- Maintain and improve water quantity
- Maintain and improve water quality
- Conserve and restore focus species
- Conserve and restore focus habitats
- Increase public outreach efforts relative to service programs, and
- Improve outdoor recreational opportunities.

Southeast United States Regional Waterbird Conservation Plan (Hunter et al. 2006): The southeast regional plan, which covers ten Bird Conservation Regions (BCRs) and all or part of 21 states, is intended to provide a link between the continental waterbird plan (Kushlan et al. 2002) and local conservation initiatives. The regional plan identifies priority species, establishes population objectives, describes major threats to waterbirds, and outlines appropriate conservation action levels for individual species.

The bird species list for Holla Bend NWR includes 27 species that are specifically addressed in this plan. The categorization of these species by the action level given in the plan is as follows:

- Critical recovery – 1 species
- Immediate management – 1 species
- Management attention – 11 species
- Long-term planning and responsibility – 11 species
- Population control – 3 species

Partners in Flight Bird Conservation Plan for the Ozark/Ouachitas [Physiographic Area 19] (Fitzgerald and Pashley 2000): This conservation plan addresses landbirds in the Ozark/Ouachita physiographic area, which includes portions of Arkansas, Missouri, and Oklahoma. Priority species are identified based on six measures of conservation vulnerability, such as size of breeding range and population trend. The plan establishes objectives for priority species populations and habitats to support those populations, and recommends conservation actions to achieve the objectives. The bird species list for Holla Bend NWR includes 29 of the 36 priority species addressed in this plan.

Partners in Flight Continental Priorities and Objectives Defined at the State and Bird Conservation Region Levels: Arkansas (Rosenberg 2004): This document is a state-level synthesis of information from the Partners in Flight (PIF) Continental Plan (Rich et al. 2004) and bird conservation plans written for specific physiographic areas or Bird Conservation Regions that include parts of Arkansas. It identifies the priority species and presents step-down population objectives applicable at the state level. The bird species list for Holla Bend NWR includes 51 of the 61 species addressed in this plan.

Ouachita Mountains Ecoregional Assessment (Ouachita Ecoregional Assessment Team 2003): This assessment addresses the Arkansas River Valley as a geologically distinct subsection of the Ouachita Mountains. The document identifies the various terrestrial, wetland, and aquatic ecological systems found in the area and describes the ecological stressors that threaten biodiversity in these systems. The conservation planning approach involves identifying a portfolio of sites (conservation areas) which, if protected, would collectively conserve the biodiversity of the assessment area. The plan then develops strategies to address the ecological stressors that threaten the identified sites. None of the currently selected conservation areas include Holla Bend NWR, however.

The Northern Bobwhite Conservation Initiative: A Report on the Status of the Northern Bobwhite and a Plan for Recovery of the Species (Dimmick et al. 2002): This plan addresses the entire range of the species but provides step-down population and habitat objectives for individual Bird Conservation Regions, including BCR 25 (West Gulf Coastal Plain/Ouachita) in which Holla Bend NWR lies. The objectives are further broken down to the state level within individual BCRs.

Strategic Management Plan for Non-Game Migratory Birds (Moore and Rowe undated):
This document provides a linkage between bird conservation planning on broad spatial scales (such as PIF plans for multi-state physiographic regions, or the Southeastern Regional Plan for colonial waterbirds), and the development of step-down goals and objectives that AGFC can use in strategic management planning for Arkansas resources. The priority species identified in the broad scale plans are used to represent suites of Arkansas bird species associated with specific types of habitats (such as bottomland hardwood forests, or scrub/shrub and early successional habitats). The population status and habitat requirements of the priority species are then used to develop general habitat and population objectives, which, in turn, provide the basis for defining specific strategies to achieve those objectives.

Lower Mississippi Valley Joint Venture: The Lower Mississippi Valley Joint Venture (LMVJV) is a regionally based coalition of public and private organizations originally developed under the auspices of the North American Waterfowl Management Plan. The LMVJV covers four Bird Conservation Regions, including BCR 25 (West Gulf Coastal Plain/Ouachita) in which Holla Bend NWR lies. The LMVJV has expanded its original focus to include landbirds, shorebirds, and waterbirds in addition to waterfowl, and supports a variety of projects such as development of habitat suitability index models, and a reforestation tracking system.

LMVJV partners have developed a variety of reports and tools that directly support regional conservation planning efforts. Examples include:

- Restoration, Management, and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat (Wilson et al. 2007);
- U.S. Shorebird Conservation Plan: Lower Mississippi Valley/Western Gulf Coastal Plain (Elliott and McKnight 2000);
- A Spatially Explicit Decision Support Model for Restoration of Forest Bird Habitat (Twedt et al. 2006); and
- Lower Mississippi Valley Joint Venture Evaluation Plan (Loesch et al. 1994).

ECOLOGICAL THREATS AND PROBLEMS

Threats to biological diversity and ecosystem sustainability on Holla Bend NWR and the surrounding Arkansas River Floodplain ecoregion are manifested over a range of geographic scales, from declines in migratory bird populations on a continental scale, to alterations in hydrology on a regional scale, or decreased habitat quality on a local scale.

Loss of bottomland hardwood forest

The American Bird Conservancy (2007) identified bottomland hardwood forest as one of the “top 20 most threatened bird habitats in the U.S.” In Arkansas, a great deal of this habitat was lost in the late 1800s and early 1900s as timber companies harvested extensive areas and farmers cleared and drained land

for cotton and (more recently) for soybeans. Much of the bottomland hardwood forest that remains is secondary growth on small patches in a highly fragmented landscape. This may limit use by area-dependent forest birds, and appears to increase the risk of nest parasitism by brown-headed cowbirds.

Changes in hydrology

When the new river channel at Holla Bend was excavated in 1954, the cutoff meander channel and surrounding bottomland forests lost their connection to the dynamics of the Arkansas River except during flood events. For aquatic habitat in the cutoff channel, this means that there is limited recruitment of fish and other aquatic organisms, water quality is more likely to be degraded by oxygen depletion and nutrient stimulation of excessive algal productivity, and habitat is destined to eventually fill in with sediment. In the bottomland forest of the floodplain, there have been changes in seasonal hydroperiod that affect which species are able to survive and which species will move in when older trees die and open up gaps in the canopy.

Invasive plants

Lands that have been disturbed by removal of the native vegetation are vulnerable to impacts from invasive plant species. Invasive species are those that grow and spread rapidly, allowing them to displace other species, decrease biodiversity, and change habitat quality and food source availability for wildlife. Johnsongrass—a common invasive plant in the southeast—was already abundant on the abandoned farmland when Holla Bend NWR was established in 1957. Other invasive species now present on the refuge include kudzu, cocklebur, and Bermuda grass. Invasive plants are difficult to control and, once established, they may be almost impossible to eradicate completely.

Soil quality

On some areas of the refuge, the topsoil is blanketed by a thick layer of sand deposited during large floods. These areas have a limited capacity to hold water or support desirable vegetation.

PHYSICAL RESOURCES

CLIMATE

The refuge is in the Subtropical Division of the Humid Temperate Domain and typically experiences long, humid summers and short, mild winters. The annual mean temperature is 61 to 63 °F. The mean temperature in January is 41 °F, and the mean temperature in July is 82 °F. The growing season usually is about 220 days.

Annual precipitation averages about 46 inches over the long term, but varies considerably from year-to-year. Seasonal variations in rainfall are relatively modest: the wettest month is usually May (average 6 inches) and the driest months are August through October (average 3 inches each). Mean annual runoff in the region is about 17 inches.

GEOLOGY AND TOPOGRAPHY

The refuge lies within the Arkansas Valley Section of the Ouachita Physiographic Province, between the Boston Mountains (to the north) and the Ouachita Mountains (to the south). The bedrock is sandstone and shale of Pennsylvanian age, and surface materials are alluvial deposits of Holocene age. There are coal and natural gas deposits in the counties surrounding the refuge, but there are no resource extraction activities on the refuge.

The refuge is on a point bar deposited by the Arkansas River. The site has “ridge and swale” topography, with elevations ranging from about 290 to 310 feet above mean sea level (msl).

SOILS

Most of the soils on the refuge are classified as either Bruno loamy fine sand or Roxana silt loam. Bruno loamy fine sand occurs adjacent to the Arkansas River and along the old river channel. These soils are excessively drained and have a very limited capacity to hold water in an impounded area. They are considered only moderately suitable for cultivated crops, with limitations imposed by droughts and occasional flooding. The native vegetation typical of these soils includes cottonwood, willow, oaks, sycamore, hackberry, and pines. Bruno loamy fine sand is considered to have poor wildlife potential.

Most of the cultivated cropland on the refuge is on Roxana silt loam, which occurs primarily in the central portion of the refuge. These soils are very deep, well-drained, and moderately permeable. Their capacity to hold water in an impounded area is somewhat limited, but the limitations can be overcome by special planning, design, or installation techniques. These soils are considered well suited for cultivated crops (including cotton, grain sorghum, soybeans, and winter small grains) as well as for pasture and hay production. Native vegetation typical of these soils includes pecan, cottonwood, and willow.

On some areas of the refuge, the topsoil is blanketed by a thick layer of sand deposited during large floods. These areas are not delineated on county soil survey maps. The sand deposits have limited capability to hold impounded water or support desirable vegetation.

HYDROLOGY

Surface Water

The Arkansas River originates in central Colorado and flows 1,460 miles before joining the Mississippi River, making it the sixth longest river in the U.S. The watershed above the refuge covers more than 153,000 mi^2 and includes parts of Colorado, New Mexico, Kansas, Texas, and Oklahoma.

The lower Arkansas River (from Catoosa, Oklahoma to the Mississippi River) is regulated as the McClellan-Kerr Arkansas River Navigation System (MKARNS). MKARNS is operated by the USACE and consists of a series of 18 mainstem locks and dams, as well as 11 storage reservoirs on tributaries in eastern Oklahoma. A 3-mile section of the MKARNS, between Arkansas River navigation miles 194 and 197, forms the northern boundary of the refuge. This section of the Arkansas River is part of MKARNS Pool No. 9, which is also known as Winthrop Rockefeller Lake.

The refuge is about 8 miles downstream of Dardanelle Lock and Dam (MKARNS L&D No. 10), which is operated by the USACE for navigation and hydropower generation. Dardanelle does not provide flood control benefits, and the USACE retained a permanent flood easement on the land that became Holla Bend NWR. The Arkansas River in the vicinity of the refuge has an extensive system of instream dikes to direct flow away from the riverbanks, and revetments to prevent erosion of the banks. The south side of the river in this vicinity also has three levee systems to constrain floodwaters: Dardanelle Drainage District Levee to the west of the refuge, Carden Bottoms Drainage District No. 2 to the east of the refuge, and Holla Bend Levee District No. 1 on the northwest corner of the refuge. The levees lessen--but do not prevent--flooding on the refuge.

During high flow periods, water from the Arkansas River overflows its banks into the cutoff channel on the refuge. Flows in the MKARNS are largely determined by conditions in the extensive watershed upstream of the confluence of the Arkansas and Verdigris Rivers, and by water storage and release from the 11 tributary reservoirs in Oklahoma; as a consequence, local rainfall is not a good predictor of the magnitude or duration of flooding on the refuge. Although winter and spring floods may make it necessary to close parts of the refuge temporarily, this periodic flooding is an essential feature of the refuge ecosystem.

The deposition of sediment from floodwaters has altered the upstream section of the cutoff channel by creating three separate ponds (Long Lake, Lodge Lake, and Luther Lake) that are connected by shallow willow sloughs. The remainder of the cutoff channel is hydraulically connected to the Arkansas River through a water control structure near the downstream end. This water control structure gives the refuge some degree of flexibility to either maintain water in the cutoff channel for aquatic habitat, or to release water and increase the amount of mud flat habitat.

Groundwater

The Arkansas River alluvial aquifer consists of sand and gravel deposits underlain by poorly permeable bedrock. Groundwater levels vary in response to river stage, but are usually within a few feet of the surface.

AIR QUALITY

The refuge is within the Central Arkansas Air Quality Control Region (Region 16) as designated by the USEPA. Air quality in this region meets or exceeds the National Ambient Air Quality Standards for each of the criteria pollutants (ozone, particulates, nitrogen dioxide, sulfur dioxide, carbon monoxide, and lead).

WATER QUALITY AND QUANITY

Surface water

The Arkansas River is classified for primary and secondary contact recreation; domestic, industrial and agricultural water supply; and support of a perennial fishery characteristic of the Arkansas Valley ecoregion. The Arkansas Department of Environmental Quality (ADEQ) maintains an ambient water quality monitoring station on the Arkansas River near Dardanelle (monitoring site ARK0032). According to the Arkansas 303(d) list of water quality-limited waterbodies, a 2.0-mile reach directly downstream from Dardanelle Reservoir occasionally has dissolved oxygen (DO) concentrations below the 5.0 mg/L water quality standard during the summer due to low DO concentrations in hydropower releases from the reservoir. In addition, a 9.4-mile section of the river does not support the designated use for drinking water supply because total dissolved solids concentrations are occasionally higher than the 500 mg/L water quality standard.

Flows in the Arkansas River at the refuge are highly variable. In 2006 for example (a year when local rainfall was near the long-term average), the average daily discharge from Dardanelle L&D was 11,078 cubic feet per second (cfs), but the maximum daily discharge was more than 189,000 cfs and there were 34 days with zero discharge.

The only perennial stream that flows onto the refuge is Mill Creek (the stream that is locally known as “Mill Creek” is identified as “Harris Creek” on some maps and in ADEQ water quality reports), which originates south of the town of Dardanelle and flows into the cutoff channel on the south side of the

refuge. This stream is classified for secondary contact recreation; domestic, industrial and agricultural water supply; and support of a seasonal fishery characteristic of the Arkansas Valley ecoregion. There are no flow data available, and ADEQ reports that water quality data are not sufficient to determine whether the creek supports its designated uses.

Sediment deposited by receding floodwaters has divided the cutoff channel on the refuge into four more or less distinct permanent water bodies: Long Lake, Lodge Lake, Luther Lake, and a 390-acre open water area on the south and east sides of the refuge. There are no water quality data available for these waterbodies. However, a fish kill on Lodge Lake in July 2006 was tentatively attributed to low DO concentrations.

Groundwater

The yield of wells in the Arkansas River alluvial aquifer may be as high as 300 to 700 gallons per minute. Groundwater quality is suitable for most uses, although hardness and high concentrations of iron and nitrate may make it undesirable for some public supply and industrial uses. Groundwater quality and quantity have not been issues for the three irrigation wells on the refuge.

BIOLOGICAL RESOURCES

HABITAT

The distribution of generalized land cover categories on the refuge is given in Table 5 below. There are no FGDC-compliant (Federal Geographic Data Committee 1997) vegetation maps or inventories available for the refuge.

Mature bottomland hardwood forests

When the refuge was established in 1957, the abandoned farm land had grown up in scrub timber and thick stands of Johnsongrass. Areas that were not re-cleared for agricultural use have now grown into mature bottomland hardwood forests. These areas are primarily confined to the periphery of the refuge.

A survey in 1994 reported that most forest compartments on the refuge were dominated by cottonwood, and that individual cottonwood trees were in a state of decline due to age (USFWS 1994). At that time, other important contributors to basal area included ash, box elder, elm, eastern red cedar, pecan, sycamore, and willow. In 1995, the refuge conducted a selective cutting on 975 acres with the intent of stimulating natural succession toward forest with greater diversity in both composition and structure.

Forested lands on the refuge have not been inventoried since 1994, but qualitative descriptions are available from several recent refuge documents. The Annual Narrative Report for 2006 describes the forests as consisting of red cedar, box elder, Osage orange, elm, hackberry, sycamore, and cottonwood trees interspersed with wild plum thickets (USFWS 2006). Tree cover on the areas closest to water is almost exclusively willow, while pecan and water oak are usually restricted to areas on ridges or adjacent to farm fields. A recent Biological Review report for the refuge indicates that much of the forest overstory consists of older age classes of cottonwood, with some pecan trees present on the higher ridges (Edwards 2007). The forest midstory is described as a mixture of sugarberry, boxelder, and elm.

Reforested fields

Over the past 10 years, about 1,420 acres of cropland on the refuge have been removed from agricultural use and replanted with hardwood tree seedlings. About a third of the acreage was planted by the refuge in the late 1990s, using tree seedlings supplied by the National Tree Trust. The remaining acreage was planted for carbon sequestration under a Memorandum of Agreement between the Service and the National Fish and Wildlife Foundation, with Environmental Synergy, Inc. as the corporate partner. The species planted include Nuttal oak, swamp chestnut oak, water oak, cherrybark oak, pin oak, willow oak, blackgum, hackberry, wax myrtle, flowering dogwood, eastern redbud, bald cypress, pecan, persimmon, sycamore, green ash, Shumard oak, and red maple.

The success of the reforestation plantings has not been quantitatively evaluated, but overall seedling survival has been estimated as 60 to 70 percent. Areas with poor survival of oak seedlings have been allowed to re-seed naturally with cottonwood, sycamore, box elder, wild plum, and eastern red cedar.

The reforested fields are in an early stage of succession and currently provide habitat that may be more accurately characterized as scrub/shrub and grassland rather than forest. The refuge staff has noted that grassland-dependent birds, such as field sparrows and northern bobwhite, appear to be thriving on these lands.

Cropland

The refuge has 1,200 acres of cropland that are farmed under a cooperative agreement with a local farmer. Generally, the farmer plants 75 percent of this acreage in cash grain crops and the remaining 25 percent (the refuge share) in crops for waterfowl and other wildlife. In addition to the 25 percent refuge share, winter wheat is double-cropped behind the soybeans to provide green browse for wildlife.

In 2006, the primary cash grain crop was soybeans and the refuge share (which is left unharvested) was primarily corn and milo. These unharvested grains provide a good source of the carbohydrates needed by wintering waterfowl to maintain body temperature during cold periods.

Moist-soil units

Moist-soil units (MSUs) are small, seasonally flooded depressions scattered throughout the farm fields. The plant community that develops naturally during the summer varies depending on soil disturbance and the timing of water level drawdown, but typically includes panic grass, smartweeds, sprangletop, millets, and a variety of sedges. The seeds of many of these plants are a valuable source of protein and other nutrients for wintering waterfowl.

On 101 of the 226 acres of MSUs, irrigation wells and water control structures allow the refuge to either flood or drain the units as needed. Water level management on the remaining 125 acres is limited to controlling the drainage of flood waters and rainfall runoff.

There was no active management of vegetation on the MSUs from 2000 to 2005. In 2005, all of the units were disked and most were replanted in millet or milo. If carried out on a 3-year rotating basis, this vegetation management approach would promote the production of desirable food sources for waterfowl while preventing succession to less desirable plant species.

Aquatic habitats

Aquatic habitat on the refuge includes a 390-acre open-water area of the abandoned channel that is heavily used by waterfowl as a resting area. Sediment deposition in the remainder of the abandoned channel has created three small ponds that are interconnected by shallow willow sloughs.

Table 5. Distribution of land cover categories on Holla Bend National Wildlife Refuge

Land cover type	Acres	Portion of refuge lands
Mature bottomland hardwood forest	2,700	41%
Reforested fields	1,420	21%
Cropland	1,200	18%
Moist-soil units	226	3%
Permanent open water	750	11%
Other (trails, roads, etc.)	320	6%

WILDLIFE

Birds

More than 240 bird species have been observed on Holla Bend NWR (Appendix I). All but 6 of these species are protected under the Migratory Bird Protection Act, and 179 are classified as Nearctic-neotropical migratory birds. More than a third are identified as species of high conservation concern in various national, regional, or state lists and plans.

The Arkansas River is a migration corridor for waterfowl that use the Mississippi and Central Flyways. The abundance of waterfowl on the refuge varies greatly from year-to-year, depending on water levels and weather conditions further up the flyways. The 24 species of waterfowl recorded on the refuge include 18 species of ducks, 4 species of geese, and 2 swan species. The most commonly seen waterfowl are mallards, blue-winged teal, American widgeon, gadwall, Canada geese, and snow geese.

The refuge is used by 20 species of waterbirds, including colonial waterbirds such as herons and egrets, and solitary-nesting waterbirds ('marshbirds') such as the pied-billed grebe and the American coot.

At least 33 species of shorebirds (e.g., sandpipers, gulls, and terns) have been reported to use the refuge. Most are observed on sandbars in the Arkansas River, mudflats along the cutoff channel, and occasionally at the edges of the larger moist-soil units.

At least 165 species of landbirds have been observed on the refuge, including a variety of owls, hawks, woodpeckers, and songbirds as well as game birds such as Northern bobwhite and wild turkey.

Mammals

There are 27 species of mammals known to occur on the refuge, including beaver, black bear, coyotes, bobcats, white-tailed deer, river otter, mink and the nine-banded armadillo. An additional 21 species *may* occur on the refuge, including 8 species of bats. Only 5 of the 48 mammal species that potentially occur on the refuge are considered to have particular conservation significance at the state or federal level (Appendix I).

Other wildlife

There are no comprehensive surveys of other wildlife on the refuge. Appendix I contains informal lists of refuge biota that have been mentioned in various recent and historical refuge reports.

CULTURAL RESOURCES

There are several known archaeological sites along the reach of the Arkansas River now impounded as Winthrop Rockefeller Lake. Most of the sites are described as surface scatter of lithic debris (i.e., waste resulting from the manufacture of stone tools), but there are also intact deposits from the Archaic Period (8000 – 500 B.C.) and the Mississippian Period (A.D. 900 – 1500).

Holla Bend NWR has not been systematically investigated for the presence of archaeological sites (Kanaski 2007). The only reported survey, which was restricted to selected portions of the refuge, did not reveal the presence of any archaeological sites, although it specifically noted the occurrence of sand deposits up to 6 meters in depth (Bennett and Caffey 1978). The natural processes that gradually shift and rework river channels and their floodplains can either destroy archaeological sites by erosion or preserve them by burying them in sediment deposits. Since geomorphologists characterize the lands of Holla Bend NWR as a point bar surrounded by areas of accretion (sediment deposition), the potential presence of archaeological sites on the refuge cannot be ruled out without additional evaluation.

There are no architectural resources on the refuge that are listed or eligible for listing on the National Register of Historic Places.

SOCIOECONOMIC ENVIRONMENT

Population distribution and growth

The four counties surrounding the refuge have a combined population of nearly 111,000, with Pope County accounting for more than half of this total (Table 6). Population densities in Yell, Conway and Perry Counties are quite low relative to state and national averages. With the exception of Conway County, population growth in the refuge-area counties between 1980 and 2000 was rapid compared to the state-wide increase for the same period. Growth rates have slowed in more recent years, however, and population increases for the period from 2000 to 2006 are comparable to, or less than, state and national averages.

Table 6. Population distribution and growth in the counties surrounding Holla Bend National Wildlife Refuge

Population Distribution and Growth	Pope Co.	Yell Co.	Conway Co.	Perry Co.
Population (2006 estimate)	57,671	21,834	20,694	10,411
Population density (persons per square mile)	67	23	37	19
Metropolitan or micropolitan statistical area	Russellville	Russellville	none	Little Rock-N. Little Rock
Population change from 1980 to 2000	up 39.8%	up 24.2%	up 4.3%	up 40.5%
Population change from 2000 to 2006	up 5.9%	up 3.3%	up 1.8%	up 2.0%

Sources: U.S. Census Bureau (2007); discoverarkansas.net (2007)

Population characteristics

The racial/ethnic makeup of the population in the counties surrounding the refuge is summarized in Table 7. The counties surrounding the refuge have a higher proportion of their populations in the "White, non-Hispanic" category than either the state or the nation as a whole. In comparison with the three other refuge-area counties, Yell County is more like the national average in terms of the percent of the population in the "Hispanic or Latino origin" category and the percent of households that speak a language other than English in the home environment.

Age distribution in the four refuge-area counties is similar to the patterns on the state and national levels. With the exception of Pope County, the average educational attainment level of adults in the refuge-area counties is lower than state and national averages.

Income and employment

Median household incomes and per capita incomes in the counties surrounding the refuge and for Arkansas as a whole were well below the national averages for the same years (Table 8). Poverty rates were comparable to the Arkansas average, but higher than the national average.

Unemployment rates in each of the refuge-area counties declined between 2004 and 2006. These counties are part of the 10-county West Central Arkansas Local Workforce Investment Area. The "education and health services" industry is currently the largest source of employment in the area. Total employment in the area is expected to grow by 19 percent between 2002 and 2012, with the highest projected growth in the "professional and business services" and the "education and health services" industries.

Agricultural economy

The four counties surrounding the refuge have a combined total of nearly 600,000 acres of farmland (Table 9). Yell and Perry Counties experienced substantial declines in farmland acreage over the period from 1997 to 2002, while farmland acreage was relatively stable in Conway County and increased slightly in Pope County. Presently, the portion of land in agricultural use ranges from a low of 19 percent in Perry County to a high of 49 percent in Conway County. In each county, the vast majority of the total market value of production is from livestock rather than crops. Based on the value of sales, "poultry and eggs" is the top farm commodity in each of the counties.

Wildlife-dependent recreation

Although recent surveys vary on specifics, they generally agree that Arkansas and the Arkansas region exceed the national average in terms of the percentage of the population that participate in wildlife-dependent recreation such as hunting, fishing, and wildlife viewing (Table 10).

In Arkansas, as well as in the nation as a whole, most wildlife watching is done near the place of residence, and only about a third of wildlife watching is done more than a mile from home. In Arkansas, about a third of wildlife watchers also participate in wildlife photography.

The Service estimated that expenditures for wildlife watching in Arkansas in 2001 added $244 million to the state economy (USFWS 2003). Equipment purchases accounted for 33 percent of expenditures, while trip-related expenditures accounted for only about 8 percent of the total.

Table 7. Population characteristics of the counties surrounding Holla Bend National Wildlife Refuge

Population Characteristics		Pope Co.	Yell Co.	Conway Co.	Perry Co.
Race/ethnicity	White, non-Hispanic	90.9%	78.7%	83.2%	95.2%
	Hispanic or Latino origin	3.8%	17.2%	2.4%	1.3%
	Black	3.0%	1.5%	12.5%	2.0%
	Native American, Asian, or other	1.4%	2.0%	1.0%	1.0%
Language	Language other than English spoken at home	3.6%	13.4%	2.9%	2.9%
Educational level of adults	High school graduates	77.4%	64.1%	73.2%	73.8%
	Bachelor's degree or higher	19.0%	10.9%	11.5%	11.1%
Age distribution	Median age, years	34.8	36.1	37.9	38.0
	Population less than 5 years old	6.4%	7.5%	6.3%	5.5%
	Population less than 18 years old	23.5%	25.1%	23.9%	23.2%
	Population 65 years or older	13.0%	14.6%	15.6%	15.2%

Sources: U.S. Census Bureau (2007); Arkansas Department of Economic Development (2007)

Table 8. Income and employment in the counties surrounding Holla Bend National Wildlife Refuge

Income and Employment	Pope Co.	Yell Co.	Conway Co.	Perry Co.
Median household income (2004)	$34,109	$30,076	$32,865	$33,094
Per capita income (1999)	$15,918	$15,383	$16,056	$16,216
Poverty rate (2004)	15.8%	15.1%	16.1%	14.4%
Unemployment rate (2004)	5.3%	5.0%	5.7%	5.6%
Unemployment rate (2006)	4.8%	4.6%	5.1%	5.0%

Sources: U.S. Census Bureau (2007); U.S. Bureau of Labor Statistics (2007)

REFUGE ADMINISTRATION AND MANAGEMENT

LAND PROTECTION AND CONSERVATION

The approved acquisition boundary of the refuge encompasses 8,319 acres. To date, the Service has acquired fee title on 6,610 acres. The remaining 1,703 acres in private ownership are distributed in numerous small tracts around the perimeter of the refuge. Current land uses on these tracts range from cropland, pasture, and mixed woodlots to standing water and lakes. Acquisition of these tracts would increase the amount of habitat that can be managed specifically to meet the purposes for which the refuge was established.

VISITOR SERVICES

The refuge had 41,764 visitors in 2006. Nearly half of the visitors indicated that the purpose of their visit was to observe wildlife.

The entrance to the refuge is a paved road with an automatic gate that opens at sunup and closes at sundown. The entrance road passes a fee booth and leads to a paved parking lot at the refuge office. The office is open from 7:00 a.m. to 3:30 p.m., Monday through Friday. The refuge is open year-round, although some refuge roads may be closed temporarily due to flooding.

Visitor facilities on the refuge include two designated hiking trails, a 10-mile self-guided auto tour route, three boat launch ramps with gravel parking areas, a small pavilion with tables and benches, handicap-accessible restrooms, and a section of the refuge office that provides nature displays and information brochures.

Table 9. Agricultural economy of the counties surrounding Holla Bend National Wildlife Refuge

Agricultural Characteristics	Pope Co.	Yell Co.	Conway Co.	Perry Co.
Total farmland (ac)	168,592	181,155	173,497	67,728
Portion of county in farmland	32%	31%	49%	19%
Change in farmland acreage, 1997 to 2002	up 4%	down 7%	up 2%	down 12%
Average farm size (ac)	161	219	223	178
Annual net income, per farm	$28,068	$38,796	$34,802	$26,639
Portion of market value of production from crops	3%	3%	7%	14%
Portion of market value of production from livestock	97%	97%	93%	86%
Top farm commodity group, by value of sales	poultry & eggs	poultry & eggs	poultry & eggs	poultry & eggs

Source: National Agricultural Statistics Service (2007)

Table 10. Geographic trends in the percent of the population reported to participate in various types of wildlife-dependent recreation.

	Arkansas	Arkansas region[A]	Nationwide
Wildlife-oriented recreation (all types)	52%	~	39%
Hunting	15% - 27%	9% - 13%	6% - 11%
Fishing	23% - 40%	19%	18%
Wildlife observation (all species)	39%	25% - 39%	30% - 31%
Bird watching	3% - 24%	31%	22% - 27%

Variation of values within geographic areas may reflect the time period of the survey, diference in the population targeted by the surey, or difference te wording of survey questions.

[A] 'Arkansas region' defined as West South Central Census Division 7 (Arkansas, Louisiana, Oklahoma and Texas); the

region within a 1-day drive of Arkansas; or USFS Region 8 (13 southeastern states); depending on source.

Sources: AGFC (2005); Outdoor Industry Foundation (2006); Responsive Management (2006); USFS (1999); USFS (2006); USFS et al. (2000); USFWS (2001); and USFWS (2002).

Hunting

The refuge is closed to all migratory bird hunting. The sanctuary provided by the refuge is particularly important in light of the popularity of hunting among Arkansas residents.

The refuge offers an archery/crossbow season for white-tailed deer from October 1 to December 10. With the exception of a small tract adjacent to the Levee Trail, the entire refuge is open for deer hunting. Turkeys, rabbits, squirrels, coyotes, beavers, raccoons and bobcats may also be taken incidental to deer hunting. The refuge sold 338 permits for archery deer hunting in 2006.

After the close of the archery hunt, a 1-day quota-limited gun hunt for deer is offered for youth ages 12 - 15. Take is limited to one buck or one doe. Fourteen youths participated in this hunt in 2006.

The refuge allows raccoon hunting every Thursday, Friday, and Saturday night during the month of February. Hunters are required to use dogs, and only rim-fire rifles no larger than .22 caliber are allowed.

In the spring, the refuge provides opportunities for turkey hunting, including a 2-day quota-limited gun hunt for youths under the age of 16, and a 2-day quota-limited gun hunt for adults, followed by an archery/crossbow season.

Fishing

Sport fishing is permitted in all refuge waters from March 1 to October 31 each year. The refuge is closed to fishing during the winter months to limit the disturbance of wintering waterfowl, although bank fishing is permitted on Long Lake from November 1 to February 28.

The Fishing Plan currently in use on the refuge was prepared in 1984. At that time, the refuge received about 6,500 fishing visits per year. Based on random creel checks, the estimated annual sportfish harvest was 13,000 pounds, with crappie accounting for more than half of the biomass harvested. Fishing for largemouth bass, catfish, and sunfish are also popular during the summer.

Receding floodwaters from the Arkansas River often trap fish in the cutoff river channel. In past years, the refuge sometimes issued special use permits, which allowed the harvest of commercial species such as buffalo, gar, and freshwater drum (gaspergou) trapped in the cutoff channel. The 1984 Fishing Plan estimated the annual harvest of commercial species at 4,300 pounds, although harvests of 20,000 pounds or more have been reported in some years.

Wildlife observation and photography

The refuge provides visitors with an incredible opportunity to see bald eagles, hawks, and waterfowl. Most of the non-consumptive recreational visitors come to the refuge to see birds. Audubon groups from across the state routinely visit the refuge.

A 10-mile, one-way loop wildlife drive provides visitors with the opportunity to see a variety of wildlife including waterfowl, eagles, hawks, migratory songbirds, and shorebirds as well as deer and other mammals. There are pull-offs along the drive with interpretive panels about the various habitats and wildlife.

The refuge has an observation tower that overlooks the cutoff channel. The existing tower is not handicap accessible, but the refuge has received funding to replace it and the new tower will be ADA-

compliant. The refuge recently partnered with Ducks Unlimited to create a wetland near the observation tower that enhances the opportunity to view wildlife. There are also 13 hunting blinds on the refuge that are available outside the deer season for visitors to use as observation/photography blinds.

The Levee Trail and the Cottonwood Trail provide visitors with the opportunity to hike through a variety of habitats and observe wildlife along the trail.

Environmental education and interpretation

Holla Bend NWR does not have a Visitor Services Park Ranger position. Visitor services functions and responsibilities, including environmental education, are provided by the refuge manager and other staff when work loads permit. The refuge has accommodated up to five groups per year, usually from schools in the Dardanelle and Russellville areas. A local wildlife rehabilitator has also come to the refuge to help with environmental education groups. Special requests for interpretive tours or programs are also accommodated as staff schedules permit.

The visitor contact area of the refuge office has attractive mounts of many of the waterfowl and raptors that are routinely seen on the refuge, as well as stunning wildlife photographs taken by volunteers and displayed on the walls and in an album. Skulls, shed snake skins, and white-tailed deer antlers are displayed on shelves. A brochure rack holds handouts on general information about the refuge, public use regulations, brochures on the birds and mammals that occur on the refuge, and other materials published by the Service about the Refuge System and related topics.

A 6-panel kiosk adjacent to the office parking lot has a panel featuring the refuge, a panel covering other national wildlife refuges and Service fish hatcheries in Arkansas, and four other interpretive panels relating to the refuge wildlife resources. There are interpretive panels along the wildlife drive that feature: Wildlife You May See, Dead Tree Cavities, Life along the Arkansas River (a large panel interpreting the history of the area and the refuge), Birds of Prey, Eagle Migration, Waterfowl, Wading Birds, Shorebirds, Wetlands, National Wildlife Refuge System, Waterfowl Migration, Bottomland Hardwoods, Bottomland Hardwood Restoration, Farming for Wildlife, and Songbirds.

PERSONNEL, OPERATIONS, AND MAINTENANCE

The annual budget of the refuge varies but averaged $425,000 for fiscal years 2001 through 2006. The refuge has 5 full-time staff positions, including: Refuge Manager (GS-11), Project Leader (GS-12), Office Assistant (GS-6), Heavy Equipment Operator (WG-10), and Heavy Equipment Mechanic (WG-10). The refuge is scheduled to lose two of these staff positions by FY09.

In 2006, the refuge made revenue sharing payments of $7,278 to Pope County and $1,390 to Yell County.

III. Plan Development

SUMMARY OF ISSUES, CONCERNS, AND OPPORTUNITIES

The planning team responsible for preparing this Draft CCP/EA was established in May 2007. It includes natural resource management professionals representing Holla Bend NWR, Service staff, and AGFC (see Appendix K – List of Preparers). The Service had previously established a biological review team with representatives from the same agencies, plus the USDA Natural Resources Conservation Service, that conducted an on-site evaluation in October 2006 and completed a Biological Review Report in June 2007 (Edwards 2007), and had established a visitor services review team that presented recommendations to the refuge staff and prepared a Visitor Services Review Report in March 2007 (USFWS 2007).

Public input to the development of this Draft CCP/EA was obtained, in part, through a public scoping meeting held in Dardanelle, Arkansas, on August 14, 2007, that was attended by 42 stakeholders. Written comments were received from 20 stakeholders. Comments received during the public scoping process are listed in Appendix D – Public Involvement.

In identifying key issues to be addressed during the planning process, the planning team considered recommendations from the Biological Review and Visitor Services Review Reports, comments received through the public scoping meeting, and input from open planning team meetings, comment packets, and personal contacts of planning team members. In addition, the team considered opportunities for coordination with other relevant conservation plans (see Chapter II – Regional Conservation Plans and Initiatives); applicable legal mandates (see Appendix C – Relevant Legal Mandates and Executive Orders); the purposes of Holla Bend NWR as well as the mission, goals, and policies of the Refuge System as a whole; and evaluations and documentation required by Service procedures for refuge planning (see Appendix E – Appropriate Use Determinations, Appendix F – Compatibility Determinations, and Appendix H – Wilderness Review).

The planning team identified a number of issues, concerns, and opportunities related to fish and wildlife protection, habitat restoration, public use, and management of threatened and endangered species. All public and advisory team comments were considered; however, some issues important to the public fall outside the scope of this planning process. The team considered all issues raised during the planning process and has developed a plan that attempts to balance competing views on important issues.

The issues, concerns, and opportunities the team judged to be most significant fall into the five categories listed below. Summaries of issues identified in the planning process follow this list.

1. Broader focus for migratory bird management
2. Need for better information on refuge resources (especially with respect to protection of threatened, endangered, or rare species)
3. Control of nuisance wildlife and invasive plants
4. Broader range of habitat management practices and use of adaptive resource management strategies
5. Improved visitor services

FISH AND WILDLIFE POPULATION MANAGEMENT

Broader Focus for Migratory Bird Management

Support of a national migratory bird management program, especially the North American Waterfowl Management Plan, is a principal purpose for which the refuge was originally established (see Chapter I, "National and International Conservation Plans and Initiatives"). The refuge has traditionally focused on the needs of migratory waterfowl. Stakeholders requested that the refuge expand its focus to include other migratory birds, especially shorebirds and birds that require grassland or early successional (e.g., scrub/shrub) habitats.

Protection of Threatened, Endangered, or Rare Species

One management objective of Holla Bend NWR is to provide habitats for federally listed threatened or endangered species. There are, or may be, opportunities for Holla Bend NWR habitat management for the following federally listed species:

- The interior population of the least tern *(Sterna antillarum athalossos)* is federally listed as "Endangered" within all or portions of 18 states. The least tern nests on sparsely vegetated sand or gravel islands in wide river channels, including sites along the Arkansas River near the refuge.

- Bald eagles *(Haliaetus leucocephalus)* are known to occur in the refuge area; an active nesting site was found on the northeast corner of the refuge in 2005. This species was formally de-listed by the Service in July 2007 as a result of the widespread recovery of bald eagle populations in recent years; however, the refuge continues to monitor and protect the nesting site.

- The American burying beetle *(Nicrophorus americanus)*, which is federally listed as "Endangered," has been reported from several Arkansas counties directly west of Holla Bend NWR. Although this species has not been reported on the refuge, no comprehensive survey has been performed.

- American alligators *(Alligator mississipiensis)* were introduced on Holla Bend NWR in 1979 to help control beaver populations. Most of the introduced alligators have probably migrated from the refuge to warmer locations, but some individuals may still be present on the refuge. This species is federally listed as "Threatened due to similarity of appearance to other listed crocodilians."

The Arkansas Natural Heritage Commission periodically publishes lists of plant and animal species that, while not federally protected under the Endangered Species Act, are considered rare in Arkansas and are classified as "Species of Special Concern" (ANHC 2008). The bird fauna of Holla Bend NWR includes 50 Species of Special Concern: 23 of these species are categorized as "Imperiled" or "Critically Imperiled" in the state.

Coordination With Other Conservation Plans

Coordination of the Holla Bend NWR CCP with existing national, regional, and state conservation plans provides an opportunity to leverage resources and enhance results. The planning process for the refuge

benefits from the technical information and broad perspective on priorities in these larger scale or "landscape-based" conservation plans. In turn, the other conservation initiatives benefit from refuge activities that contribute to achieving the population or habitat objectives specified in their plans.

Status and Trends of Resident Wildlife Populations

There is a general lack of information on the status of white-tailed deer herds, trends in wild turkey populations, and the presence of waterbird rookeries on the refuge. The status of deer herds is an issue of particular importance to hunters.

Control of Nuisance Wildlife Populations

Populations of some resident wildlife species may reach nuisance levels that negatively affect other refuge resources. Beaver and raccoon populations are of particular concern, as beavers may damage bottomland hardwood forest habitat and raccoons may reduce the reproductive success of forest-breeding and grassland-nesting birds.

There also is concern about the potential impacts of an apparent increase in the numbers of resident coyotes and bobcats on a broad range of refuge fauna.

Fisheries Management

One suggestion received during the planning process was that the refuge should consider issuing special use permits to commercial fishermen to remove rough fish trapped in the cutoff channel by receding floodwaters.

HABITAT MANAGEMENT

Increase Diversity of Managed Habitats

Habitat management on the refuge currently focuses primarily on croplands, moist-soil habitats, and waterfowl impoundments. Expanding this focus to include establishing and maintaining other habitats such as grassland, scrub/shrub, shallow water/mudflats, grassy openings in forests, buffer strips of native warm season grasses, and open water areas with emergent vegetation is a priority habitat management issue to be addressed in this plan.

Bottomland Hardwood Forest

Bottomland hardwood forest was the native vegetative cover along this section of the Arkansas River. That habitat now is relatively rare and the remaining habitat is highly fragmented. As part of a carbon sequestration effort, an attempt to restore bottomland hardwood forest habitat by planting more than 1,400 acres of cropland and fallow fields on the refuge with hardwood seedlings has had limited success. There is substantial public opposition to additional reforestation activities. In light of that opposition, the refuge might explore trading some of the carbon sequestration acreage with other refuges, or removing tree plantings not covered under the carbon sequestration contract.

Most of the "reforested" area on the refuge currently is scrub/shrub habitat. These areas are potential habitat for a variety of migratory bird species that have a high priority in various conservation plans. Maintaining these areas in a scrub/shrub habitat condition over the long term

would require active management, such as periodic disturbance to set back succession. In addition, active management of mature bottomland hardwood forests could enhance habitat quality for resident wildlife and forest-breeding birds.

Foraging Habitat for Resident Wildlife

Increasing the portion of cropland available for foraging would benefit resident wildlife, particularly white-tailed deer.

Control of Invasive Plants

Control of invasive plant species that occur on the refuge (such as Johnsongrass, Bermuda grass, and kudzu) is necessary to limit their negative impacts on native plants and habitat quality. In addition, refuge activities that disturb native vegetation should be planned and managed to preclude expansion of these species or colonization by other invasive species such as Chinese tallow and trifoliate orange.

To some stakeholders, the presence of other non-native plant species on the refuge, including sawtooth oak and non-native pines, is an ecological integrity issue.

Cropland Management

The 1,200 acres of cropland on the refuge are managed under a cooperative agreement with a local farmer whereby a portion of the grain crop is left unharvested to provide foraging habitat for wintering waterfowl. There is a risk of losing this foraging habitat if farming conditions become unprofitable for the cooperating farmer. Soybeans are the principal cash crop on the harvested acreage, while the unharvested “refuge share” is primarily corn and milo. Altering the proportions of the current crops or planting alternative crops might help maintain the profitability of cooperative farming while improving the carrying capacity of waterfowl foraging habitat.

Management of Moist-Soil Habitats

The following management activities could help the refuge meet objectives for moist-soil habitat units:

- Develop complete water management capability, with priority on installing wells to provide water for the underbank units.
- Use periodic disturbance such as disking to set back succession and maintain production of annual grasses and sedges with the greatest food value for waterfowl.

Plans for managing moist-soil habitat should take into consideration the potential for negative impacts on invertebrate biomass and aestivating Strecker’s chorus frogs.

Enhancement of Aquatic Habitat

The Service considers backwater habitat (such as the cutoff channel on the refuge) to be of particular ecological value in river systems where the natural hydrology has been modified for navigation or flood control. The present quality of this habitat on the refuge could be enhanced by managing flow and water level fluctuations. There is a potential to enhance aquatic habitat through coordination with activities being planned and implemented by the USACE under the Arkansas River Navigation Project.

RESOURCE PROTECTION

Land Acquisition

Acquisition of privately owned lands within the current refuge acquisition boundary would enhance important refuge functions such as providing sanctuary for wintering waterfowl. Stakeholders expressed support for pursuing opportunities to purchase from willing sellers or make exchanges for priority tracts.

VISITOR SERVICES

Fishing

The quality of the recreational fishery on the refuge could be enhanced by active management, in cooperation with the USACE, of water level and flow conditions, water quality, and fish community composition.

There also is an opportunity to improve fishing access by building an ADA-compliant fishing pier at the Long Lake bank fishing area.

Hunting

There is a need to determine the maximum number of archery hunters refuge resources can support. The refuge also should evaluate the feasibility of adding a dove season to provide another hunting opportunity.

Several stakeholders requested the refuge to consider changing policies on use of deer stands and hunting dogs, and the balance between archery and gun hunting opportunities.

Wildlife Observation and Photography

The principal opportunities identified to improve wildlife observation and photography are developing a bird observation trail on a loop between the refuge office and the scrub/shrub and wooded area north of the office, and improving the Lodge Lake Trail and the short loop to the Levee Trail. There also may be opportunities to improve wildlife viewing by selectively managing vegetation in some areas adjacent to refuge roads.

Environmental Education and Interpretation

The refuge has no park ranger (Visitor Services) position, and therefore environmental education and interpretation activities are limited by the workloads of existing staff. However, even with this constraint the refuge could improve environmental education opportunities by developing a teacher activity kit and a set of self-guided activity lessons for teachers, and by partnering with Arkansas Technical University to involve their students in developing environmental education opportunities.

To the extent possible, the refuge should seek opportunities for involvement with environmental educators from nearby state parks and USACE recreation areas, and should identify community-based outreach activities to enhance communication with off-site audiences.

If sufficient staffing becomes available, it would be beneficial to develop an environmental education center on the refuge, in partnership with stakeholders.

Visitor Facilities

Participants in the public scoping process requested that the refuge make the following changes:

- Establish an area for archery target practice
- Make the pavilion and picnic tables available for public use
- Decrease the width of vegetation maintenance on the Levee Trail

The refuge should improve the accessibility of parking lots, boat launch sites, and observation sites for handicapped visitors.

There also are opportunities for improvement in how the refuge provides information to visitors, including changes in the number, location, or content of directional and information signs, information kiosks, brochures, and the refuge website.

REFUGE ADMINISTRATION

Funding and Staffing

Current staffing levels place substantial constraints on environmental education and interpretation activities and law enforcement capability.

Adaptive Management of Refuge Resources

The refuge should use adaptive management to enhance efficiency and improve results of habitat management activities on the refuge. Adaptive management involves assessing baseline conditions and establishing objectives for biological response, followed by a continuing effort to document management activities and their results, and modification of management activities as necessary to achieve the desired biological response. Adaptive management of refuge resources will require additional staff and funding for documentation of management activities and systematic collection and evaluation of response data.

Baseline Inventories of Refuge Biota

There is a need for comprehensive baseline inventories of the flora and fauna on the refuge to support an ecosystem-based adaptive management strategy. These inventories would document levels of biodiversity and identify functional components and keystone species of the various refuge ecosystems. A secondary benefit would be documentation of the presence or absence of species of particular conservation concern. Inventories of reptiles and amphibians, marsh birds, bats, mussels, and invasive plant species would be of particular value.

The CCP planning process also identified a need to map baseline distributions of:

- Climbing milkweed *(Sarcostemma cynanchoides* Decne. subsp. *cynanchoides)*;
- Native cane;
- Strecker's chorus frog; and
- Breeding habitat for Bell's vireo and painted bunting.

Volunteer Programs and Partnerships

There is an opportunity to improve volunteer support for the refuge by developing a list of volunteer opportunities and job descriptions, and then recruiting volunteers willing to work at the refuge on a regular basis. Among other tasks, trained volunteers with appropriate technical expertise could conduct or assist in wildlife surveys, habitat management projects, and rehabilitation of injured wildlife.

Development of a "Friends of the Refuge" group could make implementation of many of the recommendations of the CCP easier to achieve.

Cooperative Opportunities

There are opportunities to continue, expand, or initiate participation with other organizations in cooperative conservation activities on the refuge. These include:

- Continue cooperation on Christmas Bird Count (Audubon Society);
- Cooperative evaluation of aquatic enhancement activities through the Arkansas River Navigation Project (USACE);
- Continue annual dove surveys/breeding bird surveys (Pope County, USGS);
- Cooperative aquatic habitat evaluation (AGFC);
- Cooperative deer herd evaluation (Southeastern Cooperative Wildlife Disease Study or AGFC);
- Maintain or initiate collaborations of creel surveys and wildlife population surveys (Arkansas Technical University and AGFC).

Wilderness Review

Refuge planning policy requires a wilderness review as part of the comprehensive conservation planning process. The results of the wilderness review are included in Appendix H.

IV. Management Direction

INTRODUCTION

The Service manages fish and wildlife habitats considering the needs of all resources in decision-making. But first and foremost, fish and wildlife conservation assumes priority in refuge management. A requirement of the Improvement Act is for the Service to maintain the ecological health, diversity, and integrity of refuges. Public uses are allowed if they are appropriate and compatible with wildlife and habitat conservation. The Service has identified six priority wildlife-dependent public uses. These uses are: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Described below is the proposed CCP for managing the refuge over the next 15 years. This proposed management direction contains the goals, objectives, and strategies that will be used to achieve the refuge vision.

Four alternatives for managing the refuge were considered: Alternative A–Continue Current Management (No Action); Alternative B–Enhanced Management of Habitat and Fish and Wildlife Populations; Alternative C–Enhanced Management for Wildlife-Dependent Public Uses; and Alternative D–Balanced Enhancement of Management for Habitat and Wildlife Populations and Wildlife-Dependent Public Uses. Each of these alternatives is described in the Alternatives section of the Environmental Assessment. The Service chose Alternative D as the proposed management direction.

Implementing the proposed alternative will improve refuge operation by balancing enhanced habitat and fish and wildlife population management and enhanced wildlife-dependent public use management. This adaptive management alternative consists of implementation of selected enhancements from Alternatives B and C, focusing on specific enhancements for which inherent linkages will result in greater benefits to the refuge and surrounding area than the benefits of each enhancement implemented separately. For example, the baseline biological information developed under Alternative B will be useful in identifying opportunities to improve visitor experiences, and the increased volunteer support management developed under Alternative C will lead to increased efficiencies in collecting data on biological resources and responses (e.g., nuisance and invasive species occurrence, deer herd status, and evaluation of habitat management efforts) identified in Alternative B.

VISION

Holla Bend National Wildlife Refuge will continue to provide habitat for migrating and wintering waterfowl and other migratory birds through management of agricultural, scrub/shrub and grassland, bottomland hardwood, moist-soil, and aquatic habitats. Management of these habitats will enhance protection of threatened, endangered, resident, and migratory species, and increase wildlife diversity. Holla Bend National Wildlife Refuge will manage fish and wildlife resources to meet local, state, and national goals while promoting compatible wildlife-dependent recreational opportunities.

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies presented are the Service's response to the issues, concerns, and needs expressed by the planning team, the refuge staff and partners, and the public, and are presented in hierarchical format. Chapter V, Plan Implementation, identifies the projects associated with the various strategies.

These goals, objectives, and strategies reflect the Service's commitment to achieve the mandates of the Improvement Act, the mission of the Refuge System, and the purposes and vision of Holla Bend NWR. The Service intends to accomplish these goals, objectives, and strategies within the next 15 years.

FISH AND WILDLIFE POPULATION MANAGEMENT

Goal 1. Fish and Wildlife Population Management. Protect, maintain, enhance, and restore healthy and viable populations of migratory birds, resident wildlife, fish, and native plants in a manner that supports national and international treaties, plans, and initiatives.

Discussion: Holla Bend NWR is home to a large variety of resident fish and wildlife species, including both federal- and state-listed threatened and endangered species. In addition, a wide diversity of habitats provide feeding, resting, and loafing habitat for many species of migratory birds, more specifically wintering waterfowl.

Objective 1.1 Migratory Waterfowl - Within 5 years following plan approval, provide conservation management to meet population goals of the North American Waterfowl Management Plan (NAWMP) as stepped down through the Lower Mississippi Valley Joint Venture (LMVJV) step-down objectives.

Discussion: Concern over waterfowl population declines in the 1980s resulted in the establishment of the NAWMP, which focused the attention of federal, state, and private conservation groups on critical wintering and breeding areas. The LMVJV, which encompasses Holla Bend NWR, was selected as one of the wintering habitat focus areas.

Strategies:

- Participate in LMVJV semi-annual meetings and conference calls.
- Update the Holla Bend NWR wildlife and habitat management step-down plans.
- Review the LMVJV plan and implement goals and objectives into Holla Bend step-down plans.
- Analyze habitat conditions and waterfowl use to determine if preferred habitat conditions exist throughout the winter period.
- Review population objectives and compare with actual waterfowl use data annually.
- Complete an annual assessment on available forage amounts for both grain crops and moist-soil vegetation.
- Continue efforts to improve water management capabilities.
- Maintain a GIS database of all wood duck box locations.
- Maintain a GIS database of all water control structures.
- Establish water level gauges in moist-soil lands.
- Establish regular frequency for waterfowl surveys within staff constraints.
- Develop a plan to create a waterfowl sanctuary area where human disturbance to waterfowl would be minimal during the critical wintering period (November 15 – March 1)

Objective 1.2 Migratory Birds–Closure Zone and Sanctuary - Within 5 years following plan approval, maintain the existing Migratory Bird Closure Zone to ensure that the refuge remains as an area free from disturbance to wintering waterfowl.

Discussion: High waterfowl harvest rates and hunting activity in Arkansas make sanctuary an important function of Arkansas refuges. Sanctuary or refuge is critical for waterfowl to conserve energy to survive the winter period and conduct activities preparatory to perform other life functions, particularly reproduction.

Strategies:

- Maintain and update closure zone signage with boundary survey and placement of concrete markers.
- Continue to partner with USACE and private landowners to maintain signage on areas outside Holla Bend NWR.

Objective 1.3 Migratory Waterfowl–Surveying and Banding - Over the 15-year life of the plan, continue efforts to document waterfowl use of the various habitats on Holla Bend NWR.

Discussion: Regional banding quotas, which are stepped down to individual states and stations to distribute banding throughout the range of the wood duck, have been established to determine harvest and survival. Efforts should be made to meet any quota assigned to the refuge. Further, general observations indicate that the number of migratory Canada geese that winter on Holla Bend NWR has declined significantly during the last 5 or 6 years. Official goose survey data for the refuge in recent years has been incomplete.

Strategies:

- Conduct ground-based refuge-wide waterfowl surveys bi-weekly from October-March, and record species numbers by major units within the refuge and total numbers.
- Participate in the official mid-winder waterfowl survey, working with the state to report data in accepted formats.
- Work with the state to obtain assistance with aerial surveys and provide species numbers.
- When conducting ground counting/inventories in addition to or in lieu of aerial surveys, describe the procedures and repeat using the same procedures for each count.
- Monitor wood duck nest boxes regularly before, during, and after the breeding seasons.
- Meet wood duck banding quotas during the July 1 – September 30 preseason banding period, thereby contributing to the achievement of state, regional and national flyway goals.

Objective 1.4 Habitat - Within 5 years following plan approval, provide adequate moist-soil and agriculture habitats to meet the objective of approximately 1.28 million duck energy days (DEDs) of wintering waterfowl foraging habitat annually and the goose foraging habitat objective of about 360,000 use-days.

Discussion: Habitat objectives are based on food production and acres by habitat type for the complex of habitats including harvested and unharvested cropland and moist-soil areas. Each of these habitats is required to provide an important part of the food resources (i.e., native weed seeds, small grains, and invertebrates) required by wintering waterfowl.

Strategies:

- Provide approximately 150 acres of flooded moist-soil habitat.
- Conduct vegetative surveys annually in managed impoundments to assess waterfowl food production and vegetative treatment recommendations.

- Maintain and improve farming productivity via crop rotation, soil analysis, etc.
- Provide a minimum 25 percent total farm acreage in unharvested grain crop for winter feed.
- Improve water supply and control in de-watering moist-soil units.

Objective 1.5 Nesting and Resident Waterfowl - Within 5 years following plan approval, provide nesting and brood-rearing habitat for wood ducks to support objectives of the North American Waterfowl Management Plan at Holla Bend NWR.

Discussion: Early in the 20th century, nesting cavities for wood ducks became scarce. Many land managers began placing wood duck nest boxes in the appropriate habitat.

Strategies:

- Provide nesting, brood-rearing, and feeding areas for wood ducks in key areas of the refuge.
- Before the breeding season, inventory wood duck boxes for proper predator guards and nesting material, and repair as necessary.
- Conduct at least one wood duck nest box check after the breeding season to ensure the box and predator guards are in good condition and to refresh nesting material.
- Do not harvest older trees that may form natural cavities.
- Follow the publication entitled "Increasing Wood Duck Productivity: Guidelines for Management and Banding-USFWS Refuge Lands (Southeast Region)" (Division of Migratory Birds 2003) for nest box programs.
- Maintain a GIS database of all wood duck box locations.

Objective 1.6 Migrating Geese - Within 2 years following plan approval, provide corn, milo, and wheat browse to meet the needs of migrating geese.

Discussion: Geese require a high-energy food source such as corn or milo, but will also feed on green plants such as winter wheat. Corn must be located in the middle of relatively large (about 20 acres or larger) open fields because geese are wary of predators that may be lurking in cover. Winter wheat is planted by either the Holla Bend NWR staff or cooperative farmers in areas that need to be supplemented.

Strategies:

- Provide at least 300 acres of unharvested corn and milo in traditional goose use areas.
- Provide approximately 150-200 acres of winter wheat browse in traditional goose use areas.
- Keep habitats open in traditional goose use areas.
- Reevaluate the foraging needs of geese every 5 years.
- Evaluate the possible use of contract farming.
- Use force account farming to increase hot foods and browse.

Objective 1.7 Waterbirds, Marsh birds, and Shorebirds - Within 5 years following plan approval, investigate the potential importance of Holla Bend NWR for supporting marsh bird species in conjunction with meeting wintering waterfowl habitat requirements where possible, protect breeding marsh bird habitat, and enhance critical habitats for shorebirds, especially the American woodcock.

Discussion: Loss of freshwater emergent wetlands has occurred throughout the southeast as development pressures have increased. The king rail is thought to have been seriously impacted and the least bittern is another species of high concern. Further, American woodcock populations in the region have declined 19 percent since 1968, probably because of land use changes associated with land conversion and the maturing of forest habitats.

Strategies:

- Provide at least 30 acres of shallow water/mudflat habitat for fall migration of shorebirds that will also contribute to colonial wading birds and early-migrating waterfowl.
- Monitor fall shorebird response to habitat conditions, using protocols that contribute to the LMVJV and Manomet Bird Observatory data collection efforts.
- Implement surveys to identify rookery locations and provide protection from disturbance.
- Consider management for marsh bird species including king rail and least bittern within the context of managing for wintering waterfowl and wood duck brooding habitat.
- Implement marsh bird surveys for a better understanding of species diversity and numbers on the refuge.
- Enhance American woodcock habitat to contribute to the objectives of the American Woodcock Management Plan (U.S. Dept. of Interior, Fish and Wildlife Service 1990).

Objective 1.8 Forest-breeding, Forest-wintering, and Forest-transient Birds - Over the 15-year life of the plan, provide through forest restoration and/or management a diversity of forested habitats to support priority forest species. Forest management would provide benefits to priority Partners in Flight (PIF) forest birds as well as a suite of priority wildlife species dependent upon forest.

Discussion: In many areas of the Lower Mississippi Valley (LMV), minimum forest block size, forest fragmentation, and poor stand quality are issues affecting forest breeding birds. Because of Holla Bend NWR's small size and its location within a matrix of farmland, the refuge is limited in its ability to provide a large, contiguous forest block. Forest stand quality, however, can be improved using appropriate silvicultural treatments.

Strategies:

- Maintain and/or increase appropriate forest habitat structure for priority breeding bird species with appropriate forest management.
- If appropriate, continue forest restoration in areas adjacent to other blocks of forest to increase block size and provide habitat for early successional forest species.
- Improve forest stand quality using appropriate silvicultural treatments.
- To extent possible, implement desired forest conditions outlined in the report "*Forest Restoration, Management, and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat*" to provide habitat to benefit a wide variety of forest species and forest birds, including priority Partners in Flight (PIF) forest birds.

Objective 1.9 Grassland Birds - Within 5 years following plan approval, increase management efforts for grassland-dependent landbird species on Holla Bend NWR.

Discussion: Grassland birds were historically found in vast numbers across North America. Today, these birds have shown steeper, more consistent, and more geographically widespread declines than any other group of North American species. These losses are a direct result of the declining quantity and quality of habitat due to human activities. Tallgrass prairies historically occurred in the Holla Bend NWR area, and Holla Bend NWR provides an opportunity to provide wintering habitat for grassland species, which are seen regularly in large numbers in the field adjacent to the observation tower and most other fields that are currently in a grassland condition.

Strategies:

- Maintain old fields by reducing shrubby growth with fire or mechanical disturbance every 5-6 years.
- Establish Native Warm Season Grasses in soil-appropriate areas in strips between fields, around fields, or in small blocks, and maintain with management.
- Continue current roadside and levee management to reduce use by brown-headed cowbirds by delaying roadside mowing until August and possibly planting switchgrass.
- Provide through restoration or maintenance grasslands and old fields to support a diversity of wintering grassland bird species in the West Gulf Coastal Plan (Bird Conservation Region 25).
- Conduct surveys to determine the trends in grassland-dependent bird species populations.
- Correlate survey data with habitat management activities to measure bird response to management practices.

Objective 1.10 Scrub/Shrub Birds - Within 5 years following plan approval, increase management efforts for scrub/shrub landbird species on Holla Bend NWR.

Discussion: Scrub/shrub or early successional species as a group have continued to decline in the southeastern United States and would benefit from maintenance and restoration of habitat at Holla Bend NWR. Due to the amount of reforestation that has occurred at Holla Bend NWR during the past 10 years, a substantial acreage of early successional habitat is already being provided in support of the highest priority scrub/shrub breeding species, including painted bunting, Bell's vireo, and prairie warbler. While most of these reforested sites will eventually revert to more mature forested stands, other refuge areas have the potential to be maintained in an early successional condition.

Strategies:

- Conduct surveys to determine the trends in scrub/shrub-dependent bird species populations.
- Where appropriate and to the extent possible, provide through maintenance or restoration scrub/shrub habitat to support a diversity of priority early successional species in the West Gulf Coastal Plain (Bird Conservation Region 25).
- Maintain or increase current early successional habitats with management in appropriate areas while forest restoration areas mature.

Objective 1.11 Raptors - Within 5 years following plan approval, address other special bird-related issues on refuge lands as needed to support Service goals.

Discussion: Bald eagles are a North American species that historically occurred throughout the contiguous United States and Alaska. After severely declining in the lower 48 states between the 1870s and the 1970s, bald eagles have rebounded and re-established breeding territories in each of the lower 48 states except Vermont (nesting had not been known to exist in Arkansas since 1930). As of 2006, the bald eagle is now documented as successfully breeding on Holla Bend NWR.

Strategies:

- Continue to monitor numbers of wintering migratory bald eagles foraging and roosting on and adjacent to Holla Bend NWR, including data collected on the annual Audubon Christmas Bird Count along with standard observation records of numbers of bald eagles recorded by refuge staff.
- Continue to provide protection to bald eagle winter communal roosts as they are detected on the refuge.
- Continue to provide protection for bald eagles nesting on or adjacent to Holla Bend NWR, including implementing Southeast Regional Bald Eagle Management Guidelines, or the most recent update, on any bald eagle nest found on refuge lands.
- Survey/monitor other raptors through the annual Audubon Christmas Bird Count.

Objective 1.12 Threatened and Endangered Species - Within 2 years following plan approval, maintain or increase efforts to protect threatened and endangered species.

Discussion: Alligators were stocked at Holla Bend NWR in the late 1970s and early 1980s to curb the population of beaver. Most of the alligators took the Arkansas River back to warmer southern climates, but a few still exist on the refuge and surrounding areas. At current population levels, they are not considered problematic and should continue to receive protection, including educating the public about not feeding the alligators so they will not lose their fear of humans and become a hazard, requiring removal.

The interior least tern was listed as an endangered species in 1985 in several states, including Arkansas. While interior least terns are known to nest on sand bars both upstream and downstream of the refuge, there is no suitable nesting habitat on the refuge itself; however, the refuge does provide and should continue to provide foraging habitat associated with the large oxbow lake within the refuge.

The American burying beetle was designated as a federally endangered species in 1989 and is currently known to exist in only eight states, including Arkansas. While there is no American burying beetle occurrence information for Holla Bend NWR, the refuge does provide potential breeding habitat on higher elevation grassland, scrub/shrub, and forested areas.

Finally, as stated above, bald eagles have rebounded and are now successfully breeding on the refuge; therefore, protection for this species should continue.

Strategies:

- As resources permit, institute a complete survey for threatened and endangered species on Holla Bend NWR.
- As resources permit, institute a survey for alligators on Holla Bend NWR.
- Educate the public on safety in alligator habitat.
- Continue to provide foraging habitat for the least tern.

- Cooperate with the Service's Arkansas Ecological Services Field Office on an American burying beetle potential habitat survey.
- Cooperate with the Service's Arkansas Ecological Services Field Office on an Arkansas River shiner potential habitat survey.
- Continue to monitor numbers of wintering migratory bald eagles foraging and roosting on and adjacent to Holla Bend NWR, including data collected on the annual Audubon Christmas Bird Count along with standard observation records of numbers of bald eagles recorded by refuge staff.
- Continue to provide protection to bald eagle winter communal roosts as they are detected on the refuge.
- Continue to provide protection for bald eagles nesting on or adjacent to Holla Bend NWR, including implementing Southeast Regional Bald Eagle Management Guidelines, or the most recent update, on any Bald Eagle nest found on refuge lands.

Objective 1.13 Game Species - Within 5 years following plan approval, encourage and continue active forest habitat management and crop land management to maintain current habitat capability, evaluate turkey and deer populations and adjust hunting programs as needed, and study furbearer populations.

Discussion: Habitat capability or carrying capacity for white-tailed deer on Holla Bend NWR has never been assessed; however, historically the resident deer population has exhibited a high level of productivity. Local deer hunters have equated refuge deer population levels and quality to be directly related to agricultural crop production. Management actions implemented by Holla Bend NWR managers that potentially impact deer population levels and harvest opportunity have drawn considerable scrutiny from the public. Further, Holla Bend NWR is a relatively small area, yet supports a surprisingly large number of wild turkeys. As hunting for turkey increases with an additional permit hunt, it would be appropriate to monitor population trends. Finally, furbearer populations, especially raccoon and beaver, negatively impact flora and fauna; targeted removal of these species could mitigate these negative impacts, which include deterioration and loss of bottomland hardwood trees from beaver activity and impacts on the reproduction of forest breeding birds, bobwhite quail, wild turkeys, and various other grassland nesting birds from raccoon activity.

Strategies:

- Utilize hunting as a tool to manage wildlife populations when it is compatible with other refuge purposes and activities.
- Maintain a stable deer population through a program of either-sex hunting.
- Evaluate deer populations and adjust hunting programs as needed.
- Schedule deer herd health checks, to be conducted by the Southeastern Cooperative Wildlife Disease Study, or the AGFC.
- As hunting for turkey increases, refuge staff, as resources permit, will conduct pre-season gobbler surveys to monitor population trends.
- Continue to maintain quality deer and turkey habitat through a combination of active forest management and cooperative farming.
- As resources permit, conduct a baseline study of furbearer populations, their effects on refuge habitats, and develop effective population management plans that promote diversity and stability in flora and fauna.

Objective 1.14 Amphibians and Reptiles - Within 5 years following plan approval, conduct a complete inventory of reptiles and amphibians, monitor populations, and protect priority species.

Discussion: As a wetland habitat, Holla Bend NWR is important for reptiles and amphibians; however, little is known about their populations on the refuge. No list of reptiles and amphibians has been created. In addition, because there is currently no monitoring of reptile and amphibian populations, their response to habitat management is unknown.

A complete survey of all habitats on the refuge is needed to determine baseline populations. Special effort should be taken to locate any species which are not initially detected but would be expected to inhabit the refuge based on range maps since their absence may signal problems with the habitat. Due to their susceptibility to environmental degradation and recent global population declines, amphibians are a priority taxa to be monitored both as indicators of environmental health and to protect their populations. With extensive historical and current use of pesticides known to be harmful to amphibians in the surrounding watershed, amphibians need to be monitored for health and deformities.

Strategies:

- As resources become available, institute a complete survey for reptiles and amphibians on Holla Bend NWR. Make special efforts to locate species identified as absent but expected to be here.
- Evaluate suitability of reforestation tracts for reptiles and amphibians. Also, evaluate forest management techniques of reforested and existing forested areas to enhance reptile and amphibian populations.
- Moist-soil impoundments should be allowed to dry out completely at least every 3 years. Game fish should not be stocked in potential breeding ponds unless the waterbody is specifically developed for public fishing opportunities.
- Inventory and monitor reptiles and amphibians along the old river channel. Utilize basket traps to inventory basking turtles. Protect snags along the old channel from removal.
- Educate the public on safety in alligator habitat.

Objective 1.15 Fish and Other Aquatic Species - Within 10 years following plan approval, restore, enhance, and maintain the oxbow/old river channel fisheries, riparian habitats, and water quality as part of the comprehensive conservation and management of the Arkansas River fisheries and for native freshwater mussel conservation.

Discussion: Holla Bend NWR is located within the Arkansas River corridor and is bounded by an oxbow lake that was previously the river channel prior to being cut-off by the USACE for channelization and navigation. Numerous prominent game species and species of conservation concern inhabit the oxbow. For these reasons, the Service has repeatedly sought protection, conservation, and restoration for oxbows because they represent some of the most valuable habitat remaining after the original construction of the navigation system. Fisheries improvements from water level and quality management would increase fish densities and enhance sport fishing on the refuge and in the Arkansas River. Restoration, enhancement, and maintenance of water fluctuations and fish movement into and out of the oxbow/old river channel would contribute significantly to fisheries' conservation on the refuge seasonally and to the Arkansas River annually. Additionally, the current status and composition of mussels on the refuge are not known. Surveys need to be performed to determine mussel species composition and to devise appropriate management.

Strategies:

- Seek cooperative agreements or assistance from natural resource partners and/or Arkansas Tech University to monitor water quality, monitor effects, and annually assess the fisheries.
- Develop a program or request assistance of Arkansas Tech University in performing annual creel surveys.
- Provide and maintain existing public accesses.
- Adaptively manage the oxbow/old river channel based on the best available information and a balance between restoring natural conditions and conservation of resources considering the current situation, limitations, and realities.
- Seek cooperative assistance from natural resource partners and the Service's Arkansas Ecological Services Field Office to perform mussel surveys.

Objective 1.16 Exotic/Invasive/Nuisance Animals - Within 5 years following plan approval, identify presence of exotic, invasive, and nuisance animals in various refuge habitats, and utilize control methods to reduce these non-native and nuisance species.

Discussion: A basic tenet of the Improvement Act is management for biological diversity and integrity. Native and non-native invasive/exotic/nuisance animal species and free-roaming domestic and feral animals impact the refuge's ability to carry out desired management objectives to varying degrees.

The current status and composition of mussels on the refuge are not known; there is a slight possibility that zebra mussels may be present. Feral swine are a non-native animal found throughout Arkansas and on lands adjacent to the refuge. These wild hogs can have an adverse effect on the habitat and productivity of most native wildlife, using virtually all habitat components of the landscape and directly competing for food. Holla Bend NWR does not currently have management problems associated with feral swine; however, because feral swine are known in areas adjacent to the refuge, monitoring is necessary. Beaver activity has caused some deterioration and minimal loss of bottomland hardwood trees on the refuge. Although beavers do provide some beneficial wetland habitat on the refuge, it is necessary to continue monitoring and control to keep negative impacts on forest habitat at a minimum. Finally, in large numbers, raccoons are a nuisance species that negatively impact the reproduction of forest breeding birds, bobwhite quail, wild turkeys, and various other grassland nesting birds.

Strategies:

- Continue to use refuge staff to monitor and manage site-specific beaver damage by trapping and shooting beavers and removing beaver dams. If control cannot be performed by refuge staff, develop management guidelines to administer a trapping program consistent with sound biology, Service guidelines, and refuge purposes.
- Seek cooperative assistance from natural resource partners and the Service's Arkansas Ecological Services Field Office to perform mussel surveys to determine whether zebra mussels occur on the refuge, and if so, to what extent.
- Explore options for trapping to manage raccoon population.
- Continue to monitor for feral swine presence and to allow feral swine to be hunted during all established refuge hunt seasons.
- Work with adjacent landowners to participate in control efforts, especially for feral dogs, cats, and swine.

HABITAT MANAGEMENT

Goal 2. Habitat Management. Protect, maintain, enhance, and restore optimum habitat for the conservation and healthy management of migratory birds, resident wildlife, fish, and native plants in a manner that supports national and international treaties, plans, and initiatives.

Discussion: Holla Bend NWR's land management program is designed to provide habitat for a diversity of wildlife. Land management activities are implemented to provide food, cover, and shelter for wildlife throughout the year. Most of Holla Bend NWR's wildlife and habitat management programs are funded for supporting wintering waterfowl (impoundment and agricultural cropland management). However, the refuge is also involved with several other wildlife and habitat management programs. These programs include old field management; grassland management; forest management; and invasive, exotic, and nuisance plant species control.

Objective 2.1 Impounded and Shallow Waters - Over the 15-year life of the plan, continue efforts to improve and refine the management of impoundments and shallow water areas on Holla Bend NWR.

Discussion: Impoundments and shallow water areas are important habitats that provide food and resting areas for waterfowl and other wildlife. To be effective, excellent water level management is required. This task is accomplished at Holla Bend NWR in two ways: (1) Leaving water on an impoundment year-round to promote the growth of submerged aquatic vegetation; and (2) conducting moist-soil management, which includes timely dewatering activities. Suitable habitat can always be provided for shorebirds, waterfowl, and marsh birds by staggering the rotation among the existing moist-soil units. A unit that is disked will provide mudflats for shorebirds during the first year, annual grasses and sedges for waterfowl during the second and third years, and perennial vegetation for marsh birds during years fourth and fifth years, at which time this unit could then be treated again to set back succession.

Strategies:

- Conduct moist-soil plant composition surveys to assist in determining if or when moist-soil units should be disked. Normally, most moist-soil units will need to be shallow-disked every 3 to 5 years.
- Develop a rotational management scheme for soil disturbance activities to keep moist-soil areas in an early successional stage.
- For each waterfowl impoundment, establish water level gauges and maintain accurate records of water level and vegetation management activities to correlate management actions, plant response, and waterfowl response.
- In late summer or early fall, sample moist-soil impoundment plant communities to determine, at a minimum, the percent of poor, fair, and good waterfowl foods available in each impoundment.
- Prepare a Water Management Plan for Holla Bend NWR moist-soil units.
- Do not drawdown moist-soil units at the same time.
- Stagger water removal throughout the late spring and summer.
- Precede mowing by conducting plant composition surveys.
- Use "Moist Soil Management Guidelines" to guide moist-soil unit management activities.
- A water management plan should be developed and implemented to include flood dates and rotations for management units.

Objective 2.2 Open Water - Over the 15-year life of the plan, restore, enhance, and maintain the oxbow/old river channel fisheries, riparian habitats, and water quality as part of the comprehensive conservation and management of the Arkansas River fisheries and for native freshwater mussel conservation.

Discussion: Holla Bend NWR is located within the Arkansas River corridor and is bounded by an oxbow lake that was previously the river channel prior to being cut-off by the USACE for channelization and navigation. The oxbow is separated from the river by a levee on the upstream end and a low-water weir downstream. Water can overflow the weir and levee depending upon river water stages. Fish, river water, and sediments move into and through the oxbow when spring river water flows allow. Water and sediments also move into the oxbow year-round through a small creek that catches drainage from local crop and cattle farms. Many local farmers also have liquid and semi-solid waste from poultry processing plants and municipal waste plants incorporated into the soil as fertilizer.

Numerous prominent game species and species of conservation concern inhabit the oxbow. For these reasons the Service has repeatedly sought protection, conservation, and restoration for oxbows, because they represent some of the most valuable habitat remaining after the original construction of the navigation system. Fisheries' improvements from water level and quality management would increase fish densities and enhance sport fishing on the refuge and in the Arkansas River. Restoration, enhancement, and maintenance of water fluctuations and fish movement into and out of the oxbow/old river channel would contribute significantly to fisheries conservation on the refuge seasonally and to the Arkansas River annually. Additionally, the current status and composition of mussels on the refuge are not known. Surveys need to be performed to determine mussel species composition and to devise appropriate management.

Strategies:

- Seek cooperative agreements or assistance from natural resource partners and/or Arkansas Tech University to monitor water quality and effects, and to annually assess the fisheries.
- Develop a program or request assistance of Arkansas Tech University in performing annual creel surveys.
- Provide and maintain existing public accesses.
- Adaptively manage the oxbow/old river channel based on the best available information and a balance between restoring natural conditions and conservation of resources considering the current situation, limitations, and realities.
- Seek cooperative assistance from natural resource partners and the Service's Arkansas Ecological Services Field Office to perform mussel surveys.
- Seek cooperative assistance from natural resource partners and the Service's Arkansas Ecological Services Field Office to monitor agricultural runoff and its effects on refuge flora and fauna.

Objective 2.3 Agricultural Cropland - Within 5 years following plan approval, utilize a well-managed farming program to provide food, cover, and resting areas (1200 acres) for waterfowl and other wildlife on Holla Bend NWR.

Discussion: Farming is an integral part of Holla Bend NWR's habitat management program, providing food, browse, cover, and resting areas for waterfowl and other wildlife. Cooperative farming on 1,200 acres is currently being used to meet these goals.

Strategies:

- Continue current cooperative farming program. Modify the current program as needed.
- Review acreage needed to provide for the annual hot food, primarily corn, and green browse needs of waterfowl and geese and their proper placement on Holla Bend NWR.
- Identify highest priority fields to achieve waterfowl and geese management goals.
- Secure equipment, training, and other resources to carry out limited force account farming operations.
- Continue to use cooperative farming operation to help the refuge meet objectives by maintaining a mix of grain crops "hot foods" and early successional moist-soil habitats.

Objective 2.4 Scrub/Shrub - Within 5 years following plan approval, maintain native cane stands and provide through maintenance or restoration scrub/shrub habitat to support a diversity of priority early successional species in the West Gulf Coastal Plain (Bird Conservation Region 25).

Discussion: Scrub/shrub or early successional species as a group have continued to decline in the southeastern United States and would benefit from maintenance and restoration of habitat at Holla Bend NWR. Due to the amount of reforestation that has occurred at Holla Bend NWR during the past 10 years, a substantial acreage of early successional habitat is currently being provided in support of the highest priority scrub/shrub breeding species. In time, though, most of the reforested sites will eventually revert to more mature forested stands. However, other refuge areas have the potential to be maintained in an early successional condition.

Strategies:

- Maintain or increase early successional habitats with management in appropriate areas while forest restoration areas mature.
- Maintain current native cane stands.

Objective 2.5 Grassland - Within 5 years following plan approval, increase management efforts for grassland-dependent landbird species on Holla Bend NWR.

Discussion: Grassland birds were historically found in vast numbers across North America. Today, these birds have shown steeper, more consistent, and more geographically widespread declines than any other group of North American species. These losses are a direct result of the declining quantity and quality of habitat due to human activities. Holla Bend NWR provides an opportunity to provide wintering habitat for grassland species, which are seen regularly in refuge fields that are currently in a grassland condition.

Strategies:

- Develop fire management plan and annual burn plans, coordinating burn activities with local and regional burn crews (Arkansas Tech University Fire Crew, TNC, AGFC, USDA Forest Service, and USFWS) to carry out prescribed burns on Holla Bend NWR
- Maintain old fields by reducing shrubby growth with fire or mechanical disturbance every 5-6 years.
- Establish native warm season grasses in soil-appropriate areas in strips between fields, around fields, or in small blocks, and maintain with management.

- Continue to maintain roadside and levee management to reduce use by brown-headed cowbirds by delaying roadside mowing until August and possibly planting switchgrass.
- Provide through restoration or maintenance grasslands and old fields to support a diversity of wintering grassland bird species in the West Gulf Coastal Plan (Bird Conservation Region 25).
- Conduct surveys to determine the trends in grassland-dependent bird species populations.
- Correlate survey data with habitat management activities to measure bird response to management practices.

Objective 2.6 Forests - Within 10 years following plan approval, manage forested habitats to provide a natural diversity of plant and animal species found in the LMRV to fulfill the mission and purposes of Holla Bend NWR.

Discussion: For forest-dwelling wildlife, the size, structure, and composition of forests are important to provide highly productive habitat. Within-stand successional patterns result in a shifting mosaic of patches of various ages and sizes across the landscape. At any given point in time, a particular stand may not provide desired conditions, but a different stage of that stand's succession may be crucial for providing habitat for priority wildlife species. Ideal habitat conditions for any given species are transient and the presence and abundance of species will vary temporally according to the successional stage of the stand and the surrounding landscape. In forested systems, the timeframe necessary to achieve desired conditions within a stand for a given species may be decades. Thus strategic long-term planning and implementation are necessary to achieve forest habitat goals.

Strategies:

- Inventory forested habitat to assess current condition and determine desired future condition.
- Update and implement Forest Habitat Management Plan.
- Establish an organized, safe, and well-documented prescribed burning program; develop and implement a Fire Management Plan.
- As resources permit, survey selected plants, fish, and wildlife in forested areas pre- and post-management to monitor the effectiveness of forest management and change.
- Maintain 100-acre Research Natural Area.
- Maintain native cane stands.
- Promote large trees and retain snags.
- Continue to provide protection to bald eagle winter communal roosts as they are detected on the refuge.
- Continue to provide protection for bald eagle nests and potential nesting trees on or adjacent to Holla Bend NWR, including implementing Southeast Regional Bald Eagle Management Guidelines, or the most recent update, on any bald eagle nest found on refuge lands.

Objective 2.7 Invasive Plants - Identify presence of invasive species in various refuge habitats and identify control methods to reduce non-native plants.

Discussion: Invasive plants are introduced species that become aggressive when moved without their natural competition to a new environment. Some of these invasive plants exist on the refuge and may benefit from current and future management practices. Invasive species that are known to occur on the refuge and potentially need control are Johnson grass, Bermuda grass, and kudzu.

Strategies:

- Inventory and map the distribution of non-native invasive plant species and develop an Integrated Pest Management Plan.
- Implement a control program to reduce/eliminate non-native invasive vegetation with an emphasis on control and reduction of Johnson grass, Bermuda grass, and kudzu.
- Apply for alternate funding sources to address invasive species concerns.
- Require the use of integrated pest management techniques and best management practices in all cooperative farming agreements and assist the farmers with information transfer, experimental approaches, and a range of approved control options.
- Research/monitor non-native invasive plant response to control programs.

RESOURCE PROTECTION

Goal 3. Resource Protection. Provide coordination and cooperation among organizations to enhance effective management and protection of natural and cultural resources on Holla Bend NWR.

Discussion: Resource protection means safeguarding the integrity of various resources present on refuges, including wildlife, habitat, and cultural resources. Resource protection includes ensuring that any use of refuge lands is compatible with the purposes of those sites and the Service's mission; reducing the illegal take and overuse/exploitation of biological and cultural resources, and minimizing or eliminating adverse effects on trust species, their habitats, and Service lands by working with other regulatory and land management agencies, developers, and resource users.

Objective 3.1 Law Enforcement - Over the 15-year life of the plan, maintain and improve an effective law enforcement program to ensure resource protection, visitor safety, and that visitors adhere to all refuge related acts and regulations.

Discussion: Protecting the natural resources of Holla Bend NWR and ensuring the safety of all refuge visitors are fundamental responsibilities of the Refuge System. As crime continues to increase in America, refuges face a larger and more complicated enforcement problem. A full-time officer is needed to fulfill the law enforcement requirements of Holla Bend NWR.

Strategies:

- Hire a law enforcement officer.
- Continue to cooperate with state, county, and local law enforcement agencies by developing partnerships to share law enforcement responsibilities.
- Provide assistance to Service special agents and state conservation activities within existing policy, as requested.
- Provide specialized communication and surveillance equipment.

Objective 3.2 Cultural Resources - Within 5 years following plan approval, continue to identify and protect cultural resources on Holla Bend NWR in accordance with federal and state historic preservation laws and regulations.

Discussion: With the enactment of the Antiquities Act of 1906, the Federal Government recognized the importance of cultural resources to the national identity and sought to protect archaeological sites and historic structures on those lands owned, managed, or controlled by the United States. Cultural

resources include archaeological resources, historic and architectural properties, and areas or sites of traditional or religious significance to Native Americans (Service Manual 614 FW 1, Policy, Responsibilities, and Definitions).

Strategies:

- Comply with Section 106 of the National Historic Preservation Act, the Archaeological Resources Protection Act of 1979, and any other pertinent historic preservation mandates prior to the initiation of any undertaking or habitat management action.
- Draft a cultural resources overview of Holla Bend NWR using existing information, such as the regional and State Site File Databases and technical reports describing past archaeological, historical, and geomorphic investigations.
- By 2014, complete an archaeological survey for the refuge using a comprehensive scientific approach.
- Develop and implement law enforcement procedures to protect cultural resources and to diminish site destruction due to looting and vandalism.
- Facilitate partnerships to aid in the management of cultural resources with the pertinent federal and state agencies, the State Historic Preservation Office, professional archaeologists, Native American communities, and the general public.
- Develop and implement a plan to protect identified sites in consultation and cooperation with federally recognized Native American tribes, the Arkansas State Historic Preservation Officer, and the professional archaeological community.
- In consultation with the regional archaeologist, integrate cultural resources management and protection strategies into refuge management plans.
- Catalog refuge artifacts and historic documents and assure appropriate archival.

Objective 3.3 Private Land Assistance - Work with landowners and others to restore habitats to help achieve refuge objectives and the objectives of various national and regional plans for the LMRV.

Discussion: Private landowners play a key role in providing habitat to help achieve the goals and objectives of national and regional plans, such as the NAWMP, Partners in Flight, etc. The Service's private lands program, known as Partners for Fish and Wildlife, provides technical assistance and delivers financial assistance to landowners interested in maintaining or restoring native habitat (in the LMRV, most Partners for Fish and Wildlife projects involve the restoration of hydrology and hardwood reforestation). Other agencies, particularly the USDA, have large programs, including the Wetland Reserve Program for converting croplands to wetlands to restore wetland habitats on private lands in the LMRV. The Farm Services Agency administers the Conservation Reserve Program, which provides at least 50 percent cost-share to reforest wetland and highly erosive sites in the LMRV. Various other programs are also available.

Strategies:

- Continue to work with and support the Service's Arkansas Ecological Services Field Office and other organizations in efforts to promote wildlife conservation on private lands.
- Continue to work with and support the Service's Arkansas Ecological Services Field Office and other organizations in efforts to eliminate invasive and/or exotic plant and animal species on adjacent private lands.
- Work with regional private lands biologist to acquire support for higher ranking of projects related to Holla Bend NWR as appropriate.

- Continue working with private landowners and other partners (e.g., NRCS) to develop and deliver programs that compliment the purpose of the refuge.
- Work through a variety of programs, including Partners for Fish and Wildlife, Wetland Reserve Program, and the Conservation Reserve Program to provide technical and financial assistance necessary to promote habitat enhancement/restoration on private lands adjacent to and in proximity to Holla Bend NWR.

Objective 3.4 Cooperation with Partners - Over the 15-year life of the plan, maintain existing partnerships to improve conservation of natural resources on and off refuge lands.

Discussion: In recent years, the Service has encouraged national wildlife refuges to increase their cooperation with partners. Through partnerships, the refuge harnesses not only the manpower of these groups, but also their knowledge, wisdom, and enthusiasm. This activity leverages resources to conserve the natural resources on refuge lands and elsewhere.

Strategies:

- Continue cooperation with AGFC as resources permit.
- Communicate key issues with off-site audiences by attending local civic organization meetings.
- Develop partnerships with universities, colleges, and other research-based organizations to conduct wildlife and habitat studies.

Objective 3.5 Land Acquisition and Protection - Over the 15-year life of the plan, continue pursuit of willing sellers and explore methods to protect land to fulfill the purposes for which the refuge was established.

Discussion: Land acquisition efforts are intended to contribute to the goals of the NAWMP and the LMVJV. The current refuge acquisition boundary encompasses 8,319 acres. To date, 6,616 acres have been acquired by the Service. The remaining 1,703 acres in private ownership are distributed primarily around the perimeter of the acquisition boundary and include cropland, water/lakes, mixed woodlots, and pasture, mostly in small tracts owned by numerous landowners. Acquisition of these small tracts would greatly facilitate refuge management, especially acquisition of those tracts along the old river channel, which are in the Migratory Bird Closure Zone. Adjacent lands could also be protected through easements, etc.

Strategies:

- Continue to pursue opportunities to acquire lands within the acquisition boundary to fulfill the purposes for which the refuge was established as opportunities and willing sellers arise.
- Explore methods to protect adjacent lands (conservation easements, management agreements).

Objective 3.6 Urbanization and Industrialization - Increase efforts to protect refuge resources and minimize impacts from urbanization.

Discussion: Residential, commercial, and industrial development continues to destroy and degrade farmland and natural areas at an alarming rate. Farmland conversion to commercial and industrial uses is occurring in the vicinity of Holla Bend NWR. To stimulate economic development in the area, local planners are developing a river port and rail port in close proximity to the airport at Russellville, Arkansas. This transportation complex will be nearly directly across the Arkansas River from the refuge.

Strategy:

- Work with local city, county, and state planning departments to minimize encroachment onto refuge boundaries and adverse effects of nearby commercial and industrial development on refuge resources.

VISITOR SERVICES

Goal 4. Visitor Services. Develop and implement a quality wildlife-dependent recreation program that leads to a greater understanding and appreciation of fish and wildlife resources and enjoyable recreational experiences.

Discussion: The Improvement Act states that compatible wildlife-dependent recreational uses are the priority public uses of the Refuge System (e.g., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation) and will receive enhanced consideration over other general public uses. The Service will only permit other uses when it is determined that they are appropriate and compatible and that they are legally mandated, provide benefits to the Service, occur due to special circumstances, or facilitate one of the priority wildlife-dependent recreational uses.

Objective 4.1 Hunting - Over the 15-year life of the plan, provide safe, quality hunting opportunities consistent with sound biological principals, in support of the refuge's wildlife management objectives and established purposes, and in accordance with Refuge System policy and state and federal laws.

Discussion: Hunting is an appropriate use of wildlife resources of the Refuge System, when compatible. Quality hunting programs must be conducted in a safe and cost-effective manner, and to the extent practicable, carried out in accordance with state regulations. Holla Bend NWR has a hunt plan that has been updated as needed to reflect current hunts. The refuge is closed to all migratory bird hunting.

Strategies:

- Continue current hunting program with minor annual modifications to reduce human disturbance to waterfowl, eagles, and other sensitive wildlife.
- Evaluate the hunting program annually, to assure it is consistent with the state seasons and regulations.
- On a regular basis, ensure adequate signage and law enforcement presence utilizing Service and/or state law enforcement officers.
- Annually, review 50 CFR special regulations and hunt brochure to ensure that proper codification and information are documented.
- Within a 5-year period following plan completion, provide safe, quality hunting opportunities for persons with disabilities by improving access to hunters with special handicapped equipment and/or needs.
- Regularly encourage youth to enjoy hunting, fishing, wildlife observation, and other wildlife-dependent recreational activities.

- Within a 5-year period following plan completion, develop a hunting program section in the step-down visitor services plan.

Objective 4.2 Fishing - Over the 15-year life of the plan, conduct a safe, quality fishing program in accordance with Refuge System policy, and state and federal laws.

Discussion: Fishing is an appropriate use of wildlife resources on units of the Refuge System, when compatible. Fishing programs must be quality programs, conducted in a safe and cost-effective manner, and to the extent practicable, carried out in accordance with state regulations. There are 500 acres of open lakes on Holla Bend NWR that are part of the old Arkansas River channel that encompasses most of the refuge. Currently, sport fishing is permitted on the refuge March 1 through October 31. Fishing is closed the other months to limit disturbance to wintering waterfowl, although bank fishing only (no boats allowed) is permitted in Long Lake from November 1 through February 28.

Strategies:

- Continue the current fishing program at Holla Bend NWR with annual evaluation and needed modifications.
- Within a 5-year period following plan completion, develop a fishing program section in the step-down visitor services plan.
- Within a 10-year period following plan completion, develop an ADA-compliant fishing pier on old river channel.

Objective 4.3 Wildlife Observation and Photography - Within 5 years following plan approval, conduct a safe, quality wildlife observation and photography program in accordance with Refuge System policy and state and federal laws.

Discussion: Wildlife observation and wildlife photography are appropriate wildlife-dependent recreational uses of Refuge System lands, when compatible. Viewing and photographing wildlife in natural or managed environments foster a connection between visitors and natural resources. Holla Bend NWR provides visitors an incredible opportunity to see bald eagles, hawks, and waterfowl. Most of the non-consumptive recreational visitors come to the refuge to see birds–there are several Audubon groups in the area that visit the refuge. Currently, the refuge has a bird list brochure and a brochure about mammals found on the refuge. The website provides a brief summary of key events at the refuge each month, including good wildlife viewing opportunities.

Strategies:

- Maintain wildlife drive as one-way loop. Put a “Wrong Way” sign on Holla Bend Road just after the Holla Bend Shop road intersection. Evaluate conflicts of other refuge users and make appropriate determinations regarding one-way loop annually.
- Within a 5-year period following plan completion, place trailhead kiosk at beginning of all trails. Information should include length of trail, difficulty of trail, things you might see, safety precautions, and any rules that need to be highlighted.
- Within a 5-year period following plan completion, promote the deer blinds as photo blinds/observation blinds the rest of the year.
- Within a 5-year period following plan completion, develop ADA-accessible parking at trailheads and observation tower.

- Consider a directional sign at starting point of the wildlife drive that lists the visitor opportunities and which direction to go. Evaluate conflicts of other refuge users and make appropriate determinations regarding one-way loop annually.
- Within a 5-year period following plan completion, develop the Lodge Lake Nature Trail.
- Within a 5-year period following plan completion, develop a wildlife drive brochure or tear sheet.
- Within a 10-year period following plan completion, develop live remote camera for eagle nest.
- Within a 5-year period following plan completion, install spotting scopes on observation tower.

Objective 4.4 Environmental Education and Wildlife Interpretation - Within 5 years following plan approval, conduct a safe, quality environmental education and interpretation program to communicate the most important fish, wildlife, habitat, and other resource issues to visitors of all ages and abilities.

Discussion: Formal environmental education efforts advance public awareness, understanding, appreciation, and knowledge of key fish, wildlife, plant, and resource issues. Currently, Holla Bend NWR does not have a visitor services park ranger position–visitor services functions and responsibilities, including environmental education, are provided by the refuge manager and other staff when work loads permit, and staff-led interpretive programs are not routinely offered. The refuge is located near Dardanelle and Russellville, which have a combined population of approximately 30,000. Dardanelle Elementary, Middle, and High School are within 7 miles of the refuge. Because of the ease of access, the close proximity of schools in Dardanelle and Russellville, and the diversity of habitats and wildlife, the potential for environmental education is very high.

Strategies:

- Within a 5- to 10-year period following plan completion, develop a teacher activity kit about the refuge and resources (eagles, waterfowl, songbirds, habitats, etc.).
- Within a 5- to 10-year period following plan completion, develop a set of self-guided activity lessons for teachers to use when bringing students to the refuge.
- Within a 5-year period following plan completion, develop a partnership with Arkansas Tech that involves students from the college helping develop environmental education opportunities at the refuge. This could include an internship program or a community service type program.
- Within a 5-year period following plan completion, get involved in the local environmental education group from the state parks/USACE recreation areas.
- Continue current interpretation with annual evaluation and needed modifications.
- Within a 5-year period following plan completion, develop programs to connect children and with nature.
- Within a 5-year period following plan completion, develop an interpretation program section in the step-down visitor services plan for the refuge.

Objective 4.5 Public Use Limitations - Over the 15-year life of the plan, review public use activities that may lead to wildlife disturbance or habitat degradation and initiate changes as needed to enhance resource protection and reduce illegal activities.

Discussion: Public use activities on Holla Bend NWR must be evaluated periodically to ensure wildlife resources and habitats are not being compromised. The listed strategies were designed to limit some public use activities in order to increase resource protection and reduce illegal activities.

Strategies:

- Continue to prohibit all-terrain vehicles on all refuge lands except by special use permit.
- Within a 5-year period following plan completion, develop a public access and limitation program section in the step-down visitor services plan for the Complex.
- Continue to close Holla Bend NWR to public entry between sunset and sunrise except for special events led by refuge staff.

Objective 4.6 Visitor Services Plan - Within 5 years following plan implementation, review and update the Visitor Services Plan.

Discussion: A Visitor Services Plan documents goals, measurable objectives, strategies, and evaluation criteria for all visitor services, stepping down the direction and guidance outlined in the CCP. Careful planning provides the visiting public with opportunities to enjoy and appreciate fish, wildlife, plants, and other resources.

Strategies:

- Within a 5-year period following plan completion, review and update the Visitor Services Plan.
- Annually review plan to seek new strategies of welcoming and orienting refuge visitors while promoting the Service, Refuge System, and Holla Bend NWR.

Objective 4.7 Volunteer Program - Within 8 years following plan approval, develop a planned volunteer program for Holla Bend NWR.

Discussion: Volunteers and refuge support groups fortify refuge staffs with their gifts of time, skills, and energy and are integral to the future of the Refuge System. Currently, the volunteer program at the refuge is small. No staff person has the duty of developing and managing a formal volunteer program for the refuge. Annually, there are 3-5 volunteers that occasionally participate in refuge activities.

Strategies:

- Within a 5-year period following plan completion, establish volunteer program with annual evaluations and needed modifications.
- Within a 5-year period following plan completion, develop a section on the refuge website to provide information about the volunteer program.
- Within a 5-year period following plan completion, develop recreation vehicle pads in support of the Service volunteer camper program.
- Within a 5-year period following plan completion, develop volunteer-led interpretive programs for peak times (e.g., roving interpreters and offsite presentations).
- Within a 5-year period following plan completion, develop a volunteer program section in the step-down visitor services plan for the refuge.
- Within a 5-year period following plan completion, explore opportunities for a friends support group for the refuge.

REFUGE ADMINISTRATION

Goal 5. Refuge Administration. Provide administrative support and guidance to ensure that the goals and objectives for fish and wildlife populations, habitats, resource protection and conservation, and visitor services are achieved for Holla Bend NWR.

Discussion: The administrative functions associated with the refuge include a wide range of activities that are critical to the mission of the Refuge System and the purpose(s) of each refuge. These functions include staffing, training, budgeting, planning, law enforcement, facility management, computerized databases, road infrastructure, community relations, partnering, and equipment maintenance. To carry out these functions, a national wildlife refuge must have the appropriate level of funding.

Objective 5.1 Personnel - Within the 15-year life of the plan, obtain additional staff and the resources needed to accomplish all of the outlined comprehensive conservation management goals and objectives.

Discussion: Currently, Holla Bend NWR has four full-time employees and also manages Logan Cave NWR in Benton County, Arkansas. To implement this CCP and accomplish the vision, goals, and objectives identified for Holla Bend NWR, additional resources will be needed. New staff positions at Holla Bend NWR will need to be focused on resource protection, resource conservation, habitat management, and environmental education and interpretation.

Strategies:

- Provide continuing education and training opportunities to staff members to include computer-based systems.
- Hire a law enforcement officer, wildlife biologist, biological science technician, park ranger, refuge operations specialist, and mechanic.

Objective 5.2 Facilities and Equipment - Within the 15-year life of the plan, provide adequate and functional offices, maintenance facilities, and equipment to support existing and future expansions of refuge programs.

Discussion: Adequate office space, visitor center, modern maintenance facilities, and updated office equipment are essential components needed to maintain an efficient and well-organized staff. Currently, the only staffed visitor contact station is the refuge administrative office. The refuge is located in the middle of growing communities with schools, colleges, and universities within an hour's drive. Numerous students, teachers, parents, and other resource organizations utilize the refuge as an outdoor classroom.

Strategies:

- Increase current office space at headquarters building.
- Provide modern office equipment and supplies to include updated computer hardware/software, high-speed Internet access, digital cameras, GPS, and video cameras and projectors.
- Construct a visitor center with classroom and laboratory space for environmental education.
- Provide safe, efficient, and modern maintenance equipment, facilities, and vehicles to carry out refuge operations.

- Dedicate operational funds for performing all biological work to include: basic wildlife and habitat inventorying and monitoring on refuge lands.
- Create and maintain a refuge operated website.
- Develop GIS products and/or capabilities to show and document locations and trends of such conditions as: invasive plant habitat locations/trends; moist-soil impoundment locations; farmed fields and acreage; forest habitats; boundary locations; and urban encroachment.
- Construct a dual purpose ADA-compliant fishing pier/wildlife observation pier located along the old river channel.

V. Plan Implementation

INTRODUCTION

Refuge lands are managed as defined under the Improvement Act. Congress has distinguished a clear legislative mission of wildlife conservation for all national wildlife refuges. National wildlife refuges, unlike other public lands, are dedicated to the conservation of the Nation's fish and wildlife resources and wildlife-dependent recreational uses. Priority projects emphasize the protection and enhancement of fish and wildlife species first and foremost, but considerable emphasis is placed on balancing the needs and demands for wildlife-dependent recreation and environmental education.

To accomplish the purpose, vision, goals, and objectives contained in this plan for Holla Bend NWR, this section identifies projects, funding and personnel needs, volunteers, partnerships opportunities, step-down management plans, a monitoring and adaptive management plan, and plan review and revision.

PROPOSED PROJECTS

Listed below are the proposed project summaries and their associated costs for fish and wildlife population management, habitat management, resource protection, visitor services, and refuge administration over the next 15 years. This proposed project list reflects the priority needs identified by the public, the CCP planning team, and refuge staff based upon available information. These projects were generated for the purpose of achieving the refuge's objectives and strategies. The primary linkages of these projects to those planning elements are identified in each summary.

These projects were generated for serving the purposes of the refuge and achieving the goals, objectives, and strategies for the refuge and are organized by goal and project categories. The Refuge Operations Needs System (RONS) and/or Service Asset and Maintenance Management System (SAMMS) project number is included for those projects already defined in RONS, which is a Service system of identifying and prioritizing new projects, or in SAMMS, which is a Service system of identifying and prioritizing maintenance projects.

The primary linkages of these projects to those planning elements are identified in each summary or the project category. A complete listing of each proposed project, its associated costs, and recurring costs can be found in Appendix J.

FISH AND WILDLIFE POPULATION MANAGEMENT

Project Category 1 - Increase Control of Invasive, Exotic, and Nuisance Animal Species

The control of invasive, exotic and/or nuisance animal species, particularly beavers and coyotes, is critical to refuge management. Coyotes prey on wintering waterfowl and several game species throughout the year. Beavers hamper water management efforts throughout refuge impoundments and along the entire old river channel. The refuge is also close to private and state lands that have impacts from feral swine. Currently, the refuge is using a multi-faceted control program including public hunting, and refuge staff and volunteer control through trapping. These methods have proven to be inadequate in the control of these nuisance animals. Without effective control, these nuisance animals will have a substantial negative impact on refuge flora and fauna. (Linkage: Objective 1.16).

Project 1- Remove nuisance beaver and coyotes from refuge lands.

This project will provide professional animal damage control personnel to supplement current refuge efforts. Control work will be contracted with USDA Animal Damage Control and/or other professional nuisance animal control personnel. The estimated first year cost will be $25,000, with a recurring cost of $10,000.

Project Category 2 - Increase Inventorying, Surveying, and Monitoring of Plant and Animal Populations

Inventorying, surveying, and monitoring of plant and animal populations are needed to ensure that the biological integrity of refuge lands is maintained. This information is critical for developing habitat management plans that will influence all other management activities. This project category contains two projects, which include two additional staff members. (Linkages: Objectives 1.1; 1.3-4; 1.6-14; and 1.16)

Project 2A - Enhance Biological Data to Improve Management of Holla Bend NWR by Establishing a Wildlife Biologist Position – RONS # 43590-FY08-4066

Science-based inventorying, surveying, and monitoring of plant and animal populations are critical to ensuring the biological integrity of the refuge. Information collected will serve as the basis for developing and updating wildlife management plans, habitat management plans, and annual work plans. This information is also paramount for monitoring and tracking responses of habitat and wildlife to global climate changes. Project 2A provides funds for the hiring of a wildlife biologist to conduct inventorying and monitoring of the fish, wildlife, and plant populations which utilize refuge lands. This position will also coordinate research activities and Strategic Habitat Conservation goals with local colleges and universities, various state and federal agencies, and local land owners. This project will also support Projects 1, 2, 4, 5, 6, and 7 identified in the Comprehensive Conservation Plan for Logan Cave National Wildlife Refuge. The estimated first-year cost for this project is $114,000, with a recurring cost of $75,000.

Project 2B - Improve Field Data Gathering Capabilities at Holla Bend NWR by Establishing a Biological Science Technician Position – RONS # 43590-FY08-4211

Inventorying, surveying, and monitoring of plant and animal populations are needed to develop and update wildlife management plans, habitat management plans, and annual work plans. These critical inventorying, surveying, and monitoring efforts cannot occur without acquiring the data. Project 2B provides funding for a biological science position which will be a multifaceted position. All data will be shared with appropriate state and federal partners in an effort to further Strategic Habitat Conservation goals. This project also supports Projects 1, 2, 4, 5, 6, and 7 identified in the Comprehensive Conservation Plan for Logan Cave National Wildlife Refuge. The estimated first-year cost is $95,000, with a recurring cost of $65,000. (Linkages: Objectives 1.1; 1.3-4; 1.6-14; 1.16).

HABITAT MANAGEMENT

Project Category 4 - Improve Water Management System Operations

Man-made hydrological alterations have all but eliminated the natural flooding regimes that once supported historic numbers of waterfowl and shorebirds. In this altered floodplain, a system of levees, water control structures, well, and mechanical pumps are necessary to provide dependable flooded habitats that correspond with the migration chronologies of migratory birds. The timing of water management is critical to meet the needs of migratory birds, the primary purpose of the refuge;

to stimulate the production of desirable moist-soil plants; and to control undesirable plants. Water management includes monitoring water flow, water levels, and pumping to more efficiently manage resources. This project category includes two projects that are designed to improve water management operations at Holla Bend NWR. (Linkages: Objectives 1.1; 1.4; 1.7; and 2.1).

Project 4A - Construct Three Pump Stations to Better Control Water Flow to Several Rain-Dependent Moist-Soil Units – New Project for Holla Bend NWR

Project 4A would provide funding for the installation of three pumping stations to provide water for effective water management capabilities for a larger percentage of refuge lands, and thus increase habitat for Holla Bend NWR's migratory bird population. Ongoing partnership projects with Ducks Unlimited have resulted in new impoundments created in the Underbank Unit of the refuge; however, controlling water inundation to these units is not in place. Other areas routinely planted in crops tend to exhibit traits that make them ideal locations for moist-soil management. These areas presently do not have pumping stations that would maximize their water-holding capacity. Without installation of efficient high-volume pumps, the new units in the Underbank and the various farm fields will rely on unpredictable rainfall and river flood waters for unmanageable water inundation and dewatering. Providing quality habitat for migratory birds is dependent upon the ability to remove and pump water to the critical areas of Holla Bend NWR. This project would result in improved water management for refuge moist-soil impoundments, and flooded grain crops for migratory birds and other wildlife species. The estimated first-year cost of this project is $250,000, with a recurring cost of $30,000.

Project 4B - *Improve Drainage and Water Movement from Pumping Stations to Impoundments – New Project for Holla Bend NWR*

Project 4B would provide funding necessary to improve drainage and water movement from existing pumping stations to refuge moist-soil units. Presently, some of the moist-soil units of Holla Bend NWR are dependent upon rainfall events. Past management decisions have resulted in the installation of several water distribution canals to improve water movement from pumping stations to outlying moist-soil units. In times of drought or dry soil conditions, attempted movement of water across the 5 miles of water distribution canals is not effective. Dry soil conditions tend to result in moderately dry units due to large quantities of water being absorbed in the ground. This project would result in the installation of 5 miles of water distribution lines to improve water management capabilities for all outlying moist-soil impoundments, which would directly result in increased use by migratory birds and other wildlife. The estimated first-year cost for this project is $100,000, with a recurring cost of $5,000.

Project Category 5 - Increase Control of Invasive and Undesirable Plant Species

The biological integrity of refuge lands is threatened by a variety of invasive and undesirable plant species. The majority of these problematic species are terrestrial; however, some aquatic species also occur. The ability to control invasive plants is crucial in meeting objectives of the refuge and local, state, and national conservation plans. This project category is comprised of one project. (Linkages: Objectives 2.1, and 2.7)

Project 5A - Develop an Invasive Plant Species Program to Control Invasive Plants on Holla Bend NWR – New Project for Holla Bend NWR

Project 5A would provide funding to implement a refuge program to control invasive, exotic, and undesirable plant species on Holla Bend NWR. Invasive, exotic, and undesirable plant species infestations and control efforts will be identified, mapped, and stored in GIS databases to facilitate management decisions. The estimated first-year cost is $35,000, with a recurring cost of $5,000 per year.

Project Category 6. Improve Cropland Management

Habitat management at Holla Bend NWR includes overseeing a cooperative farming program to provide food for wildlife, especially migratory waterfowl. Currently, one cooperative farmer plants between 1,200 and 1,400 acres at the refuge annually through a cooperative farming agreement in which the refuge receives a 25 percent share of planted crops. This project category is comprised of one project. (Linkages: Objectives 1.4; 1.8-10; 1.13; 2.1-5)

Project 6A - Utilize Force-Account (In-House) Farming – New Project for Holla Bend NWR

Project 6A would provide funding to increase the refuge's ability to conduct force-account farming. This would enable the refuge to take advantage of small plots of land to provide hot foods and increase the "edge effect" for wildlife that would otherwise not be available. Many reforested areas have areas where trees are not growing or have grown to the point that 12- to 20-foot-wide strips of wildlife foods could be planted to enhance and diversify wildlife habitat. This action would allow for more precise and timely placement of food for wildlife. Costs associated with this project include the purchase of seed, fertilizer, soil amendments, pesticides, equipment, and diesel fuel for conducting force-account farming. The estimated first-year cost of this project is $250,000, with a recurring cost of $50,000.

Project Category 7. Establish Native Grasses for Grassland Bird Species

Holla Bend NWR provides an opportunity to provide wintering and nesting habitat for grassland species, which are seen regularly in refuge fields that are currently in a grassland or fallow condition. This project category contains three projects designed to establish native warm-season grasses on the refuge. (Linkages: Objectives 1.9 and 2.5).

Project 7A - Establish Native Warm-Season Grasses to Benefit Grassland Bird Species – New Project for Holla Bend NWR

Project 7A would provide funding for the establishment of native warm-season grasses on 100 acres of Holla Bend NWR. Native warm-season grass establishment will be an expensive undertaking involving prescribed fire, herbicide treatments, mechanical disturbance, seed purchase, and planting, to name a few. The benefit of the establishment of warm-season grass will be seen in grassland bird species and small mammals. The estimated first-year cost of this project is $45,000, with a recurring cost of $15,000.

Project 7B - Purchase a New Cover Disk – New Project for Holla Bend NWR

Project 7B would provide funding for the purchase of a 20-foot cover disk to assist in the restoration and maintenance of native warm-season grasses at Holla Bend NWR. The estimated first-year cost of this project is $20,000, with a recurring cost of $1,000.

Project 7C - Purchase a New Native Grass Drill and Spray Rig – New Project for Holla Bend NWR

Project 7C would provide funding for the purchase of a new 12-row native grass seed drill and spray rig to assist in the maintenance and restoration of native warm-season grasses on Holla Bend NWR. The estimated first-year cost of this project is $20,000, with a recurring cost of $3,000.

RESOURCE PROTECTION

Project Category 9 - Increase Law Enforcement Activities on Holla Bend NWR

Presently, Holla Bend NWR and the satellite Logan Cave NWR are dependent upon AGFC law enforcement officers for all short-notice law enforcement needs. The Service's Arkansas zone refuge law enforcement officer provides assistance; however, other duties at other field stations take up a majority of his time. In order to adequately protect refuge resources, provide visitor safety, and ensure compliance with refuge regulations, law enforcement staff is needed at Holla Bend NWR. This project category is comprised of two projects, which includes one law enforcement position and the purchase of special surveillance equipment. (Linkages: Objectives 1.2; 1.12-13; 3.1-2; 3.4; 4.1-2; 4.5; and 5.1)

Project 9A - Increase Resource and Visitor Protection by Establishing a Full-Time Law Enforcement Officer for Holla Bend NWR – New Project for Holla Bend NWR

Project 9A would provide funds for hiring a full-time law enforcement officer to ensure visitor safety and resource protection on Holla Bend NWR. A law enforcement officer would minimize response time to refuge incidents and provide resource protection and visitor safety for this increasingly popular refuge. This project also supports law enforcement activities at Logan Cave NWR. The estimated first-year cost is $140,000, with a recurring cost of $86,000 per year.

Project 9B - Increase Monitoring Capabilities of Sensitive Areas throughout the Refuge

Project 9B would provide funding for purchasing state-of-the-art surveillance equipment to provide visitor safety and protect refuge resources. This project would also support protection for the sensitive Logan Cave NWR ecosystem by detecting trespass into the cave and in areas closed to the public on Holla Bend NWR. Littering, vandalism, and theft would be greatly reduced at both refuges. The estimated first-year cost is $20,000, with a recurring cost of $2,000 per year.

Project 9C - Conduct Boundary Line Survey of Migratory Bird Closure Zone – New Project for Holla Bend NWR

Project 9C would provide funding for a comprehensive survey of the migratory bird closure zone of Holla Bend NWR. This mandated closed area includes federal (USFWS and USACE) and private lands adjacent to the refuge. Registered surveys provide a legally defensible boundary line that is critical to protection of migratory birds. Due to sudden and swift river rises and flows, permanent boundary line indicators, i.e., deep set concrete markers, are recommended. The estimated cost of this project is $200,000.

Project Category 10 - Increase Land/Water Conservation Protection

The health of aquatic ecosystems, systems that also provide human drinking water and irrigation water, is directly linked to the health of the land. Land conservation measures are critical actions needed for protecting and improving water resources. Refuge management supports both land and water conservation measures; however, efforts are currently limited. This project category contains one project. (Linkages: Objectives 1.15 and 2.2).

Project 10A - Conduct Water Quality and Contaminants Monitoring – New Project for Holla Bend NWR

Project 10A would provide funding for water quality monitoring of the Old River Channel. Adjacent agricultural waste recycling and development programs may be negatively affecting refuge waters and resources. To date no monitoring projects have taken place to measure the effects of these potential threats. This project would result in the establishment of water monitoring stations along the old river channel which would be sampled monthly. Funds from this project would also be used to develop a contaminants monitoring program. Areas adjacent to the refuge are under concentrated agricultural practices (swine, cattle and crops). Waste from confined animal production, chicken processing plants, and local waste from municipalities are heavily applied to local crop farms. The estimated first-year cost would be $50,000, with a recurring cost of $10,000 per year.

Project Category 11 - Increase Cultural Resource Protection

The Archaeological Resources Protection Act calls for the refuge to identify, research, and protect cultural resources. The following project would provide funding for conducting research and developing scientific reports that would identify cultural resources on Holla Bend NWR. The project funding is critical for refuge managers to effectively meet federal cultural resource mandates. This project category contains one project. (Linkages: Objective 3.2).

Project 11A - Conduct a Comprehensive Cultural Resource Inventory of Holla Bend NWR – New Project for Holla Bend NWR

Project 11A would provide funding to conduct a comprehensive cultural resource inventory of Holla Bend NWR. This survey would include approved scientific methods for the inventory of all artifacts and collected items. The estimated cost of this project is $150,000.

VISITOR SERVICES

Project Category 12 - Expand Visitor Services and Volunteer Capabilities

Holla Bend NWR is situated between two heavily used Arkansas state parks (Mt. Nebo State Park and Petit Jean State Park), and within an hour's drive of two other state parks. The refuge is also situated between several cities and towns, with thousands of students within a 50-mile radius. Visitors participate in wildlife-dependent recreational opportunities, including hunting, fishing, wildlife observation (along the 10-mile auto tour route), wildlife photography, and environmental education and interpretation. Refuge visitation averages 40,000 people annually. Projects in this category would support expanding visitor services programs, improving the quality of the existing visitor services programs, and enhancing volunteer programs. This project category is comprised of six projects and includes the addition of one staff member. (Linkages: Objectives 4.1-7)

Project 12A - Enhance Visitor Services Program at Holla Bend NWR –
RONS # 43590-FY08-4218 Holla Bend NWR

Project 12A would provide funding to hire a visitor services coordinator for Holla Bend NWR. The goal of this project would be to connect children with nature and to reconnect other members of the general public to nature by broadening public use opportunities to fulfill requests for on- and off-refuge programs, including expanded community outreach and additional wildlife observation opportunities. This would be accomplished by developing quality environmental educational/interpretive programs for local schools, civic groups, and the general public. The programs would pertain to Holla Bend NWR, its habitat and inhabitants, and the Refuge System. This position would also serve as a volunteer coordinator for Logan Cave NWR, with primary interests directed at Holla Bend NWR. Volunteers increase the efficiency of daily refuge operations and public use activities. Furthermore, this project

would enhance existing partnerships and establish new partnership opportunities with regional, federal, state, and private environmental education organizations. The estimated first-year cost of this project is $128,000, with a recurring cost of $85,000.

Project 12B - Rehabilitate Auto Tour Route at Holla Bend NWR – New Project for Holla Bend NWR

Project 12B would provide funding to resurface and install culverts as needed along the 10-mile auto tour route. The auto tour route is utilized by all refuge visitors and refuge staff. This route connects the refuge headquarters to all refuge visitor use facilities and refuge maintenance facilities. The estimated first-year cost of this project is $40,000, with a recurring cost of $10,000.

Project 12C - Rehabilitate Refuge Directional Signs Along Auto Tour Route at Holla Bend NWR – SAMMS # 2007734363, VFE Project

Project 12C would provide funding to rehabilitate deteriorating informational and directional panels along the 10-mile auto tour route of Holla Bend NWR. Along with updating information on the panels, additional directional signs must be installed to orient refuge visitors and to provide guidance on travel distance to the various visitor use facilities of the refuge. The estimated cost of this project is a one-time cost of $15,000.

Project 12D - Rehabilitate Parking Lot at Refuge Headquarters/Public Restroom – New Project for Holla Bend NWR

Project 12D would provide funding for the resurfacing, sealing, and restriping of the asphalt parking lot at the refuge headquarters/public restroom at Holla Bend NWR. This 12,950-square-foot area is the only location that refuge visitors can park their vehicles while utilizing the refuge headquarters and/or public restroom facilities. The estimated cost of this project is $15,000.

Project 12E - Rehabilitate Paved Refuge Entrance Road – New Project for Holla Bend NWR

Project 12E would provide funding for the resurfacing and repair of the 0.48-mile, two-lane refuge entrance road. This is the only road into the refuge and is used by all staff and visitors. A 30-foot section of the road would need to be removed to repair underlying road damage (sinkholes) from past flooding. Large rock and gravel would need to be added and prepared for repaving. The entire road would then need to be cleaned and sealed and striped. The estimated cost for this project is $30,000.

Project 12F - Construct Volunteer Recreational Vehicle (RV) Pads – New Project for Holla Bend NWR

Project 12F would provide funding to construct recreational vehicle pads in support of the Service volunteer camper program. The refuge receives many requests each from potential volunteers desiring to volunteer their time and talents to the Service, but the refuge does not have a place for them to park their campers and thus must turn down volunteer assistance from these persons. This project would allow the refuge to construct three recreational vehicle pads near the maintenance facility on the refuge. Water, electricity, and sewage disposal would be provided by the refuge. The estimated first-year cost for this project is $30,000, with recurring cost of $2,000.

Project 12G - Construct ADA-Compliant Fishing Pier – New Project for Holla Bend NWR

Project 12G would provide funding to construct an ADA-compliant fishing pier on Lodge Lake. The fishing pier would provide the general public, including visitors with disabilities, accessible bank fishing opportunities. Ramped access and an ADA-compliant parking space would also be included

in this project. Access to this pier would be limited to normal refuge operating hours (daylight hours). The estimated first-year cost of this project is $85,000.

Project Category 13 - Increase Wildlife Observation and Photography Opportunities

Wildlife observation and photography have always been very popular activities at Holla Bend NWR. As a result, refuge management has recently constructed a new observation tower that will be accessible to all visitors. Projects in this category are designed to expand wildlife observation and photography on refuge lands. This project category contains three projects. (Linkages: Objectives 4.3-4)

Project 13A - Develop Web Page for Holla Bend NWR – New Project for Holla Bend NWR

Project 13A would provide funds to develop a web page for Holla Bend NWR to keep visitors informed of refuge programs, volunteer opportunities, wildlife sightings, current river levels, and road conditions. The refuge receives numerous requests each year from the public for a refuge web site that can be updated daily by refuge staff. The estimated one-year cost of this project is $5,000, with a recurring cost of $1,000.

Project 13B - Develop Live Eagle Nest Remote Camera – New Project for Holla Bend NWR

Project 13B would provide funding for the purchase and installation of a remote live camera for an active bald eagle nest on the refuge. Each year thousands of people visit the refuge to see resident and migratory bald eagles. Many visitors watch and call frequently to inquire about the active eagle nests and the number of eaglets hatched and fledged.

The remote live camera, mounted on the tree above the nest, could be accessed via the Internet, would be part of a website providing information on Holla Bend NWR and the Refuge System, and would be available to Internet users, greatly enhancing outreach efforts. The estimated first-year cost of this project is $70,000, with a recurring cost of $12,000.

Project 13C - Purchase and Install Spotting Scopes for new Observation Tower – New Project for Holla Bend NWR

Project 13C would provide funding for the purchase and installation of two spotting scopes for the refuge observation tower. The observation tower is located in the center of an area surrounded by backwater from the old river channel, crop fields, grassland, and forest, offering visitors a multitude of possible wildlife observations including migratory waterfowl, shorebirds, grassland and forest birds, and resident mammals. Spotting scopes accessible to all visitors would enhance this wildlife viewing experience. The estimated cost for this project is $10,000.

Project Category 14 - Expand Environmental Education and Wildlife Interpretation Programs

Holla Bend NWR is located within an hour's drive of many schools and thousands of students and visitors passing through along scenic State Highway 7. Providing visitor education and interpretation would greatly increase the number of school children and other visitors to the refuge and enhance their refuge experience. This project category contains one project. (Linkage: Objective 4.4)

Project 14A - Construct New Office/Visitor Services Center – New Project for Holla Bend NWR

Project 14A would provide funding for the construction of a new office/visitor services center that would assist the refuge in welcoming and orienting refuge visitors and enable the refuge to establish education programs that could be offered to 20,000 students and other visitors annually. The estimated cost of this project is $5,200,000.

REFUGE ADMINISTRATION

Project Category 15 - Improve Safety, Environmental Compliance, and Asset Management

Refuge management must address regulatory safety, environmental, and property accountability requirements in a systematic and cost-effective manner. By being proactive, management can help reduce the risk of non-compliance, enhance environmental protection, and improve health and safety practices for both employees and the public. Projects in this category are designed to improve safety programs, environmental compliance, and asset management at the refuge. This project category is comprised of one project. (Linkages: Objectives 3.3; 3.6; and 5.1-2)

Project 15A - Improve Safety, Environmental Compliance, and Asset Management by Establishing an Assistant Manager (ROS) to Serve as Facilities Manager – RONS # FY08-4624

Project 15A would provide funding to a hire a person that would serve as the refuges' safety/environmental compliance coordinator and asset manager to meet ever-increasing demands for environmental compliance and protection. The individual would be responsible for managing Holla Bend and Logan Cave NWRs' Service Asset and Maintenance Management System (SAMMS) program, while also serving as the Logan Cave NWR manager. The estimated cost of this project is $90,000, with a recurring cost of $55,000.

Project Category 16 - Improve Maintenance Programs, Facilities, and Road Systems

Projects in this category are designed to improve maintenance programs, facility support, and road system repairs throughout the refuge. This project category is comprised of six projects, which include the addition of one new staff member. Linkages (Objectives 1.4; 1.6; 1.7; 1.9-10; 2.1-2; 2.4; 4.1-3; and 5.1-2)

Project 16A - Improve Maintenance Programs by Hiring an Equipment Mechanic – RONS # FY08-4605

Project 16A would provide funding to hire an equipment mechanic to keep refuge equipment, vehicles, wells, and pumps maintained. This position would also be responsible for assisting with maintenance on refuge buildings, grounds, road, and public use facilities. The estimated first-year cost of this project is $100,000, with a recurring cost of $72,000.

Project 16B - Remodel Refuge Headquarters – New Project for Holla Bend NWR

Project 16B would provide funding to remodel the refuge headquarters by additional office space and storage. The present headquarters building at Holla Bend NWR was built in 1992, and is not large enough to house the equipment and materials used daily by refuge staff. This building is the only staffed visitor contact station on the refuge. Staff must often retrieve supplies from an outside storage building which is not adequate for storing supplies and printed material. Cleaning equipment and supplies are being stored in the building's mechanical room, which is not safe or adequate. The

office is large enough for only three of the four current refuge staff members. Current and future volunteers and student employees do not have office space to use for their administrative activities. Adding additional space to the refuge headquarters building would increase efficiency and productivity and provide better service to the visiting public. Estimated cost for this project is $50.000.

Project 16C - Construct New Maintenance Shop Building – SAMMS 9712367

Project 16C would provide funding to construct a new maintenance shop building. The present shop building was constructed in 1960, and is inadequate for vehicle and equipment maintenance. The roof is too low to allow equipment into the shop. Service and repair of large equipment must be conducted out in the open. Some safety and environmental factors cannot be corrected due to the building's construction. Constructing a new environmentally friendly maintenance shop would allow staff to safely repair and service refuge equipment while protecting refuge resources from hazardous waste. The estimated first-year cost for this project is $400,000, with a recurring cost of $10,000.

Project 16D - Purchase or Construct Oil and Chemical Storage Building –
New Project for Holla Bend NWR

Project 16D would provide funding to purchase or construct an oil and chemical storage building. The current building was constructed in 1960, and is inadequate for storing oil, chemicals, and hazardous waste and cannot be retrofitted to meet safety and environmental compliance measures. The current building also fills with water with each rainfall, prohibiting storage on the floor and rusting fire proof storage cabinets. The estimated first-year cost for this project is $50,000, with a recurring cost of $1,000.

Project 16E - Purchase Tractor and Boom-Axe – RONS # FY08-4574

Project 16E would provide funding to purchase a tractor with boom-axe attachment for maintaining refuge roads and trails by keeping vegetation trimmed back. Keeping tree limbs and vegetation from overhanging refuge roads prevents damage to visitor vehicles and provides for a more enjoyable visitor experience. The estimated first-year cost for this project is $150,000, with a recurring cost of $5,000.

Project 16F - Repair River Road – SAMMS # 2005204540

Project 16F would provide funding to rehabilitate the river road. This 1.68-mile stretch of road is the only route to the refuge's most popular boat ramp and the northeast section of the refuge. Past washouts need to be permanently repaired and drainage improved by installing culverts and pulling ditches. The estimated first-year cost of this project is $80,000, with a recurring cost of $10,000.

FUNDING AND PERSONNEL

Currently a staffing level of four permanent positions has been approved for the refuge. To complete the extensive wildlife habitat management, current projects, and conduct the necessary inventorying, monitoring, and maintenance activities, more staff is required. Biological and public use review teams and the general public identified the need for additional staff. The following organization chart (Figure 4) outlines the proposed future staffing requirements to implement Alternative D. The rate at which this refuge realizes its full potential to contribute locally, regionally, and nationally to wildlife conservation and appropriate and compatible wildlife-dependent recreation and environmental education is totally dependent upon receiving resources.

Figure 4. Proposed Future Staffing Requirements Organization Chart

Shaded areas represent currently existing positions

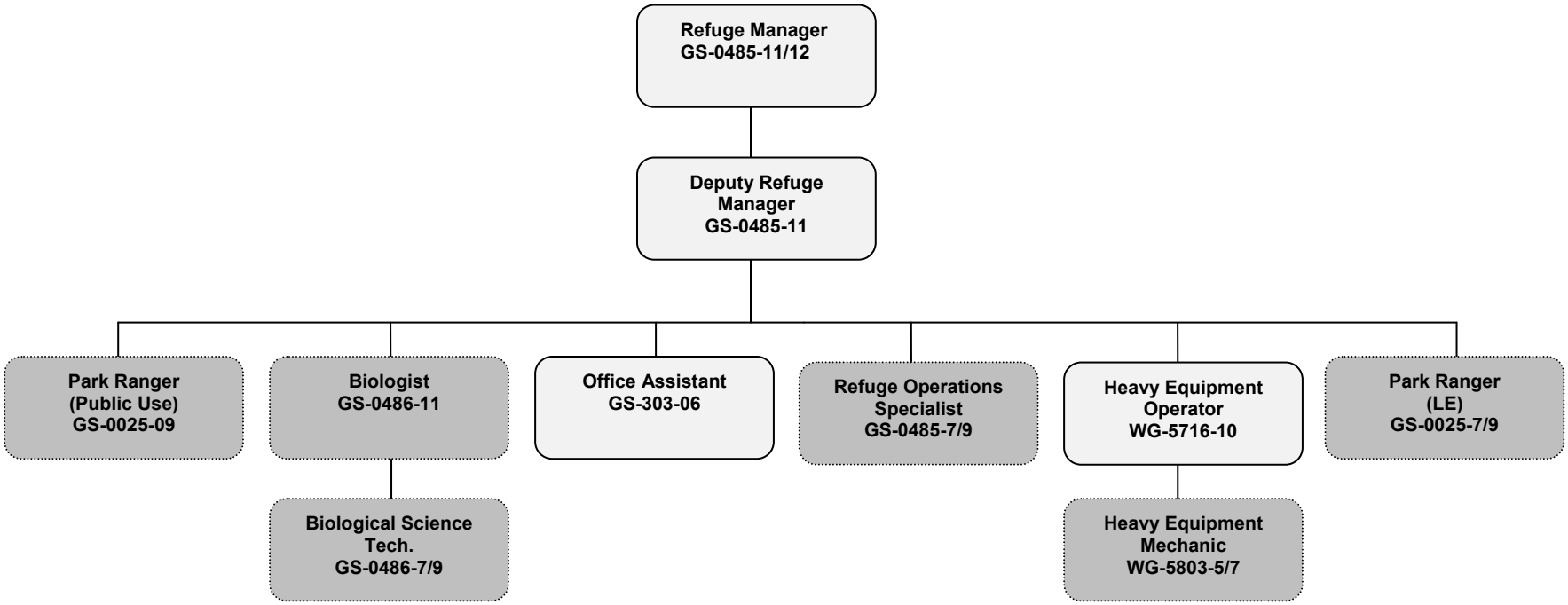


Table 11. Summary of projects

PROJECT NUMBER	PROJECT DESCRIPTION	FIRST YEAR COST	RECURRING ANNUAL COST	STAFF (FTE'S)
1	Remove nuisance beaver and coyotes from refuge lands	$25,000	$10,000	
2A	Enhance biological data to improve management of Holla Bend NWR by establishing Wildlife Biologist Position (RONS#43590-FY08-4066)	$114,000	$75,000	
2B	Improve field data gathering capabilities at Holla Bend NWR by establishing a Biological Science Technician Position (RONS # 43590-FY08-4211	$95,000	$65,000	
4A	Construct three pump stations to better control water flow to several rain-dependent moist-soil units—new project for Holla Bend NWR	$250,000	$30,000	
4B	Improve drainage and water movement from pumping stations to impoundments—new project for Holla Bend NWR	$100,000	$5,000	
5A	Develop an invasive plant species program to control invasive plants—new project for Holla Bend NWR	$35,000	$5,000	
6A	Utilize force-account (in-house) farming—new project for Holla Bend NWR	$250,000	$50,000	
7A	Establish native warm-season grasses to benefit grassland bird species—new project for Holla Bend NWR	$45,000	$15,000	
7B	Purchase a new cover disk—new project for Holla Bend NWR	$20,000	$1,000	
7C	Purchase a new native grass drill and spray rig—new project for Holla Bend NWR	$20,000	$3,000	

PROJECT NUMBER	PROJECT DESCRIPTION	FIRST YEAR COST	RECURRING ANNUAL COST	STAFF (FTE'S)
9A	Increase resource and visitor protection by establishing a full-time Law Enforcement Position—new project for Holla Bend NWR	$140,000	$86,000	
9B	Increase monitoring capabilities of sensitive areas throughout the refuge	$20,000	$2,000	
9C	Conduct boundary line survey of migratory bird closure zone—new project for Holla Bend NWR	$200,000	N/A	
10A	Conduct water quality and contaminants monitoring—new project for Holla Bend NWR	$50,000	$10,000	
11A	Conduct a comprehensive cultural resource inventory of Holla Bend NWR—new project for Holla Bend NWR	$150,000	N/A	
12A	Enhance visitor services program (RONS # 43590-FY08-4218 Holla Bend NWR)	$128,000	$85,000	
12B	Rehabilitate auto tour route—new project for Holla Bend NWR	$40,000	$10,000	
12C	Rehabilitate refuge directional signs along tour route—SAMMS # 2007734363, VFE project	$15,000	N/A	
12D	Rehabilitate parking lot at refuge headquarters/public restroom—new project for Holla Bend NWR	$15,000	N/A	
12E	Rehabilitate paved refuge entrance road—new project for Holla Bend NWR	$30,000	N/A	
12F	Construct volunteer recreational vehicle pads—new project for Holla Bend NWR	$30,000	$2,000	
12G	Construct ADA-compliant fishing pier—new project for Holla Bend NWR	$85,000	N/A	

PROJECT NUMBER	PROJECT DESCRIPTION	FIRST YEAR COST	RECURRING ANNUAL COST	STAFF (FTE'S)
13A	Develop web page—new project for Holla Bend NWR	$5,000	$1,000	
13B	Develop live eagle nest remote camera—new project for Holla Bend NWR	$70,000	$12,000	
13C	Purchase and install spotting scopes for new observation tower—new project for Holla Bend NWR	$10,000	N/A	
14A	Construct new office/visitor services center—new project for Holla Bend NWR	$5,200,000		
15A	Improve safety, environmental compliance, and asset management by establishing an Assistant Manager (ROS) to Serve as Facilities Manager (RONS # FY08-4624)	$90,000	$55,000	
16A	Improve maintenance programs by hiring an equipment mechanic (RONS # FY08-4605)	$100,000	$72,000	
16B	Remodel refuge headquarters—new project for Holla Bend NWR	$50,000	N/A	
16C	Construct new maintenance shop building—SAMMS 9712367	$400,000	$10,000	
16D	Purchase or construct oil and chemical storage building—new project for Holla Bend NWR	$50,000	$1,000	
16E	Purchase tractor and boom-axe (RONS # FY08-4574)	$150,000	$5,000	
16F	Repair river road—SAMMS # 2005204540	$80,000	$10,000	

PARTNERSHIP/VOLUNTEERS OPPORTUNITIES

A key element of this CCP is to establish partnerships with local volunteers, landowners, private organizations, and state and federal natural resource agencies. The refuge already cooperates with Arkansas Tech University, the Arkansas Game and Fish Commission, the Service's Arkansas Ecological Services Field Office, Arkansas Audubon Society, Ducks Unlimited, and several private individuals. In the immediate vicinity of the refuge, opportunities exist to establish partnerships with the Yell County Wildlife Federation, local state parks, Arkansas River Valley Interpreters Alliance, Tri-Peaks Tourist Association, and many private individuals (future Friends of Holla Bend NWR). At regional and state levels, partnerships may be established or enhanced with organizations such as the Natural Resources Conservation Service, USDA Forest Service, The Nature Conservancy, Arkansas Natural Heritage Commission, U.S. Geological Survey, National Wild Turkey Federation, U.S. Army Corps of Engineers, and Arkansas Department of Environmental Quality.

Successful partnerships will be essential for achieving the goals, objectives, and strategies set forth in this plan. This broad-based approach to managing fish and wildlife resources extends beyond social and political boundaries and requires a foundation of support from many. Holla Bend NWR will continue to seek creative partnership opportunities to achieve its vision for the future.

STEP-DOWN MANAGEMENT PLANS

A comprehensive conservation plan is a strategic plan that guides the direction of the refuge. A step-down management plan provides specific guidance on activities, such as habitat, fire, and visitor services. These plans (Table 12) are also developed in accordance with the National Environmental Policy Act, which requires the identification and evaluation of alternatives and public review and involvement prior to their implementation.

MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is a flexible approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other information. More specifically, adaptive management is a process by which projects are implemented within a framework of scientifically driven experiments to test the predictions and assumptions outlined within a plan.

To apply adaptive management, specific surveying, inventorying, and monitoring protocols will be adopted for the refuge. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches and determine how effectively the objectives are being accomplished. Evaluations will include ecosystem team and other appropriate partner participation. If monitoring and evaluating indicate undesirable effects for target and non-target species and/or communities, then alterations to the management projects will be made. Subsequently, the comprehensive conservation plan will be revised. Specific monitoring and evaluating activities will be described in the step-down management plans.

PLAN REVIEW AND REVISION

This comprehensive conservation plan will be reviewed annually as the refuge's annual work plans and budgets are developed. It will also be reviewed to determine the need for revision.
A revision will occur if and when conditions change or significant information becomes available, such as a change in ecological conditions or a major refuge expansion. The plan will be augmented by detailed step-down management plans to address the completion of specific strategies in support of the refuge's goals and objectives. Revisions to the plans will be subject to public review and NEPA compliance.

Table 12. Holla Bend National Wildlife Refuge step-down management plans related to the goals and objectives of this comprehensive conservation plan

Step-down Plan	Completion Date
Wildlife Management Plan	2013
Biological Inventorying/Monitoring Plan	2012
Habitat Management Plan	2012
Moist-Soil/Water Management	2011
Water Quality/Contaminants Monitoring	2011
Forest Management	2011
Cropland Management	2011
Integrated Pest Management Plan	2010
Nuisance Animal Control	2010
Exotic/Invasive Plant Control	2010
Fire Management Plan	2010
Law Enforcement	2014
Cultural Resources Management	2014
Visitor Services Plan	2011
Hunting and Fishing	2011
Wildlife Observation and Photography	2011
Safety/Contingency Plan	2010
Oil and Hazardous Substances	2010

SECTION B. ENVIRONMENTAL ASSESSMENT

I. Background

INTRODUCTION

The Fish and Wildlife Service (Service) prepared this Environmental Assessment (EA) for Holla Bend National Wildlife Refuge (NWR) in compliance with the National Environmental Policy Act and the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act). The Improvement Act requires the development of comprehensive conservation plans for all refuges. Following a public review and comment period on the Draft CCP/EA, a final decision will be made by the Fish and Wildlife Service that will guide Holla Bend NWR management actions and decisions over the next 15 years, provide understanding about the refuge and management activities, and incorporate information and suggestions from the public and refuge partners.

The Draft CCP/EA proposes a management direction, which is described in detail through a set of goals, objectives, and strategies. The Draft CCP/EA addresses current management issues, provides long-term management direction and guidance for the refuge, and satisfies the legislative mandates of the Improvement Act. While the Draft CCP/EA provides general management direction, subsequent step-down plans will provide more detailed management direction and actions.

This EA determines and evaluates a range of reasonable management alternatives. The intent is to support informed decision-making regarding future management of the refuge. Each alternative presented in this EA was generated with the potential to be fully developed into a final CCP. The predicted biological, physical, social, and economical impacts of implementing each alternative are analyzed in this EA. This analysis assists the Service in determining if the alternatives represent no significant impacts, thus requiring the preparation of a Finding of No Significant Impact, or if the alternatives represent significant impacts, thus requiring more detailed analysis through an Environmental Impact Statement and a Record of Decision. Following public review and comment, the Service will select an alternative to be fully developed for this refuge.

The CCP is needed to address current management issues, to provide long-term management direction for the refuge, and to satisfy the legislative mandates of the Improvement Act, which requires the preparation of a comprehensive conservation plan for all national wildlife refuges.

PURPOSE AND NEED FOR ACTION

The purpose of the EA is to meet the purpose(s) of the refuge and the goals identified in the comprehensive conservation plan (for which we evaluate each alternative). The purpose is to ensure that Holla Bend NWR serves as a sanctuary for migrating birds; conserves threatened and endangered species; serves the development, advancement, management, conservation, restoration, and protection of fish, wildlife, and habitat resources; provides opportunities for compatible wildlife-dependent recreation; promotes awareness and appreciation of natural resources; administers and protects the wilderness character; and protects and preserves archaeological and historical resources that may occur on Holla Bend NWR. The need of the EA is to adopt a 15-year management plan that provides guidance for future management and that meets the mandates of the Improvement Act.

DECISION FRAMEWORK

Based on the assessment described in this document, the Service will select an alternative to implement the Comprehensive Conservation Plan for Holla Bend NWR. The finalized plan will include a Finding of No Significant Impact (FONSI), which is a statement explaining why the selected alternative will not have a significant effect on the quality of the human environment. This determination is based on an evaluation of the Service and Refuge System mission, the purpose(s) for which the refuge was established, and other legal mandates. Assuming no significant impact is found, implementation of the plan will begin and will be monitored annually and revised when necessary.

PLANNING STUDY AREA

Holla Bend NWR is about 6 miles southeast of the city of Dardanelle, Pope and Yell Counties, in west central Arkansas. The refuge is situated on a meander in the Arkansas River "Holla Bend" that was cut off when the USACE straightened the channel in 1954. The boundaries of the 6,616-acre refuge are roughly defined by the main channel of the Arkansas River and the cutoff meander channel. The refuge also manages 441 acres of a Migratory Bird Closure Zone outside the fee title boundary, for a total managed area of 7,057 acres.

This EA will identify management on refuge lands and waters.

AUTHORITY, LEGAL COMPLIANCE, AND COMPATIBILITY

The Service developed this Draft CCP/EA in compliance with the Improvement Act and Part 602 of the Fish and Wildlife Service Manual (National Wildlife Refuge System Planning). The actions described within this plan also meet the requirements of the National Environmental Policy Act of 1969. The refuge staff achieved compliance with this Act through the involvement of the public and the incorporation of this EA, with a description of the alternatives considered and an analysis of the environmental consequences of the alternatives (Chapters III and IV in this section). When fully implemented, the CCP will strive to achieve the vision and purposes of Holla Bend NWR.

The CCP's overriding consideration is to carry out the purposes for which the refuge was established. The laws that established the refuge and provided the funds for acquisition state the purposes. Fish and wildlife management is the first priority in refuge management, and the Service allows and encourages public use (wildlife-dependent recreation) as long as it is compatible with, or does not detract from, the refuge's mission and purposes.

COMPATIBILITY

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, states that national wildlife refuges must be protected from incompatible or harmful human activities to ensure that Americans can enjoy Refuge System lands and waters. Before activities or uses are allowed on a national wildlife refuge, the uses must be found to be compatible. A compatible use "...will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge." In addition, "wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety."

An interim compatibility determination is a document that assesses the compatibility of an activity during the period of time the Service first acquires a parcel of land to the time a formal, long-term management plan for that parcel is prepared and adopted. The Service has completed an interim

compatibility determination for the six priority general public uses of the system, as listed in the Improvement Act. These uses are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

PUBLIC INVOLVEMENT AND THE PLANNING PROCESS

In accordance with Service guidelines and NEPA recommendations, public involvement has been a crucial factor throughout the development of the Draft CCP/EA for Holla Bend NWR. This plan has been written with input and assistance from interested citizens, conservation organizations, and employees of local and state agencies. The participation of these stakeholders and their ideas has been of great value in setting the management direction for Holla Bend NWR. The Service, as a whole, and the refuge staff, in particular, are very grateful to each one who has contributed time, expertise, and ideas to the planning process. The staff remains impressed by the passion and commitment of so many individuals for the lands and waters administered by the refuge.

The planning team responsible for preparing this Draft CCP/EA was established in May 2007. It includes natural resource management professionals representing Holla Bend NWR, Service staff, and the Arkansas Game and Fish Commission (see Appendix K – List of Preparers). The Service had previously established a biological review team with representatives from the same agencies, plus the USDA Natural Resources Conservation Service, that conducted an on-site evaluation in October 2006 and completed a Biological Review Report in June 2007 (Edwards 2007), and had established a visitor services review team that presented recommendations to the refuge staff and prepared a Visitor Services Review Report in March 2007 (USFWS 2007).

Public input to the development of this Draft CCP/EA was obtained, in part, through a public scoping meeting held in Dardanelle, Arkansas, on August 14, 2007 that was attended by 42 stakeholders. Written comments were received from 20 stakeholders. Comments received during the public scoping process are listed in Appendix D – Public Involvement.

In identifying key issues to be addressed during the planning process, the planning team considered recommendations from the Biological Review and Visitor Services Review Reports, comments received through the public scoping meeting, and input from open planning team meetings, comment packets, and personal contacts of planning team members. In addition, the team considered opportunities for coordination with other relevant conservation plans (see Chapter II – Regional Conservation Plans and Initiatives); applicable legal mandates (see Appendix C – Relevant Legal Mandates and Executive Orders); the purposes of Holla Bend NWR as well as the mission, goals, and policies of the Refuge System as a whole; and evaluations and documentation required by Service procedures for refuge planning (see Appendix E – Appropriate Use Determinations, Appendix F – Compatibility Determinations, and Appendix H – Wilderness Review).

The planning team identified a number of issues, concerns, and opportunities related to fish and wildlife protection, habitat restoration, public use, and management of threatened and endangered species. All public and advisory team comments were considered; however, some issues important to the public fall outside the scope of this planning process. The team considered all issues raised during the planning process and has developed a plan that attempts to balance competing views on important issues.

A complete summary of the issues and concerns is provided in Section C, Appendix D, Public Involvement - Summary of Public Scoping Comments.

II. Affected Environment

For a description of the affected environment, see Section A. Comprehensive Conservation Plan, Chapter II, Refuge Overview

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III. Description of Alternatives

FORMULATION OF ALTERNATIVES

Alternatives are different approaches or combinations of management objectives and strategies designed to achieve the refuge's purpose and vision, the goals identified in the CCP; the goals of the Refuge System; and the mission of the Service. Alternatives are formulated to address significant issues, concerns, and problems identified during the public scoping process.

The four alternatives identified for Holla Bend NWR represent different approaches to provide permanent protection, restoration, and management of the refuge's fish, wildlife, plants, habitats, and other resources, as well as compatible wildlife-dependent recreation. Refuge staff assessed the biological conditions and analyzed the external relationships affecting the refuge. This information contributed to the development of refuge goals and, in turn, helped to formulate the alternatives. As a result, each alternative presents different sets of objectives for reaching refuge goals. Each alternative was evaluated based on how much progress it would make and how it would address the identified issues related to fish and wildlife populations, habitat management, resource protection and conservation, visitor services, and refuge administration. A summary of the four alternatives is provided in Table 13.

DESCRIPTION OF ALTERNATIVES

Serving as a basis for each alternative, a number of goals and sets of objectives were developed to help achieve the refuge's purpose and the mission of the Refuge System. Objectives are desired conditions or outcomes that are grouped into sets and, for this planning effort, were consolidated into four alternatives. These alternatives represent different approaches for managing the refuge over a 15-year time frame while still meeting refuge purposes and goals. The four alternatives are summarized below. A comparison of each alternative follows the general description of alternatives.

ALTERNATIVE A - CURRENT MANAGEMENT - NO ACTION

Alternative A continues current management strategies, with little or no change in budget or funding. Under this alternative, the Service would protect, maintain, restore, and enhance 6,616 acres of refuge lands and 441 additional acres included in a migratory bird closure area around the refuge, primarily focusing on the needs of migratory waterfowl, with additional emphasis on the needs of resident wildlife, migratory non-game birds, and threatened and endangered species. The Service would continue mandated activities for protection of federally listed species. No refuge-led evaluation of resident wildlife populations would be planned. Control of nuisance wildlife populations would be undertaken as necessary. Habitat management efforts would be concentrated on moist soil management, waterfowl impoundments, and crop production. The Service would continue to monitor acreage of invasive plants, and would continue cooperative farming on 1,200 acres.

The Service would maintain the current levels of wildlife-dependent recreation activities (hunting, fishing, wildlife observation and photography, and interpretation and environmental education opportunities). The staff would maintain two designated hiking trails, a 10-mile, self-guided auto tour route (for wildlife observation and photography), and three boat launch ramps with gravel parking areas, to the extent that these facilities do not interfere substantially with or detract from the achievement of wildlife conservation. The refuge would continue to be closed to all migratory bird hunting, but would be open to deer hunting (both archery/crossbow and gun) with the exception of a

small tract adjacent to the Levee Trail. Turkeys, rabbits, squirrels, coyotes, beavers, raccoons and bobcats would also be allowed to be taken incidental to deer hunting, and on certain designated days there would be special hunts for raccoons and turkeys. Sport fishing would be permitted in all refuge waters from March 1 to October 31 each year. The refuge would be closed to fishing during the winter months to limit the disturbance of wintering waterfowl (except for bank fishing on Long Lake from November 1 to February 28). The refuge would not have a dedicated park ranger (Visitor Services) position, but staff would conduct environmental education programs for groups as requested when workloads and schedules permit.

Under this alternative, the Service would pursue opportunities that arise to purchase or exchange priority tracts within the refuge acquisition boundary, which includes 1,703 acres in private ownership distributed in numerous small tracts around the perimeter of the refuge. The Service would maintain the refuge as funding allows. The refuge staff would include a refuge manager, deputy refuge manager, heavy equipment operator, and an office assistant.

ALTERNATIVE B – ENHANCED MANAGEMENT OF HABITAT AND FISH AND WILDLIFE POPULATIONS

Alternative B reflects an increase in management of habitat and fish and wildlife populations. Under this alternative, in addition to the activities described for Alternative A, the Service would develop baseline inventories of refuge biota and habitat potential, including inventories for forest conditions, aquatic biota, and suitable woodcock habitat. The Service would broaden the refuge's focus on migratory waterfowl to include objectives for forest-dwelling and early successional birds, shorebirds, woodcock, colonial waterbirds, marsh birds, and wood ducks. In addition to continuing mandated activities for protection of federally listed species, the refuge would develop a strategy to address federally listed threatened and endangered species and state-listed rare species. The refuge would develop a database and monitor deer herd status, trends in wild turkey populations, and the presence of waterbird rookeries. Data on nuisance wildlife would be collected and aggressive control measures initiated.

Habitat management would include converting 125 acres from agricultural production to grassland and scrub/shrub habitat. By utilizing force account farming, the cropland acreage on the refuge would be reduced by 25 percent and crops would be converted to preferred waterfowl foods. The refuge would also aggressively monitor acreage of invasive plants and implement a plan to eliminate non-native plants. Enhancements in the management of moist-soil habitat would include developing complete water control capability on all moist-soil unit acreage and use of periodic disturbance to set back succession. Further, the Service would pursue cooperative projects to improve habitat quality on about 500 acres of open water. Waterfowl usage and shorebird response to habitat management also would be monitored.

Wildlife-dependent recreation activities would be the same as for Alternative A.

Under this alternative, the Service would pursue opportunities to purchase or exchange tracts within the refuge acquisition boundary that would enhance fish and wildlife management. The refuge staff would increase by the addition of a biologist, biological science technician, and park ranger (law enforcement).

ALTERNATIVE C – ENHANCED MANAGEMENT FOR WILDLIFE-DEPENDENT PUBLIC USES

This alternative represents an increased focus on wildlife-dependent public uses, rather than the increased emphasis on management of fish and wildlife populations and habitat described in Alternative B. In addition to the activities described for Alternative A, under Alternative C, the Service

would increase wildlife-dependent recreation activities (hunting, fishing, wildlife observation and photography, and interpretation and environmental education activities).

The two most significant enhancements in Alternative C would be development of an environmental education center on the refuge and addition of a park ranger (Visitor Services) position to the staff. These enhancements would greatly increase the refuge's capability and opportunity to conduct environmental education and interpretation programs, and to better utilize qualified volunteers in support of Holla Bend's mission and objectives. One function of the park ranger's responsibilities would be to develop a plan for recruiting and effectively managing volunteer support.

This alternative also would include addition of ADA-compliant fishing piers at Long Lake and Lodge Lake's bank fishing areas, development of a bird observation trail north of the refuge office, improvements to the Lodge Lake Trail and the loop to the Levee Trail, and vegetation management along refuge roads to improve wildlife viewing opportunities. Information kiosks, directional signs, parking lots, and other visitor use facilities also would be improved. It would include determining the maximum number of archery hunters refuge resources can support and opening a dove hunting season.

Under this alternative, the Service would pursue opportunities to purchase or exchange tracts within the refuge acquisition boundary that would enhance the public use program.

Refuge staff would increase by the addition of a park ranger (Public Use); a refuge operations specialist, and a heavy equipment mechanic.

ALTERNATIVE D – BALANCED ENHANCEMENT OF MANAGEMENT FOR HABITAT, FISH AND WILDLIFE POPULATIONS, AND WILDLIFE-DEPENDENT PUBLIC USES (PROPOSED ALTERNATIVE)

Alternative D reflects improving refuge operation by balancing enhanced habitat and fish and wildlife population management and enhanced wildlife-dependent public use management. This adaptive management alternative is basically concurrent implementation of selected enhancements from Alternatives B and C, focusing on specific enhancements for which inherent linkages would result in greater benefits to the refuge and surrounding area than simple addition of the benefits of each enhancement implemented separately. For example, the baseline biological information developed under Alternative B would be useful in identifying opportunities to improve visitor experiences, and the increased volunteer support management developed under Alternative C would lead to increased efficiencies in collecting data on biological resources and responses (e.g., nuisance and invasive species occurrence, deer herd status, and evaluation of habitat management efforts) identified in Alternative B.

Habitat management would include converting 100 acres from agricultural production to grassland and scrub/shrub habitat; cooperative farming would continue on 1,200 acres. To the extent possible, crops would be converted to preferred waterfowl foods. The refuge also would monitor acreage of invasive plants and would develop a strategy to eliminate non-native plants. Enhancements in the management of moist-soil habitat would include developing complete water control capability on all moist-soil unit acreage and use of periodic disturbance to set back succession. Further, the Service would pursue cooperative projects to improve habitat quality on 500 acres of open water. Waterfowl usage and shorebird response to habitat management also would be monitored.

Wildlife-dependent recreation activities would be the same as for Alternative A.

The two significant enhancements in the Public Use program would be development of an environmental education center on the refuge and addition of a park ranger (Visitor Services) position to the staff. These enhancements would greatly increase the refuge's capability and opportunity to conduct environmental education and interpretation programs, and to better utilize qualified volunteers in support of Holla Bend NWR's mission and objectives. One function of the park ranger's responsibilities would be to develop a plan for recruiting and effectively managing volunteer support.

This alternative also would include addition of an ADA-compliant fishing pier at Lodge Lake's bank fishing area, development of a bird observation trail north of the refuge office, improvements to the Lodge Lake Trail and the loop to the Levee Trail, and selective vegetation management along refuge roads to improve wildlife viewing opportunities. Information kiosks, directional signs, parking lots, and other visitor use facilities also would be improved to the extent feasible. It would include determining the maximum number of archery hunters refuge resources can support and would evaluate the feasibility of adding a dove season.

Under this alternative, the Service would pursue opportunities that arise to purchase or exchange from willing sellers priority tracts within the refuge acquisition boundary, which includes 1,703 acres in private ownership distributed in numerous small tracts around the perimeter of the refuge. The Service would maintain the refuge as funding allows.

Refuge staff would include a refuge manager, deputy refuge manager, heavy equipment operator, and office assistant, and would be increased to also include a biologist and biological science technician, a park ranger (Public Use), a park ranger (Law Enforcement), a refuge operations specialist, and a heavy equipment mechanic.

FEATURES COMMON TO ALL ALTERNATIVES

Although the alternatives differ in many ways, there are similarities among them as well. These common features are listed below to reduce the length and redundancy of the individual alternative descriptions.

Bottomland hardwood forest – Each alternative would develop a plan to improve the quality of existing mature bottomland hardwood forest habitat.

Cropland – Each alternative would use cooperative farming to help meet foraging habitat objectives for migratory waterfowl.

Moist-soil habitat – Each alternative would provide moist-soil habitat to help meet foraging habitat objectives for migratory waterfowl.

Control of invasive plants – Each alternative would develop an Integrated Pest Management Plan that provides for control of invasive plants.

Aquatic habitat – Each alternative would support development of cooperative projects for enhancing the quality of aquatic habitat in the cutoff channel.

Waterfowl – Each alternative would continue a focus on migratory waterfowl.

Threatened and endangered species – Each alternative would provide protective conservation measures for federally listed species and their habitats on the refuge.

Resident wildlife – Each alternative would use sound scientific principles for managing populations of resident wildlife species such as white-tailed deer and wild turkey.

Control of nuisance wildlife populations – Each alternative would provide for control of wildlife populations that reach nuisance levels and negatively impact other refuge resources.

Land Acquisition – Each alternative would include pursuing opportunities to purchase or exchange for priority tracts within the refuge acquisition boundary.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The alternatives development process under NEPA and the Improvement Act is designed to allow consideration of the widest possible range of issues and potential management approaches. During the alternatives development process, many different solutions were considered. Several ideas expressed during the public scoping process were considered but not selected for detailed study in this Draft CCP/EA because they are not compatible with the refuge purpose and mission. These included suggestions for increasing the length of the hunting season, allowing camping on the refuge, allowing limited hunting of migratory waterfowl, extending the fishing season, and focusing specific habitat management activities on grassland birds.

COMPARISON OF THE ALTERNATIVES BY ISSUE

Table 13. Comparison of Alternatives by Management Issues for Holla Bend National Wildlife Refuge

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Fish and Wildlife Population Management				
Broader focus for migratory bird management	Continue to focus primarily on migratory waterfowl.	Broaden focus to include other migratory birds, especially shorebirds and birds that require grassland or early successional habitats.	Same as Alt A.	Broaden focus to include other migratory birds, especially shorebirds.
Protection of threatened, endangered, or rare species	Continue mandated activities for protection of federally listed species.	Continue mandated activities for protection of federally listed species. In addition, evaluate opportunities for managing habitat to protect federally listed species and state-listed rare species.	Same as Alt A.	Same as Alt A.
Coordination with other conservation plans	Continue current level of coordination with other conservation plans.	Same as Alt A.	Same as Alt A.	Same as Alt A.
Status and trends of resident wildlife populations	No refuge-led evaluation of resident wildlife populations planned.	Develop database on deer herd status, trends in wild turkey populations, and presence of waterbird rookeries.	Same as Alt A.	Develop database on trends in wild turkey populations and presence of waterbird rookeries. Rely on state information that is available for deer herd status.
Control of nuisance wildlife populations	Undertake beaver and raccoon control activities as necessary and feasible with existing staff and budget.	Same as Alt A, plus collect data and aggressively control nuisance wildlife populations, especially beavers, raccoons, and coyotes.	Same as Alt A.	Same as Alt A, plus collect data on nuisance wildlife populations, especially beavers, raccoons, coyotes, and bobcats.
Fisheries management	Continue current activities.	Evaluate issuing special use permits to remove rough fish trapped by receding floodwaters.	Same as Alt A.	Same as Alt A.

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Adaptive management of refuge resources	Continue current management practices.	Begin documenting baseline conditions for biological resources and response to management activities.	Same as Alt A.	Use baseline biological conditions/response information to develop biological response objectives and management modifications to achieve objectives.
Baseline inventories of refuge biota	Continue current practices.	Develop comprehensive inventories of refuge flora and fauna, focusing on levels of biodiversity and keystone species of various refuge ecosystems.	Same as Alt A.	Same as Alt B.
Habitat Management				
Increase diversity of managed habitats	Maintain current habitat management focus (cropland, moist-soil unites, and waterfowl impoundments).	Expand focus to include active management of grassland, scrub/shrub, shallow water/mudflats, grassy openings in forest, buffer strips, and open water w/ emergent vegetation.	Same as Alt A.	Expand focus to include active management of grasslands, scrub/shrub, shallow water/mudflats, grassy openings in forest, and buffer strips.
Bottomland hardwood forest	Continue monitoring survival and growth of previous 1400-acre hardwood seedling planting.	Maintain hardwood seedling area as scrub/shrub habitat through periodic disturbance to set back succession.	Same as Alt A.	Same as Alt B.
Foraging habitat for resident wildlife	Maintain current proportion of 25 percent cropland left as forage; and winter wheat second-cropped behind soybeans.	Increase the portion of cropland available for foraging.	Same as Alt A.	Same as Alt B.
Control of invasive plants	Conduct minimal monitoring and control of invasive plants as necessary.	Monitor acreage of invasive plants; develop and implement a plan to aggressively control or eliminate invasive plants.	Same as Alt A.	Monitor acreage of invasive plants; develop and implement strategy to control or eliminate invasive plants.
Cropland management	Continue cooperative farming on 1,200 acres.	Utilize force account farming to reduce cropland acreage by 25 percent and convert these acres to preferred waterfowl foods.	Same as Alt A.	Continue cooperative farming on 1,200 acres; evaluate ways to improve crop production; evaluate ways to increase scrub/shrub habitat without converting agricultural cropland.

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Management of moist-soil habitat	Continue water level management on 101 acres of MSUs as needed.	Develop water control capability for remaining 125 acres of MSUs; use plantings and periodic disturbance to set back succession and promote desirable waterfowl food sources.	Same as Alt A.	Same as Alt B.
Enhancement of aquatic habitat	No active management of aquatic habitat.	Pursue cooperative projects with the USACE to adaptively manage oxbow open-water level and quality in conjunction with Arkansas River Navigation Project.	Same as Alt A.	Same as Alt B.
Resource Protection				
Refuge land acquisition	Pursue opportunities to purchase or exchange priority tracts within refuge acquisition boundary.	Pursue opportunities to purchase or exchange for priority tracts to enhance fish and wildlife management.	Pursue opportunities to purchase or exchange for priority tracts to enhance public use program.	Same as Alt B Pursue opportunities to purchase or exchange for all 1,703 acres within refuge acquisition boundary.
Law Enforcement	No law enforcement personnel on staff.	Same as Alt. A.	Add Public Use (law enforcement) position.	Same as Alt. C.
Cultural Resources	No active management. Comply with historic preservation mandates prior to initiation of management actions.	Same as Alt. A.	Develop and implement a Cultural Resources Management Plan.	Same as Alt. C.
Visitor Services				
Fishing	Continue current fishing opportunities.	Same as Alt A.	Same as Alt A, plus install ADA-compliant fishing piers at Long lake and Lodge Lake.	Same as Alt A, plus install an ADA-compliant fishing pier at Lodge Lake.

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Hunting	Continue current hunting opportunities.	Same as Alt A.	Same as Alt A, plus determine the maximum number of archery hunters refuge resources can support. Open a dove hunting season.	Same as Alt A, plus determine the maximum number of archery hunters refuge resources can support.
Wildlife observation and photography	Continue existing wildlife observation and photography opportunities.	Same as Alt A.	Develop a bird observation trail north of the refuge office; improve the Lodge Lake Trail and the loop to the Levee Trail; improve wildlife viewing by managing vegetation along all refuge roads.	Develop a bird observation trail north of the refuge office; improve the Lodge Lake Trail and the loop to the Levee Trail; improve wildlife viewing by selectively managing vegetation along refuge roads.
Environmental education and interpretation	Continue environmental education and interpretation activities as permitted by workload.	Same as Alt A	Improve ability to offer environmental education and interpretation and to cooperate with other institutions by adding a park ranger to the staff.	Same as Alt C.
Visitor facilities	No change in existing facilities.	Same as Alt A.	Develop a standardized Office and Visitor Center on the refuge in partnership with stakeholders; install two ADA-compliant fishing piers; improve information kiosks, signage, parking lots, and other facilities.	Develop a standardized Office and Visitor Center on the refuge in partnership with stakeholders; install one ADA-compliant fishing pier; improve information kiosks, signage, parking lots, and other facilities as feasible.
Volunteer programs and partnerships	Continue current volunteer management activities.	Same as Alt A.	Identify particularly useful volunteer jobs and actively recruit and train volunteers to fill these positions; install volunteer camper pads and utilities. Develop a “Friends of the Refuge” group.	Same as Alt C.

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Refuge Administration				
Funding and staffing	Refuge manager, assistant manager, maintenance (1 position), office assistan.	Same as Alt A, plus addition of a biologist, biological science technician, and park ranger (law enforcement).	Same as Alt A, plus addition of a park ranger (public use), refuge operations specialist, and heavy equipment mechanic.	Same as Alt A, plus addition of a biologist, biological science tech, 2 park rangers (public use and law enforcement), refuge operations specialist, and heavy equipment mechanic.
Cooperative opportunities	Continue current cooperative participation with Audubon, USACE, USGS, AGFC, and Arkansas Tech.	Actively seek additional cooperative opportunities as staff availability permits.	Same As Alt B.	Same as Alt B.

IV. Environmental Consequences

OVERVIEW

This section analyzes and discusses the potential environmental effects or consequences that can be reasonably expected by the implementation of each of the four alternatives described in Chapter III of this EA. For each alternative, the expected outcomes are portrayed through the 15-year life of the CCP.

EFFECTS COMMON TO ALL ALTERNATIVES

A few potential effects will be the same under each alternative and are summarized under seven categories: environmental justice, climate change, other management, land acquisition, cultural resources, refuge revenue-sharing, and other effects.

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, to focus federal attention on the environmental and human health conditions of minority and low-income populations, with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities with access to public information and opportunities for participation in matters relating to human health or the environment.

None of the management alternatives described in this environmental assessment will disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of any action alternative that includes public use and environmental education is anticipated to provide a benefit to the residents residing in the surrounding communities.

CLIMATE CHANGE

The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts as part of long-range planning endeavors.

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperatures commonly referred to as global warning. In relation to comprehensive planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's *Carbon Sequestration Research and Development* (U.S. Department of Energy 1999) defines carbon sequestration as "...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts—grasslands, forests, wetlands, tundra, perpetual ice, and desert—are effective both in preventing carbon emissions and in acting as a biological "scrubber" of atmospheric carbon monoxide. The

conclusions of the Department of Energy's report noted that ecosystem protection is important to carbon sequestration and may reduce or prevent the loss of carbon currently stored in the terrestrial biosphere.

Conserving natural habitat for wildlife is the heart of any long-range plan for national wildlife refuges. The actions proposed in this Draft CCP/EA would conserve or restore land and water, and would thus enhance carbon sequestration. This, in turn, contributes positively to efforts to mitigate human-induced global climate changes.

OTHER MANAGEMENT

All management activities that could affect the refuge's natural resources, including subsurface mineral reservations, utility lines and easements, soils, water and air, and historical and archaeological resources, would be managed to comply with all laws and regulations. In particular, any existing and future oil and gas exploration, extraction, and transport operations on the refuge would be managed identically under each of the alternatives. Thus, the impacts would be the same.

LAND ACQUISITION

Funding for land acquisition from willing sellers within the approved acquisition boundary of Holla Bend NWR would come from the Land and Water Conservation Fund, the Migratory Bird Conservation Fund, USACE mitigation programs, or donations from conservation and private organizations. Conservation easements and leases can be used to obtain the minimum interests necessary to satisfy refuge objectives if the refuge staff can adequately manage uses of the areas for the benefit of wildlife. The Service can negotiate management agreements with local, state, and federal agencies, and accept conservation easements. Some tracts within the refuge acquisition boundary may be owned by other public or private conservation organizations. The Service would work with interested organizations to identify additional areas needing protection and provide technical assistance if needed. The acquisition of private lands is entirely contingent on the landowners and their willingness to participate.

CULTURAL RESOURCES

All alternatives afford additional land protection and low levels of development, thereby producing little negative effect on the refuge's cultural and historic resources. Potentially negative effects could include logging, construction of new trails or facilities, and development of water impoundments. In most cases, these management actions would require review by the Service's Regional Archaeologist in consultation with the State of Arkansas Historic Preservation Office, as mandated by Section 106 of the National Historic Preservation Act. Therefore, the determination of whether a particular action within an alternative has the potential to affect cultural resources is an on-going process that would occur during the planning stages of every project.

Service acquisition of land with known or potential archaeological or historical sites provides two major types of protection for these resources: protection from damage by federal activity and protection from vandalism or theft. The National Historic Preservation Act requires that any actions by a federal agency which may affect archaeological or historical resources be reviewed by the State Historic Preservation Office, and that the identified effects must be avoided or mitigated. The Service's policy is to preserve these cultural, historic, and archaeological resources in the public trust, and avoid any adverse effects wherever possible.

Land acquisition, within the current acquisition boundary, by the Service would provide some degree of protection to significant cultural and historic resources. If acquisition of private lands does not occur and these lands remain under private ownership, the landowner would be responsible for protecting and preserving cultural resources. Development of off-refuge lands has the potential to destroy archaeological artifacts and other historical resources, thereby decreasing opportunities for cultural resource interpretation and research.

REFUGE REVENUE-SHARING

Annual refuge revenue-sharing payments to Pope and Yell Counties would continue at similar rates under each alternative. If lands are acquired and added to the refuge, the payments would increase accordingly.

OTHER EFFECTS

Each of the alternatives would have similar effects or minimal to negligible effects on soils, water quality and quantity, noise, transportation, human health and safety, children, hazardous materials, waste management, aesthetics and visual resources, and utilities and public services.

SUMMARY OF EFFECTS BY ALTERNATIVE

The following section describes the environmental consequences of adopting each refuge management alternative. Table 14 summarizes and addresses the likely outcomes for the specific issues, and is organized by broad issue categories.

Alternative A – Current Management (No Action)

Implementing Alternative A, the No-Action Alternative, would maintain the status quo and would have neutral to mildly beneficial impacts on the human environment, wildlife populations, and wildlife habitat. Maintaining only current funding and staffing would limit the refuge's ability to significantly address issues identified by the planning team.

<u>Fish and Wildlife Population Management</u>
The refuge would continue to focus primarily on migratory waterfowl; management for other migratory birds, including shorebirds and birds that require grassland or early successional (e.g., scrub/shrub) habitats, would be secondary. Further, the refuge would continue only mandated activities for protection of federally listed species; other opportunities for managing habitat to protect federally listed threatened and endangered species and state-listed species would not be evaluated. No refuge-led evaluation of resident wildlife populations would be planned—therefore, the refuge would have no official database of deer herd status, trends in wild turkey populations, the presence of waterbird rookeries, or nuisance wildlife populations such as beavers, raccoons, coyotes, and bobcats. Also, because no comprehensive inventory of refuge flora and fauna would exist, the refuge would not be as informed about levels of biodiversity and keystone species of various refuge ecosystems. There would be no documentation of baseline biological resource conditions, and therefore opportunity for an adaptive management strategy for refuge resources would be limited. Finally, fisheries management activities would continue without the issuance of special use permits to commercial fishermen to remove rough fish trapped by receding floodwaters.

Habitat Management

The refuge would continue its current habitat management focus on cropland, moist-soil units, and waterfowl impoundments. The refuge would not focus on establishing and maintaining other habitats, such as grassland, scrub/shrub, and mudflats, thereby limiting the diversity of habitats available for wildlife. Although the refuge would continue monitoring the survival and growth of a previous 1,400-acre hardwood seedling planting, much of which is currently in the scrub/shrub stage, these areas would not be actively managed through periodic disturbance to set back succession and maintain them as scrub/shrub habitat. These scrub/shrub areas are potential habitat for a variety of migratory bird species that have high priority in various conservation plans, and so a lack of active management could adversely affect these bird species. Further, the refuge would continue cooperative farming on 1,200 acres but would not evaluate ways to increase scrub/shrub habitat without converting that agricultural cropland. The current proportion of 25 percent cropland left as forage would be continued, with winter wheat second-cropped behind soybeans; the refuge would not increase the portion of cropland available for foraging, which would limit the benefit to resident wildlife, particularly white-tailed deer. Under this alternative, water level management on 101 acres of moist-soil units would continue as needed to produce desirable food sources for waterfowl while preventing succession to less desirable plant species; however, the refuge would not develop water control capabilities for the remaining 125 acres of moist-soil units, therefore not maximizing the benefit to waterfowl. In addition, the quality of the habitat in the cutoff channel on the refuge, which could be of particular ecological value, would not, under this alternative, be enhanced by active management of flow and water level fluctuations. Finally, invasive plant control would be limited to monitoring and removal only as necessary and without a formal strategy.

Resource Protection

The refuge would pursue opportunities to purchase or exchange only priority tracts within the refuge acquisition boundary, rather than all 1,703 acres within the boundary, therefore limiting the acreage under refuge management.

Visitor Services

Current fishing opportunities would be continued, but the quality of the fishery would not be enhanced through active management of water level and flow conditions, water quality, and fish community composition. Current hunting opportunities would be continued, but the refuge would not determine the maximum number of archery hunters refuge resources can support. Current wildlife observation and photography opportunities would exist, but no additional bird observation trails, improvements to other trails, or improvements to wildlife viewing through management of vegetation along refuge roads would occur. The refuge would continue environmental education and interpretation activities only as permitted by workload; not adding a park ranger to the staff would negatively impact the refuge's ability to conduct more of these types of activities. Current volunteer activities would continue, but the effectiveness of these activities would be negatively impacted because no formal plan would exist to identify volunteer jobs and recruit to fill them. Finally, there would be no change or improvements in existing visitor facilities—hence refuge accessibility and visitor information access would be limited under this alternative.

Refuge Administration

The refuge would continue current staffing levels, which include a refuge manager, assistant manager, maintenance worker, and an office assistant. Without additional staff, such as a biologist, park ranger, and a second maintenance worker, all refuge activities are limited, as discussed in the sections above, and especially in the areas of environmental education and education, law enforcement capability, and baseline inventories of refuge biota.

Alternative B – Enhanced Management of Habitat and Fish and Wildlife Populations

Implementing Alternative B would result in enhanced management of habitat and fish and wildlife populations, with little or no additional emphasis on management of wildlife-dependent public uses.

Fish and Wildlife Population Management

The refuge's focus on migratory waterfowl would be broadened to include other migratory birds, especially shorebirds and birds that require grassland or early successional habitats. The refuge would not only continue the mandated activities for protection of federally listed species, but would evaluate opportunities for enhanced management of habitat to protect federally listed threatened and endangered species and state-listed rare species, such as least terns, bald eagles, American burying beetles, and American alligators. Knowledge of the flora and fauna which exist on the refuge would be enhanced and documented. A database would be developed for deer herd status, trends in wild turkey populations, and the presence of waterbird rookeries, thus enhancing the refuge's ability to manage in those areas. Data would also be collected for nuisance wildlife populations, such as beavers, raccoons, and coyotes, allowing for resources to be more efficiently used in the control of those species, and the refuge would consider issuing special use permits to remove rough fish trapped by receding floodwaters. Developing comprehensive inventories of refuge flora and fauna would allow the refuge to focus on levels of biodiversity and keystone species of various refuge ecosystems, and would increase the refuge's ability to practice adaptive management of refuge resources.

Habitat Management

The refuge would increase the diversity of managed habitats, expanding its focus to include establishing and maintaining grassland, scrub/shrub, shallow water/mudflats, grassy openings in forests, buffer strips, and open water with emergent vegetation. The 1,400 acres of hardwood seedling plantings, which are currently mostly in the scrub/shrub stage, would be actively maintained as scrub/shrub through periodic disturbance to set back succession, thus enhancing the ability of migratory bird species to use these areas. Also, while continuing cooperative farming on 1,200 acres, the refuge would evaluate ways to improve crop production and further increase scrub/shrub habitat without converting the cropland. Under this alternative, water level management on 101 acres of moist-soil units would continue as needed to produce desirable food sources for waterfowl while preventing succession to less desirable plant species; further, the refuge would develop water control capabilities for the remaining 125 acres of moist-soil units, using plantings and periodic disturbance to set back succession, greatly increasing the benefit to waterfowl. In addition, the refuge would pursue cooperative projects with the USACE to adaptively manage the cutoff channel (oxbow) open-water level and quality in conjunction with the Arkansas River Navigation Project, enhancing the ecological value of this habitat. Finally, the acreage of invasive plants would be monitored, with a strategy developed and implemented to control or eliminate invasive plants, thus benefiting the native plants of the refuge.

Resource Protection

The refuge would pursue opportunities to purchase or exchange for all 1,703 acres within the refuge acquisition boundary, thus maximizing the acreage under refuge management.

Visitor Services

All current visitor services opportunities would continue as in Alternative A, the no-action alternative (see discussion in the Alternative A section, above).

Refuge Administration
A biologist would be added to the current staff, which would allow the refuge to perform the enhanced fish and wildlife population and habitat management activities described in the above sections. Further, the refuge would actively seek additional cooperative opportunities with other agencies, groups, and individuals as staff availability would permit.

Alternative C – Enhanced Management for Wildlife-Dependent Public Uses

Implementing Alternative C would result in enhanced management for wildlife-dependent public uses with little or no additional emphasis on management of habitat and fish and wildlife populations.

Fish and Wildlife Population Management

All fish and wildlife population management activities would continue as in Alternative A, the no-action alternative (see discussion in the Alternative A section, above).

Habitat Management

All habitat management activities would continue as in Alternative A, the no-action alternative (see discussion in the Alternative A section, above).

Resource Protection
Resource protection activities would be the same as in Alternative A, the no-action alternative (see discussion in the Alternative A section, above).

Visitor Services
Current fishing opportunities would be continued as in Alternative A; additionally, access to fishing activities would be enhanced by the addition of ADA-compliant fishing piers at Long Lake and Lodge Lake. Current hunting opportunities would be continued, and the refuge would determine the maximum number of archery hunters refuge resources could support, increasing efficiency of that activity. Wildlife observation and photography would be positively impacted by the development of a new bird observation trail, improvements to the Lodge Lake trail and the loop to the Levee Trail, and by selectively managing vegetation along refuge roads to improve wildlife viewing. Environmental education and interpretation activities and the ability to cooperate with other institutions would be positively impacted by the addition of a park ranger to the staff. Further, active recruitment and training of volunteers to fill particularly useful jobs would then occur; volunteer camper pads and utilities would be installed. Finally, a standardized office and visitor center on the refuge would enhance refuge accessibility and visitor information access.

Refuge Administration
A park ranger would be added to the current staff, which would allow the refuge to perform the enhanced visitor services activities described in the above section. Further, the refuge would actively seek additional cooperative opportunities with other agencies, groups, and individuals as staff availability would permit.

Alternative D – Balanced Enhancement of Management for Habitat, Fish, and Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)

Implementing Alternative D would result in a management approach where fish and wildlife population and habitat concerns are balanced with wildlife-dependent public use needs, focusing on enhancements in areas where linkages among all the concerns would result in greater benefits to the refuge and surrounding area.

Fish and Wildlife Population Management

The refuge's focus on migratory waterfowl would be broadened to include other migratory birds, mostly shorebirds. The refuge would develop a database on trends in wild turkey populations and the presence of waterbird rookeries, but would not develop a database on deer herd status—available state information would be relied upon for deer herd status. The refuge would undertake control of nuisance wildlife populations, such as beavers and raccoons, as necessary and feasible; additionally, the refuge would collect data on these nuisance wildlife populations. The refuge would develop comprehensive inventories of refuge flora and fauna, focusing on levels of biodiversity and keystone species of refuge ecosystems. Adaptive management of refuge resources would occur through the use of baseline biological conditions/response information to develop biological response objectives and management modifications to achieve objectives. While the refuge would continue mandated activities for protection of federally listed species, it would not use additional resources to evaluate opportunities to manage habitat for other federal- and state-listed species. Finally, under this alternative the refuge would not evaluate using special use permits to remove rough fish trapped by receding floodwaters.

Habitat Management

The refuge would increase the diversity of managed habitats, expanding its focus to include active management of grassland, scrub/shrub, shallow water/mudflats, grassy openings in forests, and buffer strips. The 1,400 acres of hardwood seedling plantings would be actively maintained as scrub/shrub through periodic disturbance to set back succession, thus enhancing the ability of migratory bird species to use these areas. Also, as in Alternative B, while continuing cooperative farming on 1,200 acres, the refuge would evaluate ways to improve crop production and further increase scrub/shrub habitat without converting the cropland. Under this alternative, as in Alternative B, water level management on 101 acres of moist-soil units would continue as needed to produce desirable food sources for waterfowl, and the refuge would develop water control capabilities for the remaining 125 acres of moist-soil units, greatly increasing the benefit to waterfowl. In addition, the refuge would pursue cooperative projects with the USACE to adaptively manage the cutoff channel (oxbow) open-water level and quality in conjunction with the Arkansas River Navigation Project, enhancing the ecological value of this habitat. Finally, the acreage of invasive plants would be monitored, with a strategy developed and implemented to control or eliminate invasive plants, thus benefiting the native plants of the refuge.

Resource Protection

As in Alternative B, the refuge would pursue opportunities to purchase or exchange for all 1,703 acres within the refuge acquisition boundary, thus maximizing the acreage receiving benefits of refuge management.

Visitor Services

As in Alternative C, current fishing opportunities would be continued, and access to fishing activities would be enhanced by the addition of an ADA-compliant fishing pier at Lodge Lake. Current hunting opportunities would be continued, and the refuge would determine the maximum number of archery hunters refuge resources could support, increasing efficiency of that activity. Wildlife observation and photography would be positively impacted by the development of a new bird observation trail, improvements to the Lodge Lake trail and the loop to the Levee Trail, and by selectively managing vegetation along refuge roads to improve wildlife viewing. Environmental education and interpretation activities and the ability to cooperate with other institutions would be positively impacted by the addition of a park ranger to the staff. Further, a “Friends of the Refuge” group would be developed, and active recruitment and training of volunteers to fill particularly useful jobs would then occur; volunteer camper pads and utilities would be installed. Finally, a standardized office and visitor center on the refuge would enhance refuge accessibility and visitor information access.

Refuge Administration

The current staff, which consists of a refuge manager, assistant manager, maintenance worker, and an office assistant, would be augmented by the addition of a biologist, a park ranger, and a second maintenance worker, which would allow the refuge to perform all of the enhanced activities described in the above sections. Further, the refuge would actively seek additional cooperative opportunities with other agencies, groups, and individuals as staff availability would permit.

Table 14. Summary of environmental effects by alternative for Holla Bend National Wildlife Refuge

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Fish and Wildlife Population Management				
Broader focus for migratory bird management	No change	Moderate increase	No change	Moderate Increase
Protection of threatened, endangered, or rare species	No change	Moderate Increase	No change	No change
Coordination with other conservation plans	No change	No change	No change	No change
Status and trends of resident wildlife populations	No change	Moderate Increase	No change	Slight Increase
Control of nuisance wildlife populations	No change	Major Increase	No change	Moderate Increase
Fisheries management	No change	Slight Increase	No change	No change
Adaptive management of refuge resources	No change	Moderate increase	No change	Moderate Increase
Baseline inventories of refuge biota	No change	Moderate Increase	No change	Moderate Increase
Habitat Management				
Increase diversity of managed habitats	No change	Moderate Increase	No change	Moderate Increase
Bottomland hardwood forest	No change	Moderate Improvement	No change	Moderate Improvement
Foraging habitat for resident wildlife	No change	Moderate Increase	No change	Moderate Increase
Control of invasive plants	No change	Moderate Increase	No change	Moderate Increase

Issues	Alternative A Continue Current Management (No Action)	Alternative B Enhanced Management of Habitat and Fish and Wildlife Populations	Alternative C Enhanced Management for Wildlife-Dependent Public Uses	Alternative D Balanced Enhancement of Management for Habitat, Fish And Wildlife Populations, and Wildlife-Dependent Public Uses (Proposed Alternative)
Cropland management	No change	Moderate Increase	No change	Slight Increase
Management of moist-soil habitat	No change	Major Increase	No change	Major Increase
Enhancement of aquatic habitat	No change	Major Increase	No change	Major Increase
Resource Protection				
Refuge land acquisition	No change	Moderate change	Moderate change	Major change
Visitor Services				
Fishing	No change	Slight Increase	No change	Slight Increase
Hunting	No change	No change	Moderate Increase	Slight Increase
Wildlife observation and photography	No change	No change	Moderate Increase	Moderate Increase
Environmental education and interpretation	No change	No change	Moderate Increase	Moderate Increase
Visitor facilities	No change	No change	Major Increase	Major Increase
Volunteer programs and partnerships	No change	No change	Moderate increase	Moderate Increase
Refuge Administration				
Funding and staffing	No change	Major increase	Major increase	Major Increase
Cooperative opportunities	No change	Slight Increase	Slight Increase	Slight Increase

UNAVOIDABLE IMPACTS AND MITIGATION MEASURES

Under Alternative A—the no-action alternative—there are numerous unavoidable impacts, including law enforcement that is not adequate for protecting significant visitor uses; continued degradation of the biological functions of native plant communities and wildlife habitat due to the invasion of exotic plants and nuisance animals; and a continued decrease in biodiversity. Over time, if these issues are not addressed, they will continue to impact refuge resources.

Alternative D, the proposed alternative, also has some unavoidable impacts. These impacts are expected to be minor and/or short-term in duration. However, the refuge would attempt to minimize these impacts whenever possible. The following sections describe the measures the refuge would employ to mitigate and minimize the potential impacts that could result from implementation of the proposed alternative.

WATER QUALITY FROM SOIL DISTURBANCE AND USE OF HERBICIDES

Soil disturbance and siltation due to water management activities; road and levee maintenance; and the construction of observation towers, boat ramps, and a headquarters and visitor center is expected to be minor and of short duration. To further reduce potential impacts, the refuge would use best management practices to minimize the erosion of soils into water bodies.

Foot traffic on new and extended foot trails is expected to have a negligible impact on soil erosion. To minimize the impacts from public use, the refuge would include informational signs that request trail users to remain on the trails, in order to avoid causing potential erosion problems.

Long-term herbicide use for exotic plant control could result in a slight decrease in water quality in areas prone to exotic plant infestation. Through the proper application of herbicides, however, this is expected to have a minor impact on the environment, with the benefit of reducing or eliminating exotic plant infestations.

WILDLIFE DISTURBANCE

Disturbance to wildlife is an unavoidable consequence of any public use program, regardless of the activity involved. While some activities such as wildlife observation may be less disturbing than others, all of the public use activities proposed under the proposed alternative would be planned to avoid unacceptable levels of impact.

The known and anticipated levels of disturbance from the proposed alternative are not considered to be significant. Nevertheless, the refuge would manage public use activities to reduce impacts. Providing access for fishing opportunities allows the use of a renewable natural resource without adversely impacting other resources. Hunting would also be managed with restrictions that ensure minimal impact on other resources. General wildlife observation may result in minimal disturbance to wildlife. If the refuge determines that impacts from the expected additional visitor uses are above the levels that are anticipated, those uses would be discontinued, restricted, or rerouted to other less sensitive areas.

VEGETATION DISTURBANCE

Negative impacts could result from the creation, extension, and maintenance of trails that require the clearing of non-sensitive vegetation along their length. This is expected to be a minor short-term impact.

Increased visitor use may increase the potential for the introduction of new exotic species into areas when visitors do not comply with boating regulations at the boat ramps and other access points, or with requests to stay on trails. The refuge would minimize this impact by enforcing the regulations for access to the refuge's water bodies, and by installing informational signs that request users to stay on the trails.

USER GROUP CONFLICTS

As public use increases, unanticipated conflicts between different user groups could occur. If this should happen, the refuge would adjust its programs, as needed, to eliminate or minimize any public use issues. The refuge would use methods that have proven to be effective in reducing or eliminating public use conflicts. These methods include establishing separate use areas, different use periods, and limits on the numbers of users in order to provide safe, quality, appropriate, and compatible wildlife-dependent recreational opportunities.

EFFECTS ON ADJACENT LANDOWNERS

Implementation of the proposed alternative is not expected to negatively affect the owners of private lands adjacent to the refuge. Positive impacts that would be expected include higher property values, less intrusion of invasive exotic plants, and increased opportunities for viewing more diverse wildlife.

However, some negative impacts that may occur include a higher frequency of trespass onto adjacent private lands, and noise associated with increased traffic. To minimize these potential impacts, the refuge would provide informational signs that clearly mark refuge boundaries; maintain the refuge's existing parking facilities; use law enforcement; and provide increased educational efforts at the visitor center.

LAND OWNERSHIP AND SITE DEVELOPMENT

Land acquisition efforts by the Service could lead to changes in land use and recreational use patterns. However, most of the non-Service-owned lands within the refuge's approved acquisition boundary are currently undeveloped. If these lands are acquired as additions to the refuge, they would be maintained in a natural state, managed for native wildlife populations, and opened to wildlife-compatible public uses, where feasible.

Potential development of the refuge's buildings, trails, and other improvements could lead to minor short-term negative impacts on plants, soils, and some wildlife species. When building the observation towers, efforts would be made to use recycled products and environmentally sensitive treated lumber. The visitor center would be constructed to be aesthetically pleasing to the community and to avoid any additional impacts to native plant communities. All construction activities would comply with the requirements of Section 404 of the Clean Water Act; the National Historic Preservation Act; Executive Order 11988, Floodplain Management; and other applicable regulatory requirements.

CUMULATIVE IMPACTS

A cumulative impact is defined as an impact on the natural or human environment, which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 Code of Federal Regulations, 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can "accumulate" spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially canceling out each other's effect on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource. In addition, sometimes the overall effect is greater than merely the sum of the individual effects, such as when one more reduction in a population crosses a threshold of reproductive sustainability, and threatens to extinguish the population.

A thorough analysis of impacts always considers their cumulative aspects, because actions do not take place in a vacuum. There are virtually always some other actions that have affected that resource in some way in the past, or are affecting it in the present, or will affect it in the reasonably foreseeable future. So any assessment of a specific action's effects must in fact be made with consideration of what else has happened to that resource, what else is happening, or what else could likely happen to it.

The refuge is not aware of any past, present, or future planned actions that would result in a significant cumulative impact when added to the refuge's proposed actions, as outlined in the proposed alternative.

DIRECT AND INDIRECT EFFECTS OR IMPACTS

Direct effects are caused by an action and occur at the same time as the action. Indirect effects are caused by an action but are manifested later in time or further removed in distance, but still reasonably foreseeable.

The actions proposed for implementation under the proposed alternative include facility development, wildlife and population management, resource protection, public use, and administrative programs. These actions would result in both direct and indirect effects. Facility development, for example, would most likely lead to increased public use, a direct effect; and it, in turn, would lead to indirect effects such as increased littering, noise, and vehicular traffic.

Other indirect effects that may result from implementing the proposed alternative include minor impacts from siltation due to the disturbance of soils and vegetation while expanding the water control structures, as well as expanding or creating new foot trails; construction of the observation tower and visitor center; and providing greater visitor access through improvements to the boat ramps.

SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

The habitat protection and management actions under the proposed alternative are dedicated to maintaining the long-term productivity of refuge habitats. The benefits of this plan for long-term productivity far outweigh any impacts from short-term actions, such as the construction of observation towers and a visitor center, or creation of new trails. While these activities would cause short-term negative impacts, the educational values and associated public support gained from the improved visitor experience would produce long-term benefits for the refuge's entire ecosystem.

The key to protecting and ensuring the refuge's long-term productivity is to find the threshold where public uses do not degrade or interfere with the refuge's natural resources. The plans proposed have been carefully conceived to achieve that threshold. Therefore, implementing the proposed alternative would lead to long-term benefits for wildlife protection and land conservation that far outweigh any short-term impacts.

V. Consultation and Coordination

OVERVIEW

This chapter summarizes the consultation and coordination that has occurred to date in identifying the issues, alternatives, and proposed alternative, which are presented in this Draft CCP/EA. It lists the meetings that have been held with the various agencies, organizations, and individuals who were consulted in the preparation of the Draft CCP/EA.

The planning team responsible for preparing this Draft CCP/EA was established in May 2007. It includes natural resource management professionals representing Holla Bend NWR, Service staff, and AGFC (see Appendix K – List of Preparers). The Service had previously established a biological review team with representatives from the same agencies, plus the USDA Natural Resources Conservation Service, that conducted an on-site evaluation in October 2006 and completed a Biological Review Report in June 2007 (Edwards 2007), and had established a visitor services review team that presented recommendations to the refuge staff and prepared a Visitor Services Review Report in March 2007 (USFWS 2007).

Pre-Planning

Biological Review Team

Name	Agency	Position
Ben Mense	USFWS	Refuge Manager, Holla Bend NWR
Carla Mitchell	USFWS	Assistant Refuge Manager, Holla Bend NWR
Tom Edwards	USFWS	Migratory bird biologist
Whit Lewis	USFWS	Regional IPM/Farming Coordinator
Catherine Rideout	AGFC	Songbird Program Coordinator
Kevin Lynch	AGFC	Wildlife biologist
Jeff Denman	USFWS	Forester, White River NWR
Janet Ertel	USFWS	
James Baker	USDA NRCS	Private lands biologist
Lindsey Lewis	USFWS	Ecological Services Office
Steve Osborne	USFWS	Ecological Services Office

Visitor Services Review Team

Name	Agency	Position
Garry Tucker	USFWS	Visitor Services and Outreach
Gary Brantley	USFWS	North Louisiana NWR Complex

CCP/EA Planning Team

Name	Agency	Position
Ben Mense	USFWS	Refuge Manager, Holla Bend NWR
Durwin Carter	USFWS	Refuge Manager, Holla Bend NWR
Carla Mitchell	USFWS	Assistant Refuge Manager, Holla Bend NWR
Tom Edwards	USFWS	Migratory bird biologist
Janet Ertel	USFWS	
Kevin Lynch	AGFC	Wildlife biologist
Mike Dawson	USFWS	Natural Resource Planner
Tina Chouinard	USFWS	Natural Resource Planner
Neil Carriker	Tennessee Valley Authority (TVA)	
Janice Cox	TVA	
Tammy Springston	TVA	

Appendix A. Glossary

Adaptive Management: Refers to a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in a management plan. Analysis of results helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Alluvial: Sediment transported and deposited in a delta or riverbed by flowing water.

Alternative: 1. A reasonable way to fix the identified problem or satisfy the stated need (40 CFR 1500.2). 2. Alternatives are different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission, and resolving issues (Service Manual 602 FW 1.6B).

Anadromous: Migratory fishes that spend most of their lives in the sea and migrate to fresh water to breed.

Biological Diversity: The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1. 12B). The System's focus is on indigenous species, biotic communities, and ecological processes. Also referred to as biodiversity.

Carrying Capacity: The maximum population of a species able to be supported by a habitat or area.

Categorical Exclusion: A category of actions that does not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a federal agency pursuant to the National Environmental Policy Act (40 CFR 1508.4).

CFR: Code of Federal Regulations.

Compatible Use: A proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose(s) of the national wildlife refuge [50 CFR 25.12 (a)]. A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.

Comprehensive Conservation Plan:	A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge; helps fulfill the mission of the Refuge System; maintains and, where appropriate, restores the ecological integrity of each refuge and the Refuge System; helps achieve the goals of the National Wilderness Preservation System; and meets other mandates (Service Manual 602 FW 1.6 E).
Concern:	See Issue
Cover Type:	The present vegetation of an area.
Cultural Resource Inventory:	A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).
Cultural Resource Overview:	A comprehensive document prepared for a field office that discusses, among other things, its prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement on how program objectives should be met and conflicts resolved. An overview should reference or incorporate information from a field office's background or literature search described in Section VIII of the Cultural Resource Management Handbook (Service Manual 614 FW 1.7).
Cultural Resources:	The remains of sites, structures, or objects used by people in the past.
Designated Wilderness Area:	An area designated by the U.S. Congress to be managed as part of the National Wilderness Preservation System (Draft Service Manual 610 FW 1.5).
Disturbance:	Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., aircraft overflight).
Ecosystem:	A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.
Ecosystem Management:	Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.

Endangered Species (Federal):	A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species (State):	A plant or animal species in danger of becoming extinct or extirpated in the state within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.
Environmental Assessment (EA):	A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).
Environmental Impact Statement (EIS):	A detailed written statement required by section 102(2)(C) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).
Estuary:	The wide lower course of a river into which the tides flow. The area where the tide meets a river current.
Finding of No Significant Impact (FONSI):	A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared (40 CFR 1508.13).
Goal:	Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Service Manual 620 FW 1.6J).
Habitat:	Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.
Habitat Restoration:	Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.
Habitat Type:	See Vegetation Type.
Improvement Act:	The National Wildlife Refuge System Improvement Act of 1997.
Informed Consent:	The grudging willingness of opponents to “go along” with a course of action that they actually oppose (Bleiker).

Issue:	Any unsettled matter that requires a management decision [e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or other presence of an undesirable resource condition (Service Manual 602 FW 1.6K)].
Management Alternative:	See Alternative
Management Concern:	See Issue
Management Opportunity:	See Issue
Migration:	The seasonal movement from one area to another and back.
Mission Statement:	Succinct statement of the unit's purpose and reason for being.
Monitoring:	The process of collecting information to track changes of selected parameters over time.
National Environmental Policy Act of 1969 (NEPA):	Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (40 CFR 1500).
National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57):	Under the Refuge Improvement Act, the Fish and Wildlife Service is required to develop 15-year comprehensive conservation plans for all national wildlife refuges outside Alaska. The Act also describes the six public uses given priority status within the Refuge System (i.e., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation).
National Wildlife Refuge System Mission:	The mission is 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.
National Wildlife Refuge System:	Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; game ranges; wildlife management areas; or waterfowl production areas.

National Wildlife Refuge:	A designated area of land, water, or an interest in land or water within the Refuge System.
Native Species:	Species that normally live and thrive in a particular ecosystem.
Noxious Weed:	A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive or difficult to manage; parasitic; a carrier or host of serious insect or disease; or non-native, new, or not common to the United States. According to the Federal Noxious Weed Act (P.L. 93-639), a noxious weed is one that causes disease or had adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the Untied States and to the public health.
Objective:	A concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Making objectives attainable, time-specific, and measurable (Service Manual 602 FW 1.6N).
Plant Association:	A classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.
Plant Community:	An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community.
Preferred Alternative:	This is the alternative determined (by the decision-maker) to best achieve the refuge purpose, vision, and goals; contributes to the Refuge System mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.
Prescribed Fire:	The application of fire to wildland fuels to achieve identified land use objectives (Service Manual 621 FW 1.7). May occur from natural ignition or intentional ignition.
Priority Species:	Fish and wildlife species that require protective measures and/or management guidelines to ensure their perpetuation. Priority species include the following: (1) State-listed and candidate species; (2) species or groups of animals susceptible to significant population declines within a specific area or statewide by virtue of their inclination to aggregate (e.g., seabird colonies); and (3) species of recreation, commercial, and/or tribal importance.
Public Involvement Plan:	Broad long-term guidance for involving the public in the comprehensive conservation planning process.

Public Involvement:	A process that offers impacted and interested individuals and organizations an opportunity to become informed about, and to express their opinions on Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.
Public:	Individuals, organizations, and groups; officials of federal, state, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in service issues and those who do or do not realize that Service decisions may affect them.
Purposes of the Refuge:	"The purposes 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 refuge sub-unit." For refuges that encompass congressionally designated wilderness, the purposes of the Wilderness Act are additional purposes of the refuge (Service Manual 602 FW 106 S).
Recommended Wilderness:	Areas studied and found suitable for wilderness designation by both the Director of the Fish and Wildlife Service and the Secretary of the Department of the Interior, and recommended for designation by the President to Congress. These areas await only legislative action by Congress in order to become part of the Wilderness System. Such areas are also referred to as "pending in Congress" (Draft Service Manual 610 FW 1.5).
Record of Decision (ROD):	A concise public record of decision prepared by the federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferable alternative, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigation (40 CFR 1505.2).
Refuge Goal:	See Goal
Refuge Purposes:	See Purposes of the Refuge
Songbirds: (Also Passerines)	A category of birds that is medium to small, perching landbirds. Most are territorial singers and migratory.
Step-down Management Plan:	A plan that provides specific guidance on management subjects (e.g., habitat, public use, fire, and safety) or groups of related subjects. It describes strategies and implementation schedules for meeting CCP goals and objectives (Service Manual 602 FW 1.6 U).

Strategy:	A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives (Service Manual 602 FW 1.6 U).
Study Area:	The area reviewed in detail for wildlife, habitat, and public use potential. For purposes of this CCP, the study area includes the lands within the currently approved refuge boundary and potential refuge expansion areas.
Threatened Species (Federal):	Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
Threatened Species (State):	A plant or animal species likely to become endangered in the state within the near future if factors contributing to population decline or habitat degradation or loss continue.
Tiering:	The coverage of general matters in broader environmental impact statements with subsequent narrower statements of environmental analysis, incorporating by reference, the general discussions and concentrating on specific issues (40 CFR 1508.28).
U.S. Fish and Wildlife Service Mission:	The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
Unit Objective:	See Objective
Vegetation Type, Habitat Type, Forest Cover Type:	A land classification system based upon the concept of distinct plant associations.
Vision Statement:	A concise statement of what the planning unit should be, or what we hope to do, based primarily upon the Refuge System mission and specific refuge purposes, and other mandates. We will tie the vision statement for the refuge to the mission of the Refuge System; the purpose(s) of the refuge; the maintenance or restoration of the ecological integrity of each refuge and the Refuge System; and other mandates (Service Manual 602 FW 1.6 Z).

Wilderness Study Areas: Lands and waters identified through inventory as meeting the definition of wilderness and undergoing evaluation for recommendation for inclusion in the Wilderness System. A study area must meet the following criteria:

- Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation; and
- Has at least 5,000 contiguous roadless acres or is sufficient in size as to make practicable its preservation and use in an unimpaired condition (Draft Service Manual 610 FW 1.5).

Wilderness: See Designated Wilderness

Wildfire: A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

Wildland Fire: Every wildland fire is either a wildfire or a prescribed fire (Service Manual 621 FW 1.3

ACRONYMS AND ABBREVIATIONS

ADEQ	Arkansas Department of Environmental Quality
AGFC	Arkansas Game and Fish Commission
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BRT	Biological Review Team
CCP	Comprehensive Conservation Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
DO	dissolved oxygen
DOI	Department of the Interior
DU	Ducks Unlimited
EA	Environmental Assessment
EE	environmental education
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
FTE	full-time equivalent
FY	Fiscal Year
IBA	Important Bird Area
GIS	Global Information System
LMVJV	Lower Mississippi Valley Joint Venture
MKARNS	McClellan-Kerr Arkansas River Navigation System
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
PFT	Permanent Full Time
PIF	Partners In Flight
PUNA	Public Use Natural Area
RM	Refuge Manual
RNA	Research Natural Area
ROD	Record of Decision
RONS	Refuge Operating Needs System
RRP	Refuge Roads Program
FWS	U.S. Fish and Wildlife Service (also Service)
SGCN	Species of Greatest Conservation Need
TFT	Temporary Full Time
USC	United States Code
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WMA	Wildlife Management Area

Appendix B. References and Literature Citations

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Appendix C. Relevant Legal Mandates and Executive Orders

STATUE	DESCRIPTION
Administrative Procedures Act (1946)	Outlines administrative procedures to be followed by federal agencies with respect to identification of information to be made public; publication of material in the Federal Register; maintenance of records; attendance and notification requirements for specific meetings and hearings; issuance of licenses; and review of agency actions.
American Antiquities Act of 1906	Provides penalties for unauthorized collection, excavation, or destruction of historic or prehistoric ruins, monuments, or objects of antiquity on lands owned or controlled by the United States. The Act authorizes the President to designate as national monuments objects or areas of historic or scientific interest on lands owned or controlled by the Unites States.
American Indian Religious Freedom Act of 1978	Protects the inherent right of Native Americans to believe, express, and exercise their traditional religions, including access to important sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.
Americans With Disabilities Act of 1990	Intended to prevent discrimination of and make American society more accessible to people with disabilities. The Act requires reasonable accommodations to be made in employment, public services, public accommodations, and telecommunications for persons with disabilities.
Anadromous Fish Conservation Act of 1965, as amended	Authorizes the Secretaries of Interior and Commerce to enter into cooperative agreements with states and other non-federal interests for conservation, development, and enhancement of anadromous fish and contribute up to 50 percent as the federal share of the cost of carrying out such agreements. Reclamation construction programs for water resource projects needed solely for such fish are also authorized.
Archaeological Resources Protection Act of 1979, as amended.	This Act strengthens and expands the protective provisions of the Antiquities Act of 1906 regarding archaeological resources. It also revised the permitting process for archaeological research.
Architectural Barriers Act of 1968	Requires that buildings and facilities designed, constructed, or altered with federal funds, or leased by a federal agency, must comply with standards for physical accessibility.
Bald and Golden Eagle Protection Act of 1940, as amended	Prohibits the possession, sale or transport of any bald or golden eagle, alive or dead, or part, nest, or egg except as permitted by the Secretary of the Interior for scientific or exhibition purposes, or for the religious purposes of Indians.

STATUE	DESCRIPTION
Bankhead-Jones Farm Tenant Act of 1937	Directs the Secretary of Agriculture to develop a program of land conservation and utilization in order to correct maladjustments in land use and thus assist in such things as control of soil erosion, reforestation, conservation of natural resources and protection of fish and wildlife. Some early refuges and hatcheries were established under authority of this Act.
Cave Resources Protection Act of 1988	Established requirements for the management and protection of caves and their resources on federal lands, including allowing the land managing agencies to withhold the location of caves from the public, and requiring permits for any removal or collecting activities in caves on federal lands.
Clean Air Act of 1970	Regulates air emissions from area, stationary, and mobile sources. This Act and its amendments charge federal land managers with direct responsibility to protect the "air quality and related values" of land under their control. These values include fish, wildlife, and their habitats.
Clean Water Act of 1974, as amended	This Act and its amendments have as its objective the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. Section 401 of the Act requires that federally permitted activities comply with the Clean Water Act standards, state water quality laws, and any other appropriate state laws. Section 404 charges the U.S. Army Corps of Engineers with regulating discharge of dredge or fill materials into waters of the United States, including wetlands.
Coastal Barrier Resources Act of 1982 (CBRA)	Identifies undeveloped coastal barriers along the Atlantic and Gulf Coasts and included them in the John H. Chafee Coastal Barrier Resources System (CBRS). The objectives of the act are to minimize loss of human life, reduce wasteful federal expenditures, and minimize the damage to natural resources by restricting most federal expenditures that encourage development within the CBRS.
Coastal Barrier Improvement Act of 1990	Reauthorized the Coastal Barrier Resources Act (CBRA), expanded the CBRS to include undeveloped coastal barriers along the Great Lakes and in the Caribbean, and established "Otherwise Protected Areas (OPAs)." The Service is responsible for maintaining official maps, consulting with federal agencies that propose spending federal funds within the CBRS and OPAs, and making recommendations to Congress about proposed boundary revisions.
Coastal Wetlands Planning, Protection, and Restoration (1990)	Authorizes the Director of the Fish and Wildlife Service to participate in the development of a Louisiana coastal wetlands restoration program, participate in the development and oversight of a coastal wetlands conservation program, and lead in the implementation and administration of a national coastal wetlands grant program.

STATUE	DESCRIPTION
Coastal Zone Management Act of 1972, as amended	Established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans and requires that “any federal activity within or outside of the coastal zone that affects any land or water use or natural resource of the coastal zone” shall be “consistent to the maximum extent practicable with the enforceable policies” of a state’s coastal zone management plan. The law includes an Enhancement Grants Program for protecting, restoring, or enhancing existing coastal wetlands or creating new coastal wetlands. It also established the National Estuarine Research Reserve System, guidelines for estuarine research, and financial assistance for land acquisition.
Emergency Wetlands Resources Act of 1986	This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act requires the Secretary to establish a National Wetlands Priority Conservation Plan, required the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amounts equal to import duties on arms and ammunition. It also established entrance fees at national wildlife refuges.
Endangered Species Act of 1973, as amended	Provides for the conservation of threatened and endangered species of fish, wildlife, and plants by federal action and by encouraging the establishment of state programs. It provides for the determination and listing of threatened and endangered species and the designation of critical habitats. Section 7 requires refuge managers to perform internal consultation before initiating projects that affect or may affect endangered species.
Environmental Education Act of 1990	This Act established the Office of Environmental Education within the U.S. Environmental Protection Agency to develop and administer a federal environmental education program in consultation with other federal natural resource management agencies, including the Fish and Wildlife Service.
Estuary Protection Act of 1968	Authorized the Secretary of the Interior, in cooperation with other federal agencies and the states, to study and inventory estuaries of the United States, including land and water of the Great Lakes, and to determine whether such areas should be acquired for protection. The Secretary is also required to encourage state and local governments to consider the importance of estuaries in their planning activities relative to federal natural resource grants. In approving any state grants for acquisition of estuaries, the Secretary was required to establish conditions to ensure the permanent protection of estuaries.

STATUE	DESCRIPTION
Estuaries and Clean Waters Act of 2000	This law creates a federal interagency council that includes the Director of the Fish and Wildlife Service, the Secretary of the Army for Civil Works, the Secretary of Agriculture, the Administrator of the Environmental Protection Agency and the Administrator for the National Oceanic and Atmospheric Administration. The council is charged with developing a national estuary habitat restoration strategy and providing grants to entities to restore and protect estuary habitat to promote the strategy.
Food Security Act of 1985, as amended (Farm Bill)	The Act contains several provisions that contribute to wetland conservation. The Swampbuster provisions state that farmers who convert wetlands for the purpose of planting after enactment of the law are ineligible for most farmer program subsidies. It also established the Wetland Reserve Program to restore and protect wetlands through easements and restoration of the functions and values of wetlands on such easement areas.
Farmland Protection Policy Act of 1981, as amended	The purpose of this law is to minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. Federal programs include construction projects and the management of federal lands.
Federal Advisory Committee Act (1972), as amended	Governs the establishment of and procedures for committees that provide advice to the federal government. Advisory committees may be established only if they will serve a necessary, non-duplicative function. Committees must be strictly advisory unless otherwise specified and meetings must be open to the public.
Federal Coal Leasing Amendment Act of 1976	Provided that nothing in the Mining Act, the Mineral Leasing Act, or the Mineral Leasing Act for Acquired Lands authorized mining coal on refuges.
Federal-Aid Highways Act of 1968	Established requirements for approval of federal highways through national wildlife refuges and other designated areas to preserve the natural beauty of such areas. The Secretary of Transportation is directed to consult with the Secretary of the Interior and other federal agencies before approving any program or project requiring the use of land under their jurisdiction.
Federal Noxious Weed Act of 1990, as amended	The Secretary of Agriculture was given the authority to designate plants as noxious weeds and to cooperate with other federal, State and local agencies, farmers' associations, and private individuals in measures to control, eradicate, prevent, or retard the spread of such weeds. The Act requires each Federal land-managing agency, including the Fish and Wildlife Service, to designate an office or person to coordinate a program to control such plants on the agency's land and implement cooperative agreements with the states, including integrated management systems to control undesirable plants.

STATUE	DESCRIPTION
Fish and Wildlife Act of 1956	Establishes a comprehensive national fish, shellfish, and wildlife resources policy with emphasis on the commercial fishing industry but also includes the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment and to maintain and increase public opportunities for recreational use of fish and wildlife resources. Among other things, it authorizes the Secretary of the Interior to take such steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources including, but not limited to, research, development of existing facilities, and acquisition by purchase or exchange of land and water or interests therein.
Fish and Wildlife Conservation Act of 1980, as amended	Requires the Service to monitor non-gamebird species, identify species of management concern, and implement conservation measures to preclude the need for listing under the Endangered Species Act.
Fish and Wildlife Coordination Act of 1958	Promotes equal consideration and coordination of wildlife conservation with other water resource development programs by requiring consultation with the Fish and Wildlife Service and the state fish and wildlife agencies where the "waters of a stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified" by any agency under federal permit or license.
Improvement Act of 1978	This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.
Fishery (Magnuson) Conservation and Management Act of 1976	Established Regional Fishery Management Councils comprised of federal and state officials, including the Fish and Wildlife Service. It provides for regulation of foreign fishing and vessel fishing permits.
Freedom of Information Act, 1966	Requires all federal agencies to make available to the public for inspection and copying administrative staff manuals and staff instructions; official, published and unpublished policy statements; final orders deciding case adjudication; and other documents. Special exemptions have been reserved for nine categories of privileged material. The Act requires the party seeking the information to pay reasonable search and duplication costs.
Geothermal Steam Act of 1970, as amended	Authorizes and governs the lease of geothermal steam and related resources on public lands. Section 15 c of the Act prohibits issuing geothermal leases on virtually all Service-administrative lands.

STATUE	DESCRIPTION
Lacey Act of 1900, as amended	Originally designed to help states protect their native game animals and to safeguard U.S. crop production from harmful foreign species, this Act prohibits interstate and international transport and commerce of fish, wildlife or plants taken in violation of domestic or foreign laws. It regulates the introduction to America of foreign species.
Land and Water Conservation Fund Act of 1948	This Act provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies, including the Fish and Wildlife Service.
Marine Mammal Protection Act of 1972, as amended	The 1972 Marine Mammal Protection Act established a federal responsibility to conserve marine mammals with management vested in the Department of the Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals, as well as products taken from them.
Migratory Bird Conservation Act of 1929	Established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds. The role of the commission was expanded by the North American Wetland Conservation Act to include approving wetlands acquisition, restoration, and enhancement proposals recommended by the North American Wetlands Conservation Council.
Migratory Bird Hunting and Conservation Stamp Act of 1934	Also commonly referred to as the “Duck Stamp Act,” requires waterfowl hunters 16 years of age or older to possess a valid federal hunting stamp. Receipts from the sale of the stamp are deposited into the Migratory Bird Conservation Fund for the acquisition of migratory bird refuges.
Migratory Bird Treaty Act of 1918, as amended	This Act implements various treaties and conventions between the United States and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Except as allowed by special regulations, this Act makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, barter, export or import any migratory bird, part, nest, egg, or product.
Mineral Leasing Act for Acquired Lands (1947), as amended	Authorizes and governs mineral leasing on acquired public lands.

STATUE	DESCRIPTION
Minerals Leasing Act of 1920, as amended	Authorizes and governs leasing of public lands for development of deposits of coal, oil, gas, and other hydrocarbons; sulphur; phosphate; potassium; and sodium. Section 185 of this title contains provisions relating to granting rights-of-way over federal lands for pipelines.
Mining Act of 1872, as amended	Authorizes and governs prospecting and mining for the so-called "hardrock" minerals (i.e., gold and silver) on public lands.
National and Community Service Act of 1990	Authorizes several programs to engage citizens of the U.S. in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Among other things, this law establishes the American Conservation and Youth Service Corps to engage young adults in approved human and natural resource projects, which will benefit the public or are carried out on federal or Indian lands.
National Environmental Policy Act of 1969	Requires analysis, public comment, and reporting for environmental impacts of federal actions. It stipulates the factors to be considered in environmental impact statements, and requires that federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unqualified environmental values are given appropriate consideration, along with economic and technical considerations.
National Historic Preservation Act of 1966, as amended	It establishes a National Register of Historic Places and a program of matching grants for preservation of significant historical features. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.
National Trails System Act (1968), as amended	Established the National Trails System to protect the recreational, scenic, and historic values of some important trails. National recreation trails may be established by the Secretaries of Interior or Agriculture on land wholly or partly within their jurisdiction, with the consent of the involved state(s), and other land managing agencies, if any. National scenic and national historic trails may only be designated by Congress. Several national trails cross units of the National Wildlife Refuge System.
National Wildlife Refuge System Administration Act of 1966	Prior to 1966, there was no single federal law that governed the administration of the various national wildlife refuges that had been established. This Act defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of a refuge provided such use is compatible with the major purposes(s) for which the refuge was established.

STATUE	DESCRIPTION
National Wildlife Refuge System Improvement Act of 1997	This Act amends the National Wildlife Refuge System Administration Act of 1966. This Act defines the mission of the National Wildlife Refuge System, establishes the legitimacy and appropriateness of six priority wildlife-dependent public uses, establishes a formal process for determining compatible uses of Refuge System lands, identifies the Secretary of the Interior as responsible for managing and protecting the Refuge System, and requires the development of a comprehensive conservation plan for all refuges outside of Alaska.
Native American Graves Protection and Repatriation Act of 1990	Requires federal agencies and museums to inventory, determine ownership of, and repatriate certain cultural items and human remains under their control or possession. The Act also addresses the repatriation of cultural items inadvertently discovered by construction activities on lands managed by the agency.
Neotropical Migratory Bird Conservation Act of 2000	Establishes a matching grant program to fund projects that promote the conservation of neotropical migratory birds in the united States, Latin America, and the Caribbean.
North American Wetlands Conservation Act of 1989	Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, the United States, and Mexico. The North American Wetlands Conservation Council was created to recommend projects to be funded under the Act to the Migratory Bird Conservation Commission. Available funds may be expended for up to 50 percent of the United States' share cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands).
Refuge Recreation Act of 1962, as amended	This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife-oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.
Partnerships for Wildlife Act of 1992	Establishes a Wildlife Conservation and Appreciation Fund to receive appropriated funds and donations from the National Fish and Wildlife Foundation and other private sources to assist the state fish and game agencies in carrying out their responsibilities for conservation of non-game species. The funding formula is no more that 1/3 federal funds, at least 1/3 foundation funds, and at least 1/3 state funds.

STATUE	DESCRIPTION
Refuge Revenue Sharing Act of 1935, as amended	Provided for payments to counties in lieu of taxes from areas administered by the Fish and Wildlife Service. Counties are required to pass payments along to other units of local government within the county, which suffer losses in tax revenues due to the establishment of Service areas.
Rehabilitation Act of 1973	Requires nondiscrimination in the employment practices of federal agencies of the executive branch and contractors. It also requires all federally assisted programs, services, and activities to be available to people with disabilities.
Rivers and Harbors Appropriations Act of 1899, as amended	Requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States. The Fish and Wildlife Coordination Act provides authority for the Service to review and comment on the effects on fish and wildlife activities proposed to be undertaken or permitted by the Corps of Engineers. Service concerns include contaminated sediments associated with dredge or fill projects in navigable waters.
Sikes Act (1960), as amended	Provides for the cooperation by the Departments of Interior and Defense with state agencies in planning, development, and maintenance of fish and wildlife resources and outdoor recreation facilities on military reservations throughout the United States. It requires the Secretary of each military department to use trained professionals to manage the wildlife and fishery resource under his jurisdiction, and requires that federal and state fish and wildlife agencies be given priority in management of fish and wildlife activities on military reservations.
Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948	This Act provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a state agency for other wildlife conservation purposes.
Transportation Equity Act for the 21st Century (1998)	Established the Refuge Roads Program, requires transportation planning that includes public involvement, and provides funding for approved public use roads and trails and associated parking lots, comfort stations, and bicycle/pedestrian facilities.
Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended	Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

STATUE	DESCRIPTION
Water Resources Planning Act of 1965	Established Water Resources Council to be composed of Cabinet representatives including the Secretary of the Interior. The Council reviews river basin plans with respect to agricultural, urban, energy, industrial, recreational and fish and wildlife needs. The act also established a grant program to assist States in participating in the development of related comprehensive water and land use plans.
Wild and Scenic Rivers Act of 1968, as amended	This Act selects certain rivers of the nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values; preserves them in a free-flowing condition; and protects their local environments.
Wilderness Act of 1964, as amended	This Act directs the Secretary of the Interior to review every roadless area of 5,000 acres or more and every roadless island regardless of size within the National Wildlife Refuge System and to recommend suitability of each such area. The Act permits certain activities within designated wilderness areas that do not alter natural processes. Wilderness values are preserved through a “minimum tool” management approach, which requires refuge managers to use the least intrusive methods, equipment, and facilities necessary for administering the areas.
Youth Conservation Corps Act of 1970	Established a permanent Youth Conservation Corps (YCC) program within the Departments of Interior and Agriculture. Within the Service, YCC participants perform many tasks on refuges, fish hatcheries, and research stations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 11593, Protection and Enhancement of the Cultural Environment (1971)	States that if the Service proposes any development activities that may affect the archaeological or historic sites, the Service will consult with Federal and State Historic Preservation Officers to comply with Section 106 of the National Historic Preservation Act of 1966, as amended.
EO 11644, Use of Off-road Vehicles on Public Land (1972)	Established policies and procedures to ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
EO 11988, Floodplain Management (1977)	The purpose of this Executive Order is to prevent federal agencies from contributing to the "adverse impacts associated with occupancy and modification of floodplains" and the "direct or indirect support of floodplain development." In the course of fulfilling their respective authorities, federal agencies "shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains."
EO 11989 (1977), Amends Section 2 of EO 11644	Directs agencies to close areas negatively impacted by off-road vehicles.
EO 11990, Protection of Wetlands (1977)	Federal agencies are directed to provide leadership and take action to minimize the destruction, loss of degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
EO 12372, Intergovernmental Review of Federal Programs (1982)	Seeks to foster intergovernmental partnerships by requiring federal agencies to use the state process to determine and address concerns of state and local elected officials with proposed federal assistance and development programs.
EO 12898, Environmental Justice (1994)	Requires federal agencies to identify and address disproportionately high and adverse effects of its programs, policies, and activities on minority and low-income populations.

EXECUTIVE ORDERS	DESCRIPTIONS
EO 12906, Coordinating Geographical Data Acquisition and Access (1994), Amended by EO 13286 (2003). Amendment of EOs and other actions in connection with transfer of certain functions to Secretary of DHS.	Recommended that the executive branch develop, in cooperation with state, local, and tribal governments, and the private sector, a coordinated National Spatial Data Infrastructure to support public and private sector applications of geospatial data. Of particular importance to comprehensive conservation planning is the National Vegetation Classification System (NVCS), which is the adopted standard for vegetation mapping. Using NVCS facilitates the compilation of regional and national summaries, which in turn, can provide an ecosystem context for individual refuges.
EO 12962, Recreational Fisheries (1995)	Federal agencies are directed to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities in cooperation with states and tribes.
EO 13007, Native American Religious Practices (1996)	Provides for access to, and ceremonial use of, Indian sacred sites on federal lands used by Indian religious practitioners and direction to avoid adversely affecting the physical integrity of such sites.
EO 13061, Federal Support of Community Efforts Along American Heritage Rivers (1997)	Established the American Heritage Rivers initiative for the purpose of natural resource and environmental protection, economic revitalization, and historic and cultural preservation. The Act directs Federal agencies to preserve, protect, and restore rivers and their associated resources important to our history, culture, and natural heritage.
EO 13084, Consultation and Coordination With Indian Tribal Governments (2000)	Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications.
EO 13112, Invasive Species (1999)	Federal agencies are directed to prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species in a cost effective and environmentally sound manner, accurately monitor invasive species, provide for restoration of native species and habitat conditions, conduct research to prevent introductions and to control invasive species, and promote public education on invasive species and the means to address them. This EO replaces and rescinds EO 11987, Exotic Organisms (1977).

EXECUTIVE ORDERS	DESCRIPTIONS
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. (2001)	Instructs federal agencies to conserve migratory birds by several means, including the incorporation of strategies and recommendations found in Partners in Flight Bird Conservation plans, the North American Waterfowl Plan, the North American Waterbird Conservation Plan, and the United States Shorebird Conservation Plan, into agency management plans and guidance documents.

Appendix D. Public Involvement

SUMMARY OF PUBLIC SCOPING COMMENTS

Public input to the development of the draft plan was initiated through a notice of intent to prepare a comprehensive conservation plan and environmental assessment, which was published in the Federal Register on May 17, 2007 (72 FR 27837). An invitation to attend a public scoping meeting was printed in local newspapers and on flyers distributed in the local community. The public scoping meeting held in Dardanelle on August 14, 2007 was attended by 42 stakeholders. Written comments were received from 20 stakeholders. The verbal and written comments are summarized by topic, below.

HABITAT MANAGEMENT

General

- Return to the habitat management practices and conditions from the early years of the refuge.
- Restore and maintain cropland, grasslands, and scrub/shrub habitats rather than converting them to forest.
- Place a high priority on maintaining and, where appropriate, increasing habitat diversity on the refuge.
- Use herbicides if necessary to control invasive plants.
- Can the refuge use prescribed fire for habitat management?
- The current grassy scrub/shrub habitat is beneficial to birds, but it is only temporary. The commenter suggested that the refuge trade off the carbon sequestration plots and manage those areas for grassland and scrub/shrub habitats.

Bottomland hardwood habitat

- Reforestation projects interfere with refuge purposes and other valuable uses (such as nesting of grassland birds).
- Stop planting trees!
- Remove reforestation plantings not covered under the carbon sequestration contract.
- Trade off carbon sequestration acreage with other refuges.
- Bottomland forest is becoming rare in the Arkansas River Valley.
- If reforestation is done in such a way as to provide corridors that connect forest habitat, then grassland habitat is necessarily fragmented.
- Remove the cottonwood trees among the plum thickets at the upstream end of the old river channel.
- Refuge soil is so sandy and droughty that it is incapable of supporting a rich forest.

- Tree thinning should be done from below to limit breakage of existing trees.
- Are there plans for a timber harvest on the refuge?
- Where is Hog Thief RNA? How is it managed?

Grassland habitat

- Plant native grasses along the roadways on the refuge.
- Increase amount of habitat managed as grassland.
- Do not permit any existing grassland habitat to be converted to cropland.
- Increase use of prescribed fire for grassland management.
- Commenter expressed concern about loss of grassland habitat and potential impact on grassland-dependent birds..
- Could management for grassland increase predator populations above desirable levels? If so, the commenter opposes management to increase grassland habitat.
- Grassland is not the native vegetative cover on the refuge.

Scrub/shrub habitat

- Manage wild plum thickets to keep them from "taking over."
- Maintain large, contiguous blocks of grassy and shrubby areas as habitat for bird species associated with early successional habitat.
- Cut some of the large cedar breaks and use the tops to create brushpiles for wildlife cover.

Cropland

- Increase the percent of cropland available for use by wildlife.
- Shift crop production away from soybeans toward crops like milo and millet that are more desirable as a food source for waterfowl.
- Are there any areas on the refuge that could be converted to cropland without having to cut down trees?

Moist-soil habitat

- Don't disk moist-soil units annually, as it may reduce invertebrate biomass and reduce the value of this habitat for foraging birds.
- Manage moist-soil units as stopover habitat for migrating shorebirds during the spring and fall.
- Increase the amount of moist-soil acreage with full water management capability.

Aquatic habitat

- Commenter expressed concern that the weir is leading to excess sedimentation and suggested doing an evaluation of aquatic habitats on the refuge, perhaps in cooperation with AGFC.

Other questions and comments about habitat management

- Map locations of climbing milkweed (*Sarcostemma cynanchoides* Decne. subsp. *cynanchoides*) and encourage its presence when possible.
- Restore habitat for long-eared owl along the levee near the river.
- Are all the reforested acres covered under the contract for carbon sequestration plantings?
- What are the restrictions on management of the carbon sequestration plantings by the refuge?
- What is meant by references to "under-performing carbon sequestration units?"
- Could the corporation permit the refuge to replant some of the carbon sequestration acreage?

Fish and Wildlife Population Management

General

- Increase management for non-game birds.
- Increase effort to manage fish and wildlife other than ducks.

Waterfowl

- Does the refuge have a mandate to manage waterfowl *populations* or just waterfowl *habitat*?

Birds that use early successional habitat

- Open areas on the refuge support greater diversity and abundance of birds, especially birds of conservation concern, than forested areas.
- Survey and map breeding habitat for Bell's Vireo and Painted Bunting.

Shorebirds

- Increase the amount of habitat managed for the benefit of migrating shorebirds.
- Consult with staff from other refuges on their experiences with balancing the needs of shorebirds with other refuge priorities.

Resident wildlife - mammals

- Does the refuge manage resident wildlife *populations* or just the *habitat*?
- Establish wildlife food plots. If refuge funding is a limitation, allow hunting stakeholders to volunteer resources and manpower.
- Bowhunters are concerned about increasing numbers of coyotes and bobcats. Can the refuge control predator populations?
- Management specifically for benefit of deer may conflict with management for non-game birds.
- What will be put in the CCP if the refuge is currently under (or over) the carrying capacity for deer?
- Will limits on the number and size of bucks that can be taken be based on harvest data?
- Are deer populations higher now than in past years?

Amphibians and reptiles

- Conserve Strecker's chorus frog *(Pseudacris streckeri)* on the refuge. Consider conducting an after-hours survey based on listening for calls rather than collecting additional specimens. Specifically consider the potential impact of flooding moist-soil units during the summer when this species is aestivating in the soil under them.

Fisheries

- Issue special use permits to commercial fishermen to remove rough fish from the old river channel.
- Improve spawning success by removing rough fish and maintaining higher water levels in the old river channel.

Wildlife-Dependent Recreation and Visitor Services

Hunting

- Ensure continuing opportunities for bowhunters.
- Extend the deer hunting season past December 10.
- Extend the time given to put up stands to more than 2 days or schedule the allotted days for the first full weekend before the season opens.
- Allow more than one deer stand per person.
- Prohibit all gun hunting.

- Bow hunters leave deer that they kill but then can't find. Change hunting rules to allow use of dogs on leash to aid in recovery of deer. Use the AGFC regulation on this as a model for the refuge.
- Bow hunting season is too long and not regulated properly.
- Allow hunters to cut small branches off trees when setting up blinds. Use the AGFC regulation on this as a model for the refuge.
- Allow more gun hunts for deer and turkey.
- Open the nature trail lands to hunting.
- Allow limited hunting for snow geese and feral Canada geese.

Wildlife observation and photography

- Develop a wildlife viewing trail in a loop between the refuge office and scrub habitat north of the office.
- Improve opportunities to view waterfowl from roads on refuge.
- Refuge vegetation limits wildlife viewing.
- Improve and increase waterfowl habitat along roads for benefit of wildlife viewers.

Environmental education and interpretation

- Partner with stakeholders to develop an interpretive education center on the refuge.

Volunteer program

- Support development of a "Friends of the Refuge" group.
- Make use of volunteer manpower and technical expertise on wildlife surveys and habitat management projects.
- Use volunteers or corporate sponsors to supplement refuge funding and manpower.

Other questions and comments about visitor services

- Permit camping on the refuge.
- Do not permit camping on the refuge.

Resource Protection

Refuge expansion needs

- Purchase private land inholdings.
- Purchase land along the old river channel as an additional buffer to limit disturbance of resting waterfowl.

Refuge Administration

General

- Are there any plans to turn the refuge over to AGFC?

Law enforcement

- Require hunters to sign in and hunt in a designated area (to help in tracking down sources of vandalism).

Facilities and maintenance

- Re-open an area for archery target practice.
- Partner with stakeholders to open a refuge center for rehabilitation of injured wildlife.
- Re-open or replace the pavilion and picnic table that used to be available for public use.
- Allow installation of vending machines at the maintenance area.
- Closure of road to the Luther Lake area limits access for hunting.
- Improve access for disabled hunters.
- Narrow the maintained width of the Levee Trail to just 3 to 4 feet. This would still allow wildlife viewing while better protecting owl roosting area and travel corridor for deer.
- Why was the road by the observation tower closed?

Responses to the questions used to open the public scoping meeting: "What makes Holla Bend NWR special and unique to you?" and "What do you value most about the refuge?"

- Opportunity to observe many wildlife species in open areas or on cropland.
- Opportunity to observe wintering birds.
- Bird watching in open fields, grassland, and cropland.
- Opportunities for bowhunters are unique and highly valued.

Questions and comments about the CCP process

- Was the refuge already being managed under a previous 15-year plan?
- Are there any current restrictions on hunting and fishing that the refuge must abide by? If so, can the CCP make changes in them?
- Will the CCP tie the refuge manager's hands in terms of what can be done in the future (such as opening a gun hunt)?
- Will there be anything in the CCP to guarantee the right to hunt for the 15-year duration of the plan?
- The real value of the CCP would be in providing continuity if the refuge gets a new manager before the end of the 15-year plan period.
- Will the public have an opportunity to review and comment on the Draft CCP/EA?
- Are CCPs being prepared for all national wildlife refuges?
- How will the CCP take into account the impact of changes that can't be foreseen today?

Appendix E. Appropriate Use Determinations

Holla Bend National Wildlife Refuge Appropriate Use Determinations

An appropriate use determination is the initial decision process a refuge manager follows when first considering whether or not to allow a proposed use on a refuge. The refuge manager must find that a use is appropriate before undertaking a compatibility review of the use. This process clarifies and expands on the compatibility determination process by describing when refuge managers should deny a proposed use without determining compatibility. If a proposed use is not appropriate, it will not be allowed and a compatibility determination will not be undertaken.

Except for the uses noted below, the refuge manager must decide if a new or existing use is an appropriate refuge use. If an existing use is not appropriate, the refuge manager will eliminate or modify the use as expeditiously as practicable. If a new use is not appropriate, the refuge manager will deny the use without determining compatibility. Uses that have been administratively determined to be appropriate are:

- Six wildlife-dependent recreational uses - As defined by the National Wildlife Refuge System Improvement Act of 1997, the six wildlife-dependent recreational uses (hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation) are determined to be appropriate. However, the refuge manager must still determine if these uses are compatible.

- Take of fish and wildlife under state regulations - States have regulations concerning take of wildlife that includes hunting, fishing, and trapping. The Service considers take of wildlife under such regulations appropriate. However, the refuge manager must determine if the activity is compatible before allowing it on a refuge.

Statutory Authorities for this policy:

National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee. This law provides the authority for establishing policies and regulations governing refuge uses, including the authority to prohibit certain harmful activities. The Act does not authorize any particular use, but rather authorizes the Secretary of the Interior to allow uses only when they are compatible and "under such regulations as he may prescribe." This law specifically identifies certain public uses that, when compatible, are legitimate and appropriate uses within the Refuge System. The law states ". . . it is the policy of the United States that . . .compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System . . .compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and . . . when the Secretary determines that a proposed wildlife-dependent recreational use is a compatible use within a refuge, that activity should be facilitated . . . the Secretary shall . . . ensure that priority general public uses of the System receive enhanced consideration over other general public uses in planning and management within the System . . . ." The law also states "in administering the System, the Secretary is authorized to take the following actions: . . . issue regulations to carry out this Act." This policy implements the standards set in the Act by providing enhanced consideration of priority general public uses and ensuring other public uses do not interfere with our ability to provide quality, wildlife-dependent recreational uses.

Refuge Recreation Act of 1962, 16 U.S.C. 460k. The Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

Other Statutes that Establish Refuges, including the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) (16 U.S.C. 410hh - 410hh-5, 460 mm - 460mm-4, 539-539e, and 3101 - 3233; 43 U.S.C. 1631 et seq.).

Executive Orders. The Service must comply with Executive Order 11644 when allowing use of off-highway vehicles on refuges. This order requires the Service to designate areas as open or closed to off-highway vehicles in order to protect refuge resources, promote safety, and minimize conflict among the various refuge users; monitor the effects of these uses once they are allowed; and amend or rescind any area designation as necessary based on the information gathered. Furthermore, Executive Order 11989 requires the Service to close areas to off-highway vehicles when it is determined that the use causes or will cause considerable adverse effects on the soil, vegetation, wildlife, habitat, or cultural or historic resources. Statutes, such as ANILCA, take precedence over executive orders.

Definitions:

Appropriate Use
A proposed or existing use on a refuge that meets at least one of the following four conditions.

1) The use is a wildlife-dependent recreational use as identified in the Improvement Act.
2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law.
3) The use involves the take of fish and wildlife under state regulations.
4) The use has been found to be appropriate as specified in section 1.11.

*Native American***.** American Indians in the conterminous United States and Alaska Natives (including Aleuts, Eskimos, and Indians) who are members of federally recognized tribes.

Priority General Public Use. A compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Quality. The criteria used to determine a quality recreational experience include:

- Promotes safety of participants, other visitors, and facilities.
- Promotes compliance with applicable laws and regulations and responsible behavior.
- Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives in a plan approved after 1997.
- Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation.
- Minimizes conflicts with neighboring landowners.
- Promotes accessibility and availability to a broad spectrum of the American people.
- Promotes resource stewardship and conservation.

- Promotes public understanding and increases public appreciation of America's natural resources and the Service's role in managing and protecting these resources.
- Provides reliable/reasonable opportunities to experience wildlife.
- Uses facilities that are accessible and blend into the natural setting.
- Uses visitor satisfaction to help define and evaluate programs.

Wildlife-Dependent Recreational Use. As defined by the Improvement Act, a use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Holla Bend NWR

Use: All-Terrain Vehicle Usage

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		X
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** _X__ **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate**__X___

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Holla Bend NWR

Use: Commercial Fishing

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		X
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _X__** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X___**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Holla Bend NWR

Use: Cooperative Farming

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		X
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** _X__ **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate**__X___

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Holla Bend NWR

Use: Haying

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		X
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?		X
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** _X__ **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate**__X___

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Holla Bend NWR

Use: Refuge Research Studies

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		X
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** _X__ **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate**__X___

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Holla Bend NWR

Use: Trapping of Nuisance Wildlife

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?		X
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ["no" to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ["no" to (b), (c), or (d)] may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes** _X__ **No** ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate**__X___

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

Appendix F. Compatibility Determinations

Holla Bend National Wildlife Refuge Compatibility Determination

Uses: The following uses were found to be appropriate and evaluated to determine their compatibility with the mission of the Refuge System and the purposes of the refuge.

1. ATV Use (for hunters with disabilities)
2. Commercial Fishing
3. Cooperative Farming
4. Environmental Education and Interpretation
5. Haying
6. Hunting
7. Fishing (Recreational)
8. Refuge Research Studies
9. Trapping of Nuisance Wildlife
10. Wildlife Observation and Photography

Refuge Name: Holla Bend National Wildlife Refuge

Date Established: 1957.

Establishing and Acquisition Authorities:

Transfer of Certain Real Property for Wildlife Conservation Purposes Act, 16 U.S.C. 667b
Migratory Bird Conservation Act, 16 U.S.C. 715d
Fish and Wildlife Act of 1956, 16 U.S.C. 742f[a][4]
Refuge Recreation Act, 16 U.S.C. 460k – 460k-4

Refuge Purpose: The purposes of Holla Bend NWR are identified in the legislation that authorized the acquisition of lands:

- "… particular value in carrying out the national migratory bird management program." (Transfer of Certain Real Property for Wildlife Conservation Purposes Act, 16 U.S.C. 667b);

- "… for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (Migratory Bird Conservation Act, 16 U.S.C. 715d);

- "…for the development, advancement, management, conservation, and protection of fish and wildlife resources…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services." (Fish and Wildlife Act of 1956, 16 U.S.C. 742f[a][4]); and

- "…suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species…" (Refuge Recreation Act, 16 U.S.C. 460k – 460k-4).

These purposes provide the basis for developing and prioritizing management goals and objectives within the National Wildlife Refuge System mission, and for determining which public uses are compatible with the refuge purposes.

National Wildlife Refuge System Mission:

The mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997, is:

> *... 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.*

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
Land and Water Conservation Fund Act of 1965
National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)
Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of the U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of the U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System. March 25, 1996
Title 50, Code of Federal Regulations, Parts 25-33
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990

Compatibility determinations for each description listed were considered separately. Although for brevity, the preceding sections from “Uses” through “Other Applicable Laws, Regulations and Policies” and the succeeding section, “Approval of Compatibility Determinations,” are written only once within the CCP, they are part of each descriptive use and become part of that compatibility determination if considered outside of the CCP.

Description of Use: All-Terrain Vehicle Use (for hunters with disabilities)

Holla Bend NWR is easily accessible to hunters due to the small size, good road system, and numerous hunter access roads. In most instances hunters can access the entire refuge and are able to disperse away from roads and other hunters without the use of all-terrain vehicles (ATV's). However, we do recognize the need to allow the use of ATVs for hunters with disabilities who cannot otherwise access the hunt areas on the refuge. These hunters will be allowed to use an ATV on a specified field road or trail that will not interfere with other hunters.

Service policy pertaining to ATV use requires such use be in conjunction with wildlife-dependent activities only, and be confined to designated areas or trails identified for such use. Approximately 5 miles of ATV trails will be available seasonally for handicapped/mobility-impaired hunter access only. Once a hunter requests to use an ATV for hunting purposes, the refuge manager will determine if the individual will be allowed to use an ATV. Typically, amputees and persons confined to a wheelchair will be allowed to use an ATV to hunt. However, there may be other instances where it is appropriate for the person to use an ATV, and these will be determined on a case-by-case basis with the refuge manager making the final decision. If approved, a special use permit will be issued by the refuge manager with a detailed map of where the hunter can use the ATV. The refuge presently does not have any ADA-compliant hunting blinds. Permitted ATV use does not allow hunters with disabilities to hunt anywhere the general public cannot hunt.

Availability of Resources:

Enforcement of refuge regulations to protect trust resources and provide for a quality recreational opportunity will occur via regular patrols by refuge law enforcement officers. Currently, the refuge does not have a law enforcement officer on staff. Law enforcement support is provided from surrounding refuge field stations. Additionally, personnel from the AGFC will patrol the refuge and assist refuge officers when needed.

The hunt program at the refuge will cost approximately $10,000 annually, which includes costs to create and print the hunt brochure, provide law enforcement, and create and maintain parking areas. Participation in the hunt program is estimated to be approximately 500 – 1,000 visitors annually; however, we are only anticipating less than five requests for ATV usage permits from hunters with disabilities. The refuge is in the Fee Demonstration Program and charges $12.50 for required hunt permits. Eighty percent of this money comes back to the refuge to assist with the operation and management cost of having a hunt program.

Anticipated Impacts of the Use:

ATV trails will be located on former dirt field roads and levees that existed when the refuge was established. These trails have crown to provide drainage from the trail surface and are maintained by mowing two to three times per year. ATV use causes trampling of the mowed vegetation, but rutting and associated soil erosion is very minimal. Some wildlife disturbance associated with engine noise may occur adjacent to the trails, but is believed to be minimal and is restricted to primarily the fall and winter months. Any disturbance from ATVs is comparable to regular vehicles traveling refuge roads. ATVs are restricted to designated marked trails.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

ATV use is permitted in support of hunting activities to handicapped individuals. The following stipulations will help ensure the refuge hunting program is compatible with refuge purposes:

- ATV use is restricted to hunters who are amputees or in a wheelchair. Determinations for other handicapped hunters will be made by the refuge manager on a case-by-case basis with appropriate medical documentation.
- ATV use is restricted to designated and maintained ATV trails.
- ATV tires are restricted to those no larger than 25" X 12" with a maximum lug height of 1" and a maximum allowable tire pressure of 7 psi as indicated on the tire by the manufacturer.
- ATV will not exceed the following specifications: weight - 750 pounds; length – 85 inches; and width – 48 inches.
- All weapons transported on ATVs must be fully unloaded.
- ATV use is permitted only during daylight hours.

Justification:

Hunting is identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority wildlife-dependent recreational activity that should be promoted and expanded on refuges. Holla Bend NWR has very good vehicular access to most portions of the refuge. To facilitate hunting, a limited system of ATV trails will be maintained for those hunters who are handicapped and cannot otherwise access the refuge.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date:

Description of Use: Commercial Fishing

To allow commercial fishing by special use permit(s) on specific areas of the Holla Bend NWR. Commercial fishing would occur in the old river channel and associated waters within refuge boundaries; access is by vehicles and boats, via existing boat launches. Key fish and wildlife species that occur in the proposed area include warm water game fish, waterfowl, and active bald eagle nests. Commercial fishing opportunities are available to permit holders from March 1 through October 31; exact times must be coordinated with refuge management. All boating and fishing is closed from November through February to adhere to waterfowl sanctuary status. From November 1 through February 28, bank fishing is

restricted to Long Lake, located adjacent to Highway 155. Boats of any type may not be used in refuge waters at this time. Typically a small number of permits (three) are issued annually.

Availability of Resources:

Maintaining a commercial fishing program at the current level can be accomplished at the current funding level, as long as existing partnerships remain with Arkansas Game and Fish Commission (AGFC). Presently, no refuge staff member has law enforcement authority. All enforcement activities with regard to refuge regulations and public safety associated with Holla Bend NWR's commercial fishing program are carried out by AGFC officers and national wildlife refuge law enforcement officers from surrounding refuges. In the near future, to ensure compliance and to further enhance visitor safety, resource protection, and facility security, an additional refuge law enforcement officer will be needed on Holla Bend NWR. Brochure generation and dispersal are accomplished successfully at the current staffing level.

Anticipated Impacts of the Use:

Commercial fishing is utilized to remove fish commonly known as rough fish from the refuge waters (Old River Channel and adjacent lakes). The species permitted for commercial harvest include German carp, silver carp, big head carp, grass carp, black carp, buffalo, and gar. The five carp species are exotics, which as a group compete with and negatively impact habitat of native fisheries within the refuge and ecosystem. One of the primary objectives of the Refuge System is to remove exotics from refuges and to restore native populations. Removal of exotics and a reduction in the rough fish population by commercial harvest is a management practice aimed at reducing adverse impacts to water quality and aquatic habitat. Bottom feeders, such as carp and buffalo, stir up sediments, which increase turbidity and impact nesting and spawning habitat of other fish species. Fishery biologists with the Service have long recommended commercial harvest of these species to refuge managers as a management tool, with the objective to increase/restore native fish habitat and populations on refuges. Commercial harvest of these species is considered a management economic activity that will result in removing exotics; improving quality of aquatic habitat; creating a favorable impact on recreational fishing opportunities; and providing an economic benefit to the local community.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Law enforcement officers would ensure compatibility through routine law enforcement patrols which enforce state and refuge-specific regulations. Arkansas Game and Fish Commission officers also occasionally patrol the refuge waters and monitor the access areas. Specific refuge regulations ensure minimal disturbance of waterfowl and nesting bald eagles (closed areas). Commercial fishermen are subject to all state fishing regulations. Commercial fishermen may take fish with legal size gill or trammel nets. All other commercial fishing is prohibited. Commercial fishermen may not utilize more than 20 nets in refuge waters at any time. Commercial fishermen may attend nets during daylight hours only; no night use of refuge waters is permitted. Commercial fishermen must complete

and return a harvest report to refuge manager at a designated time. Failure to comply with any of the special conditions will result in suspension of commercial fishing opportunities on the refuge. Entry into closed area is not permitted; turtle trapping is not permitted. A special use permit and permit payment are required for all commercial fishing on Holla Bend NWR.

Justification:

The primary impact of this use is removal of exotic species, which should enhance water quality and aquatic habitat and improve conditions for native species. If populations of game fish benefit from this use, recreational fishing opportunities will be enhanced. Additionally, economic benefits will accrue to the local community.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date:

Description of Use: Cooperative Farming

Cooperative farming is an economic use that is utilized to manage approximately 1,200 acres of open land habitat on the refuge. The use was deemed compatible in 2005 and is used to provide seasonally flooded crops and moist-soil units necessary to meet the refuge's waterfowl habitat objectives. When the refuge was established, a commitment was made to place all suitable lands in production of those agricultural crops which are attractive to waterfowl. Over the past 10 years, approximately 1,000 acres of cropland have been reforested to bottomland hardwood tree species.

The refuge's cooperative farmer enters into an annual cooperative farming agreement specifying what crops will be grown in specific fields for both the refuge's and farmer's shares. Typically the farmer plants corn, sorghum, soybeans and winter wheat. The farmer receives 75 percent of the planted acres, while the refuge receives 25 percent of the planted acres. The refuge's crop share is strategically located in areas that can be flooded in the winter to benefit waterfowl or placed in areas that will be beneficial to other wildlife species. These crops augment natural foods which can be depleted at critical times in the life cycles of wildlife and provide habitat diversity for a variety of species. Farming practices are also used to set back undesirable habitat succession, particularly in moist-soil management areas.

Availability of Resources:

The needed staff time for development and administration of the cooperative farming program is committed and available. Most of the needed work to prepare for these uses is done as part of routine habitat management duties. Cooperators are selected to participate in the program by the following criteria: a former landowner or a former farm tenant. If the previous landowner and farm tenant are not interested in participating in the program, a random drawing is held for interested area farmers.

Anticipated Impacts of the Use:

Due to standard practices associated with farming, some degree of erosion may take place. However, the impact of soil erosion on adjacent wetlands and water bodies is minimal because of maintained grass buffer strips around each field. Cooperative farmers are allowed to use only refuge-approved chemicals. Refuge-approved chemicals have low toxicity and fast biodegradation rates compared to other commonly used chemicals. Cooperative farming may result in short-term disturbances, but farming operations will be timed to minimize disturbance to wildlife and other compatible refuge uses. Refuge crop shares are left standing in the field to provide high-energy grain and forage for wintering waterfowl. The farmer's harvested fields are also used by woodcock, waterfowl, deer, and wild turkeys.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

The cooperative farm program is regulated through a cooperative farming agreement that specifies the field specific crops will be grown, acceptable farming practices, and approved pesticide use procedures. Special conditions contained in each agreement provide the following requirements: no fall discing, vegetative filter strips are maintained around fields and water bodies, crops must be harvested by November 1, and only approved chemicals will be used. Under these controlled conditions, the cooperative farm program has been and will continue to be compatible with the refuge's purposes.

Justification:

Cooperative farming is an important management tool that is in compliance with all refuge management plans and furthers the goals and mission of the National Wildlife Refuge System and the refuge. The farm program on the refuge is designed to provide food for migratory waterfowl; however, all species of wildlife that use the refuge benefit from the agricultural crops. Providing this important habitat also benefits other priority public uses of the Refuge System, such as wildlife observation, wildlife photography, and environmental education.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_ Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date:

Description of Use: Environmental Education and Environmental Interpretation

Environmental education and interpretation have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority public uses, provided they are compatible with the purposes of the refuge. Special events must be scheduled with the refuge staff. Refuge visitors are welcome to participate in environmental education and environmental interpretation events along the trails, roads, waterways, or any areas identified during a special event. The refuge headquarters and field tours may serve as a gathering place to educate visitors during staff-led special events. For non-staff led visitors, educational/interpretive kiosks, brochures, and public use areas such as trails, observation tower, boat ramps/waterways, and wildlife drive would be available for use.

Availability of Resources:

Additional staff and monetary resources are needed to improve these allowed uses on the refuge. Existing staff can administer permits and monitor use as part of routine management duties.

Anticipated Impacts of the Use:

As two of the six priority public uses of national wildlife refuges as identified in the National Wildlife Refuge System Improvement Act of 1997, environmental education and environmental interpretation are automatically considered appropriate uses of the refuge. Anticipated impacts of these uses at Holla Bend NWR include possible litter adjacent to public use areas (e.g., boat ramps, nature trails, wildlife observation tower, and the wildlife drive). Access to refuge waters is limited to March 1 to October 31 to allow sanctuary for wintering waterfowl.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Refuge visitors must comply with refuge regulations regarding operating hours (daylight use only) and not entering closed areas. Access to refuge waters is limited to March 1 to October 31 to allow sanctuary for wintering waterfowl.

Justification: Environmental education and interpretation are two of the six priority public uses generally considered compatible within national wildlife refuges.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date:

Description of Use: Haying

Haying is considered an economic use and involves the cutting and removal (by baling and transport) of grass species. The use was deemed compatible in 1994 and 2005 and is utilized to maintain high-quality grassland habitat. One cooperator will mow, bale, and fertilize areas along the 12-mile wildlife drive in mid- to late-summer. Roadsides are primarily red clover and purple vetch and provide excellent habitat for various wildlife species, including resident nesting birds such as the bobwhite quail and migratory birds such as the scissor tailed flycatcher. Mowing/fertilizing assists in maintaining the quality of this important habitat type and also makes the wildlife drive more aesthetically pleasing to visitors. In return for mowing the roadsides, the cooperator can utilize the grass for hay.

All nesting activity is normally completed by mid-July; therefore, mowing cannot begin until approximately July 15. All bales and associated equipment used by the cooperator must be gone by August 15, weather permitting. This use is allowed primarily along roadsides of the 12-mile wildlife drive and typically produces 200 – 400 bales.

Availability of Resources:

Allowing this use requires minimal, if any, staff time, funds, equipment, and/or facilities. The cooperator will be selected to participate in the program by the following criteria: the individual was a former landowner or a former cooperator. If a previous landowner or cooperator is not interested in participating in the program, a random drawing will be held for interested area farmers.

Anticipated Impacts of the Use:

Haying will result in very short-term disturbances and will be timed to minimize disturbance to wildlife and other compatible refuge activities. Allowing this use will provide high-quality nesting habitat for various bird species, while also providing cover and foraging habitat for other birds, white-tailed deer, rabbits, etc., at no cost to the refuge.

The cooperator will be issued a special use permit stating general and special conditions under which the use is authorized (i.e., start date, end date, reporting requirements, and fertilizer rates).

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Haying is regulated through an annual special use permit that specifies areas to be mowed, start date, report date, etc. Under the following conditions, haying has been and will continue to be compatible with the refuge's purposes.

- Permittee cannot start mowing roadsides until July 15.
- All haybales and associated equipment must be off the refuge by August 15, weather permitting.

- Permittee must utilize the refuge during “gate open” hours unless approved by refuge manager.
- Permittee must not leave equipment that is not in immediate use along roadsides.
- Permittee shall submit an annual hay report no later than December 31. The report must include the number of bales harvested and the average weight of the bales.
- No chemical applications will be approved.
- Permittee must abide by all general refuge regulations.

Justification:

Haying is an important management tool that is in compliance with all refuge management plans and furthers the goals and mission of the National Wildlife Refuge System and the refuge. Allowing this use will sustain high-quality habitat for many resident species, including the bobwhite quail, white-tailed deer, and rabbit, while also providing habitat for scissor-tailed flycatchers, bobolinks, dickcissels, and various other migratory birds. Maintaining this habitat along the 12-mile wildlife drive also benefits other priority public uses of the Refuge System, such as wildlife observation, wildlife photography, and environmental education.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 10-Year Re-evaluation Date:

Description of Use: Hunting

Hunting is one of the six priority public uses as identified in the National Wildlife Refuge System Improvement Act of 1997. Hunting for white-tailed deer, turkeys, raccoons, rabbits, squirrels, coyotes, bobcats, and beavers would enable the general public to participate in one form of recreational hunting on Holla Bend NWR. Hunters must possess a refuge hunting permit and may only hunt desired species within the outlined hunting season of the Arkansas Game and Fish Commission (AGFC) and also adhere to any specific refuge regulations. Hunting will be limited to areas within the refuge boundaries which are open to hunting. Hunting will not be allowed in areas which are closed due to potential harm to other refuge visitors, refuge staff, or refuge facilities. Maps will be distributed to all hunters along with their hunting permits, identifying any specific areas designated as closed. All hunting activities follow applicable state and federal laws and seasons. The refuge may administer further restrictions to ensure compliance with refuge specific laws and compatibility issues. Since the refuge is a daylight use only area, night hunting may not occur with the exception of raccoon hunting within the boundaries of Holla Bend NWR. Refuge management reserves the right to alter season length if public safety, resources, or threatened/endangered species are in jeopardy. The general public would park vehicles in designated parking areas and proceed on foot to desired hunting locations. Due to the relative size of the refuge, road system, and hunter access roads, all-terrain vehicles are prohibited. Hunters with disabilities are encouraged to apply for special use permits for limited all-terrain vehicle usage. A signed copy of the Holla Bend NWR

Hunting Permit is required and must be in the possession of all hunters at all times. Facilities such as boat ramps, designated parking areas, and foot trails, which are not posted closed to hunting, may be used. All boating and hunter access by water closes seasonally with the arrival of wintering waterfowl (November 1 to March 1). Camping, campsites, and campfires are prohibited on Holla Bend NWR.

Hunting is proposed by the refuge to provide a form of wildlife-dependent recreation to the general public. This use would also assist in the management of the game species found within the boundaries of Holla Bend NWR (e.g., white-tailed deer, turkeys, raccoons, rabbits, squirrels, coyotes, bobcats, and beavers). If negative impacts to other public uses, resources, public safety, threatened or endangered species, or significant declines in game populations emerge, the hunting program would be adjusted accordingly during the annual review.

Availability of Resources:

Maintaining the current hunting program can be accomplished at the current funding level as long as existing partnerships remain with the AGFC. Presently, no refuge staff member has law enforcement authority. All enforcement activities with regard to refuge regulations and public safety associated with Holla Bend NWR's hunting program are carried out by AGFC officers and national wildlife refuge law enforcement officers from surrounding refuges. In the near future, to ensure compliance and to further enhance visitor safety, resource protection, and facility security, an additional refuge law enforcement officer will be needed on Holla Bend NWR. Brochure generation and permit dispersal are accomplished successfully at the current staffing level.

Anticipated Impacts of the Use:

Disturbance to wildlife during the hunting season as people participate in the unit is an anticipated effect. Disturbance by vehicles would be limited as off-road travel or use of all-terrain vehicles would not be allowed unless issued to hunters with disabilities. If long-term impacts are realized to game populations, resources, threatened or endangered species, public health and safety, or other public uses on the refuge, adjustments to the hunting program would be made during an annual review process. Because these ecological systems are dynamic, adaptive management techniques will be applied if warranted. Improved overall health of game populations will be the result in a quality hunting program within the boundaries of the Holla Bend NWR.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):

___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

All big game (deer and turkey) bagged, found, or parts thereof must be checked at the refuge check station before leaving the refuge. When required, the back of your state license must be completed before game is moved. State regulations and bag limits apply unless otherwise noted. Only those species listed in this brochure or on refuge hunt permits may be taken. During big game seasons the automatic front gate will open one hour before daylight and close one hour after sunset. Consult each

specific hunt permit for additional information. All hunters must enter and exit the refuge from designated roads and parking lots only. Waterfowl hunting is prohibited on Holla Bend NWR and the surrounding area that falls within the Migratory Bird Closure Zone. All hunters born after December 31, 1968, must possess a hunter education card. Hunters under 16 may hunt under the direct supervision (within arm's reach) of a valid hunting license at least 21 years of age. Youth hunters under the age of 16 who have a valid hunter education card must be supervised by an adult not less than 21 years old and must remain within sight and normal voice contact of the adult. Each adult can supervise only one youth. Tree stands or portable blinds may be placed on the refuge two days before season opens and must be removed within two days after season closes. One tree stand or blind per hunter is allowed and must be permanently marked with hunter's name and address. Leaving stands out does not mean that spot is saved nor does it mean that spot belongs to a hunter.

White-tailed Deer
Deer may be harvested in the designated season for the refuge. Deer hunting on Holla Bend NWR is limited to archery hunting (crossbows are allowed). Turkeys, rabbits, squirrels, coyotes, beavers, raccoons, and bobcats may also be taken incidental to deer hunting. All state regulations and bag limits apply. There is a one day youth quote hunt for Holla Bend NWR. This is a gun hunt which takes place at the end of the season. The refuge will conduct one youth quota hunt for youths between ages 12-15 at the beginning of the gun deer season for Zone 7. Specific application procedures and dates will be available at the refuge office in September. We restrict hunt participants to those selected for the quote hunt, except that one non-hunting adult aged 21 or older must accompany the youth hunter during the hunt.

Raccoon
Raccoons may be harvested as incidental take during white-tailed deer season. A specific raccoon season runs every Thursday, Friday, and Saturday night during the month of February. Use of dogs is required. Only rim-fire rifles no larger than .22 caliber are permitted.

Spring Turkey (Gun Adult)
Quota hunt only. Contact refuge office in January for hunt dates, application procedures, and number of permits. During this quota hunt, the refuge will be closed to all other hunting-related activities including archery hunting and turkey scouting.

Spring Turkey (Gun Youth)
Quota hunt only. Contact refuge office in January for hunt dates, application procedures, and number of permits. Youth hunt restricted to youths under 16 years of age. Youths must be accompanied by an adult who is 21 years of age or older. During this quota hunt, the refuge will be closed to all other hunting-related activities including archery hunting and turkey scouting.

Spring Turkey (Archery/Crossbow)
Contact refuge office for hunt dates, but the archery hunt will typically open the day after the adult quota hunt. Permits will be available beginning March 1.

Justification:

Hunting is a historical and current tradition of the residents of Arkansas. Holla Bend NWR provides the management needed to ensure compatibility with the goals of the refuge and to maintain compliance with the National Wildlife Refuge System Improvement Act of 1997. Annual wildlife surveys or observations conducted by either the U.S. Fish and Wildlife Service or comparable state agencies have provided data to ensure that hunting of these species does not jeopardize long-range

population goals. Additional surveys and observations on Holla Bend NWR would provide the necessary data for managing the hunting program into the future.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date:

Description of Use: Fishing (Recreational)

Fishing is one of the six priority public uses as identified in the National Wildlife Refuge System Improvement Act of 1997. Sport fishing is permitted March 1 – October 31, from sunrise to sunset, on all waters within the refuge boundary; access is by vehicles and boats, via existing boat launches. A valid Arkansas fishing license is required. A refuge-specific permit is not required to fish; however, vehicle entrance fee/pass is required. Bank fishing ONLY (no boasts allowed) will be permitted in Long Lake form November 1- February 28. Access will be for the parking area off Highway 155. All fishing will be in accordance with applicable state regulations.

Availability of Resources:

Maintaining a recreational fishing program at the current level can be accomplished at the current funding level as long as existing partnerships remain with Arkansas Game and Fish Commission (AGFC). Presently no refuge staff member has law enforcement authority. All enforcement activities with regard to refuge regulations and public safety associated with Holla Bend NWR's recreational fishing program are carried out by AGFC officers and national wildlife refuge law enforcement officers from surrounding refuges. In the near future, to ensure compliance and to further enhance visitor safety, resource protection, and facility security, an additional refuge law enforcement officer will be needed on Holla Bend NWR. Brochure generation and dispersal are accomplished successfully at the current staffing level.

Anticipated Impacts of the Use:

Refuge visitors who participate in recreational fishing would park their vehicles on designated parking areas. Vehicle disturbance would be minimal, since off-road travel and all-terrain vehicles are prohibited. Fishing debris left on the banks, such as unwanted tackle and discarded fishing line or beverage containers, would be the biggest impact from recreational fishermen. If long-term impacts are realized to resources, threatened or endangered species, public health and safety, or other public uses on the refuge, adjustments to the recreational fishing program would be addressed. Because off-road vehicle use is not permitted and all-terrain vehicles are prohibited, we anticipate that vegetation would be minimally trampled by a minority of recreational fishermen accessing refuge freshwater ponds. Because these ecological systems are dynamic, adaptive management techniques will be applied if warranted. The overall health of the fish populations will result in a quality recreational fishing program within the boundaries of Holla Bend NWR.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Fishing is one of the six priority public uses as identified in the National Wildlife Refuge System Improvement Act of 1997. Sport fishing is permitted March 1 – October 31 from sunrise to sunset on all waters of the refuge. A valid Arkansas fishing license is required. A refuge specific permit is not required to fish; however, vehicle entrance fee/pass is required. Bank fishing ONLY (no boats allowed) will be permitted in Long Lake form November 1– February 28. Access will be for the parking area off Highway 155. All fishing will be in accordance with applicable state regulations subject to the following special conditions.

Bowfishing
Bowfishing is permitted during daylight hours from August 1 – August 31. Bowfishing equipment only, no broadheads, field points, or metal arrows.

Frogging
Frogs may be taken during daylight hours from May 1 – May 31. Frogging will only be allowed on those areas of the Old River Channel that connect with the Arkansas River. No other activities may occur while frogging (no fishing etc.).

Trotline, Setline, Limblines
Trotlines, setlines, and limblines may be used during regular fishing season only. Lines may not remain overnight or unattended and must be secured with cotton line which extends into the water. Each device must be clearly labeled with fisherman's name, current address, driver's license number or vehicle license number. All state regulations apply.

Free-Floating Fishing Devices
During the regular fishing season, free-floating fishing devices may be used. Up to 20 jugs or similar devices may be used and must be clearly marked with the user's name and address, driver's license number or vehicle license number. These devices may not be left overnight or unattended. All state regulations apply.

Yo-Yo Fishing
During the regular fishing season, only Yo-Yo fishing may occur on Holla Bend NWR. Up to 30 yo-yo's may be used and must be clearly marked with the user's name and address, driver's license number or vehicle license number. These devices may not be left overnight or unattended. All state regulations apply.

Justification:

Recreational fishing is a historical and current tradition of the residents of Arkansas. Holla Bend NWR provides the management needed to ensure compatibility with the goals of the refuge and to maintain compliance with the National Wildlife Refuge System Improvement Act of 1997. Annual

surveys or observations conducted by either the U.S. Fish and Wildlife Service or comparable state agencies will provide data to ensure that recreational fishing doesn't jeopardize long-range population goals. Additional surveys and observations on Holla Bend NWR would provide the necessary data for managing the recreational fishing program into the future.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date:

Description of Use: Refuge Research Studies

This use will allow university students and professors, non-governmental researchers, and governmental scientists access to the refuge's natural environment to conduct both short-term and long-term research projects. Allowing this research will result in better knowledge of our natural resources and improved techniques to manage, monitor, and protect refuge resources. The refuge will support research of, but not limited to, migratory songbirds, waterfowl, bottomland hardwood ecosystems, amphibians and reptiles, fisheries, and mammals. A strong effort will be made to continue and expand on partnerships with the University of Arkansas, Arkansas Tech. University, University of Central Arkansas, Arkansas State University, regional high schools, and non-governmental organizations to conduct research on the refuge.

Availability of Resources:

No additional staff or monetary resources are needed to allow this use. Existing staff can administer permits and monitor use as part of routine management duties.

Anticipated Impacts of the Use:

As long as sound scientific methods are used to conduct research, no significant negative impacts should occur from scientific studies on the refuge. The knowledge gained would provide information to improve management techniques and better understand the needs of trust resource species. Impacts such as trampling vegetation and temporary disturbance to wildlife will occur, but will be minimal. A small number of individual plants, animals, soil, and water samples may be collected for further study, but these collections would have a minimal effect on refuge plant, animal populations, or refuge habitat.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Each request for use of the refuge for research would be examined on its individual merit. If sound scientific methods are being proposed and refuge staff determines that requested research can be conducted without significantly affecting wildlife resources, the use will be allowed. The researcher will be issued a special use permit stating conditions that must be followed. Progress will be monitored and researchers will be required to submit annual progress reports and copies of all publications derived from the research.

Justification:

The benefits from scientifically sound research provide a better understanding of species and the environmental communities present on the refuge. These benefits far outweigh any short-term disturbance or loss of individual plants and animals that might occur.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date:

Description of Use: Trapping of Nuisance Wildlife

Raccoon, beaver, and coyote are the species upon which management activities may be directed. All species are at a sufficiently high level on the refuge to adversely affect ecosystem functions. Beaver activities have caused deterioration and loss of bottomland hardwoods on portions of the refuge, and excessive numbers of raccoons can have negative impacts on the reproduction of forest breeding birds, bobwhite quail, and wild turkeys. Trapping and/or hunting remain the only viable methods to reduce population levels of these nuisance animals. The refuge will issue special use permits to administer a trapping program consistent with sound biology, refuge purposes, and conservation of ecosystem functions.

Availability of Resources:

No additional staff or monetary resources are needed to allow this use. Existing staff can administer permits and monitor use as part of routine management duties.

Anticipated Impacts of the Use:

Targeted removal of beaver, raccoon, and coyote from portions of the refuge would reduce the negative impacts these species are having on ecosystem functions. Control of beaver populations would help ensure the protection of important bottomland hardwood forests and minimize drainage problems associated with drawdowns of moist-soil units. Regulated trapping of raccoon populations would reduce the nest predation caused to neotropical birds, bobwhite quail, and wild turkeys. Reduction of coyote would minimize predation on wintering waterfowl, small mammals, and resident wildlife.

No trapping program, regardless of how well it is designed, can prevent the possible take of other species. Trappers would be required to report the incidental take of other species. A negligible impact on other wildlife species is expected in both the short- and long-term.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

As a trapping program is implemented on the refuge, it would be closely monitored to assess the potential adverse effects on other wildlife as well as the benefits to game and nongame species and their habitats. Modifications to the program would be implemented as needed to maintain compatibility. All trapping activities would be carried out under a special use permit. Trappers would be limited by number, area, and season in order to target problem areas and minimize any negative impacts. Each trapper will be required to report the number and location of all traps and all wildlife taken. The implementation of a trapping program, under controlled conditions, provides an essential population control management tool and is compatible with the purposes of the refuge.

Justification:

The purposes of Holla Bend NWR emphasize conservation of wetlands and migratory birds. Trapping is a wildlife population management tool used to regulate the population of certain wildlife species when those species are disrupting ecosystem functions. Beavers, raccoons, and coyotes have been documented to cause negative impacts to forested wetlands and nesting birds. When these negative impacts become significant on the refuge, wildlife managers need trapping as a management tool to control the level of damage. Beavers, raccoons, and coyotes are important components of the ecosystem, but when their populations and negative impacts become significant, wildlife managers need a regulated trapping program to reduce their populations to acceptable levels.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date:

Description of Use: Wildlife Observation and Photography

Wildlife observation and photography have been identified in the National Wildlife Refuge System Improvement Act of 1997 as priority wildlife-dependent recreational uses, provided they are compatible with the purposes of the refuge. This compatibility determination applies only to personal wildlife observation and photography on the trails, wildlife drive, and waters of the Holla Bend NWR.

Availability of Resources:

No additional staff or monetary resources are needed to allow these uses. Existing staff can administer permits and monitor use as part of routine management duties.

Anticipated Impacts of the Use:

As two of the six wildlife-dependent, priority public uses of national wildlife refuges cited in the National Wildlife Refuge System Improvement Act of 1997, wildlife observation and photography are automatically considered appropriate uses of the refuge. Possible impacts would be litter along the wildlife drive, nature trails, boat ramps, and areas adjacent to the wildlife viewing tower. Vegetation may be minimally impacted by foot traffic.

Public Review and Comment:

This compatibility determination is provided for public review and comment during the Draft CCP/EA review process.

Determination (check one below):
___ Use is Not Compatible
_X_ Use is Compatible With Following Stipulations

Stipulations Necessary to Ensure Compatibility:

Refuge visitors must comply with refuge regulations in regards to operating hours (daylight use only) and not entering closed areas. Access to refuge waters is limited to March 1 to October 31 to allow sanctuary for wintering waterfowl.

Justification:

Wildlife observation and photography are two of the priority public uses generally considered compatible with national wildlife refuges.

NEPA Compliance for Refuge Use Decision:

___ Categorical Exclusion without Environmental Action Statement
___ Categorical Exclusion and Environmental Action Statement
_X_Environmental Assessment and Finding of No Significant Impact
___ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date:

Approval of Compatibility Determinations

The signature of approval is for all compatibility determinations considered within the Comprehensive Conservation Plan for Holla Bend NWR. If one of the descriptive uses is considered for compatibility outside of the comprehensive conservation plan, the approval signature becomes part of that determination.

Refuge Manager: _____
(Signature/Date)

Regional Compatibility Coordinator: _____
(Signature/Date)

Refuge Supervisor: _____
(Signature/Date)

Regional Chief, National Wildlife Refuge System, Southeast Region: _____
(Signature/Date)

Appendix G. Intra-Service Section 7 Biological Evaluation

REGION 4
INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Durwin Carter **Telephone Number:** 479-229-4300
E-Mail: durwin_carter@fws.gov
Date: March 30, 2009

PROJECT NAME: Holla Bend National Wildlife Refuge CCP

I. Service Program:
___ Ecological Services
___ Federal Aid
___ Clean Vessel Act
___ Coastal Wetlands
___ Endangered Species Section 6
___ Partners for Fish and Wildlife
___ Sport Fish Restoration
___ Wildlife Restoration
___ Fisheries
_X_ Refuges/Wildlife

II. State/Agency: U.S. Fish and Wildlife Service

III. Station Name: Holla Bend National Wildlife Refuge (NWR)

IV. Description of Proposed Action: Implementation of the Comprehensive Conservation Plan for Holla Bend NWR by adopting the proposed alternative of Ecosystem Emphasis, which will provide guidance, management direction, and operation plans for the next 15 years.

V. Pertinent Species and Habitat:

A. Species/habitats:

- Bald eagle occurs refuge-wide.
- Arkansas River shiner may use main channel of Arkansas River.
- Least tern uses gravel and sand bars along the Arkansas River.
- American alligator occurs refuge-wide in sloughs and lakes.
- American burying beetle known to occur in counties west of the refuge.

B. Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS
Bald Eagle	De-listed
Arkansas River Shiner	T
Least Tern	E
American Alligator	T
American Burying Beetle	E

[1]STATUS: E=endangered, T=threatened, PE=proposed endangered, PT=proposed threatened, CH=critical habitat, PCH=proposed critical habitat, C=candidate species

VI. Location:

A. Ecoregion Number and Name: Arkansas/Red Ecosystem No.15

B. County and State: Yell and Pope Counties, Arkansas

C. Section, township, and range (or latitude and longitude): R19W T6N Sections 19, 20, 21, 28, 29, 30, 31, 32, 33 and R20W T6N Sections 23, 24, 25, 26, 35, 36.

D. Distance (miles) and direction to nearest town: The refuge is approximately 6 miles south of Dardanelle, Arkansas.

E. Species/habitat occurrence: Bald eagles are common on the refuge in the winter when waterfowl are present, and the refuge currently hosts three eagle nests; two are known to be active.

Least terns and the Arkansas River shiner are known to utilize the Arkansas River. Least terns utilize the sand and gravel bars while the Arkansas River shiner utilizes the main channel of the river.

American alligators found on the refuge were the result of a restocking effort made in 1979 when twelve alligators from Louisiana were released in Lodge Lake. Several are known to exist on the refuge, nearby Petit Jean WMA and CPE lands.

The American burying beetle has been reported from several Arkansas counties west of the refuge, including Scott and Logan Counties. No occurrence survey has been conducted on the refuge.

VII. Determination of Effects:

A. Explanation of effects of the action on species and critical habitats in item V. B (attach additional pages as needed):

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Bald Eagle	Minimal impact, more protection
Arkansas River Shiner	No impact, more protection
Least Tern	No impact, more protection
American Alligator	No impact, more protection
American Burying Beetle	No impact, more protection

B. Explanation of actions to be implemented to reduce adverse effects:

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Bald Eagle	Protect and expand potential nest trees
Arkansas River Shiner	Maintain old river channel
Least Tern	Protect and maintain habitat
American Alligator	Protect and maintain wetland habitat
American Burying Beetle	Protect and maintain habitat

Most disturbances to bald eagles would be during the nesting season. Boating and fishing are closed on the refuge from November 1 through the end of February. Nests are given additional protection by having boaters maintain a “no wake” zone between boat ramp until past the protected area of the eagle nest, and all activities, including hunting and fishing, around all nests are closed to within 1,500 feet of the nests until young have fledged. Planned activities will have no effect on the other species listed.

VIII. Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION[1]			RESPONSE[1] REQUESTED
	NE	NA	AA	
Bald Eagle		X		Concurrence
Arkansas River Shiner	X			Concurence
Least Tern	X			Concurence
American Alligator	X			Concurence
Ameican Burying Beetle	X			Concurence

[1]DETERMINATION/RESPONSE REQUESTED:

NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a "Concurrence".

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response Requested for proposed or candidate species is "Conference".

_____ _____
Signature (originating station) date

_____
Title

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence _____ Nonconcurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

_____ _____
Signature date

_____ _____
Title office

Appendix H. Wilderness Review

The Wilderness Act of 1964 defines a wilderness area as an area of federal land that retains its primeval character and influence, without permanent improvements or human inhabitation, and is managed so as to preserve its natural conditions and which:

1. generally appears to have been influenced primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;

2. has outstanding opportunities for solitude or primitive and unconfined types of recreation;

3. has at least 5,000 contiguous roadless acres or is of sufficient size to make practicable its preservation and use in an unimpeded condition; or is a roadless island, regardless of size;

4. does not substantially exhibit the effects of logging, farming, grazing, or other extensive development or alteration of the landscape, or its wilderness character could be restored through appropriate management at the time of review; and

5. may contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

The lands within Holla Bend NWR were reviewed for their suitability in meeting the criteria for wilderness, as defined by the Wilderness Act of 1964.

No lands in the refuge were found to meet these criteria. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this CCP.

Appendix I. Refuge Biota

BIRDS

SP Spring, March-May
S Summer, June-July
F Fall, August-November
W Winter, December-February

a. abundant (a common species which is very numerous)
c. common (certain to be seen in suitable habitat)
u. uncommon (present but not certain to be seen)
o. occasional (seen only a few times during a season)
r. rare (seen at intervals of 2 to 5 years)

Birds: Common Name		SP	S	F	W
Loons and Grebes					
Common Loon					o
Pied-billed Grebe		r	r	c	u
Pelicans and Allies					
American White Pelican		u		u	o
Double-crested Cormorant		u	u	u	c
Anhinga		o	o		
Herons, Egrets, Ibises and Vultures					
American Bittern			o		o
Great Blue Heron		c	c	c	c
Great Egret		c	c	c	o
Snowy Egret		r	r	o	
Little Blue Heron		r	u	u	
Cattle Egret		r	r		
Green Heron		u	u	u	
Black-crowned Night-Heron			u	u	
Yellow-crowned Night-Heron			u	u	u
White Ibis				r	
Glossy Ibis		r		r	
Wood Stork				r	
Black Vulture		c	c	c	c

Birds: Common Name		SP	S	F	W
Turkey Vulture		a	a	a	a
Swans, Geese, and Ducks					
Greater White-fronted Goose				u	u
Snow Goose		u		c	c
Ross' Goose		u		u	u
Canada Goose		u	u	c	c
Trumpeter Swan		o			u
Tundra Swan					u
Wood Duck		u	u	u	u
Gadwall		u		c	c
American Wigeon		u		c	c
American Black Duck		r		r	r
Mallard		u	u	c	c
Blue-winged Teal		o	u	c	o
Northern Shoveler		u		u	u
Northern Pintail		u		o	o
Green-winged Teal				o	o
Canvasback				r	
Redhead		r		r	r
Ring-necked Duck		u		u	c
Lesser Scaup		u		u	u
Bufflehead				u	u
Common Goldeneye				r	r
Hooded Merganser				u	u
Common Merganser				u	u
Rudy Duck				r	r
Black-Bellied Whistling Duck		r			r
Hawks and Falcons					
Osprey		u	u	u	
Bald Eagle		o	o	u	c
Northern Harrier		c	o	c	c

Birds: Common Name		SP	S	F	W
Sharp-shinned Hawk		u		u	u
Cooper's Hawk		u	u	u	u
Red-shouldered Hawk		c	c	c	c
Broad-winged Hawk		u	u	u	
Swainson's Hawk		o			
Red-tailed Hawk		c	c	c	c
Rough-legged Hawk				o	o
Golden Eagle				r	r
American Kestrel		c	c	c	c
Merlin					r
Peregrine Falcon				r	r
Prairie Falcon					o
Turkey and Quail					
Wild Turkey		c	c	c	c
Northern Bobwhite		c	c	c	c
Rails, Gallinules, and Cranes					
Sora		u		u	
American Coot		u		c	u
Sandhill Crane				r	r
Plovers, Sandpipers, Gulls, and Terns					
Black-bellied Plover		o		u	
American Golden-Plover		o			
Semipalmated Plover		u	r	r	
Killdeer		c	c	c	c
American Avocet				r	
Greater Yellowlegs		u		u	
Lesser Yellowlegs		u		u	
Solitary Sandpiper		r	o	o	
Upland Sandpiper		u		o	
Hudsonian Godwit		o			
Ruddy Turnstone				o	
Sanderling		o			

Birds: Common Name		SP	S	F	W
Semipalmated Sandpiper		u			
Western Sandpiper			r	u	
Least Sandpiper		u	u	u	u
White-rumped Sandpiper		u	r		
Pectoral Sandpiper		c		c	
Dunlin		o		r	
Stilt Sandpiper		r		r	
Long-billed Dowitcher		u	o	u	
Common Snipe		c		c	c
American Woodcock		u			
Wilson's Phalarope		c		u	
Franklin's Gull		u		u	
Bonaparte's Gull				u	u
Ring-billed Gull		u		c	c
Herring Gull		u		u	u
Caspian Tern				o	
Forster's Tern		o		o	
Least Tern		u	u	u	
Black Tern		u	o	u	
Doves					
Rock Dove		u	u	u	u
Morning Dove		a	a	a	a
Common Ground Dove		r			
Cuckoos and Roadrunners					
Black-billed Cuckoo		r		r	
Yellow-billed Cuckoo		u	u	u	
Greater Roadrunner		u	u	u	u
Owls					
Barn Owl		u	u	u	u
Eastern Screech Owl		c	c	c	c
Great Horned Owl		u	u	u	u
Burrowing Owl					o

Birds: Common Name		SP	S	F	W
Barred Owl		c	c	c	c
Long-eared Owl		r		r	r
Short-eared Owl		u		r	u
Goatsuckers					
Common Nighthawk		c	c	c	
Chuck-will's-widow		c	c		
Whip-poor-will			r		r
Swifts and Hummingbirds					
Chimney Swift		c	c	c	
Ruby-throated Hummingbird		u	u	u	
Kingfishers					
Belted Kingfisher		c	c	c	u
Woodpeckers					
Red-headed Woodpecker		u	u	u	u
Red-bellied Woodpecker		c	c	c	c
Yellow-bellied Sapsucker		c	c	c	c
Downy Woodpecker		c	c	c	c
Hairy Woodpecker		c	c	c	c
Northern Flicker		c	c	c	c
Pileated Woodpecker		u	u	u	u
Flycatchers					
Eastern Wood-Pewee		c	c	c	
Acadian Flycatcher		u			
Alder Flycatcher		u			
Least Flycatcher		u			
Eastern Phoebe		u	u	u	u
Great Crested Flycatcher		c	c		
Eastern Kingbird		u	c	u	
Scissor-tailed Flycatcher		c	c	c	
Shrikes					
Loggerhead Shrike		o	o	o	o
Vireos					

Birds: Common Name		SP	S	F	W
White-eyed Vireo		c	u	u	
Bell's Vireo		c	c	r	
Yellow-throated Vireo		c	u	u	
Warbling Vireo		o	u	r	
Philadelphia Vireo		o			
Red-eyed Vireo		c	u	u	
Jays and Crows					
Blue Jay		c	c	c	c
American Crow		a	a	a	a
Fish Crow		c	c	c	u
Larks					
Horned Lark		u	u	u	c
Swallows					
Purple Martin			c	c	
Tree Swallow		u	r	u	
Northern Rough-winged Swallow		c	c	c	
Bank Swallow		u		u	
Cliff Swallow		u	u	u	
Barn Swallow		c	c	c	
Chickadees and Titmice					
Carolina Chickadee		c	c	c	c
Tufted Titmouse		c	c	c	c
Nuthatches					
White-breasted Nuthatchu		u	u	u	u
Creepers					
Brown Creeper					u
Wrens					
Carolina Wren		a	c	c	c
Bewick's Wren		u		u	u
House Wren		u		u	r
Winter Wren					u
Sedge Wren				u	r

Birds: Common Name		SP	S	F	W
Marsh Wren				u	
Kinglets					
Golden-crowned Kinglet		u		u	c
Ruby-crowned Kinglet		u		u	c
Gnatcatchers					
Blue-gray Gnatcatcher		c	c		
Thrushes					
Eastern Bluebird		c	c	u	u
Gray-cheeked Thrush		r		r	
Swainson's Thrush		u		r	
Hermit Thrush		u		u	u
Wood Thrush		c	c	c	
American Robin		c	c	a	a
Mockingbirds, Thrashers, and Allies					
Gray Catbird		u	u	u	
Northern Mockingbird		c	c	c	c
Brown Thrasher		c	c	c	c
Starlings					
European Starling		c	c	c	c
Pipits					
American Pipit		r		r	r
Waxwing					
Cedar Waxwing		c	c		c
Wood Warblers					
Tennessee Warbler		u		u	
Orange-crowned Warbler				r	
Nashville Warbler		u			
Northern Parula		o			
Yellow Warbler		u			
Magnolia Warbler		u			
Yellow-rumped Warbler		c		c	c

Birds: Common Name		SP	S	F	W
Black-throated Green Warbler		u			
Yellow-throated Warbler		u	u	u	
Pine Warbler				u	u
Prairie Warbler		u			
Palm Warbler				r	
Blackpoll Warbler			u		
Black-and-White Warbler		u			
American Redstart		u	u		
Prothonotary Warbler		u			
Swainson's Warbler		o	o		
Ovenbird		u			
Northern Waterthrush		u			
Louisiana Waterthrush		u			
Kentucky Warbler		u	u		
Common Yellowthroat		c	c	u	
Hooded Warbler		u			
Wilson's Warbler		u			
Yellow-breasted Chat		u	u		
Tanagers					
Summer Tanager		c	c	c	
Scarlet Tanager		u	u	u	
New World Sparrows					
Eastern Towhee				u	u
American Tree Sparrow					o
Chipping Sparrow		r			
Clay-colored Sparrow		r	r		
Field Sparrow		a	a	a	a
Vesper Sparrow				u	u
Lark Sparrow		c	c	c	o
Savannah Sparrow		c		c	a
Grasshopper Sparrow		r	r		
Le Conte's Sparrow		u		u	u

Birds: Common Name		SP	S	F	W
Fox Sparrow		u		u	c
Song Sparrow		c		c	c
Lincoln's Sparrow		u		u	u
Swamp Sparrow		c		c	c
White-throated Sparrow		c		c	a
Harris' Sparrow		u		u	u
White-crowned Sparrow		c		c	a
Dark-eyed Junco		u		u	a
Lapland Longspur		u		u	u
Cardinals, Grosbeaks, and Allies					
Northern Cardinal		a	a	a	a
Rose-breasted Grosbeak		u		u	
Blue Grosbeak		u			
Indigo Bunting		c	c	u	
Painted Bunting		u	u		
Dickcissel		a	a	r	
Blackbirds and Allies					
Bobolink			u		o
Red-winged Blackbird		a	a	a	a
Eastern Meadowlark		a	a	a	a
Western Meadowlark		r		r	r
Yellow-headed Blackbird		r	r		
Rusty Blackbird		r			u
Brewer's Blackbird					u
Common Grackle		c	c	c	c
Brown-headed Cowbird		c	c	c	u
Orchard Oriole		c	c	c	
Baltimore Oriole		c	c	u	
Finches					
Purple Finch		u			c
House Finch			o	o	
Pine Siskin					r

Birds: Common Name		SP	S	F	W
American Goldfinch		c		c	c
Evening Grosbeak					r
Old World Sparrows					
House Sparrow		c	c	c	c

Mammals: Common Name	Scientific Name
Species Known to Occur on the Refuge	
Beaver	*Castor Canadensis*
Black Bear	*Ursus americanus*
Bobcat	*Lynx rufus*
Cotton Mouse	*Peromyscus gossypinus*
Coyote	*Canis latrans*
Deer Mouse	*Peromyscus maniculatus*
Eastern Cottontail	*Sylvilagus floridanus*
Eastern Fox Squirrel	*Sciurus niger*
Eastern Gray Squirrel	*Sciurus carolinensis*
Eastern Mole	*Scalopus aquaticus*
Fulvous Harvest Mouse	*Reithrodontomys fulvescens*
Golden Mouse	*Ochrotomys nuttali*
Hispid Cotton Rat	*Sigmodon hispidus*
House Mouse	*Mus musculus*
Mink	*Mustela vison*
Muskrat	*Ondatra zibethicus*
Nine-banded Armadillo	*Dasypus Novemcinctus*
Norway Rat	*Rattus norvebicus*
Raccoon	*Procyon lotor*
Red Fox	*Vulpes fulva*
River Otter	*Lutra Canadensis*
Southern Flying Squirrel	*Glaucomys volans*
Striped Skunk	*Mephitis mephitis*
Swamp Rabbit	*Sylvilagus aquaticus*

Mammals: Common Name	Scientific Name
Virginia Opossum	*Didelphis marsupialis*
White-tailed Deer	*Odocoileus virginianus*
Woodchuck	*Marmota monax*
Species That May Range Onto the Refuge	
Big Brown Bat	*Iptesicus fuscus*
Eastern Chipmunk	*Tamias striatus*
Eastern Cougar	*Felis Concolor*
Eastern Pipistrelle	*Pipistrellus subflavus*
Eastern Spotted Skunk	*Spilogale putorius*
Eastern Woodrat	*Neotoma floridana*
Evening Bat	*Nycticeius humeralis*
Gray Fox	*Urocyon cinereoargenteus*
Hoary Bat	*Lasiurus cinereus*
Keen's Myotis	*Myotis keenii*
Least Shrew	*Cryptotis parva*
Little Brown Myotis	*Myotis lucifugus*
Long-tailed Weasel	*Mustela frenata*
Marsh Rice Rat	*Oryzomys palustris*
Nutria	*Myocastor coypus*
Red Bat	*Lasiurus borealis*
Silver-haired Bat	*Lasionycteris noctivagans*
Southeastern Shrew	*Sorex longirostris*
Southern Short-tailed Shrew	*Blarina carolinensis*
White-footed Mouse	*Peromyscus leucopus*
Woodland Vole	*Microtus pinetorum*

Reptiles Reported to Occur on Holla Bend NWR (Informal List): Common Name	Scientific Name
Copperhead	*Agkistrodon contortrix*
Cottonmouth	*Agkistrodon piscivorus*
Eastern Hognose Snake	*Heterodon platirhinos*
Speckled Kingsnake	*Lampropeltis getula*
Plainbelly Water Snake	*Nerodia erythrogaster*
Diamondback Water Snake	*Nerodia rhombifer*
Northern Water Snake	*Nerodia sipedon*
Racer	*Coluber constrictor*
Rough Green Snake	*Opheodrys aestivus*
Black Rat Snake	*Pantherophis obsoletus*
Midland Brown Snake	*Storeria dekayi*
Western Ribbon Snake	*Thamnophis proximus*
Common Garter Snake	*Thamnophis sirtalis*
Southern Coal Skink	*Plestiodon anthracinus*
Five-lined Skink	*Plestiodon fasciatus*
Eastern Fence Lizard	*Sceloporus undulates*
Ground Skink	*Scincella lateralis*
Smooth Softshell	*Apalone mutica*
Spiny Softshell	*Apalone spinifera*
Common Snapping Turtle	*Chelydra serpentine*
Chicken Turtle	*Deirochelys reticularia*
Eastern Mud Turtle	*Kinosternon subrubrum*
Alligator Snapping Turtle	*Macrochelys temminckii*
Eastern River Cooter	*Pseudemys concinna*
Common Musk Turtle	*Sternotherus odoratus*
Red-eared Slider	*Trachemys scripta*
American Alligator	*Alligator mississippienis*

Fish Reported to Occur on Holla Bend NWR (Informal List): Common Name	Scientific Name
Alligator Gar	*Atractosteus spatula*
Bowfin	*Amia calva*
Gizzard Shad	*Dorosoma cepedianum*
Grass Carp	*Ctenopharyngodon idella*
Common Carp	*Cyprinus carpio*
Black Buffalo	*Ictiobus niger*
Blue Catfish	*Ictalurus furcatus*
Channel Catfish	*Ictalurus punctatus*
Flathead Catfish	*Pylodictis olivaris*
Largemouth Bass	*Micropterus salmoides*
White Bass	*Morone chrysops*
Striped Bass	*Morone saxatilis*
Bluegill	*Lepomix macrochirus*
Black Crappie	*Promoxis nigromachlatus*
White Crappie	*Promoxis annularis*
Freshwater Drum	*Aplodinotus grunniens*
Western Mosquitofish	*Gambusia affinis*

Amphibians Reported to Occur on Holla Bend NWR (Informal List): Common Name	Scientific Name
Northern Cricket Frog	*Acris crepitans*
American Toad	*Bufo americanus*
Fowler's Toad	*Bufo fowleri*
Eastern Narrowmouth Toad	*Gastrophryne carolinensis*
Green Treefrog	*Hyla cinerea*
Gray Treefrog	*Hyla versicolor*
Spring Peeper	*Pseudacris crucifer*
Strecker's Chorus Frog	*Pseudacris streckeri*
Bull Frog	*Rana catesbeiana*
Green Frog	*Rana clamitans*
Southern Leopard Frog	*Rana sphenocephala*
Spotted Salamander	*Ambystoma maculatum*
Marbled Salamander	*Ambystoma opacum*

Trees, Shubs, and Vines Reported to Occur on Holla Bend NWR (Informal List): Common Name	Scientific Name
Eastern Cottonwood	*Populus deltoides*
Black Willow	*Salix nigra*
American Sycamore	*Platanus occidentalis*
Eastern red Cedar	*Juniperus virginiana*
Osage Orange	*Maclura pomifera*
American Plum	*Prunus americana*
Boxelder	*Acer negundo*
Green Ash	*Fraxinus pennsylvanica*
American Elm	*Ulmus americana*
Sawtooth Oak	*Quercus acutissimi*
Sugarberry	*Celtis laevigata*
Pecan	*Carya illinoensis*
Sweetgum	*Liquidambar styraciflua*
Bald Cypress	*Taxodium distichum*
Nuttal Oak	*Quercus nuttallii*
Swamp Chestnut Oak	*Quercus michauxii*
Cherrybark Oak	*Quercus pagoda*
Pin Oak	*Quercus palustris*
Willow Oak	*Quercus phellos*
Water Oak	*Quercus nigra*
Blackgum	*Nyssa sylvatica*
Hackberry	*Celtis occidentalis*
Flowering Dogwood	*Cornus florida*
Rough-leaved Dogwood	*Cornus drummondii*
Eastern Redbud	*Cercis Canadensis*
Overcup oak	*Quercus lyrata*
Hercules Club	*Aralia spinosa*
Black Cherry	*Prunus serotina*
Common Persimmon	*Diospyros virginiana*
Possum-haw, Deciduous Holly	*Ilex decidua*

Trees, Shubs, and Vines Reported to Occur on Holla Bend NWR (Informal List): Common Name	Scientific Name
Soapberry	*Sapindus saponaria*
Wax Myrtle	*Morella cenifera*
Honey Locust	*Gleditsia triacanthos*
Silver Maple	*Acer saccharinum*
Switch Cane	*Arundinaria gigantea*
Sassafras	*Sassafras albidum*
Loblolly Pine	*Pinus taeda*
Swamp Privet	*Forestiera acuminate*
Mistletoe	*Phoradendron serotinum*
Dodder, Love Vine	*Cuscuta spp.*
French Mulberry	*Callicarpa Americana*
Trumpet Creeper	*Campsis radicans*
Poison Ivy	*Toxicdendron radicans*
Virginia Creeper	*Parthenocissus quinquefolia*
Dew Berry	*Rubus flagellaris*
Common Greenbrier	*Smilax rotundifolia*

Plants Reported to Occur on Holla Bend NWR (Informal List): Common Name	Scientific Name
Horsetail spikerush	*Eliocharis equisetoides*
Smartweeds	*Polygonum spp.*
Sesbania	*Sesbania cannabina*
Golden Rod	Solidago altissima
Switchgrass	*Panicum virgatum*
Sprangletop	*Leptachloa filiformis*
Duckweeds	*Lemna spp.*
Chufa	*Cyperus esculentus*
Aster	*Aster spp.*
Broomsedge	*Andropogon virginicus*
Common Ragweed	*Ambrosia artemisifolia*
Invasive Plants Reported to Occur on Holla Bend NWR (Informal List): Common Name	**Scientific Name**
Kudzu	*Pueraria spp.*
Johnsongrass	*Sorghum halepense*
Cocklebur	*Xanthium strumarium*
Pigweed	*Amaranthus spp.*
Morning glory	*Ipomoea spp.*
Honeysuckle	*Lonicera japonica*
Bermuda Grass	*Cynodon spp.*
Privet	*Ligustrum vulgare*
Russian Olive	*Elaeagnus angustifolia*

Mammal Species With Particular Conservation Significance at the Federal or State Level

		Federal Status [a]	SGCN in AWAP [b]	State status [c]	State rank [d]
Black Bear	*Ursus americanus*		√		
Eastern Cougar[e]	*Felis (≡Puma) concolor*	LE			
Eastern Spotted Skunk[e]	*Spilogale putorius*		√	INV	S4
Long-tailed Weasel[e]	*Mustela frenata*		√	INV	S?
Southeastern Shrew[e]	*Sorex longirostris*		√	INV	S2?

a. LE = Listed Endangered

b. Identified as a 'Species of Greatest Conservation Need' in the Arkansas Wildlife Action Plan (Anderson 2006)

c. INV = Arkansas Natural Heritage Commission is currently conducting inventory work on this species

d. S4 = Apparently secure in the state. Uncommon but not rare; some cause for long-term concern.

S? = Rank uncertain

S2? = Imperiled in the state due to very restricted range, very few populations, steep declines, or other factors making it vulnerable to extirpation. However, numeric rank of S2 is considered inexact.

e. Occurrence on the refuge has not been confirmed.

Appendix J. Budget Requests

REFUGE OPERATING NEEDS SYSTEM (RONS)