

DRAFT LAND PROTECTION PLAN AND ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED EXPANSION OF CACHE RIVER NATIONAL WILDLIFE REFUGE

Monroe, Prairie, Woodruff, Jackson, Cross, and Poinsett Counties, Arkansas



Southeast Region



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I. Introduction and Purpose

PROJECT DESCRIPTION

This Draft Land Protection Plan (Draft LPP) identifies and describes the proposed expansion of the acquisition boundary for Cache River National Wildlife Refuge (NWR). In order to truly restore the ecological functions for fish and wildlife species in the Cache River Basin, fully implement strategic habitat conservation, and demonstrate that watershed restoration within the Mississippi Alluvial Valley (MAV) is achievable, the Fish and Wildlife Service (Service) and its partners believe that the land acquisition focus for the refuge must be extended beyond the scope of the current approved acquisition boundary. If the proposed expansion is approved and implemented, it will: (1) Enable protection, restoration and enhancement of an additional 102,000 acres; (2) provide new connections with Bald Knob NWR, Cache River NWR, and White River NWR, six Arkansas state wildlife management areas, two state natural areas, and numerous private lands conserved through federal, state, and non-governmental organization easements (Figures 1 and 2); (3) enhance conservation effectiveness; (4) help restore ecological functions: (5) increase water quality, (6) protect and restore natural hydrology and habitats for the benefit of numerous fish and wildlife trust species; (7) benefit willing sellers outside the current acquisition boundary; and (8) improve access and public use opportunities on a nationally renowned hunting and wildlife observation area.

Cache River NWR, in Monroe, Prairie, Woodruff and Jackson Counties of east-central Arkansas, extends an areal distance of approximately 65 miles along the Cache River floodplain from Clarendon to Grubbs. Land acquisition has continued on a willing-seller basis, and the refuge now contains about 67,400 acres. This proposal would expand the current 185,574-acre acquisition boundary of Cache River NWR to include up to an additional 102,000 acres surrounding the Cache River NWR (Figure 2). When combined with the current Cache River NWR acquisition boundary, this proposal seeks to protect, restore, and enhance up to a total of 287,574 acres both east and west of the Cache River and Bayou DeView. This proposal encompasses undeveloped areas in Monroe, Prairie, Woodruff, Jackson, Cross, and Poinsett Counties. Towns located within or adjacent to the proposed expansion include: Grubbs, Fisher, McCrory, Cotton Plant, Gregory, and Beulah.

Three expansion areas have been identified within the proposed expansion project (Figure 3). A brief description of the currently proposed expansion areas are as follows: Area 1 – Cache River/Bayou DeView Corridor (38,483 acres) to provide corridor habitat and connect the watersheds of Cache River and Bayou DeView; Area 2 – Bayou DeView Peripheral (32,630 acres) strategically expand northward protection of the Bayou DeView floodplain, provide a restoration area associated with the junction of channelized/non-channelized river courses, further connect the watershed of Bayou DeView and Cache River, and establish watershed buffers east of Bayou DeView; and Area 3 - Cache River Peripheral (29,997 acres) to conserve unique habitats west of Cache River, facilitate future connection of the watersheds of the White and Cache Rivers, expand northward protection of the Cache River floodplain, and enhance riparian buffers along the Cache River. The areas and acreages above exclude state and municipal ownerships. These areas are encompassed by the recommended acquisition boundary proposed in Alternative 2 of a Draft Environmental Assessment for the proposed expansion of the refuge. (The current proposed configurations of the expansion areas total 101,110 acres; however Service Director's approval for this project is up to a total of 102,000 acres). The purposes of this Draft LPP are to:

- Provide landowners and the public with an outline of Service policies, priorities, and protection methods for land in the project area;

Figure 1. Location map

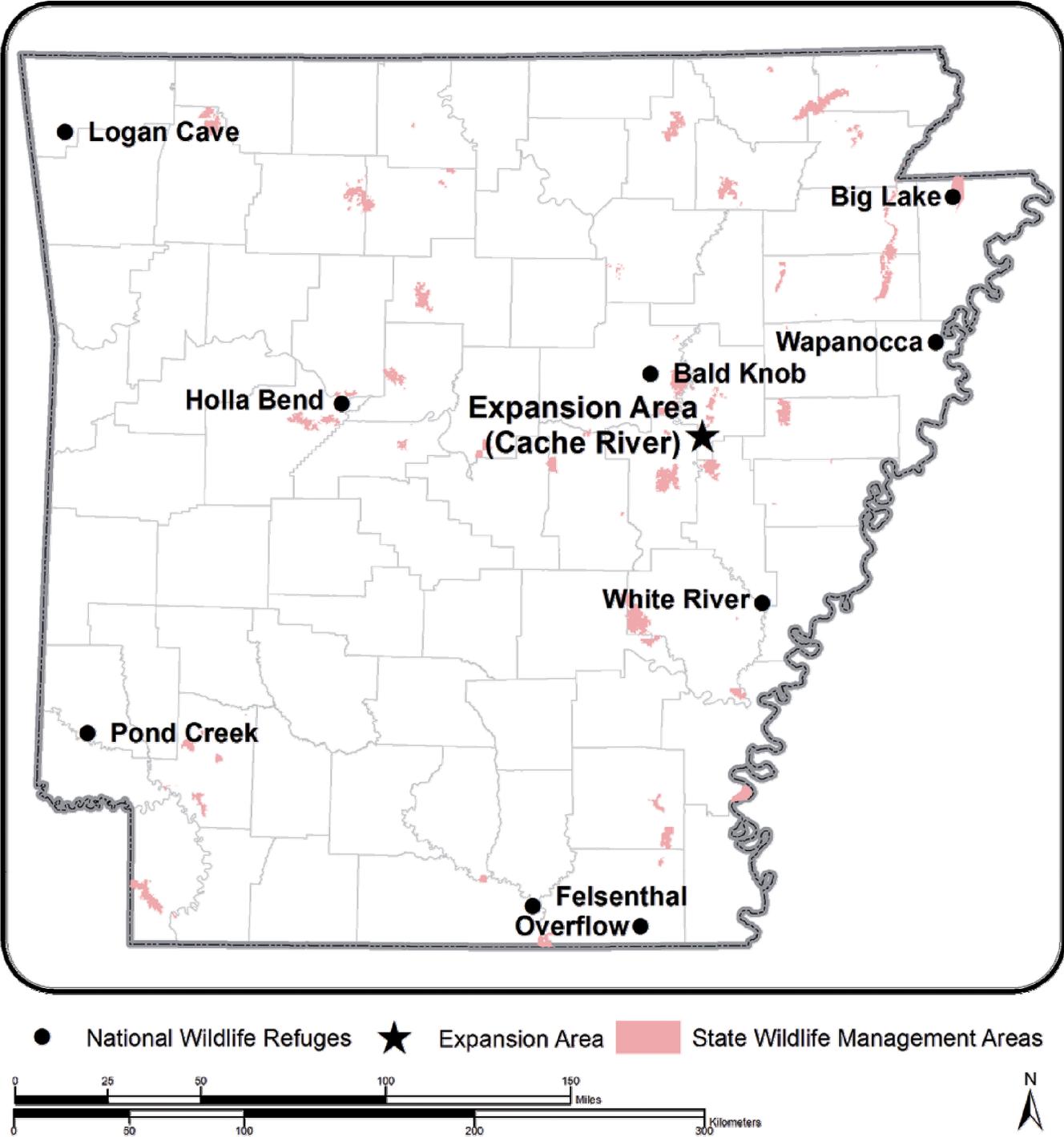


Figure 2. Related resources map

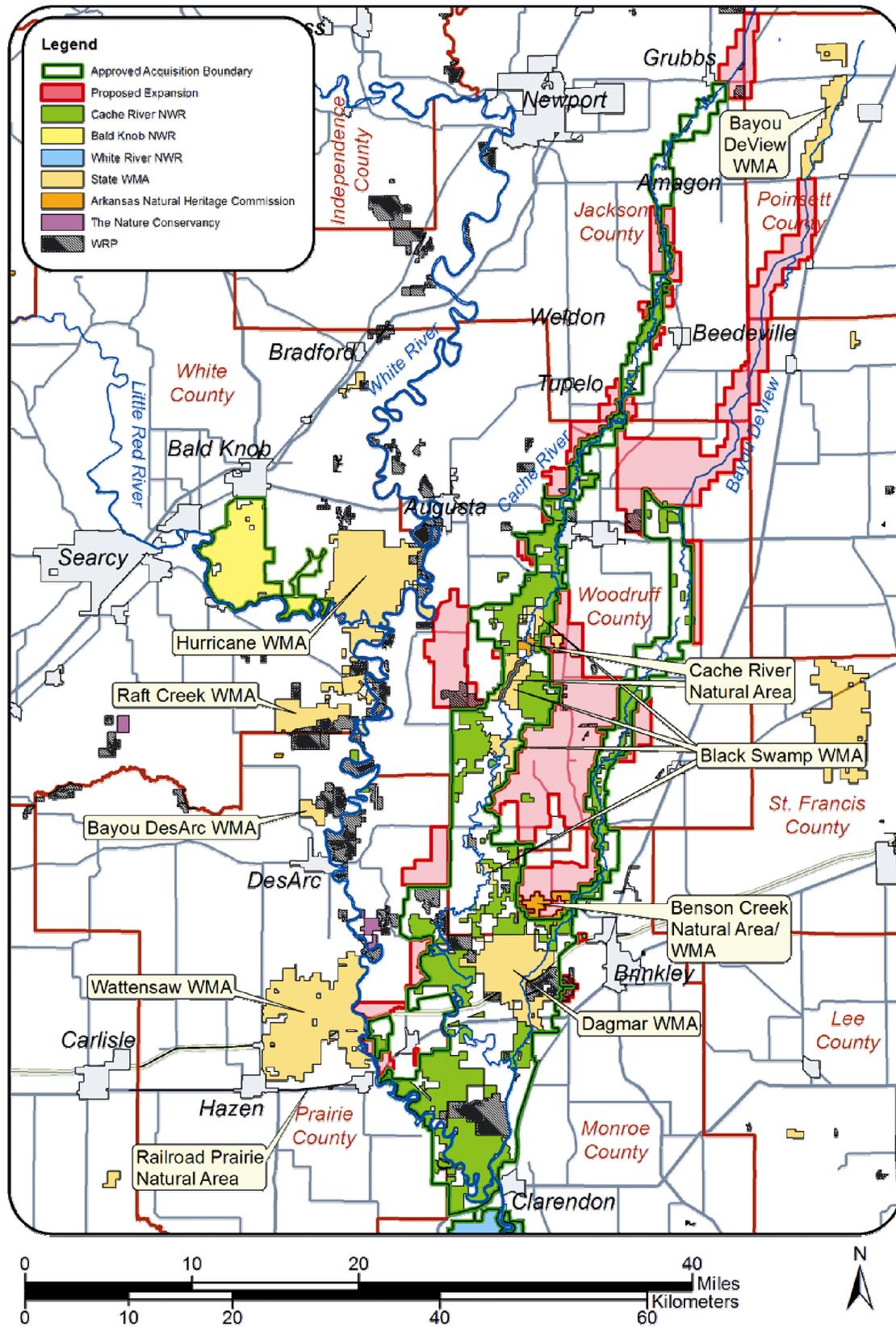
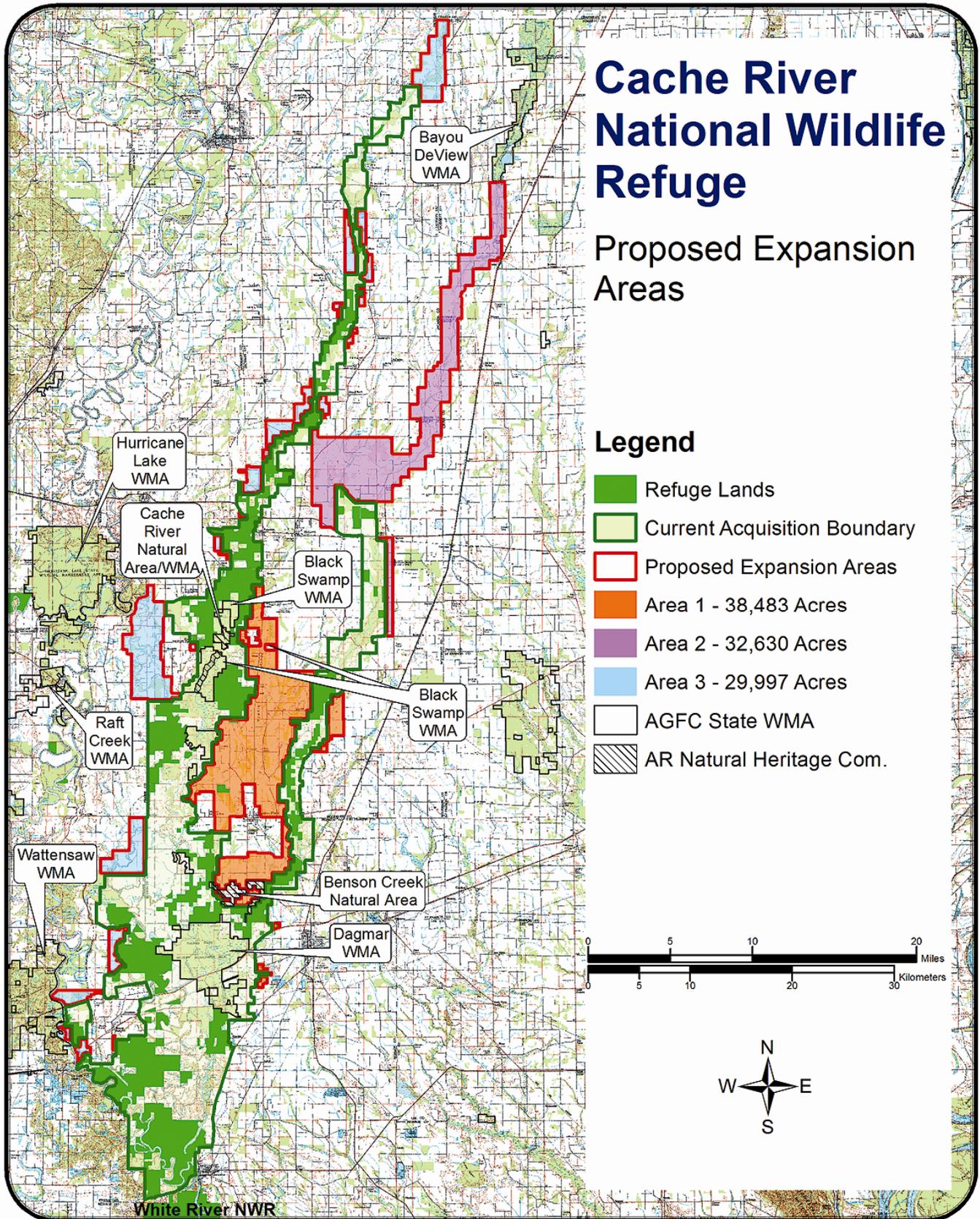


Figure 3. Project map



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- Assist landowners in determining whether their property lies within the proposed acquisition boundary; and
 - Inform landowners about our long-standing policy of acquiring land only from willing sellers. (We will not buy any lands or easements if the owners are not interested in selling.)

This Draft LPP presents the methods the Service and interested landowners can use to accomplish their objectives for wildlife habitat within the refuge boundary. Within approved acquisition boundaries, the Service would be able to enter into negotiations and/or partnerships for the protection, restoration, and enhancement of environmentally sensitive lands. The following list presents the most urgent needs for acquiring an interest in the lands encompassed by this proposal.

- Restore key ecological processes that drive and sustain the unique, but declining Cache River floodplain ecosystem, and improve ecosystem services and associated public benefits.
- Strategically restore altered geophysical features and original connectivity of water flow within and between the Cache River and Bayou DeView floodplains.
- Improve hydrologic function of these streams and their floodplains and enhance wetland and aquatic ecosystems for the benefit of trust species.
- Incorporate protection and enhancement of a diversity of critical habitats on which trust species depend to better represent the full spectrum of habitats that was historically present.
- Restore forested habitat and other natural plant communities to improve overall watershed health and stability, promote carbon sequestration, bolster ecological integrity, and increase habitat patch size to accomplish goals set forth in refuge, state, LMVJV, regional, and national plans for migratory birds, forest breeding birds, endangered species, and resident wildlife and fish species.
- Protect, restore, and enhance fragmented and degraded floodplain forests and create large contiguous forest and riparian buffers adjacent to the Cache River and Bayou DeView to improve water quality, provide fish and wildlife movement corridors, and enlarge habitat patch sizes for trust wildlife species.
- Protect lands between Bald Knob, Cache River, and White River National Wildlife Refuges, state wildlife management areas, state natural areas, and private conservation lands to enlarge conservation benefits within the Cache/White Rivers' watershed, and increase and facilitate access and wildlife-dependent recreation on public lands.

REFUGE PURPOSE(S)

Cache River National Wildlife Refuge (NWR) was established on June 16, 1986, with the purchase of 1,395 acres within an approved acquisition boundary of 60,400 acres. On August 5, 1998, the Regional Director approved the Final Environmental Assessment and Final Land Protection Plan to expand the existing acquisition boundary an additional 114,900 acres. The approved expansion approximated the 10-year floodplain of the Lower and Middle Cache Rivers' Basin, including Bayou DeView, and increased the approved acquisition boundary to a total of 175,300 acres. The acquisition boundary was further expanded by 410 acres on June 22, 1999, and by 9,864 acres on February 4, 2005, by authority delegated to Regional Directors to approve any refuge expansion totaling 10 percent or less of the approved acquisition boundary for an established refuge. The current acquisition boundary encompasses 185,574 acres. The refuge now contains about 67,400 acres (in fee-title). Cache River NWR is one of four refuges administered by the Central Arkansas National Wildlife Refuge Complex (Complex) that also

includes Bald Knob, Big Lake, and Wapanocca National Wildlife Refuges (Figure 1). In addition, Cache River NWR adjoins White River NWR to the south.

Cache River NWR's official purposes and enabling legislation are:

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

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." 16 U.S.C. 742f(a)(4) ...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956);

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

The vision statement for Cache River NWR states:

"Refuges within the Central Arkansas National Wildlife Refuge Complex will be conserved and managed as havens for migratory birds, especially waterfowl, in a region of the continent critically important for their survival. Working with partners, the Service will protect, restore, and enhance bottomland hardwood forest ecosystems, wintering waterfowl habitats, and other fish and wildlife habitats for the benefit of the American public. The Service will provide opportunities for the public to use and enjoy these refuges in a way that safeguards their values and promotes awareness of their importance" (USFWS 2009).

The Complex would continue to serve the American people by continuing opportunities for compatible, wildlife-dependent recreation such as hunting, fishing, wildlife photography and observation, as well as environmental education and interpretation. In addition, the Complex would seek partnerships that promote environmental stewardship, foster research opportunities to enhance resource management and restoration efforts, and protect its historical and cultural resources.

II. Resources

RESOURCES TO BE PROTECTED, RESTORED, AND ENHANCED

The Cache River Basin has been highly altered and degraded from numerous factors, principally conversion of bottomland hardwood forests to agricultural cropland, changed physical topography and water flow pathways, changed physical hydrodynamics of the Cache River and Bayou DeView, degraded water quality and quantity throughout the system, changed distribution and composition of remnant bottomland hardwood forests and aquatic communities and discontinuity of bottomland hardwood tracts and nutrient/energy flow (M.E. Heitmeyer 2010). Attempts to restore and enhance functions, values, and resources in the basin will require coordinated, multi-disciplinary approaches that address the entire landscape context of the watershed (M.E. Heitmeyer 2010).

Cache River NWR is highlighted as part of Secretary Salazar's America's Great Outdoors (AGO) Rivers Initiative, and as an AGO state project, and also has been designated as a National Blueways System Pilot Project. The Cache River Basin is also encompassed within USDA-Natural Resources Conservation Service's Mississippi River Basin Healthy Watersheds Initiative, and is embedded within the Gulf Coastal Plain-Ozarks Landscape Conservation Cooperative. The project area is identified as a "Wetland of International Importance" (Ramsar Convention), and as the most important wintering area for mallard ducks in North America (North American Waterfowl Management Plan).

The Draft LPP also would facilitate the refuge in meeting objectives of the following national, regional, and local plans and initiatives: U.S. Shorebird Conservation Plan, North American Waterfowl Management Plan, Partners in Flight Bird Conservation Plan, American Woodcock Management Plan, Southeast U.S. Waterbird Conservation Plan, Mississippi Alluvial Valley Bird Conservation Plan, Northern Bobwhite Quail Initiative, Fisheries Vision for the Future, Southeast Aquatic Resources Partnership, Arkansas Comprehensive Wildlife Conservation Strategy, Big Woods of Arkansas (The Nature Conservancy), Cache/White Rivers'-Big Woods Collaborative Conservation Focus Area, Beyond the Boundaries (National Wildlife Refuge Association), and several Endangered Species Recovery Plans.

The current acquisition boundary for Cache River NWR, although effective in enabling land conservation actions within a core area of the Cache River Basin, falls well short of a watershed-scale conservation project. Through this proposal the Service, working with partners and the public, seeks to expand the acquisition boundary of Cache River NWR to encompass up to 102,000 acres, which would produce a total conservation footprint of up to 287,574 acres and protect approximately 229 main river channel miles within the Cache River and White River floodplains. The proposal would increase conservation effectiveness within the watershed by employing a strategic habitat conservation approach and providing new connections with Bald Knob NWR, Cache River NWR and White River NWR, six Arkansas state wildlife management areas, two state natural areas, and numerous private lands conserved through federal, state, and non-governmental organization easements. Implementation of this proposal would serve to: (1) Improve water quality and restore hydrologic function; (2) protect, restore, and enhance aquatic, wetland, and terrestrial habitats for waterfowl, other migratory birds, seven threatened/endangered species, and numerous other native wildlife and fish species; (3) reconnect historical riparian ecosystems, enlarge contiguous blocks of bottomland hardwood forest; (4) enhance ecological integrity of the Cache and White Rivers' Basin, and (5) improve access and public use opportunities on an area nationally and internationally renowned for ecological and wildlife conservation value.

Migratory and resident waterfowl, American woodcock, shorebirds, secretive marshbirds, colonial wading and water birds, and forest breeding and neotropical migratory birds are common throughout the Cache River Basin. Resident birds and mammals, such as eastern wild turkey, white-tailed deer, bats, numerous furbearers, and small mammals also are common. Additionally, there are numerous species of reptiles, amphibians, mussels, and fish that are common in rivers, bayous, lakes, sloughs, and other wetland areas.

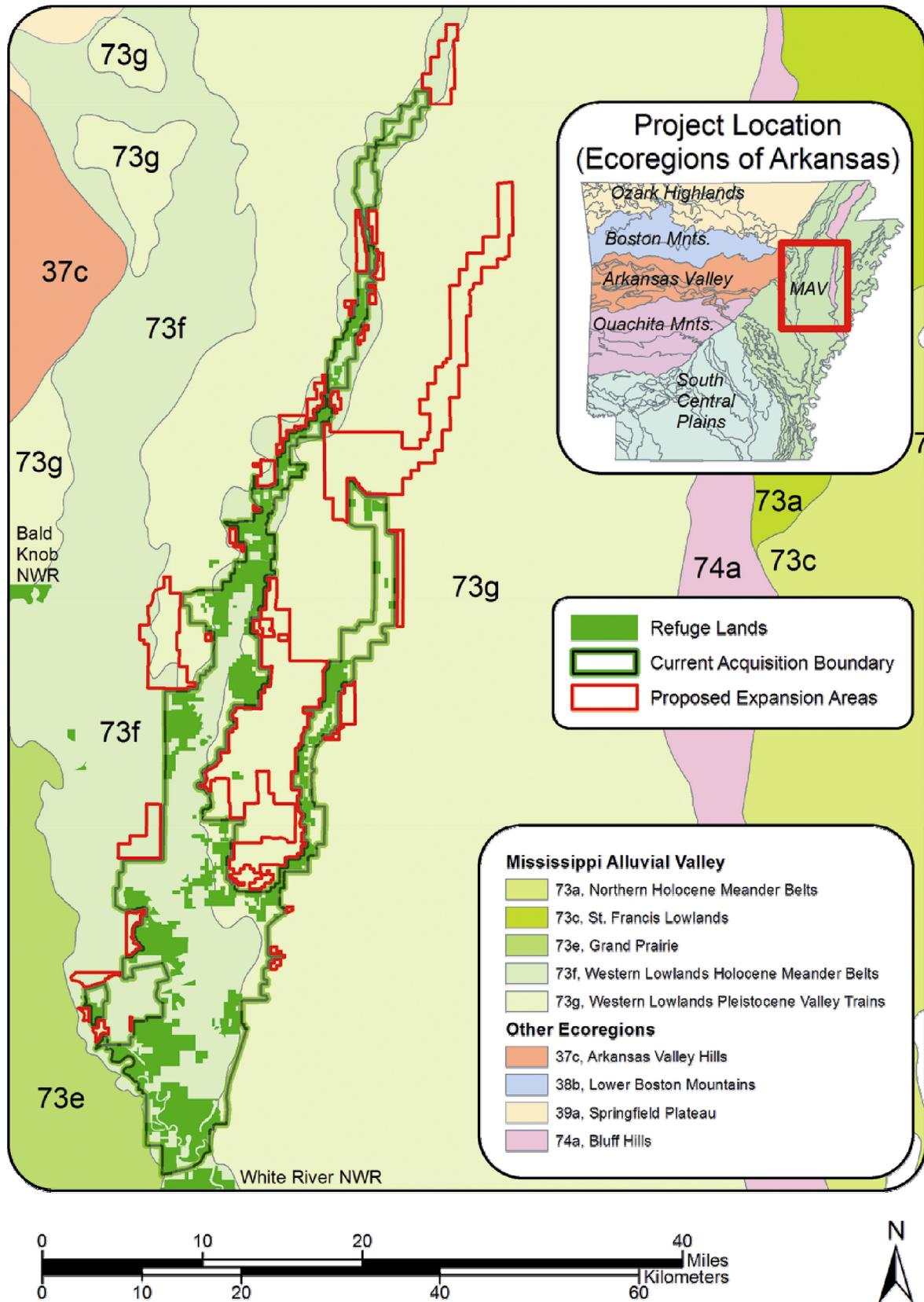
Ivory-billed woodpeckers; bald eagles; wood storks; southeastern myotis bats; and Rafinesque's big-eared bats; pink mucket, fat pocketbook, and rabbitsfoot (Candidate) mussels; and pondberry and are some of the endangered species and species of special concern that are known to occur in the Cache and White Rivers' Basins. Additionally, endangered least terns and piping plovers occur within the proposed expansion area.

During pre-European settlement, the floodplain of the Cache River Basin was almost entirely covered by various bottomland hardwood forest community types. Edges of the floodplain were mostly forested, with some isolated, higher elevation terraces and dune areas containing relatively small areas of bottomland prairie and savanna. This bottomland hardwood-dominated ecosystem supported a high diversity of plant and animal species and was an important corridor of movement for water, nutrients, sediments, and animals within the MAV (U.S. Department of the Interior 1984). The location of the refuge and proposed expansion area within the MAV and the ecoregions of Arkansas are depicted in Figure 4.

Today, the basin's 100-year floodplain is nearly 75 percent cleared and used as agricultural land; much of this land was cleared in the 1960s and 1970s for soybean production. Despite the extensive deforestation and ecological alterations, the Cache River Basin remains as one of the most important bottomland hardwood ecosystems in North America and is identified by many national and international conservation entities for its unique and valuable ecological significance and as a priority region for future protection and restoration (complete documentation in U.S. Fish and Wildlife Service 2009).

Land use within the current approved acquisition boundary is dominated by agriculture; the remaining forested habitats are characterized by riverine backwater communities comprised of overcup oak with Nuttall oak as a common associate, baldcypress and water tupelo predominant in swales and along internal drainages, and on slightly higher sites, willow oak/Nuttall oak with overcup oak in vernal pools. Also present are riverine overbank communities of sycamore, cottonwood, black willow, pecan, cedar elm, boxelder, sugarberry, and Nuttall, willow, and water oaks. Topography in these bottoms is relatively flat with connected sloughs, oxbows, and depressions. Higher in the floodplain are found various hardwood flat communities of water oak, sugarberry, and sweetgum, with willow and Nuttall oaks in vernal pools - and further to the north - hardwood flats of water oak, swamp chestnut oak and mockernut hickory with willow oak, Nuttall oak, and green ash in vernal pools (Klimas et al. 2009). Cache River NWR currently occupies 67,400 acres of which approximately 47,000 acres are hardwood forest complex and approximately 17,000 acres are reforestation/restoration. Although the habitat communities within the current holdings and current acquisition boundary of Cache River NWR are diverse, they do not represent the full spectrum of the ecosystem that was historically present. Unique habitats exist very near the refuge on which trust wildlife resources - including those not found within the current boundary - are dependent, but are unavailable for protection, restoration, or enhancement because they are outside the approved acquisition boundary. Furthermore, it is essential to protect, restore, and enhance ecological functions and plant and animal communities beyond the current acquisition boundary on a landscape scale in order to strategically and effectively accomplish the purposes for which Cache River NWR was established. Therefore, this preliminary step toward restoration of functional watersheds of the Cache and White Rivers will promote comprehensive fulfillment of refuge purposes.

Figure 4. Ecoregions map



The current acquisition boundary could be viewed as an ecological core, and the proposed expansion area could function not only as an insulative buffer, but also to provide the means to protect, restore, and enhance unique habitats for trust resources (endangered species, migratory birds, wetlands, and interjurisdictional fishes) that are underrepresented in this region.

A description of habitats for each expansion area (Figure 3) follows:

Cache River/Bayou DeView Corridor – 38,483 acres

Currently, only about 15 percent of this 38,483-acre area is forested; the remainder has been cleared for agriculture. The bulk of existing forest remains in partially connected Riverine Overbank Tributary areas (small drains) and contains willow oak, water oak, American elm, green ash, persimmon, and cherrybark oak, or in Post Oak Flats or Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains. However, historically, the dominant habitat types were: Wet Phase Hardwood Flats of delta post oak, willow oak, Nuttall oak, and overcup oak (41 percent), then roughly equal parts of: Riverine Overbank areas (14 percent), and Post Oak Flats (14 percent), and Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains (13 percent). Also worthy of note are smaller components of significant habitat currently underrepresented on the refuge: Isolated Depressions (3 percent), Terrace Depressions (1 percent), and especially Upland Hardwoods (9 percent).

Acquisition of the this area would enable hydrologic and habitat restoration within this broad and critical gap between the two major prongs (Cache River and Bayou DeView) of the current acquisition boundary, and provide a unique opportunity to functionally reconnect these two watersheds and restore a comprehensive suite of habitat communities. Additionally, threats to the ecological health and integrity of the refuge could be significantly reduced by correcting the altered hydrologic regime resulting from agricultural conversions, curbing non-point source pollution, and reestablishing native plant communities. These improvements would support achievement of refuge purposes to an extent not possible without such expansion and the resultant increase in capacity and capability for conservation and management programs.

Bayou DeView Peripheral – 32,630 acres

This area extends the zone of protection of the historic channel of Bayou DeView from the current acquisition boundary northward to connect to Bayou DeView State WMA holdings; the area also extends in strategic areas to the east and west to encompass desirable habitats and improve access and management capability. The main expansion northward would provide a critical riparian habitat buffer for Bayou DeView (which currently does not exist) and allow hydrologic restoration and water quality improvement both here and downstream. This area would enable future restoration efforts to restore more natural flows through the historic bayou channel and reestablishment of more normally functioning riparian corridor and floodplain. Significant benefits to the Bayou DeView system also would be derived from reducing erosion and sedimentation, surface water withdrawal, chemical and nutrient runoff, and stream zone disturbance.

Most of the area has been cleared for agriculture; only around 6 percent of the area remains as forest in scattered blocks. Historically, the area supported mostly Wet Phase Hardwood Flats of delta post oak, willow oak, Nuttall oak, and overcup oak (35 percent), and then roughly equal parts of Riverine Overbank Tributary Valleys of willow oak, water oak, American elm, green ash, persimmon, and cherrybark oak (14 percent); Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains (12 percent); and the final major components of Riverine Backwater Upper and Lower Zones (11 percent and 10 percent, respectively). Following

these are components of significant habitat currently underrepresented on the refuge: Post Oak Flats (6 percent), and Upland Hardwoods (4 percent).

Cache River Peripheral – 29,997 acres

The Cache River Peripheral area expands the current acquisition boundary 29,997 acres in several blocks strategically located along the western and northern sides of the Cache River watershed. Only about 15 percent of the area is currently forested; the remainder is agricultural land. Similar in function to Area 1, this expansion area would enable restoration and at least partial connection of the watersheds of the White and Cache Rivers. The largest concentrations of existing hardwoods are either: (1) Riverine Backwater Upper and Lower Zones; the Upper Zone containing willow oak and Nuttall oak with overcup oak in vernal pools, and the Lower Zone containing overcup oak, with Nuttall oak as a common associate and baldcypress and water tupelo in swales and along internal drainages, or (2) Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains.

Historically, the dominant habitat types were: (1) Riverine Backwater Upper and Lower Zones (17 percent and 15 percent, respectively); (2) dunes containing black oak, post oak, southern red oak, prairie grasses, prickly pear, and blackjack oak (13 percent). (Dunes are soils made up of wind-blown sands deflated from Late Wisconsin outwash channels and deposited on the adjacent, older valley train terraces. These dune fields are unique to the Arkansas Delta Region of the Lower Mississippi Valley (LMV), and scarcely represented in only a portion of two current refuge tracts); and (3) Holocene Point Bars and Backswamps containing Delta post oak, water oak, swamp chestnut oak, and mockernut hickory, with willow oak, Nuttall oak, and green ash in vernal pools (12 percent). Other substantial components found here that are very unique habitats to the Cache River watershed are Post Oak Flats (2 percent), and especially isolated Sand Ponds (1 percent in the Cache Bayou area) that historically supported shrub species of concern, such as corkwood (*Leitneria floridana*) (state listed as vulnerable), and the federally endangered pondberry (*Lindera melissifolia*).

THREATS TO THE RESOURCE

AGRICULTURE

The dominant land use within the proposed expansion area is agriculture. Similarly, the vast majority of non-refuge tracts within the current approved acquisition boundary of 185,574 acres are converted agricultural lands that are situated within the approximate 10-year floodplain of the lower and middle Cache River Basin, including Bayou DeView. Bottomland hardwood forest was historically the predominant habitat type, but approximately 85 percent of the basin has been cleared for agriculture. Most of the converted habitats were forested wetlands. Large, contiguous stands of bottomland hardwood forest are required to expand habitat capacity and capability for wintering waterfowl to meet NAWMP goals as stepped down through the LMVJV, and to support self-sustaining populations of forest breeding birds, especially forest interior and area sensitive species, such as the wood thrush, cerulean warbler, prothonotary warbler, and Swainson's warbler. There are some large forest blocks remaining within the refuge, or in combination with adjacent state-owned management areas, but much of the existing forest habitat is severely fragmented. More than 17,000 acres of agricultural or fallow fields on Cache River NWR have been planted in hardwood seedlings in an effort to improve water quality, connect fragmented forested tracts, restore functional habitat corridors, and to create larger contiguous forest blocks for wildlife.

The great majority of lands purchased as a result of implementing the proposed expansion would be restored to a forested condition and would serve as important habitat linkages that would increase connectivity, as well as consolidate and enlarge forested blocks. Moreover, the project would connect and link similar habitat conservation and restoration efforts among partner agencies, non-governmental organizations, and private landowners adjacent to the refuge. Habitat loss and degradation, forest fragmentation, lack of habitat connectivity, and impaired hydrologic function are major obstacles to fulfillment of Cache River NWR purposes and the mission of the National Wildlife Refuge System. Furthermore, deterioration of water quality due to agricultural-based erosion and sedimentation, and contamination from pesticides, herbicides, and fertilizers continue to compromise the health and suitability of fish and wildlife habitats in the riparian systems and associated wetlands.

HYDROLOGIC ALTERATIONS

A basic appreciation of the hydrology of the Cache/Lower White Rivers' watershed, and recognition and acknowledgement of its importance as the driving force behind all other ecosystem processes and functions is fundamental to addressing long-term conservation. Without this explicit recognition by all partners, effective long-term management of public lands within the basin is impossible, and efforts toward meaningful, sustainable restoration of ecosystem functions cannot be effective or adequately focused.

Hydrologic alterations, such as flood control and drainage practices that support intensive agricultural land conversion and use, threaten the biological integrity of the refuge and fish and wildlife resources of the Cache/White River Basin overall. A relatively recent and continuing hydrologic alteration is the increasing withdrawal of surface water for agricultural irrigation from essentially all available streams. Portions of the Cache River, with a relatively low base flow, are frequently pumped dry for some periods during most summers. Similarly, the upper portion of Bayou DeView, designated as a "critical surface water area" by the State of Arkansas, usually has no base flow during some summer months and agricultural pumping has exacerbated this to the point that the stream has recorded no-flow conditions for 10 percent of the time over the last 37 years (ASWCC 1988). Additionally, the recent average stream flow of the White River at Clarendon has decreased slightly, and this is suspected to be the result of current withdrawals for irrigation. In contrast, as a direct result of the increased rate of drainage from the basin during periods of high rainfalls at lower elevations and those areas nearest the Cache River, Bayou DeView, and White River now receive all water more rapidly and in quantities that more frequently exceed the capacity of the system to carry and discharge into the Mississippi River. The lowest portions of the Cache and Lower White Rivers seem now to be subjected to more frequent flooding at greater depths and for longer duration than was the historic tendency. These conditions are further exacerbated by sudden and extensive releases of water from flooded rice fields adjacent to the refuge woodlands. In summary, the hydrologic regime has been altered to such a degree that the streams and associated wetlands now suffer from low water periods that are much drier with less water depth, and high water periods that are much wetter with greater depths, rates, and duration of inundation. This major change in the hydroperiods has a high potential to change plant species and their distributions thus negatively effecting wildlife and fisheries communities.

Implementation of the proposed expansion would facilitate hydrological restoration and mediation of altered water-flow patterns in much of the lands adjoining Cache River and Bayou DeView. Reforestation of agricultural lands, enabled by this project, would reduce erosion and sedimentation that compromise the health of wetland and riparian systems. Similarly, cessation of irrigation on restored agricultural lands would halt groundwater and surface withdrawals and improve water quantity. Likewise, reduction of commercial farming operations in the riparian zone would lead to reduced use of herbicide, pesticide, and fertilizer that now threaten water quality. Natural hydrology could also be restored by the removal of existing levees and drainage ditches.

OIL AND GAS EXTRACTION

Exploration for and development of oil and natural gas reserves have greatly intensified area-wide in recent years. Water withdrawal activities associated with natural gas production, particularly when combined with agricultural groundwater withdrawal for irrigation, increases the potential for depletion of the aquifer. Furthermore, increased potential exists for contamination of wetlands and waterways flowing through the Cache River NWR from runoff, overflow, or breach of containment reservoirs for drilling fluids and tailings at the well sites. Similarly, the construction and installation of associated pipelines, situated adjacent to the refuge and traversing the Cache River and Bayou DeView in the vicinity of the refuge, also have increased the potential for negative impacts to refuge resources.

GLOBAL CLIMATE CHANGE

The challenging problems associated with the current threats to the refuge are expected to amplify with global climate change, which may give rise to other issues. Although the impacts of climate change on the Cache River and surrounding area are uncertain, changes are expected. As reported in "Global Climate Change Impacts in the United States," higher temperatures, less rainfall, increased storm frequency and intensity, and more drought will occur throughout the Southeast (Scott et al. 2008). It is forecasted that temperatures will increase by at least 4.5°F by 2080, and fire severity will increase 10 to 30 percent within the next 50 years. The resultant higher temperatures will induce changes to precipitation levels and the native plant and animal distributions within associated aquatic or upland ecosystems.

Such climate changes may induce new threats and problems in refuge management. However, the proposed expansion would result in tens of thousands of acres of agricultural lands that would be reforested and provide for carbon sequestration, which would contribute to the Service's initiatives to address the impacts of accelerated climate change. Another benefit of expansion would be restoration of hydrologic function and conservation of surface and underground aquatic systems, which may help buffer the effects caused by altered precipitation and flooding patterns. By increasing the lands strategically managed and influenced by the Service in the MAV, the methods and programs necessary to mitigate the impacts of climate change on trust resources in this region would be much more likely to be successfully implemented. Moreover, the expanded refuge would have much greater potential to serve as refugia for species that may be vulnerable to habitat losses due to sea level rise and storm damage, particularly waterfowl and shorebirds that have lost coastal wintering areas, and warm water species, such as alligators, that have the ability to move northward into the Cache River Basin as range extensions (shifts) are stimulated due to warming conditions and changing habitats.

RELATIONSHIP OF PROJECT TO LANDSCAPE CONSERVATION GOALS AND OBJECTIVES

AMERICA'S GREAT OUTDOORS

The Cache River is a Rivers Demonstration Project within the America's Great Outdoors Initiative (AGO) and an inter-organizational working group has been established to identify and seek implementation of conservation goals for the Cache/Lower White Rivers' watershed in order to fulfill a common vision for the future of this watershed. The vision conceived by this group is to: "Maintain and enhance the globally significant Cache - White Rivers' bottomland hardwood ecosystem within a sustainable agriculture-based landscape to balance ecological, economic, and social interests."

The group has developed the following goals:

1. Improve ecological health of the Cache and Lower White Rivers' system (habitat);
2. Promote voluntary, sustainable agricultural and forestry practices that improve water quality and enhance wildlife habitat (agriculture);
3. Effectively manage surface and groundwater resources to support all users. (hydrology);
4. Increase outdoor recreational opportunities and access (recreation); and
5. Increase public awareness of the link between economic benefits and conservation goals (outreach).

The working group identified the proposed acquisition boundary expansion for Cache River NWR among the highest priority objectives for completion, because of its relevance and importance to achieving the vision and goals for the watershed and fulfillment of the principal tenets of the AGO Initiative.

Other short-term (1 to 3 years) objectives set forth for the Cache/Lower White Rivers' AGO project that relate to the implementation of this expansion proposal include:

1. Acquire 5,000 acres of public land;
2. Improve 20,000 acres to desired forest condition for wildlife habitat on public lands;
3. Establish ecological flows for the Cache River and Bayou DeView;
4. Establish a coordinated Cache/White Rivers' water quality monitoring program to prioritize sub-watershed projects;
5. Make 5,000 acres of acquisition available to the public; and
6. Enhance 4,000 acres of public wetland habitat for recreational use.

Mid-term (3 to 7 years) objectives set forth for the Cache/Lower White Rivers' AGO project that relate to the implementation of this expansion proposal include:

1. Implement restoration of lower 5.7 miles of the Cache River restoration;
2. Acquire and restore up to 40,000 acres through conservation easements or long-term agreements;
3. Acquire and restore 35,000 acres of public land;
4. Implement watershed management plan for upper Cache River (Grubbs);
5. Implement 10 additional miles of stream restoration projects;
6. Improve 50,000 acres to desired forest condition for wildlife habitat;
7. Implement a coordinated Cache/White Rivers' water quality monitoring program to prioritize sub-watershed projects;
8. Remove 1 impaired sub-watershed from EPA list;
9. Make 35,000 acres of acquisition available to the public; and
10. Enhance additional 2,500 acres of public wetland habitat for recreational use.

NATIONAL BLUEWAYS SYSTEM

On May 24, 2012, Interior Secretary Salazar established the National Blueways System through a Secretarial Order. Included in the purpose statement of the order was the following: *"This Order establishes a program to recognize river systems conserved through diverse stakeholder partnerships that use a comprehensive watershed approach to resource stewardship. River systems designated as a National Blueway shall collectively constitute a National Blueways System. The National Blueways System will provide a new national emphasis on the unique value and significance of a "headwaters to mouth" approach to river management and create a mechanism to encourage stakeholders to integrate their land and water stewardship efforts by adopting a watershed approach."*

The order also characterized the intent of the National Blueways System as: “*National Blueways will be nationally and regionally significant rivers and their watersheds that are highly valued recreational, social, economic, cultural, and ecological assets for the communities that depend on them. National Blueways encourage a landscape-scale approach to river conservation that involves a river from its headwaters to its mouth and across its watershed, rather than individual segments of the channel and riparian area alone. Establishment of a National Blueways System will help promote best practices, share information and resources, and encourage active and collaborative stewardship of rivers across the country.*”

The Cache River has been designated as a National Blueways Pilot Project and implementation of this expansion proposal would directly facilitate the fulfillment of the purpose and goals of the Blueway System. Additionally, the conservation benefits derived from implementation of this proposal would significantly contribute to the health and stability of the watershed in direct agreement with Blueway concept for integration of land and water stewardship efforts. Moreover, the AGO working group listed achievement of Blueways designation for the Cache –White Rivers’ watershed as a high-priority, short-term objective

INTERNATIONAL PRIORITY WETLAND AREAS

The Cache and White Rivers Ecosystem was designated as a “**Wetland of International Importance**” in 1989 (and updated in 2011), under the auspices of the “Convention on Wetlands of International Importance Especially as Waterfowl Habitat,” commonly referred to as the Ramsar Convention. The Convention criteria, under which these lands qualified as the eighth U.S. Wetlands of International Importance, were:

1. Volume of use by migratory and resident waterfowl, especially mallards;
2. Outstanding example of a wetland community characteristic of its bio-geographic region;
3. Endangered species;
4. Species diversity;
5. Research value; and
6. Practicality of conservation and management.

Implementation of this proposal would further promote the biological and ecological significance for which the Cache-White Rivers’ ecosystem was originally recognized, would directly facilitate the enhancement of the watershed in all areas of Ramsar criteria listed above, and further demonstrate the importance of this ecosystem.

GULF COASTAL PLAINS AND OZARKS LANDSCAPE CONSERVATION COOPERATIVE

To ensure that the Service is “putting science in the right places,” the Service Directorate determined in April 2009, that the agency needed a national, geographic framework for implementing landscape conservation. Just as migratory bird flyways have provided an effective spatial frame of reference to build capacity and partnerships for international, national, state, and local waterfowl conservation, this geographic framework would provide a continental platform upon which the Service could work with partners to connect site-specific efforts to larger biological goals and outcomes. In its meeting on August 4-6, 2009, the Directorate approved a geographic framework developed by a team of Service and U.S. Geological Survey experts from across the country. Geographic areas were defined that provide a spatial frame of reference for building and targeting science capacity that would support the Service and partners in planning and designing conservation strategies at landscape scales. It also allows us to more precisely explain to partners, Congress, and the American public why, where, and how we target conservation resources and how our science-based efforts connect to a greater whole. Currently, Cache River NWR falls in the Gulf Coastal Plains and Ozarks (GCPO) Landscape

Conservation Cooperative (LCC). Cache River NWR provides habitat for many of the priority species in the GCPO LCC (Table 1). Implementation of this boundary expansion would enable additional lands to be conserved, restored, and enhanced for the benefit of priority species.

Table 1. Priority bottomland forest species of the West Gulf Coastal Plains 2009

Priority Bottomland Forest Species	
Southeastern Myotis Bat	Swainson’s Warbler
Rafinesque’s Big-eared Bat	Hooded Warbler
Swallow-tailed Kite	Wood Thrush
Swamp Rabbit	Prothonotary Warbler
Mississippi Kite	American Woodcock
Bird-voiced Treefrog	Mole Salamander

LOWER MISSISSIPPI RIVER ECOSYSTEM

The Lower Mississippi River Ecosystem (LMRE) is the primary wintering habitat for mid-continent waterfowl populations, as well as breeding and migrating habitat for songbirds returning from Central and South America. Furthermore, it provides high-quality habitat for a myriad of resident wildlife species, including some that are rare and imperiled. Geographically, the refuge lies on the northwestern boundary of the LMRE. Members of the Cache River NWR staff are active participants of the Service’s Lower Mississippi River Ecosystem (LMRE) Team. The proposed boundary expansion of the Cache River NWR would contribute significantly to the following priorities identified for the LMRE:

1. Protect key habitats and manage populations of migratory birds and endangered species;
2. Halt degradation of bottomland hardwood systems and their associated plant and animal communities; and
3. Increase public awareness and interest in the values of trust fish and wildlife, their habitats, and the ecosystems they depend upon.

With the proposed expansion, the refuge would further support the following goals of the LMRE:

1. Conserve, enhance, protect, and monitor migratory bird populations and their habitats in the LMRE;
2. Protect, restore, and manage the wetlands of the LMRE;
3. Protect and/or restore imperiled habitats and viable populations of all threatened, endangered, and candidate species and species of concern in the LMRE;
4. Protect, restore, and manage the fisheries and other aquatic resources historically associated with the wetlands and waters of the LMRE;
5. Restore, manage, and protect national wildlife refuges and national fish hatcheries;
6. Increase public awareness and support for LMRE resources and their management;
7. Enforce natural resource laws; and
8. Protect, restore, and enhance water and air quality throughout the LMRE.

FISH AND WILDLIFE SERVICE

The Service is the primary federal agency responsible for conserving, protecting, and enhancing the Nation's fish and wildlife resources and their habitats. The mission of the Service is "*working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.*" Objectives of this acquisition boundary are directly relevant to and would promote all of the conservation priorities of the Service:

1. National Wildlife Refuge System;
2. Landscape Conservation;
3. Migratory Birds;
4. Threatened and Endangered Species;
5. Aquatic Species; and
6. Connecting People with Nature.

NATIONAL WILDLIFE REFUGE SYSTEM

This boundary expansion proposal directly supports fulfillment of the mission of the National Wildlife Refuge System, which 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.*" According to the National Wildlife Refuges System Improvement Act of 1997, the Service is required to conserve the biological integrity, diversity, and environmental health of refuges, and consider the conservation of the ecosystems of the United States, while planning the growth of the National Wildlife Refuge System. The acquisition, protection, restoration, and management of areas within the current acquisition and this Draft LPP should significantly improve the functionality, integrity, diversity, and health of the Cache River NWR and its ecosystem. In turn, these actions would strengthen the conservation impact of the Refuge System as a whole.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Implementation of this expansion proposal would contribute to habitat and population goals of the North American Waterfowl Management Plan (NAWMP) as stepped down through the LMVJV by providing additional critical habitats for wintering waterfowl in the Cache River Basin. Increased acres managed habitats on the refuge would increase the Duck Energy Day (DED) output or capacity to successfully winter waterfowl. Additional restored forested and wetland habitats would enhance migratory and resident waterfowl feeding, roosting, and brooding habitats. Furthermore, this project would assist in meeting NAWMP Joint Venture Habitat Objectives of protecting/securing 407,000 acres and restoring/enhancing 2,046,000 acres of waterfowl habitat in the LMV.

PARTNERS IN FLIGHT BIRD CONSERVATION PLAN

Similarly, the expansion proposal would assist in meeting objectives for Forest Breeding Birds in the MAV by providing sufficient forest habitat to support forest breeding birds designated as high priority in the MAV (Bird Conservation Region 26) through forest restoration on new parcels and silvicultural management of existing forested tracts.

In addition to the positive contributions of this project described above, the Draft LPP would also assist the refuge in meeting land protection, habitat restoration and enhancement, population, and partnership goals/objectives of the following national, regional, and local plans and initiatives:

- U.S. Shorebird Conservation Plan
- American Woodcock Management Plan
- Southeast U.S Waterbird Conservation Plan
- Northern Bobwhite Quail Initiative
- American Woodcock Management Plan
- Fisheries Vision For The Future
- Southeast Aquatic Resource Partnership
- Mississippi River Basin Healthy Watershed Initiative
- Arkansas Comprehensive Wildlife Conservation Strategy
- Arkansas Wildlife Action Plan
- Arkansas Conservation Delivery Network Action Plan
- Cache/White Rivers – Arkansas Big Woods - Collaborative Conservation Focus Area
- Beyond the Boundaries Initiative
- Endangered Species Recovery Plans

CENTRAL ARKANSAS NWR COMPLEX COMPREHENSIVE CONSERVATION PLAN

The proposed expansion directly contributes to the Resource Protection goal, objective, and strategies for Cache River NWR in the Central Arkansas National Wildlife Refuge Complex Comprehensive Conservation Plan (CCP), approved in 2009.

Cache River Goal 3 states:

“Promote communication, cooperation, and partnerships between local, state, and federal agencies, land managers, and private citizens to minimize impacts from off-site environmental degradation and other threats to the functions and values of the refuge’s associated wetland ecosystems and watersheds.”

Under this goal, Objective 3-4 (Land Acquisition) states:

“Acquire lands from willing sellers within or adjacent to the approved acquisition boundary of the refuge to enhance conservation programs, achieve legislated purposes of the refuge, and fulfill the mission of the Refuge System.”

Additionally, under this objective, the following strategies were developed as necessary to enhance the LMRE:

“Over the long term (i.e., the 15-year span of this CCP and beyond), consider expansion of the refuge acquisition boundary in response to the need for additional conservation of important wildlife habitats by considering:

Creating a wildlife corridor from the Cache River to Bayou DeView at Howell, which would not only connect these two forest blocks, but would also secure a range of diverse habitats (upland to bottomland) and provide secure habitat for wildlife escaping winter flooding; several properties that would help achieve this purpose are available from willing sellers;

Extending the acquisition boundary from Amagon to Grubbs or possibly north of Grubbs;

Broadening the acquisition boundary to conserve unprotected lands along the White River, particularly adjacent to Wattensaw WMA and South of I-40;

The proposed expansion, when implemented, would enable the undertaking of these strategies to the fulfillment of refuge purposes, CCP Objectives, and National Wildlife Refuge System mission. The LPP also will assist the refuge in meeting the following objectives from the CCP:

- *Cache River NWR CCP Objective 1-1: Migratory Waterfowl*
- *Cache River NWR CCP Objective 1-2: American Woodcock*
- *Cache River NWR CCP Objective 1-6: Forest Breeding Birds*
- *Cache River NWR CCP Objective 1-9: Eastern Wild Turkey*
- *Cache River NWR CCP Objective 1-10: White-tailed Deer*
- *Cache River NWR CCP Objective 1-11: Furbearers*
- *Cache River NWR CCP Objective 1-12: Small Game (Mammals)*
- *Cache River NWR CCP Objective 1-13: Black Bears*
- *Cache River NWR CCP Objective 1-14: Bats*
- *Cache River NWR CCP Objective 1-15: Reptiles and Amphibians*
- *Cache River NWR CCP Objective 1-16: Fisheries, Mussels, and Aquatic Habitat Management*
- *Cache River NWR CCP Objective 1-17: Endangered Species and Species of Concern*
- *Cache River NWR CCP Objective 1-18: Ivory-billed Woodpecker*

PARTNERSHIP EFFORTS/RELATED RESOURCES

Multiple federal and state agencies, as well as non-governmental entities and private parties, sponsor, conduct, support, and promote natural resources conservation and habitat management programs throughout or near the proposed expansion area. One of the primary purposes for the proposed project is to link these various conservation areas and extend their overall conservation effectiveness. The proposed expansion area would serve to connect a complex of federal, state, non-governmental, and private conservation lands and would provide additional habitat restoration, management, enhancement, and partnership opportunities.

Wildlife/habitat conservation areas managed or protected within or in the vicinity of the proposed expansion area include (Figures 2 and 3):

1. Bald Knob National Wildlife Refuge
2. Cache River National Wildlife Refuge
3. White River National Wildlife Refuge
4. Earl Buss Bayou DeView Wildlife Management Area (WMA)
5. Rex Hancock Black Swamp WMA
6. Sheffield Nelson Dagmar WMA
7. Henry Gray Hurricane Lake WMA
8. Steve N. Wilson Raft Creek WMA
9. Mike Freeze Wattensaw WMA
10. Benson Creek Natural Area/WMA
11. Cache River Natural Area

Bayou Des Arc WMA, Railroad/Prairie Natural Area, and Downs Prairie Natural Area are not included within or adjacent to the proposed expansion area, but are situated in the vicinity and could be connected within the scope of a potential future expansion that truly would attain landscape/watershed scale.

Cache River, White River, and Bald Knob NWRs are active participants of the Service's LMRE Team. The LMRE is the primary wintering habitat for mid-continent waterfowl populations, as well as breeding and migrating habitat for songbirds returning from Central and South America. Cache River, Bald Knob, and White River NWRs contribute to many of the goals and objectives established for the protection and management of the LMRE.

The Nature Conservancy and its partners, including the Service, have protected more than 120,000 acres in the Big Woods of Arkansas, a 550,000-acre corridor of floodplain forest along the Mississippi River. A significant component of the corridor includes national wildlife refuge lands. In 2004, the ivory-billed woodpecker, thought to be extinct, was rediscovered within the corridor and floodplain of Bayou DeView (Fitzpatrick et al. 2005). Major conservation and restoration priorities for the Big Woods have been identified and the Nature Conservancy, the Service, the Arkansas Natural Heritage Commission, the Arkansas Game and Fish Commission, and others continue to focus efforts on these ecologically important lands. The Nature Conservancy has partnered with the refuge to enable the purchase of thousands of acres of land for Cache River NWR, has provided technical advice and assistance in habitat restoration and management programs, and continues to support the refuge's outreach programs.

The National Wildlife Refuge Association has selected Cache River NWR as one of its highest priority projects in the National Wildlife Refuge System for habitat and wildlife conservation, partnership engagement, and public benefit. The National Wildlife Refuge Association established the Beyond the Boundaries Initiative designed to promote and facilitate landscape-scale conservation initiatives centered on priority refuges. Additionally, it has facilitated recent land acquisition transactions on Cache River NWR, and has pledged to partner with the refuge to implement the expansion project.

The Conservation Fund also has been a land acquisition partner in the past and is expected to provide assistance in the future. The refuge is a participant in the AGO working group for Cache River, as previously described. The refuge also participates in the efforts of the Arkansas Conservation Delivery Network, a subgroup of the LMVJV that is a collaboration of many organizations involved in conservation and management of wildlife habitats and ecosystems in the Cache and White River Basins. Included in the network are the Service, NRCS, USDA Forest Service, AGFC, ANHC, TNC, DU, and Audubon-Arkansas.

III. Land Protection Strategy

ACTION AND OBJECTIVES

In determining how to achieve the fish and wildlife habitat protection goals for the project lands identified in this document, we considered and evaluated three alternatives. Alternative 2 is our proposed alternative, because it better serves the outlined purpose and need, as well as the stated goals and objectives, and the vision and purposes of the refuge. This proposal seeks to meet both present and future land conservation and resource protection needs for Cache River NWR. By protecting additional conservation lands critical to the management of refuge resources, this proposal is tied to many of the goals and objectives of the Central Arkansas NWR Complex Comprehensive Conservation Plan (USFWS 2009).

LAND PROTECTION PRIORITIES

The Service's Proposed Action (Alternative 2) would result in the acquisition of up to 102,000 acres of wildlife habitat as an expansion of Cache River NWR, through a combination of fee-title purchases from willing sellers and less-than-fee interests (e.g., conservation easements and cooperative agreements) from willing sellers. The Service believes these are the minimum interests necessary to conserve and protect the fish and wildlife resources in the proposed area.

The private property within the proposed expansion area has been prioritized for acquisition using the following criteria: (1) Biological significance; (2) existing and potential threats; (3) significance of the area to refuge management and administration; and (4) existing commitments to purchase or protect land.

There are approximately 101,110 acres in private holdings within the proposed expansion area (Table 2). The overall average holding for a single private ownership is around 197 acres. Numerous tracts in the proposed expansion areas are currently willing sellers, and local support of the refuge and its expansion is expected to be favorable. Many users of the refuge have expressed the desire for the refuge to increase in size. Frequent requests have been made by landowners outside the current approved acquisition boundary, but within the proposed expansion area, for the refuge to purchase their properties. Many of these tracts actually border current refuge property, yet are still outside the approved boundary.

Table 2. Acreage and ownership of expansion areas

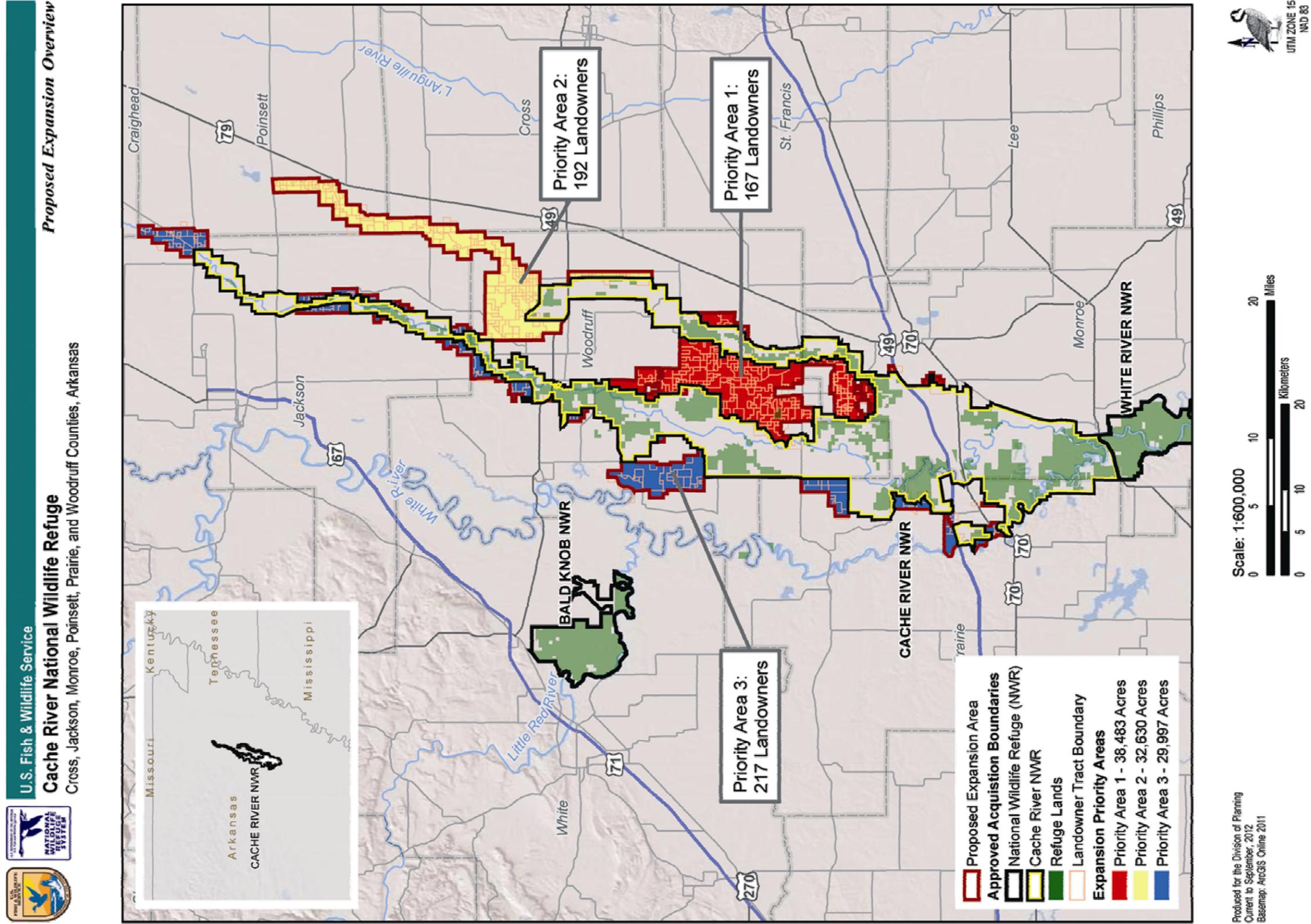
Area Number	Area	Approximate Number of Landowners	Acres	Average Holding
1	Cache River/Bayou DeView Corridor	167	38,483	252
2	Bayou DeView Peripheral	192	32,630	179
3	Cache River Peripheral	217	29,997	161
Total		576	101,110**	197

*** (Director's approval for this proposed expansion is for up to 102,000 acres.)*

The preferred acquisition method is fee-title from willing sellers only. This may be accomplished in part through normal refuge acquisition funds as addressed in the Funding section. Additionally, conservation easements and memoranda of agreements also would be utilized to acquire interests in lands within the expansion area as necessary and feasible.

Three categories of land acquisition have been established, with the highest priority being the Priority I lands. A description of the lands within each of the three priority groups is provided below. Table 3 summarizes the Service's land protection priorities and proposed methods of acquisition. Locations of the project areas and their respective priority groups are depicted in Figure 5. The majority of landowners in the expansion areas are private landowners, including individuals, incorporated farms, and other private entities. Other ownership types are Arkansas Game and Fish Commission and Arkansas Natural Heritage Commission. Ownership type, as well as an acreage breakdown by area, is provided in Table 3. Parcel locations are depicted in Figures 6 through 13.

Figure 5. Land protection priority groups within the proposed expansion areas



Priority Group I – Cache River/Bayou DeView Corridor – 38,483 acres

Acquisition of the this area (Figure 5) would enable hydrologic and habitat restoration within this broad and critical gap between the two major prongs (Cache River and Bayou DeView) of the current acquisition boundary, and provide a unique opportunity to restore a comprehensive suite of habitat communities and functionally reconnect these two watersheds. These improvements would support achievement of refuge purposes to an extent not possible without such expansion, and resulting connection, restoration, conservation, and management programs. Currently, only about 15 percent of this 38,483-acre area is forested; the remainder has been cleared for agriculture. Additionally, threats to the ecological health and integrity of the refuge could be significantly reduced by correcting the altered hydrologic regime resulting from agricultural conversions, curbing non-point source pollution, and reestablishing native plant communities. This area historically contained significant components of habitat now underrepresented in the landscape: Post Oak Flats and Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory, with willow oak in vernal pools and minor drains, and especially Upland Hardwoods of southern red oak, post oak woodland/savannah.

Priority Group II – Bayou DeView Peripheral – 32,630 acres

This area (Figure 5) extends the zone of protection of the historic channel of Bayou DeView from the current acquisition boundary northward to connect to Bayou DeView State WMA holdings; the area also extends in strategic areas to the west and east to encompass desirable habitat and improve access and management capability. Most of the area has been cleared for agriculture; only around 6 percent remains as forest in scattered blocks. This area historically contained significant components of habitat now underrepresented in the landscape: Wet Phase Hardwood Flats of delta post oak; Post Oak Flats; and Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory; and Upland Hardwoods of southern red oak, post oak woodland/savannah. The main expansion northward would provide a critical riparian habitat buffer for Bayou DeView, and allow hydrologic restoration and water quality improvement both here and downstream. This area would enable future restoration efforts to restore more natural flows through the historic bayou channel and reestablishment of more normally functioning riparian corridor and floodplain. Moreover, a significant connection between the Cache River and Bayou DeView could be restored that would augment the connections established downstream as a result of restoration activities accomplished in Priority Group 1. Significant benefits to the Bayou DeView system also would be derived from reducing erosion and sedimentation, surface water withdrawal, chemical and nutrient runoff, and stream zone disturbance.

Priority Group III – Cache River Peripheral – 29,997 acres

The Cache River Peripheral area (Figure 5) expands the current acquisition boundary 29,997 acres in several blocks strategically located along the western and northern sides of the Cache River watershed. Similar in function to Area 1, this expansion area would enable restoration and at least partial connection of the watersheds of the White and Cache Rivers. Currently, only about 15 percent of the area is forested; the remainder is agricultural land.

Historically, this area contained broad expanses of Riverine Backwater, Holocene Point Bar, and Backswamp communities. This area also contained ecologically important habitat types now underrepresented in the landscape such as: Dunes containing black oak, post oak, southern red oak, prairie grasses, prickly pear, and blackjack oak (dunes are soils made up of wind-blown sands; these dune fields are unique to the Arkansas Delta Region of the Lower Mississippi Valley, and scarcely represented on only a few acres of the refuge); Post Oak Flats; and isolated Sand Ponds that historically supported shrub species of concern, such as corkwood (*Leitneria floridana*) [state listed as vulnerable], and the federally endangered pondberry (*Lindera melissifolia*).

Achievement of refuge purposes would be enhanced through this expansion, because unique habitats beneficial to trust species, but not encompassed in the current acquisition boundary, would be conserved. Furthermore, this expansion would enable the refuge to take preliminary steps to conserve and connect Cache River habitats to conserved habitats along the White River, which is the predominant hydrologic force in this area. This would ultimately result in major benefits to waterfowl, other migratory birds, declining fish species, endangered mussels, and other native wildlife. Additionally, a major blockage in the Cache River exists at the junction of the channelized and non-channelized courses of the Cache River in the northernmost end of this expansion area. Acquisition within this area could contribute to proper remediation of the blockage, improvement in hydrologic function for the Cache River, reduction in damaging flood events for area farmers and residents, and restoration of riparian habitat.

LAND PROTECTION OPTIONS

The Service acquires lands and interests in lands (such as easements) and management rights in lands through leases or cooperative agreements, consistent with legislation or other congressional guidelines and executive orders, for the conservation of fish and wildlife and to provide wildlife-dependent public use for recreational and educational purposes. These lands include national wildlife refuges, national fish hatcheries, research stations, and other areas.

We would use the following options to implement this LPP, if approved:

- Option 1: Fee-title acquisition by the Service
- Option 2: Less-than-fee-title acquisition by the Service
- Option 3: Management or land protection by others

When land is needed to achieve fish and wildlife conservation objectives, the Service seeks to acquire the minimum interest necessary to meet those objectives, and acquire it only from willing sellers. Our proposal includes a combination of options 1, 2, and 3 as stated above. We believe this approach offers a cost-effective way of providing the minimal level of protection needed to accomplish refuge objectives, while also attempting to meet the needs of local landowners.

Option 1. Fee-title acquisition by the Service

Under Option 1, the Service would acquire parcels in fee-title from willing sellers, thereby purchasing all rights of ownership. This option would us the most flexibility in managing priority lands, and ensuring the protection in perpetuity of nationally significant trust resources.

Generally, the lands the Service purchases require more intervention than passive management, and we employ methods such as reforestation, wetland restoration, silvicultural treatments, water level management, mowing, prescribed burning, invasive species control, cooperative farming, or administering and managing public access and wildlife-dependent recreation. We only propose fee-title acquisition when adequate land protection is not assured under other ownerships, specialized active land management is required, or when the current landowner would be unwilling to sell a partial interest, such as a conservation easement.

In some cases, it may become necessary to convert a previously acquired conservation easement to fee-title acquisition; for example, when an owner is interested in selling the remainder of interest in the land on which we have previously acquired an easement. We would evaluate that need on a case-by-case basis.

Option 2. Less-than-fee-title acquisition by the Service

Under Option 2, the Service would protect and manage land by purchasing only a partial interest, typically in the form of a conservation easement. This option leaves the parcel in private ownership, while allowing the Service control over the land use in a way that enables us to meet our goals for the parcel or that provides adequate protection for important adjoining parcels and habitats. The structure of such easements would provide permanent protection of existing wildlife habitats, while also allowing habitat management or improvements and access to sensitive habitats, such as for endangered species or migratory birds. We would determine, on a case-by-case basis, and negotiate with each landowner, the extent of the rights the landowner would be willing to relinquish and those we would be interested in acquiring. Those may vary, depending on the configuration and location of the parcel, the current extent of development, the nature of wildlife activities in the immediate vicinity, the needs of the landowner, and other considerations.

In general, any less-than-fee-title acquisition would maintain the land in its current configuration with no further subdivision. Easements are a property right, and typically are perpetual. If a landowner later sells the property, the easement would continue as part of the title. Properties subject to easements generally remain on the tax rolls, although the change in market value may reduce the assessment. The Service does not pay refuge revenue sharing on easement rights. Where we identify conservation easements, we would be interested primarily in purchasing development and some wildlife management rights. Easements are best when: (1) Only minimal management of the resource is needed, but there is a desire to ensure the continuation of current undeveloped uses and to prevent fragmentation over the long-term, and in places where the management objective is to allow vegetative succession; (2) a landowner is interested in maintaining ownership of the land, does not want it to be further developed, and would like to realize the benefits of selling development rights; (3) current land use regulations limit the potential for adverse management practices; (4) the protection strategy calls for the creation and maintenance of a watershed protection area that can be accommodated with passive management; or (5) only a portion of the parcel contains lands of interest to the Service.

The determination of value for purchasing a conservation easement involves an appraisal of the rights to be purchased, based on recent market conditions and structure in the area. The Land Protection Methods' section further describes the conditions and structure of easements.

Option 3. Management or Land Protection by Others

More than 50,000 acres of land adjacent to, and ecologically important to, the proposed project is already owned by our partners or managed by our partners through conservation easements. It should also be emphasized that the protection of this area fits well into a landscape-scale wildlife and habitat corridor that is being pieced together in the area. This proposed project would serve as an important keystone in this conservation effort. The following partners own, manage, or have restored property within or in the vicinity of the project area: AGFC, ANHC, NRCS, DU, TNC, and U.S. Army Corps of Engineers.

LAND PROTECTION METHODS

The Service uses several methods of acquiring either a full or a partial interest in the parcels identified for land protection in this proposal: (1) Fee-title purchase; (2) easement purchase; (3) donation; (4) exchanges; and (5) leases and cooperative agreements.

Purchase

For most of the tracts in the boundary, the proposed method is listed as *Fee* or *Easement*; however, the method the Service ultimately uses depends partly on the landowner's wishes. We will purchase land from willing sellers only.

Fee-Title Purchase

A fee-title interest is normally acquired when: (1) The area's fish and wildlife resources require permanent protection not otherwise assured; (2) land is needed for visitor use development; (3) a pending land use could adversely impact the area's resources; or (4) it is the most practical and economical way to assemble small tracts into a manageable unit.

Fee-title purchase conveys all ownership rights to the Federal Government and provides the best assurance of permanent resource protection. A fee-title interest may be acquired by donation, exchange, transfer, or purchase (as the availability of funding allows).

Easement Purchase

Easement purchase refers to the purchase of limited rights (less-than-fee-title) from an interested landowner. The landowner would retain ownership of the land, but would sell certain rights identified and agreed upon by both parties. The objectives and conditions of our proposed conservation easements would recognize lands for their importance to wildlife habitat or outdoor recreational activities, and any other qualities that recommend them for addition to the National Wildlife Refuge System. Land uses that are normally restricted under the terms of a conservation easement include: (1) Development rights (agricultural, residential, etc.); (2) alteration of the area's natural topography; (3) uses adversely affecting the area's floral and faunal communities; (4) private hunting and fishing leases; (5) excessive public access and use; and (5) alteration of the natural water regime.

Donation

We encourage donations in fee-title or conservation easement in the approved areas. We are not currently aware of any formal opportunities to accept donations of parcels in our land protection boundary.

Exchanges

We have the authority to exchange land in Service ownership for other land that has greater habitat and wildlife value. However, inherent in this concept is the requirement that the exchange provide clear and compelling benefit to the refuge, National Wildlife Refuge System, and the public. Real estate value must be met dollar-for-dollar with, occasionally, an equalization payment. Resource, ecosystem, and public use values must be met or exceeded for land received compared to Service interest divested. Although exchanges do not require purchase funds, they may be very labor-intensive, take a long time to complete, and require expenditure of acquisition funds for requirements such as appraisals, surveys, and title work.

Leases and Cooperative Agreements

Potentially, the Service can protect and manage habitat through leases and cooperative agreements. Management control on privately owned lands could be obtained by entering into long-term renewable leases or cooperative agreements with the landowners. Short-term leases can be used to protect or manage habitat until more permanent land protection can be negotiated.

SERVICE LAND ACQUISITION POLICY

Once a land protection (refuge acquisition) boundary has been approved, we can contact neighboring landowners to determine whether any are interested in selling. More commonly, however, the landowner approaches the refuge manager to inquire whether the Service would be interested in purchasing his property for the refuge. If a landowner expresses an interest and gives the Service permission, a real estate appraiser will appraise the property to determine its market value. Once an appraisal has been approved, we can present an offer for the landowner's consideration.

Appraisals conducted by Service or contract appraisers must meet federal, as well as professional, appraisal standards. In all fee-title acquisition cases, the Service is required by Federal law to offer 100 percent of the property's appraised market value, which is typically based on comparable sales of similar types of properties.

We based the proposed land protection (refuge acquisition) boundary primarily on the biological importance of key habitats. The establishment or expansion of this boundary would give the Service approval to negotiate with landowners that may be interested, or may become interested, in selling their land in the future. With this internal approval in place, the Service can react more quickly as important lands and funding become available. Our long-established policy is to work with willing sellers only and we continue to operate under that policy. Lands within this boundary do not become part of the refuge unless their owners willingly sell or donate them to the Service.

FUNDING

Funding for acquisition would likely come from the Migratory Bird Conservation Fund (MBCF), Land and Water Conservation Fund (LWCF), North America Wetlands Conservation Act Fund, and from non-governmental partners. The MBCF and LWCF are not derived from traditional tax revenues. The MBCF is collected from the sale of Federal Duck stamps, entrance fees from certain national wildlife refuges, and import duties on arms and ammunition. The LWCF is derived from royalties paid to the Federal Government by companies drilling offshore for oil and gas. Both the MBCF and LWCF are intended for land conservation and may be used to purchase the land and/or permanent conservation easements.

IV. Coordination

Extensive internal and external, governmental and non-governmental, partner, and public outreach and scoping were conducted during February through June 2012. This Cache River NWR boundary expansion project has overall support of local congressional staff, the Arkansas Governor's office, local officials, Arkansas Game and Fish Commission, Arkansas Natural Heritage Commission, Arkansas Forestry Commission, Arkansas Parks and Tourism Department, Arkansas Department of Environmental Quality, Arkansas Natural Resources Commission, Natural Resources Conservation Service, National Park Service, Farm Services Agency, U.S. Army Corps of Engineers, The Nature Conservancy, The Conservation Fund, National Wildlife Refuge Association, Ducks Unlimited, Arkansas Audubon, Arkansas Wildlife Federation, and the public.

Three public scoping meetings were held: May 7, 2012, in Newport, AR; May 8, 2012, in Augusta, AR; and May 10, 2012, in Brinkley, AR. Initial public reaction to the proposed refuge expansion generally has been favorable, with no explicit opposition received. Some questions or concerns were raised by individuals regarding property taxes, acquisition funding sources, use of condemnation, potential restrictions on private lands, economic impacts, restrictions on public use, and problems associated with the Cache River blockage near Grubbs, Arkansas. Many comments indicated a desire to expand the refuge to include areas not initially delineated in the preliminary planning project. Numerous comments also received indicated that the project boundary should be expanded further to: (1) Restore marginal agricultural lands to forest or wetland habitats; (2) enlarge contiguous blocks of habitat for neotropical migratory birds, ivory-billed woodpeckers, wintering waterfowl, and other native wildlife; (3) serve as a partial connection of a complex of federal, state, non-governmental, and private conservation lands; (4) provide greater riparian buffers; and (5) increase public use opportunities. During the three public meetings, support for the proposed expansion was expressed, and several landowners indicated that they would be willing sellers.

V. *Strategic Habitat Conservation and Landscape Conservation Cooperatives*

Strategic habitat conservation (SHC) is a means of applying adaptive management across large landscapes. Landscape conservation cooperatives (LCC) will facilitate strategic habitat conservation (USFWS 2008). This proposed expansion would apply the strategic habitat conservation framework as outlined in the National Ecological Assessment Team report. Strategic habitat conservation involves an ongoing cycle of biological planning, conservation design, conservation delivery, outcome-based monitoring, and assumption-based research. It is also the process by which the Service continues to develop and apply science focused on improving the ability to apply conservation delivery actions, which result in landscapes capable of supporting populations of priority species at desired levels. Additionally, SHC provides the framework by which the Service develops and applies science to inform and continually improve conservation delivery by addressing landscape-level population limiting factors in an adaptive manner.

The Service will use LCCs as a means of implementing SHC. Landscape conservation cooperatives are formal science and management partnerships between the Service, U.S. Geological Survey, other federal agencies, states, tribes, non-governmental organizations, universities, and others to increase applied conservation science capacity in support of fish and wildlife management within specific landscapes. The tools developed by the LCCs allow Service offices, and our many partners, to implement on-the-ground actions in the most effective locations to meet their goals. Cache River NWR is located in the Gulf Coastal Plains and Ozarks LCC.

Eventually, fully unifying these proposed expansion areas and their associated resource conservation efforts would magnify resource conservation benefits landscape-wide, and are in accordance with the Service Director's mandate for strategic habitat conservation.

Table 3. Protection priorities for the proposed expansion and recommended methods of acquisition

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
Cache River / Bayou DeView Corridor				
1	1	Private	122	Fee Title
1	2	Private	1,269	Fee Title
1	3	Private	40	Fee Title
1	4	Private	9	Conservation Easement
1	5	Private	138	Fee Title
1	6	Private	77	Fee Title
1	7	Private	1,556	Fee Title
1	8	Private	741	Fee Title
1	9	Private	81	Fee Title
1	10	Private	165	Fee Title
1	11	Private	292	Fee Title
1	12	Private	54	Fee Title
1	13	Private	125	Fee Title
1	14	Private	42	Fee Title
1	15	Private	354	Fee Title
1	16	Private	39	Fee Title
1	17	Private	240	Fee Title
1	18	Private	158	Fee Title
1	19	Private	16	Fee Title
1	20	Private	498	Fee Title
1	21	Federal	289	Fee Title
1	22	Private	38	Fee Title
1	23	Private	218	Fee Title
1	24	Private	545	Fee Title
1	25	Private	508	Fee Title
1	26	Private	41	Fee Title
1	27	Private	406	Fee Title
1	28	Private	1,742	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
1	29	Private	259	Fee Title
1	30	Private	222	Fee Title
1	31	Private	83	Fee Title
1	32	Private	126	Fee Title
1	33	Private	534	Fee Title
1	34	Private	383	Fee Title
1	35	Private	39	Fee Title
1	36	Private	81	Fee Title
1	37	Private	120	Fee Title
1	38	Private	41	Fee Title
1	39	Private	362	Fee Title
1	40	Private	61	Fee Title
1	41	Private	1,121	Fee Title
1	42	Private	527	Fee Title
1	43	Private	259	Fee Title
1	44	Private	11	Fee Title
1	45	Private	38	Fee Title
1	46	Private	197	Fee Title
1	47	Private	162	Fee Title
1	48	Private	42	Fee Title
1	49	Private	1,908	Fee Title
1	50	Private	61	Fee Title
1	51	Private	42	Fee Title
1	52	Private	79	Fee Title
1	53	Private	80	Fee Title
1	54	Private	159	Fee Title
1	55	Private	612	Fee Title
1	56	Private	1,394	Fee Title
1	57	Private	35	Fee Title
1	58	Private	338	Fee Title
1	59	Private	41	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
1	60	Private	42	Fee Title
1	61	Private	47	Fee Title
1	62	Private	557	Fee Title
1	63	Private	24	Fee Title
1	64	Private	16	Fee Title
1	65	Private	238	Fee Title
1	66	Private	86	Fee Title
1	67	Private	77	Fee Title
1	68	Private	128	Fee Title
1	69	Private	138	Fee Title
1	70	Private	1,061	Fee Title
1	71	Private	19	Fee Title
1	72	Private	57	Fee Title
1	73	Private	309	Fee Title
1	74	Private	42	Fee Title
1	75	Private	48	Fee Title
1	76	Private	35	Fee Title
1	77	Private	59	Fee Title
1	78	Private	58	Fee Title
1	79	Private	81	Fee Title
1	80	Private	47	Fee Title
1	81	Private	25	Fee Title
1	82	Private	169	Fee Title
1	83	Private	988	Fee Title
1	84	Private	1,157	Fee Title
1	85	Private	161	Fee Title
1	86	Private	200	Fee Title
1	87	Private	86	Fee Title
1	88	Private	51	Fee Title
1	89	Private	14	Fee Title
1	90	Private	199	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
1	91	Private	96	Fee Title
1	93	Private	161	Fee Title
1	94	Private	19	Fee Title
1	95	Private	988	Fee Title
1	96	Private	624	Fee Title
1	97	Private	425	Fee Title
1	100	Private	50	Fee Title
1	101	Private	134	Fee Title
1	102	NGO	99	Fee Title
1	103	Private	163	Fee Title
1	104	Private	283	Fee Title
1	105	Private	122	Fee Title
1	106	Private	87	Fee Title
1	107	Private	13	Fee Title
1	108	Private	85	Fee Title
1	109	Private	121	Fee Title
1	110	Private	142	Fee Title
1	114	Private	28	Fee Title
1	115	Private	15	Fee Title
1	116	Private	10	Fee Title
1	117	Private	23	Fee Title
1	118	Private	80	Fee Title
1	119	Private	521	Fee Title
1	120	Private	461	Fee Title
1	121	Private	62	Fee Title
1	127	Private	39	Fee Title
1	129	Private	1,540	Fee Title
1	130	Private	541	Fee Title
1	132	County	31	No Interest
1	133	Private	67	Fee Title
1	134	Private	153	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
1	240	Private	9	Conservation Easement
1	241	Private	41	Fee Title
1	428	Private	1,132	Fee Title
1	429	Private	157	Fee Title
1	430	Private	58	Fee Title
1	431	Private	42	Fee Title
1	432	Private	42	Fee Title
1	433	Private	77	Fee Title
1	434	Private	411	Fee Title
1	435	Private	38	Fee Title
1	436	Private	77	Fee Title
1	437	Private	38	Fee Title
1	438	Private	78	Fee Title
1	439	Private	205	Fee Title
1	440	Private	701	Fee Title
1	441	NGO	814	Fee Title
1	442	Private	478	Fee Title
1	443	Private	37	Fee Title
1	444	Private	228	Fee Title
1	445	Private	76	Fee Title
1	446	Private	37	Fee Title
1	447	Private	19	Fee Title
1	448	Private	19	Fee Title
1	449	Private	51	Fee Title
1	450	Private	36	Fee Title
1	451	Private	246	Fee Title
1	452	Private	52	Fee Title
1	453	Private	24	Fee Title
1	454	Private	268	Fee Title
1	455	Private	77	Fee Title
1	456	Private	40	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
1	457	Private	78	Fee Title
1	458	Private	186	Fee Title
1	459	Private	40	Fee Title
1	460	Private	113	Fee Title
1	461	Private	534	Fee Title
1	462	Private	544	Fee Title
1	463	Private	227	Fee Title
1	464	Private	57	Fee Title
1	519	Private	1,843	Fee Title
1	520	Private	102	Fee Title
1	538	Private	45	Fee Title
1	539	Private	18	Fee Title
1	540	Private	21	Fee Title
1	541	Private	27	Fee Title
1	542	Private	38	Fee Title
Bayou DeView Peripheral				
2	135	Private	649	Fee Title
2	138	Private	35	Fee Title
2	140	Private	41	Fee Title
2	141	Private	169	Fee Title
2	143	Private	195	Fee Title
2	144	Private	20	Fee Title
2	145	Private	26	Fee Title
2	146	Private	37	Fee Title
2	147	Private	77	Fee Title
2	148	Private	878	Fee Title
2	151	Private	150	Fee Title
2	153	Private	186	Fee Title
2	155	Private	80	Fee Title
2	156	Private	829	Fee Title
2	158	Private	20	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
2	159	Private	21	Fee Title
2	160	Private	42	Fee Title
2	161	Private	82	Fee Title
2	162	Federal	41	Fee Title
2	163	Private	214	Fee Title
2	164	Private	80	Fee Title
2	165	Private	205	Fee Title
2	166	Private	282	Fee Title
2	167	Private	21	Fee Title
2	168	Private	569	Fee Title
2	169	Private	20	Fee Title
2	170	Private	160	Fee Title
2	171	Private	289	Fee Title
2	172	Private	40	Fee Title
2	173	Private	41	Fee Title
2	174	Private	315	Fee Title
2	176	Private	809	Fee Title
2	177	Private	43	Fee Title
2	179	Private	20	Fee Title
2	180	Private	45	Fee Title
2	181	Private	120	Fee Title
2	182	Private	65	Fee Title
2	184	Private	96	Fee Title
2	185	Private	42	Fee Title
2	186	Private	124	Fee Title
2	187	Private	78	Fee Title
2	189	Private	83	Fee Title
2	191	Private	39	Fee Title
2	192	Private	82	Fee Title
2	193	Private	84	Fee Title
2	194	Private	304	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
2	197	Private	228	Fee Title
2	198	Private	155	Fee Title
2	199	Private	41	Fee Title
2	200	Private	37	Fee Title
2	201	Private	122	Fee Title
2	202	Private	38	Fee Title
2	203	Private	84	Fee Title
2	206	Private	1,898	Fee Title
2	207	Private	324	Fee Title
2	208	Private	212	Fee Title
2	209	Private	128	Fee Title
2	210	Private	41	Fee Title
2	211	Private	370	Fee Title
2	212	Private	40	Fee Title
2	215	Private	634	Fee Title
2	216	Private	457	Fee Title
2	217	Private	233	Fee Title
2	218	Private	209	Fee Title
2	219	Private	990	Fee Title
2	220	Private	372	Fee Title
2	221	Private	1,385	Fee Title
2	223	Private	44	Fee Title
2	224	Private	69	Fee Title
2	225	Private	15	Fee Title
2	226	Private	87	Fee Title
2	227	Private	108	Fee Title
2	228	Private	86	Fee Title
2	229	Private	116	Fee Title
2	230	Private	639	Fee Title
2	231	Private	15	Fee Title
2	232	Private	239	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
2	233	Private	307	Fee Title
2	236	Private	266	Fee Title
2	237	Private	169	Fee Title
2	243	Private	40	Fee Title
2	244	Private	82	Fee Title
2	245	Private	99	Fee Title
2	246	Private	598	Fee Title
2	247	Private	685	Fee Title
2	248	Private	164	Fee Title
2	249	Private	32	Fee Title
2	250	Private	36	Fee Title
2	251	Private	512	Fee Title
2	252	Private	42	Fee Title
2	253	Private	78	Fee Title
2	254	Private	2	No Interest
2	255	Private	2	No Interest
2	256	Private	2	No Interest
2	257	Private	25	Fee Title
2	258	Private	32	Fee Title
2	259	Private	5	Conservation Easement
2	260	Private	215	Fee Title
2	261	Private	256	Fee Title
2	262	State	6	No Interest
2	263	Private	98	Fee Title
2	264	Private	214	Fee Title
2	265	Private	368	Fee Title
2	266	Private	261	Fee Title
2	267	Private	68	Fee Title
2	268	Private	1	No Interest
2	269	Private	1	No Interest
2	270	Private	944	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
2	332	Private	160	Fee Title
2	333	Private	620	Fee Title
2	334	Private	46	Fee Title
2	335	Private	1,256	Fee Title
2	336	Private	7	Conservation Easement
2	337	Private	32	Fee Title
2	338	Private	43	Fee Title
2	339	Private	< 1	No Interest
2	365	Private	5	Conservation Easement
2	366	Private	3	No Interest
2	367	Private	71	Fee Title
2	368	Private	< 1	No Interest
2	369	Private	120	Fee Title
2	370	Private	168	Fee Title
2	371	Private	44	Fee Title
2	372	Private	190	Fee Title
2	373	Private	1	No Interest
2	374	Private	1	No Interest
2	375	Private	3	No Interest
2	376	Private	39	Fee Title
2	377	Private	99	Fee Title
2	378	Private	169	Fee Title
2	379	Private	412	Fee Title
2	380	Private	214	Fee Title
2	381	Private	81	Fee Title
2	387	Private	9	Conservation Easement
2	388	Private	4	No Interest
2	389	Private	1	No Interest
2	390	Private	5	Conservation Easement
2	391	Private	6	Conservation Easement
2	392	Private	1	No Interest

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
2	393	Private	< 1	No Interest
2	394	Private	115	Fee Title
2	395	Private	1,527	Fee Title
2	396	Private	1	No Interest
2	397	Private	< 1	No Interest
2	398	Private	< 1	No Interest
2	399	Private	< 1	No Interest
2	400	Private	< 1	No Interest
2	401	Private	< 1	No Interest
2	402	Private	83	Fee Title
2	403	Private	392	Fee Title
2	404	Private	87	Fee Title
2	405	Private	177	Fee Title
2	406	Private	8	Conservation Easement
2	407	Private	319	Fee Title
2	408	Private	86	Fee Title
2	409	Private	81	Fee Title
2	410	Private	78	Fee Title
2	411	Private	166	Fee Title
2	412	Private	243	Fee Title
2	413	Private	307	Fee Title
2	414	Private	116	Fee Title
2	415	Private	109	Fee Title
2	416	Private	162	Fee Title
2	417	Private	398	Fee Title
2	418	Private	47	Fee Title
2	419	Private	358	Fee Title
2	420	Private	293	Fee Title
2	421	Private	2	No Interest
2	422	Private	590	Fee Title
2	423	Private	377	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
2	425	Private	464	Fee Title
2	426	Private	122	Fee Title
2	427	Private	< 1	No Interest
2	500	Private	< 1	No Interest
2	513	Private	120	Fee Title
2	514	Private	52	Fee Title
2	515	Private	2	No Interest
2	516	Private	2	No Interest
2	517	Private	46	Fee Title
2	518	Private	39	Fee Title
2	527	Private	26	Fee Title
2	528	Private	16	Fee Title
2	529	Private	11	Fee Title
2	530	Private	64	Fee Title
2	531	Private	20	Fee Title
2	533	Private	33	Fee Title
2	534	Private	13	Fee Title
2	535	Private	99	Fee Title
2	536	Private	46	Fee Title
2	537	Private	76	Fee Title
2	575	Unknown	311	Fee Title
2	576	Unknown	15	Fee Title
Cache River Peripheral				
3	92	Private	311	Fee Title
3	98	Private	1,386	Fee Title
3	99	Private	201	Fee Title
3	111	Private	3,206	Fee Title
3	112	Private	407	Fee Title
3	113	Private	241	Fee Title
3	122	Private	174	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	123	Private	82	Fee Title
3	124	Private	1,176	Fee Title
3	125	Private	46	Fee Title
3	126	Private	40	Fee Title
3	128	Private	159	Fee Title
3	131	Private	169	Fee Title
3	136	Private	271	Fee Title
3	137	Private	106	Fee Title
3	139	Private	1,183	Fee Title
3	142	Private	338	Fee Title
3	149	Private	109	Fee Title
3	150	Private	88	Fee Title
3	152	Private	84	Fee Title
3	154	Private	80	Fee Title
3	157	Private	244	Fee Title
3	175	Private	38	Fee Title
3	178	Private	67	Fee Title
3	183	Private	364	Fee Title
3	188	Private	74	Fee Title
3	190	Private	325	Fee Title
3	195	Private	157	Fee Title
3	196	Private	128	Fee Title
3	204	Private	78	Fee Title
3	205	Private	29	Fee Title
3	213	Private	40	Fee Title
3	214	Private	50	Fee Title
3	222	Private	49	Fee Title
3	234	Private	638	Fee Title
3	235	Private	12	Fee Title
3	238	Private	102	Fee Title
3	239	Private	705	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	242	Private	15	Fee Title
3	271	Private	133	Fee Title
3	272	Private	123	Fee Title
3	273	Private	2	No Interest
3	274	Private	4	No Interest
3	275	Private	251	Fee Title
3	276	Private	22	Fee Title
3	277	Private	2	No Interest
3	278	Private	1	No Interest
3	279	Private	6	Conservation Easement
3	280	Private	3	No Interest
3	281	Private	4	No Interest
3	282	Private	7	Conservation Easement
3	283	Private	20	Fee Title
3	284	Private	39	Fee Title
3	285	Private	82	Fee Title
3	286	Private	20	Fee Title
3	287	Private	33	Fee Title
3	288	Private	31	Fee Title
3	289	Private	125	Fee Title
3	290	Private	170	Fee Title
3	291	Private	398	Fee Title
3	292	Private	2	No Interest
3	293	Private	3	No Interest
3	294	Private	5	Conservation Easement
3	295	Private	45	Fee Title
3	296	Private	< 1	No Interest
3	297	Private	124	Fee Title
3	298	Private	398	Fee Title
3	299	Private	119	Fee Title
3	300	Private	39	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	301	Private	294	Fee Title
3	302	Private	41	Fee Title
3	303	Private	41	Fee Title
3	304	Private	42	Fee Title
3	305	Local Govt.	12	No Interest
3	306	Private	158	Fee Title
3	307	Private	161	Fee Title
3	308	Private	2	No Interest
3	309	Private	468	Fee Title
3	310	Private	20	Fee Title
3	311	Private	733	Fee Title
3	312	Private	119	Fee Title
3	313	Private	96	Fee Title
3	314	Private	146	Fee Title
3	315	Private	205	Fee Title
3	316	Private	363	Fee Title
3	317	Private	39	Fee Title
3	318	Private	197	Fee Title
3	319	Private	219	Fee Title
3	320	Private	286	Fee Title
3	321	Federal	59	No Interest
3	322	Private	15	Fee Title
3	323	Private	84	Fee Title
3	324	Private	17	Fee Title
3	325	Private	426	Fee Title
3	326	Private	327	Fee Title
3	327	Private	174	Fee Title
3	328	Private	602	Fee Title
3	329	Private	80	Fee Title
3	330	Private	178	Fee Title
3	331	Private	713	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	340	Private	37	Fee Title
3	341	Private	1	No Interest
3	342	Private	1	No Interest
3	343	Private	1	No Interest
3	344	Private	4	No Interest
3	345	Private	2	No Interest
3	346	Private	2	No Interest
3	347	Private	1	No Interest
3	348	Private	< 1	No Interest
3	349	Private	484	Fee Title
3	350	Private	37	Fee Title
3	351	Private	< 1	No Interest
3	352	Private	2	No Interest
3	353	Private	< 1	No Interest
3	354	Private	1	No Interest
3	355	Private	4	No Interest
3	356	Private	1	No Interest
3	357	Private	268	Fee Title
3	358	Private	120	Fee Title
3	359	Private	1	No Interest
3	360	Private	470	Fee Title
3	361	Private	34	Fee Title
3	362	Private	47	Fee Title
3	363	Private	107	Fee Title
3	364	Private	66	Fee Title
3	382	Private	1	No Interest
3	383	Private	52	Fee Title
3	384	Private	< 1	No Interest
3	385	Private	< 1	No Interest
3	386	Private	< 1	No Interest
3	424	Private	1	No Interest

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	465	Private	12	Fee Title
3	466	Private	60	Fee Title
3	467	Private	77	Fee Title
3	468	Private	223	Fee Title
3	469	Private	258	Fee Title
3	470	Private	1,051	Fee Title
3	471	State	58	No Interest
3	472	Local Govt.	95	No Interest
3	473	Federal	1,130	Fee Title
3	474	Private	269	Fee Title
3	475	Private	314	Fee Title
3	476	Private	314	Fee Title
3	477	Private	167	Fee Title
3	478	Private	555	Fee Title
3	479	Private	35	Fee Title
3	480	Private	23	Fee Title
3	481	Private	74	Fee Title
3	482	Private	16	Fee Title
3	483	Private	41	Fee Title
3	484	Private	65	Fee Title
3	485	Private	807	Fee Title
3	486	Private	888	Fee Title
3	487	Private	344	Fee Title
3	488	Private	482	Fee Title
3	489	Private	10	Conservation Easement
3	490	Private	394	Fee Title
3	491	Private	487	Fee Title
3	492	Private	122	Fee Title
3	493	Private	160	Fee Title
3	494	Private	84	Fee Title
3	495	Private	244	Fee Title

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	496	Private	406	Fee Title
3	497	Private	241	Fee Title
3	498	Private	41	Fee Title
3	499	Private	< 1	No Interest
3	501	Private	432	Fee Title
3	502	Unknown	256	Fee Title
3	503	Private	85	Fee Title
3	504	Private	50	Fee Title
3	505	Private	84	Fee Title
3	506	Private	40	Fee Title
3	507	Private	5	Conservation Easement
3	508	Private	52	Fee Title
3	509	Private	21	Fee Title
3	510	Private	3	No Interest
3	511	Private	189	Fee Title
3	512	Private	35	Fee Title
3	521	Private	35	Fee Title
3	522	Private	103	Fee Title
3	523	Private	144	Fee Title
3	524	Private	19	Fee Title
3	525	Private	15	Fee Title
3	526	Private	65	Fee Title
3	532	Private	37	Fee Title
3	543	Private	18	Fee Title
3	544	Private	11	Fee Title
3	545	Private	3	Fee Title
3	546	Private	42	Fee Title
3	547	Private	14	Fee Title
3	548	Private	1	No Interest
3	549	Private	5	Conservation Easement
3	550	Private	3	No Interest

Priority Group	Parcel ID #	Type of Landowners	Approximate Acreage	Methods of Acquisition (minimum interest)*
3	551	Private	4	No Interest
3	552	Private	4	No Interest
3	553	Private	7	Conservation Easement
3	554	Private	1	No Interest
3	555	Private	6	Conservation Easement
3	556	Private	5	Conservation Easement
3	557	Private	1	No Interest
3	558	Private	1	No Interest
3	559	Private	1	No Interest
3	560	Private	45	Fee Title
3	561	Private	6	Conservation Easement
3	562	Private	7	Conservation Easement
3	563	Private	5	Conservation Easement
3	564	Private	2	No Interest
3	565	Private	2	No Interest
3	566	Private	1	No Interest
3	567	Private	2	No Interest
3	568	Private	4	No Interest
3	569	Private	10	Conservation Easement
3	570	Private	3	No Interest
3	571	Private	10	Conservation Easement
3	572	Private	4	No Interest
3	573	Private	3	No Interest
3	574	Private	3	No Interest

**Generally, the Service will not seek to acquire any property interest in dwellings or commercial buildings situated on any parcels regardless of acreage—any consideration of such acquisition would solely be on a case-by-case basis.*

Figure 6. Landowner parcels - Priority Area 1 Map 1

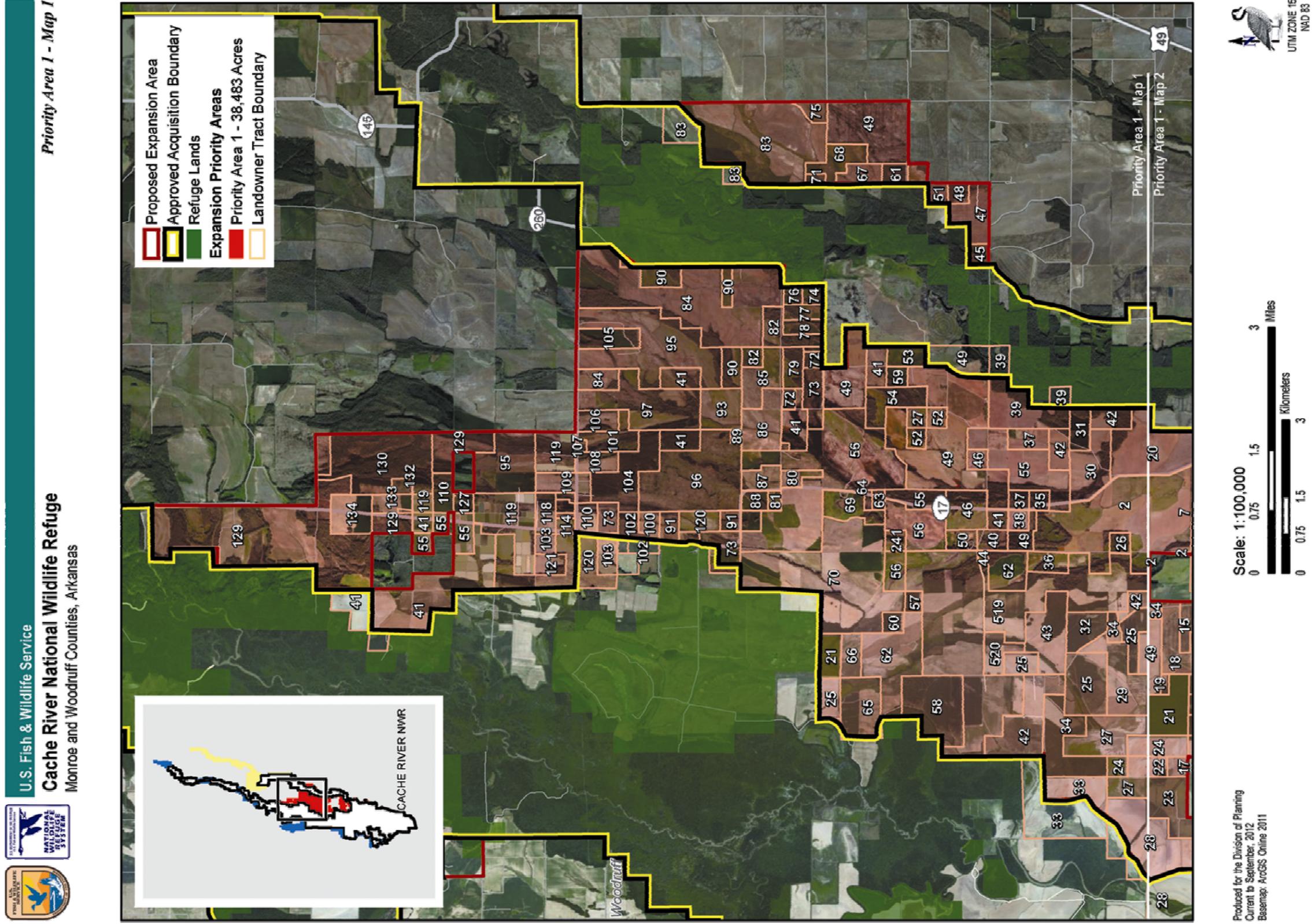


Figure 8. Landowner parcels - Priority Area 2 Map 1

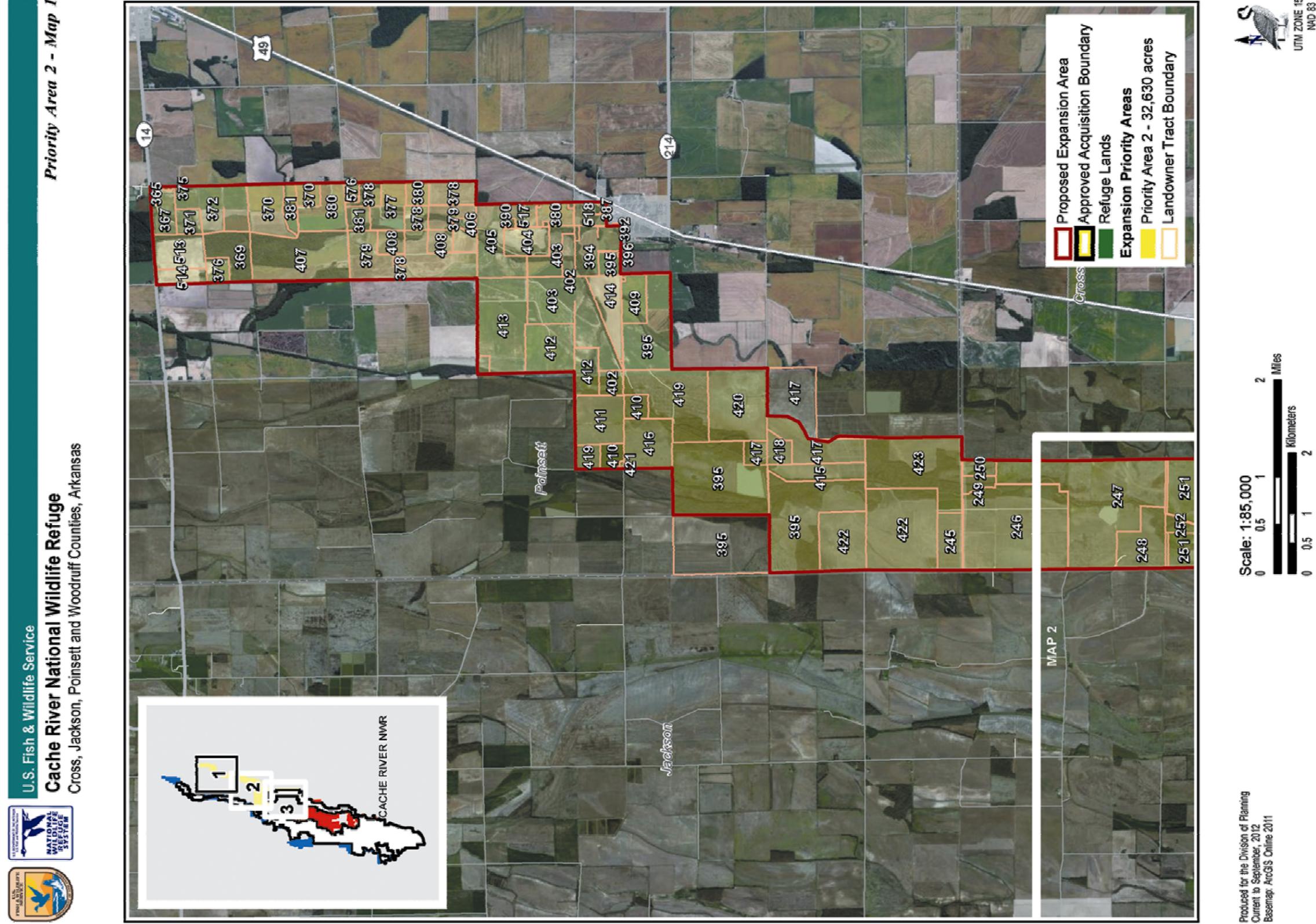


Figure 10. Landowner parcels - Priority Area 2 Map 3

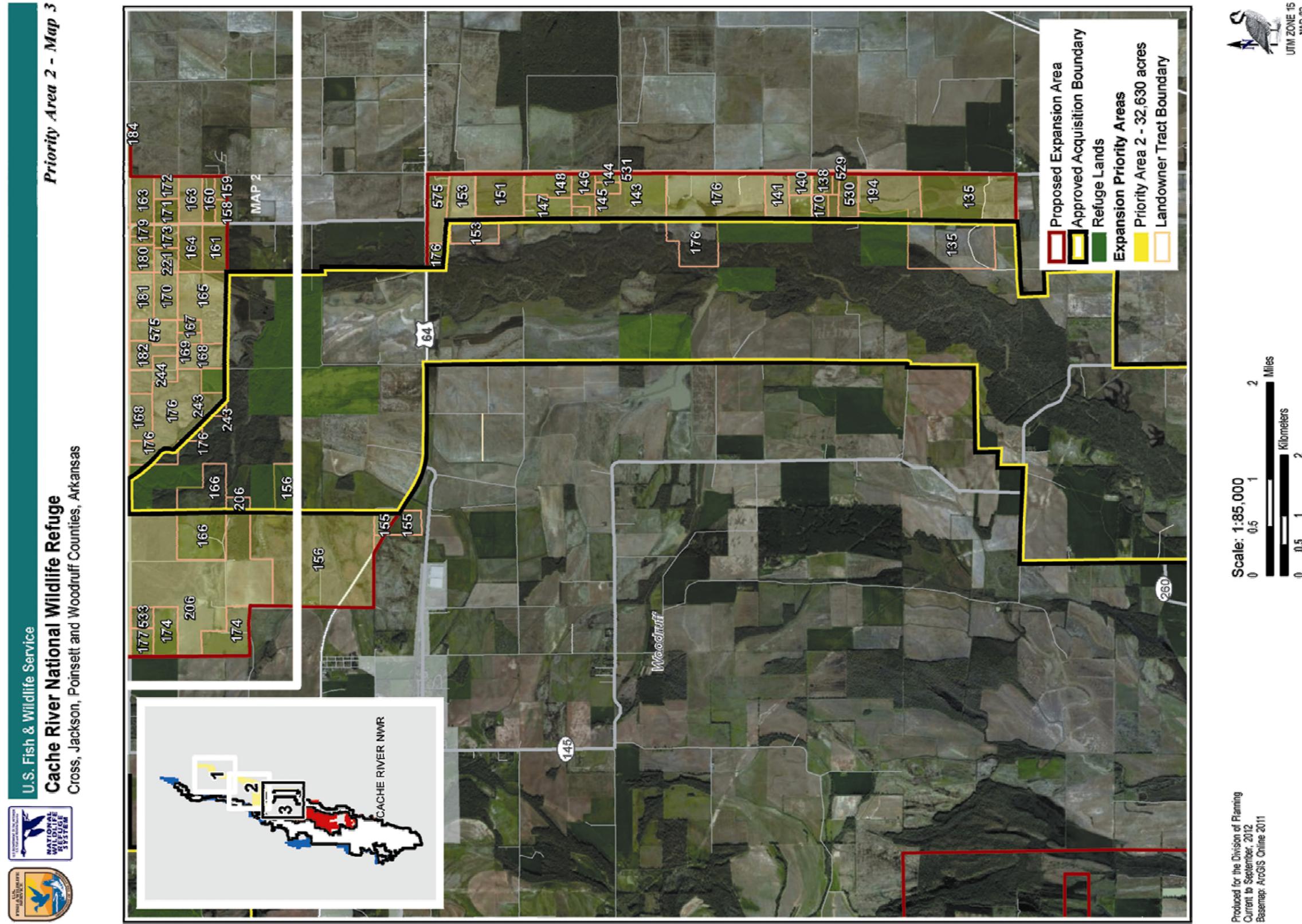


Figure 12. Landowner parcels - Priority Area 3 Maps 3 and 4

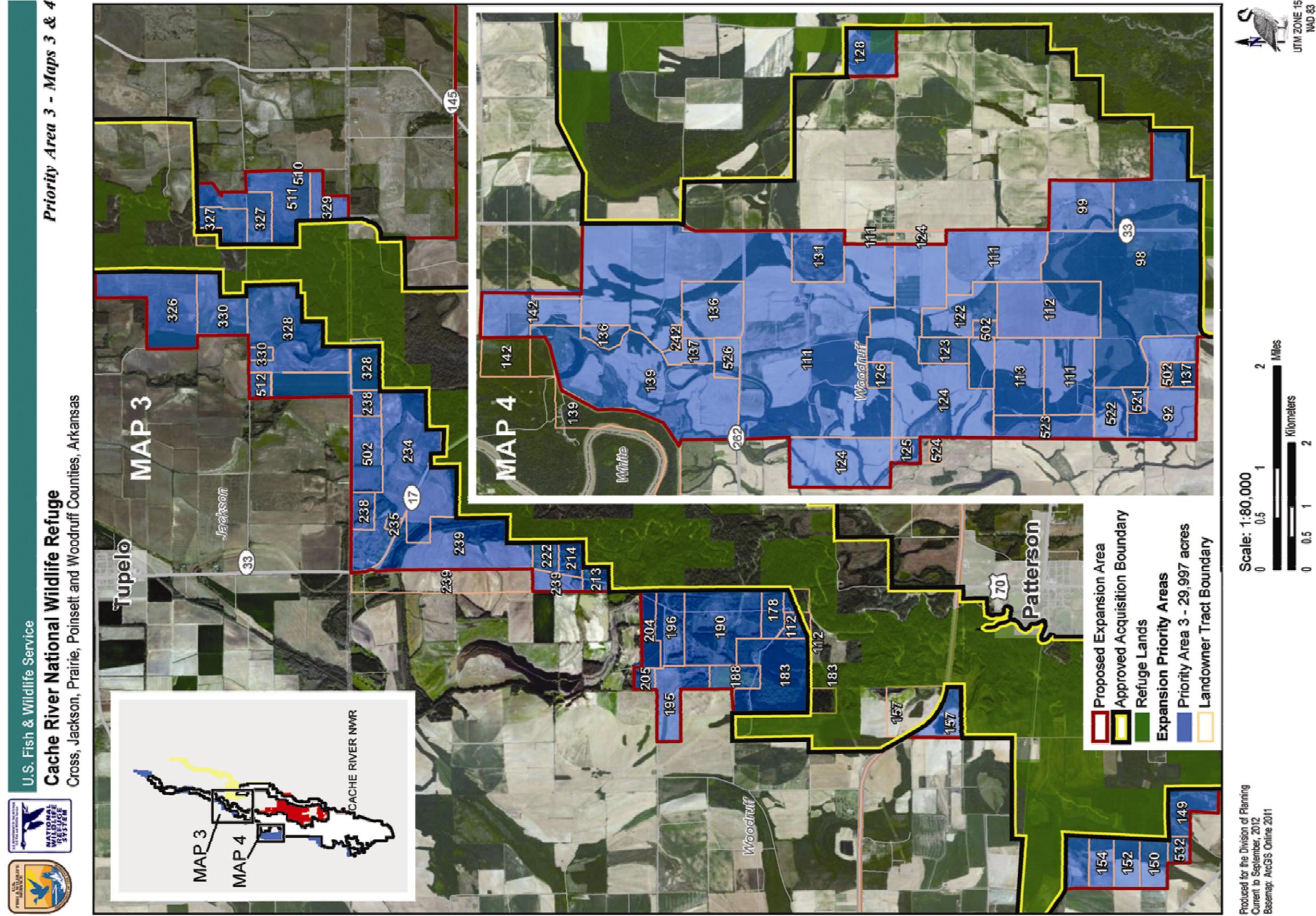
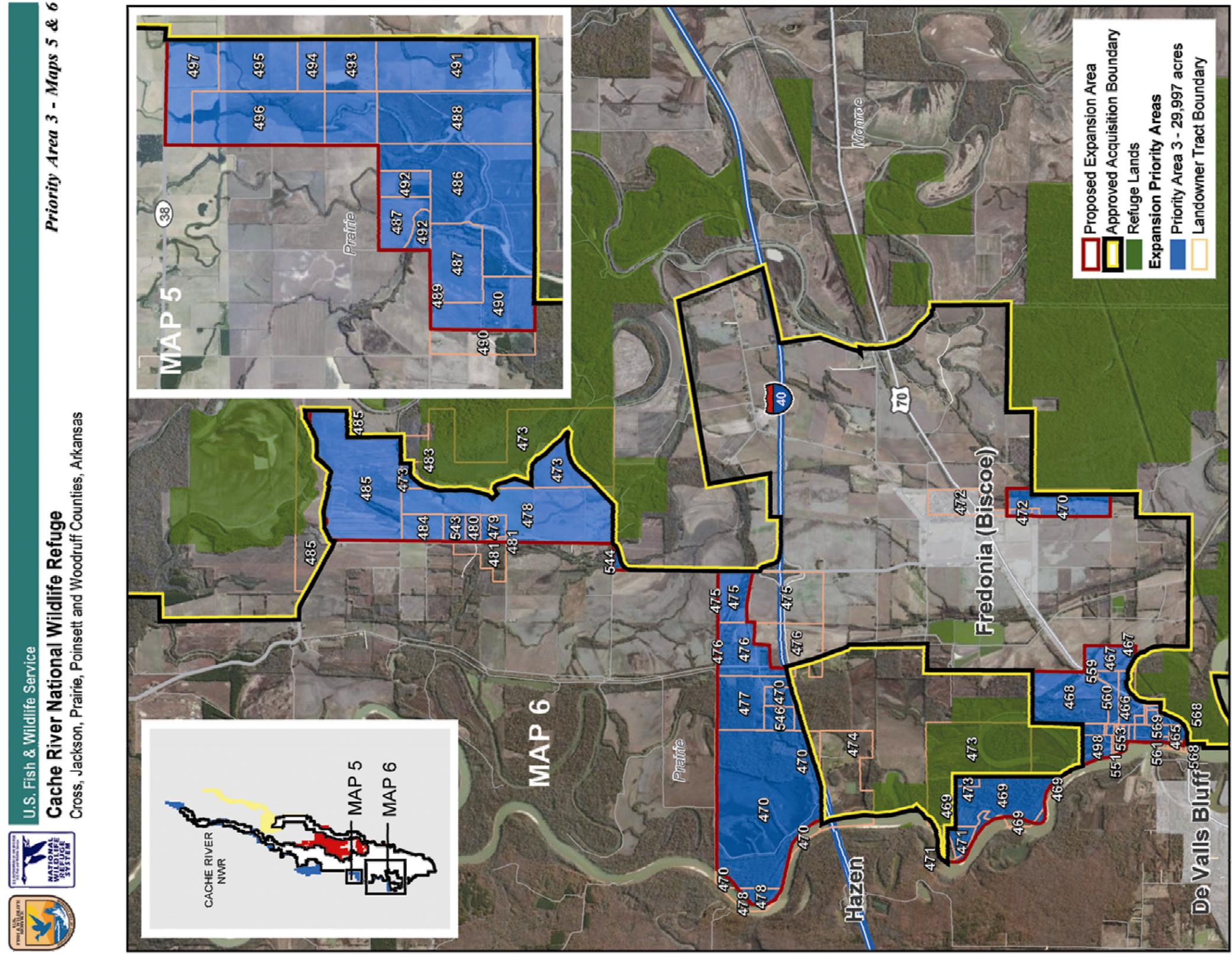


Figure 13. Landowner parcels - Priority Area 3 Maps 5 and 6



ENVIRONMENTAL ASSESSMENT

I. Purpose and Need for Action

INTRODUCTION

The U.S. Fish and Wildlife Service (Service) proposes to protect, restore, and enhance additional fish and wildlife habitat in Monroe, Prairie, Woodruff, Jackson, Cross, and Poinsett Counties, Arkansas, through the expansion of the current 185,574-acre Cache River National Wildlife Refuge (NWR) acquisition boundary by up to 102,000 acres. The refuge now contains about 67,400 acres (in fee-title) and if the project is approved would bring the total potential conservation footprint up to 287,574 acres.

The mission of the National Wildlife Refuge System 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 Improvement Act of 1997; PL 105-57). National wildlife refuges provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in conserving threatened and endangered species. Refuges offer a wide variety of wildlife-dependent recreational opportunities and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 25 million visitors annually hunt, fish, observe and photograph wildlife, or participate in educational and interpretive activities on refuges.

The scope of this Draft Environmental Assessment (Draft EA) is limited to the proposed acquisition of lands for the expansion of the Cache River NWR. This Draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. Cache River NWR has an approved Comprehensive Conservation Plan (USFWS 2009) that would dictate the management of the proposed lands, if acquired. Uses on the proposed area would include those approved under existing refuge compatibility determinations: Hunting; Fishing; Wildlife Observation and Photography; Environmental Education and Interpretation; Research and Monitoring; Forest Products Harvesting; Commercial Guiding for Wildlife Observation/Photography; Commercial Video and Photography; Nuisance Animal Control; Cooperative Farming; Furbearer Trapping; and Commercial Fishing. If the refuge is expanded and the needed lands or interests in lands are acquired, the Service would modify the refuge's existing step-down management plans to incorporate the new lands and resources under its control. At that time, these modified refuge management plans would be reviewed in accordance with Departmental requirements of the National Environmental Policy Act.

PURPOSE AND NEED

This Draft EA presents a proposal for the protection, restoration, and enhancement of additional wildlife habitat in Monroe, Prairie, Woodruff, Jackson, Cross, and Poinsett Counties, Arkansas, through the expansion of the Cache River NWR. This proposal would expand the acquisition boundaries for the refuge by up to 102,000 acres.

Acquisition boundaries are administrative lines delineating areas in which the Service may consider negotiations with willing sellers for acquisition of an interest in land. Lands within a refuge acquisition boundary do not become part of the refuge unless and until a legal interest is acquired through a management agreement, easement, lease, donation, or purchase. Lands within an acquisition

boundary are not subject to any refuge regulations or jurisdiction unless and until an interest is acquired. Land interests are acquired from willing sellers only. Any landowner that is within an approved acquisition boundary, even though the surrounding parcels may have been purchased by the Service, retains all the rights, privileges, and responsibilities of private land ownership. This includes, but is not limited to, the right to access, hunting, vehicle use, control of trespass; the right to sell the property to any other party; the right to enroll in government programs, (e.g., Wetland Reserve Program or farm payments) and the responsibility to pay local real estate or property taxes. Additional information regarding the Service's land acquisition policy is provided in the Cache River NWR Draft Land Protection Plan (Draft LPP).

Within approved acquisition boundaries, the Service would be able to enter into negotiations and/or partnerships for the protection, restoration, and enhancement of environmentally sensitive lands. The most urgent needs for acquiring an interest in these lands are as follows:

- Restore key ecological processes that drive and sustain the unique, but declining Cache River floodplain ecosystem, and improve ecosystem services and associated public benefits.
- Strategically restore altered geophysical features and original connectivity of water flow within and between the Cache River and Bayou DeView floodplains.
- Improve hydrologic function of these streams and their floodplains and enhance wetland and aquatic ecosystems for the benefit of trust species.
- Incorporate protection and enhancement of a diversity of critical habitats on which trust species depend to better represent the full spectrum of habitats that was historically present.
- Restore forested habitat and other natural plant communities to improve overall watershed health and stability, promote carbon sequestration, bolster ecological integrity, and increase habitat patch size to accomplish goals set forth in refuge, state, Lower Mississippi Valley Joint Venture (LMVJV), regional, and national plans for migratory birds, forest breeding birds, endangered species, and resident wildlife and fish species.
- Protect, restore, and enhance fragmented and degraded floodplain forests and create large contiguous forest and riparian buffers adjacent to the Cache River and Bayou DeView to improve water quality, provide fish and wildlife movement corridors, and enlarge habitat patch sizes for trust wildlife species.
- Protect lands between Bald Knob, Cache River, and White River National Wildlife Refuges, state wildlife management areas, state natural areas, and private conservation lands to increase conservation effectiveness within the Cache/White River watershed, and increase and facilitate access and wildlife-dependent recreation on public lands.

BACKGROUND

Cache River NWR was established on June 16, 1986, with the purchase of 1,395 acres within an approved acquisition boundary of 60,400 acres. On August 5, 1998, the Regional Director approved the Final Environmental Assessment and Land Protection Plan to expand the existing acquisition boundary an additional 114,900 acres. The approved expansion approximated the 10-year floodplain of the Lower and Middle Cache Rivers' Basin, including Bayou DeView, and increased the approved acquisition boundary to a total of 175,300 acres. The acquisition boundary was further expanded by

410 acres on June 22, 1999, and by 9,864 acres on February 4, 2005, by authority delegated to Regional Directors to approve any refuge expansion totaling 10 percent or less of the approved acquisition boundary for an established refuge. The current acquisition boundary encompasses 185,574 acres. The refuge now contains about 67,400 acres (in fee-title). Cache River NWR is one of four refuges administered by the Central Arkansas National Wildlife Refuge Complex (Complex) that also includes Bald Knob, Big Lake, and Wapanocca NWRs (Figure 14). In addition, Cache River NWR adjoins White River NWR to the south (Figure 15).

Figure 14. Location of Cache River NWR in Arkansas

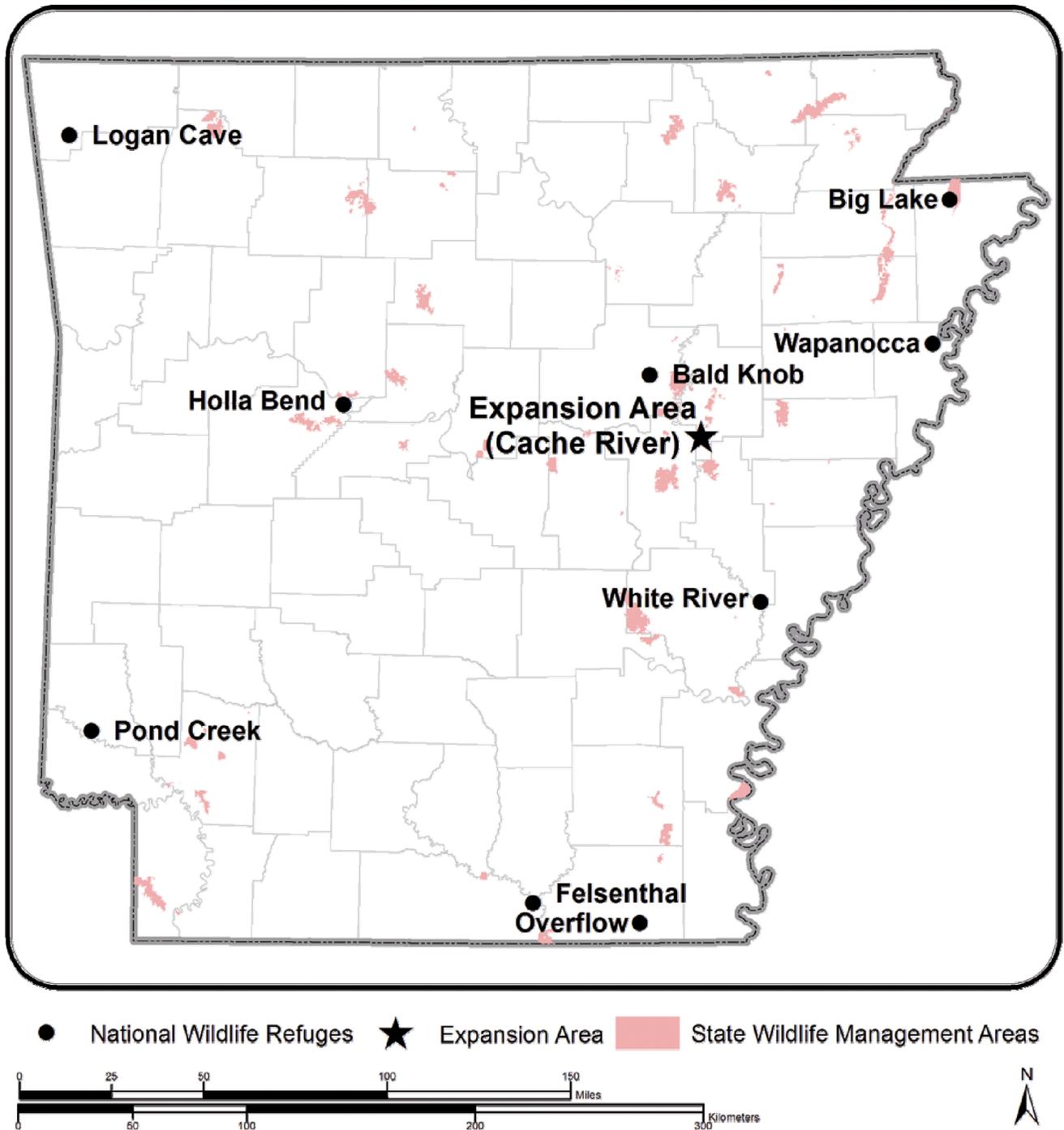
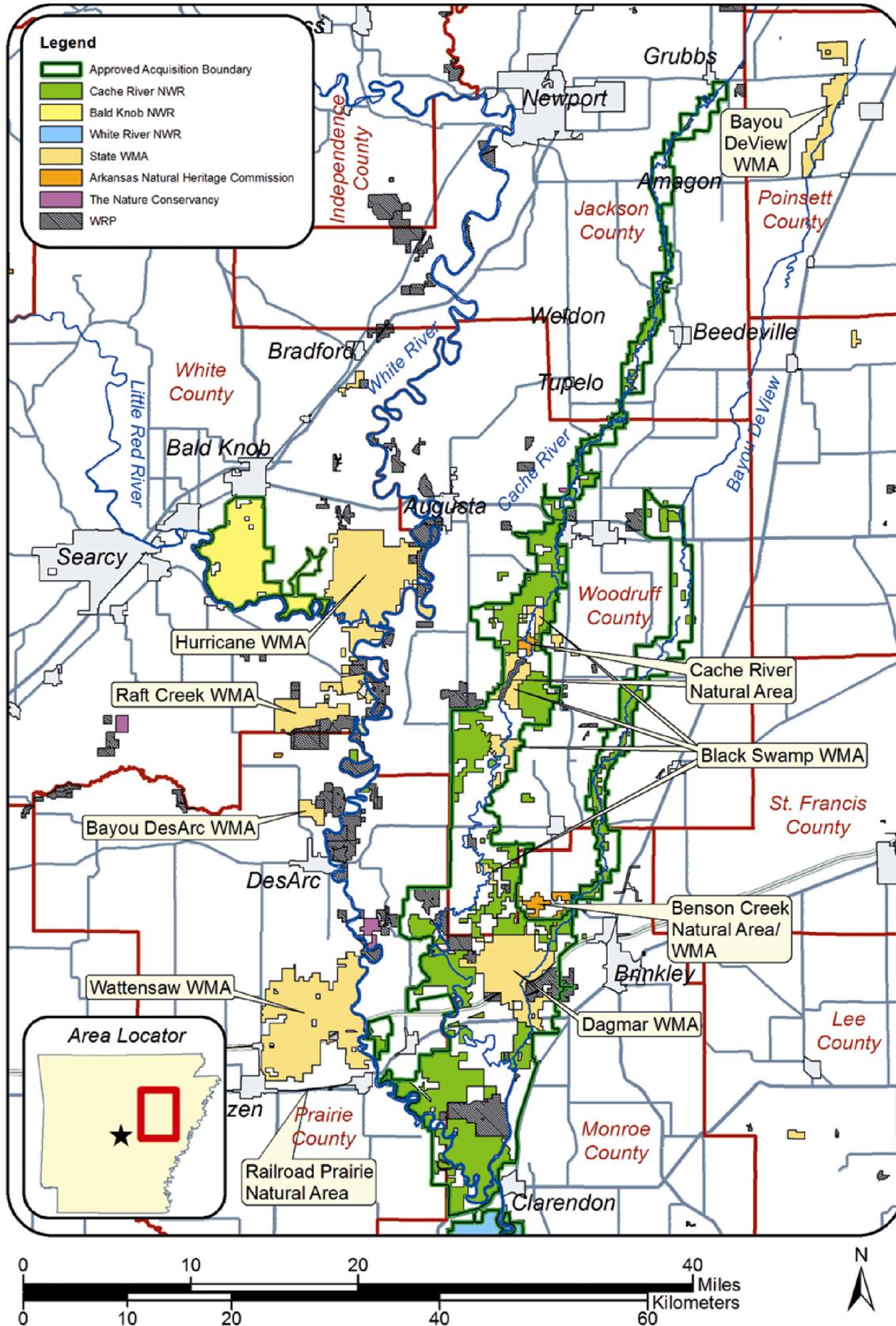


Figure 15. Cache River NWR



Cache River NWR's official purposes and enabling legislation are:

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

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." 16 U.S.C. 742f(a)(4) ...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956);

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

The vision statement for Cache River NWR states the *"Refuges within the Central Arkansas National Wildlife Refuge Complex will be conserved and managed as havens for migratory birds, especially waterfowl, in a region of the continent critically important for their survival. Working with partners, the Service will protect, restore, and enhance bottomland hardwood forest ecosystems, wintering waterfowl habitats, and other fish and wildlife habitats for the benefit of the American public. The Service will provide opportunities for the public to use and enjoy these refuges in a way that safeguards their values and promotes awareness of their importance"* (USFWS 2009).

The Complex would continue to serve the American people by continuing opportunities for compatible, wildlife-dependent recreation such as hunting, fishing, wildlife photography and observation, as well as environmental education and interpretation. In addition, the Complex would seek partnerships that promote environmental stewardship, foster research opportunities to enhance resource management and restoration efforts, and protect historical and cultural resources of the Complex.

PROPOSED ACTION

The Service proposes to acquire, protect, restore, and enhance strategic conservation lands through fee-title purchases, leases, conservation easements, and/or cooperative agreements of up to 102,000 acres from willing sellers only. The Draft LPP presents the methods the Service and interested landowners could use to accomplish their objectives for wildlife habitat within the refuge boundary. Within approved acquisition boundaries, the Service would be able to enter into negotiations for the protection of environmentally sensitive lands. The most urgent needs for acquiring an interest in these lands are as follows:

- Restore key ecological processes that drive and sustain the unique, but declining Cache River floodplain ecosystem, and improve ecosystem services and associated public benefits.
- Strategically restore altered geophysical features and original connectivity of water flow within and between the Cache River and Bayou DeView floodplains.
- Improve hydrologic function of these streams and their floodplains and enhance wetland and aquatic ecosystems for the benefit of trust species.
- Incorporate protection and enhancement of a diversity of critical habitats on which trust species depend to better represent the full spectrum of habitats that was historically present.

-
- Restore forested habitat and other natural plant communities to improve overall watershed health and stability, promote carbon sequestration, bolster ecological integrity, and increase habitat patch size to accomplish goals set forth in refuge, state, LMVJV, regional, and national plans for migratory birds, forest breeding birds, endangered species, and resident wildlife and fish species.
 - Protect, restore, and enhance fragmented and degraded floodplain forests and create large contiguous forest and riparian buffers adjacent to the Cache River and Bayou DeView to improve water quality, provide fish and wildlife movement corridors, and enlarge habitat patch sizes for trust wildlife species.
 - Protect lands between Bald Knob, Cache River, and White River NWR, state wildlife management areas, state natural areas, and private conservation lands to increase conservation effectiveness within the Cache/White Rivers' watershed, and increase and facilitate access and wildlife-dependent recreation on public lands.

It is anticipated that funding for this proposal would be provided through the Migratory Bird Conservation Fund, Land and Water Conservation Fund, North American Wetlands Conservation Fund, and Land for Timber Exchange. The authority for the use of these funds for land acquisition is the Emergency Wetlands Resources Act of 1986, the Migratory Bird Conservation Act of 1929, Land and Water Conservation Act, or North America Wetlands Conservation Act.

COORDINATION AND CONSULTATION

Coordination and consultation occurred with the Service (Ecological Services, Fisheries, Refuges), Arkansas Game and Fish Commission (AGFC), Arkansas Natural Heritage Commission (ANHC), Arkansas Forestry Commission (AFC), Arkansas Department of Environmental Quality (ADEQ), Arkansas Department of Parks and Tourism, Arkansas Department of Agriculture, Arkansas Natural Resource Commission (ANRC), U.S. Army Corps of Engineers (USACE), Mayor-city of Augusta, T & S Sawmill, White River Levee District, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), USDA-Farm Services Agency, The Nature Conservancy, Audubon-Arkansas, Ducks Unlimited, National Wildlife Refuge Association, Farm Bureau – Monroe, Prairie, Woodruff Counties, Monroe County Judge, Prairie County Judge, Jackson County Judge, Poinsett County Judge, Cross County Judge, Woodruff County Judge, Arkansas Wildlife Federation, National Wild Turkey Federation, landowners, and the public.

Meetings were conducted to inform state, federal, tribal, and local agencies along with conservation organizations of the Service's refuge expansion proposal. It was decided to hold three public meetings in Arkansas: Newport High School Cafeteria, 406 Wilkerson Street, Newport, AR, on Monday, May 7, 2012, 6:00 – 8:00 p.m.; Augusta High School Cafeteria, 1011 Main Street, Augusta, AR, Tuesday, May 8, 2012, 6:00 – 8:00 p.m.; and Brinkley Convention Center, 1501 Weatherby Drive, Brinkley, AR, Thursday, May 10, 2012, 6:00 – 8:00 p.m. The meetings had over 40 non-Service people attend. Initial public reaction to the proposed refuge expansion generally has been favorable, with no explicit opposition received. Some questions or concerns were raised by individuals regarding property taxes, acquisition funding sources, use of condemnation, potential restrictions on private lands, economic impacts, restrictions on public use, and problems associated with the Cache River blockage near Grubbs, Arkansas. Many comments indicated a desire to expand the refuge to include areas not initially delineated in the preliminary planning project. Numerous comments also received indicated that the project boundary should be expanded further to: restore marginal agricultural lands to forest or wetland habitats; enlarge contiguous blocks of habitat for neotropical migratory birds, ivory-billed woodpeckers, wintering waterfowl, and other native

wildlife; serve as a partial connection of a complex of federal, state, non-governmental, and private conservation lands; provide greater riparian buffers; and increase public use opportunities. During the three public meetings, support for the proposed expansion was expressed, and several landowners indicated that they would be willing sellers.

II. AFFECTED ENVIRONMENT

This chapter describes the environment that would be affected by the implementation of the alternatives. It is organized under the following impact topics, which includes the area's natural vegetation, land use, fish and wildlife resources, cultural resources, and socioeconomic and sociocultural conditions.

GENERAL

The affected environment includes a range of sites that are mostly marginal agricultural land with a small percentage of extant forest located in Arkansas within and adjacent to Cache River NWR within the Gulf Coastal Plains and Ozarks (GCPO) Landscape Conservation Cooperative (LCC).

CLIMATE

The climate of central and eastern Arkansas can be characterized as mild and moderately humid. The mean monthly minimum temperature at Stuttgart is 39.7°F in January, and the mean monthly maximum is 91.1°F in July. Winters are relatively mild, but brief cold periods occur occasionally. The region has a long growing season, ranging from approximately 200 days in the north to 220 days in the south, and extended hot, humid periods are common during the summer, with maximum temperatures often exceeding 100°F during July and August.

The region receives abundant precipitation, ranging from 48 to 51 inches annually. Although rainfall is considered to be well distributed throughout the year (the average number of days with measurable precipitation is about 100 per year), there is a pronounced seasonal pattern. Almost one-third of the annual rainfall occurs during March, April, and May, with the driest months being July through October. The average annual evaporation is about 37 inches, with approximately 23 inches occurring from May through September, which exceeds the average rainfall during this period by about 5 inches. The average annual runoff throughout this region is 16 to 20 inches, most occurring from November through April (Friewald 1985). These climatic characteristics are important in driving the hydrology of the watershed, which is, in turn, the most critical component in shaping ecosystem functions and processes.

TOPOGRAPHY AND GEOLOGY

Topography and geology for the Cache River NWR is representative of the proposed lands.

An understanding of the basic geology of Arkansas' Delta is important for understanding the interrelationships of the soil and hydrologic components and processes of the ecosystem, which provide the basis for the associated biotic communities. Paleozoic bedrock outcrops occur on the western edge of the Delta, and declines to the southeast, where outcrops are overlain by more recent alluvial and loessal strata deposited during alternating inundations and recessions of the Gulf of Mexico. The bedrock below the Cache/Lower White River system originated nearly 1,000 to over 4,000 feet below sea level. Various overlying strata of gravel and sand support several important and productive aquifers, alternating with confining strata of silts and clays (ASWCC 1988).

The surface strata of the Cache/Lower White Rivers' Basin are all Quaternary deposits of alluvium and loess. Holocene alluvial deposits of the existing major rivers, abandoned meanders, and areas near channels form the current "bottomland" areas. These are the lowest areas in the basin, and most likely to be forested and retain other obvious wetland characteristics. Immediately upslope of these most recent deposits are one or more terraces of Pleistocene alluvial deposits. Lands at this and higher elevations are the ones which have largely been cleared for agricultural production. Older deposits are exposed in only very limited circumstances in the basin. These include an area of dune sand located in Woodruff County between the Cache River and Bayou DeView, and some isolated pockets of exposed silt and sand along Bayou DeView north and east of Jonesboro.

The elevation at the north end of the basin at the Missouri state line is approximately 300' mean sea level (MSL), compared to 125' MSL at the mouth of the White River. This drop in elevation across 185 air miles represents an average slope of only 0.018 percent (approximately 1 ft/mi) across the entire basin. Although relatively flat, the topography of the basin can be somewhat complex, with numerous current stream and river channels, old meanders, and oxbow lakes surrounded by one or more terrace levels or bottoms.

The topography is usually one of three basic types: braided-stream terraces which display a characteristic dendritic drainage pattern; meander belts which contain areas of past or present channel migration with numerous parallel, crescent-shaped ridges and swales; and backswamps, which are flat areas that remained peripheral to channel migration and slowly filled with layers of fine sediments. Thus, in contrast to the apparent "flatness" of the landscape, the subtle complexity resulting from past and ongoing geologic forces has a dramatic and pronounced effect on the processes which drive this ecosystem and its functions. These processes, in turn, dictate the complexity of associated biologic communities that evolved here.

SOILS

A casual examination of any of the county soil surveys for the basin provides further visual reinforcement of the inherent complexity of the system. The majority of the soil types in the basin are hydric. The spatial relationships of the various soil types and associations present further evidence of their fluvial origin and influence. By and large, the soils of the basin are rich and fertile, and thus the reason for draining and clearing of most of the original forests for agricultural production. Most of the soils have a high clay content, which results in their capability to perch water at the surface, but this also prevents most areas from contributing to significant groundwater recharge through infiltration. These soil characteristics allow the cultivation of rice over a significant percentage of the lands in the basin. Where water retention and flooding characteristics of individual soils are not suited to rice, the dominant crops are soybeans, winter wheat, and milo, with minor acreages of corn and cotton occurring on the highest, most well-drained sites. Physiochemical and physiographic characteristics of soils (e.g., high clay content, susceptibility to erosion, water retention capabilities, and compressibility), and their relationships to ongoing hydrologic processes necessitate careful consideration during assessment of potential impacts of management and land use activities, if restoration and conservation of ecosystem functions are to be successful.

HYDROLOGY

A basic appreciation of the hydrology of the Cache/Lower White Rivers' Basin, and recognition and acknowledgement of its importance as the driving force behind all other ecosystem processes and functions is fundamental to addressing long-term conservation. Without this explicit recognition by all partners, effective long-term management of public lands within the basin is impossible, and efforts toward meaningful, sustainable restoration of ecosystem functions cannot be effective or adequately

focused. Although a thorough understanding and comparison of the past and present hydrologic function of the system would be desirable, available data are inadequate. However, the basic concepts and generalizations which are known can contribute significantly to providing context and direction to management of the public lands within the ecosystem, and to addressing the influence of the surrounding agricultural landscape.

Pre-settlement Conditions – The Cache/Lower White Rivers' Basin was a forested wetland habitat complex whose composition, structure, and function were largely determined by the frequency, duration, and depth of inundation. The Cache River drainage area is 1,037 mi² and that of Bayou DeView is 421 mi². The abundant annual rainfall, flat topographic profile, and other hydrologic influences resulted in flooding, which ranged from frequent, deep, and prolonged events adjacent to the major drainages and in the lower portion of the system, to shallow and temporary events in the topographically higher areas of the bottoms and in isolated, but often extensive depressions throughout the terrace lands. The annual hydrologic cycle reflected seasonal rainfall patterns, with lowest flows occurring in July through October, and flooding along the river bottoms typically beginning in December or January and peaking in February and March on the Cache River and Bayou DeView and in April and May on the Lower White River (ASWCC 1988). The system contained an abundance of stream channels, sloughs, oxbow lakes, and scrub-shrub swamps, which contained water throughout the year in all but the driest years. Extremely dry periods, during which a significant percentage of the smaller stream channels (on the order of Cache River and smaller) were exposed, were infrequent but must have occurred every few hundred years as evidenced by: (1) The current distribution of baldcypress, which can survive but not germinate in inundated conditions, and (2) documentation through a 400+ year-flow reconstruction based on a dendrochronological study of old-growth baldcypress trees on the Cache River (Cleaveland et al. 1988). The extreme dynamism of the hydrology within the system, over both the short- and long-term, was one of its most important pre-settlement characteristics.

There also was and is a significant degree of spatial variation in the hydrology within the ecosystem. Relatively shallow depressions in the bottomlands and terraces are the first areas to be annually influenced by inundation through a process termed "puddling," when they gradually fill during the onset of fall rains in November. With continuing rainfall, these areas expand and interconnect, affecting larger and larger acreages. These depressions also would have been among the last seasonally flooded wetlands to dry during late spring with the end of the rainy period. With the continuation of fall rains, the upper reaches of the streams' floodplains were largely affected by "headwater flooding," which is the relatively rapid flooding of drainage areas due to heavy rainfalls during short periods of time. Heavy rains, in conjunction with the natural constraints of small channels and broad, vegetated floodplains, can exceed the short-term capacity of the system to carry away the rainfall. As this process proceeded with additional winter and spring rains, gradually pushing major drainages like the White and Mississippi Rivers to capacity, larger areas of flats and floodplains were inundated by "backwater flooding." This was caused by water "backing" into higher areas as a result of flows greatly in excess of stream channel capacities and/or impeded drainage in lower portions of the system. For example, high flows on the Mississippi River greatly affect the hydrology of the lower half of the White River NWR by reducing the ability of the White River to discharge into it; conversely, high flows of the White River may be relatively easily carried if the Mississippi River is low. The same situation exists at the confluence of the Cache and White Rivers at Clarendon, and at other tributary confluences on a smaller scale. Thus, there were complex hydrologic interrelationships between the tributaries and primary rivers within the ecosystem, including the Lower White River and Arkansas and Mississippi Rivers.

Hydrologic Modifications – Unfortunately, these hydrologic patterns and relationships and their effects on other functions of the Cache/Lower White Rivers’ Basin have often been inadequately considered as it has been incrementally but significantly altered since settlement. It is helpful to view the hydrologic alteration of the Cache/Lower White Rivers within the perspective of historic flood control and drainage policies of the Mississippi Alluvial Valley (MAV) as a whole (Baxter and Sunderland 1985). During settlement in the late 1800s and early 1900s, there were many uncoordinated, local flood control and drainage projects. Although these early projects may have had a significant cumulative impact on the terrace lands within the ecosystem, they had less effect on natural headwater and backwater flooding of the major drainages. However, subsequent to the major Mississippi River flood of 1927, when much of the Arkansas Delta was inundated, a comprehensive federal flood control program was initiated. This resulted in the construction of the mainstem Mississippi River levees, and levee projects on major tributaries such as the White River. These projects constricted the floodplains of the Mississippi River and its tributaries such that lower flows now result in higher elevations of flooding than was the case for pre-settlement hydrology. Additionally, headwater dams at Greers Ferry, Bull Shoals, and Norfolk were installed as part of the comprehensive federal response to the 1927 floods. Operation of these dams have affected downstream peak flood flows and lowered summer/fall base flows.

One of the by-products of the subsequent era of major flood control projects was the extensive conversion of bottomland hardwoods to agricultural production, much of it occurring in the Cache/Lower White Rivers’ Basin during the 1940s through the mid-1970s. Land that was provided protection from flooding by these major levee systems was quickly cleared and brought into agricultural production. Extensive conversion of bottomland hardwood forests to agricultural lands has negatively impacted the hydrological regime of the Cache/Lower White Rivers’ Basin, as well as the Lower Mississippi Alluvial Valley (LMAV) as a whole. The clearing of forest, increased the “flashiness” of streams due to accelerated run off, and exacerbated siltation in streams and wetland systems due to increased sediment transport. The federal Flood Control Acts of 1944 and 1965 promoted a policy of bottomland hardwood conversion, and the 1965 Act included as a part of its justification the clearing of 4.9 million acres in the MAV (Baxter and Sunderland 1985), much ultimately occurring in the Cache/Lower White Rivers’ Basin. With this federal policy in place, many local drainage/flood control projects, now coordinated to some extent by USACE, continued up the tributaries through the mid-1980s. Beginning in the early 1900s and continuing until the early 1930s, local drainage districts channelized the upper portion of the Cache River Basin, from Grubbs (river mile 128 of 203), at the north end of the Cache River NWR acquisition boundary, to its headwaters. The lower seven miles of the Cache River were also channelized in the early 1970s, but this project was stopped by legal action, and the overall hydrologic impacts of this 7-mile modification are not quantified.

The collective results of over a century of flood control activities has been: (1) The draining and clearing of the vast majority of the terrace lands and driest portions of the forested wetland habitats of the entire system, especially within the Cache River/Bayou DeView Basin, where clearing to the riverbanks has occurred in many areas; (2) constriction of the floodplain of the Lower White River with levees, and the clearing of lands protected by those levees; and (3) the modification of the natural hydrologic patterns (e.g., timing, frequency, and flow rates) throughout the ecosystem. It should be noted that from the biological perspective, these alterations have occurred within a single generation of trees, which constitutes a significant biological alteration. Approximately 85 percent of the basin has been cleared of its hardwoods, and most of these lands were forested wetlands.

A relatively recent and continuing hydrologic modification is the increasing withdrawal of surface water from essentially all available streams for agricultural irrigation. These withdrawals occur at the farm level, are individually relatively small, but are cumulative in their effect throughout the basin. There is no available estimate of current withdrawal rates, but they are known to be collectively substantial. For example, portions of the Cache River, with a relatively low base flow, are frequently pumped dry for

some periods during most summers. Similarly, the upper portion of Bayou DeView usually has no base flow during some summer months, and agricultural pumping has exacerbated this to the point that the stream has recorded no-flow conditions for 10 percent of the time over the last 37 years and has been designated as a "critical surface water area" by the State of Arkansas (ASWCC 1988). However, in contradiction to the previously described long-term effects of flood control and regulation projects, the recent average streamflow of the White River at Clarendon has decreased slightly, and this has been speculated to be the result of current withdrawals for irrigation. Several large-scale irrigation projects, including the Grand Prairie Area Demonstration Project, are being promoted by the ANRC, NRCS, and USACE, with the White River being the primary source of irrigation.

Current Hydrologic Status – Even though the basic processes of puddling and headwater and backwater flooding still operate within the basin, their collective contribution to hydrologic function has been profoundly modified by both quantitative and qualitative alteration, and by the addition processes such as irrigation withdrawals. Interestingly, the overall hydrologic effects on the system can be described as being at both ends of the spectrum: drier in most areas, wetter in some. The many local efforts directed at drainage associated with agricultural production and transportation (e.g., road ditches) have significantly reduced the area affected by puddling and the amount of water that could be held as a result of puddling. Areas that were cleared of forest and ditched now contribute virtually none of their original hydrologic function to the system by immediately discharging excess rainfall as runoff to the watercourses. When the acreage that has been influenced by flood control projects intended to reduce the impacts of headwater flooding are added to these, then the vast majority of the ecosystem is now affected. This area no longer holds temporary water as it did historically, and now relatively rapid discharges runoff to the rivers; thus, these areas, comprising most of the higher elevations of the ecosystem, are drier than they were historically, being inundated much less frequently and for much shorter durations.

However, as a direct result of the increased rate of drainage from most of the basin, the lower elevations and those areas nearest the Cache River, Bayou DeView, and White River now receive all this water more rapidly and in quantities more frequently exceeding the capacity of the system to carry and discharge into the Mississippi River. Additionally, the discharge capacity of the White River into the Mississippi River and Cache River into the White River is greatly reduced from historic conditions due to the effects of the levee projects. Thus, the areas immediately adjoining the upper and middle Cache River and Bayou DeView, subjected to unregulated flows, can be characterized as being more frequently flooded at greater depths, but for shorter durations than in the natural ecosystem. The stochastic dynamics of the natural system have in many ways been exaggerated by the hydrologic modifications. On the other hand, the lowest portions of the Cache and Lower White Rivers seem now to be subjected to more frequent flooding, at greater depths, for longer durations than was the historic tendency.

HABITAT AND LAND USE

During pre-European settlement, the floodplain of the Cache River Basin was almost entirely covered by various bottomland hardwood forest community types. Edges of the floodplain were mostly forested with some isolated, higher elevation terraces and dune areas containing relatively small areas of bottomland prairie and savanna. This bottomland hardwood-dominated ecosystem supported a high diversity of plant and animal species and was an important corridor of movement for water, nutrients, sediments, and animals within the MAV (U.S. Department of the Interior 1984). The location of the refuge and proposed expansion area within the MAV and the ecoregions of Arkansas are depicted in Figure 4. Today, the basin's 100-year floodplain is nearly 75 percent cleared and used as agricultural land; much of this land was cleared in the 1960s and 1970s for soybean production. Despite the extensive deforestation and ecological alterations, the Cache River Basin

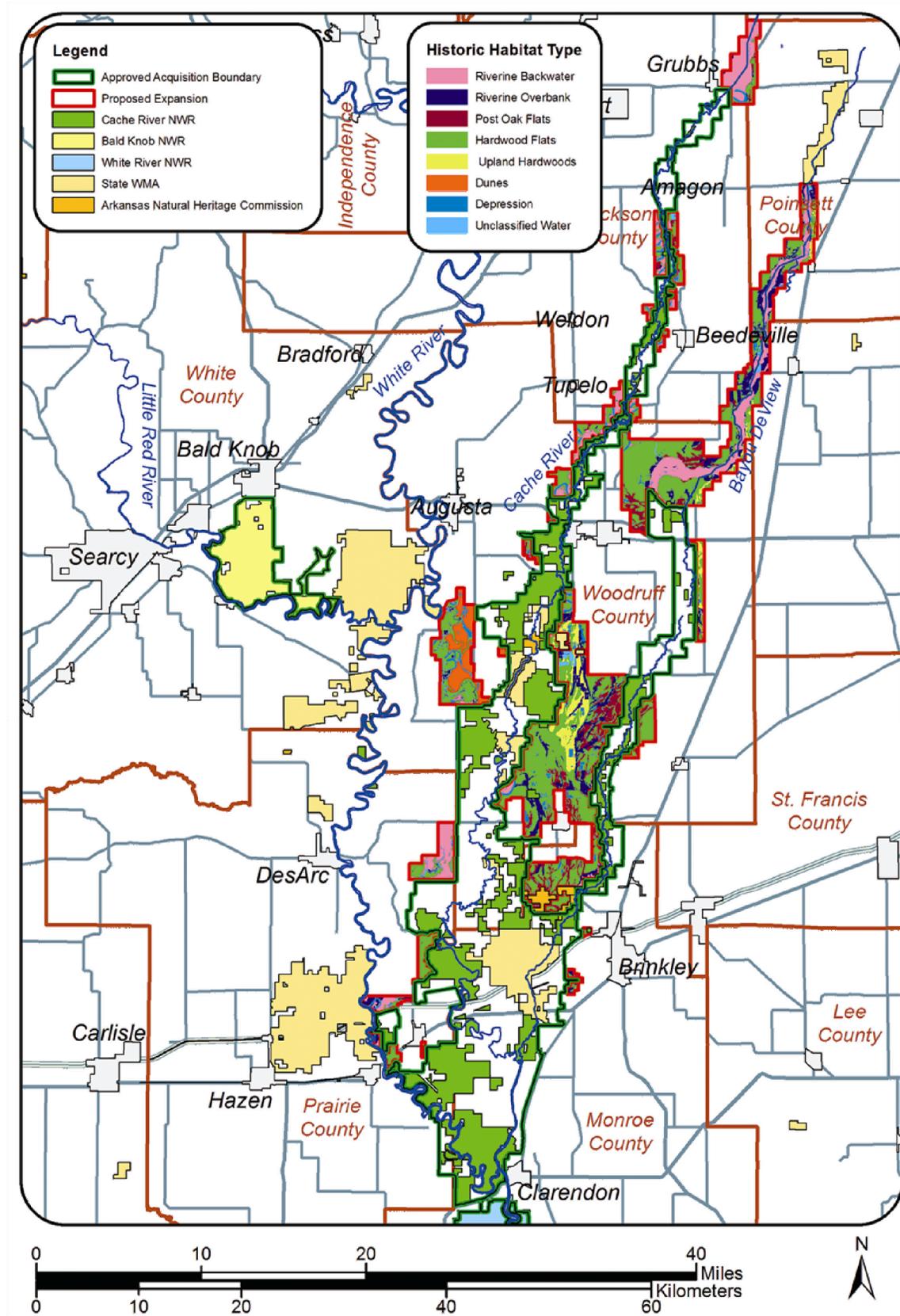
remains as one of the most important bottomland hardwood ecosystems in North America, and is identified by many national and international conservation entities for its unique and valuable ecological significance and as a priority region for future protection and restoration (complete documentation in U.S. Fish and Wildlife Service 2009).

Land use type within the current approved acquisition boundary is dominated by agriculture; the remaining forested habitats are characterized by riverine backwater communities comprised of overcup oak with Nuttall oak as a common associate, baldcypress and water tupelo predominant in swales and along internal drainages, and on slightly higher sites, willow oak/Nuttall oak with overcup oak in vernal pools. Also present are riverine overbank communities of sycamore, cottonwood, black willow, pecan, cedar elm, boxelder, sugarberry, and Nuttall, willow, and water oaks. Topography in these bottoms is relatively flat with connected sloughs, oxbows, and depressions. Higher in the floodplain are found various hardwood flat communities of water oak, sugarberry, and sweetgum, with willow and Nuttall oaks in vernal pools - and further to the north - hardwood flats of water oak, swamp chestnut oak and mockernut hickory with willow oak, Nuttall oak, and green ash in vernal pools (Klimas et al. 2009). Cache River NWR currently occupies 67,400 acres of which approximately 47,000 acres are hardwood forest complex and approximately 17,000 acres are reforestation/restoration.

Although the habitat communities within the current holdings and current acquisition boundary of Cache River NWR are diverse, they do not represent the full spectrum of the ecosystem that was historically present. Unique habitats exist very near the refuge on which trust wildlife resources, including those not found within the current boundary, are dependent, but are unavailable for protection, restoration, and enhancement because they are outside the approved acquisition boundary (Figure 16). Furthermore, it is essential to conserve, restore, and enhance plant and animal communities beyond the current acquisition boundary on a landscape scale in order to strategically and effectively accomplish the purposes for which Cache River NWR was established. Therefore, this preliminary step toward restoration of functional watersheds of the Cache and White Rivers and Bayou DeView would promote comprehensive fulfillment of refuge purposes. The current acquisition boundary could be viewed as an ecological core, and this and potential future proposed expansion areas could function not only as an insulative buffer, but also provide the means to conserve and restore unique habitats for trust resources (endangered species, migratory birds, wetlands, interjurisdictional fishes) that are under-represented in this region. The ultimate outcome of the proposed expansion would facilitate: (1) Improvement of hydrologic function and water quality; (2) reestablishment of forest communities on agricultural lands; (3) enable enlargement of bottomland and upland forest habitat block size for the benefit of migratory birds; (4) promote restoration of wetlands for waterfowl; waterbirds, fishes, mussels, and other trust species; and (5) enable programs for restoration and enhancement of riparian and other aquatic systems for fishes and mussels.

Moreover, this expansion would be a strategic opportunity for the Service to: demonstrate enhanced landscape/watershed conservation, restoration, and management programs (the heart of the National Wildlife Refuge System mission), facilitate partnerships, and provide increased opportunities for public access and wildlife-dependent recreation. Indeed, the overarching theme for the need and justification for the proposed expansion is that of increased capability and capacity for conservation, restoration, and management (enhancement) for the benefit of trust resources to better fulfill refuge purposes, vision, goals, and objectives and the National Wildlife Refuge System mission for the betterment of present and future generations of Americans.

Figure 16. Habitat map of area



A description of habitats for each expansion area follows:

Cache River/Bayou DeView Corridor – 38,483 acres

Currently, only about 15 percent of this 38,483-acre area is forested; the remainder has been cleared for agriculture. The bulk of existing forest remains in partially connected Riverine Overbank Tributary areas (small drains) and contains willow oak, water oak, American elm, green ash, persimmon, and cherrybark oak, or in Post Oak Flats or Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains. However, historically, the dominant habitat types were: Wet Phase Hardwood Flats of delta post oak, willow oak, Nuttall oak, and overcup oak (41 percent), then roughly equal parts of: Riverine Overbank areas (14 percent), and Post Oak Flats (14 percent), and Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains (13 percent). Also worthy of note are smaller components of significant habitat currently underrepresented on the refuge: Isolated Depressions (3 percent), Terrace Depressions (1 percent), and especially Upland Hardwoods (9 percent).

Acquisition of this area would enable hydrologic and habitat restoration within this broad and critical gap between the two major prongs (Cache River and Bayou DeView) of the current acquisition boundary, and would provide a unique opportunity to restore a comprehensive suite of habitat communities and functionally reconnect these two watersheds. Additionally, threats to the ecological health and integrity of the refuge could be significantly reduced by correcting the altered hydrologic regime resulting from agricultural conversions, curbing non-point source pollution, and reestablishing native plant communities. These improvements would support achievement of refuge purposes to an extent not possible without such expansion and the resultant increase in capacity and capability for conservation and management programs.

Bayou DeView Peripheral – 32,630 acres

This area extends the zone of protection of the historic channel of Bayou DeView from the current acquisition boundary northward to connect to Bayou DeView State WMA holdings; the area also extends in strategic areas to the east and west to encompass desirable habitat and improve access and management capability. The main expansion northward would provide a critical riparian habitat buffer for Bayou DeView (which currently does not exist) and allow hydrologic restoration and water quality improvement both here and downstream. This area would enable future restoration efforts to restore more natural flows through the historic bayou channel and reestablishment of more normally functioning riparian corridor and floodplain. Significant benefits to the Bayou DeView system also would be derived from reducing erosion and sedimentation, surface water withdrawal, chemical and nutrient runoff, and stream zone disturbance.

Most of the area has been cleared for agriculture; only around 6 percent of the area remains as forest in scattered blocks. Historically, the area supported mostly Wet Phase Hardwood Flats of delta post oak, willow oak, Nuttall oak, and overcup oak (35 percent), and then roughly equal parts of Riverine Overbank Tributary Valleys of willow oak, water oak, American elm, green ash, persimmon, and cherrybark oak (14 percent); Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains (12 percent); and the final major components of Riverine Backwater Upper and Lower Zones (11 percent and 10 percent, respectively). Following these are components of significant habitat currently underrepresented on the refuge: Post Oak Flats (6 percent), and Upland Hardwoods (4 percent).

Cache River Peripheral – 29,997 acres

The Cache River Peripheral area expands the current acquisition boundary 29,997 acres in several blocks strategically located along the western and northern sides of the Cache River watershed. Only about 15 percent of the area is currently forested; the remainder is agricultural land. Similar in function to Area 1, this expansion area would enable restoration and at least partial connection of the watersheds of the White and Cache Rivers. The largest concentrations of existing hardwoods are either (1) Riverine Backwater Upper and Lower Zones; the Upper Zone containing willow oak and Nuttall oak with overcup oak in vernal pools, and the Lower, overcup oak, with Nuttall oak as a common associate and baldcypress and water tupelo in swales and along internal drainages, or (2) Dry Phase Hardwood Flats of post oak, southern red oak, and shagbark hickory with willow oak in vernal pools and minor drains.

Historically, the dominant habitat types were: (1) Riverine Backwater Upper and Lower Zones (17 percent and 15 percent, respectively); (2) dunes containing black oak, post oak, southern red oak, prairie grasses, prickly pear, and blackjack oak (13 percent). Dunes are soils made up of wind-blown sands deflated from Late Wisconsin outwash channels and deposited on the adjacent, older valley train terraces. These dune fields are unique to the Arkansas Delta Region of the LMV, and scarcely represented in only a portion of two current refuge tracts; and (3) Holocene Point Bars and Backswamps containing Delta post oak, water oak, swamp chestnut oak, and mockernut hickory, with willow oak, Nuttall oak and green ash in vernal pools (12 percent). Other substantial components found here that are very unique habitats to the Cache River watershed are Post Oak Flats (2 percent), and especially isolated Sand Ponds (1 percent in the Cache Bayou area) that historically supported shrub species of concern, such as corkwood (*Leitneria floridana*) (state listed as vulnerable), and the federally endangered pondberry (*Lindera melissifolia*).

Achievement of refuge purposes would be enhanced through this expansion because unique habitats beneficial to trust species, but not encompassed in the current acquisition boundary, would be conserved. Furthermore, this expansion would enable the refuge to take preliminary steps to conserve and connect Cache River habitats to conserved habitats along the White River, which is the predominant hydrologic force in this area, which will ultimately result in major benefits to waterfowl, other migratory birds, declining fish species, endangered mussels, and other native wildlife. Additionally, a major blockage in the Cache River exists at the junction of the channelized and non-channelized courses of the Cache River in the northernmost end of this expansion area. Acquisition of this area would allow proper resolution of the blockage and improvement in hydrologic function for the Cache River and reduction in damaging flood events for area farmers and residents.

WILDLIFE RESOURCES

As one of the few remaining areas in the LMAV not drastically altered by channelization and drainage, the Cache River Basin contains some of the most intact and least disturbed bottomland hardwood forests in the MAV. Migratory and resident waterfowl, American woodcock, shorebirds, secretive marshbirds, colonial wading and water birds, and forest breeding and neotropical migratory birds are common throughout the Cache River Basin. Resident birds and mammals, such as eastern wild turkey, white-tailed deer, squirrels, bats, numerous furbearers, and small mammals, are also common. Additionally, there are numerous species of reptiles, amphibians, mussels, and fish that are common in rivers, bayous, tributaries, lakes, and other wetland areas.

Ivory-billed woodpeckers; bald eagles; wood storks; southeastern myotis bats; Rafinesque's big-eared bats; pink mucket, fat pocketbook, and rabbitsfoot (Candidate) mussels; and pondberry are some of the endangered species and species of special concern that are known to occur in the

Cache/White Rivers' Basins. Additionally, endangered least terns and piping plovers occur within the proposed expansion area (Table 4).

Table 4. Partial listing of rare, threatened, and endangered species found in expansion area

Scientific Name	Common Name	Federal Status	Global Rank		State Rank	
<i>Cycleptus elongates</i>	Blue Sucker Mussel	N/A	G3G4	Imperiled	S2	Imperiled
<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot Mussel	Candidate	G3G4T3	Vulnerable	SNR	Not Ranked
<i>Potamilus capax</i>	Fat Pocketbook Mussel	Endangered	G1G2	Critically Imperiled	S1	Critically Imperiled
<i>Lampsilis abrupta</i>	Pink Mucket Mussel	Endangered	G2	Imperiled	S2	Imperiled
<i>Leitneria floridana</i>	Corkwood	N/A	G3	Vulnerable	S3	Vulnerable
<i>Lindera melissifolia</i>	Pondberry	Endangered	G2G3	Imperiled	S2	Imperiled
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	N/A	G3G4	Vulnerable	S3	Vulnerable
<i>Myotis austroriparius</i>	Southeastern Myotis Bat	N/A	G3G4	Vulnerable	S3	Vulnerable
<i>Campephilus principalis</i>	Ivory-billed Woodpecker	Endangered	G1	Critically Imperiled	S1	Critically Imperiled
<i>Sterna antillarum</i>	Interior Least Tern	Endangered	G4T2Q	Imperiled (Interior)	S2B	Imperiled Breeding
<i>Charadrius melodus</i>	Piping Plover	Endangered	G3	Vulnerable	SNR	Not ranked

MIGRATORY AND RESIDENT WATERFOWL

The refuge provides important foraging and resting (sanctuary) habitats within the LMAV for waterfowl and serves in an integral role in both the North American Waterfowl Management Plan (NAWMP) and Lower Mississippi Valley Joint Venture (LMVJV) on a national, flyway, and local scale. The Cache River Basin has been identified as the most important wintering area for mallards in North America. During peak years, 400,000 to 500,000 mallards have been estimated to winter within the current acquisition boundary of Cache River NWR.

A diversity of habitats, such as flooded cypress brakes and bottomland hardwoods, as well as afforestation, moist-soil, and agriculture areas, are required by migrating waterfowl to meet their life cycle and nutritional needs for molting, migrating, pair bonding, and egg laying. The refuge has strived to increase managed waterfowl habitat (Duck-Energy-Days) to meet the habitat and population goals of the NAWMP as stepped-down through the LMVJV. Acquiring additional habitat is necessary to meet the refuge goals and also assist in meeting the NAWMP Joint Venture Habitat Objectives of protecting/securing 407,000 acres and restoring/enhancing 2,046,000 acres of waterfowl habitat. Purchasing additional lands would increase the acreage of protected, restored, and managed wetland habitats for wintering waterfowl, as well as provide vital breeding, nesting, and brood-rearing habitat for wood ducks and hooded mergansers.

FOREST BREEDING BIRDS AND NEOTROPICAL BIRDS

Forest breeding birds, and neotropical migratory birds, in general, are experiencing long-term declines as a result of habitat loss across their full range of wintering habitats in Central and South America, and their migrating and breeding habitats in North America, including the LMAV. Minimum forest block size, forest fragmentation, and poor stand quality (structure and species composition) are critical issues affecting forest breeding birds and other neotropical migratory birds that utilize the MAV.

The remnant, narrow blocks of contiguous forest on the Cache/White River ecosystem are now considered the most important in the MAV. The Partners in Flight Bird Conservation Plan for the MAV established avian population goals to support source populations of high-priority species in contiguous bottomland hardwood forests. The estimated minimal patch size required to maintain a source population of 500 breeding pairs of Swainson's warblers and prothonotary warblers is 10,000 acres and 20,000 acres for Cerulean warblers. A block of 100,000 acres is a minimal patch size that will support 80 breeding pairs of swallow-tailed kites.

Within the current acquisition boundary (old White River North Bird Conservation Area), there is only one contiguous forest block greater than 10,000 acres but smaller than 20,000 acres, and only five blocks of contiguous forest greater than 20,000 acres but less than 100,000 acres. The largest forested block totals 72,984 acres. Although many of the refuge's forested tracts are separated by agricultural fields, there is great opportunity for reestablishing contiguous forested tracts (connecting existing public land and privately owned conservation tracts (WRP) to create larger forested blocks) by eventually expanding the Cache River NWR to fully connect with Earl Buss Bayou DeView, Rex Hancock Black Swamp, Sheffield Nelson Dagmar, Henry Gray Hurricane Lake, Steve N. Wilson Raft Creek Bottoms, Bayou Des Arc, and Mike Freeze Wattensaw WMAs, Bald Knob NWR, and White River NWR. The proposed expansion of the refuge and restoring forested habitats would contribute to the LMVJV goals for the refuge and the national goals of the Partners in Flight Bird Conservation Plan and the North American Bird Conservation Initiative for the Cache River Basin.

Upland forests are an essential habitat component of forest breeding birds and neotropical migratory birds. Currently, this habitat is very limited in the LMAV and on Cache River NWR. The purchase, protection, enhancement, and restoration of this habitat would increase biodiversity and species richness on a landscape scale, and significantly benefit migratory and resident bird species that use these habitats. The proposed expansion would begin to provide increased capability to conserve complementary, contiguous upland and bottomland hardwood communities not found on such a large scale elsewhere in the MAV, as well as associated grassland, savanna, prairie, and scrub-shrub habitats. In summary, acquiring agricultural lands and restoring upland and bottomland forest, wetland habitats, and hydrologic function would increase forest block size and restore more typical flooding regimes, enable implementation of sound forest management programs to produce ideal forest species composition and habitat structure desired by forest breeding birds, and connect these

habitats by establishing functional corridors. These actions would greatly increase the desirability and suitability of the habitat for use by forest breeding and neotropical migratory birds, which would enhance species richness and abundance.

SHOREBIRDS

Shorebirds migrate through the MAV from the southernmost parts of South America to the northernmost parts of North America. They typically probe in soft mud (e.g., mudflats) and shallow water for worms and small invertebrates. In the MAV, these birds generally move through during spring and fall, foraging as they migrate. They may only spend 10 days in the LMAV, with very few overwintering or nesting in the LMAV; however, these stop-over habitats are in short supply overall, particularly outside the refuge, and are critical to maintaining the energy requirements of shorebirds as they travel through their migratory routes.

Examples of shorebirds that occur on the refuge and in the expansion area, that would benefit from increased areas of restoration/management/enhancement expansion include killdeer, willets, least sandpipers, lesser yellowlegs, black-necked stilts, solitary sandpipers, peeps, and common snipe. Also present in the expansion area are wading birds, such as various species of herons, egrets, and ibis, and marsh birds, such as rails, bitterns, and gallinules that would be favorably influenced by increased protection of marsh nesting and rookery sites and enhancement of foraging areas. Quality shorebird habitat is limited during the summer and early fall on Cache River NWR. Mud flats, shallow water impoundments, or flooded agricultural lands are prime shorebird habitats, the quantity and quality of which could be greatly increased through restoration and enhancement programs made possible by refuge boundary expansion and land acquisition, which, in turn, would better enable the refuge to fulfill its purposes and achieve its goals as part of the United States Shorebird Conservation Plan.

AMERICAN WOODCOCK

American woodcock are migratory game birds that occur in the forested portions of the eastern United States. Their numbers have declined 19 percent from 1968 to 1990, and their continuing population declines are thought to be the result of land-use changes associated with land conversion and the maturing of forest habitats. The American Woodcock Management Plan (USFWS 1990) included an objective to protect and enhance wintering and migrating habitat on public lands to increase woodcock carrying capacity. American woodcock have become a priority species for restoration and management in the eastern United States at the federal, state, and private levels.

Arkansas' lowlands are thought to be important migratory habitat given the large population which migrates to and overwinters in Louisiana. Cache River NWR and adjacent areas contain a substantial amount of habitat that appears to be suitable for woodcock. Wintering habitat for woodcock includes moist bottomland hardwood forests with brush and understory, agricultural fields, and "old field" successional habitat. These sites are typically thickets with spongy, wet soil and a high density of vertical plant stems with sparse ground cover. The purchase, protection, and enhancement of additional bottomland hardwood forests, reforestation sites, and early successional wetland sites in the proposed expansion area would increase woodcock habitat and associated wetland bird use that would help the refuge contribute to the local, regional, and national goals of the American Woodcock Management Plan.

IVORY-BILLED WOODPECKER

Ivory-billed woodpeckers (IBWO) once inhabited forested habitats throughout the southeastern United States and Cuba. Although there are little specific population data available, it is likely that European settlement and extensive forest clearing caused the species to decline in the second half of the 19th Century. By the mid-20th Century, the IBWO was reduced to a very small population in the Tensas River Basin in Louisiana, where the last widely accepted IBWO sightings occurred in 1944. Since that time, there have been numerous unsubstantiated sightings throughout the historic range of the species. Many of these sightings seemed credible but lacked hard evidence.

In February 2004, Cornell Lab of Ornithology biologists became aware of a credible sighting of the IBWO on a portion of Bayou DeView, which is located on Cache River NWR. Subsequently, Cornell biologists and their partners documented the presence of at least one IBWO in that area. Sixteen sightings of the IBWO were reported deep within the cypress-tupelo swamp of the Bayou DeView in 2006.

Rediscovery of the IBWO in 2004 on the Cache River NWR was announced in 2005. Researchers from Cornell, with assistance from personnel from the Nature Conservancy, Arkansas Audubon, Arkansas Game and Fish Commission, and the Service, along with numerous volunteers, have been faithfully searching the Big Woods of Arkansas, including Cache River NWR, for the last several years. There have been many reported sightings, interesting audio, and other supporting data, but no additional video or still pictures have been recorded. A helicopter search conducted in February 2008 failed to produce any sightings of IBWO.

The IBWO relies upon large forested blocks that produce sustainable amounts of forage and habitat. Tanner (1942) estimated that the minimum area necessary for an IBWO pair under ideal habitat conditions was approximately 2.5 to 3 square miles or 1,600 to 1,920 acres. This could range much higher under less desirable habitat conditions, even up to 17 square miles. Key to the species occurrence is an ample food source of large beetles (e.g., cerambycids and buprestids) and larva found in recently dead and dying wood. The IBWO is the initial predator on insects that attack stressed trees and dying trees within the first few years of decay. Another element of habitat crucial to IBWO is a relatively high density of large trees. Large trees supply roosting and perching habitat, and an element of senescence that promotes development of a food source.

Currently, the remaining MAV forest is heavily fragmented and primarily concentrated along large riparian corridors, so now the natural disturbance factors impacting the MAV seldom impact large amounts of forest, and these remaining forest blocks are universally relied upon more heavily by all forest-dependent wildlife. The forest's structure and composition, more so than its age class, are important factors to these species and the IBWO. Future purchase and enhancements of forested lands and acquisition of agricultural lands with subsequent reforestation to create larger blocks of high-quality contiguous forest should improve habitat quality and quantity not only for IBWO, but also a wide array of other forest-dwelling birds. Implementation of the proposed expansion would ultimately result in significant increases in habitat suitable for ivory-billed woodpeckers.

BALD EAGLES AND OTHER SPECIES OF SPECIAL CONCERN

During the winter, bald eagles commonly use Cache River NWR. They are often seen in open areas or near bodies of water searching for prey. Eagles frequently congregate near large waterfowl concentrations during the fall and winter months. Additionally, the refuge hosts breeding bald eagles. In the past 5 years, two pairs of eagles have nested near Rainbow Lake and near Opossum Creek, and both nests were successful. Additional nesting occurs outside the current acquisition boundary, and would be encompassed within the expansion area.

Although bald eagles were recently removed from the endangered species list, they are still protected by the Bald and Golden Eagle Protection Act. The acquisition, protection, restoration, and enhancement of additional wetlands in the proposed expansion area would increase habitat suitability and benefit migrating and breeding bald eagles.

Rafinesque's big-eared bat and the southeastern myotis bat occur in forests on the Cache River NWR and surrounding lands. Roost sites consist primarily of hollow, water tupelo and blackgum trees in mature forests. Baldcypress, magnolia, willow oak, and sweetgum are also used. Restoration and enhancement of wetlands and prairie/grassland areas in the expansion area would increase foraging opportunity for bats. The reforestation and enhancement of upland hardwoods in the expansion area would increase habitat quality and diversity and provide more opportunities for roosting.

Federally endangered least terns and piping plovers are occasional occupants of the Cache/White Rivers' Basin, particularly during spring and fall migration. The proposed expansion includes areas used by these species and would provide potential restoration opportunities to increase suitable habitat. The wood stork, which is not federally listed in Arkansas but is a species of concern, has been observed more frequently in recent years on the refuge during the spring and fall. Many high-priority shorebird species move through the MAV during the spring and fall migration periods. They are particularly limited by foraging opportunities at mudflats during the fall migration from August to October. The creation and/or enhancement of shallow water impoundments and open marsh habitat within the expansion area would benefit these species and a number of other shorebird, secretive marshbird, and wading bird species. Future conservation of additional riparian areas in the Cache and White Rivers through subsequent expansion and land acquisition would increase habitat suitability for fish species of concern, such as paddlefish and alligator gar. A partial listing of additional rare species that have been documented in the proposed expansion area is presented in Table 4.

NORTHERN BOBWHITE

The northern bobwhite (bobwhite quail) has become a focal species for restoration and management in the MAV, as identified by the LMVJV and the Arkansas Game and Fish Commission (Dimmick et al. 2002). The quantity and quality of quail habitat have been severely impacted by the intensive agricultural practices and residential development in the Lower MAV. Acquisition within the proposed expansion area would provide significant opportunity for quail restoration and management by afforestation of marginal agricultural lands, restoration of brushy field borders, and reestablishment of fire-maintained grassland and savanna/prairie habitats. The Arkansas Game and Fish Commission has approached the refuge about serving as a management and demonstration area for the Northern Bobwhite Restoration Initiative (Arkansas goal is 26,880 acres of grasses and an increase of 29,830 coveys) and the proposed expansion would increase chances for success due to the varied habitats and communities that are underrepresented in the current acquisition boundary

BLACK BEARS

Bears were once common in the Cache/Lower White Rivers' system before large blocks of forest were cleared for farming and other purposes. By the early 1900s, black bears had been virtually eliminated from Arkansas, except for a very small population that survived in the most remote portion of the Lower White River. As a result of protection afforded by the refuge and state hunting regulations, black bear numbers increased significantly on the White River NWR and surrounding forested areas. However, bear numbers on the Cache River NWR are still relatively low based on the few documented hits at bait stations and limited sighting reports. These bears are probably transient adult males or dispersing juvenile males searching for unoccupied territory. Female bears are necessary for population expansions, but are not thought to occur on the refuge, with the possible

exception of the large, forested Biscoe Tract at the southern end. To the south on White River NWR, where there are very large blocks of contiguous forest, the black bear population is thriving.

The lack of good quantity and quality of bear habitat, and lack of sufficient connectivity among tracts, all considered as an indicator of overall forest health for numerous wildlife species, are likely the reasons for low bear numbers on Cache River NWR. Large contiguous tracts of diverse mature bottomland and upland forests (higher than the 10-year floodplain) interspersed with farmland and reforested areas that provide foraging, escape cover, and denning habitat, are needed to sustain a healthy and viable bear population. These tracts also must be of sufficient expanse such that disturbance is not a limiting factor. Bear home ranges can easily be in excess of 25 square miles, so additional land acquisition and reforestation, such as proposed in this expansion that create and connect large blocks of forests, as well as silvicultural treatments on forested sites, would support increased bear numbers, facilitate dispersal, and promote breeding and genetic interchange between existing sub-populations.

In summary, as mentioned in the Description of Habitat Section regarding habitat values, the theme of the expansion would be increased opportunity to conserve, restore, and enhance habitats, and consequently dependent animal communities, to comprehensively fulfill refuge purposes and the mission of the National Wildlife Refuge System. Of primary importance would be the ability to directly influence a wide range of waterfowl and other migratory birds on a conserved, diverse complex of habitats from upland to bottomland forests, across marshes and swamps, in grasslands and prairies, and managed agricultural lands (cooperative farming), and concomitantly enhance interjurisdictional fishes and other aquatic life, such as endangered mussels, in spawning, nursery, and foraging waters.

FISHERY RESOURCES

MUSSELS AND FISHERIES

Several endangered mussel species occur in Arkansas and although none have been documented on the refuge, it is expected that they do occur and would be documented whenever suitable surveys are performed (Table 4). The pink mucket, fat pocketbook, rabbitsfoot, and scaleshell mussels are documented in the adjacent White River, which although not included in this expansion proposal, may be included in potential future expansions. Major threats to mussel species include sedimentation and chemical runoff from agricultural lands. Sedimentation is caused by a number of sources, including agricultural practices, head cutting in fields and drainage tributaries, stream bank erosion, channel blockages, and stream channel instability and degradation. A wide variety of chemicals is used in modern agriculture in Arkansas, including pesticides, herbicides, defoliants, and fertilizers. Some of these chemicals are detrimental to fish and wildlife, particularly after they accumulate in streams and water bodies.

Malacologists generally agree that contaminants are partially responsible for the decline of freshwater mussels. Continued reforestation on lands along rivers and natural drainages, such as are included in the proposed expansion area, would decrease fragmentation, expand riparian buffers, increase filtration of contaminants, and reduce sedimentation in water bodies occurring from agriculture and stream bank erosion.

Flowing rivers and bayous, such as the White River, Cache River, and Bayou DeView, provide permanent lotic habitats of Cache River NWR. Abandoned channel scars in the form of open-water oxbow lakes or forested brakes provide most of the permanent lentic habitats. There is also a small number of man-made ponds and borrow pits on the refuge. Many of these habitats are periodically connected during seasonal flood events. The frequency and duration of connection are dependent

on flood stages and the elevation of lakes. During major flood events, a large portion of the flooded bottomland hardwoods found throughout the refuge serve as temporary habitat for many aquatic species. Many fishes use this critical habitat of flooded forests, sloughs, and lakes for spawning and/or nursery habitat. Fishes and freshwater mussels occupy rivers, bayous, and deep lakes on the refuge throughout the year. Reforestation of agricultural lands and hydrologic restoration on a watershed scale would serve to greatly enhance spawning and nursery conditions.

The Cache River, Bayou DeView, and Bayou Des Arc are classified as “designated use not supported for fisheries” due to chlorides, total dissolved solids, lead, and zinc, with the primary pollution source being agriculture with some industrial and municipal point source pollution (Arkansas’s List of Impaired Waterbodies - Arkansas Department of Environmental Quality Document 2010 303(d))

The Cache River, Bayou DeView, and Bayou Des Arc are classified as “designated use not supported for fisheries” due to chlorides, total dissolved solids, lead, and zinc, with the primary pollution source being agriculture, with some industrial and municipal point source pollution (Arkansas’s List of Impaired Waterbodies - Arkansas Department of Environmental Quality Document 2010 303(d)). However, the aquatic habitats within Cache River NWR and surrounding properties support a large diversity of sport fish species. Some species popular with anglers include white crappie, black crappie, largemouth bass, spotted bass, bluegill, flathead catfish, and blue catfish. Additionally, many nongame and commercial fishes are also found in the various aquatic habitats of the refuge. Although not included in this proposed expansion, potential future expansion that would augment this proposal could include an extensive section of the White River that would expand habitat and species diversity to include species of conservation concern, such as paddlefish (spoonbill) and alligator gar. Twenty-nine species of larval fish were detected in the forested floodplain of the Cache River. The protection, restoration, and enhancement of forested habitat along the White and Cache Rivers, Bayou DeView, and their tributaries enabled through this project would create suitable riparian buffers, improve water quantity and quality, create and improve habitat conditions for endangered mussels, fish, and other aquatic species, and contribute to the Service’s Fisheries’ Vision for the Future plan at all levels.

Bottomland hardwood wetlands provide spawning and nursery habitat to many species of fish. Hydrology (primarily extent, duration, and periodicity of flooding) is one of the primary factors regulating utilization and reproductive success of fishes in wetlands. A total of 36 species of larval fish and 51 adult species were collected in a 1994 fisheries’ study in the flooded bottomland forest in the Cache River. Among the fish found in refuge waters are various species of crappie, bream, catfish, bass, buffalo, carp, alligator gar, and paddlefish.

RELATED RESOURCES

Multiple federal and state agencies as well as non-governmental entities and private parties conduct natural resource conservation and habitat management programs throughout or near the proposed expansion area. A primary purpose for the proposed project is to link these various public conservation areas and increase their overall effectiveness, and ultimately, that of the watershed. The proposed expansion area would serve to connect a complex of federal, state, non-governmental, and private conservation lands and would provide additional habitat management and restoration partnership opportunities.

Wildlife/habitat conservation areas managed or protected within or in the vicinity of the proposed expansion area include (Figure 17):

1. Bald Knob National Wildlife Refuge
2. Cache River National Wildlife Refuge
3. White River National Wildlife Refuge
4. Earl Buss Bayou DeView Wildlife Management Area (WMA)
5. Rex Hancock Black Swamp WMA
6. Sheffield Nelson Dagmar WMA
7. Henry Gray Hurricane Lake WMA
8. Steve N. Wilson Raft Creek WMA
9. Mike Freeze Wattensaw WMA
10. Benson Creek Natural Area/WMA
11. Cache River Natural Area

Bayou Des Arc WMA and Downs Prairie Natural Area are not included within or adjacent to the proposed expansion area, but are situated in the vicinity and could be connected within the scope of a potential future expansion that would attain landscape/watershed scale.

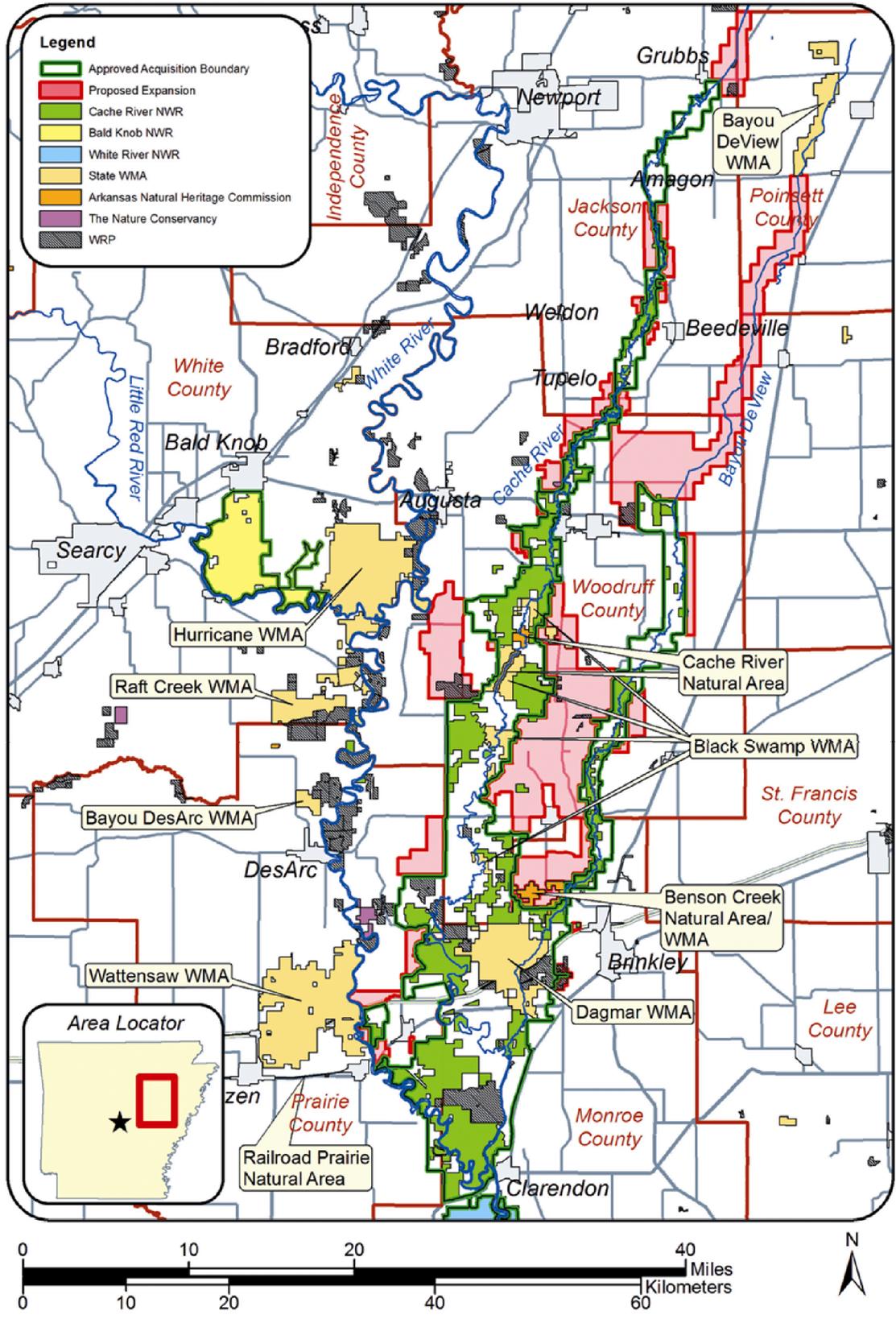
Cache River NWR is highlighted as part of Secretary Salazar's America's Great Outdoors (AGO) Rivers Initiative, and as an AGO state project, and also has been designated as a National Blueways System Pilot Project. The Cache River Basin is also encompassed within USDA Natural Resources Conservation Service's Mississippi River Basin Healthy Watersheds Initiative, and is embedded within the Gulf Coastal Plain-Ozarks Landscape Conservation Cooperative. The project area is identified as a "Wetland of International Importance" (Ramsar Convention) and as the most important wintering area for mallard ducks in North America (North American Waterfowl Management Plan).

Staff members of Cache River, White River, and Bald Knob NWRs are active participants of the Service's Lower Mississippi River Ecosystem (LMRE) Team. The LMRE is the primary wintering habitat for mid-continent waterfowl populations, as well as breeding and migrating habitat for songbirds returning from Central and South America. Although geographically situated on the northwestern boundary of the LMRE, Cache River and Bald Knob NWRs contribute to many of the goals and objectives established for the protection and management of the LMRE.

The Nature Conservancy and its partners, including the Service, have protected more than 120,000 acres in the Big Woods of Arkansas, a 550,000-acre corridor of floodplain forest along the Mississippi River. Some of the corridor includes National Wildlife Refuge System lands. In 2004, the ivory-billed woodpecker, thought to be extinct, was rediscovered within the corridor and floodplain of Bayou DeView (Fitzpatrick et al. 2005). Major conservation and restoration priorities for the Big Woods have been identified and the Nature Conservancy, the Service, the Arkansas Natural Heritage Commission, the Arkansas Game and Fish Commission, and others continue to focus efforts on these ecologically important lands.

The proposed expansion area would serve as a partial connection of a complex of federal, state, non-governmental, and private conservation lands. Eventually, fully unifying these areas and their associated resource conservation efforts would expand on the connections accomplished in this proposed expansion and magnify resource conservation benefits landscape-wide.

Figure 17. Conservation ownership/land management within and near the proposed expansion



CLIMATE CHANGE

The challenging problems associated with the current threats to the refuge are expected to amplify with global climate change, which may give rise to other issues. Although the impacts of climate change on the Cache River and surrounding area are uncertain, changes are expected. As reported in "Global Climate Change Impacts in the United States," higher temperatures, less rainfall, increased storm frequency and intensity, and more drought will occur throughout the Southeast (Scott et al. 2008). It is forecasted that temperatures will increase by at least 4.5°F by 2080, and fire severity will increase 10 to 30 percent within the next 50 years. The resultant higher temperatures will induce changes to precipitation levels and the native plant and animal distributions within associated aquatic or upland ecosystems.

Such climate changes may induce new threats and problems in refuge management. However, the proposed expansion would result in tens of thousands of acres of agricultural lands that would be reforested and provide for carbon sequestration, which would contribute to the Service's initiatives to address the impacts of accelerated climate change. Another benefit of expansion would be restoration of hydrologic function and conservation of surface and underground aquatic systems, which may help buffer the effects caused by altered precipitation and flooding patterns. By increasing the lands strategically managed and influenced by the Service in the MAV, the methods and programs necessary to mitigate the impacts of climate change on trust resources in this region would be much more likely to be successfully implemented. Moreover, the expanded refuge would have much greater potential to serve as refugia for species that may be vulnerable to habitat losses due to sea level rise and storm damage, particularly waterfowl and shorebirds that have lost coastal wintering areas, and warm water species, such as alligators, that have the ability to move northward into the Cache River Basin as range extensions (shifts) are stimulated due to warming conditions and changing habitats.

SOCIOECONOMIC AND SOCIOCULTURAL CONDITIONS

The general socioeconomic setting of the Cache/Lower White Rivers' region is generally similar to that of the broader Mississippi River Delta, and can be characterized as follows: (1) Strongly agriculturally oriented; (2) low relative per capita incomes; (3) relatively high rates of unemployment; and (4) relatively low, sparsely distributed, and stable or decreasing population. Jonesboro is situated at the northeast edge of the watershed, and is by far its largest city with a population of 46,535. The other significant population centers are Brinkley (4,234), DeWitt (3,553), Clarendon (2,072), McCrory (1,971), and Cotton Plant (1,150). Other scattered communities of less than 1,000 in population are found in the region.

Agriculture in the area is dominated by soybeans and rice, with a substantial amount of wheat grown on well-drained areas, lesser amounts of corn and milo scattered throughout, and some cotton production on the best-drained, sandiest soils. Arkansas leads the nation in rice production (approximately 40-50 percent of annual national production), and the Cache River Basin significantly contributes to this total. There is also a relatively small but growing acreage of land dedicated to aquaculture production.

The forested wetlands and aquatic habitats of the basin have historically provided extensive wildlife-dependent recreation. The relative importance of hunting and fishing to Arkansans was revealed in a survey of hunting and fishing conducted by the Service in 2006. The 2006 survey of wildlife-associated recreational activities in Arkansas (U.S. Department of Interior 2006) revealed that 1.4 million people (residents and non-residents), 16 years and older, hunted, fished, or observed wildlife

in Arkansas. These participants spent \$2.4 billion in Arkansas while engaging in these pursuits, including \$569 million in trip-related expenses alone.

Similarly, participation by residents of the Cache/Lower White Rivers and the surrounding region probably exceeded these statewide averages, because wildlife-dependent recreation represents the traditional primary recreational opportunity in the area. Public use within the region is of intense interest to Arkansans for three principal reasons:

- The fish and wildlife habitats in the Cache/Lower White Rivers' ecosystem represent approximately 40 percent of all suitable areas for wildlife-dependent recreation in the Arkansas Delta.
- A significant proportion (65 percent) of the habitats in this ecosystem is in public ownership, with 89 percent of that being federal.
- These habitats retain very high fish and wildlife values relative to the remainder of the Arkansas Delta (U.S. Department of the Interior 2006).

CULTURAL RESOURCES

The National Register of Historic Places, established by Congress in 1966, is the nation's official list of significant historic properties. The National Register recognizes five basic types of historic properties: historic buildings, such as plantation houses; courthouses or log cabins; historic structures, such as old bridges, lighthouses or forts; historic districts, such as old residential or commercial neighborhoods; historic sites, such as battlefields or Indian mounds; and historic objects, such as old steamboats or fire engines. It is important to note that not every historic site or old building or neighborhood is eligible for the National Register. Properties must have some type of significance: properties that are closely associated with an important person, event, or development; buildings that are architecturally significant because they are important examples of a particular style or type, or a method of construction; and, properties that are archaeologically significant because the remains yield information about the nation's history or prehistory. Generally, properties are not placed on the National Register if they are less than 50 years old; if the period of their historical significance is less than 50 years old; or if they have been significantly altered.

Each state has a historic preservation office which is responsible for nominating buildings, sites, districts, etc., to the National Register. This program is administered by the Arkansas Historic Preservation Program. None of the refuge sites covered by this LPP are known to be eligible for inclusion on the National Register of Historic Places at this time and they would not be designated as scientific sites. Official designation as scientific sites, as part of the planning process, also carries the risk of alerting illegal artifact collectors to the location of these sites. The Archaeological Resources Protection Act of 1979 specifically prohibits making available to the general public the location of any archaeological site, if such notification may create a risk of harm to the site.

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archaeological Resources Protection Act require the Service to evaluate the effects of any of its actions on cultural resources (e.g., historic, architectural and archaeological) that are listed or eligible for listing in the National Register of Historic Places). In accordance with these regulations, the Service has coordinated the review of this proposal with the Arkansas State Historic Preservation Office.

The Service believes that the proposed acquisition of lands would have no adverse effect on any known or yet-to-be identified NRHP-eligible cultural resources. However, in the future, if the Service plans or permits any actions that might affect eligible cultural resources, it would carry out appropriate site identifications, evaluations, and protection measures as specified in the regulations and in Service directives and manuals.

III. Alternatives Including the Proposed Action

In determining how to achieve the fish and wildlife habitat protection, restoration, and enhancement goals for the project lands and waters identified in this document, the Service considered and evaluated three alternatives. These are:

ALTERNATIVE 1: NO ACTION

This is the "status quo" alternative. Under this alternative, the Service would not acquire any of the lands proposed for the expansion of the refuge. The proposed project lands would remain in private ownership and current land uses would continue. Protection of the fish and wildlife habitats and natural resource values of these lands would be contingent upon the enforcement of existing federal, state, and local environmental regulations (the Clean Water Act, state water quality and pollution laws, etc.), and the discretion of the private landowners.

ALTERNATIVE 2: PROTECTION AND MANAGEMENT OF UP TO 102,000 ACRES BY THE FISH AND WILDLIFE SERVICE (PROPOSED ALTERNATIVE)

Under this alternative, the Service would acquire up to 102,000 acres in the Cache River/Bayou DeView/White River landscape, restoring watershed function, enhancing ecosystem integrity, and managing fish and wildlife habitats in the face of landscape-scale environmental threats (Figures 4 and 5). Cache River NWR, in Monroe, Prairie, Woodruff, and Jackson Counties of east-central Arkansas, extends an areal distance of approximately 65 miles along the Cache River floodplain from Clarendon to Grubbs. Land acquisition has continued on a willing-seller basis, and the refuge now contains about 67,400 acres. This proposal would expand the current 185,574-acre acquisition boundary of Cache River NWR to include up to an additional 102,000 acres surrounding the Cache River NWR (Figure 18). When combined with the current Cache River NWR acquisition boundary, this project seeks to protect up to a total of 287,574 acres, both east and west of the Cache River.

This alternative incorporates significant portions of unprotected areas of the lower watersheds of Bayou DeView and Cache River. Significant opportunities exist for restoration of habitats critical to trust wildlife species, and to facilitate comprehensive conservation of these riparian systems through reduction in erosion, sedimentation, unnatural hydrologic periods, contaminants, surface and groundwater withdrawals, and adverse habitat alterations. Additionally, this alternative would encompass the full range of aquatic and terrestrial communities (and associated plant and animal populations) within these watersheds that include upland and bottomland hardwood forests, swamps and marshes, riparian and lacustrine zones, grasslands, and prairies.

Expanding the Cache River NWR to encompass these lands provides a physiographic/biological-based framework for conservation of ecosystem/habitat resources critical for regionally rare and unique habitats, migratory birds, endangered species, aquatic organisms, and other native wildlife. Three expansion areas have been identified within the proposed expansion project (Table 5 and Figure 18). A brief description of the current proposed expansion areas are as follows: Area 1 – Cache River/Bayou DeView Corridor (38,483 acres) to provide corridor habitat and connect the watersheds of Cache River and Bayou DeView; Area 2 – Bayou DeView Peripheral (32,630 acres) to strategically expand northward protection of the Bayou DeView floodplain, provide a restoration area associated with the junction of channelized/non-channelized river courses, further connect the watershed of Bayou DeView and Cache River, and establish watershed buffers east of Bayou DeView; and Area 3 - Cache River Peripheral (29,997 acres) to conserve unique habitats west of

Cache River, facilitate future connection of the watersheds of the White and Cache Rivers, expand northward protection of the Cache River floodplain, and enhance riparian buffers along the Cache River. The areas and acreages above exclude state and municipal ownerships.

Table 5. Acreage and ownership of expansion areas

Area Number	Area	Approximate Number of Landowners	Acres	Average Holding
1	Cache River/Bayou DeView Corridor	167	38,483	252
2	Bayou DeView Peripheral	192	32,630	179
3	Cache River Peripheral	217	29,997	161
Total		576	101,110**	197

*** (Director's approval for this proposed expansion is for up to 102,000 acres.)*

The acquisition methods that could be used by the Service under this alternative are described as follows:

1. LEASES AND COOPERATIVE AGREEMENTS

Potentially, the Service can protect and manage habitat through leases and cooperative agreements. Management control on privately owned lands could be obtained by entering into long-term renewable leases or cooperative agreements with the landowners. Short-term leases can be used to protect or manage habitat until more secure land protection can be negotiated.

2. CONSERVATION EASEMENTS

Conservation easements give the Service the opportunity to manage lands for their fish and wildlife habitat values. Such management precludes all other uses that are incompatible with the Service's management objectives. Only land uses that would have minimal or no conflicts with the management objectives are retained by the landowner. In effect, the landowner transfers certain development rights to the Service for management purposes as specified in the easement.

Easements would likely be useful when: (1) Most, but not all, of a private landowner's uses are compatible with the Service's management objectives, and (2) the current owner desires to retain ownership of the land and continue compatible uses under the terms set by the Service in the easement.

Land uses that are normally restricted under the terms of a conservation easement include:

- Development rights (agricultural, residential, etc.);
- Alteration of the area's natural topography;
- Uses adversely affecting the area's floral and faunal communities;

-
- Excessive public access and use; and
 - Alteration of the natural water regime.

3. FEE-TITLE ACQUISITION

A fee-title interest is normally acquired when: (1) The area's fish and wildlife resources require permanent protection not otherwise assured, (2) land is needed for visitor use development, (3) a pending land use could adversely impact the area's resources, or (4) it's the most practical and economical way to assemble small tracts into a manageable unit.

Fee-title acquisition conveys all ownership rights to the Federal Government and provides the best assurance of permanent resource protection. A fee-title interest may be acquired by donation, exchange, transfer, or purchase.

ALTERNATIVE 3: PROTECTION AND MANAGEMENT OF UP TO 86,164 ACRES BY THE FISH AND WILDLIFE SERVICE

Under this alternative, the Service would acquire up to 86,164 acres of habitats for protection and management as part of Cache River NWR (Figure 19). The Service would acquire sufficient interest in the identified lands to prevent conflicting land uses and to manage the areas for their wildlife values. The same acquisition methods as described in Alternative 2 would apply to this alternative.

Figure 18. Lands included in the proposed project under Alternative 2

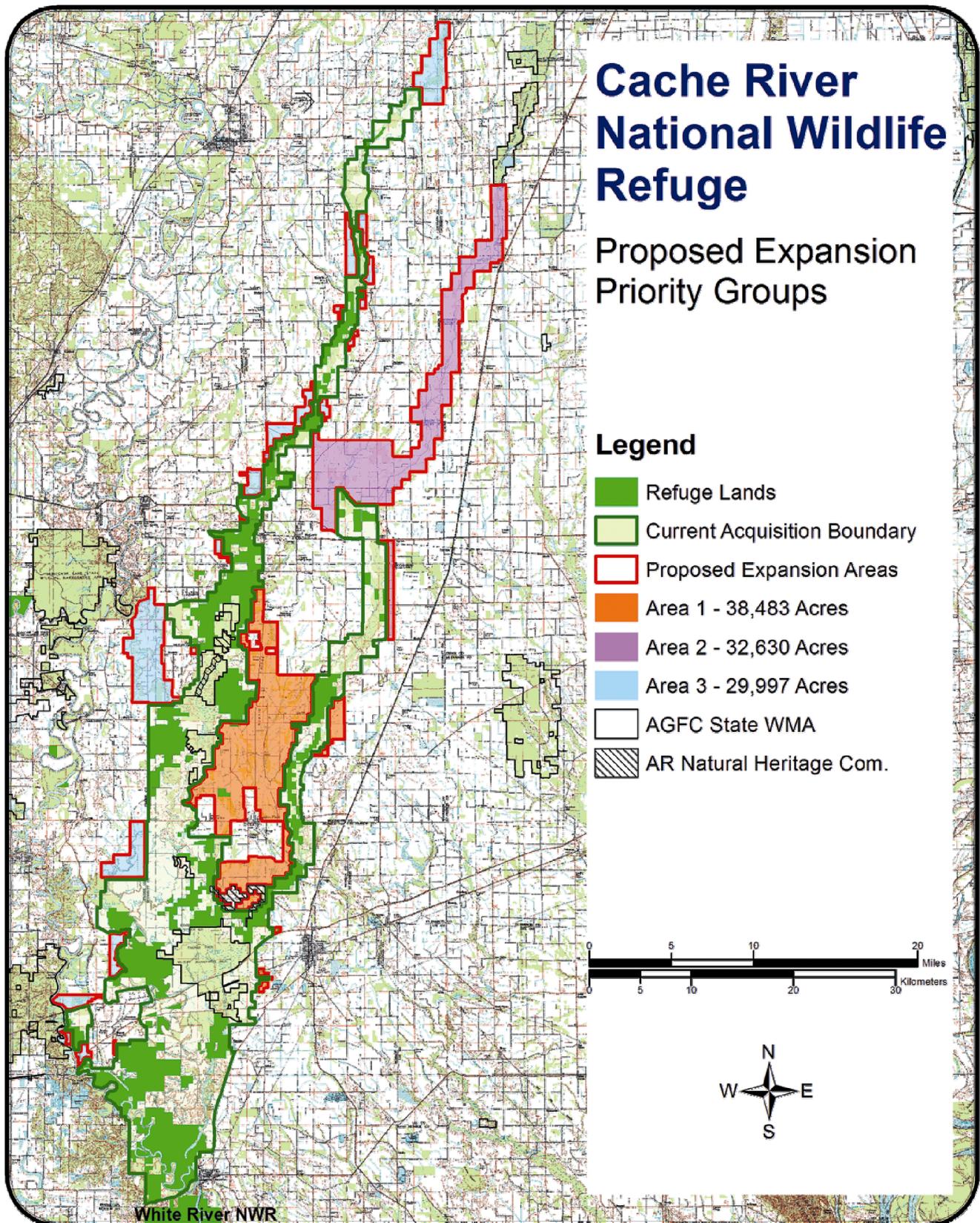
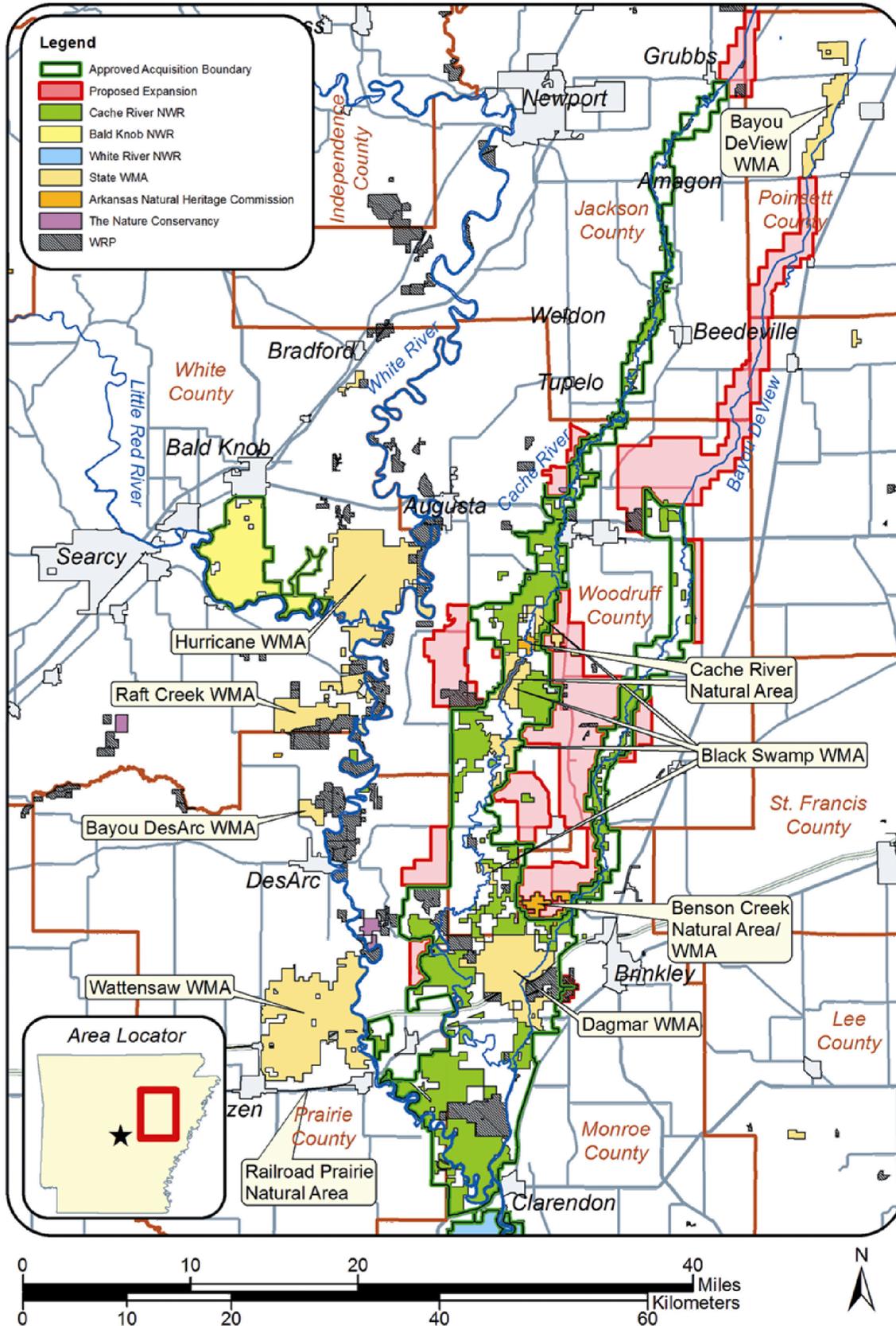


Figure 19. Lands included in the proposed project under Alternative 3



IV. ENVIRONMENTAL CONSEQUENCES

This section analyzes and discusses the potential environmental impacts of the three management alternatives described in Chapter III.

ALTERNATIVE 1: NO ACTION

Under this alternative, the Service would take no action to acquire, protect, and enhance any lands to expand Cache River NWR.

Future habitat protection under existing laws and regulations may be insufficient to prevent significant degradation of the area's fish and wildlife resource values. Federal executive orders involving the protection of wetlands and floodplains only apply to federal agencies. They do not apply to habitat alterations by non-federal entities, which receive no federal funds.

The primary deterrent against the loss of resource values is the USACE Section 404 permit program, which is administered under the authority of the Clean Water Act. This program requires permits for most types of work in wetlands. Most of the wetlands in the project area qualify for protection under this program. In addition, the State of Arkansas has regulatory authority over the area and would not permit any developments that would violate the state's water quality standards.

However, there is no assurance that the protection offered by these regulations would be consistent with protection of the area's fish and wildlife resources. The regulatory programs are designed to accomplish different objectives. In addition, these programs are subject to changes in the law and to varying definitions and interpretations, often to the detriment of wetlands. The USACE's regulatory authority provides for the issuance of Section 10 and/or Section 404 permits when it is not contrary to the public interest to do so and provided other conditions are met. Fish and wildlife conservation is only one of several public interest factors that are considered in permit issuance decisions. If fish and wildlife conservation is outweighed by other factors, permits that would alter the wetlands in the proposed area could be issued.

The desired fish and wildlife protection objectives, therefore, cannot be achieved to any degree under this alternative. Specifically, implementation of the No Action Alternative would adversely impact the area's valuable fish, waterfowl, and wildlife habitats.

The vast majority of non-refuge tracts within the current approved acquisition boundary of 185,574 acres is agricultural lands that are situated within the approximate 10-year floodplain of the Lower and Middle Cache River Basin, including Bayou DeView. Bottomland hardwood forest was historically the predominant habitat type, but approximately 85 percent of the basin has been cleared for agriculture. Most of the converted habitats were forested wetlands. Habitat loss and degradation, forest fragmentation, and lack of connectivity are major obstacles to fulfillment of refuge purposes and the mission of the National Wildlife Refuge System. Furthermore, unabated groundwater and surface water extraction for irrigation, altered hydrology, deterioration of water quality due to agricultural-based erosion and sedimentation, and contamination from pesticides, herbicides, and fertilizers would continue to compromise the health and suitability of fish and wildlife habitats in the riparian systems and associated wetlands under the No Action Alternative.

A potential threat to the proposed area is a decline in the fisheries' resources as a result of incompatible land management practices. Disturbance to the soil from agriculture and development leads to sedimentation in nearby creeks, rivers, and bayous. This then causes a decline in water quality. Water temperatures also increase when forests are cleared, causing less oxygen to be present in the water. Additionally, surface water extraction for irrigation often during critical periods of low base flows in streams, such as Cache River and Bayou DeView, threatens aquatic organisms such as mussels, fish, and bottom-dwelling invertebrates.

Another potential threat to the proposed area is incompatible forestry practices or lack of proper forest management. Private forests are often cut without a management plan addressing objectives of the landowner or plans for the future. Such stands may be cut as "logger's choice" or "diameter limit," removing only the largest trees; these practices can lead to high-grading, or decreased value of the forest resources and decreased wildlife habitat value. Also, forest may be cleared and converted to other uses, resulting in habitat loss, forest fragmentation, erosion, and decreased water quality.

Under this alternative, current wildlife-dependent recreational uses of hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation still would be allowed on the refuge. However, the proposed area would not be acquired by the refuge; therefore, it would not be opened to the public for wildlife-dependent recreational use. Private lands of the proposed area are hunted by the owners themselves, or leased for hunting and fishing purposes. Membership is restricted; therefore, hunting and fishing opportunities are limited.

ALTERNATIVE 2: PROTECTION AND MANAGEMENT OF UP TO 102,000 ACRES BY THE FISH AND WILDLIFE SERVICE (PROPOSED ALTERNATIVE)

Under this alternative, the Service would expand the current acquisition boundary of 185,274 acres up to 102,000 additional acres as part of Cache River NWR. The land protection priorities and proposed methods of acquisition are summarized in Chapter III.

The purpose of the proposed project would be to:

- Restore key ecological processes that drive and sustain the unique, but declining Cache River floodplain ecosystem, and improve ecosystem services and associated public benefits.
- Strategically restore altered geophysical features and original connectivity of water flow within and between the Cache River and Bayou DeView floodplains.
- Improve hydrologic function of these streams and their floodplains and enhance wetland and aquatic ecosystems for the benefit of trust species.
- Incorporate protection and enhancement of a diversity of critical habitats on which trust species depend to better represent the full spectrum of habitats that was historically present.
- Restore forested habitat and other natural plant communities to improve overall watershed health and stability, promote carbon sequestration, bolster ecological integrity, and increase habitat patch size to accomplish goals set forth in refuge, state, LMVJV, regional and national plans for migratory birds, forest breeding birds, endangered species, and resident wildlife and fish species.

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- Protect, restore, and enhance fragmented and degraded floodplain forests and create large contiguous forest and riparian buffers adjacent to the Cache River and Bayou DeView, to improve water quality, provide fish and wildlife movement corridors, and enlarge habitat patch sizes for trust wildlife species.
 - Protect lands between Bald Knob, Cache River, and White River National Wildlife Refuges, state wildlife management areas, state natural areas, and private conservation lands, to enlarge conservation benefits within the Cache/White Rivers' watershed, and increase and facilitate access and wildlife-dependent recreation on public lands.

Under this alternative, the desired fish and wildlife protection, restoration, and enhancement objectives could be achieved. The proposed alternative would ultimately allow for the strategic conservation of up to 102,000 acres, protecting approximately 75 air miles along the Cache River floodplain and 229 miles of main river channels in the basin, improving water quality, restoring habitats, and enhancing the ecological function of the Cache River system.

Only 20 percent of historic bottomland hardwood forests are left today, most of which are highly fragmented (Tiner 1984). The expansion area would increase core area size of forest blocks and provide necessary corridors for forest breeding birds, black bears and other wildlife. These lands are important to neotropical migratory birds following the Cache River during spring and fall migrations, as well as to nesting prothonotary, Swainson's and worm-eating warblers, Mississippi kites, and wood ducks. Large expanses of bottomland hardwoods are important for breeding cerulean warblers. This species is thought to have bred in this area historically, but has not been recorded in recent times. Wood storks use these areas during late summer to feed after dispersing from their breeding grounds. Bald eagles winter and nest on the refuge; and several breeding pairs exist on the refuge and neighboring lands. Rookeries of great and little blue herons, anhingas, egrets, ibises, and night-herons also are present in these bottomlands. The Cache River Basin is widely recognized for its importance as wintering habitat for waterfowl. It is identified in the NAWMP as the most important wintering area for mallards in North America. Hundreds of thousands of migratory waterfowl use these lands as wintering habitat and the invertebrates, acorns, and other seeds found in flooded bottomlands prepare these birds for breeding in the spring.

Given the 2004 credible sightings of the IBWO in a portion of Bayou DeView, which is located on Cache River NWR, Cornell biologists and their partners documented the presence of at least one IBWO (Fitzpatrick et al. 2005) in that area. Forest habitat restoration and management would be enhanced and refined, resulting in better conditions for IBWO. Intensified monitoring would better enable adaptive management.

The historic range of black bears included all forested areas of North America. In the southeastern United States, the species was eliminated from 90 percent of its former habitat. Black bears are present on Cache River NWR. The acquisition of the proposed expansion lands would provide a contiguous block of bottomland hardwood forest. Because fragmentation can result in increased mortality as bears are forced to forage on less protected sites, travel farther to forage, or cross barriers such as well-travelled roads (Pelton 2001), the black bear would benefit from the protected corridor and the increase in core area.

The LMVJV considers forest interior songbirds that utilize bottomland hardwood forests a priority resource, particularly Kentucky, Swainson's and cerulean warblers. Cerulean warblers are classified as a bird of conservation concern requiring critical recovery and immediate management activities in the Gulf Coastal Plains and Ozarks LCC. The cerulean warbler has experienced dramatic declines over the last 30 years. Estimates from researchers suggest forest

tracts as large as 19,700 acres may be required to ensure sustainable populations in the LMRE (LMVJV HSI Model). Breeding birds have higher reproductive success in large core areas of forest blocks than in small, isolated blocks (Robinson et al. 1995).

The proposed area would be protected from development and agriculture. Forest fragmentation, degradation, hydrologic modifications, and loss of habitat would not occur on the proposed area.

Incompatible forestry practices would not occur under this alternative. Forestry management practices would be directed towards meeting approved wildlife and habitat objectives.

Fisheries resources would be protected under this alternative because many acres of agricultural land would be reforested. Spawning grounds and nursery habitat would be protected, water quality (i.e., temperature, turbidity, and dissolved oxygen) would remain high, and primary production would occur.

Based on the nature of the proposal, the location of the site and the current land use, the proposed alternative would not have any significant effects on the quality of the human environment, including public health and safety. Further, because the purpose of the proposal is to protect, maintain, and where possible, enhance the natural habitat of the lands within the proposed acquisition area, the proposal is not expected to have any significant adverse effects on the area's wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

Implementation of the proposed alternative would not involve any highly uncertain, unique, unknown, or controversial effects on the human environment. The proposed action would not establish a precedent for future actions with significant effects, nor would it represent a decision in principle about a future consideration. No cumulatively significant impacts on the environment would be anticipated.

In addition, the proposal would not significantly affect any unique characteristic of the geographic area, such as historical or cultural resources, wild and scenic rivers, or ecologically critical areas. The proposal would not significantly affect any site listed in or eligible for listing in the National Register of Historic Places, nor would it cause loss or destruction of significant scientific, cultural, or historic resources. The area's cultural resources would be protected under the regulations of the National Historic Preservation Act of 1966, as amended, the Archaeological Resources Protection Act, and the Advisory Council on Historic Preservation (36 CFR 800). The Arkansas and Louisiana State Historic Preservation Offices would be contacted whenever any future management activities have the potential to affect cultural resource sites.

Under this alternative, the proposed area would have the same wildlife-dependent recreation activities as those available on Cache River NWR. The refuge would be open to the public for hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Some hunting and fishing regulations on the refuge may be more restrictive than those on private land. People that currently own land or have memberships in private hunting clubs within the proposed area would no longer have exclusive access to the proposed lands once they are acquired, and would have to abide by the more restricted hunting and fishing regulations. However, the proposed area would be open to all members of the public at no cost. All tracts acquired by the Service in fee-title would be removed from local real estate tax rolls, because Federal Government agencies are not required to pay state or local taxes. However, the Service makes annual payments to local governments in lieu of real estate taxes, as required by the Refuge Revenue Sharing Act (Public Law 95-469). Payment for acquired land is computed on whichever of the following formulas is greatest: (1) Three-fourths of 1 percent of the fair market value of the lands acquired in fee-title; (2) 25 percent of the net refuge receipts collected; or (3) 75 cents per acre of the lands acquired in fee-title. The estimated annual revenue-sharing payment is difficult to reliably predict because it depends

on the amount of acres in refuge ownership per county, appraised value of lands, availability of funds in the Refuge Revenue Sharing account, and amount of any supplemental congressional appropriations. Previous payments for the past 5 years (Fiscal Years 2006-2010) ranged from \$13,791 to \$7,084 for Jackson County; \$73,341 to \$39,477 for Monroe County; \$45,464 to \$20,991 for Prairie County; and \$113,758 to \$65,070 for Woodruff County.

No actions would be taken that would lead to a violation of federal, state, or local laws imposed for the protection of the environment.

ALTERNATIVE 3: PROTECTION AND MANAGEMENT OF UP TO 86,184 ACRES BY THE FISH AND WILDLIFE SERVICE

Under this alternative, the Service would acquire up to 86,184 acres of habitat as part of Cache River NWR.

Potential adverse impacts of this alternative include increased development and urbanization on the 16,000 acres, included in Alternative 2, but not in Alternative 3. Some of the potential human impacts resulting from this alternative include forest fragmentation; road-associated impacts; degradation of aquatic, wetland, and terrestrial habitats; conversion of habitat to non-wildlife uses; incompatible public uses; exotic species' introductions; hydrologic modifications; and residential development.

Under this alternative, the proposed area would have the same wildlife-dependent recreation as those available on Cache River NWR. The refuge would be open to the public for hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Some hunting and fishing regulations on the refuge may be more restrictive than those on private land. Those people that currently have memberships in private hunting clubs within the proposed area would no longer have exclusive access to the proposed lands, and they would have to abide by the more restrictive hunting and fishing regulations. However, the proposed area would be open to all members of the public at no cost.

CUMULATIVE EFFECTS

According to the Council on Environmental Quality NEPA implementing regulations in 40 CFR 1508.7, "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

PHYSICAL RESOURCES

Some minimal and minor impacts on physical resources are expected, under each of the alternatives, but none of these are anticipated to be cumulatively significant. Cumulative effects on individual physical resource categories are further discussed below.

Land Use

The No Action Alternative would be expected to have a minor cumulative effect on land use in the proposed lands due to continued use of minimally productive agricultural land. The dominant land use within the proposed expansion area is agriculture. Similarly, the vast majority of non-refuge tracts within the current, approved acquisition boundary of 185,574 acres are agricultural lands that are situated within the approximate 10-year floodplain of the lower and middle Cache River Basin,

including Bayou DeView. Bottomland hardwood forest was historically the predominant habitat type, but approximately 85 percent of the basin has been cleared for agriculture. Most of the converted habitats were forested wetlands. Large, contiguous stands of bottomland hardwood forest are required to expand habitat capacity and capability for wintering waterfowl to meet LMVJV goals and to support self-sustaining populations of forest breeding birds, especially forest interior and area sensitive species, such as the wood thrush, cerulean warbler, prothonotary warbler, and Swainson's warbler. There are some large forest blocks remaining within the refuge, or in combination with adjacent state-owned management areas, but much of the existing forest habitat is severely fragmented. More than 17,000 acres of agricultural or fallow fields on Cache River NWR have been planted in hardwood seedlings in an effort to link fragmented forested tracts, to restore functional habitat corridors, and to create larger forest blocks for wildlife.

The great majority of lands purchased as a result of implementing the proposed expansion would be restored to a forested condition, and would serve as important habitat linkages that would increase connectivity, as well as consolidate and enlarge forested blocks. Moreover, the project would connect and link similar habitat conservation and restoration efforts among partner agencies, non-governmental organizations, and private landowners adjacent to the refuge. Habitat loss and degradation, forest fragmentation, and lack of connectivity are major obstacles to fulfillment of refuge purposes and the mission of the National Wildlife Refuge System. Furthermore, deterioration of water quality due to agricultural-based erosion and sedimentation, and contamination from pesticides, herbicides, and fertilizers continue to compromise the health and suitability of fish and wildlife habitats in the riparian systems and associated wetlands.

Exploration for and development of oil and natural gas reserves have greatly intensified area-wide in recent years. Water withdrawal activities associated with natural gas production, particularly when combined with agricultural groundwater withdrawal for irrigation, increases the potential for depletion of the aquifer. Furthermore, increased potential exists for contamination of wetlands and waterways flowing through the Cache River NWR from runoff, overflow, or breach of containment reservoirs for drilling fluids and tailings at the well sites. Similarly, the construction and installation of associated pipelines, situated adjacent to the refuge and traversing the Cache River and Bayou DeView in the vicinity of the refuge, also have increased the potential for negative impacts to refuge resources.

Currently, these lands are largely owned by private agricultural operations, but projected population growth would likely result in the spread of developed areas. State and other land protection efforts would have a difficult time keeping pace with the loss of natural and other open areas. Alternatives 2 and 3 would have positive cumulative effects on land use of the area by helping protect portions of the landscape against residential development, and would increase reforestation of marginal agricultural land.

Climate Change

The challenging problems associated with the current threats to the refuge are expected to amplify with global climate change, which may give rise to other issues. Although the impacts of climate change on the Cache River and surrounding area are uncertain, changes are expected. As reported in "Global Climate Change Impacts in the United States," higher temperatures, less rainfall, increased storm frequency and intensity, and more drought will occur throughout the Southeast (Scott et al. 2008). It is forecasted that temperatures will increase by at least 4.5°F by 2080, and fire severity will increase 10 to 30 percent within the next 50 years. The resultant higher temperatures will induce changes to precipitation levels and the native plant and animal distributions within associated aquatic or upland ecosystems.

Such climate changes may induce new threats and problems in refuge management under Alternative 1. However, Alternatives 2 and 3 would result in tens of thousands of acres of agricultural lands that would be reforested and provide for carbon sequestration, which would contribute to the Service's initiatives to address the impacts of accelerated climate change. Another benefit of Alternatives 2 and 3 would be restoration of hydrologic function and conservation of surface and underground aquatic systems, which may help buffer the effects caused by altered precipitation and flooding patterns. By increasing the lands strategically managed and influenced by the Service in the MAV, the methods and programs necessary to mitigate the impacts of climate change on trust resources in this region would be much more likely to be successfully implemented. Moreover, the expanded refuge would have much greater potential to serve as a wildlife emigration corridor and as refugia for species that may be vulnerable to habitat losses due to sea level rise and storm damage, particularly waterfowl and shorebirds that have lost coastal wintering areas, and warm water species, such as alligators, that have the ability to move northward into the Cache River Basin as range extensions (shifts) are stimulated due to warming conditions and changing habitats.

Topography

The No Action Alternative would have a minimal negative cumulative effect on the topography of the proposed lands. Without protection, the erosion of soil from agricultural production would continue. Under Alternatives 2 and 3, no adverse cumulative effects are predicted to this resource.

Hydrology and Water Quality

Hydrologic alterations, such as flood control and drainage practices that support intensive agricultural land conversion and use, threaten the biological integrity of the refuge and fish and wildlife resources of the Cache/White River Basin overall. A relatively recent and continuing hydrologic alteration is the increasing withdrawal of surface water for agricultural irrigation from essentially all available streams. Portions of the Cache River, with a relatively low base flow, are frequently pumped dry for some periods during most summers. Similarly, the upper portion of Bayou DeView, designated as a "critical surface water area" by the State of Arkansas, usually has no base flow during some summer months and agricultural pumping has exacerbated this to the point that the stream has recorded no-flow conditions for 10 percent of the time over the last 37 years (ASWCC 1988). Additionally, the recent average stream flow of the White River at Clarendon has decreased slightly, and this is suspected to be the result of current withdrawals for irrigation. In contrast, as a direct result of the increased rate of drainage from the Basin during periods of high rainfalls at lower elevations and those areas nearest the Cache River, Bayou DeView, and White River now receive all water more rapidly and in quantities that more frequently exceed the capacity of the system to carry and discharge into the Mississippi River. The lowest portions of the Cache and Lower White Rivers seem now to be subjected to more frequent flooding at greater depths and for longer duration than was the historic tendency. These conditions are further exacerbated by sudden and extensive releases of water from flooded rice fields adjacent to the refuge woodlands. In summary, the hydrologic regime has been altered to such a degree that the streams and associated wetlands now suffer from low water periods that are much drier with less water depth, and high water periods that are much wetter with greater depths, rates, and duration of inundation.

Implementation of Alternatives 2 and 3 would facilitate hydrological restoration and mediation of altered water flow patterns in much of the lands adjoining Cache River and Bayou DeView. Reforestation of agricultural lands, enabled by this project, would reduce erosion and sedimentation that compromise the health of wetland and riparian systems. Similarly, cessation of irrigation on restored agricultural lands would halt groundwater and surface withdrawals and improve water

quantity. Likewise, reduction of commercial farming operations in the riparian zone would lead to reduced use of herbicides, pesticides, and fertilizers that now threaten water quality.

BIOLOGICAL RESOURCES

The No Action Alternative would have cumulative adverse impacts on the biological community within the proposed area. Habitat loss, degradation, and fragmentation over time would have cumulative negative effects on wildlife resources. Under Alternatives 2 and 3, habitats would be protected from habitat loss, fragmentation, and degradation, thereby increasing the health of forests for the long term. Consequently, wildlife resources benefit cumulatively due to increased populations.

CULTURAL RESOURCES

There could be some minimal cumulative adverse impacts to cultural resources under the No Action alternative. Less land would be protected from development, increasing the risk of disturbance or destruction of cultural resources. Under Alternatives 2 and 3, beneficial effects would occur because of increased land protection and compliance with federal cultural resource laws and regulations. In addition, increased field surveys would likely be conducted on Service-owned lands to identify and protect any sites discovered.

SOCIOECONOMIC ENVIRONMENT

There would be no expected long-term, significant cumulative change in the local economy under Alternative 1. Current development rates, tax revenues, and business revenues would remain subject to market influences. There could be some loss of economic opportunities associated with wildlife-dependent recreation (e.g., hunting, fishing, and wildlife watching). In addition, there could be increased costs to local communities associated with the loss of vegetated areas, as residential development continued on unprotected lands. Vegetated areas have been shown to reduce costs of providing clean water and air. Furthermore, vegetated lands help reduce stormwater runoff, providing additional cost savings (e.g., less frequent repairs to water control structures) to nearby communities. Alternatives 2 and 3 would have some positive effects on socioeconomic resources. Wildlife-dependent recreation would provide additional direct and indirect economic benefits to the region by drawing visitors. Increased opportunities for wildlife-dependent recreational opportunities would further help improve the quality of life in the area, particularly as open space available to the public becomes increasingly scarce over the next decades. Further, no significant negative impacts would be anticipated to neighboring landowners from the implementation of either Alternative 2 or Alternative 3, including from management and public use activities.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are the effects of those actions that could cause significant harm to the human environment and that cannot be avoided, even with mitigation measures. There would be some minor, localized unavoidable adverse effects under all the alternatives. The No Action Alternative would maintain the status quo for development and growth in the area, thus contributing to the unavoidable effects of such development (e.g., increased air emissions and increased impervious surface and stormwater runoff). Under Alternatives 2 and 3, there would be property tax losses to towns that could be an unavoidable effect in those years that revenue sharing payments are less than local property taxes. However, none of these effects rises to the level of significance. All would be mitigated, so there would in fact be no significant unavoidable adverse impacts under any of the alternatives.

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The No Action Alternative would be expected to diminish the long-term productivity and sustainability of natural resources within the proposed land expansion. In contrast, Alternatives 2 and 3 would strive to maintain or enhance the long-term productivity and sustainability of natural resources on proposed refuge lands. These alternatives would strive to conserve federal trust species and state listed species and the habitats they depend on.

POTENTIAL IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Alternative 1 would have no long-term effect on potential irreversible and irretrievable commitments of federal financial resources. Expanding the refuge, as described under Alternatives 2 and 3, may contribute to irreversible and irretrievable commitments of federal financial resources. Another irreversible commitment of resources impacting local communities is Service land acquisition. Once these lands become part of the refuge, it is unlikely they would revert back to private ownership.

ENVIRONMENTAL JUSTICE

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” (February 11, 1994), requires that federal agencies consider as part of their actions, any disproportionately high and adverse human health or environmental effects to minority and low income populations. Agencies are required to ensure that these potential effects are identified and addressed. The communities surrounding the refuge are relatively homogenous; minority groups do not represent a substantial portion of the affected community. No differential impacts based on minority status would therefore be anticipated under any of the alternatives.

RECOMMENDATION

Alternative 2 is recommended because it better serves the outlined purpose and need, as well as the purposes of the refuge, the refuge vision, and stated goals and objectives found in the CCP. Water quantity and quality would be improved, hydrologic function would be enhanced, bottomland hardwood forest habitats along the Cache River and Bayou DeView would be protected, and reforestation and wetland habitat restoration on acquired agricultural lands would increase the core habitat for neotropical migratory songbirds, wintering waterfowl, ivory-billed woodpeckers, aquatic species, black bears, and other priority wildlife. Alternative 3 would enable the refuge to work towards these objectives, but it would exclude some areas that if protected could better enhance overall ecosystem function by enabling restoration of key geophysical and hydrological characteristics, unique natural plant communities, and wildlife habitat corridors.

APPENDICES

APPENDIX A. COMPATIBILITY DETERMINATION

The CCP for Central Arkansas NWR Complex (USFWS 2009) has been completed along with compatibility determinations. These proposed lands covered under this EA would be brought into the National Wildlife Refuge System and will be managed as current lands on Cache River NWR. Lands purchased to expand Cache River NWR have the following uses already found compatible: Hunting; Fishing; Wildlife Observation and Photography; Environmental Education and Interpretation; Research and Monitoring; Forest Products Harvesting; Commercial Guiding for Wildlife Observation/Photography; Commercial Video and Photography; Nuisance Animal Control; Cooperative Farming; Furbearer Trapping; and Commercial Fishing.

APPENDIX B. INTERIM RECREATION ACT FUNDING

Station Name: Cache River National Wildlife Refuge

Date Refuge Established: 1986

Purposes for which the Refuge was Established: Cache River NWR, in Jackson, Monroe, Prairie, and Woodruff Counties, in central Arkansas, was established on June 16, 1986, with the purchase of 1,395 acres. Land acquisition has continued on a willing-seller basis, and the refuge now includes more than 65,000 acres. The approved land acquisition boundary of 185,574 acres is defined as lands within the 10-year floodplain of the lower and middle Cache River Basin, including Bayou DeView.

Cache River NWR's official purposes are:

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

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." 16 U.S.C. 742f(a)(4) ...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

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

Public Use(s) Evaluated for the proposed expansion of Cache River NWR:

Hunting
Fishing
Wildlife Observation and Photography
Environmental Education and Interpretation
Research and Monitoring
Forest Products Harvesting
Commercial Guiding for Wildlife Observation/Photography
Commercial Video and Photography
Nuisance Animal Control
Cooperative Farming
Furbearer Trapping
Commercial Fishing

Funding required to administer and manage the recreational use(s).

Minimal funding in the amount of \$100,000 would be made available to implement initial protection, hunt implementation, data collection, and non-consumptive uses.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage the recreational uses.

Project Leader: _____
(Signature/Date)

Refuge Supervisor: _____
(Signature/Date)

Regional Chief, National
Wildlife Refuge System,
Southeast Region: _____
(Signature/Date)

APPENDIX C. INFORMATION ON PREPARERS

This document was prepared by Keith Weaver, Project Leader, Cache River NWR, with assistance from Tina Chouinard, Regional Planner, and the staff of Cache River NWR.

APPENDIX D. INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Keith Weaver
 Telephone Number: 870-347-2074
 E-Mail: keith_weaver@fws.gov
 Date: August 9, 2012

PROJECT NAME: ENVIRONMENTAL ASSESSMENT AND LAND PROTECTION PLAN FOR THE PROPOSED EXPANSION OF CACHE RIVER NATIONAL WILDLIFE REFUGE

- 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
 - Refuges/Wildlife

II. State/Agency: Arkansas/USFWS

III. Station Name: Cache River NWR

IV. Description of Proposed Action: The U.S. Fish and Wildlife Service (Service) proposes to protect and manage additional habitat in Monroe, Prairie, Woodruff, Jackson, Cross, and Poinsett Counties, Arkansas, through the expansion of the current 185,574 acres of Cache River National Wildlife Refuge (NWR) acquisition boundary by up to 102,000 acres. The refuge now contains about 67,400 acres (in fee-title), and if the project is approved, would bring the total potential conservation footprint up to 287,574 acres.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map: See VI

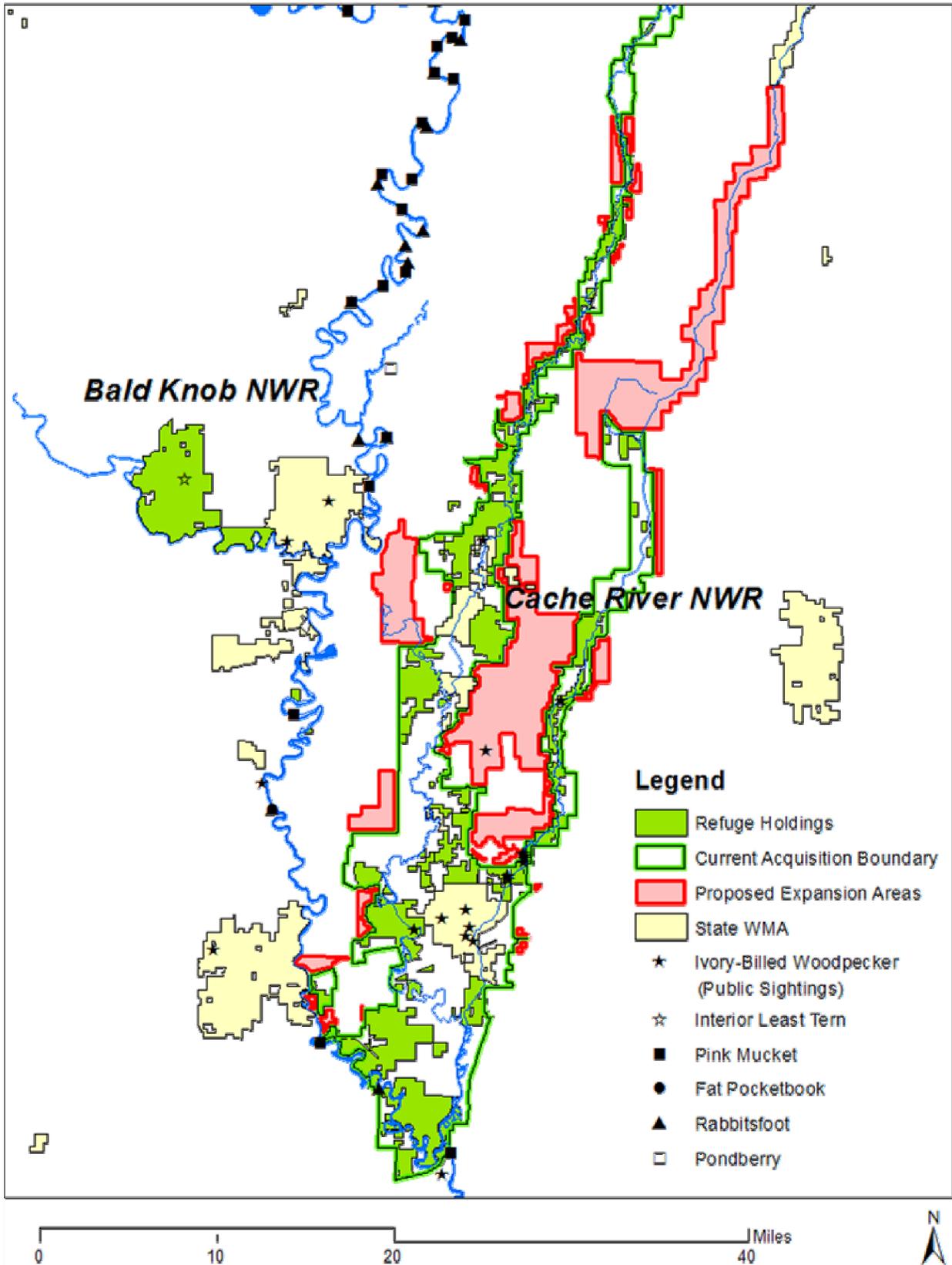
Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS1
Ivory-billed Woodpecker (<i>Campephilus principalis</i>)	E
Interior Least Tern (<i>Sterna antillarum</i>)	E
Piping Plover (<i>Charadrius melodus</i>)	E
Pink Mucket Mussel (<i>Lamprolaima abrupta</i>)	E

SPECIES/CRITICAL HABITAT	STATUS1
Fat Pocketbook Mussel (<i>Potamilus capax</i>)	E
Rabbitsfoot Mussel (<i>Quadrula cylindrica</i>)	C
Pondberry (<i>Lindera melissifolia</i>)	E

1STATUS: E=endangered, T=threatened, PE=proposed endangered, PT=proposed threatened, CH=critical habitat, PCH=proposed critical habitat, C=candidate species, S/A=Similar Appearance

VI. Location (attach map):



A. Ecoregion Number and Name: West Gulf Coastal Plain; Lower Mississippi River Ecosystem 27

County and State: This project encompasses undeveloped areas in Monroe, Prairie, Woodruff, Jackson, Cross, and Poinsett Counties, Arkansas.

Section, township, and range (or latitude and longitude):

Northern Extent; 35° 42' 30," Southern Extent; 34° 40' 7," Western Extent; -91° 28' 9," Eastern Extent; -90° 57' 56," NAD 1983 projection

Distance (miles) and direction to nearest town: Major towns immediately adjacent to the area: Cotton Plant, Patterson, McCrory, Biscoe, Gregory, Brinkley, Amagon, Beedeville.

Species/habitat occurrence: Ivory-billed Woodpecker (IBWO) – The IBWO was once an inhabitant of forested habitat throughout the southeastern United States and Cuba. Although little specific population data are available, it is likely that European settlement and clearing of the forest caused the species to decline in the latter half of the 19th century. By the mid-20th century, the IBWO was reduced to a very small population. The last widely accepted sightings were made in the Tensas River area in 1944. Since that time there have been numerous unconfirmed sightings throughout the historic range of the species. Many of these sightings seemed highly credible but lacked hard evidence.

In February 2004, Cornell Laboratory of Ornithology biologists became aware of credible sight reports of the IBWO in a portion of Bayou DeView, which is located on Cache River NWR. Subsequently, Cornell biologists and their partners documented the presence of at least one IBWO (Fitzpatrick et al. 2005) in that area.

This stretch of the Bayou De View is currently providing some or all of the life cycle requirements for this species. The sixteen sightings of the IBWO were documented within the cypress-tupelo swamp of the Bayou De View. Searchers deployed recording units within this area to capture the double taps and kent calls by this species. These vocalizations are the communication tools that the IBWO uses throughout the day. Much of this information from the recording units is still being analyzed.

Interior Least Tern – Interior least terns have been observed foraging intermittently in shore bird areas on Bald Knob NWR and the Raft Creek Bottoms along the White River.

Piping Plover – Piping Plover is an occasionally documented migratory bird in the Cache/Lower White River floodplain that does not winter or breed in Arkansas. It has not yet been reported on the refuge, but likely uses areas in the proposed expansion.

Fat Pocketbook Mussel – The fat pocketbook mussel inhabits the White River and has been found in other streams, but has not been found in the Cache River on any recent surveys.

Pink Mucket Mussel – The pink mucket mussel inhabits the White River and its major tributaries; one specimen was tentatively identified in the Cache River.

Rabbitsfoot – The rabbitsfoot mussel inhabits the White River and has been found in other streams, but is believed extirpated from the Little Red River and Cache Rivers circa 1970s and 1980s respectively.

Pondberry – Pondberry is limited in occurrence in Poinsett County (St. Francis Sunken Lands WMA), and is believed to occur in Woodruff and Jackson Counties in isolated sand pond depressions.

VII. Determination of Effects:

Explanation of effects of the action on species and critical habitats in item V. B:

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Ivory-billed Woodpecker	Extent of occurrence on Cache River NWR is unknown. Proposed management activities, such as reforestation, land acquisition, and hydrologic restoration, would connect and create large forest blocks and improve the ecosystem. Improvement cuts to forest habitat would be short-term disturbances, but would improve forest structure, composition, productivity, and sustainability of habitat over the long term. Public use, research, and other proposed activities are low volume and low impact.
Interior Least Tern	Limited occurrence on project area. Proposed management activities would improve habitat overall; foraging areas and potential nesting sites would not likely be impacted by the proposed action.
Piping Plover	Occasionally documented migratory bird likely to occur on refuge and in expansion area associated, with shallow mudflats such as wet agricultural fields, drying oxbow lakes, or managed moist-soil units. Proposed management activities would improve habitat overall; foraging areas and rest sites would not likely be impacted by the proposed action.
Fat Pocketbook Mussel	Limited occurrence in White River and not recently found in the Cache River. Proposed management activities would improve water quality through forest management, reforestation, and hydrologic restoration; public use, research, and other proposed activities would likely have no impact to the aquatic habitat.
Pink Mucket Mussel	Limited occurrence in White River and possibly found in the Cache River. Proposed management activities would improve water quality through forest management, reforestation, and hydrologic restoration; public use, research, and other proposed activities would likely have no impact to the aquatic habitat.
Rabbitsfoot Mussel	Limited occurrence in White River. Proposed management activities would improve water quality through forest management, reforestation, and hydrologic restoration; public use, research, and other proposed activities would likely have no impact on the aquatic habitat.
Pondberry	Limited occurrence in Poinsett County (St. Francis Sunken Lands WMA), and believed to occur in Woodruff and Jackson Counties in isolated sand pond depressions. Proposed management activities would improve critical habitat through restoration of geophysical features and hydrology; public use, research, and other proposed activities are low volume and low impact.

B. Explanation of actions to be implemented to reduce adverse effects:

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Ivory-billed Woodpecker	Surveys to determine potential use of an area by this species are conducted prior to any habitat manipulation. Close coordination with Ecological Services and the Regional Office continues to ensure protection and proper management for this species.
Interior Least Tern	Refuge ownership and law enforcement are key elements to protection of this species and its habitat
Piping Plover	Refuge ownership and law enforcement are key elements to protection of this species and its habitat.
Fat Pocketbook Mussel	Refuge ownership and therefore management and law enforcement would ensure protection of this species and its habitats.
Pink Mucket Mussel	Refuge ownership and therefore management and law enforcement would ensure protection of this species and its habitats.
Rabbitsfoot Mussel	Refuge ownership and therefore management and law enforcement would ensure protection of this species and its habitats.
Pondberry	Refuge ownership and therefore management and law enforcement would ensure protection and potentially restoration of this species and its habitats.

VIII. Effect Determination and Response Requested:

SPECIES/CRITICAL HABITAT	DETERMINATION ¹			REQUESTED
	NE	NA	AA	
Ivory-billed Woodpecker (Campephilus principalis)		x		Concurrence
Interior Least Tern (Sterna antillarum)		x		Concurrence
Piping Plover (Charadrius melodus)		X		
Pink Mucket Mussel (Lamsilis abrupt)		x		Concurrence
Fat Pocketbook Mussel (Potamilus)		x		Concurrence
Rabbitsfoot Mussel (Quadrula cylindrica)		x		Concurrence
Pondberry (Lindera melissifolia)		x		Concurrence

¹DETERMINATION/ 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 and candidate species is "Conference".

Signature (originating station)

Date

Keith M. Weaver,
Project Leader

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence _____ Non-concurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

Signature

Date

Title

Office

Appendix E. REFERENCES

- Arkansas Game and Fish Commission. 1989. A proposal for designation of protected areas within the Cache/Lower White Rivers Joint Venture Project as "Wetlands of International Importance". AGFC unpublished report. Little Rock, AR.
- Arkansas Soil and Water Conservation Commission. 1988. Arkansas state water plan: Eastern Arkansas Basin. Little Rock, AR. 255 pp.
- Bayley, P.B. 1995. Understanding large river-floodplain ecosystems. *BioScience* 45 (3): 153-158.
- Black Bear Conservation Committee. 2005. Black bear management handbook for Louisiana, Mississippi, Southern Arkansas, and East Texas. 3rd ed. Black Bear Conservation Committee, Baton Rouge, Louisiana, 88 pp.
- Davis, B.E, A.D. Afton, and R.R. Cox. 2008. Habitat Use by Female Mallards in the Lower Mississippi Alluvial Valley. *Journal of Wildlife Management* 73(5): 701-709.
- Dimmick, Ralph W., Mark J. Gudlin, and Donald F. Mckenzie. 2002. The northern bobwhite conservation initiative. Miscellaneous publication of the Southeastern Association of Fish and Wildlife Agencies, South Carolina. 96 pp.
- Fitzpatrick, John W., Martjan Lammertink, M. David Luneau, Jr., Tim W. Gallagher, Bobby R. Harrison, Gene M. Sparling, Kenneth V. Rosenberg, Ronald W. Rohrbaugh, Elliott C. H. Swarthout, Peter H. Wrege, Sara Barker Swarthout, Marc S. Dantzker, Russell A. Charif, Timothy R. Barksdale, J. V. Remsen, Jr., Scott D. Simon, Douglas Zollner. 2005. Ivory-billed Woodpecker (*Campephilus principalis*) Persists in Continental North America. *Science* June 2005: Vol. 308. no. 5727, pp. 1460 – 1462.
- Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009.
- Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative. 2009. Development and Operations Plan. 120 pp.
- Heitmeyer, Mickey E. Ph.D. 2010. An evaluation of ecosystem restoration options for the 100-Year floodplain of the Cache River Basin in Arkansas and Missouri with special reference to channel blockage near Grubbs, Arkansas and sediment management in the Big Creek Watershed. Greenbrier Wetland Services Report 10-2.
- Hoffman, V.E. 1999. Roosting and relative abundance of the southeastern myotis, (*Myotis austroriparius*), in a bottomland hardwood forest. M.S. thesis, Arkansas State University, Jonesboro.
- Klimas, C., E. Murray, T. Foti, J. Pagan, M. Williamson and H. Langston. 2009. An ecosystem restoration model for the Mississippi Alluvial Valley based on geomorphology, soils, and hydrology. *Wetlands* 29:430-450.

-
- LMVJV Forest Resource Conservation Working Group. 2007. Restoration, management, and monitoring of forest resources in the Mississippi Alluvial Valley: recommendations for enhancing wildlife habitat. Edited by R. Wilson, K. Ribbeck, S. King, and D. Twedt, 88 pp
- Pelton, M.R. 2001. American Black Bear. Pp. 224-233 in *Wildlife of Southern Forests: Habitat and Management*, ed. J. Dickson. 2001. Hancock House Publishers, Blaine, WA. 480 pp.
- Reinecke, K.J., R.M. Kaminski, D.J. Moorhead, J.D. Hodges, and J.R. Nassar. 1989. Mississippi Alluvial Valley. Pp.203-247 in *Habitat management for migrating and wintering waterfowl in North America*, eds. L.M Smith, R.L. Pederson, and R.M. Kaminski. 1989. Texas Tech University Press. 560 pp.
- Robinson, S.K., F.R. Thompson, T.M. Donovan, D.R. Whitehead, and J. Faaborg. 1995. Regional forest fragmentation and the nesting success of migratory birds. *Science* 267:1987-1990.
- Scott, J.M., B. Griffith, R.S. Adamcik, D.M. Ashe, B. Czech, R.L. Fischman, P. Gonzalez, J.J. Lawler, A.D. McGuire, and A. Pidgorna, 2008: National Wildlife Refuges. In: Preliminary review of adaptation options for climate-sensitive ecosystems and resources. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research [Julius, S.H., J.M. West (eds.), J.S. Baron, B. Griffith, L.A. Joyce, P. Kareiva, B.D. Keller, M.A. Palmer, C.H. Peterson, and J.M. Scott (Authors)]. U.S. Environmental Protection Agency, Washington, DC, USA, pp. 5-1 to 5-100.
- Stahle, D.W., M.K. Cleaveland, and J.G. Hehr. 1985. A 450-year drought reconstruction for Arkansas, United States. *Nature* 316(6028):530-532.
- Tanner, J.T. 1942. *The Ivory-billed Woodpecker*. Dover publications.
- Tiner, R. W., Jr. 1984. *Wetlands of the United States: current status and recent trends*. United States Fish and Wildlife Service, National Wetland Inventory Washington, D.C.
- U.S. Department of the Interior. 1984. *Cache River Basin: a waterfowl habitat preservation proposal – final environmental impact statement*. U.S. Fish and Wildlife Service, Atlanta, GA.
- U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2006 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.
- U.S. Fish and Wildlife Service. 1990. *American Woodcock management plan*. Washington, D.C. 11 pp.
- U.S. Fish and Wildlife Service. 2009. *Central Arkansas National Wildlife Refuge Complex, Bald Knob, Big Lake, Cache River and Wapanocca National Wildlife Refuges, Draft Comprehensive Conservation Plan and Environmental Assessment*, Atlanta, GA. 523 pp.
- U.S. Fish and Wildlife Service. 2009. *Central Arkansas National Wildlife Refuge Complex Comprehensive Conservation Plan*. Atlanta, GA 207 pp.
- Weaver, K.M. and M.R. Pelton. 1992. Denning ecology of black bears in the Tensas River Basin of Louisiana. *Bears: Their Biology and Management*, Vol 9, Part 1: A selection of papers from the Ninth International Conference on Bear Research and Management, Missoula, Montana, pp. 427-433.