Citizen's Guide to Water Quality in the Tombigbee and Tennessee River Basins

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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 Tombigbee and Tennessee River Basins, consisting of representatives from 28 state and federal agencies and stakeholder organizations (see page 30 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

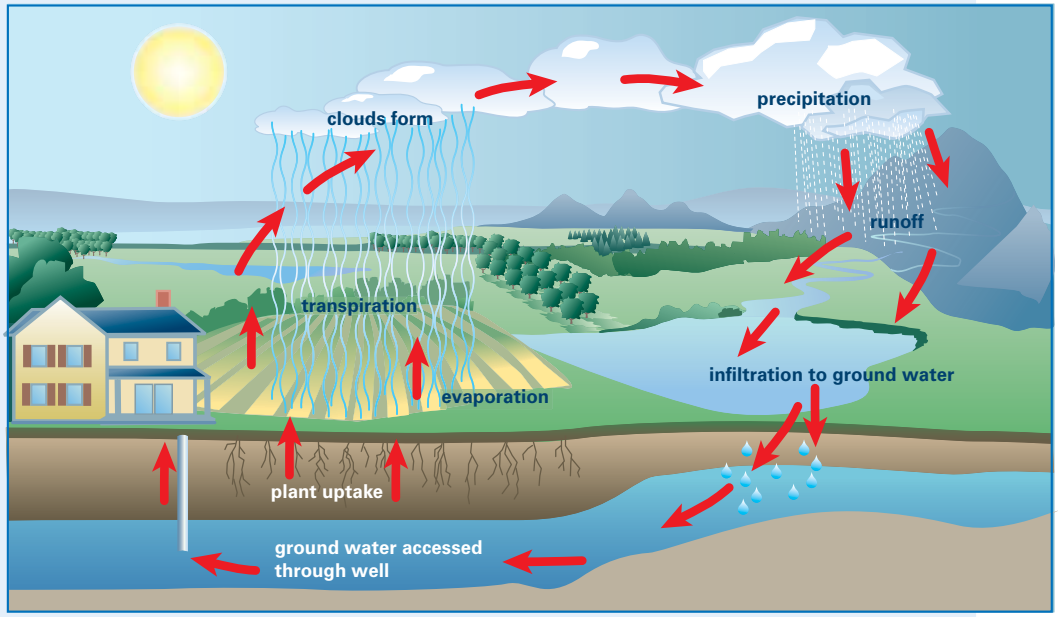
or by accessing MDEQ's website at:
www.deq.state.ms.us

Cover photos
Top: Yellow Creek; Peter Cada, Tetra Tech, Inc.
Inset: John C. Stennis Lock & Dam; US Army Corps of Engineers
Bottom: Pickwick Lake; Janet Chapman, MDEQ

Water
Our Precious Natural Resource

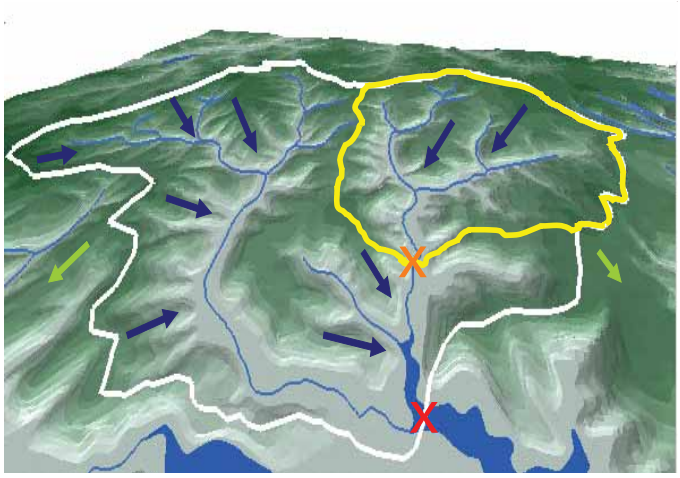
The Water Cycle and Water Quality

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 Tombigbee or Mississippi. Smaller watersheds join to form larger watersheds. For example, the Browning Creek, Town Creek and Noxubee River watersheds are smaller watersheds within the Tombigbee River Basin. Since watershed boundaries are determined by hills and ridges rather than political delineations, a watershed can cross county or state boundaries. For example, the Tennessee River Basin is spread across portions of seven states!



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 234-mile Tennessee-Tombigbee Waterway.

Janet Chapman, MDEQ

Gulfport Beach sunrise

USACE

Sailing on Jamie Whitten Lake

Janet Chapman, MDEQ

Shrimp boat anchored in Pearl River

Chunky River at Dunns Falls

Janet Chapman, MDEQ

Polypipe irrigation

USACE

Aberdeen Lock and Dam on the Tennessee-Tombigbee Waterway

USDA NRCS

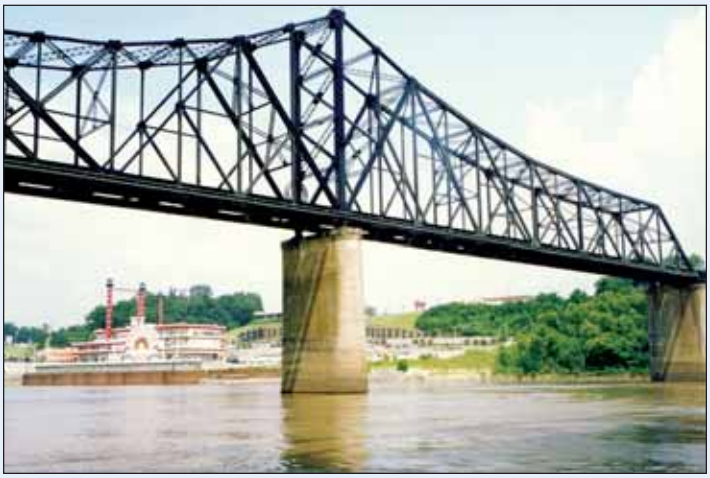
Remnant of a cypress/tupelo wetland in an oxbow in central Mississippi

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

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



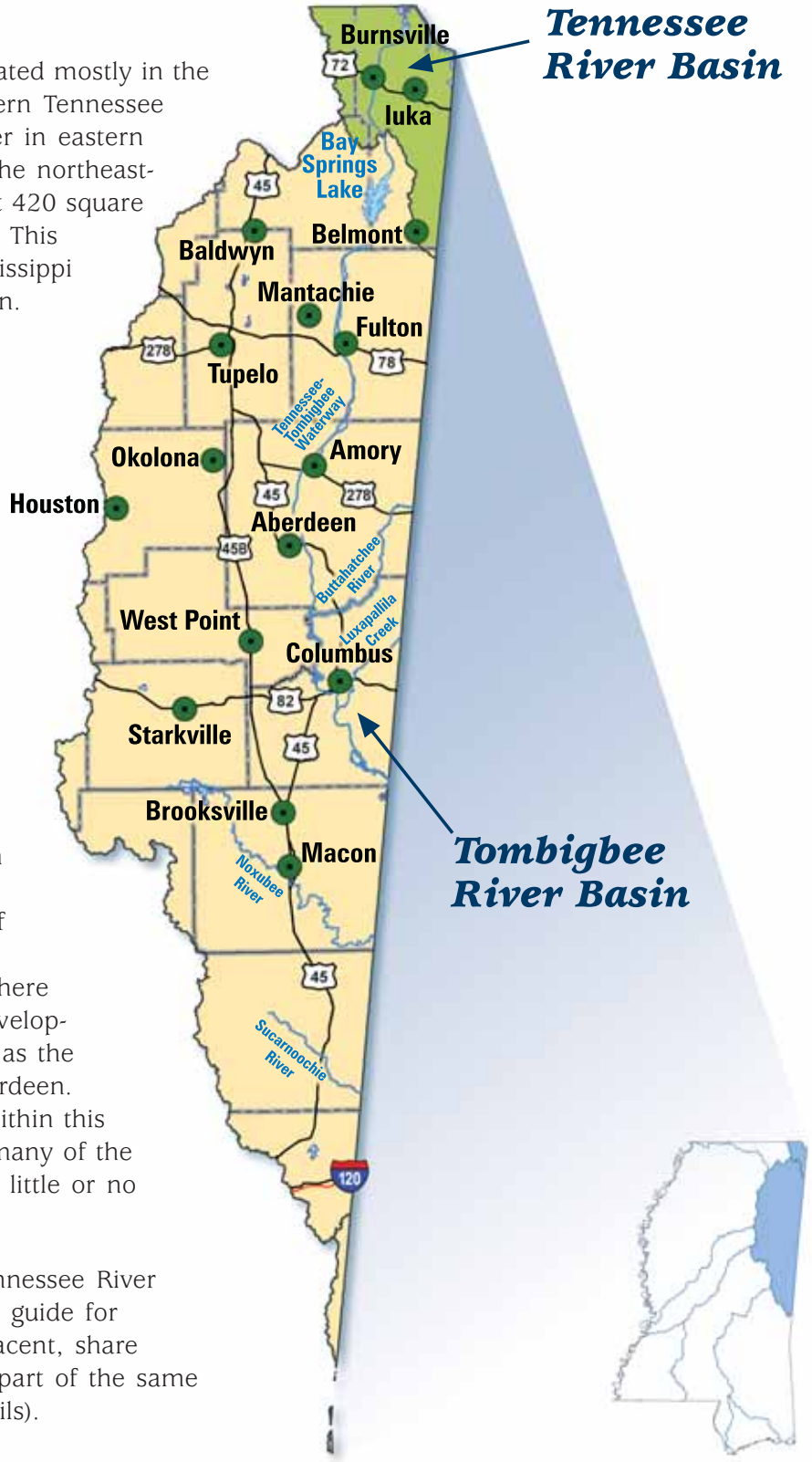
Mississippi River Bridge at Vicksburg

Welcome to the Tombigbee and Tennessee River Basins

The Tennessee River is located mostly in the State of Tennessee. It starts in eastern Tennessee and eventually meets the Ohio River in eastern Kentucky. Along the way, it enters the northeastern corner of Mississippi, with about 420 square miles of its watershed in Mississippi. This Citizen's Guide will address the Mississippi portion of the Tennessee River Basin. Most of the basin in Mississippi is either forested or used for farming. Mississippi's highest point is found here at Woodall Mountain, which is 806 feet above sea level. There are about 650 miles of streams, which usually have sand, gravel, and rock bottoms with clear, fast-flowing water.

The Tombigbee River Basin in Mississippi has about 6,100 square miles draining all or parts of 19 counties in the northeastern section of the state. Its streams and rivers flow to the south into Alabama and join the Mobile River, which empties into the Gulf of Mexico. This basin is primarily rural and sparsely populated. However, there are several growing and rapidly developing urban and industrial areas such as the cities of Tupelo, Columbus, and Aberdeen. There are 11,700 miles of streams within this basin. Due to the soils found here, many of the streams in the central portion carry little or no water except after it rains.

The Tombigbee River Basin and Tennessee River Basin are presented together in this guide for several reasons. The basins are adjacent, share similar landscape features, and are part of the same "Basin Group" (see page 21 for details).



Well-Known Fishing and Recreation Areas

The waters of the Tombigbee and Tennessee River Basins provide an abundance of great fishing opportunities and include several large lakes, many public streams, and spillways on the Tennessee-Tombigbee Waterway. Pickwick Lake on the Tennessee River is the largest in the area with 47,000 acres. A popular fishing spot, Pickwick is known for its bass fishing. Another popular location is Aberdeen Lake in Monroe County, which hosts the Tenn-Tom Bassmaster Classic held annually in April. Bay Springs Lake offers great crappie and bass fishing. Columbus Lake is home to a great variety of fish species including largemouth, striped and white bass, crappie, bluegill, channel catfish, and blue catfish. Northeast Mississippi is truly a fisherman's paradise.

Janet Chapman, MDEQ

Pickwick Lake from Goat Island

Janet Chapman, MDEQ

Noxubee Wildlife Refuge

Tombigbee Community

Tupelo

Tupelo, in Lee County, boasts its appeal as a place with small town friendliness and big city attractions. It is home to the Elvis Presley Birthplace and Museum, where visitors can learn about his humble beginnings. Tupelo is also home to the largest buffalo herd east of the Mississippi River, the Natchez Trace Parkway Visitor Center, and several more museums and historic sites. The majority of upholstered furniture made in the U.S. is produced in Mississippi, much of it in and near Tupelo.

Janet Chapman, MDEQ

Downtown Tupelo

Janet Chapman, MDEQ

Tupelo Automobile Museum

Janet Chapman, MDEQ

Elvis Presley's birthplace

Tennessee-Tombigbee Waterway

Completed in 1984, the Tennessee-Tombigbee Waterway, or TTW, is a series of interconnected lakes, locks, and pools, which allows recreational and commercial navigation from the Tennessee River all the way to the Gulf of Mexico. The construction of the TTW was the largest single earth excavation project in history—more than double the amount of earth moved for the Panama Canal. About 10 million tons of goods are shipped on the TTW each year. It is one of the top sports fishing spots in the nation, and thousands of acres along the waterway are dedicated to public hunting of deer, waterfowl, turkeys, and small game.

Adrien Lamarre, US Army Corps of Engineers

Barge on the Tennessee-Tombigee Waterway

Bevill Lock and Dam on the Tennessee-Tombigee Waterway

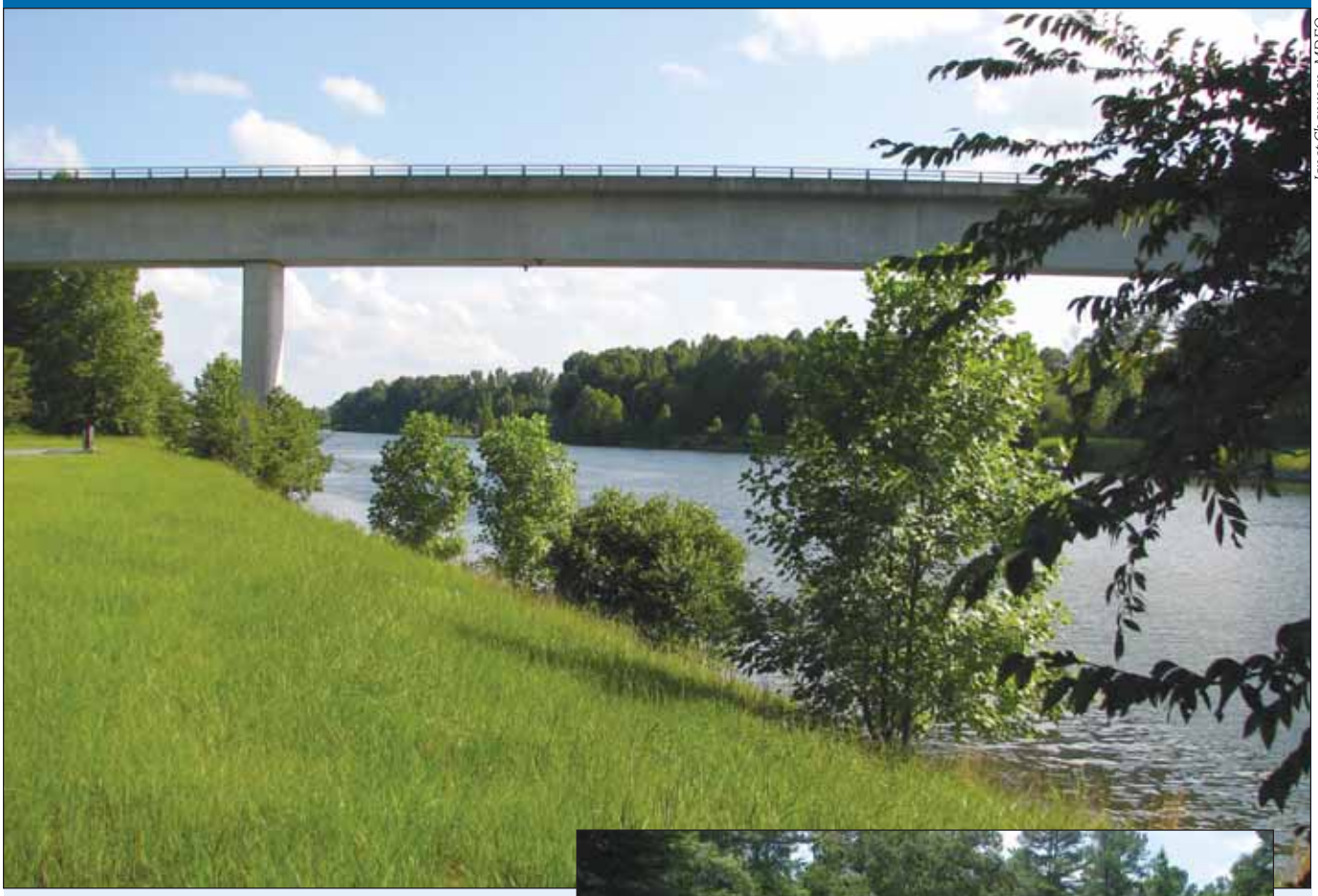
Tombigbee Community

Columbus

The City of Columbus, with a population of 26,000 is located in Lowndes County on the east bank of the Tombigbee River. Founded in 1821, it is the birthplace of playwright Tennessee Williams, author of *Cat on a Hot Tin Roof* and *A Streetcar Named Desire*. It is also home to the Mississippi University for Women, or the "W" as it is called, founded in 1884 as the first public college for women in America. Columbus Air Force Base, one of only four Air Force pilot training facilities in the United States, is located north of the city. Columbus Lake, formed by the John C. Stennis Lock and Dam of the Tennessee-Tombigbee Waterway, is nearby. East Columbus is separated from Columbus proper by Luxapallila Creek, which runs through the city. The "Lux", as it is locally known, joins the Tombigbee about three miles south of downtown.

Peter Cada, Tetra Tech, Inc.

Luxapallila Creek



Janet Chapman, MDEQ

Natchez Trace over the Tennessee-Tombigee Waterway

Natchez Trace Parkway

Janet Chapman, MDEQ

Bynum Indian Mounds on Natchez Trace

The Natchez Trace Parkway, with its visitors center headquartered in Tupelo, is a historic 444-mile highway between Natchez, Mississippi and Nashville, Tennessee, that follows the historic Natchez Trace. It began as a trail traveled by Indians over 8,000 years ago. During the eras of French, British and American settlement, the Natchez Trace was one of the main routes between the interior highlands of the south-central United Sates and the lower Mississippi River Valley. The Parkway is a tribute to the original Natchez Trace, and links many parks and historic sites along its route. The Natchez Trace Visitors Center is open year-round and provides exhibits and displays for travelers. One such display is the Chickasaw Village, site of an 18th century Chickasaw Indian Settlement, located four miles south of the Visitors Center. Interpretive signs at the site describe a Chickasaw's daily life and the early tribal history. A nature trail features plants used by the Indians.

Special Plants and Animals of the Tombigbee and Tennessee

The rivers and streams of the Tombigbee and Tennessee River Basins are home to an astounding variety of freshwater species, and are among the most biologically diverse river systems in the United States, particularly for fish and mussels. The Tombigbee and Tennessee River Basins also provide homes to several endangered plants and animals. A large number of species of turtles and aquatic snails inhabit their waters. Good water quality and protection of habitat are essential to support these species.

While these basins support abundant and diverse plants and animals, there are some species that have dwindled in numbers. In most cases, they have special needs that compete with our uses of the land. Many require habitats that are found only in the Tombigbee and Tennessee River Basins. The mussels and fish need clear, silt-free water to survive. Some, like the bald eagle, are susceptible to toxic chemicals. Others, like Price's potato bean, reproduce poorly to start with and cannot find new places to live quickly enough when their habitat is disturbed. As we learn what leads to the decline of certain species, we can take the necessary steps to help sustain and restore them.

Mussels

Freshwater mussels are the "poster creatures" for endangered species in these two river basins. Over 50 species are found here, demonstrating the incredible biodiversity this region supports. Yet over one-fourth are considered endangered or threatened by the federal government and the State of Mississippi. Some, such as the black clubshell (*Pleurobema curtum*) are found only in Mississippi. Because of their sensitivity, mussels are a good indicator to watch for early signs of water quality problems; they require good quality water, stable habitat, and are highly sensitive to siltation. The construction of the Tennessee-Tombigbee Waterway provided benefits to recreation and the economy of the region, but channel dredging had a detrimental effect on mussels found there.

Jerry Litton

Black Clubshell, *Pleurobema curtum*

Jerry Litton

Crystal darter, *Cystallaria asprella*

Fish

The Tombigbee and Tennessee River Basins are home to over 115 species of fish, many of which are considered endangered by the State of Mississippi. Those that are endangered come from three different families of fish—minnows, catfish, and darters. Yet they all have two interesting things in common—all are small fish (three to six inches) and they all need clear streams with sand and gravel bottoms. Most have been impacted by sedimentation and turbidity. Land management practices that control erosion help protect these fish.

Salamanders

The cave salamander (*Eurycea lucifuga)*, spring salamander (*Gyrinophilus porphyriticus)*, and green salamander (*Aneides aeneus*) are found in a very small area of the Tennessee River Basin around Tishomingo State Park. All three of these salamanders live on the land, but need to stay damp to survive. They live under logs and in rock crevices, eat insects for food, and attach their eggs to the undersides of rocks.

Jerry Litton

Cave salamander, *Eurycea lucifuga*

Bats

Most people think bats are creepy, and they are often shown as harmful bloodsuckers in movies. However, this is an inaccurate depiction of these mammals. Two federally endangered bats are found in the Tennessee River Basin, the gray bat (*Myotis grisescens*) and the Indiana bat (*Myotis sodalist*). Both hibernate and breed in other states, but migrate here in the summer. They feed over streams and rivers, eating up to half their body weight in insects every night!

Jerry A. Payne, USDA ARS, Bugwood.org

Gray bat, *Myotis grisescens*

Jerry Litton

Black-knobbed Sawback Turtle, *Graptemys nigrinoda*

The knobs on the back of this turtle look like teeth on a saw. The sawback prefers large streams and rivers, and loves to bask in the sun on sandbars and logs. In Mississippi, it is found along the Tombigbee and Noxubee rivers, and is considered endangered. Much of its habitat has been altered or destroyed by construction of the Tennessee-Tombigbee Waterway. It is also threatened by people who collect them for the pet trade, and by others who indiscriminately shoot them.

Price's Potato Bean, *Apios princeana*

This federally threatened vine grows to 15 feet, blooms with beautiful flower clusters, and is often found on bluffs near streams. It gets its name, "potato bean", from two different features—the seeds look like beans and the vine grows from a tuber that looks like a potato. Pioneers and Native Americans who used the tubers as a food source inadvertently contributed to the plant's decline. In Mississippi, Price's Potato Bean is found only in the Tombigbee River Basin. Efforts to save this rare plant focus on protecting areas where it is found.

Matthew Miller, The Nature Conservancy

Bill Stripling

Bald Eagle, *Haliaeetus leucocephalus*

This majestic creature, our national bird, became threatened by the effects of DDT, a pesticide widely used in the U.S. until it was banned in the 1970s. It is a huge bird, with a wingspan of over six feet. Bald Eagles live near large bodies of water. Their incredibly sharp vision and powerful bodies enable them to swoop down and snatch fish out of the water with their piercing talons. They also eat reptiles, small mammals, and other waterfowl. In 1992, 30 young bald eagles were released along the length of the Tennessee-Tombigbee Waterway, and they are beginning to flourish—from nests along the waterway 60 bald eagles have hatched and become fledglings. The Bald Eagle was recently removed from the federal endangered species list by the U. S. Fish and Wildlife Service.

Other Special Animal Species

Mussels

- Alabama Moccasinshell, *Medionidus acutissimus*
- Black Clubshell, *Pleurobema curtum*
- Cumberland Combshell, *Epioblasma brevidens*
- Delicate Spike, *Elliptio arctata*
- Kidneyshell, *Ptychobranchus fasciolaris*
- Monkeyface, *Quadrula metanevra*
- Orange-Nacre Mucket, *Lampsilis perovalis*
- Ovate Clubshell, *Pleurobema perovatum*
- Purple Wartyback, *Cyclonaias tuberculata*
- Slabside Pearlymussel, *Lexingtonia dolabelloides*
- Snuffbox, *Epioblasma triquetra*
- Southern Clubshell, *Pleurobema decisum*
- Southern Combshell, *Epioblasma penita*
- Southern Pink Pigtoe, *Pleurobema taitianum*
- Southern Round Pigtoe, *Pleurobema marshalli*
- Stirrupshell, *Quadrula stapes*

Gary Peeples, U.S. Fish and Wildlife Service, Bugwood.org

Monkeyface Mussel, *Quadrula metanevra*

Gary Peeples, U.S. Fish and Wildlife Service, Bugwood.org

Snuffbox Mussel, *Epioblasma triquetra*

Small Fish

- Bigeye Shiner, *Notropis boops*
- Greenside Darter, *Etheostoma blennioides*
- Frecklebelly Madtom, *Noturus munitus*
- Suckermouth Minnow, *Phenacobius mirabilis*
- Slender Madtom, *Noturus exilis*
- Slenderhead Darter, *Percina phoxocephala*
- Crystal Darter, *Crystallaria asprella*

Jerry Litton

Frecklebelly Madtom, *Noturus munitus*

Others Species

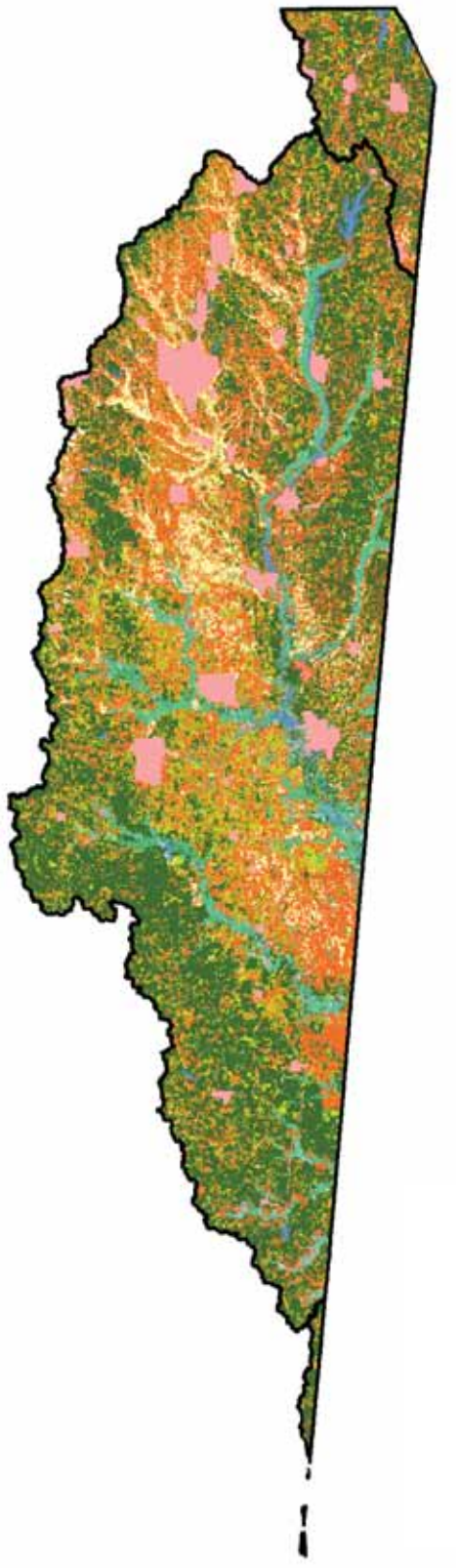
- Alabama Sturgeon, *Scaphirhynchus suttkusi*
- Bewick's Wren, *Thryomanes bewickii*
- Wood Stork, *Mycteria Americana*

Jerry Litton

Slenderhead Darter, *Percina phoxocephala*

Land Use and Its Effects on Water Quality in the Tombigbee and Tennessee River Basins

Our water is affected by our day-to-day activities. Urban areas, highways, forests, wetlands, and agriculture all have different influences on the amount and quality of water that runs off into streams and rivers. The Tombigbee and Tennessee River Basins have similar stories about land use, with forests and pasture dominating the landscape. Yet there are subtle differences and variations.



Peter Cada, Tetra Tech, Inc.

Timber operations

Janet Chapman, MDEQ

Forests

Northeast Mississippi, one of our nation's major furniture manufacturing areas, is home to mixed forests of oak, hickory, and pine. The 66,600 acre Tombigbee National Forest is located in the southwest corner of the Tombigbee Basin. The central portion of the Tombigbee, called the Black Belt Prairie for the rich dark soils found there, is a gently rolling lowland that supports hardwoods such as sugar maple, which can tolerate the high limestone content of the soil. Areas next to the Black Prairie support a mix of sweet gum, oak, and juniper. Much of the original forests have been replaced with stands grown for timber. Now a mix of pines and hardwoods produce lumber and wood pulp products. Regrowing forests are so common that they make up about 15% of the land in each of the two basins. Erosion and runoff from unprotected clearcuts can increase sediment into the streams, destabilize stream channels, and substantially reduce or eliminate aquatic habitat. To protect water quality, MDEQ and the Mississippi Forestry Commission (MFC) offer guidance for road building and tree harvesting, such as improved stream crossings, stream buffers, and select cutting.

Wetlands are among a river's greatest assets, and Mississippi's wetland management goal is no net loss of wetlands. Occupying about 1% of the land area in the Tombigbee and Tennessee River Basins, wetlands filter pollutants, replenish ground water and stream flow, and reduce flooding by storing stormwater like sponges. 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.

Janet Chapman, MDEQ

Great egret on the prowl

Janet Chapman, MDEQ

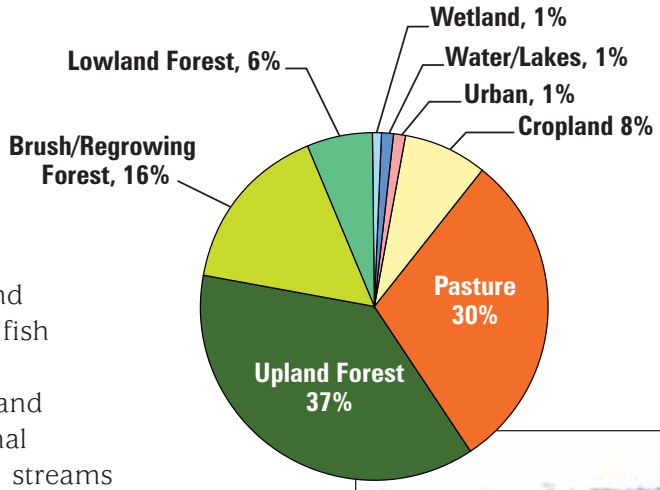
Water lilies at Noxubee Wildlife Refuge

Agriculture

Farming is another important land use in these basins. Pasture and rangeland are prevalent throughout both basins, taking up about 30% of the land area. Livestock production forms the backbone of the rural economy, with 230,000 head of cattle in the two basins. One source of stress to water

quality is cattle access to streams; the stream banks and channels often become unstable and erode, loading sediment into the stream. The sediment is washed further downstream, covering the bottom and eliminating habitat for fish and other aquatic life. Additionally, nutrients and bacteria from the animal wastes can get into the streams causing low dissolved oxygen levels and other water quality problems. The Basin Team for the Tombigbee and Tennessee River Basins is working with the farming community on these problem areas through the use of pollutant reduction management practices, fencing to limit cattle access to streams, improved stream crossings, prescribed grazing, and other best management measures.

Tombigbee River Basin

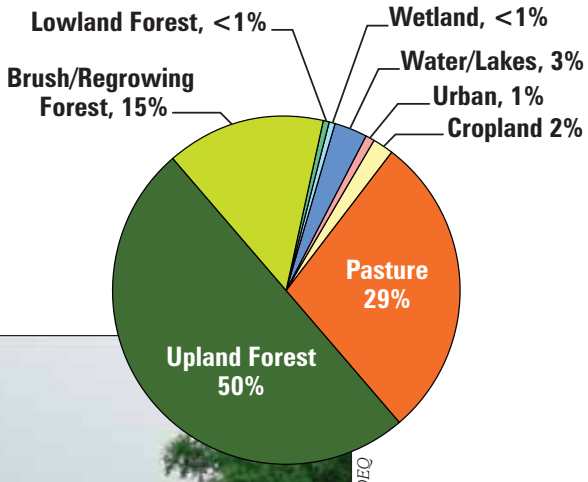


Janet Chapman, MDEQ

Nutrients are essential for plant and animal growth. However, excessive amounts of nitrogen and phosphorus can stimulate harmful blooms of algae and other aquatic plants in water bodies. These blooms can harm fish and other aquatic life by reducing dissolved oxygen to levels that are not adequate to support aquatic life.

The fertile soils in the Black Belt Prairie portion of the Tombigbee River Basin support a strong agricultural economy. Historically, large cotton plantations were a mainstay of this region, but today's farms support a diversity of activities. Most of the row crops grown in the basins are found here—soybeans, corn, and cotton. In recent years, state and federal agencies have stressed the need for soil conservation and best management practices, such as no-till farming, strategic tree planting, and vegetated stream buffers, which keep the topsoil in production and sediment out of the streams. Many of these same practices help reduce the runoff of nutrients from fertilizers, harmful pesticides, or other farm chemicals, which can attach to sediment and be carried by rain into our streams, rivers, and lakes.

Tennessee River Basin



Janet Chapman, MDEQ

Janet Chapman, MDEQ

Downtown Tupelo

Cities and Suburbs

The Tombigbee and Tennessee River Basins are sparsely populated in most areas, but there are a few significant urban and industrial centers, such as Tupelo, Columbus, and Starkville. Rapid growth is now occurring in Lee County which has added nearly 12,500 residents between 1990 and 2004—a 19% increase in population.

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. Urban runoff frequently contains higher amounts of pesticides, herbicides, and fertilizers from lawns and other managed landscapes. To help curb these impacts, the State now requires stormwater permits for many communities. Another source of nutrients is inadequate wastewater treatment from septic systems in areas without sanitary sewer systems.

Cities and towns bring industry, and these industries often generate pollutants as byproducts. If improperly managed, these pollutants can negatively impact our streams and air. Both water and air discharges are regulated by MDEQ through permits to limit them to acceptable levels.

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 erosion can clog streams

Janet Chapman, MDEQ

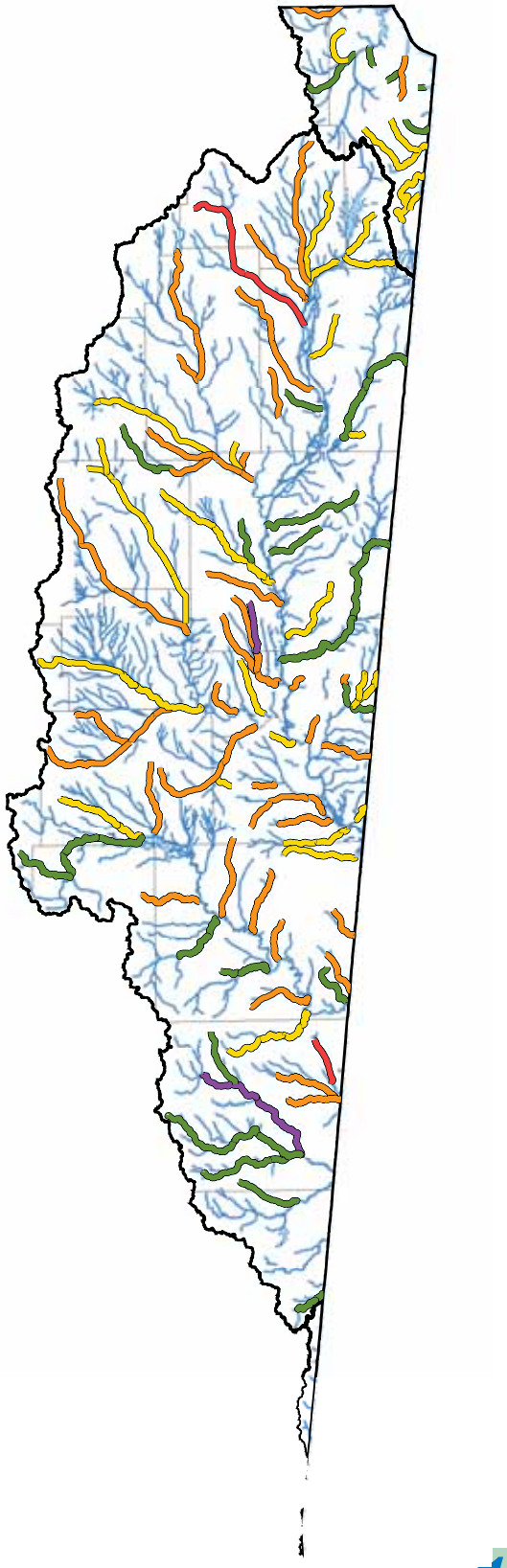
Polluted runoff comes from many scattered sources. As runoff from rainfall moves over and through the ground, it picks up and carries natural and man-made pollutants, and deposits them into streams, lakes, wetlands, coastal waters, and even underground aquifers. Runoff from yards washes excess fertilizer,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

Water Quality
in the Tombigbee and Tennessee River Basins

Surface Water Quality

In the past, what was known about the condition of water bodies in the Tombigbee and Tennessee Basins was limited to a few well-studied lakes and streams. Recent monitoring has provided a better understanding of water quality conditions across both basins.

In the Tombigbee Basin, 25% of monitored streams are rated good or very good and adequately support aquatic life (from aquatic insects to fish). The presence of the many fish and mussel species found in the Tombigbee is a direct indicator of high quality water where they are found. Another 33% are rated fair. These have aquatic life that is only somewhat impacted by pollution. Of major concern are the 42% of streams in poor or very poor condition, where the aquatic life is limited and significantly impacted by nonpoint source pollution. These impacts are mostly from



Janet Chapman, MDEQ

Algae in pond due to nutrient enrichment

historical and current agricultural practices, primarily in the heavily cultivated Black Belt Prairie.

In the Tennessee Basin, 46% of its streams are rated good or very good and adequately support aquatic life. Another 46% are rated fair. Of major concern are the 8% of streams in poor or very poor condition, where the aquatic life is limited and significantly impacted by pollution.

In both basins major pollutants and their sources include excessive nutrients and bacteria from animal wastes and inadequate septic systems, and excessive sediment from eroding lands (crop and pasture land, timber operations, and new development).

There are no fish consumption advisories on any streams, rivers, or lakes in either the Tombigbee or Tennessee Basins.

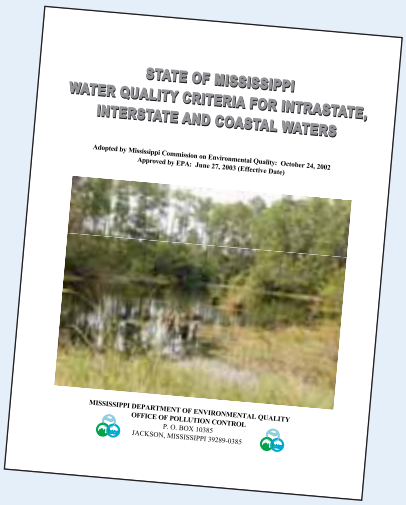
How can I learn more?

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

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 use categories*** 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 to protect each designated use. Monitoring is used to compare actual conditions to the criteria to determine whether the waters are supporting their designated uses. The criteria are also used to set limits on the amount of pollutants 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.

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 80 water body segments in the Tombigbee and Tennessee River Basins. Most of these TMDLs state the estimated amount of bacteria, persistent pesticides or sediments 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 20 TMDLs will be developed by 2008 for the water bodies remaining on the state's List of Impaired Water Bodies in the Tombigbee and Tennessee River Basins. Table 1 provides a summary of completed and needed TMDLs in both basins.

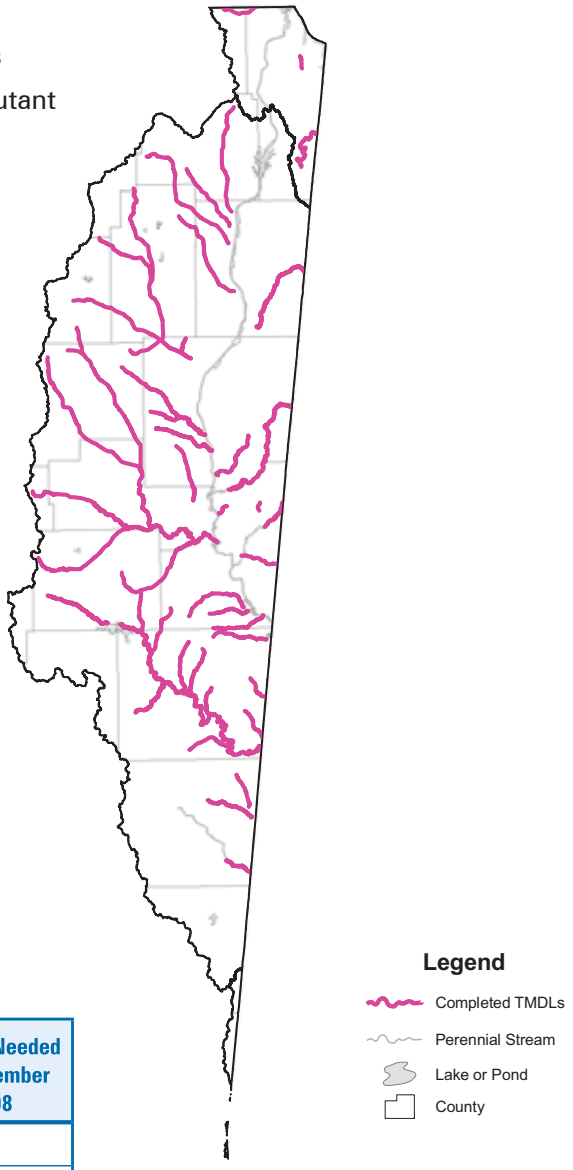


Table 1. Tombigbee and Tennessee TMDL Summary

	TMDLs Completed	TMDLs Needed by December 2008
Biological Impairment	0	1
Mercury	0	0
Metals (Aluminum, Copper, and Lead)	0	0
Miscellaneous*	1	0
Nutrients	4	9
Organic Enrichment/Low DO	6	8
Pathogens	19	1
Pesticides (including DDT and Toxaphene)	9	0
Sediment/Siltation	41	1
Toxicity (Total Toxics and Unknown Toxicity)	0	0
Total	**80**	**20**

*Miscellaneous: Cause Unknown

How can I learn more?

For more information on TMDLs, visit the MDEQ website at ***www.deq.state.ms.us***, or contact the MDEQ Office of Pollution Control, Surface Water Division, 601-961-5729.

Janet Chapman, MDEQ

Fountain near library at MSU

Drinking Water Protection

Ground water supplies most of the drinking water used in the Tombigbee and Tennessee River Basins. Although private domestic wells remain widely used in rural areas, most people in these basins have access to a public water supply. The Tombigbee and Tennessee Basins also contain two sources of drinking water drawn from surface waters. Tupelo draws a portion of its drinking water from the Tombigbee River and some communities in Tishomingo County obtain their water supply from the Yellow Creek Embayment within the Pickwick Lake Watershed.

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 level of protection that may be needed.

Most of the public drinking water wells in the Tombigbee and Tennessee Basins are deep and draw from aquifers protected naturally by thick layers of clay. Sampling of the public water wells throughout the basins has confirmed that ground water quality is good, although natural coloration issues can pose some problems locally. The basins' two surface water supplies, on the other hand, were ranked as highly susceptible to potential contamination due to the existence of nearby waste management facilities, petroleum storage sites, and transportation corridors.

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.

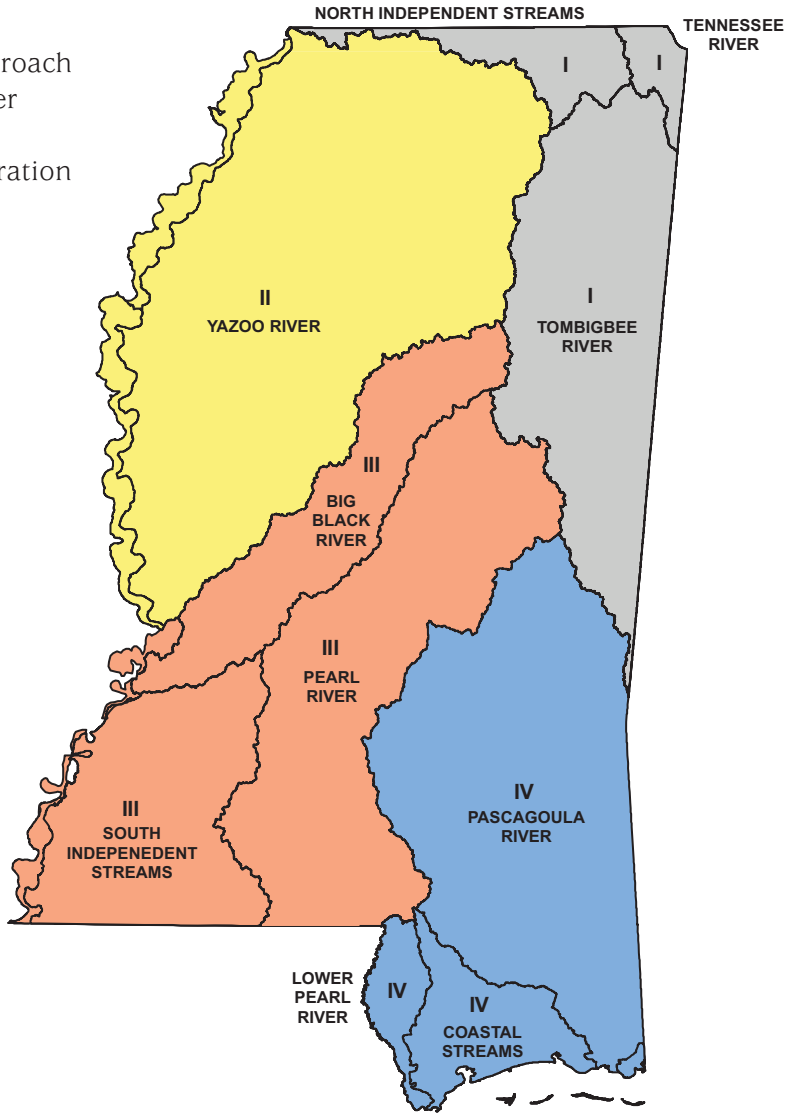
Before beginning work, a developer must obtain permits specifying temporary management practices that must be in place to keep excessive sediment from leaving a construction site. After construction is complete, permanent detention basins or similar measures may be required to treat the increase in stormwater 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.

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.	Yellow Creek Embayment (Pickwick Lake)
2.	Bear Creek
3.	Brown Creek
4.	Twenty Mile/Donivan Creek
5.	Town Creek
6.	Buttahatchee River
7.	Luxapallila Creek

Janet Chapman, MDEQ

Tombigbee and Tennessee Rivers Basin Team

Janet Chapman, MDEQ

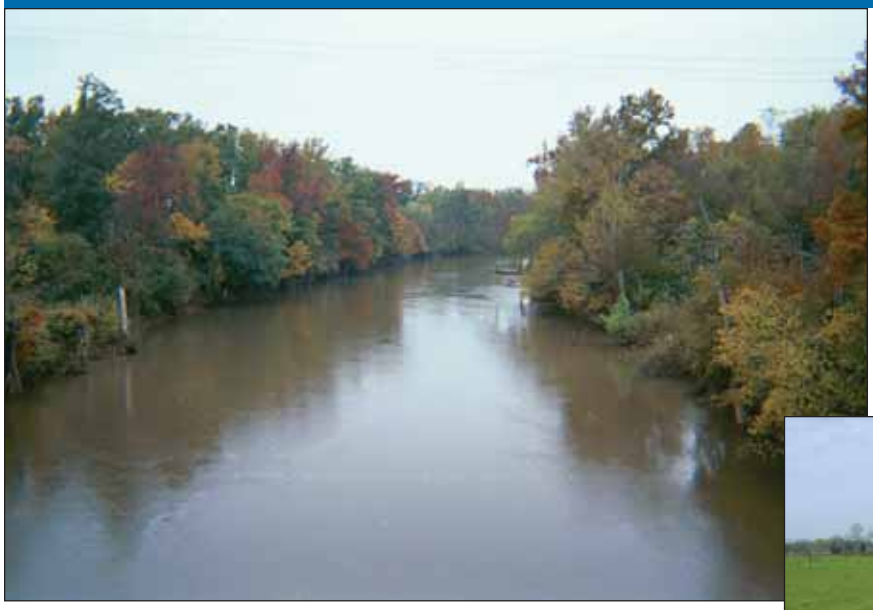
Fun in the waters of Pickwick Lake at JP Colelman State Park

A Basin Team of 28 local, state, and federal resource agencies, with strong input from the general public and active local stakeholder organizations, has established priority watersheds in the Tombigbee and Tennessee River Basins. The team reviewed information on the streams and lakes, and ranked watersheds based on the extent of water quality problems, resource value, seriousness of the threat, level of support for implementing management measures, and probability of success for a restoration or protection project. The ranking relied most heavily on resource value and risk or seriousness of the threat.

During 2004 in the Tombigbee River Basin, the Basin Team selected two priority watersheds—Buttahatchee River and Luxapallila Creek. In each of these priority areas, Watershed Implementation Teams (WITs) have completed action plans (called Watershed Implementation Plans) to address the identified water quality concerns, and are coordinating restoration and protection efforts throughout the watersheds. The Nature Conservancy, Mississippi Soil & Water Conservation Commission (MSWCC), local Soil and Water Conservation Districts (SWCDs), U.S. Fish and Wildlife Service, Natural Resources Conservation Service (NRCS), and other team members are currently implementing these plans. In the Tennessee River Basin, the Basin Team has identified the Yellow Creek Embayment Watershed of Pickwick Lake and the Bear Creek Watershed as two priority watersheds for restoration and protection. Highlights of the four priority watersheds follow.

Janet Chapman, MDEQ

Buttahatchee River at Hwy 373 looking eastward



K. Dean, EPA Region 4 Water Division

Buttahatchee River

Nothing to see here? This field has a nutrient management plan, helping to reduce water quality impacts to nearby waters.

Buttahatchee River

The Buttahatchee River begins in Alabama and flows southwestward to the Mississippi state line. From there, it forms the boundary between Monroe and Lowndes counties, and flows to its confluence with the Tombigbee River. Throughout its 200 square mile watershed in Mississippi, the river maintains much of its wild and scenic character as it meanders though a landscape of agricultural and forest lands. Historically, agriculture has been the mainstay of the area's economy, but over the last 30 years forest products and diversified manufacturing have become major contributors. The Buttahatchee is a favorite fishing and boating site for residents and visitors of Northeast Mississippi.

Most of the Buttahatchee River in Mississippi is impaired by fecal coliform from agricultural runoff, cattle access to streams, and failing septic systems. Sediment eroding from steeper slopes on hayland and pastureland is also a major source of siltation in streams and is impacting rare and endangered mussels and other aquatic animals. The Buttahatchee and its tributaries support 37 mussel species, including the last known reproducing populations of two state-listed endangered mussels and four federally-listed endangered mussels.

Another source of water quality impacts is sand and gravel mining, which has occurred along the Buttahatchee River in Lowndes County for decades. Downstream of U.S. Highway 45 many old sand and gravel pits have been captured by the river and the channel has become wide and unstable. The river channel has begun widening upstream of Highway 45 as well due to head cutting, which appears to have been caused by the mining activities.

MDEQ has completed a total maximum daily load (TMDL) for fecal coliform to set pollutant reduction goals. A multi-state Watershed Implementation Team of 16 partners led by The Nature Conservancy is implementing projects and activities to

restore the Buttahatchee River. Since 2004, projects completed by the Watershed Implementation Teams include:

- Two livestock watering ponds and tanks
- Over 23,000 feet of fencing to limit cattle access to streams
- Inventory of failing septic systems
- Development of a Conservation Area Plan
- 1,250 acres of prescribed grazing
- Inventory of silviculture BMPs
- 1,500 acres of nutrient management
- 1,240 acres of pasture and hayland planting

Livestock feeding station helps concentrate cattle in one area, thereby reducing overall impacts to nearby fields and streams

How can I learn more and get involved?

Successful restoration efforts in the Buttahatchee River watershed will preserve the plants, animals and natural communities for future generations of Mississippians, retaining its place as a boating and fishing mecca. If you would like to help restore the Buttahatchee or would like more information about the team's efforts, contact Matthew Miller, Watershed Implementation Team Leader (662-844-1885 or matthew_miller@tnc.org).

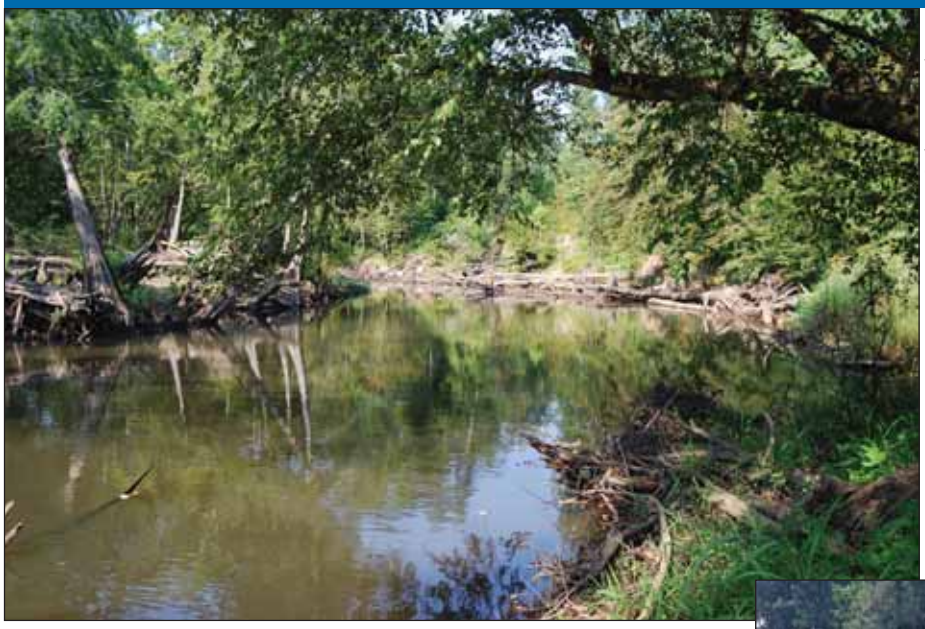
Peter Cada, Tetra Tech, Inc.

Luxapallila Creek

Luxapallila Creek

Luxapallila Creek, or the "Lux" as it is called locally, begins in Marion County, Alabama and flows into Lowndes County, Mississippi. The Luxapallila (a Choctaw Indian word meaning "turtles crawl there") drains more than 790 square miles of farmlands and forests as it flows southwestwardly to the Tombigbee River. It provides habitat for more than 100 fish species, including the walleye and several threatened and endangered species. The Luxapallila in Missisippi has excellent water quality and a non-impaired status.

Mississippi and Alabama are coordinating efforts for protecting Luxapallila Creek's water quality and its threatened and endangered species. The Luxapallila Creek Watershed Alliance has been formed as the Watershed Implementation Team, and is made up of nine partner agencies and



Peter Cada, Tetra Tech, Inc.

Luxapallila Creek

Peter Cada, 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 the steams.

organizations led by Mississippi State University's Water Resources Research Institute. The Alliance completed the Luxapallila Creek Watershed Implementation Plan in 2004 and they are working to achieve the following goals:

- Maintain existing populations of threatened and endangered native mussel species in the watershed
- Address sedimentation, erosion and fecal coliform issues within the Luxapallila Creek
- Continue to achieve or exceed state water quality standards in the Luxapallila Creek and its tributaries

Since 2004, the Alliance has conducted planned actions which include:

- Farmer education and farmland BMP implementation
- Aerial survey of silvicultural activities, evaluation of risk from recently harvested forest tracts, and landowner contact and education for tracts at risk
- Survey of failing septic system locations
- Mussel population survey
- Stream bank stabilization

How can I learn more and get involved?

The Luxapallila Creek Watershed Alliance is a collaborative Alabama/Mississippi initiative working to protect and preserve the scenic beauty and aquatic habitats of this important natural resource. To help restore and protect the Luxapallila Creek Watershed, contact Mary Love Target with the Mississippi State Water Resources Research Institute (662-325-8081 or mltagert@cfr.msstate.edu).

Peter Cada, Tetra Tech, Inc.

Yellow Creek Embayment (Pickwick Lake)

Peter Cada, Tetra Tech, Inc.

Field terracing traps sediment in runoff during storms

Yellow Creek Embayment (Pickwick Lake)

Pickwick Lake is a large impoundment of the Tennessee River reaching from Tennessee to Alabama. The Yellow Creek Embayment watershed of Pickwick Lake is located in northern Tishomingo County, and drains 45 square miles. The Tenn-Tom Waterway connects to the Tennessee River via Yellow Creek. The Yellow Creek embayment is classified as a public water supply, providing drinking water for the Short-Coleman Water Association. The watershed is mainly forested, but its soils erode easily and pose a risk for siltation in streams and the embayment.

MDEQ is partnering with the Mississippi Rural Water Association, Tennessee Valley Authority and the Short-Coleman Water Association to develop the Short-Coleman Source Water Protection Plan for the Yellow Creek Embayment and the drinking water intake. Under the leadership of Randy Turnage of Mississippi Rural Water Association, a source water protection team is being formed to help develop and implement the source water protection plan. Currently the team is identifying businesses, landowners and local governments interested in working on the source water protection plan.

How can I learn more and get involved?

A clean, protected drinking water source has direct benefits for the communities of Northeast Mississippi and for their citizens, workers, visitors and business leaders. If you would like to help protect the Short-Coleman drinking water source or would like more information about the team's efforts, you may contact Damien Simbeck, Watershed Implementation Team Leader (256-386-2543 or djsimbeck@tva.gov).

Janet Chapman, MDEQ

Bear Creek at Natchez Trace Parkway

Peter Cada, Tetra Tech, Inc.

Bank stabilization reduces risk of stream bank erosion and collapse

Bear Creek

Bear Creek is located in Tishomingo and Itawamba counties in Mississippi, draining 149 square miles before entering Alabama. It flows through Tishomingo State Park and is a favorite canoeing destination for Mississippians and visitors to the state. Much of Bear Creek is surrounded by a beautiful landscape of fern-filled crevices and massive boulders blanketed in moss. Bear Creek is designated as a Mississippi Scenic Stream under the Mississippi Scenic Streams Stewardship Program, administered by the MS Department of Wildlife, Fisheries and Parks.

Bear Creek has a proposed total maximum daily load (TMDL) for biological impairment due to sediment. Sediment erosion is a major source of siltation in streams and impacts aquatic animals that live in them. Sources of sediment include cropland and pasture, forestry operations, construction sites, and surface mining. MDEQ is partnering with the Tennessee Valley Authority, U.S. EPA Region 4, U.S. Fish & Wildlife Service, Natural Resources Conservation Service, MS Department of Wildlife, Fisheries & Parks, MS Soil & Water Conservation Commission, and the Mississippi chapter of The Nature Conservancy to restore and protect the natural resources and water quality of Bear Creek.

How can I learn more and get involved?

The Tennessee Valley Authority (TVA) is leading the effort in the Bear Creek Watershed and engaging local stakeholders to address water quality issues with on-the-ground activities. The Pickwick Lake Watershed Team has been formed to work in the Yellow Creek Embayment and Bear Creek area. If you want to join the Team or would like additional information, please contact Damien Simbeck, Watershed Implementation Team Leader (256-386-2543 or djsimbeck@tva.gov).

Mississippi Scenic Streams Stewardship Program

The Mississippi Scenic Streams Stewardship Program began in 1999 and encourages voluntary conservation efforts by streamside landowners to maintain scenic values and streambank stability. The program's goal is to educate landowners and encourage them to adopt practices that help maintain good water quality and stable banks. The use of forestry BMPs by streamside landowners helps to maintain streams for future generations as productive fish and wildlife habitat and as recreational assets. Scenic stream nomination depends on support from landowners and nearby citizens.

Bear Creek in the Tennessee River Basin received a Mississippi Scenic Stream designation in 2005. The Tombigbee River (East Fork) in Itawamba County has been nominated and is under consideration for a scenic stream designation.

If you would like additional information on the Mississippi Scenic Streams Stewardship Program, please contact Andrew Whitehurst (601-354-7303 or Andrew.whitehurst@mmns.state.ms.us).

William Vinson, TRVWMP

Town Creek

New Watershed Planning and Local Team Building Efforts

In November 2006, the basin team identified three additional priority watersheds in the Tombigbee River Basin—Town Creek, Brown Creek, and Twenty Mile/Donivan Creek. Restoration and protection activities may be conducted in these watersheds in the future. The basin team wants input from stakeholders about their concerns and interest in these watersheds.

William Vinson, TRVWMP

Brown Creek

If you would like to share your interest and concerns regarding these or any other watersheds in your area, or if you would like to have the Tombigbee-Tennessee Rivers Basin Coordinator come to speak with your organization, please contact Janet Chapman, Tombigbee-Tennessee Rivers Basin Coordinator at 601-961-5266 or janet_chapman@deq.state.ms.us.

William Vinson, TRVWMP

Twenty Mile Creek

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 Tombigbee and Tennessee River Basins' 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, 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:

State of Mississippi Agencies

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 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 Forestry Commission (MFC)
601-359-1386 *www.mfc.state.ms.us*

Mississippi Soil and Water Conservation Commission (MSWCC)
601-354-7645 *www.mswcc.state.ms.us*

Mississippi State Department of Health, Bureau of Environmental Health (MSDH/BEH)
601-576-7400 *www.msdh.state.ms.us*

Mississippi State University Cooperative Extension Service (MSU/CES)
662-325-8747 *msucares.com*

Mississippi State University Water Resources Research Institute (MSU/WRRI)
662-325-8081 *www.wrri.msstate.edu*

United States Government Agencies

Tennessee Valley Authority (TVA)
601-386-2543 *www.tva.gov*

U.S. Army Corps of Engineers, Mobile District (USACE)
251-694-3857 *www.sam.usace.army.mil*

U.S. Department of Agriculture Farm Service Agency (USDA/FSA)
601-965-4300 *www.fsa.usda.gov*

U.S. Department of Agriculture Forest Service (USDA/FS)
601-965-4391 *www.fs.fed.us*

U.S. Department of Agriculture Natural Resource Conservation Service (USDA/NRCS)
601-965-4139 *www.ms.nrcs.usda.gov*

U.S. Department of Agriculture Rural Development (USDA/RD)
601-965-5460 *www.ms.rd.usda.gov*

U.S. Department of Commerce, National Oceanic and Atmospheric Administration Coastal Services Center (NOAA)
228-688-1701 *www.csc.noaa.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. Geological Survey (USGS)
601-965-2900 *www.usgs.gov*

Stakeholder Organizations

Alabama Clean Water Partnership
334-514-8326 *www.cleanwaterpartnership.org*

Mississippi Association of Soil and Water Conservation Districts (SWCDs)
601-354-7645 *www.mswcc.state.ms.usmacd*

Mississippi Farm Bureau Federation
601-877-4238 *www.msfb.com*

Mississippi Land Trust
662-686-3375 *www.wildlifemiss.org*

Noxubee Wildlife Refuge Management Office
662-323-1125 *www.nwr.fws.gov*

Tenn-Tom Waterway Development Authority
662-328-3286 *www.tenntom.org*

The Nature Conservancy (TNC) in Mississippi
601-713-3355 *www.nature.org/wherewework/northamerica/states/mississippi*

Tombigbee River Valley Water Management District
662-842-2136 *www.mswater.org/management*

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

Storm drain marking

Janet Chapman, MDEQ

What You Can Do To Protect Your Watershed:

- Mulch your garden—mulching conserves water, moderates soil temperatures, and controls weeds.
- Return your old car battery when buying a new one.
- Water slowly and thoroughly. Over-watering wastes water and can carry pollutants such as pesticides 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 up a water body in your area.
- Donate trees to a school or park. Trees generate oxygen while consuming carbon dioxide, provide shade and cooling, reduce stormwater runoff, process pollutants, and add beauty.

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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