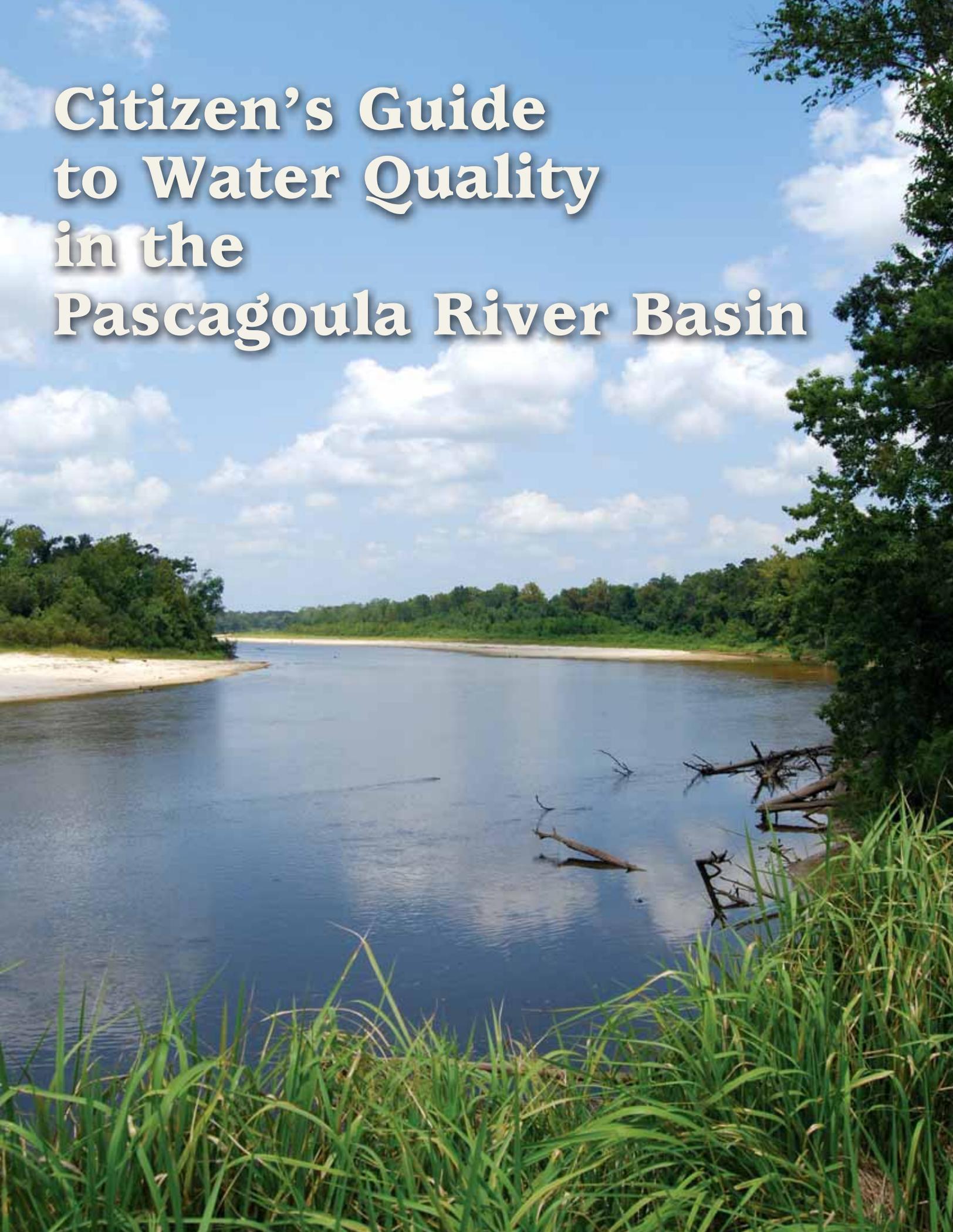


Citizen's Guide to Water Quality in the Pascagoula River Basin



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About this Guide

Mississippi’s Citizen’s Guides to Water Quality are intended to inform you about:

- Mississippi’s abundant water resources
- Natural features, human activities, and water quality in a particular river basin
- The importance of a healthy environment to a strong economy
- Watersheds targeted for water quality restoration and protection activities
- How to participate in protecting or restoring water quality
- Whom to contact for more information

We hope these guides will enhance the dialogue between citizens and key decision makers to help improve our management of Mississippi’s precious water resources. We encourage you to invest in this effort—read this guide and actively restore and protect our water resources for future generations.

Acknowledgments

This guide is a product of the Basin Team for the Pascagoula River Basin, consisting of representatives from 39 state and federal agencies and stakeholder organizations (see pages 33–34 of this document for a complete listing). The lead agency for developing, distributing, and funding this guide is the Mississippi Department of Environmental Quality (MDEQ). This effort was completed in 2008 under a Clean Water Act Section 319 Nonpoint Source grant, and includes publication services from Tetra Tech, Inc.

Copies of this guide may be obtained by contacting:

**Mississippi Department of
Environmental Quality**
Office of Pollution Control
515 East Amite Street
Jackson, MS 39201
601-961-5171

or by accessing MDEQ’s website at:
www.deq.state.ms.us

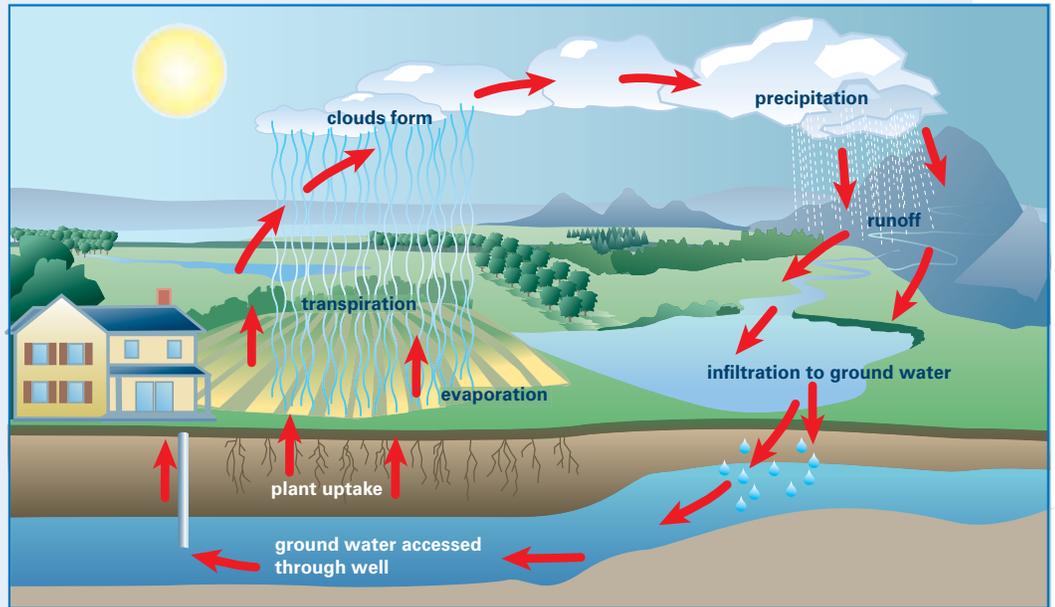
Cover photo: Peter Cada, Tetra Tech, Inc.

Water

Our Precious Natural Resource

The Water Cycle and Water Quality

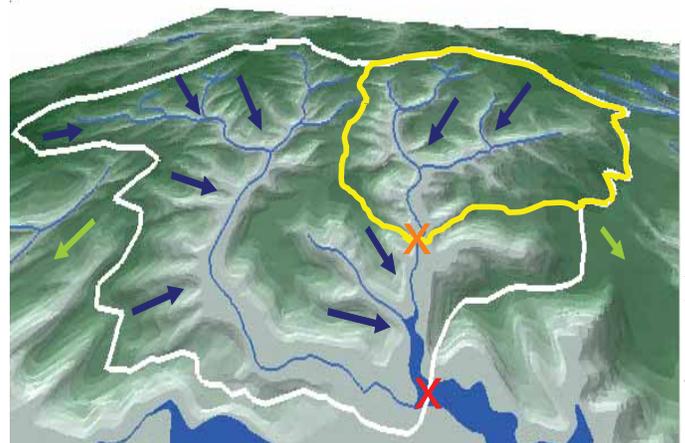
Clouds, rain, runoff, rivers, lakes, marshes, ground water, oceans—what’s the common thread? All have their place in the earth’s water cycle. After rain has fallen to the earth, it either remains in a water body, goes up into the atmosphere (evaporation and transpiration), goes down into the ground (infiltration) or flows over the land (runoff). Stormwater runoff is the link in the water cycle most likely to degrade water quality. Runoff often carries dissolved chemicals,



bacteria, and suspended matter like sediment (sand, silt, and clay soil particles) into our water bodies. In fact, many kinds of pollutants in the path of runoff may be transported to our streams and rivers. The proper care of the land, therefore, is essential for protecting water quality.

What is a watershed?

A watershed is the area of land that drains to a common water body, such as a stream, lake, wetland, estuary or large river like the Pascagoula River. Smaller watersheds join to form larger watersheds. For example, the Okatoma Creek, Tallahala Creek and Okatibbee Creek watersheds are smaller watersheds within the Pascagoula River Basin. Since watershed boundaries are determined by hills and ridges rather than political delineations, a watershed can cross county or state boundaries. Most of the Pascagoula River Basin is located in Mississippi, but it also includes a small area in southwest Alabama.



Center for Watershed Protection

Mississippi's Water Resources

- Mississippi has 10 major river basins with 86,000 miles of streams.
- Most of our streams (63%) are intermittent (flow only during rainy periods).
- The rest flow year-round, with a base flow (normal level) fed by ground water.
- The state is covered with hundreds of lakes, reservoirs, and ponds that provide wonderful recreation, as well as irrigation for crops and habitat for fish and wildlife.
- Mississippi has over 2,400 miles of man-made ditches and canals used for drainage and transportation, such as the 164-mile Tennessee-Tombigbee Waterway.



Janet Chapman, MDEQ

Gulfport Beach sunrise



USACE

Sailing on
Jamie Whitten Lake



Chunky River at Dunns Falls



Janet Chapman, MDEQ

Shrimp boat anchored in Pearl River



Janet Chapman, MDEQ

Polypipe irrigation



USACE

Aberdeen Lock and Dam on the Tennessee-Tombigbee Waterway



USDA NRCS

Mississippi's economy and quality of life depend on our water resources.

Remnant of a cypress/tupelo wetland in an oxbow in central Mississippi

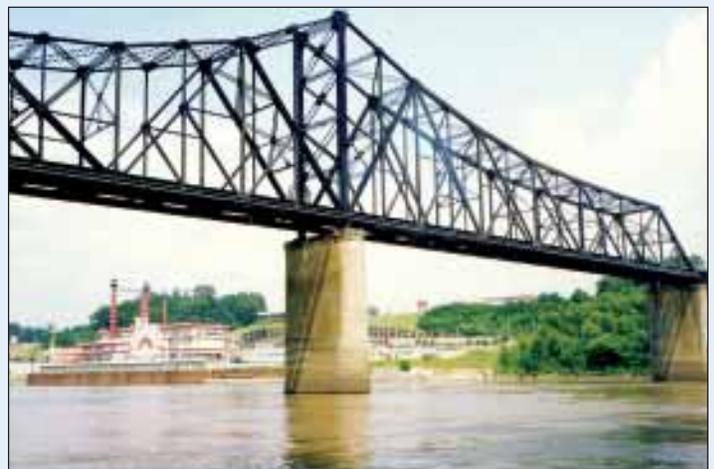


Cypress swamp in the Tenn-Tom Waterway

- Wetlands cover about 2.7 million acres throughout the state, providing habitat for wildlife and natural filters for cleaning stormwater runoff on its way downstream.
- Most of our streams and rivers flow to some point along Mississippi's 86-mile coastline. Many flow into estuarine bays (a mix of fresh and salty water)—St. Louis Bay, Back Bay of Biloxi, and Pascagoula Bay—before entering the Mississippi Sound. Those waters then flow past our barrier islands into the Gulf of Mexico. Other waters, like the Yazoo River, flow into the Mississippi River which discharges directly into the Gulf of Mexico south of New Orleans. In all, Mississippi's estuarine waters cover over 750 square miles.
- Barrier islands and coastal estuaries reduce the impacts of hurricane storm surges and provide the nursery habitat needed by both commercial and non-commercial fisheries.



Gulfport Harbor

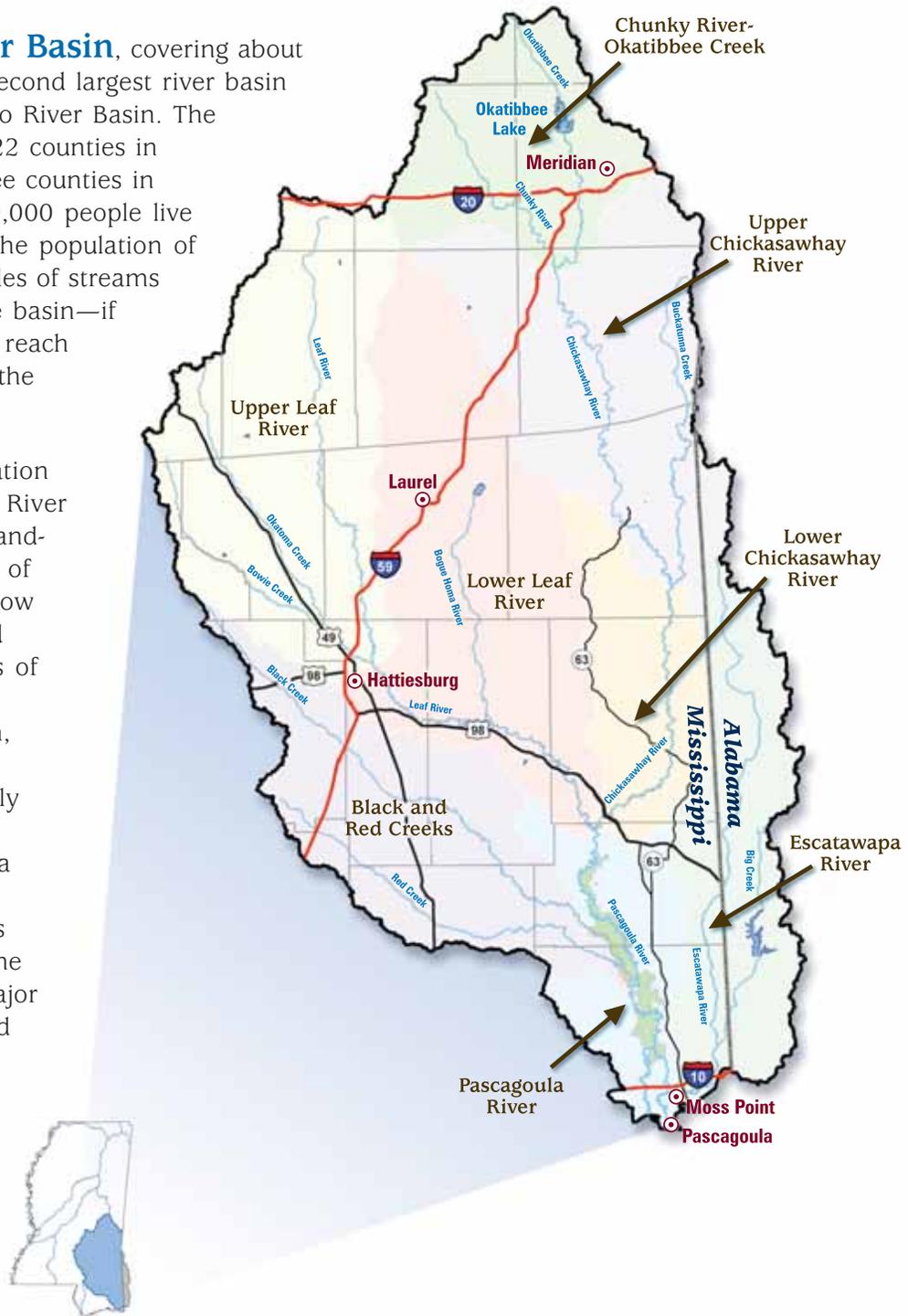


Mississippi River Bridge at Vicksburg

Welcome to the Pascagoula River Basin

The Pascagoula River Basin, covering about 9,600 square miles, is the second largest river basin in Mississippi after the Yazoo River Basin. The basin drains all or parts of 22 counties in Mississippi and parts of three counties in western Alabama. Over 700,000 people live here, about one-quarter of the population of Mississippi. Over 15,000 miles of streams and rivers wind through the basin—if laid end to end, they would reach more than halfway around the Earth!

Prized as an outdoor recreation destination, the Pascagoula River Basin is a place of diverse landscapes. In the northern part of the basin, the headwaters flow among high rolling hills and ravines covered with forests of hardwood and pine. As the waters gather moving south, they form broad, flat floodplains among the gently rolling hills of the Pine Belt. Pasture and rangeland are a vital part of the rural agricultural economy in this area. Near the Gulf Coast, the Pascagoula River and its major tributaries become wide and deep, and meander through flatlands of forest and swamps. Finally, the Pascagoula River empties into the Mississippi Sound and the Gulf of Mexico, replenishing the productive marshes and coastal waters with nutrients and sediment vital for their maintenance.



Pascagoula Community

Hattiesburg

Hattiesburg is the fourth largest city in Mississippi with a population of nearly 50,000. Not only is the city located at the intersection of four major highways (I-59, US-49, US-98, and US-11), this “Hub City” also rests at the fork of the Leaf and Bouie Rivers, tributaries of the Pascagoula River. Historically, the area was known for its vast Virginia pine timberlands that set off a lumber boom in the late 1800s. Today, the city provides important education, retail, and medical services to the surrounding population of over a quarter of a million people. Hattiesburg is home to the University of Southern Mississippi, William Carey College, Pearl River Community College and several business and training schools. Camp Shelby, a military post and training center, is located 15 miles south of Hattiesburg and is the largest state-owned training site in the nation, covering over 200 square miles.



Hattiesburg historic train station



Hattiesburg historic train station

Peter Cada, Tetra Tech, Inc.

Peter Cada, Tetra Tech, Inc.



Dunn's Falls on Chunky River, Lauderdale County

Janet Chapman, MDEQ

Pascagoula Water Parks

The Pat Harrison Waterway District manages nine water parks where the public can enjoy the Pascagoula River Basin's water resources. Anglers can fish year-round for abundant bass, bream, crappie, and catfish. Visitors explore nature along many trails where they find wild flowers, deer, turkey and other wildlife. While all of the water parks provide similar opportunities—including camping, boating, fishing, and hiking—each park has unique characteristics. At

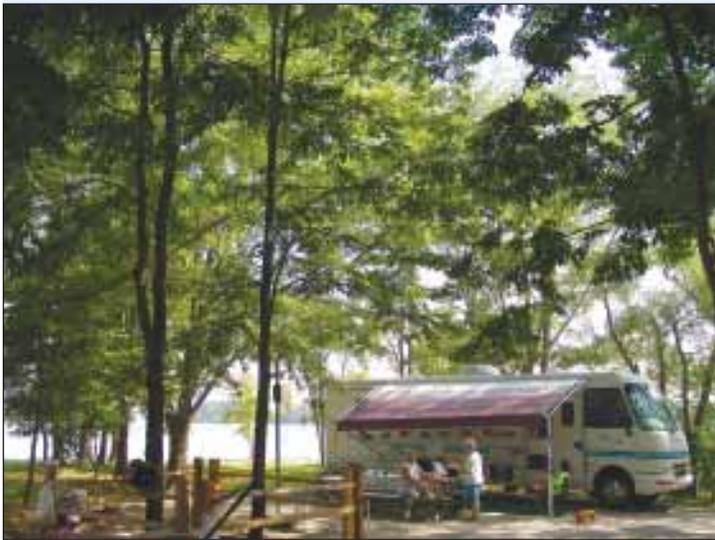
Okatibbee Water Park, families enjoy the Splashdown Country water slide, and water skiers enjoy the 3,800-acre lake. Several parks have historic and natural amenities as well. At Dunn's Falls Park, visitors marvel at the 65 foot waterfall that adjoins Chunky River and the adjacent gristmill that once was powered by the falling waters. Waterslides are generally open from Memorial Day until Labor Day, while all other park features are open year-round. For more information, visit www.phwd.net.



Flint Creek Water Park, Stone County



Waiting for fish to bite at Lake Mike Conner, Covington County



Camping at Clarkco State Park, Clarke County



Boating on the Okatoma Creek, Covington County

Popular Fishing and Recreation Areas

The Pascagoula River Basin is a recreation paradise for outdoor enthusiasts, offering spectacular hunting, fishing, canoeing, kayaking, camping, and hiking opportunities. State parks, wildlife management areas, and state lakes are found throughout the basin from the headwaters to the coast. In addition, the Pat Harrison Waterway District manages nine water parks where you can fish, camp, picnic, and swim during most of year. De Soto National Forest provides an extensive hiking trail that is unmatched in the state. You'll also find trails for horseback riding, as well as camping and picnicking areas. If you are a bird watcher, you'll find numerous opportunities to view migratory and non-migratory birds. The Mississippi Audubon Society (www.msaudubon.org) is a great resource for learning more about bird watching here and throughout Mississippi. The Pascagoula River Basin is home to the best canoeing and kayaking streams in the state, including the Chunky River, Red Creek, Black Creek, Okatoma Creek, Chickasawhay River, Pascagoula River, Escatawpa River, Leaf River and Bouie Creek. The Mississippi Outdoor Club (www.msoutdoorclub.org) can help you find out more about recreational boating, outfitters, and rentals. Also, visit the Mississippi Tourism website at www.visitmississippi.org/outdoor_rec/index.asp. For details about camping, swimming, boating and other recreational opportunities, see the map and charts on the following pages.



The Nature Conservancy

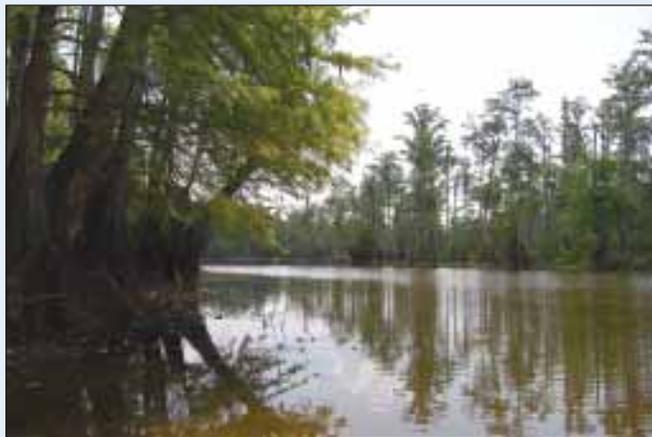
Bladderworts on a Leaf River oxbow near McLain, Greene County

Legend

- City
- County
- Interstate
- US Highway
- State Highway
- Major River
- Large Lake/Pond
- National Forest/National Wildlife Refuge**
 - Bienville National Forest
 - De Soto National Forest
 - Mississippi Sandhill Crane National Wildlife Refuge
- National Forest Service/Recreation Area
- State Wildlife Management Area
- Pascagoula River/Ward Bayou Wildlife Management Area
- State Parks
- Water Parks
- State Boundary



	Trailer Camping	Tent Camping	Concessions	Drinking Water	Toilets	Lodge	Cabins	On Lake	On River	Swimming	Recreational Room/ Facility	Boating	Picnicking	Fishing	Golf	Hiking Trails
State Parks																
Paul B. Johnson	■	■	■	■	■	■	■	■		■		■	■	■		■
Clarkco	■	■	■	■	■	■	■	■		■		■	■	■		■
For more information contact: MS Dept. of Wildlife, Fisheries & Parks - mississippistateparks.reserveamerica.com/ or 1-800-GO PARKS																
State Lakes																
Lake Claude Bennett	■	■		■	■			■				■	■	■		
Lake Ross Bennett	■	■		■	■			■				■	■	■		
Lake Perry	■	■		■	■			■				■	■	■		■
Lakeland Park Lake								■					■	■		
Lake Bogue Homa	■	■		■	■			■				■	■	■		
Lake Mike Conner	■	■		■	■			■				■	■	■		
For more information contact: MS Dept. of Wildlife, Fisheries & Parks - www.mdwfp.com/Level2/Fisheries/lakes.asp or 601-432-2400																
State Wildlife Management Areas (WMAs)																
Okatibbee		■						■					■	■		
Tallahala		■											■	■		
Mason Creek		■										■	■	■		
Leaf River		■											■			
Red Creek		■											■			
Pascagoula River		■						■	■	■		■	■	■		
Ward Bayou		■							■	■		■	■	■		■
Chickasawhay		■											■			
For more information contact: MS Dept. of Wildlife, Fisheries & Parks - www.mdwfp.com/Level2/Wildlife/wma.asp or 601-432-2400																
Corps Lakes																
Okatibbee	■	■		■	■			■		■		■	■	■		■
For more information contact: U. S. Army Corps of Engineers - www.sam.usace.army.mil/op/rec/okatib/ or 601-626-8431																
National Wildlife Refuges																
Mississippi Sandhill Crane				■	■						■					■
For more information contact: www.fws.gov/mississippisandhillcrane or 228-497-6322																



Peter Cadda, Tetra Tech, Inc.

Upper Rhyme Lake in the Pascagoula Wildlife Management Area



The Nature Conservancy

Splendor of nature at the Pascagoula Wildlife Management Area

	Trailer Camping	Tent Camping	Concessions	Drinking Water	Toilets	Lodge	Cabins	On Lake	On River	Swimming	Recreational Room/ Facility	Boating	Picnicking	Fishing	Golf	Hiking Trails
National Forest Service																
Bienville – Marathon Lake	■	■		■	■			■		■		■	■	■		■
Bienville – Shongelo					■			■		■			■	■		■
De Soto – Turkey Fork	■	■		■	■			■		■		■	■	■		■
De Soto – Ashe Lake				■	■			■					■	■		■
De Soto – Big Creek Landing									■			■	■	■		■
De Soto – Cypress Creek Landing at Black Creek		■		■	■				■			■	■	■		
De Soto – Fairley Bridge Landing		■			■				■			■	■	■		■
De Soto – Janice Landing at Black Creek	■	■		■	■				■			■	■	■		■
De Soto – Moody’s Landing at Black Creek				■	■				■			■	■	■		■
For more information contact: National Forest Service - Mississippi - www.fs.fed.us/r8/mississippi/ or 601-965-1600																
Pat Harrison Waterway District Water Parks																
Archusa Creek	■	■		■	■	■	■	■		■	■	■	■	■	■	■
Big Creek	■	■		■	■		■	■		■	■	■	■	■		■
Dry Creek	■	■		■	■			■			■	■	■	■		■
Dunn’s Falls		■		■	■		■		■	■			■	■		■
Flint Creek	■	■	■	■	■	■	■	■		■	■	■	■	■		■
Little Black Creek	■	■		■	■		■	■		■	■	■	■	■		■
Maynor Creek	■	■		■	■	■	■	■		■	■	■	■	■		■
Okatibbee	■	■	■	■	■		■	■		■	■	■	■	■		■
Turkey Creek	■	■		■	■	■	■	■		■	■	■	■	■		■
For more information contact: Pat Harrison Waterway District - www.phwd.net or 800-748-9618 Notes: Archusa Creek has 9-hole disc golf. Maynor Creek has two lodges. Many parks have open air pavilions.																
Other Recreational Resources																
Canoeing, Kayaking, Hiking and Backpacking	For more information on recreational boating, hiking and backpacking including outfitters/rentals in the basin, contact MS Outdoor Club at www.msoutdoorclub.org															
Birding	For more information on birding and bird watching activities in the basin, contact Mississippi Audubon Society at www.msaudubon.org															
Hunting & Fishing	For more information on hunting and fishing in the basin, contact the Mississippi Department of Wildlife, Fisheries and Parks at www.mdwfp.com and the Mississippi Wildlife Federation at www.mswildlife.org															



Peter Cada, Terra Tech, Inc.

Okatoma Creek near Fairchild’s Landing, Covington County



Peter Cada, Terra Tech, Inc.

Campsite near Okatoma Creek, Covington County

De Soto National Forest

De Soto National Forest covers nearly 400,000 acres of rolling hills, sandy ridges, savannas, and floodplain swamps and provides a variety of opportunities to enjoy nature and solitude. The forest offers 170 miles of hiking, bicycle, horse, and ATV trails. Two National Recreation trails intersect the forest: the Black Creek Trail and the Tuxachanie Trail. With a length of 41 miles, the Black Creek Trail is Mississippi's longest hiking trail. The De Soto National Forest provides several developed campgrounds with tent and RV sites. Primitive tent camping, hunting, and fishing are also allowed throughout the forest. For paddlers, Black Creek provides 38 miles of canoeing along this scenic creek. Black Creek is Mississippi's only National Wild and Scenic River, and visitors to Black Creek frequently see otters and wood ducks while enjoying the beauty of its white sandbars and gentle pace.

The U.S. Congress has designated two areas within De Soto National Forest as Wilderness Areas. The Black Creek Wilderness Area covers 5,050 acres of wilderness traversed by Black Creek and its namesake trail. The Leaf Wilderness Area covers a smaller but substantial wilderness of 940 acres. Except for trails and boardwalks, the pristine character of these areas has been left undisturbed. Only foot and horse traffic are allowed, and visitors are expected to "leave no trace."



US Forest Service,
De Soto Ranger District

Bethel Bicycle Trail offers 25 miles of mountain biking, Stone and Harrison Counties



US Forest Service,
De Soto Ranger District

Riders on Bigfoot horse trail, Stone and Harrison Counties

Okatibbee Lake

The 4,144 acre Okatibbee Lake was created in 1962 for recreation and flood control for the Meridian area. The United States Army Corps of Engineers manages the lake and the 7,150 acres of land surrounding it. The lake is located in the headwaters of the Pascagoula River Basin, on Okatibbee Creek. It has five swimming beaches, more than 20 fish attractors and several bream beds, two campgrounds, six boat ramps, and seven picnic areas. Visitors to this lake can enjoy an abundance of activities whether staying for a few hours or several days.



USACE

Okatibbee Lake, Lauderdale County



Watersports at Okatibbee Lake, Lauderdale County

Special Plants and Animals of the Pascagoula River Basin

The rivers and streams and the surrounding landscapes of the Pascagoula River Basin are home to a remarkable variety of plants and animals. A large number of threatened and endangered species are found here—not because the basin is heavily impacted by human activities, but quite the opposite—the basin represents one of the most natural areas in Mississippi. The Pascagoula River itself is the largest unimpeded river system in the lower 48 states, lacking flood control structures and reservoirs found on most rivers. Much of the land in the lower part of the basin is held in public ownership and is protected. The wildness of the landscape that makes this area so popular for outdoor recreation also provides safe haven for the plants and animals that live there. Good water quality and protection of habitat are essential to support these species.

Why do some plants and animals become rare or endangered? In most cases, they have special needs that compete with our uses of the land. The pine savannah of the Mississippi sandhill crane habitat was largely developed or converted to pine plantations during the last 50 years. Some species, such as the yellow-blotched sawback turtle, reproduce poorly and have trouble finding nesting sites along river banks with heavy recreational use. Other species, such as the Camp Shelby burrowing crayfish and the Louisiana quillwort, are unique to the Pascagoula River Basin and need special habitats found only in this basin. As we learn more about what leads to population decline, we can take the necessary steps that will support species success.

Camp Shelby Burrowing Crayfish, *Fallicambarus gordonii*

This crustacean is found only on the Camp Shelby National Guard Training Facility in the De Soto National Forest. It depends on pitcher plant bogs—low lying areas that are frequently flooded and contain an abundance of pitcher plants, a distinctive carnivorous plant. This crayfish spends much of its time within the complex burrow system it creates, taking occasional trips to the surface for mating and feeding. Its habitat can be destroyed by military activities and logging practices. Since this crayfish is not widespread throughout Camp Shelby, these activities can be conducted in other locations to avoid habitat destruction. Regular prescribed burning may also help maintain pitcher plant communities and prevent overgrowth of vegetation.



Camp Shelby Burrowing Crayfish

Jerry L. Litton



Louisiana Quillwort

Steve Leonard

Louisiana Quillwort, *Isoetes louisianensis*

This grass-like plant grows along creeks, on sand and gravel bars, or similar wetland habitat. Its multiple leaves extend in a spiral as much as one foot from its central root system. One unique feature of this plant is that it collects air within chambers in its leaves. The plant reproduces by releasing newly germinated plants and dispersing them into nearby water. Most of the Mississippi colonies of this plant are found in the De Soto Ranger District of De Soto National Forest. Louisiana Quillwort colonies are endangered by activities that disturb or destroy wetland habitat—such as forestry operations, military training, and all-terrain vehicle use.

Mississippi Sandhill Crane, *Grus Canadensis pulla*



U.S. Fish and Wildlife Service

Mississippi Sandhill Crane

The Mississippi Sandhill Crane is a four-foot tall, slender bird with a red forehead and a wing span of over five feet. Historically, it inhabited coastal pine savannas of Louisiana, Mississippi, and Alabama, but the only remaining population resides in a small area west of the Pascagoula River in Jackson County. As of 2000, only 110 to 120 cranes remained in the wild. Much of its habitat has been altered or destroyed by urban development, pine plantations, and drainage canals, and the population is highly vulnerable to hunting by humans, coyote and other predators. To protect them from extinction, the U.S. Fish and Wildlife Service breeds Mississippi Sandhill Cranes in captivity and regularly introduces captive-bred cranes into the wild population. The Mississippi Sandhill Crane National Wildlife Refuge is currently restoring about 18,000 acres of this majestic bird's habitat.

Gulf sturgeon, *Acipenser oxyrinchus desotoi*

The Gulf sturgeon is a large fish, attaining an average length of six to eight feet. It has an elongated head and the body is covered with rows of bony, scale-like plates. Gulf sturgeon are anadromous fish—they live in salt water, but migrate to freshwater to breed. They eat tiny crustaceans and worms by siphoning them off the bottom with a tube-like mouth. Heavy fishing reduced their numbers through the early 1900s; few have been seen in Mississippi since that time. Since its listing as a threatened species is based on a low population, fishing for Gulf sturgeon is now prohibited. Current threats include pollution and habitat loss. The Pascagoula River was designated by the U.S. Fish and Wildlife Service and National Marine Fisheries Service as critical habitat for the Gulf sturgeon.



Jerry L. Litton

Gulf Sturgeon

Red-cockaded Woodpecker, *Picoides borealis*



U.S. Fish and Wildlife Service

Red-cockaded Woodpecker

This bird once thrived throughout the southeastern United States, but is now endangered because it needs a type of habitat which is hard to find today—large, old, living pine trees (preferably longleaf pine) spaced far apart, with frequent underbrush fires preventing the spaces from filling in. Their habitat has disappeared for several reasons; longleaf pine stands are no longer common, large trees are a prized timber resource, and forest fire prevention allows other trees to fill in the spaces. Red-cockaded woodpeckers (so-called for the red feathers the males have above their eyes) carve out cavities where they nest. They peck holes in the tree to release sap, making it hard for snakes (a predator) to climb the tree trunks and get into the nest. In the Pascagoula River Basin, Red-cockaded woodpeckers primarily reside in De Soto National Forest, with an estimated 350 breeding groups in the Chickasawhay Ranger District and an estimated 250 breeding groups in the De Soto Ranger District. The ranger districts are playing a vital role in the species recovery program of the Red-cockaded woodpecker.



Jerry L. Litton

Yellow-blotched Sawback

Yellow-blotched Sawback, *Graptemys flavimaculata*

Found only within the Pascagoula River Basin, this turtle spends much of its time basking in the sun on logs in the Pascagoula River and its large tributaries. It is named for large yellow or orange spots on its shell and the black spines along its back. The sawback is threatened due to its limited range and low success rate for nests. Recreational use of river banks and invasive vegetation have limited the number of good nesting sites; it is also a victim of indiscriminant shooting and collection for pet trade. Public education to encourage protection of the sandbars where it nests and discourage the shooting of basking turtles can help the yellow-blotched sawback survive.

Other Special Animal Species

- Alabama Redbelly Turtle, *Pseudemys alabamensis*
- Alabama Shad, *Alosa alabamae*
- Bald Eagle, *Haliaeetus leucocephalus*
- Black Pine Snake, *Pituophis melanoleucus lodingi*
- Brown Pelican, *Pelecanus occidentalis*
- Chaffseed, *Schwalbea americana*
- Delicate Spike, *Elliptio arctata*
- Dusky Gopher Frog, *Rana sevosia*
- Eastern Indigo Snake, *Drymarchon couperi*
- Florida Panther, *Puma concolor coryi*
- Gopher Tortoise, *Gopherus polyphemus*
- Green Sea Turtle, *Chelonia mydas*



Jerry A. Payne, USDA Agricultural Research Service, Bugwood.org

Green Sea Turtle



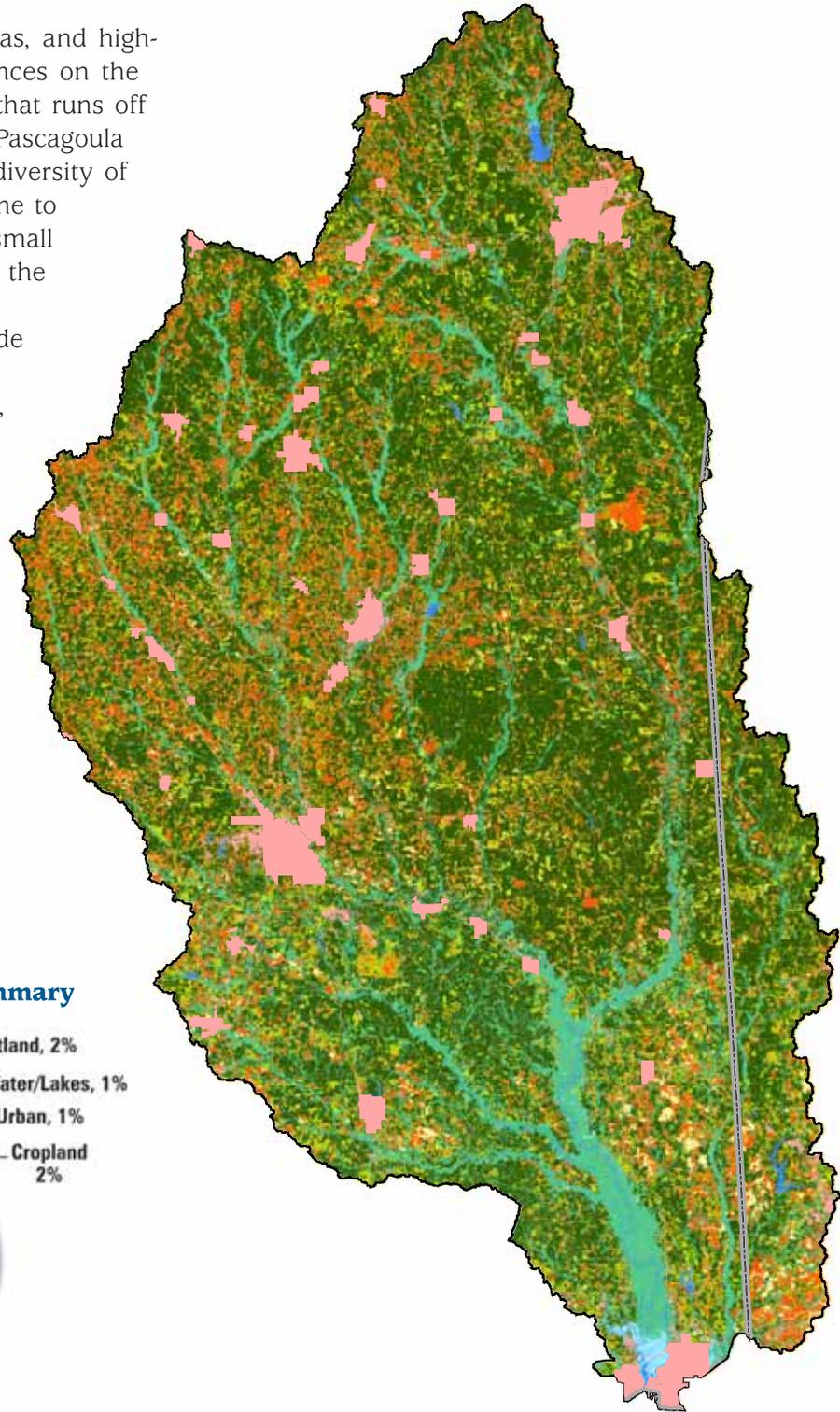
Gary Stolz, USFWS

Louisiana Black Bear

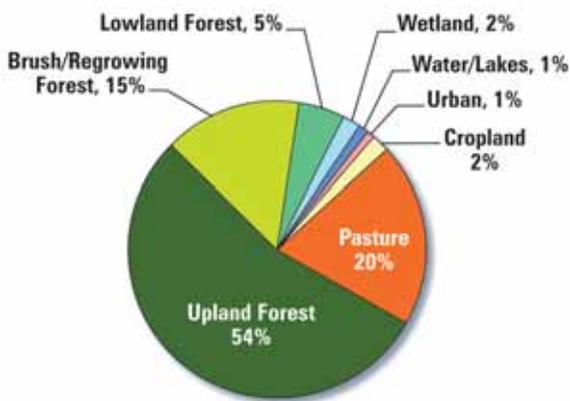
- Kemp's Ridley Sea Turtle, *Lepidochelys kempii*
- Loggerhead Sea Turtle, *Caretta caretta*
- Louisiana Black Bear, *Ursus americanus luteolus*
- One-toed Amphiuma, *Amphiuma pholeter*
- Pearl Darter, *Percina aurora*
- Peregrine Falcon, *Falco peregrinus*
- Rainbow Snake, *Farancia erytrogramma*
- Saltmarsh Topminnow, *Fundulus jenkinsi*
- Snowy Plover, *Charadrius alexandrinus*
- Eastern Hognose Snake, *Heterodon platyrhinos*
- Striped Bass, *Morone saxatilis*
- West Indian Manatee, *Trichechus manatus*

Land Use and Its Effects on Water Quality in the Pascagoula River Basin

Forests, agriculture, urban areas, and highways all have different influences on the amount and quality of water that runs off into streams and rivers. The Pascagoula River Basin supports a great diversity of animals and habitats. It is home to several cities and numerous small towns. In the northern part of the basin, gently rolling hills and broad, flat river valleys provide the backdrop for the rural landscape. Moving southward, the basin gradually flattens out, and the meandering rivers become wider and deeper.



Legend and Land Use Summary



 State Boundary

Forests and Timberlands

Nearly 60% of the Pascagoula River Basin is covered by forested land; regrowing forests and brushland account for another 15%. The majority of the forested land is privately owned, but government-owned and protected forest land occupies a significant area, nearly one million acres. The diverse holdings include the De Soto and Bienville National Forests, seven state-owned wildlife management areas, state-owned coastal preserves, and the Mississippi Sandhill Crane National Wildlife Refuge.

Historically, longleaf pine savannas were an important feature in the southern part of the basin. Frequent fires were crucial for maintaining these unique forests by removing competing brush and small trees, but not the tall, fire-tolerant longleaf pines. Wiregrass grew under the pines, creating a park-like atmosphere. Over time most of the longleaf pines were cut for timber, and in their place, timber plantations were established. Fire control during the past century prevented the regrowth of longleaf pines, even in forested areas allowed to grow back naturally without timber management.

Similar factors have changed the makeup of forests in the northern part of the basin. Historically, this region supported a mix of oak, hickory, pine, and other tree species. As a result of fewer fires, timbering, and agriculture, the northern basin forests are less diverse than in pre-settlement times—nowadays, pines typically dominate the younger forests, and oaks grow more densely in older forests.

The forest industry owns about one fourth of the forested land in the basin. The basin's forest land is an important economic resource for the state; accounting for \$324 million of Mississippi's economy in 1999. Typically, pine and hardwood are grown for lumber, wood pulp, and veneer products.



US Forest Service, De Soto Ranger District

Overlooking De Soto National Forest

Wetlands

Wetlands are among a river's greatest assets, and Mississippi's wetland management goal is "no net loss of wetlands." Wetlands filter pollutants, replenish ground water and stream flow, and act like sponges to reduce flooding by storing runoff. As an enormous water cleaning facility, wetlands remove pollutants using no electricity, and have no filters to maintain. Free of charge, wetlands do the work of treatment plants that would cost tens of millions of dollars to build. In addition to the economic benefits to society, wetlands provide essential habitat for animals, birds, plants and trees. The Pascagoula River Basin has many types of wetlands making up about 2% of the land area, including floodplain swamps, oxbow lakes and sloughs, and coastal marshes.

Through its 404 Permitting Program, the U.S. Army Corps of Engineers protects against the loss of wetlands and mitigates impacts to these systems. The permitting program also protects many lowland forest areas, some of which are classified as wetlands.



Peter Cada, Tetra Tech, Inc.

Upper Rhyme Lake in Pascagoula Wildlife Management Area



Peter Cada, Tetra Tech, Inc.

Timber truck near Hickory, MS

Forestry practices can degrade water quality, especially if timber land is not properly managed. Unprotected clear cuts and unpaved forest roads produce erosion and runoff that add sediment to streams, destabilize stream channels, and damage or eliminate aquatic habitat. Many landowners have voluntarily installed practices designed to protect and restore water quality—improved stream crossings, selective cutting, and streamside buffers. Streamside buffers reduce sediment running into the stream and provide shade that keeps the water cooler. Intact stream-side forests also protect and hold bank soils in place and provide excellent wildlife habitat. When properly managed, timberlands have less severe effects on water quality compared to other agricultural or urban land uses.

Agriculture

Livestock production is the most important agricultural activity in the Pascagoula River Basin. Poultry dominates the livestock industry here; about 44% of the state's poultry production comes from the Pascagoula River Basin, second only to the Pearl River Basin with 46% of the production. Pasture and rangeland for cattle and livestock are found throughout the basin as well, accounting for 20% of the land use. Nutrients and bacteria from animal wastes often get into the streams either from pasture runoff or directly from the animals themselves, resulting in low dissolved oxygen levels and other water quality

problems. Additionally, when cows graze near streams, the stream banks and channels may become unstable and erode. Bank erosion causes portions of the downstream channels to fill with sediment, affecting habitat for fish and other aquatic life. The basin team and the farming community are already at work on these problem areas, using waste management plans, restricting cattle access to streams, and improving stream crossings. The Priority Watersheds section beginning on page 28 includes details of these activities.



Peter Cada, Tetra Tech, Inc.

Poultry houses

Row crop production is much less prevalent, occupying less than 2% of the basin. Since the 1930s, state and federal agencies have stressed the need for soil conservation and good farming practices, such as no till farming and maintaining vegetated stream buffers. By keeping topsoil in place, these practices help keep sediment out of the streams. Many of these same practices also reduce fertilizer and pesticide runoff.



Peter Cada, Tetra Tech, Inc.

Grazing cattle

Cities and Suburbs

Urban areas make up a small portion of the Pascagoula River Basin. For the most part, the basin is sparsely populated, with small towns dotting the countryside. However, a number of urban areas are found here, most notably Pascagoula, Moss Point, Meridian, Hattiesburg, and Laurel. Most people in the basin live in or near these cities. Over the past years, the urban areas have experienced a steady growth in population, especially in Lamar County near Hattiesburg, and in Jackson County at the coast. One of the largest industrial areas in the state can be found in the lower part of the basin where major industries include timber products, energy production, and chemical, agricultural, and metal manufacturing.



Downtown Meridian

Urban centers cover only a small area in the basin, but impact water quality in many ways. During highway and building construction, disturbed land erodes and runoff carries excessive sediment if the site is not properly managed. Once construction is complete, stormwater runoff from developed areas flows into streams more quickly, and with a higher volume. As a result, urban streams have larger and more frequent floods than undisturbed rural streams. The increased flow and velocity also causes scouring, erosion, and sedimentation in the stream channel.

Polluted runoff comes from many scattered sources. As runoff from rainfall moves over and through the ground, it picks up and carries natural and man-made pollutants, depositing them into streams, lakes, wetlands, coastal waters, and even underground aquifers. Runoff from yards washes excess fertilizer, pesticides, and sediment into storm drains that flow untreated into streams. Runoff also flushes litter and leaked motor oil on streets and parking lots into streams.



Concrete-lined stream in Meridian

Sediment (soil material composed of sand, silt, and clay particles) naturally moves off the land into water bodies. However, excessive sediment from construction sites is filling in lakes and streams in parts of the basin. Sediment clouds the water reducing the amount of light reaching aquatic plants, covers fish spawning areas and food supplies, and clogs the gills of fish. In addition, other pollutants like phosphorus, pathogens, and heavy metals are often chemically attached to the soil particles and are carried into water bodies with the sediment.



Sediment from roadside erosion can clog streams

Urban runoff frequently contains pesticides, herbicides, and fertilizers from lawns and other managed landscapes. To help curb these impacts, the state now requires stormwater permits for many communities.

Cities and towns attract industry, and these industries sometimes generate pollutants as by-products. These by-products have the potential to negatively impact our streams and air. Mercury and other pollutants discharged into the air can travel many miles, even across state boundaries, before settling onto the ground and washing into streams and lakes. Regional solutions are necessary to curb these interstate problems. Both air and water discharges are regulated by MDEQ through permits to limit them to acceptable levels.

Surface Mining

About 250 sand and gravel surface mines operate within the Pascagoula River Basin. Although surface mines have a very small footprint in the basin, they can have a significant effect on water quality if proper storm water controls are not put into place and maintained. Runoff from these operations can also cause water bodies to become more acidic, harming fish and other aquatic life. Surface mining can disrupt wildlife habitat if buffer zones are not protected following a thorough survey by a qualified biologist.



Surface mining operations near Wiggins, Stone County

Peter Cadda, Tetra Tech, Inc.

On August 29, 2005, **Hurricane Katrina** ravaged the Gulf Coast and delivered a blow to the entire Pascagoula River Basin area. All 22 counties in the basin were impacted by hurricane force winds, and 20% to 25% of the basin's timberland (1.7 million acres) received damage. Trees in streamside buffers were especially hard hit and extensive fish kills resulted from reduced dissolved oxygen in streams. The Mississippi Department of Wildlife, Fisheries and Parks and the U.S. Fish & Wildlife Service have worked together to help restore the fish populations in many of the impacted streams. In the aftermath, the federal government responded with the following assistance programs:

- Emergency Watershed Protection Program for timber debris removal
- Emergency Conservation Program for replanting assistance
- Emergency Conservation Reserve Program for long-term cost-share conservation

For more information on these programs, contact your county USDA Farm Services Agency office.



Wind damage in De Soto National Forest

US Forest Service, De Soto Ranger District

Water Quality in the Pascagoula River Basin

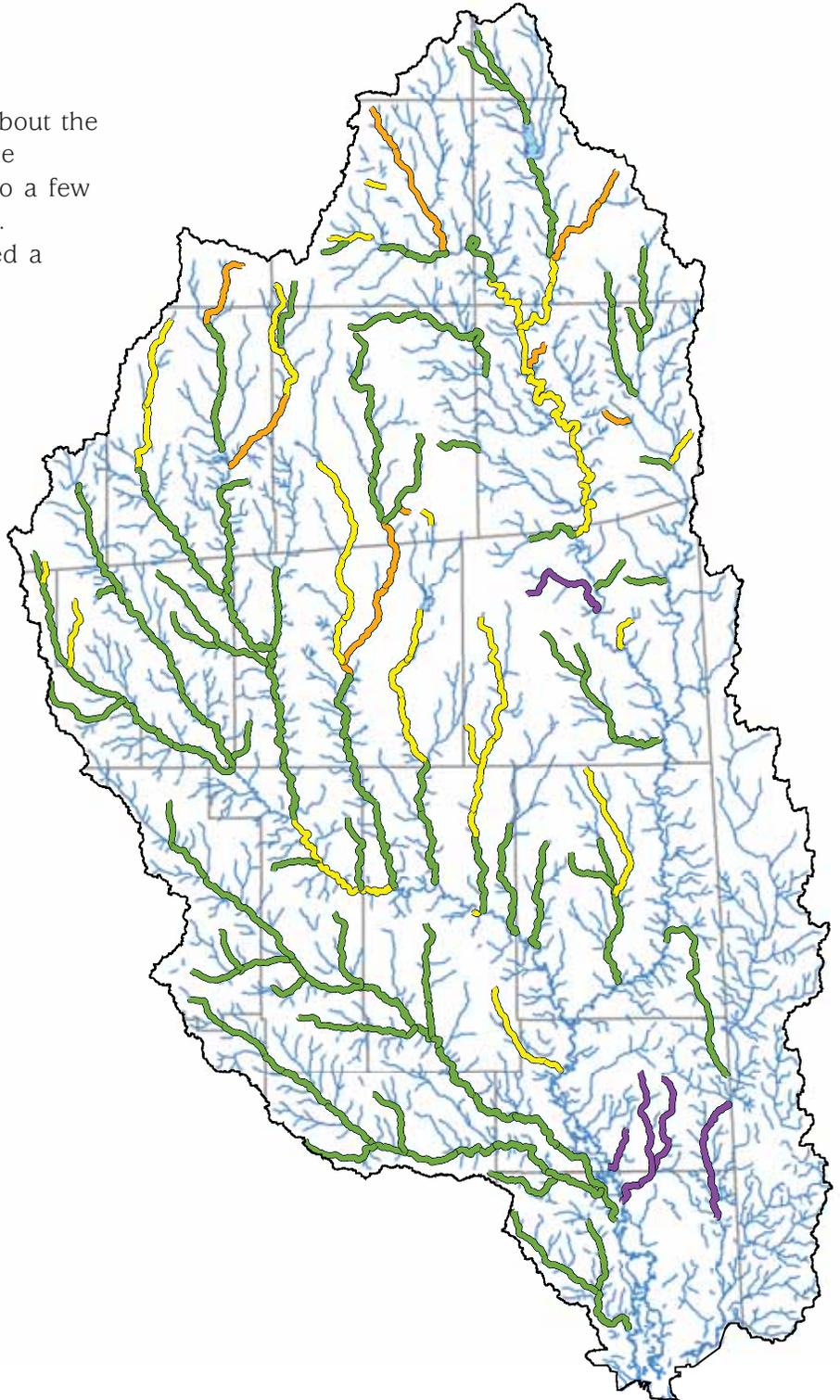
Surface Water Quality

In the past, what was known about the condition of water bodies in the Pascagoula Basin was limited to a few well-studied lakes and streams. Recent monitoring has provided a better understanding of water quality conditions across the entire basin.

Legend

Stream Condition for Aquatic Life Support

-  Very Good
-  Good
-  Fair
-  Poor
-  Very Poor
-  Perennial Stream
-  Lake or Pond
-  County



Of streams monitored in the Pascagoula Basin, 61% are rated good or very good and adequately support aquatic life such as aquatic insects and fish. Another 30% are rated fair. They have aquatic life that is only somewhat impacted by pollution. Of major concern are the 9% of streams in poor or very poor condition, where the aquatic life is significantly impacted by pollution. Major pollutants and their sources include the following:

- Pathogens from animal wastes and failing septic systems
- Pesticides from agricultural and urban runoff
- Eroded sediment from agricultural, timber harvesting, and construction sites
- Organic and nutrient enrichment from animal wastes and failing septic systems



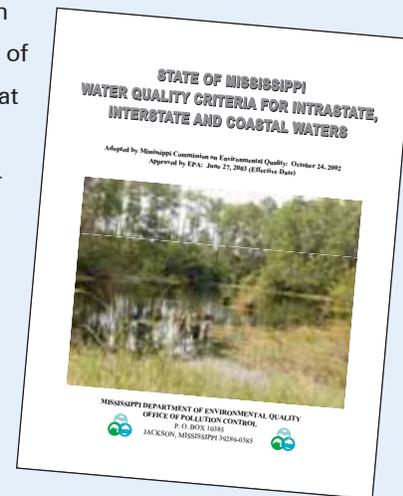
Field water quality monitoring



Technicians performing aquatic insect inventory

Surface Water Quality Standards

Mississippi water quality standards establish the goals for protecting and maintaining the quality of our surface waters (streams, lakes, estuaries, etc.) so that they will support their intended or designated uses. In Mississippi, designated uses are fish and wildlife support, public water supply, recreation, and shellfish harvesting. With the exception of fish and wildlife support, not all uses apply to each water body—rather each is assigned specific uses. Criteria are set for a large number of water quality parameters in order to protect each use. Monitoring is then performed to compare conditions in individual streams, lakes or estuaries to the criteria to assess whether the waters are supporting their designated uses. The criteria are also used to set limits on the amount of pollution that can be put into a water body while still protecting its uses.



How can I learn more?

For more information on Mississippi's water quality standards, visit www.deq.state.ms.us or contact MDEQ, 601-961-5171.

Some streams and lakes in the Pascagoula Basin are also impacted by mercury, a toxic chemical. Mercury in Pascagoula Basin waters is thought to originate from widely distributed sources such as air emissions from incinerators and coal-fired power plants. It can travel many miles before settling on the ground and being washed into streams and lakes.

Once in the water, mercury enters the food chain and may accumulate in fish. Fish tissue studies have led MDEQ to issue fish consumption advisories in three water bodies and the Gulf of Mexico. Only the fish listed in the advisory are subject to the consumption limitations. The advisories do not apply to farm-raised catfish. Fish consumption advisories for the Pascagoula River Basin are shown on the adjacent map and listed in detail in Table 1.

How can I learn more?

For more information on water quality in the basin, see the state's latest Water Quality Assessment at www.mdeq.state.ms.us or contact MDEQ's Water Quality Assessment Section, 601-961-5150.



Table 1. Pascagoula Basin Fish Consumption Advisories

Stream Reach	Chemical	Action
Escatawpa River from the Alabama state line to I-10	Mercury	Limit consumption of largemouth bass and large catfish (greater than 27 inches).*
Pascagoula River, entire length	Mercury	Limit consumption of largemouth bass and large catfish (greater than 27 inches).*
Archusa Creek Water Park	Mercury	Limit consumption of largemouth bass and large catfish (greater than 27 inches).*
Gulf of Mexico	Mercury	King Mackerel: less than 33 inches—no limit 33 to 39 inches—limit consumption** greater than 39 inches—do not eat

* The Mississippi State Health Department recommends that people limit the amount of bass and large catfish that they eat from these areas because of high levels of mercury in the fish. Children under seven and women of childbearing age should eat no more than one meal of these fish every two months. Other adults should eat no more than one meal of these fish every two weeks.

** The Mississippi State Health Department recommends that people limit the amount of 33- to 39-inch King Mackerel they eat from the Mississippi Gulf Coast. Children under seven and women of child bearing age should eat no more than one meal of these fish every two months. Other adults should eat no more than one meal of these fish every two weeks.

TMDLs

You can think of Total Maximum Daily Loads (TMDLs) as pollution budgets. They determine how much of a pollutant can be present in a stream, river, lake, or other water body without affecting aquatic life or public health. TMDLs have been developed for 89 water body segments in the Pascagoula River Basin. Most of these TMDLs state the estimated amount of bacteria, sediment, or nutrients entering the waters and how much these pollutants should be reduced to restore healthy conditions. Rural and urban communities will need to work in partnership with resource management agencies to restore and maintain the water quality necessary to support aquatic life and safe recreation in these waters. An additional 16 TMDLs remain to be completed for the water bodies remaining in the Pascagoula River Basin on the state's List of Impaired Waters, but more biological impairment listings may be added. Table 2 provides a summary of completed and needed TMDLs in the Pascagoula River Basin.



Legend

- 2006 Completed TMDL
- Perennial Stream
- Lake
- County

Table 2. Pascagoula River Basin TMDL Summary

	TMDLs Completed	TMDLs Remaining
Biological Impairment	0	11
Mercury	7	2
Metals (Aluminum, Copper, and Lead)	0	0
Miscellaneous*	6	1
Nutrients	10	0
Organic Enrichment/Low DO	8	1
Pathogens	31	0
Pesticides (including DDT and Toxaphene)	6	0
Sediment/Siltation	19	0
Hydrocarbons/Phenols	0	1
Toxicity (Total Toxics and Unknown Toxicity)	2	0
Total	89	16

* Miscellaneous: PCBs, oil and grease, pH, salinity/tds/chlorides, cause unknown.

How can I learn more?

For more information on TMDLs, contact Greg Jackson with the MDEQ Office of Pollution Control, Surface Water Division, (601) 961-5098 or visit the MDEQ website at www.deq.state.ms.us.

Drinking Water Protection

Ground water supplies all of the drinking water consumed in the Pascagoula River Basin. Abundant ground water resources from several aquifers allow for a large number of domestic wells throughout the rural areas of the basin. These wells are often relatively shallow and may be susceptible to contamination from a variety of sources. Improperly sited and poorly maintained septic systems are usually the biggest health concern.

Much of drinking water supply in the Pascagoula River Basin is furnished by the 222 public water systems serving the area. The water wells used by these systems generally pump from deep aquifers naturally protected by thick overlying layers of clay. The only real ground water protection concern is abandoned wells, which are potential conduits for contamination. These wells should be plugged to protect ground water resources.

Drinking water resources are protected by the federal Safe Drinking Water Act (SDWA). The SDWA establishes safe drinking water criteria (referred to as maximum contaminant levels or MCLs) and it requires assessments of the areas around supply sources to evaluate potential threats and levels of

protection that may be needed. In Mississippi, the State Department of Health regulates public water systems operating in the state, and MDEQ assists in the protection of drinking water sources through the Source Water Assessment/Protection Program.

MDEQ has sampled 124 drinking water wells in the Pascagoula River Basin over the past 15 years. Analyses of these samples included 100 widely-used pesticides and various constituents, including volatile organic compounds and inorganic constituents. Analytical results of this sampling indicated no chemical detections exceeding EPA's primary drinking water standards (MCLs). Although ground water generally is of good quality in the basin, natural coloration can occur locally in certain aquifers.



De Kalb Water Tower, Stone County

Peter Cada, Tetra Tech, Inc.

How can I learn more?

For more information on drinking water assessments, visit www.deq.state.ms.us, or contact the MDEQ Office of Land and Water Resources, 601-961-5395.

As authorized by the federal Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating "point sources" that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their treated wastewater goes into state waters. These permits specify the types, quantity, and concentrations of pollutants that may be discharged by a facility. Since its introduction in the 1970s, the NPDES permit program has led to significant improvements in our nation's and Mississippi's water quality.

Before beginning work, a developer must obtain permits specifying temporary management practices that must be in place to keep excessive sediment from leaving the construction site. After construction is complete, permanent detention basins or similar measures may be required to treat the increase in storm-water runoff and pollutants as a result of the development.

How can I learn more?

For more information on NPDES Permitting, visit www.deq.state.ms.us, or contact the MDEQ Office of Pollution Control, Environmental Permits Division, 601-961-5702.

Gulf Region Water and Wastewater Plan

With the post-Katrina population shift from the coast to more inland areas comes the challenge of providing enough clean drinking water and wastewater treatment for the current and future residents of the Gulf Region. The purpose of the Gulf Region Water and Wastewater Plan is to identify the infrastructure needs for providing water (e.g., water mains) and wastewater (e.g., sewer lines) services to the six Gulf region counties of Hancock, Harrison, George, Jackson, Pearl River, and Stone. The plan was created by Governor Haley Barbour, and uses congressional money to aid long-term Hurricane Katrina recovery efforts.

MDEQ is responsible for developing the plan to provide storm-proof solutions for the region's water and wastewater infrastructures. Any priority projects identified by the Plan will be eligible for funding. The Plan will incorporate short and long-term projections of population growth in the region to identify where potential infrastructure may be needed.

A regional plan provides a more comprehensive approach for protecting infrastructure from storm events, providing a higher level of public safety, and supporting economic development. An important part of the process was ensuring the involvement of local community stakeholders throughout the Plan's development.



Janet Chapman, MDEQ



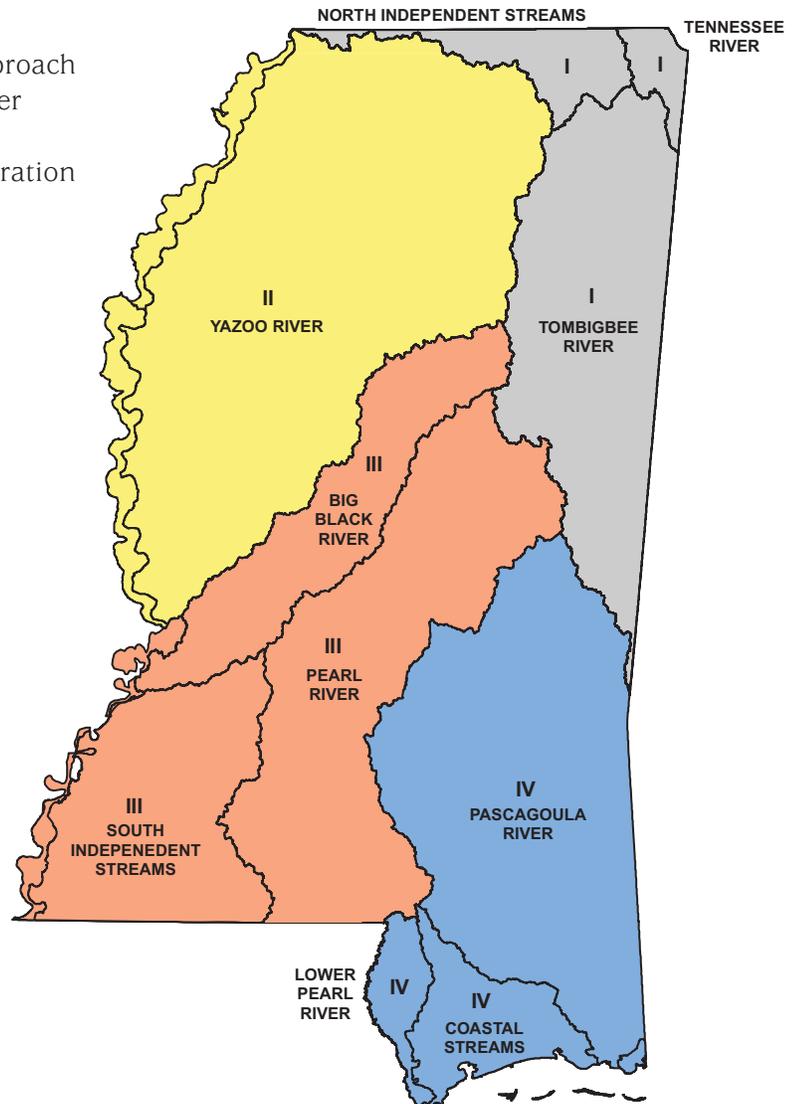
Governor Barbour and others break ground for the Moss Point Water Treatment Plant

How can I learn more?

For more information on the Gulf Region Water and Wastewater Plan, visit www.msgulfregionplan.org, or contact Ray Eaton with MDEQ at 601-961-5171, or Jim Hust with MSEG at 601-355-3518.

Mississippi's Basin Management Approach

The mission of the Basin Management Approach is to foster stewardship of Mississippi's water resources through collaborative watershed planning, education, protection, and restoration initiatives. To accomplish this, nine of Mississippi's major river basins have been organized into four basin groups (see map inset). Each basin group has a basin team of state and federal agencies and local organizations. This team provides the opportunity for multiple levels of government and local stakeholders to coordinate their efforts. Together, basin team members help assess water quality, determine causes and sources of problems, and prioritize watersheds for water quality restoration and protection activities. The Basin Management Approach also encourages and provides the opportunity for basin team members to pool both technical and financial resources to address priority watersheds.



How can I learn more?

Contact your Basin Coordinator:

- Group I** **North Independent Streams, Tennessee River & Tombigbee River**
 Janet Chapman (601) 961-5266 • janet_chapman@deq.state.ms.us
- Group II** **Yazoo River**
 Richard Ingram (601) 961-5078 • richard_ingram@deq.state.ms.us
- Group III** **Pearl River, South Independent Streams & Big Black River**
 Richard Ingram (601) 961-5078 • richard_ingram@deq.state.ms.us
- Group IV** **Pascagoula River, Coastal Streams & Lower Pearl River**
 Richard Ingram (601) 961-5078 • richard_ingram@deq.state.ms.us

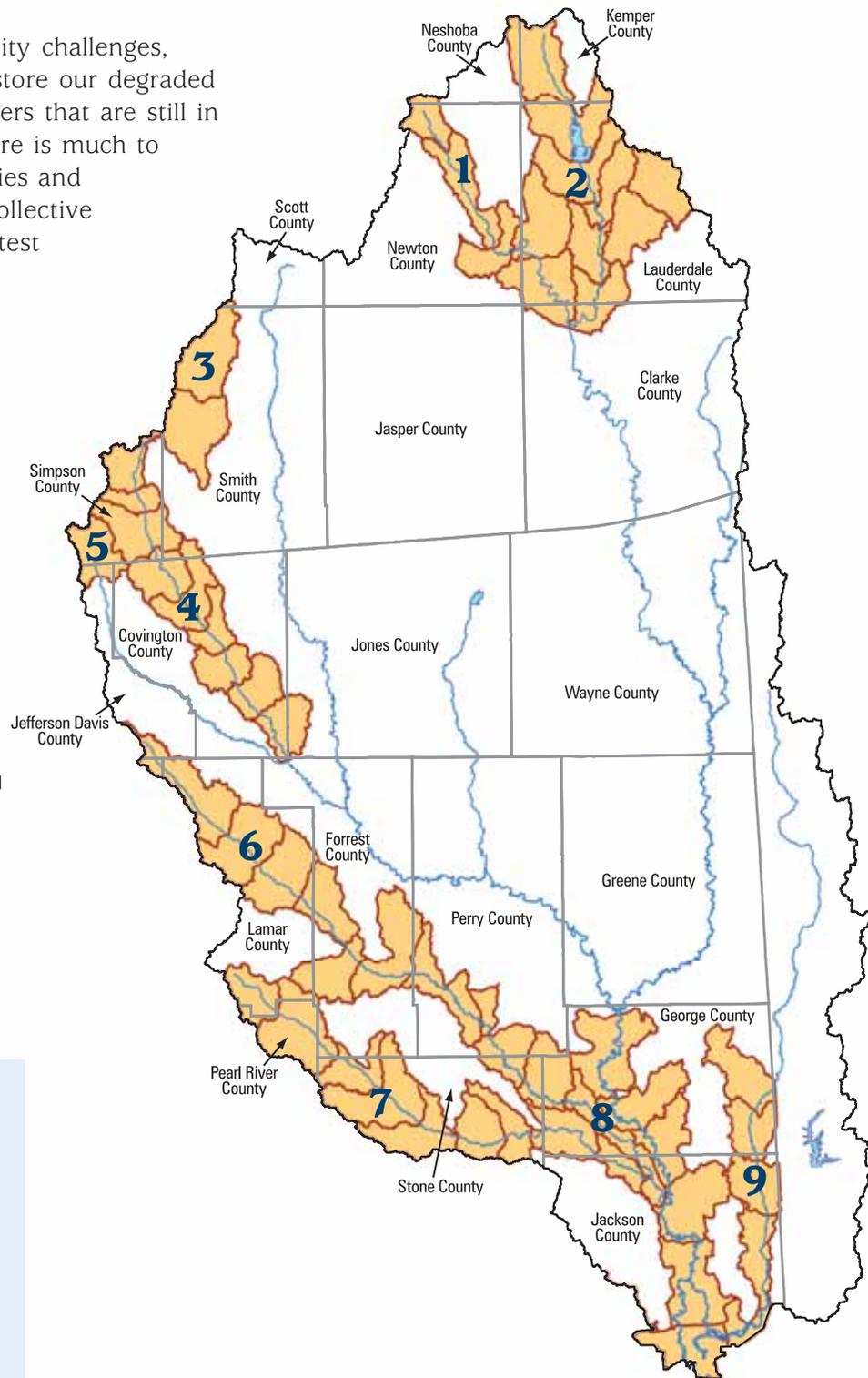
Priority Watersheds

With so many water quality challenges, where do we begin to restore our degraded waters or protect our waters that are still in good condition? Since there is much to do, we need to set priorities and target areas where our collective efforts will have the greatest benefit.

Legend

-  Priority Subwatershed
-  Watershed
-  Major River
-  Lake or Pond
-  County

- | Number | Watershed |
|--------|------------------|
| 1. | Chunky River |
| 2. | Okatibbee Creek |
| 3. | Oakohay Creek |
| 4. | Okatoma Creek |
| 5. | Skiffer Creek |
| 6. | Black Creek |
| 7. | Red Creek |
| 8. | Pascagoula River |
| 9. | Escatawpa River |

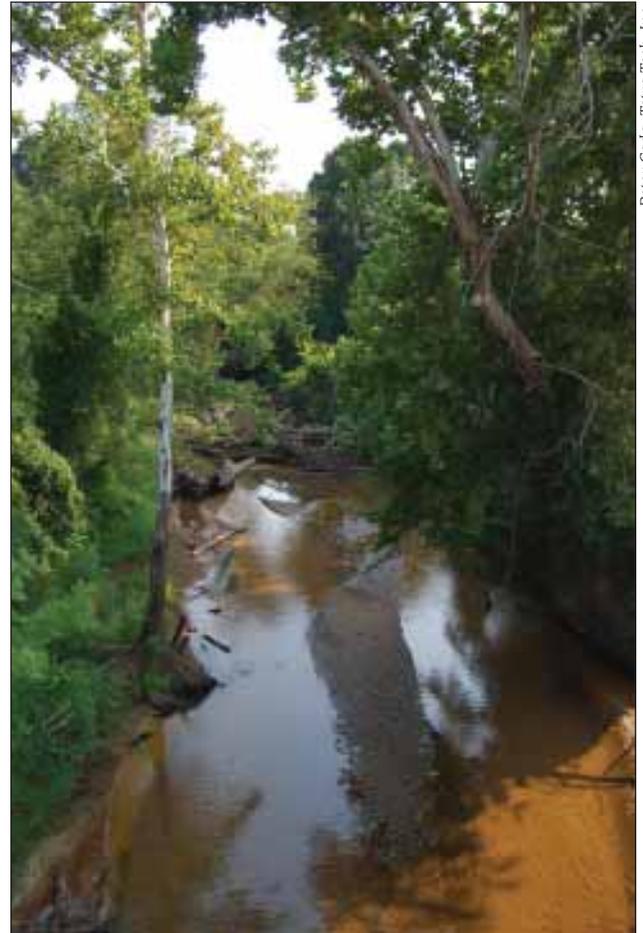




Adopt-A-Stream Workshop

A Pascagoula River Basin Team of 39 local, state and federal resource agencies, with strong input from the general public and active local stakeholder organizations, has developed a list of priority watersheds for the Pascagoula River Basin. The team reviewed information on the basin's streams and lakes, and ranked the watersheds based on resource value (intrinsic benefit to the citizens of the state), integrity of water quality data, TMDL data, degree of impairment of the watershed, level of support for implementing management measures, historical/cultural/scenic qualities, and expected benefits. This resulted in the targeting of watersheds for management planning and implementation activities.

The Basin Team selected nine priority watersheds: Black Creek, Chunky River, Escatawpa River, Oakohay Creek, Okatibbee Creek, Okatoma Creek, Pascagoula River, Red Creek, and Skiffer Creek. In several of these priority watershed areas, watershed implementation teams are being formed to coordinate restoration and/or protection efforts throughout the watershed. Teams have already been formed for Red Creek and



Chunky River near Highway 80, Lauderdale County

Chunky River/Okatibbee Creek. These teams have the support of several organizations, including the East Mississippi Foothills Land Trust, Land Trust for the Mississippi Coastal Plain, Mississippi Soil and Water Conservation Commission, local Soil and Water Conservation Districts, Natural Resources Conservation Service, MSU Department of Wildlife and Fisheries, Pat Harrison Waterway District and other team members who are identifying where to improve water quality. Each team is developing implementation plans that will identify what each agency, organization, and landowner is willing to do to address water quality problems. Highlights of three of the priority watersheds follow.



Red Creek near Highway 49, Stone County



Swimmers enjoy the cool water of Red Creek on a hot summer day

Red Creek

Red Creek is a beautiful coastal blackwater stream that begins near Lumberton in Lamar County and continues southeasterly through Stone, George and Jackson counties. From beginning to end, Red Creek is approximately 95 miles long. It joins with Black Creek in Jackson County forming Big Black Creek, and shortly thereafter flows into the Pascagoula River. Red Creek derives its name from the reddish stain that occurs naturally from the tannins in the water. The Red Creek watershed drains 490 square miles. The watershed is largely forest and agriculture with very little urban area. Several public access areas to Red Creek are located on Hwy. 26, Hwy. 49, City Bridge, Hwy. 15, Vestry Bridge, and Hwy. 57. In 2007, Red Creek was designated by the Mississippi Legislature as a scenic stream and is part of the State Scenic Streams Program.

Some of the pollutants that impact the stream include sediment, pathogens, and nutrients. Restoration and protection efforts in this watershed will employ the following management practices to improve water quality and the recreational use of waters:

- Bank stabilization projects
- Riparian forest buffers—shrub and tree planting
- Repaired septic systems
- Aquatic vegetation control

A Red Creek Watershed Team was established in 2006 to develop a program to help restore and protect the lands and waters along Red Creek. The team meets quarterly to discuss and address the above pollution issues and other issues impacting the stream.

How can I learn more and get involved?

Red Creek is a watershed with many needs. It will take all of us—local stakeholders, resource agencies and organizations—working together to improve the quality of its waters to maximize the recreational and economic potential of the watershed. Why don't you join with us? For information about restoration and protection activities for the Red Creek watershed, contact Judy Steckler with the Land Trust for the Mississippi Coastal Plain at 228-435-9191.



Peter Cadda,
Tetra Tech, Inc.

Livestock watering ponds provide water to cattle that have been fenced out of nearby streams. This helps reduce pathogen and sediment loads from cattle directly entering streams.



Peter Cadda, Tetra Tech, Inc.

Oakohay Creek headwaters, Scott and Smith Counties

Oakohay Creek Watershed

Oakohay Creek begins near the county line between Scott and Smith counties, and continues south through Smith County and Covington County. It flows into the Leaf River just east of Hot Coffee. Forest and pasture are the most common land uses in the watershed. The section of Oakohay Creek targeted for restoration activities is located entirely in Smith County. This section of the stream is about 18 miles long and drains 111 square miles. Water quality in Oakohay Creek is most affected by nutrients and sediment. Restoration and protection efforts in this watershed may employ one or more of the following management practices to improve water quality:

- Critical area planting
- Sediment basins
- Pasture and hayland planting
- Nutrient management
- Fencing
- Stream crossings

How can I learn more and get involved?

Oakohay Creek is a watershed with many needs. It will take all of us—local stakeholders, resource agencies and organizations—working together to improve the quality of its waters to maximize the recreational and economic potential of the watershed. Why don't you join with us? For information about restoration activities for Oakohay Creek, contact Mark Gilbert with the MS Soil & Water Conservation Commission at 601-354-7645.



Peter Cada, Tetra Tech, Inc.

Okatibbee Creek Near Route 19, Lauderdale County

Chunky River and Okatibbee Creek Watershed

Chunky River begins in Newton County near the towns of Hickory and Chunky, formed by the confluence of Chunky Creek and Okahatta Creek. It flows east to Lauderdale County, and then south into Clarke County. From beginning to end, the Chunky River is 27 miles long and drains 140 square miles. It joins Okatibbee Creek just north of Enterprise to form the Chickasawhay River. The watersheds are largely forest and agriculture, with some light rural development. In 2003 the Chunky River was designated by the Mississippi Legislature as a scenic stream and is part of the State Scenic Streams Program.

Okatibbee Creek's watershed begins in east central Neshoba County and continues through Kemper, Lauderdale and Clarke counties. The stream is about 65 miles long and drains 265 square miles. Okatibbee Creek in Lauderdale County was dammed in the 1960s for flood control, forming Okatibbee Lake. The lake and Twitley Branch Campground are managed by the U.S. Army Corps of Engineers, and Pat Harrison Waterway District operates the campground at Okatibbee Water Park. The



Peter Cada, Tetra Tech, Inc.

Chunky Creek near Highway 80, Newton County

lake is a popular recreational area for fishing and boating, and a haven for wildlife including bald eagles, deer, geese and alligators.

Water quality in Okatibbee Creek is affected by nutrients, sediment, pathogens, and pH. The pollutants that impact Chunky River include animal waste, pathogens and sediment. Restoration and protection efforts in these two watersheds may employ one or more of the following management practices to improve water quality and the recreational use of waters:

- Bank stabilization projects
- Riparian forest buffers—shrub and tree planting
- Repaired septic systems
- Aquatic vegetation control



Peter Cada, Tetra Tech, Inc.

Farm ponds help reduce sediment and pollutant loading to streams by treating surface runoff.

A Chunky/Okatibbee Watershed Team was established in 2006 to develop a Watershed Implementation Plan to address pollution and other issues impacting the watershed. The Plan will recommend activities to restore and protect the lands and water along these two streams.



Peter Cada, Tetra Tech, Inc.

Trees beside streams shade the water, take up nutrients, and help protect streams from erosion.

How can I learn more and get involved?

The Chunky-Okatibbee is a watershed with many needs. It will take all of us—local stakeholders, resource agencies and organizations—working together to improve the quality of its waters to maximize its recreational and economic potential. Why don't you join with us? For information about restoration activities for Chunky River and Okatibbee Creek, contact Tommy Vincent (601-484-2564), watershed team leader.

Agencies and Organizations Cooperating for Improved Water Quality

Numerous state and federal agencies and stakeholder organizations are working together to protect the quality of the Pascagoula River Basin's waters. These organizations have voluntary management and/or assistance programs that encourage the implementation of best management practices, regulatory programs that focus on permitting and compliance requirements, wetland and other habitat restoration programs, monitoring and assessment programs, and other watershed management efforts. For specific information on water quality activities or how to be involved in watershed protection, contact:

Stakeholder Organizations and Local Agencies

Audubon Mississippi

228-475-0825 www.msaudubon.org &
www.mscoastaudubon.org

Chevron Pascagoula Refinery

228-938-4563 www.chevronpascagoula.com

Land Trust for the Mississippi Coastal Plain

228-435-9191 www.ltmcp.org

Mississippi Association of Soil and Water Conservation Districts (SWCDs)

601-354-7645 www.mswcc.state.ms.usmacd

Mississippi Farm Bureau Federation

800-227-8244 www.msfb.com

Mississippi Fish & Wildlife Foundation

662-686-3375 www.wildlifemiss.org

Mississippi Forestry Association

601-354-4936 www.msforestry.net

Mississippi Power Company

228-865-5152 www.mississippipower.com

Mississippi Wildlife Federation

601-206-5703 www.mswildlife.org

Pascagoula River Basin Alliance

228-475-0825 mlasalle@audubon.org

The Nature Conservancy—Mississippi Chapter

601-713-3355

www.nature.org/wherewework/northamerica/states/mississippi

Agencies and Organizations Cooperating for Improved Water Quality (continued)

State of Mississippi/Alabama Agencies

Alabama Department of Environmental Management

251-450-3408 www.adem.state.al.us

Auburn University Marine Extension & Research Center

251-438-5690 www.ag.auburn.edu

Mississippi Agricultural and Forestry Experiment Station (MAFES)

662-325-9803 www.msucares.com

Mississippi Department of Agriculture and Commerce (MDAC)

601-359-1100 www.mdac.state.ms.us

Mississippi Department of Environmental Quality (MDEQ)

601-961-5171 www.deq.state.ms.us

Mississippi Department of Health, Bureau of Environmental Health (MSDH/BEH)

601-576-7400 www.msdh.state.ms.us

Mississippi Department of Marine Resources

228-374-5000 www.dmr.state.ms.us

Mississippi Department of Transportation (MDOT)

601-359-9815 www.mdot.state.ms.us

Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP)

601-432-2400 www.mdwfp.com

Mississippi Development Authority (MDA)

601-359-2832 www.mississippi.org

Mississippi Emergency Management Agency (MEMA)

601-352-8314 www.msema.org

Mississippi Forestry Commission (MFC)

601-359-1386 www.mfc.state.ms.us

Mississippi National Guard

601-313-6138 www.ngms.state.ms.us

Mississippi Soil & Water Conservation Commission (MSWCC)

601-354-7645 www.mswcc.state.ms.us

Mississippi State University Coastal Research & Extension Center

228-475-7047

www.msstate.edu/dept/crec/crec.html

Mississippi State University Cooperative Extension Service (MSU/CES)

662-325-8747 www.msucares.com

Mississippi State University Department of Wildlife and Fisheries

601-325-6768 www.cfr.msstate.edu/wildlife

Pat Harrison Waterway District

601-264-5951 www.phwd.net

University of Southern Mississippi Gulf Coast Research Lab

228-872-4203 www.usm.edu/gcrl

United States Government Agencies

Agricultural Research Service, National Sedimentation Lab (USDA/ARS/NSL)

662-232-2900 www.ars.usda.gov

Natural Resource Conservation Service (USDA/NRCS)

601-965-4139 www.ms.nrcs.usda.gov

U.S. Army Corps of Engineers, Mobile District (USACE)

251-694-3861 www.sam.usace.army.mil

U.S. Army Corps of Engineers, Waterways Experiment Station (WES)

601-634-6111 www.erdc.usace.army.mil

U.S. Department of Agriculture Farm Service Agency (USDA/FSA)

601-965-4300 www.fsa.usda.gov

U.S. Environmental Protection Agency, Region 4 (EPA/R4)

404-562-9396 www.epa.gov/region4

U.S. Fish and Wildlife Service (USFWS)

601-965-4900 www.fws.gov

U.S. Forest Service (USFS)

601-965-4391 www.fs.fed.us

U.S. Geological Survey (USGS)

601-965-2900 www.usgs.gov

Sustaining Our Environmental Resources and Economic Development

Some citizens of Mississippi understand the importance of their natural resources, both for their environmental and economic values. Locally-led teams are working to identify concerns and develop watershed implementation plans. These plans will not only restore, protect, and sustain environmental resources, but also provide opportunities for economic development and community growth. The Mississippi Department of Environmental Quality and its resource agency partners are actively involved with local watershed teams through Mississippi's Basin Management Approach. Watershed planning, education, protection, and restorative initiatives are all critical tools for carrying out this important work. Mississippians are working hard to preserve their abundant natural resources that provide outstanding fishing, hunting, economic development, and quality of life.



Fishing for generations



Janet Chapman, MDEQ

Storm drain marking

Citizens Can Help Protect Their Watershed:

- **Return your old car battery** when buying a new one.
- **Mulch your garden**—mulching conserves water, moderates soil temperatures, and controls weeds.
- **Water slowly and thoroughly.** Over-watering wastes water and can carry pollutants such as insecticides and fertilizer to streams or lakes.
- **Plant vegetation along stream banks.** If you have a creek running through your property, maintain a vegetated buffer zone along the waterway. This improves infiltration of water into the ground, helps filter runoff entering the stream, holds soils in place, and slows down flowing water in flood conditions.
- **Participate in school programs.** Learn about an environmental topic and volunteer to make a presentation at a local school.
- **Join an Adopt-A-Stream program** and help clean a water body in your area.
- **Donate a tree or trees** to a school, public building, or park. Trees generate oxygen while consuming carbon dioxide, and provide shade and cooling.



US Forest Service, De Soto Ranger District

Spring cleaning



Mississippi Department of Environmental Quality

Office of Pollution Control

515 East Amite Street

Jackson, MS 39201

601-961-5171

www.deq.state.ms.us

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