



MISSOURI

Introduction and General Description

Where the Rivers Run

If you were to travel across Missouri from the northwest to the southeast, it would be clear to you that Missouri terrain changes drastically. From the Glaciated and Osage plains in north and west central Missouri, to the Ozark Highlands and Mississippi Lowlands in southern and southeast Missouri (Figure 1), the Fish and Wildlife Service has been restoring habitats on private lands statewide since 1991 through the Partners for Fish and Wildlife Program.

Climate in Missouri is more typical of the southeastern United States, with hot, humid summers and mild winters. Average precipitation ranges from 33 inches in the northwest, to 46 inches in the southeast. Summer high temperatures average 90 degrees. Winter temperatures are generally mild with lows in the upper teens and low 20's.

One of Missouri's unique qualities

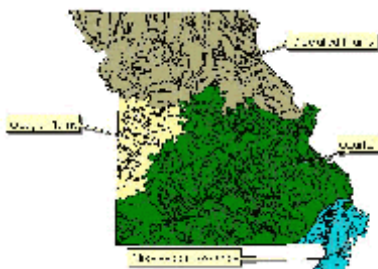


Figure 1. Major Habitat Communities in Missouri

is that it is centrally located in North America, making it a crossroads of many of the major U.S. habitat communities. Furthermore, three rivers, the Mississippi, Missouri, and Ohio are associated with the State and drain the region between the Rocky and Appalachian Mountains. These rivers serve as major dispersal corridors for America's aquatic life and migratory birds.

River and stream habitat serve as a common thread on the Missouri landscape. The diversity of habitat in Missouri relates to the variety of different plants growing in concert with changes in topography, so with a closer look, such subtle or extreme changes create a patchwork of smaller habitats which are all associated with 54,000,000 miles of streams and rivers in the State (Figure 2).

Two classification systems have been developed to define the diversity of habitat types both on the land and in the waters of the State. Terrestrially, there are 89 different natural communities including forests, savannahs, prairies, glades, cliffs, talus slopes, streambeds, wetlands and caves. There are 105 distinct aquatic communities, including types of freshwater springs, cave streams, headwater streams, small and large river communities, oxbows, sloughs, and ponds. This degree of diversity makes Missouri unique in the Midwest.

Prior to the European settlement of Missouri, many of these habitats types were in sound condition. Today, however, while some still

remain virtually undisturbed, many others have been degraded, converted to other uses, or overtaken with invasive species. We assist Missouri landowners who voluntarily wish to restore their property through the Partners for Fish and Wildlife Program.

Habitats of Special

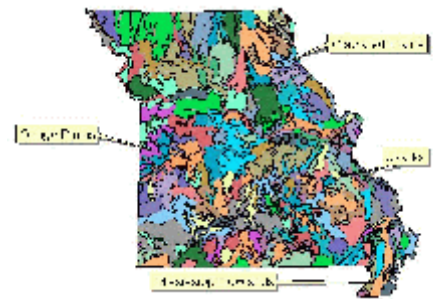


Figure 2. Terrestrial communities in Missouri

Concern

The Partners Program is primarily focusing on four major habitat types in Missouri: 1) wetlands; 2) native prairie; 3) savannahs; and 4) Ozark streams, because of their importance in providing quality



Cypress-tupelo swamp in southeast Missouri

habitat for migratory birds, threatened, endangered, and declining species, amphibians, reptiles, fish and mammals.

Wetlands

The Partners Program has five major focus areas for wetland restoration on private lands: the floodplain of the Missouri River, the floodplain of the Mississippi River, southeast Missouri, and north-central and west-central Missouri. The focus areas are closely aligned with our national wildlife refuges in the State, including Squaw Creek NWR, Swan Lake NWR, Great River NWR, Mingo NWR, and the Big Muddy National Fish and Wildlife Refuge.

Missouri is extremely important because it serves as a midway point for hundreds of species of migratory birds, including ducks, geese, large wading birds, shorebirds, terns, gulls, songbirds, hawks, and eagles who utilize wetlands as resting and feeding areas so they can continue their migration to and from breeding and wintering grounds.

Without adequate wetland habitat, many species would fail to reach their destination, or may have such depleted energy reserves that they



Wood duck in a forested wetland

cannot invest in reproduction.

Other species that benefit from Missouri wetlands include the declining eastern massasauga rattlesnake, endangered Hine's emerald dragonfly, and threatened western prairie-fringed orchid.

Prairie and Savannah

Native prairie and savannah habitats in the central U.S. provide extremely important habitat to a number of songbirds, reptiles, butterflies, and mammals, and



Native prairie in west central Missouri

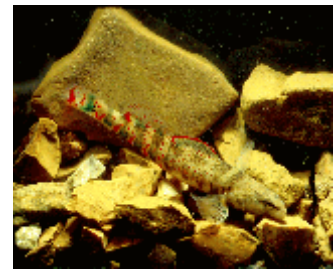
Missouri is no exception.

A number of species have come to depend on these diverse landscapes to live and reproduce. However, as more prairie habitat declines or becomes marginal, more species experience population declines.

Many songbird species require large expanses of intact grasslands to survive. Prairie birds of concern to the Service include the bobolink, loggerhead shrike, grasshopper sparrow, Henslow's sparrow, dickcissel, and eastern meadowlark. Our efforts are focused on the north- and west-central parts of Missouri.

Ozark Streams

Ozark streams have an incredibly diverse array of aquatic species.



Threatened Niangua darter

We are focusing on streams which provide habitat for declining species and for those on the Endangered Species List.

Nearly one-third of Missouri's 67 fish species occur in the Ozarks. Twenty of these, like the Niangua darter, are unique to the Ozark region and occur nowhere else in the world. Of those 20, four species are on the Endangered Species List.

We have three major focus areas for streams in the Ozarks:

- 1) watersheds that support the threatened Niangua darter;
- 2) the Meramec River basin which has the largest assemblage of mussel species in Missouri, 43 of which have shown marked declines; and
- 3) caves, sinkholes, and freshwater springs which provide habitat to several rare underground species.

Threats

Wetlands

Nearly 87 percent of Missouri's original 4.8 million acres of wetlands have been lost primarily by urbanization and agriculture. Problems include drainage, conversion, and water quality

degradation due to excess nutrients and pesticides.

Prairie/Oak Savannah

Prairie once dominated the Glaciated and Osage Plains in Missouri, but today, along with savannah roughly 1 percent remains.

Largely this loss is due to prairie being converted to cropland and also because many European varieties of grasses were introduced to the landscape, thereby displacing native species.

The prairie that does remain is very disjointed and mixed within a patchwork of non-native grasses and row crops.

Ozark Streams

The streams in the Ozarks are threatened by an increase in human encroachment, confined animal feeding operations, excess phosphorus and nitrogen which compromise water quality, timber clearing along stream corridors, and stream modification caused by gravel mining and other activities.



Big Spring on the Current River in Shannon County

Many fish species adapted to Ozark streams cannot tolerate these habitat changes because they prefer clear, cool, fast flowing waters. The more these waters

are impaired, the more decline we see in aquatic species.

Conservation Strategies

The objectives for the Partners Program in Missouri are to provide technical and financial assistance to as many volunteer landowners as possible in order to provide habitat for fish, wildlife, and plants. We work closely with our partners in identifying priority areas and our close working relationship with our State conservation agency allows us to reach many Missourians who otherwise might be missed.

Partnerships with other Federal, State, and non-governmental organizations is the foundation for the success of the program in Missouri.

With our partners we have identified high priority areas in the State for wetland, grassland improvement, stream, and prairie restoration. We have provided assistance for: 1) wetland restoration or enhancement (\$250-\$400 per acre); 2) tree removal from prairie landscapes (average \$600 per acre); and 3) converting fescue to warm season grasses and forbs (\$400 to \$600 per acre).

In the Ozarks, we primarily work in watersheds where the Niangua darter occurs but have been expanding the program to benefit other imperiled species. The Missouri Department of Conservation, local soil and water conservation districts, local Natural Resources Conservation Service, the Service, and local voluntary landowners have been working to link stream corridors through protection of the riparian habitat and by providing alternative watering sources for livestock.

We also provide guidance on rotational grazing practices, and assist with streambank erosion problems (projects average \$7,000 per mile of stream).

Finally, we believe that working with communities to enhance or restore wetland and prairie habitat is essential. These efforts help to educate children and adults on the importance of these habitats for fish, wildlife and the web of life.

Partners

Our success with improving and restoring habitat on private lands can be attributed to the myriad of partnerships we have formed over the past 10 years with landowners and State and Federal agencies, as well as non-governmental organizations. Through these partnerships, over 200 landowners have participated in the Partners Program statewide. Our partners include:

Missouri Department of
Conservation
Natural Resources Conservation
Service
Missouri Department of Natural
Resources
The Nature Conservancy
Grassland Coalition
Missouri Prairie Foundation
Ducks Unlimited
City of Columbia
Columbia Public Schools
Shaw Arboretum
St. Louis Parks and Recreation
Boonville Public Schools
St. Joseph Myrna Manor North
Home Association
Nevada Public Schools

Restoration Projects

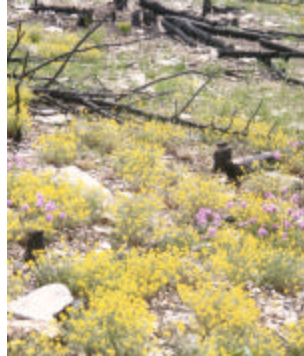
Glade Restoration

Glades are habitat on the fringe of prairies and forests and are often overrun by red cedar. Limestone glades are rare and they support a plant that is listed as threatened, the Missouri bladderpod. To restore glade habitat, we remove trees and conduct prescribed burns to provide enough



The beginning of restoration, just after tree removal

sunlight to allow the plant to grow.



Bladderpod growth after tree removal and prescribed burn

Emergent Wetland Restoration

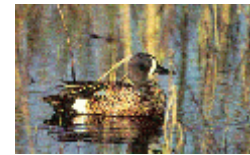
To provide habitat for dabbling ducks, songbirds, mammals, reptiles, and amphibians, we construct small levees, about 3 feet high, and install water level control structures in areas generally too wet to farm.



Abandoned cropland before wetland restoration.



The same area after wetland restoration.



Blue-winged teal

Photo Credits: Rick Hansen, FWS; Kelly Srigley Werner, FWS; Jim Hazelman, FWS; and the Missouri Department of Conservation (darter and prairie enhancement photos)

Prairie Enhancement

Prairie and grassland habitat is often fragmented by hedge rows. Some birds need wide open habitat to



Before prairie restoration

survive and We assist for birds prairie-bobolink.



Bobolink



Prairie after hedgerow removal.

to avoid predators. with the removal of open up the vista like the greater chicken and

Accomplishments

The Partners for Fish and Wildlife Program in Missouri has been fully operational since 1991. Accomplishments from 1991 to 2000 are:

- 10,000 acres of wetlands restored
- 3,000 acres of prairie restored
- 20 miles of Niangua darter stream habitat improvements
- 250 acres of glade habitat restored
- 347 Partners agreements have been signed with landowners
- Improved habitat on the rare loess hills along the Missouri River, in northwest Missouri

Future Needs

- K There is still an opportunity to restore 60,000 acres of wetlands in identified priority areas.
- K We estimate there are at least 100,000 acres of grasslands in high priority areas that could be restored or enhanced.
- K Many declining aquatic species occur in Ozark streams and there about 27,000,000 miles of streams in this region of the State. Restoration could by done in many of these streams.
- K At least 500 acres of glade habitat could be restored through tree removal and management practices.

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