Tumbling Creek Cave Ecosystem Conservation Strategies

- Increase glade connectivity and plant diversity.
- Restore woodland natural communities.
- Control invasive plants and animals.
- Reduce pollutants entering groundwater through erosion control, protection of karst features and improved sewage treatment.
- Protect habitats within Tumbling Creek Cave.
- Encourage compatible private land management through improved delivery of cost-share and incentive programs.
- Expand environmental education programs.

Ozark Underground Laboratory

Woodlands and forests surrounding Big Creek provide important foraging habitat for gray bats.

Priority Research and Inventory Needs

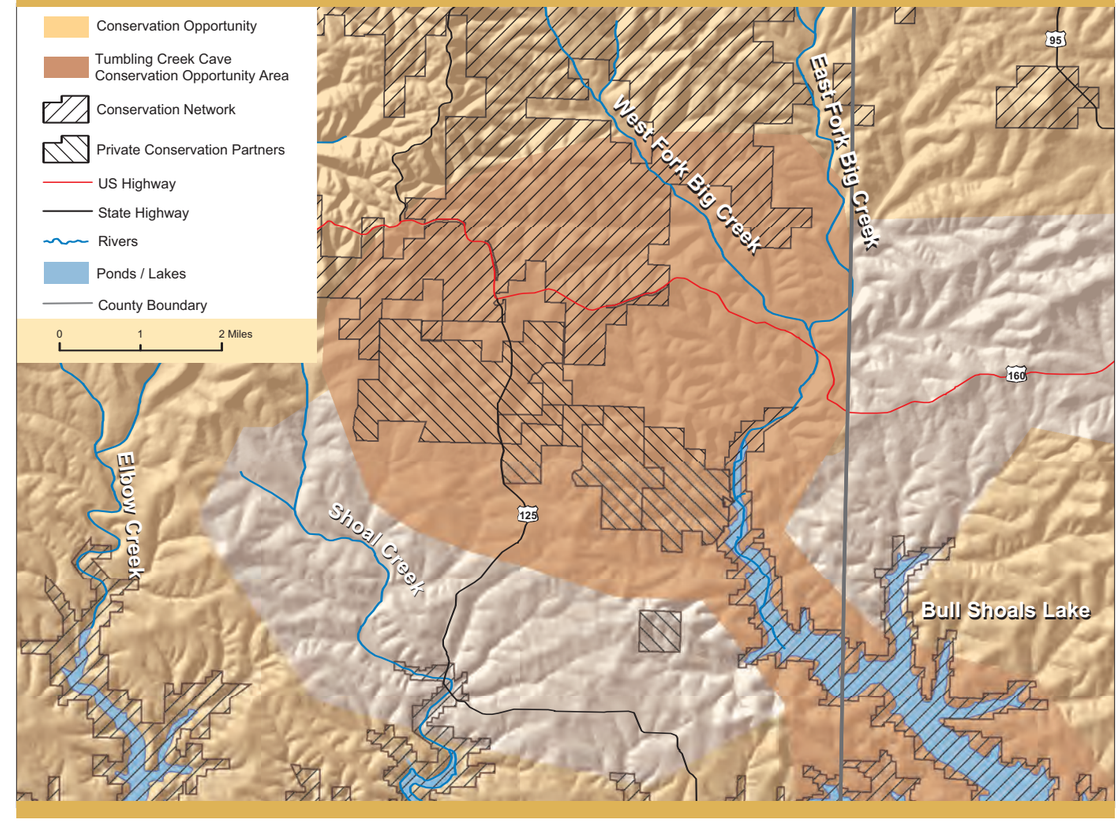
- Determine the best methods for reforesting stream and river banks.
- Investigate the impacts of Bull Shoals Reservoir flooding on cave habitats.
- Determine techniques for artificially propagating Tumbling Creek cavesnails.
- Continue monitoring bat populations at Tumbling Creek Cave.
- Survey for additional bat caves in the Tumbling Creek Cave Ecosystem COA.
- Survey for additional caves with habitat suitable for the Tumbling Creek cavesnail.
- Develop Ecological Landtype data for the Tumbling Creek Cave Ecosystem COA.
- Inventory and characterize karst features (including losing streams and sinkholes).

Conservation Partners

Existing: Ozark Underground Laboratory (OUL); Tumbling Creek Cave Foundation; American Cave Conservation Association; Cave Research Foundation; Missouri Conservation Heritage Foundation (MCHF); Tennessee Aquarium Research Institute; Mark Twain School; The Nature Conservancy (TNC); private landowners; Southwest Missouri Resource Conservation and Development; U.S. Fish and Wildlife Service (USFWS); U.S. Forest Service (USFS); U.S. Army Corps of Engineers (USACE); Missouri Department of Conservation (MDC)

Potential: Bat Conservation International; Trust for Public Land; Greater Ozarks Audubon Society; Upper White River Basin Foundation; private landowners; USFS (Bonanza Cave); Natural Resources Conservation Service (NRCS)

Tumbling Creek Cave Ecosystem Conservation Opportunity Area



Funding Sources

Existing: OUL annual budget; USFS annual budget; USACE annual budget; USFWS Partners for Fish and Widlife Program; NRCS Wildlife Habitat Incentive Program; NRCS Grassland Reserve Program; NRCS Environmental Quality Incentives Program; NRCS Farm and Ranch Land Protection Program; Farm Service Agency Conservation Reserve Program; MDC Private Lands Cost Share Program; MDC Wildlife Diversity Funds; Taney County Soil and Water Conservation District State Cost Share Funds; MCHF Stream Stewardship Trust Fund; TNC Grant

Promising Future Sources: National Fish and Wildlife Foundation grants; MDC Landowner Incentive Program; MDC State Wildlife Grants; USFWS Private Stewardship Program; Upper White River Basin Foundation

Existing Conservation Network

Ozark Underground Laboratory; Mark Twain National Forest (Ava District); Bull Shoals Lake

David C. Ashley, Missouri Western State College

Tumbling Creek cavesnails are found only in Tumbling Creek Cave. The population was once estimated at 15,000. Today, as few as 20-40 remain. Water pollution and increased sedimentation are believed to be the primary threats to this tiny aquatic snail.

Ozark Underground Laboratory

The Tumbling Creek Cave Ecosystem is also home to the Ozark Underground Laboratory (OUL). OUL provides hydrologic consulting services to support educational programs and ecosystem protection efforts. The Tumbling Creek Cave Foundation now owns the cave's natural entrance as well as land overlying some of the cave's major passages.

Conservation Challenges

The Tumbling Creek Cave Ecosystem offers a diverse complex of woodlands, glades and underground cave communities. Potential challenges to conservation success include existing pollution sources, excessive ATV and dirt bike use, water level management for Bull Shoals Lake, public opinion, economics, differing agency management regulations and limited staff.

To learn more about the Tumbling Creek Cave Ecosystem Conservation Opportunity Area, please contact:

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Wildlife Division
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Tumbling Creek Cave Ecosystem

Conservation Opportunity Area

Ozark Underground Laboratory

Tumbling Creek Cave has the highest recorded biological diversity of any cave west of the Mississippi River.

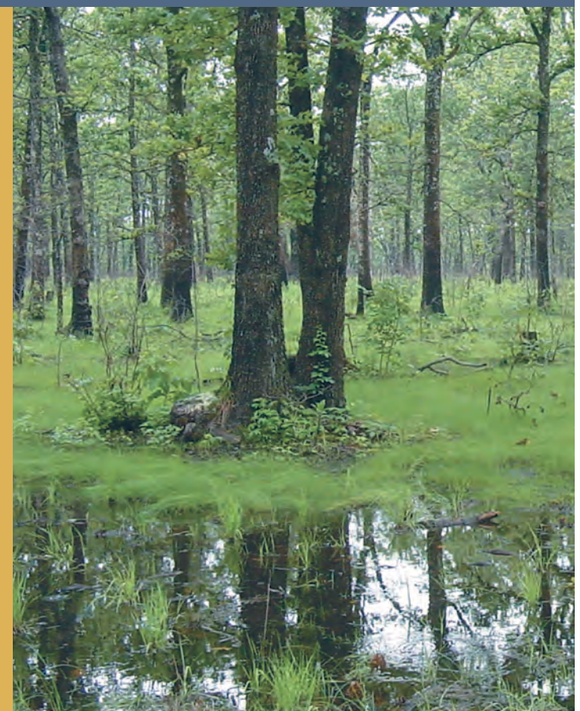
Located in southeast Taney County and southwest Ozark County, the Tumbling Creek Cave Ecosystem features open oak woodlands with scattered rocky glades. Existing glade and woodland complexes provide habitat for a variety of wildlife, including species of conservation concern such as Bachman's sparrows, painted buntings and eastern collared lizards. The Tumbling Creek Cave Ecosystem's rarest species, however, live underground.

Tumbling Creek Cave is home to at least 110 animals, including several known only from this cave. The cave stream contains the planet's only known population of the federally endangered Tumbling Creek cavesnail. In addition to its selection as a National Natural Landmark, Tumbling Creek Cave has been designated a Priority 1 gray bat cave ("absolutely essential" in preventing extinction).

The Tumbling Creek Cave Ecosystem Conservation Opportunity Area (COA) includes land surrounding the nine square mile recharge area for Tumbling Creek Cave and the Big Creek Arm of Bull Shoals Lake. Woodlands and forests along the Big Creek Arm provide important foraging areas for a maternal gray bat colony that utilizes the cave. Since approximately two-thirds of the Tumbling Creek Cave Ecosystem is privately owned, encouraging compatible private land management will be a critical component of conservation success.

Upper Gasconade Conservation Strategies

- Restore riparian corridors to conserve declining mussels, fish and hellbenders.
- Restore large, contiguous woodlands and forests to improve upland habitat for declining forest dwelling songbirds, rare plants and other terrestrial plants and animals.
- Improve habitat and implement Best Management Practices on private lands adjacent to the existing conservation network.
- Develop workshops, field days and stream teams to balance wildlife with the needs of the citizenry who live, work and recreate in the Upper Gasconade River Hills.
- Improve water quality through cooperative water quality improvement projects in local communities.



Paul W. Nelson, U.S. Forest Service

*The **Western Star Flatwoods** (Mark Twain National Forest) are characterized by a dense layer of soil that restricts water drainage and tree root growth.*

Priority Research and Inventory Needs

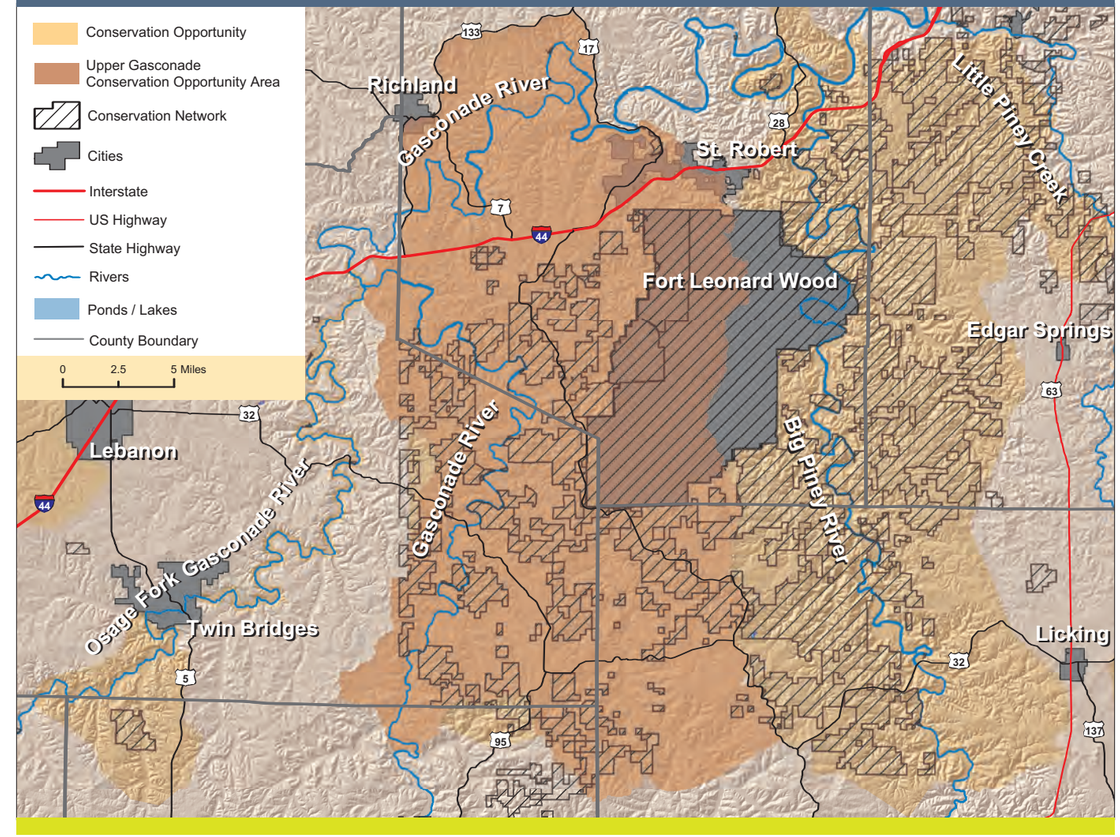
- Inventory aquatic life.
- Gather baseline data on forest dwelling birds; use Breeding Bird Survey data and Christmas Count data to determine abundance of birds.
- Determine the success of new stream restoration techniques.
- Document cave and spring recharge areas.
- Inventory caves and cave life.
- Inventory the extent of non-native invasive species.

Conservation Partners

Existing: Ozark Regional Land Trust (ORLT); U.S. Forest Service (USFS); Missouri Department of Conservation (MDC); U.S. Fish and Wildlife Service (USFWS)

Potential: The Nature Conservancy – Missouri Chatper; Central Hardwoods Joint Venture; Roubidoux Fly Fishers Association; Trout Unlimited; Audubon Missouri; American Fisheries Society; Missouri Stream Teams; National Wild Turkey Federation (NWTF); private landowners; Natural Resources Conservation Service (NRCS); U.S. Department of Defense (DOD)

Upper Gasconade Conservation Opportunity Area



Funding Sources

Existing: USFS annual budget; DOD annual budget; MDC annual budget; MDC Private Lands Cost Share Program; ORLT annual budget; Farm Service Agency Conservation Reserve Program; NRCS Wildlife Habitat Incentive Program; NRCS Environmental Quality Incentives Program; Soil and Water Conservation District State Cost Share Funds

Promising Future Sources: MDC State Wildlife Grants; MDC Wildlife Diversity Fund; MDC Forest Legacy Program; USFWS Partners for Fish and Wildlife Program; USFWS Fish Passage Funds; USFWS Non-Game Bird Funds; Missouri Department of Natural Resources 319 Grants; Environmental Protection Agency Targeted Watersheds Grant Program; Missouri Bird Conservation Initiative Grants; NWTF Wild Turkey Super Fund; National Fish and Wildlife Foundation Grants

Existing Conservation Network

Mark Twain National Forest – Houston/Rolla District; Fort Leonard Wood; Roubidoux Creek Conservation Area; Great Spirit Cave Conservation Area; Adams Access; Schlicht Springs Access; Mitschele Access; Ozark Regional Land Trust Easements

Chuck-will's-widows summer in Ozark woodlands and forests. They eat moths, grasshoppers and other flying insects. Chuck-will's-widows are closely related to whip-poor-wills.

Jim Rathert, Missouri Department of Conservation

Monitoring Mussels

Sue Bruenderman and Scott Faiman monitor mussel populations in the Gasconade River. Missouri Department of Conservation researchers crawl along streambeds wearing wet suits and weighted diving belts. Researchers are finding more Asian clams than native mussels in the Gasconade River. Asian clams are an introduced, invasive species that are more tolerant of poor water quality.

Jim Rathert, Missouri Department of Conservation

Conservation Challenges

The Upper Gasconade River Hills have a wide variety of landscapes and natural communities. Except where cleared for livestock and pastures, upland woodland and forest natural communities remain. Bottomlands are mostly cleared for cattle grazing on fescue pastures. Invasive species (e.g. feral hogs, sericea lespedeza, multiflora rose, autumn olive, Russian olive, teasel, Asian clams) affect native habitats. Conservation goals should include the maintenance and restoration of native oak woodlands and the protection of sensitive cave and aquatic resources. Additional obstacles to conservation success may include woodland and forest fragmentation, finding willing private landowners to implement Best Management Practices, limited funding and staff time and some gravel mining practices.

To learn more about the Upper Gasconade River Hills Conservation Opportunity Area, please contact:

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Upper Gasconade River Hills

Conservation Opportunity Area

The Gasconade River supports a variety of fish, crayfish, mussels and amphibians.

Paul W. Nelson, U.S. Forest Service

Early land surveyors described the landscape surrounding the Gasconade River as "hilly, stony, thin soil, unfit for cultivation." Oak woodlands, savannas and forests occupy the uplands with glades scattered throughout. Bottomlands were historically wooded. Like much of the Ozarks, the Upper Gasconade landscape includes sinkholes, losing streams, springs, fens and caves.

The Upper Gasconade River Hills Conservation Opportunity Area (COA) includes portions of the Gasconade River and Roubidoux Creek. Much of the land is owned by the U.S. Forest Service (Mark Twain National Forest) and the U.S. Department of Defense (Fort Leonard Wood).

The Upper Gasconade River has a diverse aquatic natural community and remains one of the few Ozark rivers unaffected by dams. Freshwater mussels are important for healthy rivers and streams. They provide food for muskrats, raccoons, river otters and some birds. Since mussels are filter-feeders, they are important indicators of clean water. Thirty-five kinds of mussels have been observed in the Gasconade River basin, including seven species of conservation concern. A primary interest for this landscape is to improve aquatic habitat for mussels, which will benefit crystal darters, least darters, bluestripe darters, eastern hellbenders and sport fish.

White River Glades and Woodlands Conservation Strategies:

- Increase the connectivity and quality of glade, savanna and woodland habitats, emphasizing locations known to support species of conservation concern.
- Improve water quality through the protection of riparian habitats, sinkholes and losing streams.
- Control unwanted invasive plant and animal populations to the maximum extent possible (e.g. sericea lespedeza, tall fescue, eastern red cedar, feral hogs).
- Increase opportunities to work with willing private landowners on fescue conversion, grazing management, cost share, etc.

Jim Rathert, Missouri Department of Conservation

The smoke tree grows on glades in four counties of southwestern Missouri. When the salmon-colored blossoms drop off, the colorful, hairy stalks remain, giving the tree the smoky look that provides its name. The foliage of smoke tree also displays brilliant orange and red autumn color.

Priority Research and Inventory Needs

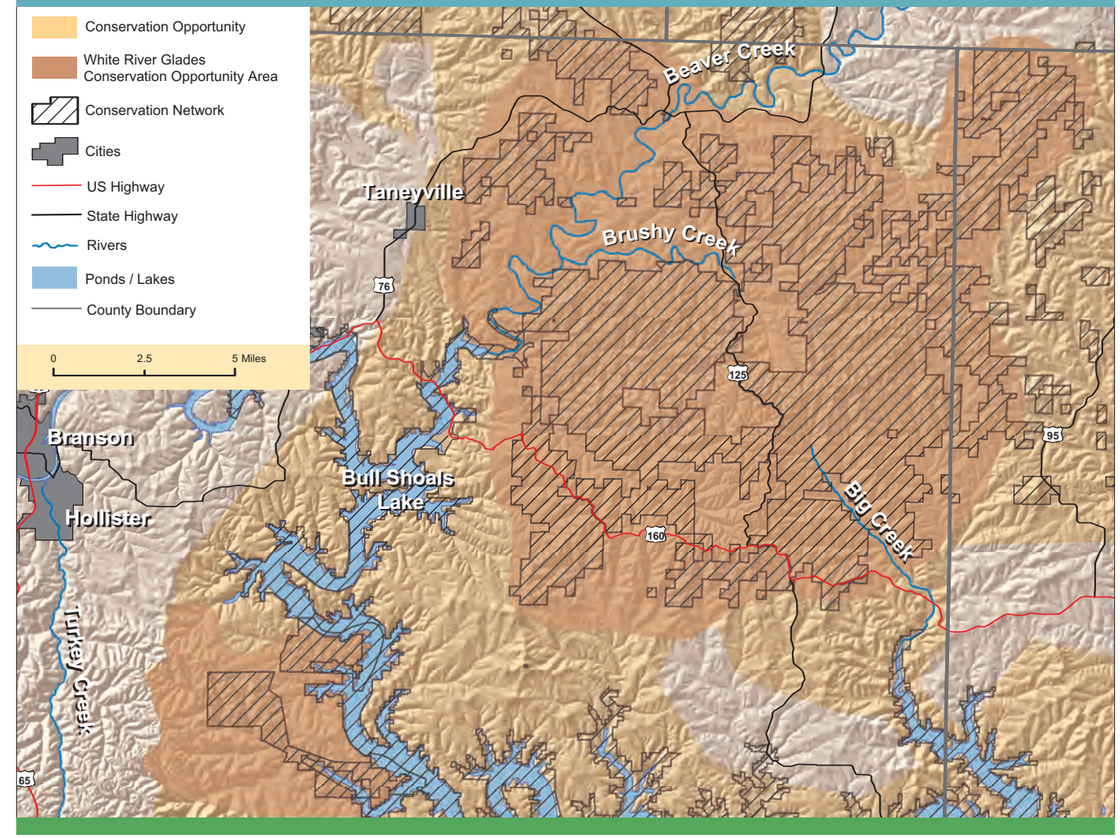
- Determine an appropriate fire management regime for habitat restoration.
- Conduct a land inventory to determine public-private connections.
- Update species and community occurrences in the heritage database.
- Inventory karst features and losing stream segments.
- Conduct research to determine the best methods for long-term control of sericea lespedeza.

Conservation Partners

Existing: Audubon Missouri; Greater Ozarks Audubon Society; Tumbling Creek Cave Foundation; Missouri State University's (MSU) Bull Shoals Field Station; National Wild Turkey Federation (NWTF); Southwest Missouri Resource Conservation and Development; South Missouri Water Quality Project; U.S. Forest Service (USFS); Missouri Department of Conservation (MDC)

Potential: Ozark Regional Land Trust; Central Hardwoods Joint Venture; The Nature Conservancy – Arkansas and Missouri Chapters; Cave Research Foundation; Missouri Bass Angler Sportsmen Society; Missouri Conservation Heritage Foundation (MCHF); private landowners; Natural Resources Conservation Service (NRCS); U.S. Army Corps of Engineers (USACE)

White River Glades and Woodlands Conservation Opportunity Area



Funding Sources

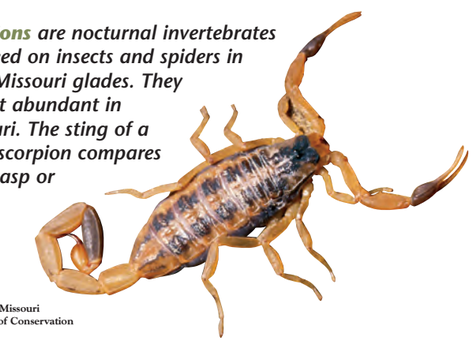
Existing: MDC annual budget; USFS annual budget; Farm Service Agency Conservation Reserve Program; NRCS Environmental Quality Incentives Program; NRCS Wildlife Habitat Incentive Program; NWTF Wild Turkey Super Fund; Taney County Soil and Water Conservation District State Cost Share Funds; Missouri Bird Conservation Initiative Grants; L-A-D Foundation Grant

Promising Future Sources: National Fish and Wildlife Foundation Grants; MDC Landowner Incentive Program; MDC State Wildlife Grants; MDC Wildlife Diversity Funds; MDC Private Lands Cost Share; MCHF Stream Stewardship Trust Fund; USACE Section 1135 Program

Existing Conservation Network

Mark Twain National Forest – Ava District (Hercules Glades Wilderness Area, Glade Top Trail Scenic Byway, Haden Bald Natural Area); Drury-Mincy Conservation Area (MSU Bull Shoals Field Station); Bull Shoals Lake

Scorpions are nocturnal invertebrates that feed on insects and spiders in some Missouri glades. They are not abundant in Missouri. The sting of a wood scorpion compares to a wasp or bee.



Jim Rathert, Missouri Department of Conservation

Open woodlands surround glades. Low-intensity fires keep woodlands open and able to support a groundcover of grasses and wildflowers.

Jeremy Kolaks, Missouri Department of Conservation

Conservation Challenges

Eastern red cedars have invaded most glades and woodlands in the White River Glades and Woodlands COA. Restoring dolomite glade and woodland complexes with their associated wildlife is a principle challenge. Careful use of prescribed fire is essential. Obstacles to conservation success may include increased urbanization and development, difficulty accessing areas in need of habitat work, smoke management concerns, increasing numbers of invasive and exotic species, increasing illegal use of ATVs and dirt bikes, lack of data on best methods for measuring water quality, public perception and habitat management restrictions associated with the Hercules Glades Wilderness designation.

To learn more about the White River Glades and Woodlands Conservation Opportunity Area, please contact:

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Wildlife Division
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White River Glades and Woodlands

Conservation Opportunity Area

The White River Glades and Woodlands Conservation Opportunity Area contains one of the largest complex of dolomite glades in North America.

Jeremy Kolaks, Missouri Department of Conservation

Our hills ain't high, but our hollers sure are deep. At least that's how early settlers of southwest Missouri described their grand hills and hollows. For more than 250 million years, the land surface was exposed to the weather, while the rest of the state was covered by alternating glaciers, seas and floods. Uplifting rock, followed by stream erosion, created the region's winding hollows, steep cliffs, caves and springs. Early explorers described the landscape as a mix of open parklands, glades and woodlands.

The U.S. Forest Service owns much of the eastern portion of the White River Glades and Woodlands Conservation Opportunity Area (COA) including the Hercules Glades Wilderness Area and Glade Top Trail Scenic Byway. Glades cover local hilltops, although many have overgrown with cedar trees in the absence of periodic fires. Many valleys that were formerly timbered in oak woodlands have been cleared for pasture.

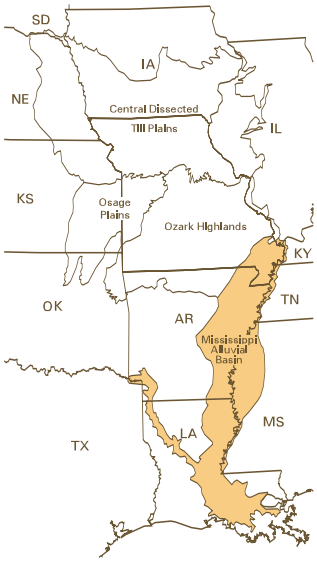
The western portion of the Conservation Opportunity Area is dominated by rolling oak savannas and woodlands, with a smaller proportion of glades. Lower slopes and valleys in this landscape were historically wooded, and stands of giant cane were once common along streams. This area is mostly privately owned, although there are also large public land holdings at Drury-Mincy Conservation Area and Bull Shoals Lake.

The large glade and woodland complexes present within the White River Glades and Woodlands COA support a variety of wildlife, including species of conservation concern such as Bachman's sparrows, painted buntings and eastern collared lizards. The landscape also supports a number of glade and woodland plants such as Cherokee sedge, pale gerardia, stenosiphon, and Trelease's larkspur. Small populations of the state endangered Swainson's warbler persist in scattered cane breaks along streams, offering restoration potential for riparian habitats.

Mississippi River Alluvial Basin

Historically, the Mississippi Alluvial Basin was an inaccessible wilderness of swamps, bottomland forests and marshes. Frequent flooding played a significant role in the creation and maintenance of complex wetlands. Soils are very deep, accumulating as floodplain sediments left by the Mississippi and Ohio rivers. The broad alluvial plain has remarkably low relief except for the sandy terraces or natural levees that rise 15-30 feet above the general surface. Sand prairies, savannas, and woodlands are restricted to elevated sandy areas. Riverfront forests occupied natural levees along the Mississippi River and other large rivers.

While the Mississippi River Alluvial Basin region has largely been drained and converted to row crop agriculture, remnants exist that can perhaps sustain the Bootheel's characteristic wildlife.



Photos: Allred Lake Natural Area and Green Treefrog
Jim Rathert, Missouri Department of Conservation

Mississippi River Alluvial Basin

Animal Targets of the Mississippi River Alluvial Basin

Forest
Spotted Salamander • Marbled Salamander • Mole Salamander • Upland Chorus Frog • Mississippi Kite • Prothonotary Warbler • Swainson's Warbler • Northern Parula • Golden Mouse • Cotton Mouse • Swamp Rabbit

Woodland
Timber Rattlesnake

Prairie
Illinois Chorus Frog • Eastern Spadefoot

Wetland
Bald Cypress Katydid • Hoosier Grasshopper • Banded Pygmy Sunfish • Bantam Sunfish • Swamp Darter • Starhead Topminnow • Pugnose Minnow • Three-toed Amphiuma • Green Treefrog • Western Mud Snake • Western Chicken Turtle • American Bittern • Least Bittern • Little Blue Heron • Snowy Egret • Black-crowned Night Heron • Hooded Merganser • Sora • King Rail • Virginia Rail • Least Tern • Black Tern • Rice Rat

Cave
Spring Cavefish

River and Stream
Bankclimber • Flat Floater • Texas Lilliput • Wartyback • Cajun Dwarf Crayfish • Shield Crayfish • Shrimp Crayfish • Freshwater Shrimp • A Mayfly (Baetisca obesa) • Brown Bullhead • Western Sand Darter • Pirate Perch • Flier • Lake Chubsucker • Mud Darter • Bluntnose Darter • Harlequin Darter • Goldstripe Darter • Cypress Darter • Scaly Sand Darter • Cypress Minnow • Dollar Sunfish • Ironcolor Shiner • Taillight Shiner • Alligator Snapping Turtle

Interior Least Tern

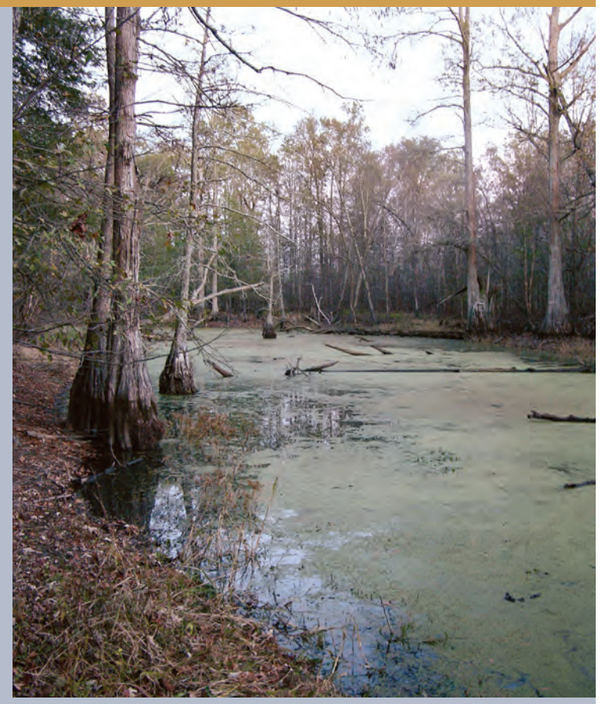
Western Mud Snake

Mississippi Kite

Photos: Jim Rathert, Missouri Department of Conservation

Mingo Basin Conservation Strategies

- Restore natural hydrologic conditions where feasible.
- Improve the quality of bottomland hardwood forest, woodland, wetland and aquatic natural communities.
- Control invasive plants and animals.
- Introduce alligator gar to the aquatic system.
- Reduce stream sedimentation and soil erosion.
- Work cooperatively with local partnership groups and landowners to restore natural communities.



Vergil Harp, U.S. Fish and Wildlife Service

A swamp is a nearly continuously flooded wetland dominated by trees. Most of Missouri's remaining swamps are small remnants of a once vast complex of wetlands in the Bootheel region.

Priority Research and Inventory Needs

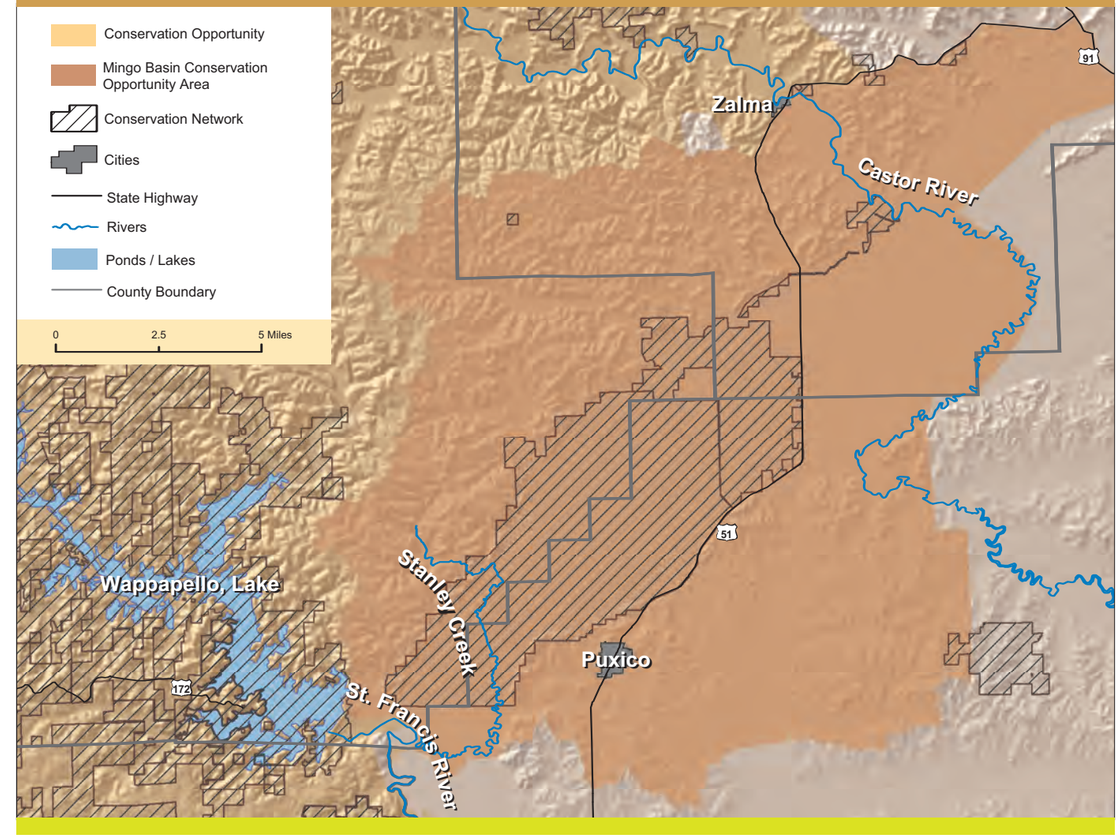
- Develop current and historic maps of Mingo Basin's hydrology and geomorphology.
- Identify natural processes and habitats for restoration.

Conservation Partners

Existing: Ducks Unlimited; Mingo Swamp Friends, Inc.; East Ozarks Audubon Society; University of Missouri's Gaylord Memorial Laboratory; U.S. Fish & Wildlife Service (USFWS); Missouri Department of Conservation (MDC)

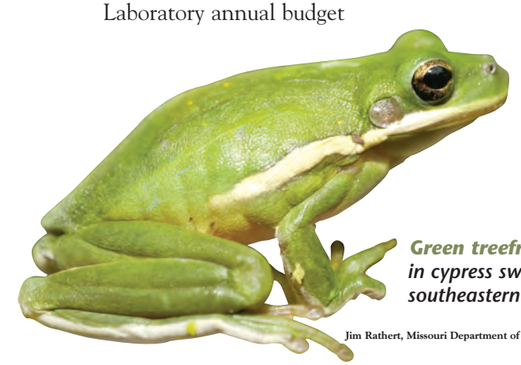
Potential: The Nature Conservancy; National Wild Turkey Federation (NWTF); Missouri Conservation Heritage Foundation (MCHF); National Fish and Wildlife Foundation (NFWF); U.S. Army Corps of Engineers (USACE); Natural Resources Conservation Service (NRCS)

Mingo Basin Conservation Opportunity Area



Funding Sources

Existing: USFWS annual budget; USFWS Partners for Fish and Wildlife Program; USFWS Cooperative Conservation Initiative; USFWS Challenge Cost Share grant; MDC annual budget; Mingo Swamp Friends, Inc. fundraising; NRCS Wetland Reserve Program; Ducks Unlimited Conservation Projects Program; Gaylord Laboratory annual budget



Green treefrogs live in cypress swamps of southeastern Missouri.

Jim Rathert, Missouri Department of Conservation

Promising Future Sources: MDC Landowner Incentive Program; MDC Wildlife Diversity Funds; NRCS Wetland Reserve Program; Farm Service Agency Conservation Reserve Program; Missouri Department of Natural Resources (DNR) Special Area Land Treatment Program; DNR 319 program; USFWS/U.S. Geological Survey Science Support Partnership Program; USGS Watershed Grant Program; Environmental Protection Agency Biological Support Grant; USACE Section 1135 Program; NFWF grants; NWTF Wild Turkey Super Fund; MCHF Stream Stewardship Trust Fund; USFWS North American Wetlands Conservation Act Grants

Existing Conservation Network

Mingo National Wildlife Refuge; Duck Creek Conservation Area; Dark Cypress Swamp Conservation Area; Sank Conservation Area; Clubb Creek Conservation Area; Crowley's Ridge Conservation Area; Maple Flats Access; Gipsy Towersite

Western Mud Snake

Jim Rathert, Missouri Department of Conservation

This shiny, iridescent snake lives in southeastern Missouri swamps. With the destruction of natural swamps throughout the Bootheel, the western mud snake is listed as a Missouri species of conservation concern. The Mingo Basin COA offers some of the best habitat for this snake and the aquatic salamanders (amphiumas and sirens) that it preys upon.

Conservation Challenges

The Mingo Basin Conservation Opportunity Area retains much of its historic floodplain wetlands. Potential obstacles to conservation success include intense farming within the Mingo Basin, lack of financial resources and personnel and a lack of understanding of wetlands by the public.

To learn more about the Mingo Basin Conservation Opportunity Area, please contact:

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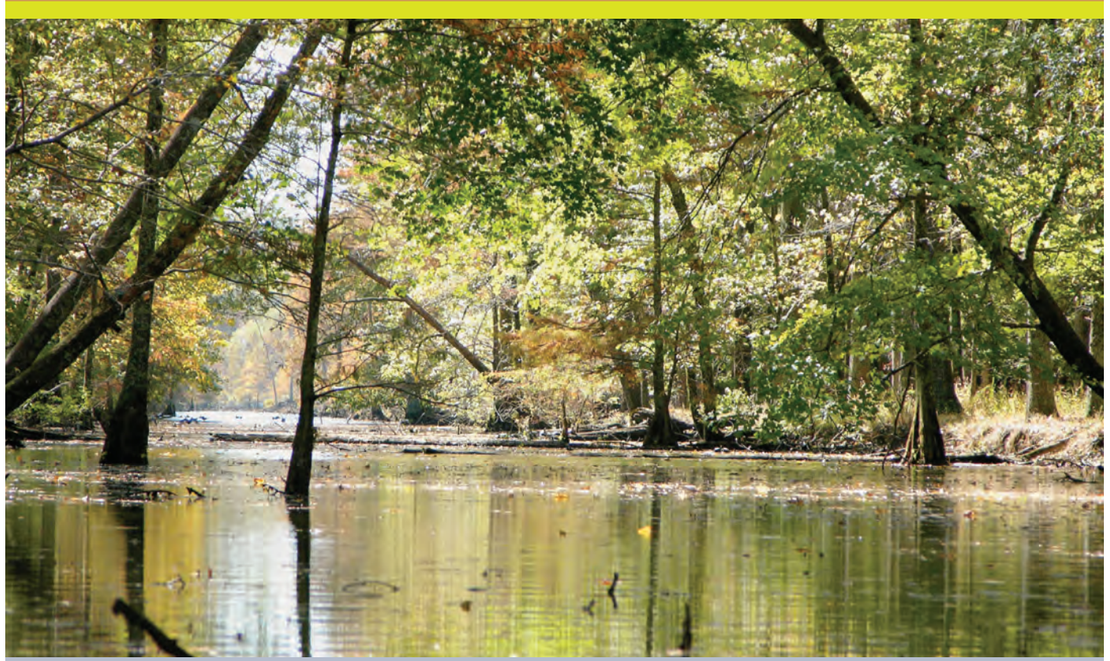
Mingo Basin

Conservation Opportunity Area

Mississippi River Alluvial Basin



Vergial Harp, U.S. Fish and Wildlife Service

Mingo National Wildlife Refuge conserves some of Missouri's last remaining cypress-tupelo swamps.

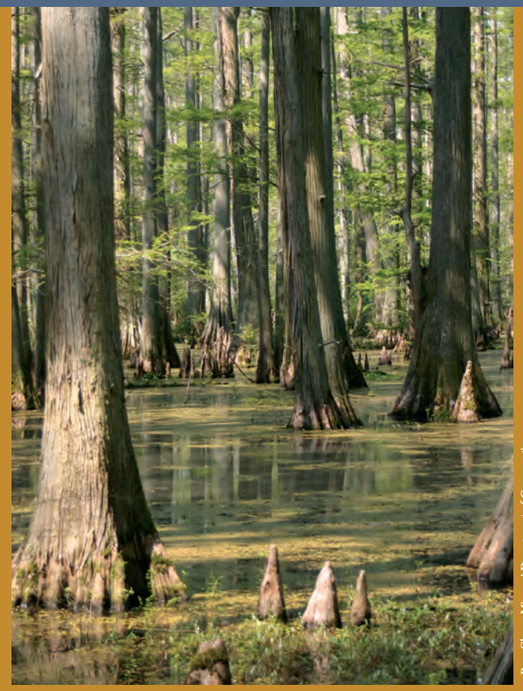
The Mingo Basin formed 18,000 years ago when the Mississippi River shifted east, leaving a dense swamp in the abandoned river channel. Today the basin includes backwater sloughs, marshes, open water, bottomland forests, cypress-tupelo swamps, shrub swamps, upland woodlands and agricultural land. Mingo National Wildlife Refuge and Duck Creek Conservation Area (17,000 acres combined) conserve the largest remaining tract of bottomland forest in Missouri's Bootheel region.

Vast bottomland forests and swamps once covered 2.5 million acres of the Bootheel. Attempts to harvest the timber and drain the swampland were largely successful by the 1970s. Most of the region was converted to cropland, but a few hard-to-drain locations retain wetland habitat. The Mingo Basin lies in a low-lying pocket between the Ozark Highlands and Crowley's Ridge and is blocked on both ends by natural levees of the St. Francis River and Castor River. Mingo Swamp was heavily logged and grazed in the early 20th century, but efforts to drain it were unsuccessful.

The Mingo Basin Conservation Opportunity Area (COA) is a restored wetland complex that retains many plants and animals characteristic of big river bottomlands. It includes uplands in the adjacent Ozark Highlands and Crowley's Ridge.

River Bends Conservation Strategies

- Reforest bottomlands to create larger blocks of continuous bottomland forest.
- Promote partnerships with the forest products industry; provide them with assistance in the implementation of conservation actions on their properties.
- Reestablish connectivity of the Mississippi River with the floodplain through projects that emulate backwater flooding.
- Recover slough and oxblow lake natural communities.
- Identify, protect and manage wetland natural communities, providing habitat for migratory waterfowl, shorebirds, wading birds, amphibians and reptiles.
- Promote the Wetland Reserve Program (and other federal programs) through private landowner assistance programs and outreach and education efforts.
- Protect and enhance existing habitats for mussels, native fish and invertebrates.
- Control invasive exotic species.



Ross Glenn, Missouri Department of Conservation

***Bald cypress trees** produce "knees" to facilitate gas exchange. Because it is resistant to wood-rotting fungi, cypress is a valued lumber for shingles, trim and benches.*

Priority Research and Inventory Needs

- **Inventory forest interior birds using remnant forest blocks.**
- **Determine the most effective ways to reforest converted bottomland forests.**
- **Investigate methods to control reed canary grass at Ten Mile Pond Conservation Area.**
- **Monitor cane stands at Donaldson Point; assess long-term survival of canebrake restorations.**
- **Conduct comprehensive surveys for amphibians and reptiles.**

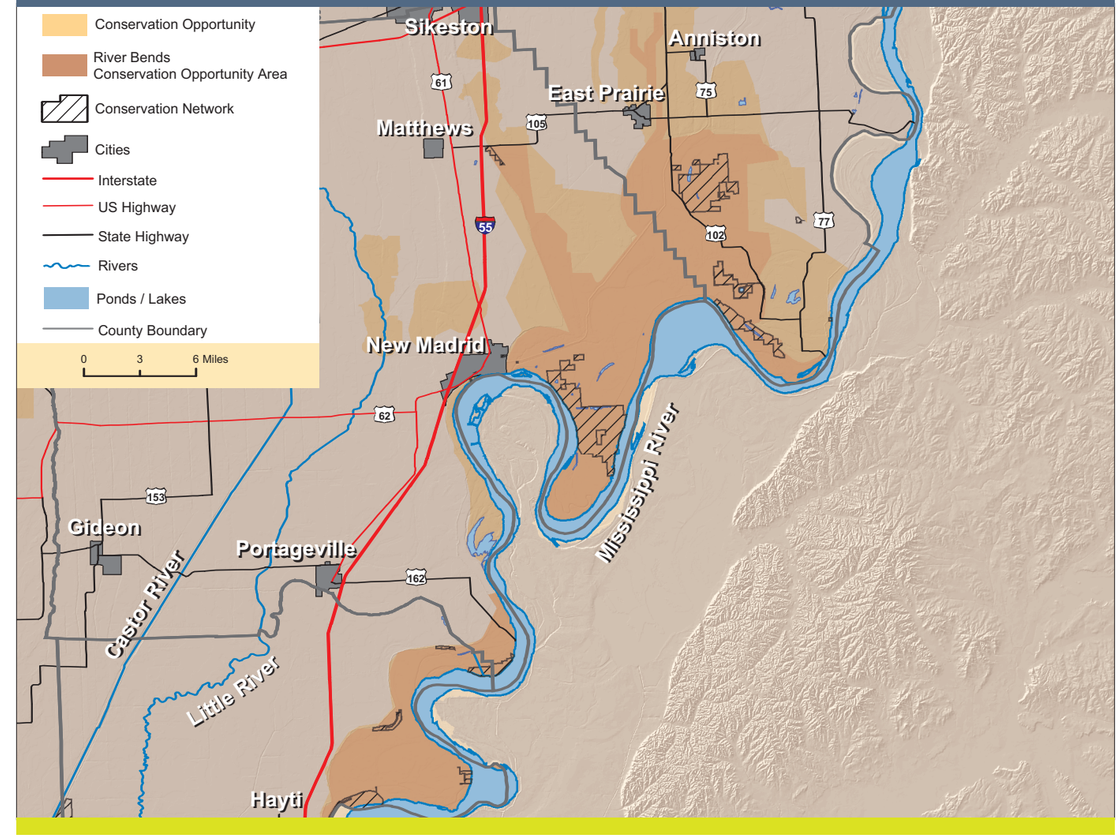
Conservation Partners

Existing: Four-Seasons Audubon Society; Ducks Unlimited (DU); MeadWestvaco Corporation; Southeast Missouri State University; Missouri Department of Natural Resources (DNR); Missouri Department of Conservation (MDC)

Potential: National Wild Turkey Federation (NWTF); American Fisheries Society; Audubon Missouri; The Nature Conservancy – Missouri Chapter; Sierra Club – Ozark Chapter; Missouri Stream Teams; private landowners; U.S. Army Corp of Engineers; U.S. Fish and Wildlife Service (USFWS); National Resource Conservation Service (NRCS)

The federally endangered interior least tern makes its nest on sand islands in the lower Mississippi River. Adult terns eat fish that are less than 4 inches long. When rivers are leveed, channelized and restricted with dikes and dams, native river fish have fewer opportunities to spawn on the floodplain, which translates into fewer small fish for terns to eat.

River Bends Conservation Opportunity Area



Funding Sources

Existing: MDC annual budget; MDC State Wildlife Grants; MDC Private Lands Cost Share Program; DNR annual budget; DU Conservation Projects Program; Soil and Water Conservation District State Cost Share Funds; Farm Service Agency Conservation Reserve Program; NRCS Wetland Reserve Program; NRCS Environmental Quality Incentives Program; NRCS Wildlife Habitat Incentive Program

Promising Future Sources: MDC Landowner Incentive Funds; USFWS Partners for Fish and Wildlife Program; USFWS North America Wetlands Conservation Act Grants; National Fish and Wildlife Foundation Grants; NWTF Wild Turkey Super Fund; Missouri Bird Conservation Initiative Grants

Existing Conservation Network

Big Oak Tree State Park (Big Oak Tree Natural Area); Donaldson Point Conservation Area; Ten Mile Pond Conservation Area; Seven Island Conservation Area; Gayoso Bend Conservation Area; Girvin Conservation Area; Wolf Bayou Conservation Area (Wolf Bayou Natural Area); DeSoto Conservation Area; Twin Borrow Pits Conservation Area; Big Oak Lake; Swift Ditch Access; Seven Island Access; St. John's Bayou Access

Jim Rathert, Missouri Department of Conservation

Big Oak Tree State Park

The 1,000-acre patch of bottomland forest in Big Oak Tree State Park stands as testimony to the once vast unbroken swamplands that stretched from Missouri's Bootheel to the Gulf of Mexico. Efforts continue to restore the park's currently altered water cycle.

Cliff White, Missouri Department of Conservation

Conservation Challenges

The River Bends Conservation Opportunity Area has a number of sizeable forest remnants even though much of the land has been drained and converted to cropland. Remaining natural vegetation is affected by reduced flooding and habitat fragmentation. Expanding the area of influence and size of forest systems will assist in long-term conservation. Conservation and restoration efforts around existing public lands and other privately owned remnants might ensure the long-term sustainability of larger areas. Success will require better integration of agriculture and natural ecosystems. Potential obstacles to conservation success include continued infrastructure developments that reduce natural flooding, likely irreversible loss of natural vegetation, shifting tree regeneration patterns and a lack of funding and staff for conservation efforts.

To learn more about the River Bends Conservation Opportunity Area, please contact:

Missouri Department of Conservation
Wildlife Division
P.O. Box 180
Jefferson City, MO 65102-0180

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River Bends

Conservation Opportunity Area

Mississippi River Alluvial Basin

Swamps and bottomland forests still occur in the River Bends Conservation Opportunity Area.

Ross Glenn, Missouri Department of Conservation

Early explorers to the Bootheel region of southeast Missouri discovered a landscape of floodplains with giant trees. Bottomland trees grew to enormous proportions in the fertile earth. Regular flooding over millions of years created bottomland forests, swamps, marshes and oxbow wetlands. Over the past two centuries, settlers cleared the land and drained the swamps to create productive cropland.

The River Bends Conservation Opportunity Area (COA) includes several important blocks of remnant forest centered at Donaldson Point Conservation Area and Big Oak Tree State Park. Forested lands are also owned by the forest products industry – agencies that implement conservation practices, are adept at producing rapid forested cover and have significant rotational acreages of forested lands.

Land along the Mississippi River is still regularly influenced by flooding. In most areas, however, the timing, duration, depth and velocity of flood events have been altered, eliminating much of the natural flooding important to swamp and wetland natural communities.

In addition to the towering hickories and majestic oaks, rich soils provide habitat for green ash, swamp cottonwood, American elm, black willow, persimmon, baldcypress and patches of giant cane. Bottomland trees within Big Oak Tree State Park are unsurpassed in the state for size, with six qualifying as state champions of their species and two registered as national champions. More than 150 kinds of birds live among the lofty bottomland trees, including prothonotary warblers, cerulean warblers, red-shouldered hawks, Mississippi kites and fish crows.