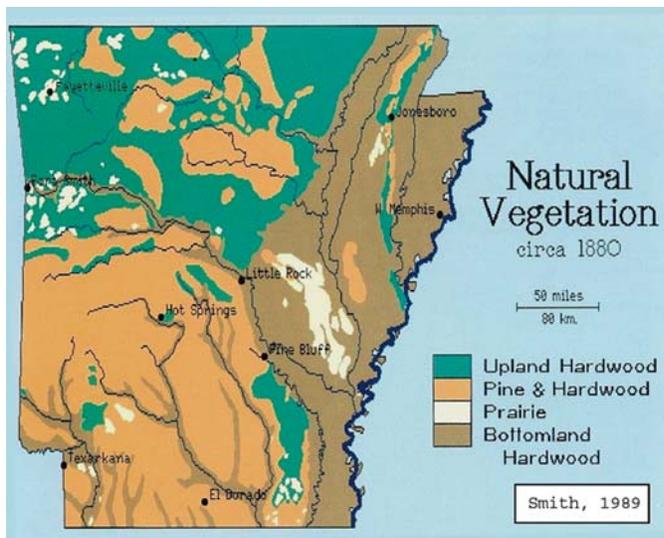


Appendix A: Arkansas



Both figures from Smith, 1989, the *Atlas of Arkansas*

Introduction and Overview

Arkansas is a diverse state of dramatic contrasts, from mountains, upland forests, and karst areas to alluvial plains, bottomland hardwood forests, swamps, prairies, and large extensive river systems. In addition, two of the principal North American Migratory Bird Flyway routes cross the State, with the Mississippi Flyway crossing Arkansas from north to south and overlapping with the Central Flyway at the State's westernmost edge. Arkansas can be divided into highlands and lowlands, based loosely on elevation and geology.

In the north and west, the highlands are part of the Southern Interior Highlands, consisting of the Ozark Highlands and Ouachita Mountains. In the south and east, the lowlands are part of the Atlantic Coastal Plain which extends along the Gulf of Mexico. The Coastal Plain is dominated by flat bottomlands and low rolling hills. It is further subdivided into the West Gulf Coastal Plain and the Mississippi Alluvial Plain, the latter known as the "Delta" (Smith 1989).

Arkansas lies on the western edge

of the great deciduous and pine forests that once covered most of the eastern United States. The State is roughly divided into four natural vegetation regions: upland hardwood, pine-hardwood, bottomland hardwood, and prairie.

Upland hardwoods are found primarily in the Ozark mountain areas and are composed predominantly of broadleaf deciduous trees with a blending of some conifers. The dominate vegetation of the Ouachita Mountains is a pine-hardwood forest of predominantly shortleaf pine with a blend of oak and other hardwoods. In the Gulf Coastal Plain (Coastal Plain), the pine-hardwood forest continues with shortleaf and loblolly pine naturally mixed with oak-hickory stands in the drier areas. In the wetter parts of the Coastal Plain, species of white and red oaks, hickory, sweet gum, ash, and pecan

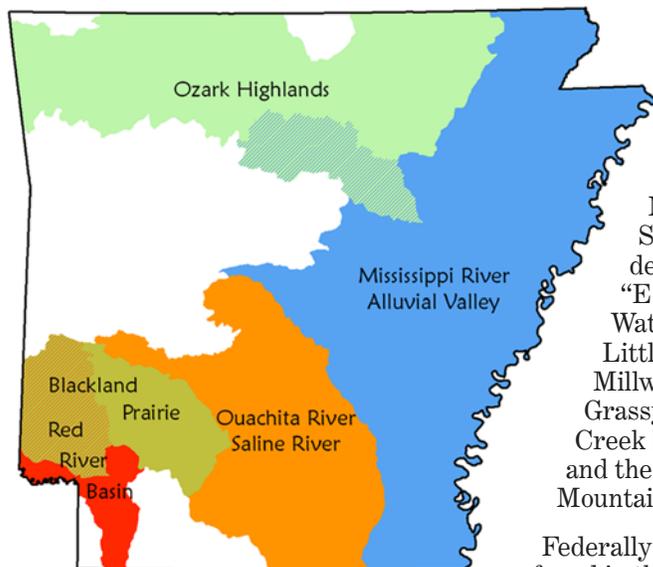
predominate. The bottomland forests along the major rivers that flow through this area are considered old extensions of the bottomland hardwood forests of the adjoining Mississippi Alluvial Plain (Smith 1989).

The Endangered Species Act (ESA) protects 32 federally listed species in Arkansas, of which 24 are endangered and eight are threatened; 27 are animals and five are plants. Recovery plans are in place for 21 of these listed species. There are also five candidate species for federal listing, including two freshwater mussels, two fish, and one amphibian.

Overview of Focus Areas

Arkansas originally had an estimated 9.8 million acres of wetlands, or almost 30 percent of the State's surface area. By the 1980s, less than 2.8 million acres remained, or only about 8 percent of the State's land area; the Delta region suffered the greatest loss. Of the 8 million acres of forested wetlands, only about 875,000 acres remain today in fragmented forests. The wetlands of the bottomland forest ecosystem include some of the most productive fish and wildlife habitat in the nation. Arkansas's wetlands, especially those located in the Delta along the Mississippi Flyway, are sometimes referred to as part of the 'mallard flyway' (Smith 1998). Their recognized importance has led to the wetlands in the Cache-Lower White River system being designated as one of only seventeen "Wetlands of International Importance" by the United Nations RAMSAR Convention on wetlands. It is also within this wetland system that the Ivory-billed woodpecker, thought to be extinct, was recently rediscovered.

Utilizing Arkansas's Comprehensive Wildlife Conservation Strategy (Arkansas Game and Fish Commission 2005), five focus areas have been established in Arkansas for implementation of the Partner Program. They are concentrated mainly within the migratory flyway and associated river systems; bottomland hardwood forests; and at-risk ecosystems. Numerous plans



Arkansas Focus Areas

have addressed all or parts of these focus areas, such as the Ozarks Ecoregional Conservation Assessment prepared by The Nature Conservancy Ozarks Ecoregional Assessment Team (The Nature Conservancy 2003). In addition to Arkansas's Comprehensive Wildlife Conservation Strategy, plans created by the Arkansas Multi-Agency Wetland Planning Team (MAWPT), the Arkansas Game and Fish Commission's private lands program, The Nature Conservancy, and the Lower Mississippi River Ecosystem Team were consulted in the development of the Partners focus areas.

Red River Basin (RRB) Focus Area

Located in the southwestern segment of the State in the Central/Mississippi Flyway's overlap region, the RRB focus area encompasses parts of Miller, Lafayette, Little River, Hempstead, Sevier, and Howard counties.

The major river systems of the RRB focus area are the Red River that flows out of Texas and Oklahoma from the southwest, the Little River that flows out of southern Oklahoma, the Cossatot River that flows out of Arkansas, and Arkansas's Sulphur River. Important but smaller river systems in the focus area include Robinson Creek and Badcau Bayou.

The Cossatot and Little Missouri Rivers are designated as National Wild and Scenic Rivers. State-designated "Ecologically Sensitive Waterbodies" include the Little River above Millwood Reservoir; Grassy Lake and Yellow Creek below the reservoir; and the lower part of the Mountain Fork Little River.

Federally listed mussels are found in the Caddo and Little Missouri Rivers within the focus area. The diverse mussel and fish species found in these river systems are especially sensitive to agricultural and chemical runoff and siltation. Many of the focus area's river systems are also home to a variety of other aquatic species of concern (Service 2006).

Luke Medana/Arkansas Tech University



The Interior least tern (*E*) nests in the Red River Basin focus area.

Priority Habitat

Wetland: Bottomland hardwood forest, riverine systems, and riparian habitats

Five-Year Target (FY 2007-2011)

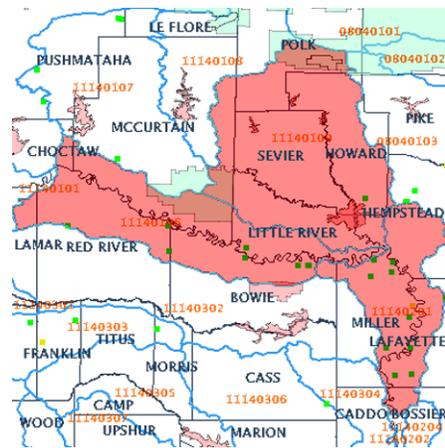
Reforestation: 500 acres; Riparian: 2.5 miles

*Focus Species**

Interior least tern (*E*); American bald eagle (*T*); leopard darter (*T*) (and its critical habitat in Mountain Fork Little River); Caddo madtom (*SOC*); scaleshell (*E*); Ouachita rock-pocketbook (*E*); and pink mucket (*E*).

Threats

Urban development; logging and clearcutting; agricultural runoff and siltation; excessive pumping from wells and waterways



Red River Basin Focus Area

Action Strategies

■ **Habitat Improvement:** Reforest agricultural land, create riparian buffer zones, and fence cattle out of streams to reduce forest fragmentation, siltation, and chemical runoff into rivers and streams to improve mussel and fisheries habitat. Emphasize partnering with landowners, the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the Arkansas Game and Fish Commission, the Arkansas Natural Heritage Commission, The Nature Conservancy (TNC), and other agencies to aid and support the various USDA Farm Bill programs (i.e., the Conservation Reserve Program, the Wildlife Habitat Incentives Program), buffer initiatives, and other available programs.

■ **Water Conservation Planning:** Partner with landowners and other agencies to develop water retention ponds/reservoirs and tailwater recovery systems to reduce water withdrawal from aquifer and river systems. Coordinate with various agencies and landowners to design water retention areas. If properly designed and executed, reservoirs/ponds and tailwater recovery systems will increase the basin's wetland and surface water areas and provide additional foraging/resting habitat for migratory birds traveling the flyway.



Blackland Prairie Focus Area

Blackland Prairie (BP) Focus Area

The BP focus area is located in parts of Clark, Hempstead, Howard, Little River, Pike, Quachita, Nevada, and Sevier counties. Considered one of the most at-risk ecosystems in the Southeast, it is an area characterized by gently rolling topography. These prairies and associated woodlands do not occur contiguously, but are found in localized areas where the blackland soils have formed from calcareous substrates (Foti 1989).

The ecology and requirements of this fragmentary prairie ecosystem set it apart as its own focus area. These small, highly productive prairie habitats, with their associated woodlands and bottomlands, support more than 600 plant and 315 animal species. Blackland prairie flora typically consists of grasses three to four feet tall, intermixed with a diversity of forbs. Many of the species associated with these prairie lands are classified as rare and are listed as species of concern (SOC) by the State.

The associated Blackland prairie woodlands occur on dry to mesic sites and have an open canopy with well-established herbaceous development. A fire-driven ecosystem, the Blackland prairies and forests become degraded when subjected to long-term fire suppression.



Both photos, Mark Clark, The Nature Conservancy of Arkansas

Top: Clearing of invading eastern red cedar. Bottom: allowing native prairie plants to revegetate naturally.

Degraded prairie forests are characterized by closed canopies and a reduced herbaceous layer dominated by Cherokee sedge. These sites have an increased abundance of woody species and aggressive, non-native plant species in direct competition with native prairie species (Hattenbach et al. 2006).

Priority Habitat

Upland: Blackland prairie

Five-Year Target (FY2007-2011)

Prairie Restoration: 750 acres

*Focus Species**

American burying beetle (E); and other state-listed rare prairie plants

Threats

Prairie conversion to other land uses; long-term fire suppression; competing plant species (native and invasive)

Action Strategies

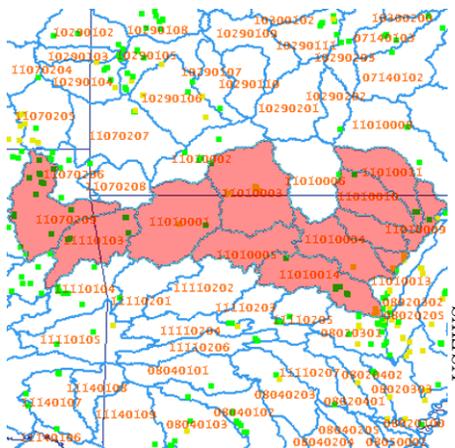
■ **Management of Existing Prairies:** Coordinate with landowners, TNC, AGFC, and other partners to support efforts to maintain existing prairies through fire management procedures and control of undesirable vegetation. Support and partner with TNC and their fire management efforts to maintain existing prairies.

■ **Reestablishment of Native Prairies:** Partner with willing landowners and other agencies to reestablish native prairies. Provide technical assistance and cost-sharing of funds to support the development and implementation of fire management plans, prescribed burning; removal of competing vegetation by mechanical or chemical treatment; and the reintroduction of native prairie grasses and forbs.

Ozark Highlands Karst (OHK) Focus Area

Formed in limestone carbonate bedrock, the OHK focus area extends from northern Arkansas and southern Missouri into eastern Oklahoma, supporting an ancient underground ecosystem of limestone caves, fractures, springs, and aquifers. The term ‘karst’ is used to define this underground landscape that covers portions of ten northern counties. The OHK focus area includes the majority of those counties located in Arkansas’s karst region, with some overlap into the Mississippi Alluvial Plain Focus Area.

The OHK ecosystem is home to a variety of rare and unique species. Some of these animals are indigenous to this fragile ecosystem and are found nowhere else in the world. Bats, fish, salamanders, crayfish, insects and spiders coexist in a delicate balance in some of the caves, but degraded water quality and disturbance is a threat to their continued survival.



Ozark Highlands Karst Focus Area

All Arkansas bats hibernate in caves during the winter when their main food source (insects) is absent. Bats roused from hibernation lose one to three months' worth of body fat, and can starve. In summer, bats use caves as maternity colonies, which decline after human disturbance. Usually producing only one young a year, bats are one of the slowest reproducing mammals of their size in the world. This is one of the reasons that bats are extremely vulnerable to extinction. Human disturbance scares mother bats, who may abandon their babies (TNC 2006).

Many human-induced activities degrade or destroy karst habitat by altering the quality of air and water entering cave systems. Karst systems are easily contaminated by urban development and agriculture runoff, which introduces fecal coliform bacteria, nutrients, and chemicals into karst networks. This is especially problematic because Arkansas karst geology contains much of the state's supply of groundwater.

Priority Habitat

Upland: Karst; Riparian and In-Stream

Five-Year Target (FY 2007-2011)

Caves Protected: 10; Upland: 3 acres; Riparian/Instream: 5 miles

Focus Species*

Indiana bat (E); Ozark big-eared bat (E); gray bat (E); cave crayfish (E); and other indigenous cave species; yellowcheek darter (c)



A joint Partners Program and USDA cave fencing project in the Ozark Highlands Karst Focus Area



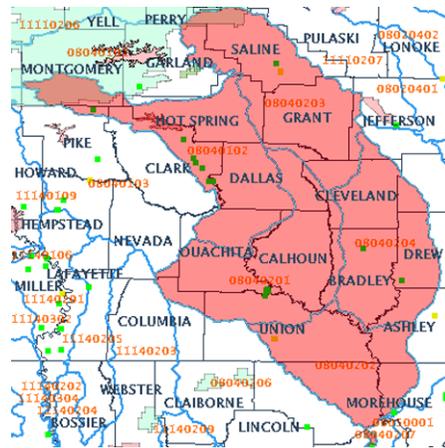
Gray bats (E) in a cave in the Ozark Highlands Karst Focus Area

Threats

Groundwater contamination; reduction in water quality; habitat degradation; human disturbance. The threats to water quality include an increase in livestock production and a reduction in the number and size of woodlands throughout the recharge area. Human disturbance threats include such activities as caving, vandalism, agricultural and silvicultural activities, urbanization, and gravel mining.

Action Strategies

- **Cave Gating and Fencing:** Gate or fence selected caves to prevent human disturbance of bats and other indigenous cave species.
- **Protection of Cave Recharge Areas:** Protect and improve water quality entering cave recharge areas. Partner with landowners and USDA conservation programs to fence livestock out of streams, provide alternative water sources, and increase buffer zones in cave recharge areas.



Ouachita/Saline Rivers (OSR) Focus Area

- **Creation of Buffers:** Improve and increase the size of buffer zones and forests along rivers and streams in cave recharge areas.

Ouachita/Saline Rivers (OSR) Focus Area

The bottomland forests along the major rivers that flow through the OSR focus area are considered old extensions of the bottomland hardwood forests of the adjoining Mississippi Alluvial Plain and are vital to maintaining the health of these aquatic ecosystems. The bottomland hardwood ecosystem is considered one of the most productive habitat types in the United States.

The Saline River is designated by the State as an Extraordinary Resource Water; and an Ecologically Sensitive Waterbody. The Ouachita River is also listed as an Ecologically Sensitive Waterbody. Both rivers are home to several federally listed endangered mussel species and many species of concern.

Priority Habitat

Aquatic (Riverine); Bottomland Hardwoods

Five-Year Target (FY 2007-2011)

Reforestation: 750 acres; Riparian: 3.75 miles

Focus Species*

Ivory-billed woodpecker (E); Ouachita rock-pocketbook (E); pink mucket (E); spectaclecase (C); winged mapleleaf (E); Arkansas fatmucket (T); and numerous species of concern.

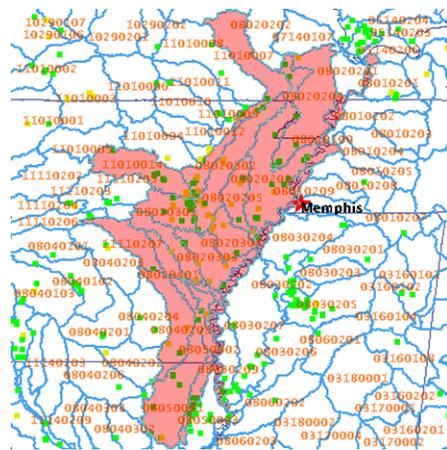
Threats

Forest fragmentation, mainly from conversion to agricultural development; agricultural runoff and siltation; stream alteration; in-stream gravel mining; bottomland hardwood forest conversion to pine plantations

Action Strategies

■ **Reforestation:** Reforest agricultural land, create riparian buffer zones, and fence cattle out of streams to reduce forest fragmentation, siltation, and chemical runoff into the focus area rivers and streams and improve mussel and fisheries habitat. Emphasize partnering with landowners, the NRCS, the FSA, the Arkansas Game and Fish Commission, the Arkansas Natural Heritage Commission, TNC, and other agencies to aid and support the various USDA Farm Bill programs (i.e., the Conservation Reserve Program, the Wildlife Habitat Incentives Program, and the Healthy Forest Reserve Program), buffer initiatives, and other available programs.

■ **Water Conservation Planning:** Partner with landowners and other agencies to develop water retention ponds/reservoirs and tailwater recovery systems to reduce water withdrawal from aquifer and river systems. Coordinate with various agencies and landowners to design water retention areas. If properly designed and executed, reservoirs/ponds and tailwater recovery systems will increase the basin's wetland and surface water areas and provide additional foraging/resting habitat for migratory birds traveling the flyway.



Mississippi Alluvial Plain (MAP) Focus Area

Mississippi Alluvial Plain (MAP) Focus Area

The MAP focus area extends through portions of seven states and once consisted primarily of bottomland hardwood forests. More than 80 percent of this habitat has been converted to agriculture and other uses. The MAP focus area occupies the entire portion of the Mississippi Alluvial Valley occurring in Arkansas.

The MAP focus area is dominated by two main bottomland hardwood forest types. The lowest is at floodplain level and subject to inundation 20 to 40 percent of the time. These areas support woodlands that are usually composed of a mixture of water hickory, bitter pecan, overcup oak, water locust, sugarberry, green ash, bald cypress, and water tupelo. At higher elevations normally flooded only 10 to 20 percent of the time, the forests are comprised of willow, water, Nuttall, cherrybark, swamp chestnut, and Shumard oaks.

Bottomland hardwood wetlands, floodplain grasslands, and other extensions of riparian habitat constitute key aspects of the rejuvenation and continued existence of aquatic and wildlife resources in this ecosystem. Periodic inundation of floodplain habitat creates and sustains bottomland hardwoods, making this habitat one of the most productive for wildlife in the United States. The MAP focus area also includes the largest continuous system of wetlands left in North America, providing important habitat for numerous species of fish and



Bottomland hardwood reforestation in the Mississippi Alluvial Plain

wildlife. It is also an important part of the Mississippi Flyway, a major bird migration corridor used by large numbers of ducks, geese, shorebirds, neotropical songbirds, and other birds during spring and fall migrations. These migratory species rely heavily on the foraging and resting places this focus area provides.

The recognized importance of this ecosystem has led to the wetlands within the Cache-Lower White River system being designated as one of only seventeen "Wetlands of International Importance" by the United Nations Ramsar Convention on Wetlands. Within this wetland system, the Ivory-billed woodpecker was recently rediscovered. Thought to be extirpated for more than 60 years, the bird was located in the Big Woods of the MAP focus area. The plant and animal communities of the Big Woods are among the most biologically diverse and productive in the world (TNC 2006).

Priority Habitat

Wetland: Bottomland Hardwood Forest

Five-Year Target (FY 2007-2011)

Reforestation: 3,500 acres; Riparian: 17.5 miles

*Focus Species**

Ivory-billed woodpecker (E); Interior least tern (E); American bald eagle (T); neotropical migratory birds and shorebirds (SOC); pink mucket (E); fat pocketbook (E); scaleshell (E); pallid sturgeon (E); pondberry (E)



The Prothonotary warbler, a forest-breeding neotropical migrant of concern occurring in the Mississippi Alluvial Valley Focus Area

Threats

Forest fragmentation, mainly from conversion to agricultural development; agricultural runoff and siltation; ditching; stream alteration; river levees; in-stream gravel mining; hardwood forest conversion to pine plantations

Action Strategies

- **Reforestation:** Reforest agricultural land, create riparian buffer zones, and fence cattle out of streams to reduce forest fragmentation, siltation, and chemical runoff into the focus area rivers and streams and improve mussel and fisheries habitat. Emphasize partnering with landowners, the NRCS, the FSA, the Arkansas Game and Fish Commission, the Arkansas Natural Heritage Commission, TNC, and other agencies to aid and support the various USDA Farm Bill programs (i.e., the Conservation Reserve Program, the Wildlife Habitat Incentives Program), buffer initiatives, and other available programs.
- **Water Conservation Planning:** Partner with landowners and other agencies to develop water retention ponds/reservoirs and tailwater recovery systems to reduce water withdrawal from aquifer and river systems. Coordinate with various agencies and landowners to design water retention areas. If properly designed and executed, reservoirs/ponds and tailwater recovery systems will increase the basin's

wetland and surface water areas and provide additional foraging/resting habitat for migratory birds traveling the flyway.

E=federally listed endangered species; T=federally listed threatened species; C=federal candidate species; SOC=species of concern

Stakeholders Involved

The following is a list of stakeholders involved in the Partners Program in Arkansas. The stakeholders are involved in carrying out program activities in varying degrees; however, to some extent all participate in supporting the program by providing technical assistance, locating potential projects, and promoting the program.

- Private landowners (more than 130 landowners have entered into Partners for Fish and Wildlife agreements with the Service during the last five years)
- USDA Natural Resources Conservation Service
- USDA Farm Service Agency
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- White River National Wildlife Refuge
- Arkansas Forestry Commission
- Arkansas Game and Fish Commission
- Arkansas Natural Heritage Commission
- Arkansas Department of Environmental Quality
- University of Arkansas - Pine Bluff
- The Nature Conservancy of Arkansas
- Ducks Unlimited, Inc.
- Audubon Arkansas
- Fish America Foundation
- Bayou Bartholomew Alliance
- Union County Conservation District
- Mississippi River Trust
- Lower Mississippi River Conservation Committee

- Arkansas Stream Team
- ARKLATX Operating Co., Inc.
- Des Arc Elementary School

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