

## The Wetlands of Missouri

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*Water is the essence of life, so it should come as no surprise that Missouri's wetlands provide some of the state's richest wildlife habitat. In fact, nearly half of Missouri's total plant species are associated with wetlands, and more than a quarter of Missouri's nesting and migratory birds depends on wetlands for part of their life cycle.*

Wetlands are the primary habitat of 200 plant and animal species considered rare or endangered in Missouri. Millions of ducks and shorebirds that migrate through the state each year depend on wetlands for food and shelter. Missouri's 43 species of amphibians depend on wetlands for breeding and larval development.

Many people think of marshes when they hear the word "wetlands," but in Missouri we have nine different wetland natural communities (not counting man-made ponds and lakes). They include marshes, shrub swamps, bottomland prairies, bottomland forests, swamps, sinkhole ponds, oxbow lakes and sloughs, riparian areas and groundwater seeps.

Most natural wetlands change continually and all have a high degree of biological productivity and diversity. They have soils that develop in saturated conditions and support water-tolerant plants. A wetland's seasonal pattern of water levels, drives the establishment and maintenance of specific wetland plants.

From a river's edge to upland slopes, the floodplains of Missouri's rivers and streams contain most of our wetland acreage.


Marshes, shrub swamps, bottomland prairies,

swamps, oxbow lakes and sloughs, riparian areas and bottomland forests all depend on flowing water and periodic flooding. Sinkhole ponds and groundwater seeps are usually located in upland areas. Despite their smaller acreage, these lesser-known wetland types are extremely important to our state's biological diversity.



### Marshes

Natural marshes usually develop in remnant river channels and around oxbow lakes and sloughs in north, west, central and southeast Missouri. They are usually categorized by the depth of the standing water. For example, shallow marsh zones, sometimes called wet meadows or moist-soil wetlands, have moist to saturated soils with standing water present sporadically during the growing season. Plants growing there include smartweeds, nut sedges and bur marigolds. Shallow marshes provide important foraging habitat for migratory ducks and shorebirds. They also provide habitat for Woodhouse's and spadefoot toads.

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Emergent marsh zones have standing water for long periods during the growing season. This allows the establishment of wetland plants like cattails, bulrushes, bur-reed, arrowheads and sedges. They provide habitat for many rare marsh birds, including bitterns, sora and king rails, pied-billed grebes and moorhens, as well as more common species like redwing blackbirds. Other animals at home in emergent marshes include leopard frogs, muskrats and dragonflies. Periodic fires and flooding help maintain the open, herbaceous (non-woody) nature of emergent marshes.

Deep marsh zones are at the margin between open water and wetland. They almost always are covered with standing water. Here we find aquatic plants such as pondweeds, spatterdock and water lilies. Grebes, ducks, geese, dragonflies and fish rely on these deep marshes for feeding and shelter. Swallows often forage for insects over them.

## Sinkhole Ponds

Sinkholes are natural depressions formed by the dissolution of limestone or the collapse of a cavern roof. When they contain water, they are considered a wetland type.

Water enters sinkholes from a combination of rain, overland flow and groundwater conduits. Sinkhole ponds are found in karst landscapes in the Ozarks.

Most sinkhole ponds are a striking contrast to the dry upland forests and open woodlands that surround them. Sinkhole ponds usually have an outer ring of buttonbush. The center of the pond may have open water but is dominated by sedges and grasses. A few sinkhole ponds harbor swamp trees, such as water tupelo. Because of their long isolation from other wetlands, sinkhole ponds may contain swamp loosestrife or other rare plants. Sinkhole ponds provide breeding

habitat for spring peepers and many salamanders.

## Shrub Swamps

Buttonbush and short-statured willows dominate these often impenetrable wetland thickets. While they may be hard for us to navigate, shrub swamps provide homes for yellow warblers and green herons. Shrub swamps often are found in or near marshes, swamps or bottomland forests.

## Swamps

The primeval-looking wetlands are found only in the southeastern part of the state in the ancient floodplain of the Mississippi River. Trees that are usually associated with the Deep South, such as bald cypress (some are more than 500 years old), water tupelo and water locust grow over open water around sloughs and oxbow lakes. These areas contain many interesting plants, such as water canna, swamp rose and water violet. You'll also find black-crowned night herons, green treefrogs and swamp darters.

## Bottomland Forests

Towering trees and vine lattices characterize mature bottomland forests. In the lowlands bordering a river are forests of cottonwood, willow, ash, elm, sycamore, silver maple and hackberry. Periodic flooding keeps the understory of these riverfront bottomland forests fairly open. They provide the habitat for gray treefrogs, red-shouldered hawks and northern parula warblers, as well as nesting trees for bald eagles and great blue herons.

On terraces farther from the river, a number of oak species, shellbark hickory and pecan dominate the forest. The understory of these areas contains shrubs such as pawpaw, spicebush and deciduous holly. Sedges cover the ground.



Animal habitats of these forests include rare cerulean warblers, barred owls, prothonotary warblers, small-mouthed salamanders, mole salamanders and wood ducks. Bottomland hardwood forests most often are found in the southeast Missouri lowlands.

## Oxbow Lakes & Sloughs

These wetlands have open standing water less than seven feet deep and scattered aquatic plants, such as water lilies. They are found in the large river floodplains of the state and provide important habitat for fish, crayfish, turtles and water snakes. Great blue herons and egrets often hunt at their edges. These backwaters are important larval fish nurseries when they are connected to a river.

## Riparian Areas

Throughout the Ozarks, spring-fed streams flow through a network of gravel bars, pools and riffles.

In a riparian zone extending from the main channel to about 50 feet on the land on either side of the stream, you'll find willows, sycamore, witch hazel and blue beech, along with water willow, mistflower, cardinal flower and, blue lobelia. Characteristic animals include belted kingfishers, river otters, Blanchard's cricket frogs and Fowler's toads.

## Bottomland Prairies

These prairies are dominated by prairie cordgrass, or ripgut. These plants form a thick sod that covers terraces on floodplains above marshes in north and west-central Missouri. Bottomland prairies are subject to flooding, but standing water is present only briefly during the growing season.

In addition to flooding, bottomland prairies require periodic fires to prevent being overwhelmed by woody vegetation. Intermixed with the dense cover of cordgrass

are sedges, milkweeds, wild iris and sawtooth sunflower. The northern harrier, western chorus frog, northern crawfish frog and grassland crayfish all use bottomland prairies.

## Groundwater Seeps

The contact zone between different geological layers sometimes causes groundwater to well up and slowly percolate onto the land. Groundwater seeps are relatively rare and are most commonly found along the bases of hillsides in the Ozarks.

Because of the constant saturation of cold water, these groundwater seeps often have peat or muck deposits that build up over many years. In north Missouri there are a handful of saline seeps where salt-enriched groundwater bubbles onto land.

In the Ozarks, groundwater seeps may be called fens or acidic seeps, depending on whether their water chemistry is alkaline or acidic. Fens receive alkaline groundwater that has flowed through calcareous bedrock, such as limestone or dolomite. Missouri's fens most often are found in karst landscapes in the Ozarks along with caves, sinkholes and springs. Sedges, bulrushes and wildflowers typically dominate fens. However, some fens have prairie plants, such as Michigan lily, and others have an overstory of trees.

Because of their cool and wet microclimate, fens often contain plants more typical of states to the north. Many of those plants are rare or endangered in Missouri. Plants characteristic of fens include sedges, swamp orange coneflower, golden ragwort, cowbane and grass of Parnassus. The rare four-toed salamander uses fens, as well as acidic seeps.

When groundwater flows through sandstones, cherty gravels, sands and igneous rocks, the seeps that develop are acidic. Acidic seeps abound in ferns and mosses and also have



sedges and orchids. Acidic seeps are found throughout the Ozarks and along Crowley's Ridge in southeastern Missouri.

## Adapting To Wetness

Plants living in wetland natural communities are adapted to deal with flooded conditions. For example, many wetland plants, including water lilies, have air pockets in their roots and stems. The pockets allow oxygen from the air to reach the plant's roots during flood conditions.

Many animals also have adapted to wetland environments. Ducks have an oil gland on their back that allows them to waterproof their feathers. Ducks also have special air sacs in their body to make them ore buoyant.

The webbed feet of waterfowl allows them to swim, dive and cross mud. The feet of wading birds like herons and shorebirds allow them to cross mudflats without getting stuck. Amphibians and insects need wetlands for maturing their young.

<http://mdc.mo.gov/conmag/2001/09/wetlands-missouri?page=0,2>



1- conservation wetland, 2- forest wetland, 3- marsh,  
4- pond, 5- prairie wetland, 6- swamp wetland,  
7- wetland, 8- lake wetland





## The Value of Wetlands

When settlers arrived on this continent, they found a land of seemingly limitless natural resources. Among the wild rivers, virgin forests and endless prairies, were perhaps as many as 127 million acres of wetlands. Today, over 50% of those wetlands are gone, and without protection, thousands of acres will be lost each year in the United States.

In Missouri the sad tale has been repeated, although on a smaller scale. Of the original 2.4 million wild-acres of forested lowlands in southeast Missouri, less than 60,000 acres, or 2 percent, remain today. A map of the riverways of the Bootheel reveals blue lines that are straight enough to be a prairie highway. They are not highways, however. They are man-made channels and drainage ditches that bear no resemblance to the meandering lowland streams and sloughs of the past. First it was lumbering brought by the railroads, then agriculture that was responsible for the clearing of those rich alluvial soils. The process, typical of man's stubborn diligence, took only 200 years to rob Missouri of its hardwood swamps.

Before the last decade, wetlands rarely were considered in terms other than their importance as wild-acres life habitat. Today, however, we are learning that wetlands perform many other valuable functions, such as filtering pollutants, recharging and stabilizing underground aquifers, moderating flood waters, governing the quantity and quality of flow of our water resources and producing valuable commercial crops. Wetlands also are recognized as important places of scenic beauty, providing recreation to millions of birdwatchers, hunters, fishermen and outdoor enthusiasts of all types.

As knowledge of wetlands increases, people are recognizing that, left in their natural state, wetlands are areas of important public value.

Wetlands are home to countless invertebrates, amphibians, reptiles, fish, birds and mammals. Some fish, such as northern pike, walleye and yellow perch, require shallow marshy areas for spawning. The failure of many aspects of commercial and recreational fishing in the Great Lakes has been linked to destruction of wetlands.

Wetland productivity also includes waterfowl and furbearing mammals. Millions of ducks depend on wetlands scattered across the United States for their existence. As a direct result, two million waterfowl hunters participate in more than 15 million hunting days of recreation each year in the United States. Wetlands also constitute the principal habitat for producing the annual crop of furbearing animals. Missouri's fur resources produce substantial financial revenues each year.

Wetlands provide economic returns other than from the fish and wildlife they support. In their natural state, many wetlands produce crops of considerable value. For example, the annual crop of wild rice in Minnesota is valued at more than \$1 million, and studies in neighboring states have revealed that many wetlands could be adapted to produce wild rice crops, also.

Closer to home, a commercially valuable wetland crop is wood. In Missouri's Bootheel, wetlands can support bald cypress, tupelo, sweet-gum and bottomland oaks. These trees—especially cypress because of its durability without preservative treatment—are valuable. Bottom-land oaks and pecan are found throughout the state and are important wetland trees for lumber, nuts and wildlife foods.

Fish, frog and crawfish farming are other economic benefits from wetlands. There is a small but growing Missouri industry in this type of farming.



Another important aspect of wetlands is their function of reducing the pollution levels in water. Wetlands improve water quality by decreasing the level of soluble nutrients in the water flowing through them. This process is accomplished when plants take up pollutants, store them and then use them as nutrients. For example, excess nitrogen and phosphorus from farming have been responsible for reducing plant growth. When the plants die, the chemicals are slowly released. Wetland vegetation filters particles from water, reducing siltation of streams and rivers. This ability of wetlands to improve water quality has been used by municipalities and livestock feedlots to treat wastewater. Columbia, Missouri has constructed a wetland system to provide secondary treatment of city wastewater. The effluent will then be utilized to provide flooding for wetland habitats managed by the Missouri Department of Conservation.

Wetlands also improve water quality by acting as a settling basin for upland runoff. Because of their low gradient and thick vegetation, wetlands slow the flow of water entering them, allowing suspended soil particles to settle out. The water then is released into adjacent streams and underground supplies.

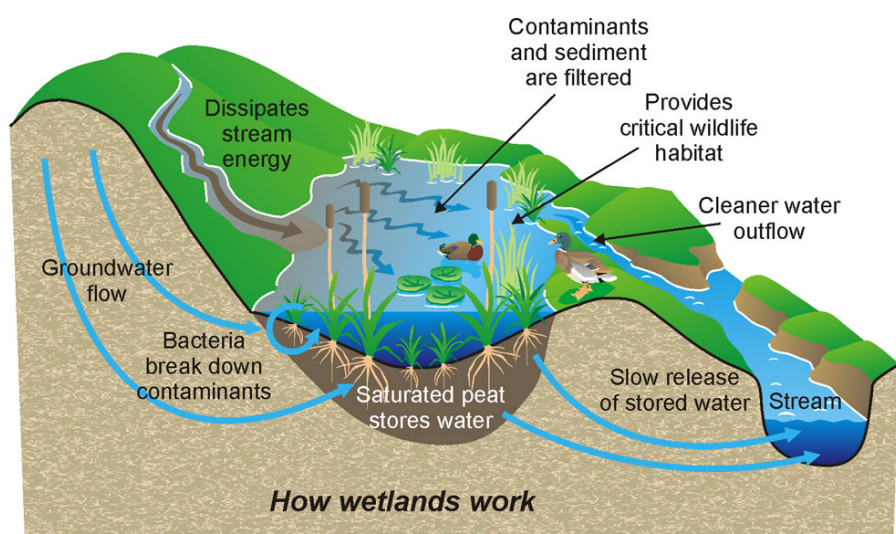
Another important function of wetlands is their role in flood control. Wetlands act as giant sponges made up of organic matter and specialized plants that can absorb up to 18 times their weight in water. During periods of heavy rains or runoff, the wetlands' soaking action holds water and releases it slowly back into the watershed.

By retaining water and releasing it gradually, wetlands reduce the total amount of water entering lower watersheds and, consequently, reduce flood risk and peak flood flows. Wetlands also tend to reduce erosion by stabilizing soils and reducing stream velocity.

The unique role of wetland ecosystems in food production, pollution control, water quality improvement, flood and erosion reduction, and replenishment of groundwater supplies is just the beginning to be understood and appreciated. Because of the great number and variety of life forms they support, wetlands provide many hours of outdoor recreation, plus educational and scientific research opportunities.

As human populations increase and progress trudges on, the pressure for converting wetlands to agricultural production, urban development and other uses will increase. One of the best ways to guarantee the protection of our remaining wetlands is to understand how the important values of wetlands serve mankind.

<http://mdc.mo.gov/landwater-care/wetlands-management/wetland-values>



*How wetlands work*