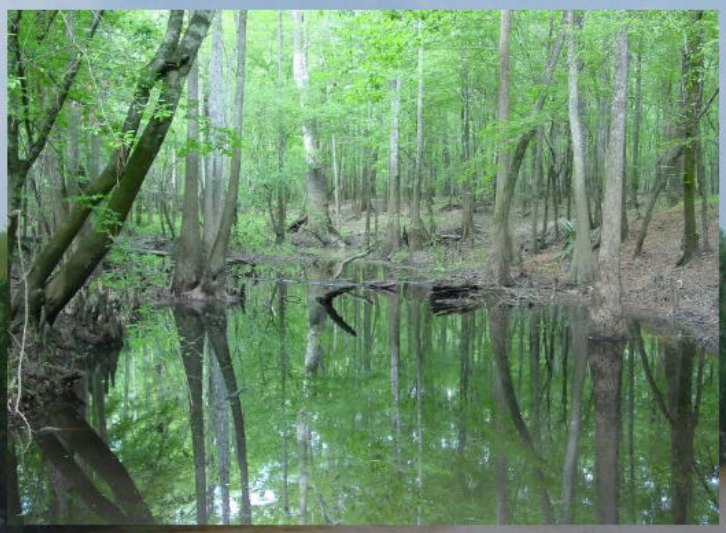
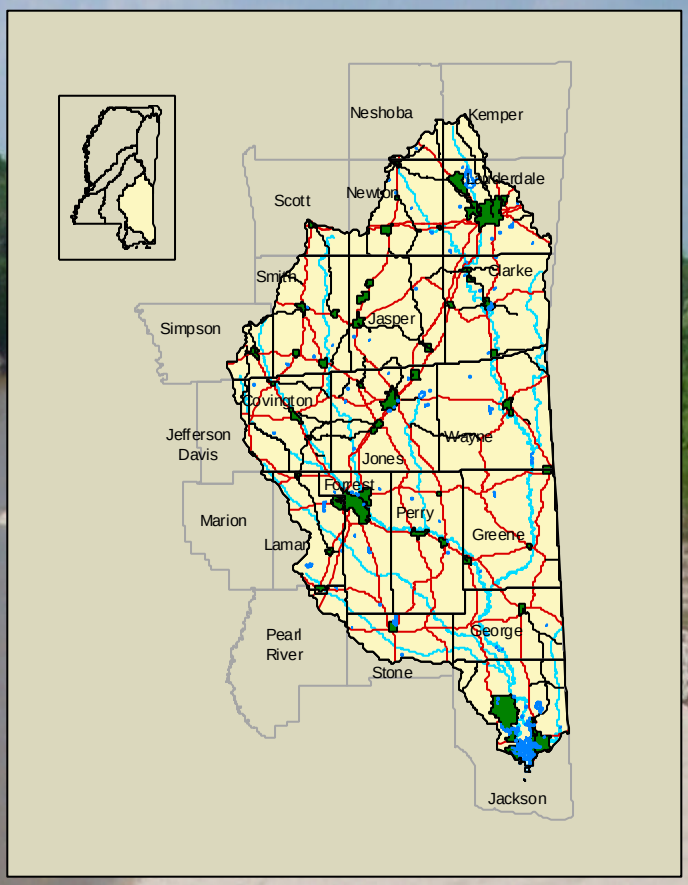
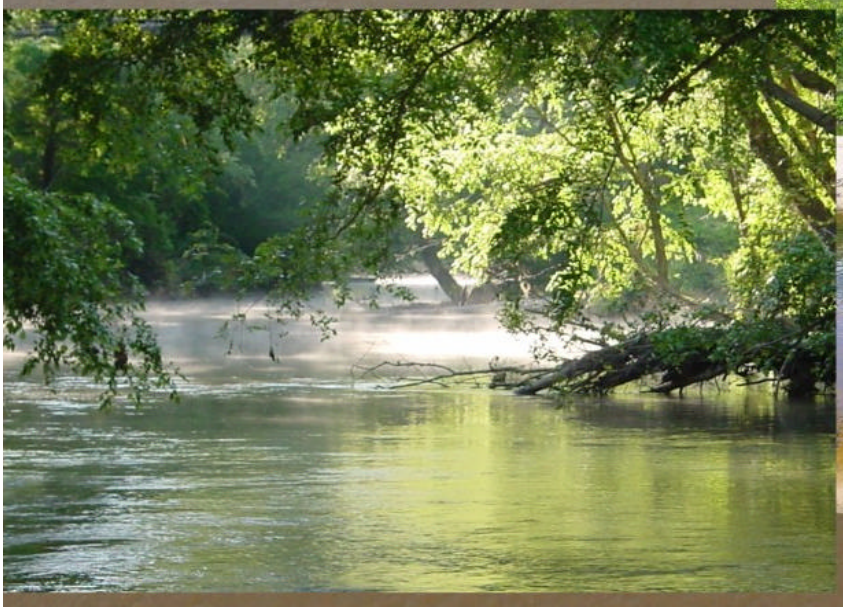





# Pascagoula River Basin Status Report 2001



**Cover Photographs (clockwise, from top left):**

The background cover photo was taken on the Leaf River at Highway 98 in Greene County. The Leaf River drains the western half of the basin.

The upper left cover photo was taken in a hardwood swamp near the Pascagoula River at Merrill. These cypress and tupelo gum swamps provide habitat for a number of wildlife species.

The upper right cover illustration depicts the boundary of the Pascagoula River Basin, as well as county lines, major roads, and major streams and lakes in the basin.

The lower right cover photo was taken on Black Creek in southern Forrest County. Black Creek is the only federally designated Wild and Scenic Stream in the state.

The lower left cover photo was taken on Bowie Creek in Covington County. Many of the streams in the basin are used for recreational purposes.

# ACKNOWLEDGMENTS

This document is a product of the Pascagoula River Basin Team, which consists of representatives from twenty-six state and federal agencies, and was developed under the leadership of the Basin Management Approach staff of the Mississippi Department of Environmental Quality (MDEQ). The Pascagoula River Basin Team consists of the following resource agency partners:

State of Mississippi Agencies

Agriculture and Commerce (MDAC)
Agricultural and Forestry Experiment Station (MAFES)
Bureau of Plant Industry (MDAC/BPI)
Development Authority (MDA)
Emergency Management Agency (MEMA)
Environmental Quality (MDEQ)
Forestry Commission (MFC)
Health (MSDH)
Marine Resources (MDMR)
Mississippi – Alabama Sea Grant Consortium (MASGC)
MSU Extension Service (MSU/ES)
Pat Harrison Waterway District (PHWD)
Soil & Water Conservation Commission (MSWCC)
Transportation (MDOT)
University of Southern Mississippi (USM)
University of Southern Mississippi, College of Marine Science, Gulf Coast Research Lab (GCRL)
Wildlife, Fisheries, and Parks (MDWFP)
Wildlife, Fisheries, and Parks, Museum of Natural Science (MMNS)
Water Resource Research Institute (MWRRI)

United States Government Agencies

Army Corps of Engineers, Mobile District (USACOE)
Agricultural Research Service, National Sedimentation Lab (USDA/ARS/NSL)
Environmental Protection Agency, Gulf of Mexico Program (EPA/GOMP)
Environmental Protection Agency, Region 4 (EPA/R4)
Fish and Wildlife Service (USFWS)
Forest Service (USDA/USFS)
Geological Survey (USGS)
Natural Resource Conservation Service (USDA/NRCS)

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# INTRODUCTION

## What Is The Pascagoula River Basin Status Report?

Mississippi Department of Environmental Quality (MDEQ) manages its water programs on a basinwide scale and has established a process that coordinates the water assessment and management activities of numerous state and federal agencies. This process, the Mississippi Basin Approach to Water Quality Management, will culminate with the development of basin management plans for each of Mississippi's major river basins (Figure 1). The development of each of the basin management plans will be carried out in five successive phases, referred to as the Basin Management Cycle — Planning, Data Gathering, Data Evaluation, Management Plan Development, and Implementation (Figure 2). An early activity under the planning phase of the Basin Management Cycle is the preparation of a Basin Status Report. This document provides an overview of the Pascagoula River Basin, describes the basin's current water quality conditions, and identifies current assessment and management activities within the basin.

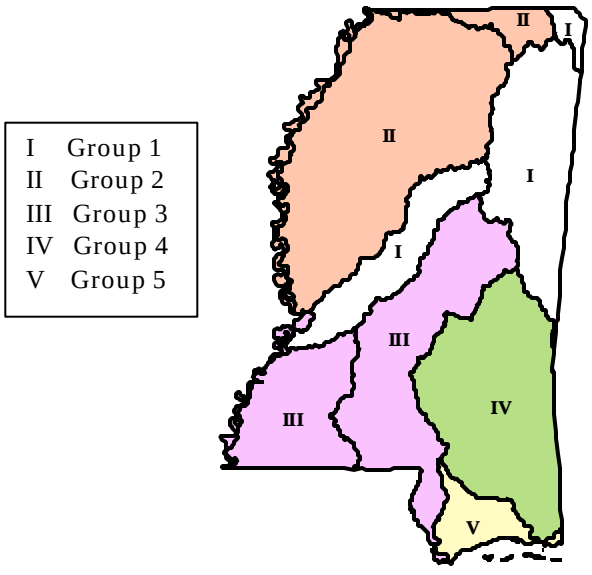



*Figure 1. Basin Management Groups under the Mississippi Basin Approach to Water Quality Management (MDEQ)*

| Basin Groups and Cycle Year | | |
|---|---|---|
| **Group** | **Basin** | **Year Started** |
| I | Big Black , Tombigbee, and Tennessee River Basins | 1998 |
| II | Yazoo River and North Independent Streams Basins, and adjacent tributaries of the Mississippi River | 1999 |
| III | Pearl River and South Independent Streams Basins, and adjacent tributaries of the Mississippi | 2000 |
| IV | Pascagoula River Basin | 2001 |
| V | Coastal Streams Basin | 2002 |

## What's Inside?

After this introduction, the report is divided into three major sections. Each section builds on the previous one to explain the condition of water resources within the Pascagoula River Basin.

The *first section* provides an overall description of the basin and its major features, including hydrology, land use characteristics, and biological features.

The *second section* summarizes how water quality in Mississippi is assessed and describes the current data collection efforts and research programs that are occurring within the basin. The status of the water quality conditions in the basin for ground water and surface water is reviewed. Additionally, this section identifies some of the activities that may affect water quality in the basin. Management needs that have been identified and future steps in the basin management cycle are also discussed.

The *third section* provides information on the current management programs that are used to assess and improve water quality conditions in the basin.

## Who Should Read This Document?

Everyone in the basin—from families living off the land to large and small business owners—can use the information in this report to better understand the current conditions of water resources in the basin, as well as activities designed to protect those resources. Local government officials can use this report to find out about water resource assistance programs. State and federal agencies can use the report to learn about existing data collection activities within the basin. Individuals and local organizations can use the report to identify potential causes of water quality problems in their community and learn how to get involved in local watershed protection activities.

The purpose of Mississippi's Basin Management Approach is to restore and protect the quality of the State's water resources by developing and implementing effective management strategies that address water quality issues while fostering sound economic growth. The process will culminate in the development and implementation of a basin management plan designed to address priority water resource problems in the basin. This status report is an early product of the process.

## How Is The Status Report Related To Other Basin Planning Activities?

Mississippi's Basin Approach to Water Quality Management, or Basin Management Approach, is an effort led by MDEQ to facilitate comprehensive water quality planning and to foster the implementation of practices that will result in water protection on a basinwide scale. This approach also works with state and federal agencies to coordinate water quality programs that depend on each other for success.

These activities include monitoring, assessment, problem identification and prioritization, planning, permitting, and implementation of best management practices. The key component of the Basin Management Approach is the coordination of these activities and the integration of information on a basinwide scale that will serve to better focus water quality protection efforts.

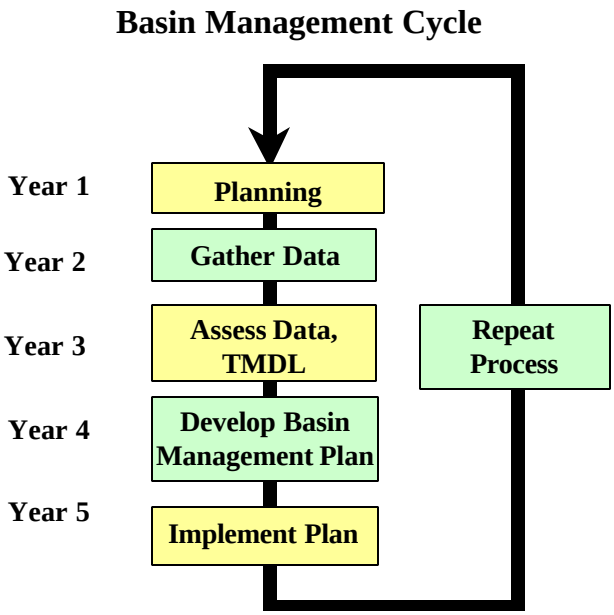



*Figure 2. Basin Management Cycle (MDEQ)*

The progression of water quality management activities in the basin will be based on a repeating five-year management cycle. During Year 1 of the Basin Management Cycle, water quality-related issues of concern in the basin are identified and prioritized, a Basin Status Report is prepared, and a Data Collection Plan is developed that focuses on gathering data and information on the priority issues of concern. During Year 2, the Data Collection Plan is implemented and the information is collected according to the direction of the plan. Year 3 activities focus on the interpretation of the collected and identified data, as well as coordination with development of water quality-related modeling applications. Year 4 addresses the development of a basin management plan and action strategy to address priority issues. Implementation of the management plan is the focus of Year 5.

# PASCAGOULA RIVER BASIN DESCRIPTION

## Where Is The Pascagoula River Basin?

The Pascagoula River Basin is the second largest basin in Mississippi at approximately 164 miles long and 84 miles wide and comprises most of southeastern Mississippi with a small part extending into southwestern Alabama. The Pascagoula River system drains an area of about 9600 square miles and eventually empties into the Gulf of Mexico. The Pascagoula River System is the last unimpeded major river system in the lower 48 states.

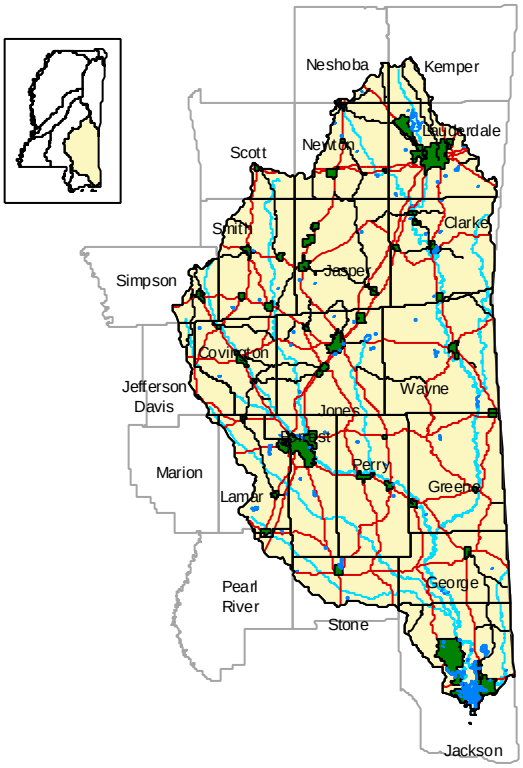



*Figure 3. Pascagoula River Basin (MDEQ)*

## What Are The Characteristics Of The Basin's Land Surface?

The Pascagoula River Basin is heavily forested throughout the entire river basin. The central portion of the basin is known as the Pine Belt because the Basin's forests consist mostly of pine forests with scattered hardwoods. Near the Gulf Coast, drainage areas are low-lying flatlands, forested wetlands, and marshlands. Farther inland, the basin consists primarily of gently rolling hills and broad, flat floodplains. The majority of the streams are deep to moderately deep, fast flowing perennial streams. Stream conditions are natural or unmodified in appearance with clear water. Some streams are considered "blackwater" streams because they are stained by tannic acid leached from vegetation. There are also several urban areas in the basin near population centers such as Meridian, Laurel, Hattiesburg, and Pascagoula.

### Pascagoula River Basin Statistics

Area: 9,600 square miles

Stream Miles: 15,045

Number of Counties: 22

Number of Sub-Basins: 8

2000 Census Population: ~717,000

## What Are The Water Resources In The Basin?

Sub-basins represent drainage areas for major river systems in a basin and provide useful boundaries for planning, assessment, and management activities. Eight major sub-basins are located in the Pascagoula River Basin (Figure 4).

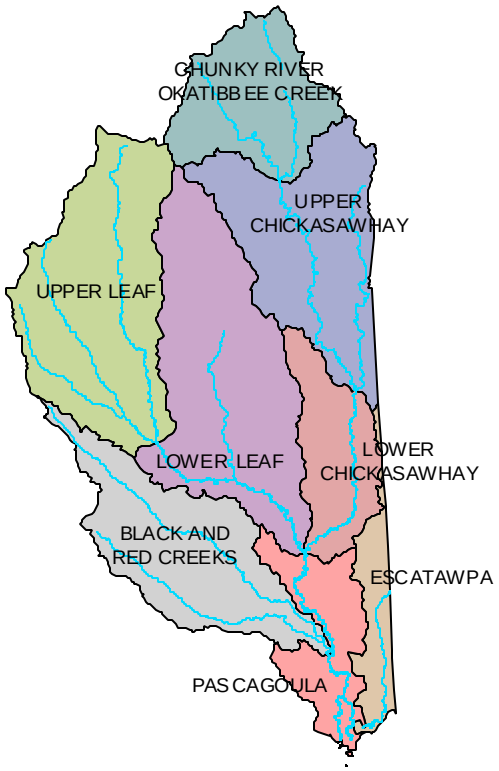



*Figure 4. Sub-basins of the Pascagoula River Basin (MDEQ)*

| Pascagoula River Basin Sub-basins | |
|---|---|
| Sub-basin | Area ($mi^2$) |
| Chunky-Okatibbee | 912 |
| Upper Chickasawhay | 1471 |
| Lower Chickasawhay | 657 |
| Upper Leaf | 1744 |
| Lower Leaf | 1827 |
| Pascagoula | 608 |
| Black - Red | 1292 |
| Escatawpa | 1059 |

## *Reservoirs and Lakes*

Numerous reservoirs and lakes can be found in the Pascagoula River Basin. In fact, EPA's First River Reach File has recognized 1680 lakes and ponds within the Basin. These lakes are significant natural and recreational resources. The Pat Harrison Waterway District manages eight flood control reservoirs that double as waterparks and two are also designated as water supply reservoirs. The Mississippi Department of Wildlife, Fisheries, and Parks manages nine State Fishing Lakes as well as two state park lakes within the Basin.

| Major Public Reservoirs and Lakes in the Pascagoula River Basin* | | |
|---|---|---|
| Waterbody | Watershed | Acres |
| Okatibbee Reservoir | Chunky-Okatibbee | 3800 |
| Bogue Homa | Lower Leaf | 1200 |
| Flint Creek | Black – Red | 600 |
| Little Black Creek | Black – Red | 600 |
| Archusa Creek | Upper Chickasawhay | 450 |
| Maynor Creek | Lower Chickasawhay | 450 |
| Turkey Creek | Chunky-Okatibbee | 250 |
| Big Creek | Lower Leaf | 150 |
| Dry Creek | Upper Leaf | 150 |
| Lake Perry | Lower Leaf | 125 |

*larger than 100 acres

## *Coastal Wetlands*

An important aspect of the Pascagoula River Basin is the role it plays in maintaining the health and diversity of the Mississippi Sound. The Mississippi Sound is an estuary that is largely a product of the rivers that feed it. The Pascagoula River Basin supplies a large portion of the fresh water entering the Mississippi Sound. In so doing, it replenishes nutrients and sediments that play a critical role in maintaining the productivity of the coastal waters. The sediment it carries maintains an extensive salt marsh habitat that in turn regulates the discharge of

nutrients to coastal waters. Marshes are effective filters, removing sediment and pollutants from the water, and at the same time are some of the most productive habitats in the world. Because the marshes are important for sustaining the coastal ecosystem, changes in marsh area, plant species, and bio-geological habitats adversely affect the water bodies that they help buffer.

Evolution of coastal wetland habitats through historical and pre-historical times has largely shaped the Mississippi coastal environment into what we see today. In addition to the prolific productivity and filtering capabilities, the physiography that they create is also beneficial. Protective bays and shallows are important habitats for seagrass, oysters, fish and shellfish. These landforms have evolved through time based primarily on the sediments carried by the rivers. Coastal erosion, river meandering or capture, and changes in river transport have markedly affected the geometry and geography of Mississippi's marsh habitats.

The total coastal marsh (below the 15ft contour) within Mississippi's Pascagoula River Basin is approximately 21,000 acres, making up roughly 35 percent of the total marsh habitat in Coastal Mississippi. From the 1950's to the 1990's, approximately 9,000 acres of coastal marsh were lost in Mississippi; of the total, 3,000 were lost in the Pascagoula River Basin.

## *Rivers and Streams*

The Pascagoula River Basin has 15,045 miles of rivers and streams. According to the *State of Mississippi Water Quality Criteria for Intrastate, Interstate and Coastal Waters*, the majority of these waterbodies are classified as Fish and Wildlife streams. Waters in this classification are intended for fishing and for the propagation of fish, aquatic life and wildlife and secondary, or incidental contact recreation. There are also a significant number of streams that are classified as recreational streams. This classification requires the quality of the water to be suitable for contact recreational purposes such as swimming and water skiing.

There are also four waterbodies that are classified as Public Water Supply, and are suitable for drinking water and food processing.

## What are the Biological Features?

The populations of wildlife and plants found in the Pascagoula River Basin are very diverse and unique. This is primarily due to the diverse habitats found throughout this large basin including the coastal marshes and estuaries. The Gulf Sturgeon and the Swallow-tailed Kite can be found here as well as many more species. The Pascagoula River Basin has 11 federally threatened and six federally endangered species as well as approximately 13 non-native species. Because of the abundant wildlife populations, this basin provides great bird watching, hunting and fishing recreational activities as well as a tremendous seafood industry along the coast.

## How Important Is Ground Water?

Approximately 230 million gallons of freshwater are pumped for beneficial use each day in the Pascagoula River Basin. This volume is a reflection of the relative large size of the basin and its sizeable population and industrial base. Approximately 60 percent of this total volume and virtually all of the potable water supply for the basin are obtained from the available ground water resources in the area.

*Most Drinking Water in the Basin Comes from Ground Water*

Although private domestic wells remain widely used in rural areas, most basin inhabitants have access to one of 211 community water systems that operate 553 large-capacity wells in the counties included in the basin. These wells pump from deep, confined aquifers that generally are not susceptible to contamination. The largest groundwater pumping centers are located in the more urbanized and industrialized areas of the basin (Figure 5). The use of available surface water resources to offset the significant industrial base in some areas has aided in the protection of the basin aquifers from severe overdraft.

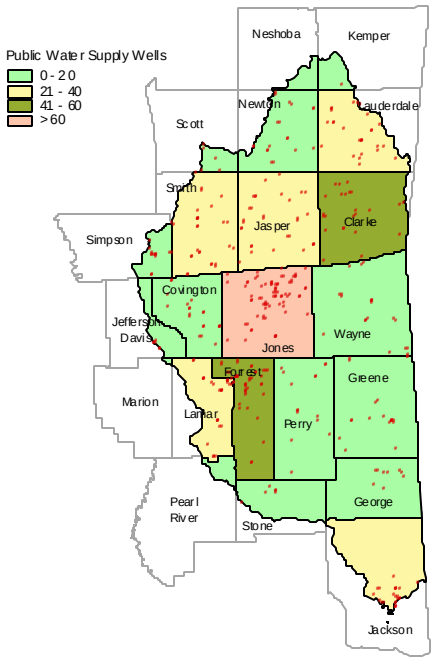



*Figure 5. Number and Locations of Public Water Supply Wells by County in the Pascagoula River Basin (MDEQ 1999)*

Numerous geologic formations outcrop in the Pascagoula River Basin. These outcrop areas, which serve as the source of recharge for at least ten aquifers, are characterized by unconfined aquifers that furnish base flow to surface water bodies in the basin. Water wells placed in such aquifers typically are used for home wells. The sandy soils at or near the land surface in these recharge areas shows how vulnerable these shallow aquifers to contamination by surface activities.

## Where Do People Live In The Basin?

The Pascagoula River Basin, with an estimated population of 716,925 encompasses roughly one-quarter of Mississippi's population. The Basin is predominantly rural with an average population density of around 75 people per square mile. Greater population densities are found near the urban areas of Pascagoula, Moss Point, Meridian, Hattiesburg, and Laurel (Figure 6).

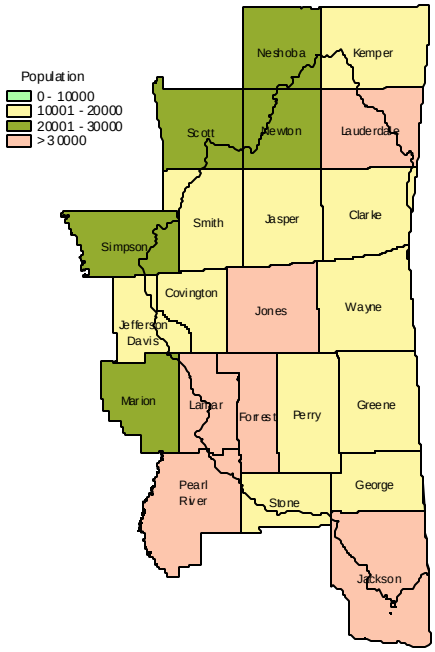



*Figure 6. 1990 Population by County (US Census Bureau)*

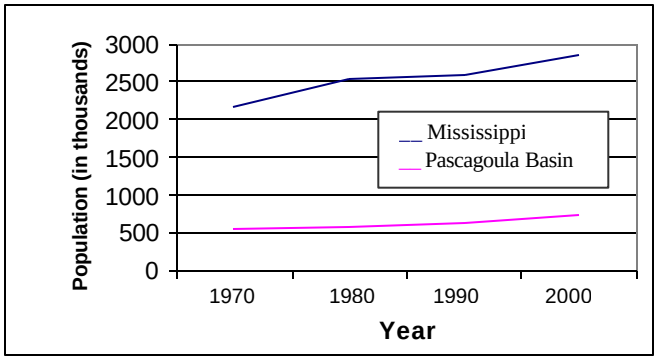



*Figure 7. Population Trends 1970-2000 (US Census Bureau)*

Population in the Pascagoula River Basin has shown a slight steady growth over the past 30 years, although growth has mainly occurred in the urban areas.

## How Are Lands Used In The Basin?

Prior to the 1860's the predominant commodity was cotton with over a million bales moving down the Pascagoula River. Soon to follow were the shipyards and sawmills along these rivers that sought to profit from the vast timber resources found here. The river corridors supplied the infrastructure to transport these timber products throughout the world through the Port of Pascagoula. This industry established many outposts, which in turn grew into our cities and towns. Timber is still king in this part of the state, but many diverse land uses have staked their claim on this resource rich area of our state. Among these are oil and gas production, agriculture, recreation, and urban development. The distribution of major land cover in the basin is spread relatively evenly over the whole basin. (Figures 8 & 9)

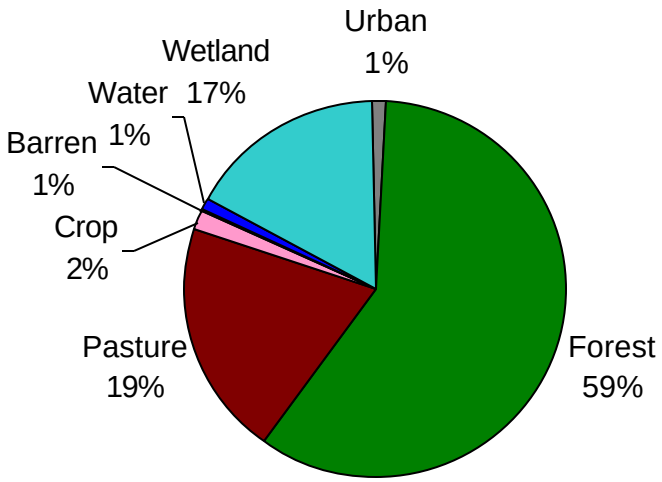



*Figure 8. Major Land Cover in the Pascagoula River Basin (MARIS)*

## How Do These Land Uses Impact Water Quality?

Many anthropogenic, or man-caused activities routinely occur in the basin that could potentially affect water quality. These include agricultural and forestry activities, direct discharge of pollutants from industrial or municipal wastewater treatment facilities, mining, and waste management.

### *Forests and Wildlife Management Areas*

Forests dominate the land cover, with 59 percent of the basin covered by forest. These forests consist of 64 percent Non-Industrial Privately owned lands, 22 percent Forest Industry owned lands, and 14 percent Government owned land. In 1999, approximately 26 percent of Mississippi's timber production came from the basin contributing about $324 million to the Mississippi economy. When proper management practices are not used, potential impacts from erosion and sediment runoff can be significant. Also, the threat exists from improperly applied fertilizers, pesticides, and herbicides.

The entire Desoto National Forest (501,000 acres) and approximately 90,000 acres of the Bienville National Forest are located in the Pascagoula River Basin. The Department of Wildlife, Fisheries and Parks manages seven wildlife management areas within the basin totaling approximately 368,651 acres that are primarily forests and wetlands. One of these management areas, Ward Bayou Wildlife Management Area is the result of land mitigation from the Tennessee Tombigbee Waterway. The Department of Marine Resources manages three Coastal Preserves in the basin totaling approximately 14,000 acres, mostly in coastal marshland.

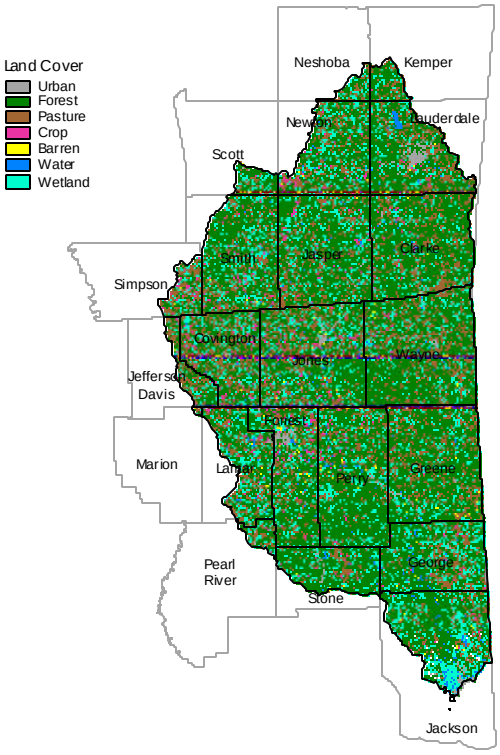



*Figure 9. Distribution of Land Cover in the Pascagoula River Basin (MARIS)*

Also the U.S. Fish and Wildlife Service manages the 19,273 acre Mississippi Sandhill Crane National Wildlife Refuge. By utilizing periodic harvest practices on these management areas, the forests support diverse populations of wildlife and plant species. The Mississippi Forestry Commission estimates that forestry best management practice use exceeds 80 percent.

## *Urban*

Urban uses (i.e., towns and cities) make up only two percent of the basin area. However, one of the largest concentrations of industry in the state is in the coastal portion of the basin near the cities of Pascagoula, Moss Point, Escatawpa, and Gautier. This basin has 17 permitted major point sources with half being Publicly Owned Treatment Works and the other half being industrial discharges.

The major concerns that exist with urban areas are the control of growth and storm water runoff. This includes control of sediment during construction and the increase of impermeable surfaces that prevent the absorption of rainwater. Also new federal regulations dealing with storm water become effective soon. Many historically rural areas are experiencing rapid growth in population and development and many counties are developing county plans and codes to manage this growth.

## *Agriculture*

Agriculture accounts for about 21percent of the land use, with two percent of the basin used for cropland and 19 percent for pasture. The poultry industry also plays a major role in the agricultural activities in the basin. There are seven poultry processors in the basin to support this industry. There are also 27 dairy farms and 12 permitted aquaculture facilities in the Basin.

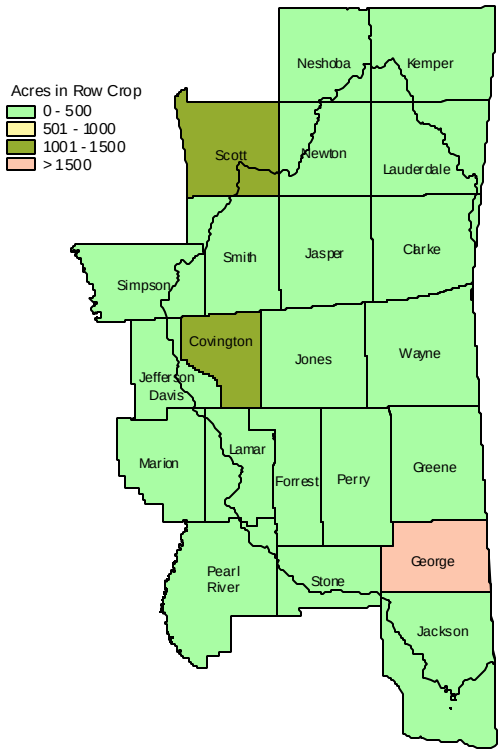



*Figure 10. Acres in Row Crop Production by County (USDA)*

The possibility of contamination exists when proper management practices are not in place. Many state and federal agencies spend a tremendous amount of time teaching the management practices needed to control runoff of pesticides, nutrients and sediments.

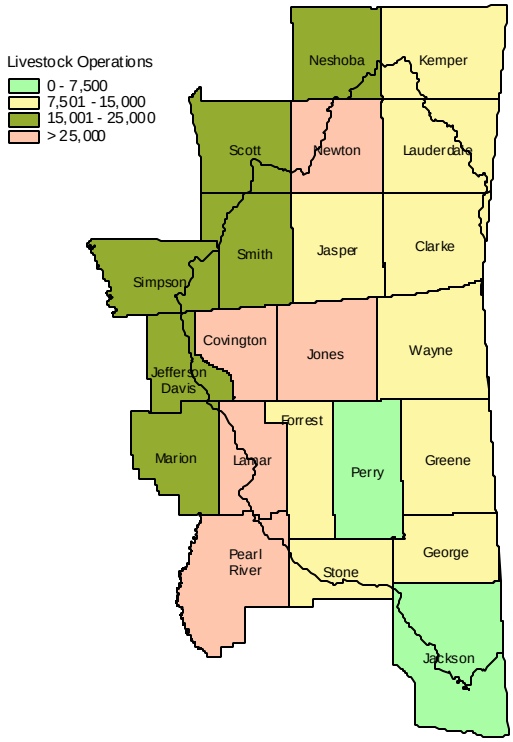



*Figure 11. Livestock Operations by County (USDA)*

Livestock production is an important element of the agricultural economy in Mississippi and a significant element of land use in the basin (Figure 11). The total number of livestock (cows, pigs, chicken, and sheep) in the Pascagoula River Basin is estimated at 525,000,000. Of this number, approximately 377,000 are cattle (33.4 percent of state), 2400 swine (1.1 percent of state), and 1700 sheep (35.1 percent of state.) The most prominent livestock production in the basin is poultry production with approximately 524,000,000 birds produced in 1998 resulting in 73 percent the state's production (1997 Census of Agriculture and MSU-ES.)

When livestock are found in high numbers or are confined for concentrated feeding operations, the high volume of generated wastes raises the potential for surface water pollution from runoff (e.g., coliform bacteria) and for ground water contamination where proper management practices are not in place.

*Cattle in Jasper County*

## *Mining, Oil and Gas*

The Pascagoula River Basin also produces 75 percent of the Oil, 50 percent of the saltwater and 50 percent of the natural gas produced in Mississippi. This is produced from about 50 percent of the 4080 producing oil and gas wells reported in 1999 in Mississippi.

*The Pascagoula River Basin produced 75 percent of the oil in Mississippi during 1999*

The surface geology is dominated by sandy and unconsolidated sediments, which promote widespread surface mining. Within the Pascagoula River Basin, there are slightly more than 250 mining operations. Forrest County has the most with 50 permitted and exempt surface mines; Greene County has the fewest with two. Surface mining disturbs the original topography, vegetation, and often the flow patterns of nearby streams and creeks. Potential water quality impacts include increases in sediment and heavy metals, as well as, changes in pH.

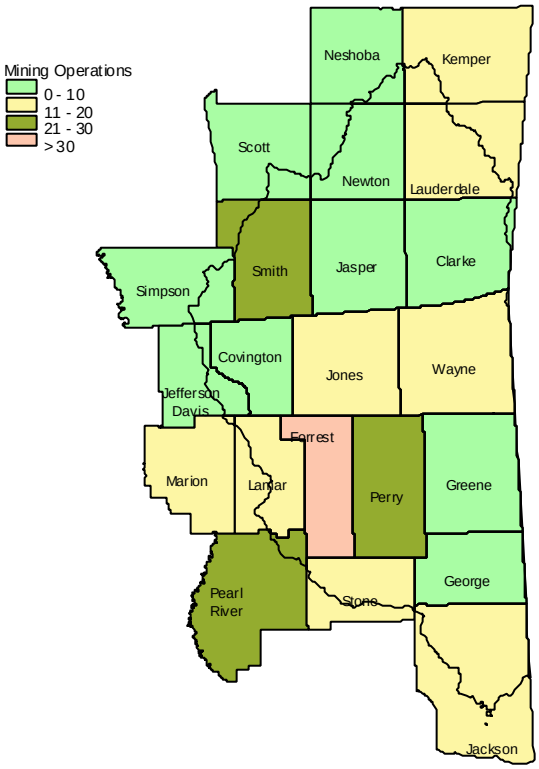



*Figure 12. Number of Mining Operations by County (MDEQ 2001)*

## *Recreation*

Because the basin has so many high quality waters, recreation is a major activity in the basin. Fishing and water sports are abundant since the Pascagoula River Basin has approximately 1680 lakes and many miles of streams.

Pat Harrison Waterway District manages nine water parks for exceptional recreation opportunities, and 12 boat ramps, that provide river access to the public. According to the Department of Wildlife, Fisheries and Parks, there are over 86 boat ramps and public fishing piers in the basin. Many of these offer picnic tables and recreation areas in addition to access to the lake or stream. According to the Department of Marine Resources, there are 12 public recreational areas including boat ramps and marinas along the coastal portion of the Basin. With an abundant quantity of natural water resources comes the responsibility to protect water quality. Recreational use sometimes poses a threat to water quality from litter, gas and oil spillage, sewage and other impairments. Appropriate management practices are used to minimize these impacts.

*Fishing is a Very Popular Recreation Use of the Waters*

Recreational areas exist away from the stream bank also. There are over 30 golf courses throughout the basin, as well as, many ball fields that support activities such as soccer, football, and baseball. Turf grass management is becoming more important everyday, as the popularity of these sports requires more acreage. These areas require the proper application of fertilizers, pesticides, and herbicides to maintain high quality playing areas. However, in excess, these chemicals can runoff into streams causing impairments.

## *NPDES Permitted Dischargers*

A National Pollutant Discharge Elimination System (NPDES) permit is issued to any facility discharging treated wastewater to state waters. These permits specify the types, quantity, and concentrations of pollutants that may be discharged. Facilities receiving NPDES permits include industrial dischargers, municipal sewage dischargers, and commercial/private sewage dischargers.

**Industrial Dischargers.** Approximately 143 industrial point source dischargers are permitted in the basin (Figure 13). These sources include two industrial parks, eight major sources, and 12 individual storm water permit holders. These dischargers represent several types of industries, including timber products; energy production; and chemical, agricultural, metal manufacturing and other miscellaneous industries.

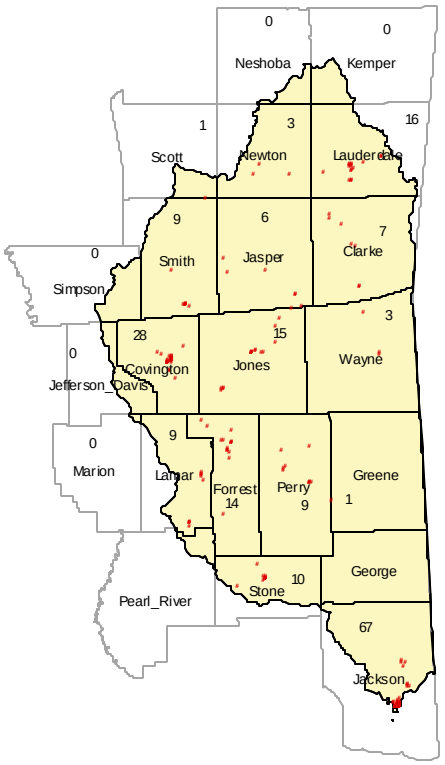



*Figure 13. Number of Permitted Industrial Dischargers by County (MDEQ 2001)*

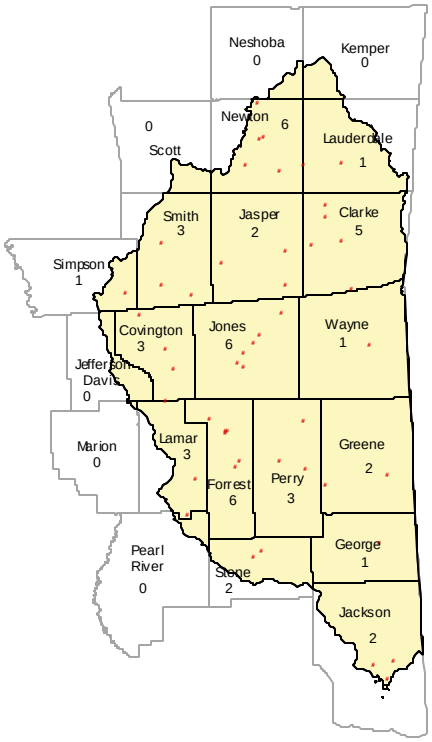



*Figure 14. Number of Permitted Municipal Sewage Dischargers by County (MDEQ 1999)*

**Municipal Dischargers.** Where people live and work, they must have a way to collect and treat their sewage. Thirty-Seven of the basin's 41 incorporated communities have centralized wastewater collection and treatment facilities.

Of these cities, seven need treatment plant upgrades or expansions, while 11 need to expand their collection system or repair them to eliminate infiltration of ground water and inflow of stormwater which overload sewers and treatment facilities. Without needed improvements to these systems, inadequately treated wastewater can flow or be discharged into streams.

There are currently 38 permitted municipal sewage dischargers within the Pascagoula River Basin (Figure 14).

Nine of these are major municipal dischargers (i.e., discharge flows greater than one million gallons per day). The discrepancy between the number of permitted municipal dischargers and the number of

incorporated communities with sewer systems is due to the fact that some communities have more than one discharge and that there are some towns that operate under regional wastewater authorities.

There are approximately 100 recognized unincorporated communities within the Pascagoula River Basin. These areas which lack central sewage collection and/or treatment systems are assumed to utilize individual on-site wastewater treatment systems. Such systems include septic tanks and small package treatment plants that may or may not discharge to surface waters.

These same type individual systems are used in rural areas throughout the basin. Where these systems are not used, are not maintained, and/or are located in unsuitable soils, contamination of ground water or surface water is likely. Potential pollutants commonly associated with sewage disposal include ammonia, nitrogen, phosphorus, organic material, and pathogens.

**Commercial/Private Dischargers.** Numerous other facilities exist in the basin that discharge wastewater, but are not classified as industrial or municipal dischargers. These commercial/ private dischargers include schools, trailer parks, and residential subdivisions. Typically, these facilities do not individually discharge the large volumes of treated wastewater, as do industrial and municipal facilities. 243 NPDES Permits have been issued to commercial/private dischargers in the Pascagoula River Basin.

**Hazardous Waste Operations.** Hazardous waste sites pose potential localized threats to human health and the environment through releases to the soil, sediment, or ground water. These sites may have been contaminated by leaking chemical tanks (both above and below ground), abandoned landfills, or various chemical spills.

MDEQ has regulatory authority over these sites. 232 of these sites exist in the basin, with the majority of these sites found in industrialized areas (Figure 15). Thirty-five are being actively investigated or have remediation efforts under way. Thirty have been remediated or determined to require no further action.

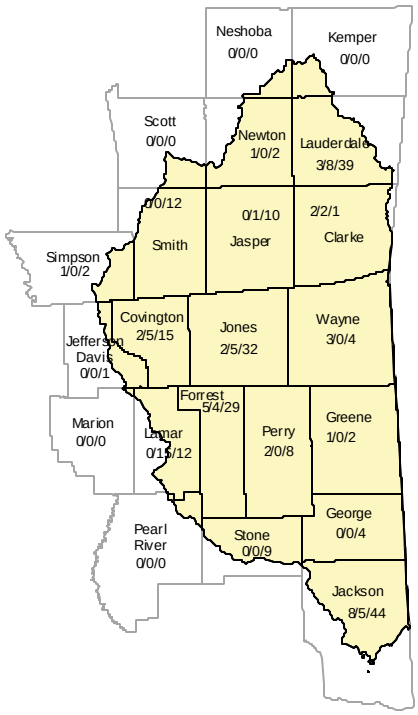



*Figure 15. Number of Hazardous Waste Sites Requiring No Further Action/Active Sites/Total Number of Sites by County (MDEQ 1999)*

Additionally, 523 facilities within the basin have notified MDEQ that they generate quantities of hazardous wastes that require proper disposal (Figure 16). These facilities include conditionally exempt small quantity generators (CESQG) that generate less than 220 pounds of hazardous wastes each month, small quantity generators (SQG) that generate less than 2,200 pounds of hazardous wastes each month (but more than 220 pounds), and large quantity generators (LQG) that generate more than 2,200 pounds of hazardous wastes each month.

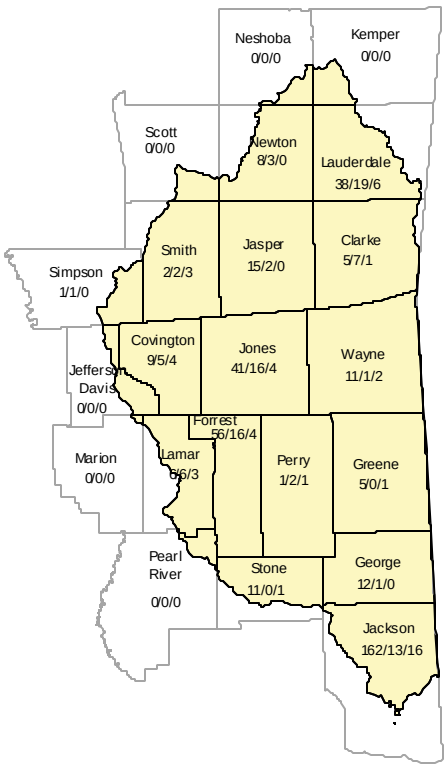



*Figure 16. Number of Conditionally-Exempt Small Quantity Generators / Small Quantity Generators / Large Quantity Generators by County(MDEQ 2001)*

**Solid Waste Management.** Solid wastes include household garbage, yard wastes, construction and demolition wastes, municipal and non-municipal wastewater sludges, industrial wastes, and other commercial and industrial non-hazardous wastes. In the past, state and federal guidelines on the disposal of solid wastes were not as stringent as they are now. As a result, older dumps and other sites where solid wastes were disposed may threaten ground and surface water resources in the basin.

In recent years, new guidelines on siting and operating solid waste management facilities such as landfills, land application sites, and other facilities, have greatly reduced the risk of contamination from solid wastes. Currently there are four active municipal solid waste landfills in the Pascagoula River Basin: Clearview Environmental Control Facility in Scott County, MacLand Ash Disposal Landfill in Jackson County, Pine Belt Regional Landfill in Perry County, and Pine Ridge Sanitary Landfill in Lauderdale County. These landfills receive virtually all of the household garbage and a large portion of the commercial and industrial non-hazardous waste generated within the basin. Groundwater monitoring is conducted at each of these landfills on a semi-annual frequency. There are no known water quality problems associated with these four facilities.

In addition, there are approximately 50 rubbish sites and industrial landfill sites located in the basin. Rubbish sites generally receive wastes limited to yard wastes, construction and demolition debris, wood wastes, and furniture. There are also four land application sites, that receive municipal and non-municipal wastewater sludge and 51 closed landfill sites located throughout the basin area. In addition to the potential problems posed by older landfills, illegal random dumping of solid wastes also threatens to pollute ground and surface waters.

*Entrance to Clearview Landfill, Scott County*

# ASSESSMENT OF RESOURCES

## What Are Water Resource Assessments and How Are They Used?

Water resource assessments determine the quality of water bodies within a basin. Are fish caught from a water body safe to eat? Is it safe for swimming? Is it safe to use to irrigate our food crops? Does it support healthy and diverse aquatic life?

The information collected in such an assessment is used to support sound decision-making by identifying good quality water bodies and tracking their condition over time. The assessments also provide clues to the sources and levels of pollutants for water bodies that are impaired or threatened, and help managers understand the impacts of human activities within a watershed and the effectiveness of installed management practices.

## *Designated Uses*

All water bodies in the state are classified by MDEQ according to a primary designated use. Water quality standards are more stringent for the designated uses that are directly related to human health concerns (e.g., Drinking Water Supply and Food Processing.) The designated use provides a basis for establishing water quality standards for all of the water bodies in the state.

| Designated Uses of Mississippi Waters |
|---|
| 1. Drinking Water Supply and Food Processing |
| 2. Shellfish Harvesting |
| 3. Contact Recreation |
| 4. Secondary Contact Recreation |
| 5. Fishing and Fish Consumption |
| 6. Aquatic Life Support |

## *Water Quality Criteria*

Water quality criteria are designed to protect the designated uses of water bodies in the state. These standards are comprised of both numeric and narrative criteria. The numeric criteria consist of sets of parameter-specific requirements related to potentially harmful chemical constituents that, if exceeded, could potentially harm aquatic life and/or human health. As an example, MDEQ has numeric criteria for dissolved oxygen which is a common indicator of aquatic life support.

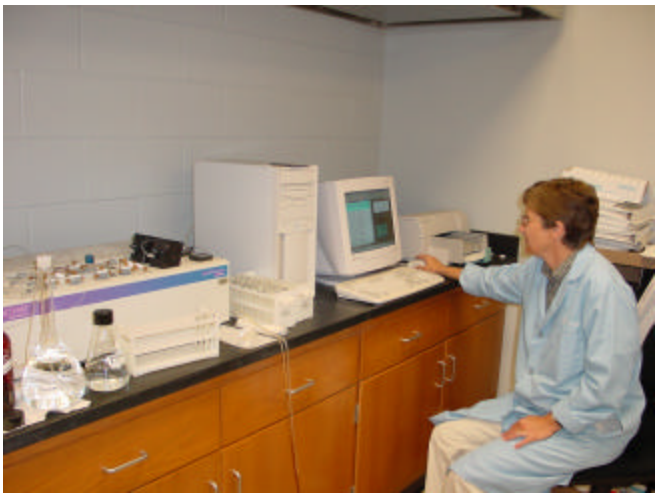
Narrative criteria address more general conditions that may adversely affect water quality but for which no actual numeric standard has been adopted. For assessment of the state's narrative water quality standards, screening levels for parameters, such as nutrients or water clarity, are used as targets for potential water quality degradation.

**Streams Designated for Recreation**

| Waters | From | To |
|---|---|---|
| Beaverdam Creek | Headwaters | Black Creek |
| Black Creek | Hwy. 11 | Pascagoula River |
| Bowie Creek | Hwy. 589 | Bowie River |
| Bowie River | Bowie Creek | I-59 |
| Chickasawhay River | Stonewall, MS | Hwy. 84 |
| Chunky River | Hwy. 80 | Chickasawhay River |
| Okatoma Creek | Hwy. 590 | Bowie River |
| Pascagoula River | 6 mi. N. of Hwy. 26 | Cumbest Bluff |
| Pascagoula River | Cumbest Bluff | Smear Bayou |
| Red Creek | Hwy. 49 | Big Black Creek |
| Tallahala Creek | 1 mi. N. of Hwy. 15 | Sholars |

## What Are The Main Assessment Reports In The State?

A primary objective of the Mississippi Basin Management Approach is to coordinate the assessments of water quality for the basin's streams, lakes, and estuaries. Two of the main reporting efforts, the 305(b) Water Quality Assessment Report and the 303(d) List of Impaired Waterbodies, are prepared to meet requirements contained in the Clean Water Act.



*Water Quality Laboratory Analysis*

## *Section 305(b) Report*

Mississippi's biennial Water Quality Assessment Report is prepared by MDEQ pursuant to Section 305(b) of the federal Clean Water Act. The purpose of the 305(b) Report is to describe for EPA, Congress, and the public the status of the quality of Mississippi's waters. Along with water quality information, the report lists the causes and potential sources of pollution for those waters determined to be impaired. It also identifies and discusses water pollution control programs for point and non-point sources of pollution, documents environmental improvements for the previous two years, notes special water quality concerns and problems, and describes Mississippi's water quality monitoring program.

The major focus of the report is to determine if the designated uses of Mississippi's surface water bodies are supported. Each designated use assessed for a water body is determined to be *Fully Supported, Fully Supported But Threatened, Partially Supported, or Not Supported* in accordance with its water quality standards. These determinations are based on the percentage of samples that exceed established water quality standards.

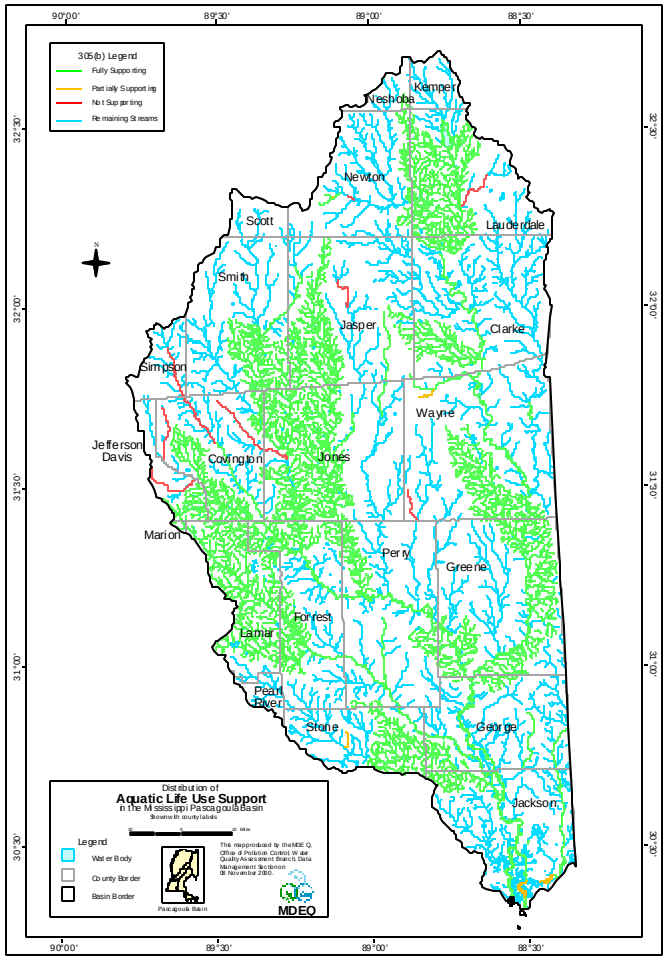



*Figure 17. Aquatic Life Use Support Map from 2000 305b Report*

| Determination of Support | |
|---|---|
| Support | percent of Samples Exceeding Water Quality Standards |
| Fully Supported | ≤10% |
| Partially Supported | 11-25% |
| Not Supported | >25% |

The Section 305(b) Report also includes recommendations for needed studies, programs, and funding to adequately manage Mississippi's water quality resources. Copies of the 2000 305(b) report are available from the MDEQ website, www.deq.state.ms.us.

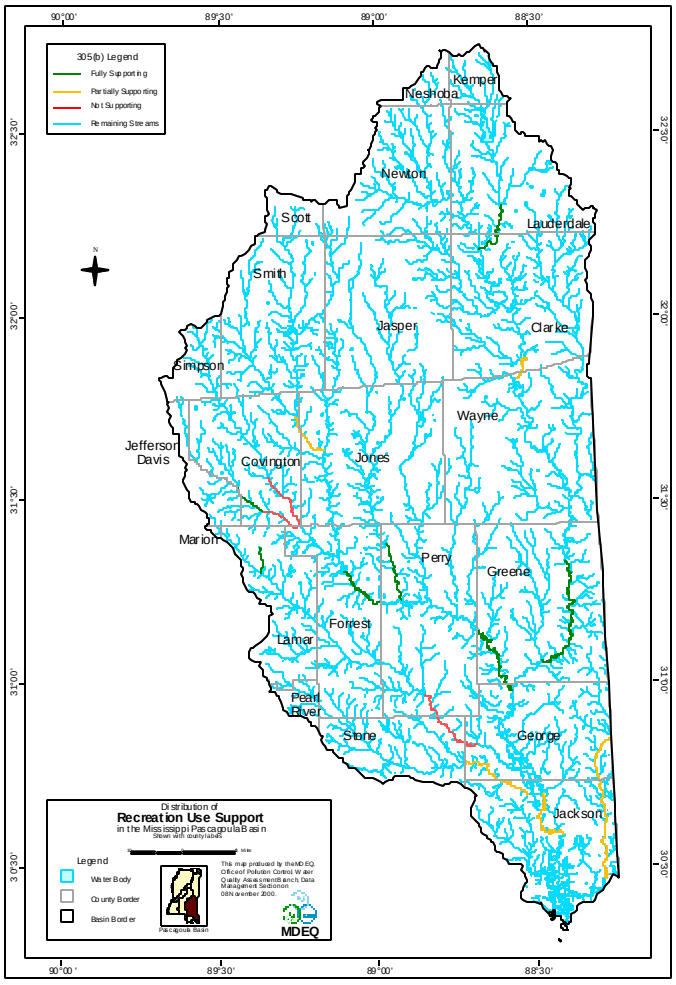



***Figure 18***. *Recreation Use Support Map from 2000 305b Report*

## *Section 303(d) List and TMDLs*

Section 303(d) of the Clean Water Act requires the State to identify and list water body segments where water quality standards are not met and the designated use is impaired. Additionally, the State is required to establish a priority ranking system of the impaired waters (taking into account the severity of the pollution and the importance of the water's impaired use), and to develop total maximum daily loads for those pollutants impairing any use of the water body.

Because the list is biennial, the number of water bodies listed changes, depending upon monitoring results. For example, the 1996 list contained 75 water body segments in the Pascagoula River Basin, while the 1998 list contains 25 water body segments listed as monitored and 60 water body segments listed as evaluated. Water quality monitoring can result in a stream being listed, if impaired, or de-listed, if found not to be impaired.
Total maximum daily loads (TMDLs), as defined by EPA, are written plans and analyses established to ensure that the water body will attain and maintain water quality standards, including consideration of reasonably foreseeable increases in pollutant loads.

The TMDL should establish pollutant level reductions that will cause the impaired use to be fully supported.

**TMDLs Approved to Date**

| Waterbody | Cause |
|---|---|
| Black Creek | Pathogens |
| Bowie Creek | Pathogens |
| Chickasawhay River | Pathogens |
| Country Club Lake | PCP/Dioxin |
| Cypress Creek | Pathogens |
| Escatawpa River | Mercury |
| Escatawpa River | Organic Enrichment /Low DO |
| Escatawpa River | Pathogens |
| Escatawpa River | Non Priority Organics |
| Escatawpa River | PH |
| Escatawpa River | Toxics |
| Leaf River | Pathogens |
| Okatibbee Creek | Pathogens |
| Okatoma Creek | Pathogens |
| Pascagoula River | Pathogens |
| Red Creek | Pathogens |
| Richardson Mill / Potterchitto Creeks | Organic Enrichment / Low DO |
| Richardson Mill / Potterchitto Creeks | Ammonia |
| Tallahala Creek | Pathogens (3 segments) |
| Tallahala Creek | Organic Enrichment / Low DO (2 segments) |

# What Are The Assessments Based Upon?

For water quality assessment purposes, all readily available water quality information is utilized in watershed assessments. The information is compiled and then categorized as one of two types of assessments, evaluated or monitored, based on the quality and quantity of the data available. These two types of assessments are necessary to provide a comprehensive assessment and understanding of water quality conditions and trends within an entire watershed.

## *Evaluated Assessments*

Evaluated assessments focus on stream reaches where no current site specific monitoring data is available. These assessments take into consideration land use activities, surveys and questionnaires from other agencies, locations of potential pollution sources, volunteer monitoring data, monitoring data greater than five years old, and data that has been extrapolated from an adjacent monitored stream reach.

**Evaluated Causes of Impairment for Pascagoula River Basin Streams and Lakes***

| Cause | Number | % |
|---|---|---|
| Siltation | 41 | 22 |
| Nutrients | 37 | 20 |
| Pesticides | 34 | 18 |
| Pathogens | 25 | 14 |
| Organic Enrichment/ Low Dissolved Oxygen | 22 | 12 |
| Others | 26 | 14 |
| Total | 184 | 100 |

**184 evaluated causes for 60 water body segments. Each water body segment can have more than one cause of impairment (1998 303d list)*

## *Monitored Assessments*

MDEQ and other state, federal and local agencies have programs that routinely monitor the conditions of surface and ground waters to determine their quality and quantity relative to human health considerations, ecological conditions, and designated water uses. MDEQ also uses this data to assess the quality of the water body by comparing observed measurements to the State's water quality standards for the water's designated uses.

Common methods used to monitor water quality include fixed network routine ambient monitoring for long-term status and trends, as well as targeted basin monitoring to address specific data needs. Both of these monitoring methods are used to obtain water quality data on physical, chemical, bacteriological and biological indicators.

Monitored assessments focus on stream reaches where current site specific monitoring data is available. Current data is defined as data collected within five years of the date of the assessment. These assessments are based on one or more different types of monitoring data that have been grouped together by water body and then are analyzed collectively in order to determine water quality status or condition for the water body. Monitoring data can come in many different forms but primarily consist of one or more of the following data types: physical/chemical, biological, habitat, bacteriological, and/or toxicological.

## *Biological Impairment*

The concept of using biological indicators, such as biodiversity, to evaluate water quality is based upon the premise that healthy ecological systems should support diverse populations of many different types of organisms. Streams that are degraded due to poor water quality or habitat loss tend to have a population shift to more pollution-tolerant organisms and/or fewer species and, therefore, have less biodiversity.

| Monitored Causes of Impairment for Pascagoula River Basin Streams and Lakes* | | |
|---|---|---|
| Cause | Number | % |
| Pathogens | 12 | 46 |
| Mercury | 8 | 30 |
| Biological Impairment | 2 | 8 |
| Organic Enrichment/ Low Dissolved Oxygen | 2 | 8 |
| pH | 1 | 4 |
| Nutrients | 1 | 4 |
| Total | 26 | 100 |

** 26 monitored causes for 24 water body segments. Each water body segment can have more than one cause of impairment (1998 303d list)*

For some water bodies, biological data (e.g. aquatic insect communities, fish communities) are the primary data available for water quality assessment. Because there are no numerical water quality standards for biological data, narrative standards are applied during an assessment, i.e. "the water body must support a healthy aquatic community." A "healthy aquatic community" is defined by comparing the biological data of the stream in question to that of a pre-established reference stream or condition. If this comparison indicates that the health of the aquatic community is substandard, the stream is considered "impaired" and biological impairment (BI) is listed as the cause of impairment. When these situations occur, additional monitoring is required to determine the specific causes (chemical or physical) of impairment so Total Maximum Daily Loads (TMDLs) can be established for the specific pollutants.

# What Are the Findings of These Assessments?

## *Surface Water Quality.*

Principal causes of water quality problems in the Pascagoula River Basin identified in the most recent Section 305(b) Report (2000) are excessive concentrations of metals (mercury), pathogens and low dissolved oxygen from non-point source pollution.

Mississippi's 1998 303(d) List of Impaired Water Bodies identifies all of the water bodies within the state that are considered to be impaired. Sources of data for this list include monitored and evaluated assessments from various water quality programs. Within the Pascagoula River Basin, impairment has been found in 28 monitored water body segments. 49 TMDLs have been completed and 39 monitored causes were removed from the list due to data or other reasons. 184 water body segments have been evaluated as being potentially impaired. These evaluated segments will be targeted for additional monitoring during the upcoming basin management cycle to verify actual water quality conditions.

## *Ground Water Quality.*

The large withdrawals from the aquifers in this region support the Basin's population and industrial base. Record setting droughts during 1999 and 2000 have resulted in aquifer water level declines. They are most noticeable in the outcrop areas, which serve to recharge at least 10 aquifers. The declines have resulted in decreased base flows for many of the streams in the area.

Analytical results reviewed from MDEQ's Agricultural Chemical Ground Water Monitoring Program and the Mississippi State Department of Health's Division of Water Supply of the 130 shallow wells sampled or the 533 community water systems in the basin indicate that the ground water is generally of good quality.

# What Are The Main Pollutants Of Concern In The Basin?

## *Monitored Causes.*

In the Pascagoula River Basin, two parameters account for nearly 76 percent of the monitored impairments in the 1998 303(d) List: pathogens and mercury. These impairments typically affect waters designated for contact recreation, secondary contact recreation and fish consumption.

Pathogens. Pathogens are bacteria that may cause illness in humans. Pathogens occur in human and animal wastes and pose a threat to humans primarily through skin contact or ingestion. Fecal coliform is a bacterium that is used in the monitoring process to indicate the potential for exposure to pathogens. The Mississippi water quality standard for fecal coliform specifies the maximum safe concentration of this bacterium.

| **Monitored Water Bodies Impaired by Pathogens in the Pascagoula River Basin** | | |
|---|---|---|
| **Designated Use: Contact Recreation** | | |
| Water Body | Support | Miles |
| Black Creek | Not | 9 |
| Bowie Creek | Partial | 9 |
| Leaf River | Not | 22 |
| Okatoma Creek | Not | 12 |
| Pascagoula River | Partial | 45 |
| Red Creek | Not | 21 |

(1998 303d list)

| **Monitored Water Bodies Impaired by Pathogens in the Pascagoula River Basin** | | |
|---|---|---|
| **Designated Use: Secondary Contact Recreation** | | |
| Water Body | Support | Miles |
| Chickasawhay River | Partial | 19 |
| Cypress Creek | Partial | 12 |
| Leaf River | Not | 19 |
| Leaf River | Partial | 30 |
| Okatibee Creek | Not | 17 |
| Tallahala Creek | Partial | 31 |

(1998 303d list)

The 1998 303(d) List identified 12 streams or stream segments that were considered to be impaired due to pathogens. Potential sources for this impairment are often attributed to wildlife, livestock production, and wastewater discharge.

Mercury. Because of regional and national concern over mercury contamination in fish, MDEQ began intensively monitoring the state's fisheries for mercury in 1993. From 1994-1998, 865 fish tissue samples from 155 sites were analyzed. Based on results obtained in 1993 and 1994, an interagency task force was convened to address mercury contamination in Mississippi. Members of the task force are from MDEQ, Mississippi Department of Wildlife, Fisheries, and Parks, and other agencies. This task force issued seven consumption advisories in 1996 and 1997 on water bodies having fish with average levels of at least 1 part per million of mercury. The Department of Marine Resources also works with the task force and in 1998 an advisory was placed on King Mackerel in the Mississippi Gulf.

| **Monitored Water Bodies Impaired by Mercury in the Pascagoula River Basin** | | |
|---|---|---|
| **Designated Use: Fish Consumption** | | |
| Water Body | Support | Miles |
| Archusa Creek Water Park | Partial | |
| East Pascagoula River | Not | 11 |
| East Pascagoula River | Partial | 8 |
| Escatawpa River | Partial | 20 |
| Escatawpa River | Partial | 24 |
| Pascagoula River | Partial | 45 |
| West Pascagoula River | Partial | 8 |
| West Pascagoula River | Partial | 17 |

(1998 303d list)

The majority of the scientific community believes that elemental mercury is widely distributed in the environment due to a combination of natural geologic conditions, old industrial sources, and atmospheric deposition from coal fired power plants and incinerators. It is further believed that water quality or sediment quality conditions in certain waterbodies favor the conversion of this relatively inert form of mercury to a more toxic form, which multiplies in the food chain more readily.

The 1998 303(d) List identified eight streams or stream segments that were considered to be impaired due to mercury.

## *Evaluated Causes.*

The three main pollutants identified by the evaluation process are nutrients, sedimentation, and pesticides. These pollutants are known to have detrimental effects on aquatic life if present in higher than recommended concentrations.

Nutrients. Elevated levels of nutrients can cause excessive growth of aquatic plant communities. Excessive growth of these plants, such as algae, can impair the growth of other life, deplete the dissolved oxygen in surface water, and cause eutrophication.

Sedimentation. Disturbance of lands adjacent to streambeds can significantly increase the loading of sand, silt, and clay to streambeds. This sedimentation reduces the available aquatic habitat and flow capacity of a stream, as well as increases sedimentation in downstream lakes and reservoirs.

Pesticides. Excessive levels of pesticides and herbicides can cause adverse effects on a number of aquatic species. Additionally, bioaccumulation of pesticides in fish can result in higher pesticide levels over time. Because many people in the basin rely on fish as a source of food, pesticide concentrations in fish and their potential human health impacts need to be studied further.

## *Fish Kills.*

Since January 1996, MDEQ has investigated several fish kills in the Pascagoula River Basin. The causes of these fish kills were low dissolved oxygen levels, pesticides or suspected pesticides, elevated ammonia levels, and some were of unknown origin.
Most of the fish kills attributed to low dissolved oxygen were natural occurrences in backwater areas. By the time many of the kills were reported, the dead fish were deteriorated to the point that the cause was difficult to discern. In these situations, the kills were categorized as unknown.

## *Air Quality.*

The ambient air quality in the Pascagoula River Basin is in attainment with National Ambient Air Quality Standards (NAAQS) for carbon monoxide, ozone, nitrogen dioxide, particulate matter 10 microns or less ($PM_{10}$), sulfur dioxide, and lead. Attainment status for fine particulate matter of 2.5 microns or less ($PM_{2.5}$) is not currently known. Mississippi does not monitor for deposition of air pollutants in the Basin, therefore, the impact of air pollutants on water quality, if any, is not known.

# Pascagoula River Basin Fish Tissue Advisories and Commercial Fishing Bans

June 2001

| Stream Reach | Chemical | Date Issued | Action |
|---|---|---|---|
| Escatawpa River from the AL-MS State line to I-10 | Mercury | May '95 | Limit Consumption Advisory for largemouth bass and large catfish (>27" )* |
| Pascagoula River, Entire length | Mercury | Sept. '96 | Same as Above |
| Archusa Creek Water Park | Mercury | Sept. '96 | Same as Above |
| Gulf of Mexico | Mercury | May '98 | King Mackerel <33"-no limit 33-39" limit consumption** >39"-do not eat |

*The Mississippi State Department of Health 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 Department of Health recommends that people limit the amount of 33-39" King Mackerel they eat from the Mississippi Gulf Coast. 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.

# WATER QUALITY MANAGEMENT IN THE PASCAGOULA RIVER BASIN

## What Programs Are Working to Improve Water Quality?

Numerous state and federal programs support the managed protection of the quality of Mississippi's water bodies. These include regulatory programs that focus on permitting and compliance requirements, as well as voluntary management and assistance programs that encourage the implementation of management practices.

## State-Administered Regulatory Programs

A number of statewide regulatory programs work to protect and improve the quality of Mississippi's water bodies. MDEQ is the primacy agent for a number of these programs that have been delegated from the U.S. Environmental Protection Agency. Additionally, there are also several regulatory programs enabled by state laws that are administered by MDEQ.

### *National Pollutant Discharge Elimination System (NPDES)*

The NPDES program issues permits to any facility discharging treated wastewater to state waters. These permits specify the types, quantity, and concentrations of pollutants that may be discharged by a facility.

### *Other MDEQ Programs.*

Additional permitting programs exist for a variety of activities, including the generation of hazardous wastes; the transportation, storage, and disposal of hazardous and non-hazardous wastes; underground storage tank installation and monitoring; concentrated animal feeding operations; air emissions; surface and ground water withdrawals;

*Treated Waste Water Effluent Discharged into the Leaf River*

and surface mining operations. In addition, the agency reviews proposed projects that could potentially impact wetlands areas through the Wetlands Protection Program (also known as 401 Certification).

The issuance of permits necessitates monitoring and enforcement of permit requirements. MDEQ has an active permit compliance and enforcement program for all of the permitted activities described in the previous paragraph. During the period from October 1, 2000 to May 1, 2001, MDEQ's enforcement and compliance division performed 143 inspections in the basin and 235 discharge violations were found. To simplify the permitting process and ensure an effective compliance and enforcement program, MDEQ recently established separate permitting and compliance/enforcement divisions.

### *Total Maximum Daily Loads (TMDLs)*

MDEQ has implemented the basin planning process to help develop TMDLs. Several activities must be carried out during established phases of the basin management cycle in order to establish TMDLs that

are scientifically based, technically sound, and acceptable to the public. These activities include clarifying specific causes and sources of evaluated water quality impairments, developing predictive means (for example, water quality models) for establishing pollutant loading capacity, and setting point source load allocations and non-point source load allocations. The Basin Team will follow the basin cycle for developing TMDLs while seeking stakeholder input at key points in the process. These efforts will be needed for each of the monitored water body segments identified on the 303(d) List of Impaired Water bodies in the Basin.

### *Confirming Impairment*

Significant numbers of stream segments were placed on the 1998 303(d) List as evaluated waters due to the lack of monitoring information. A significant effort is underway to develop water quality information through biological assessments that will provide information necessary to support or disprove these listings. Information will be gathered from streams considered impaired, to determine the causes and sources of the impairment.

### *Evaluating BMPs*

Information from programs designed to evaluate the economic, management and environmental benefits of best management practices will support the decisions required to improve the water quality within the basin.

## Federally-Administered Regulatory Programs

### *U.S. Army Corps of Engineers, Mobile District*

The Corps of Engineers issues and enforces permits for several programs intended to maintain navigable waters and protect the environment such as wetland protection (sect. 404) permits. From 1998 to March of 2001, there were 765 permit actions carried out by the Corps of Engineers with most taking place in Jackson County. (www.usace.army.mil)

## State-Administered Management/Assistance Programs

A number of state-administered management/ assistance programs exist in a variety of State agencies. Many of these are briefly described below.

### *Mississippi Department of Environmental Quality (MDEQ)*

MDEQ manages several major water quality management programs that issue grants and low-interest loans and provide technical assistance to the public and municipal entities. These programs include the Section 319 Non-point Source Pollution Grant Program, the Clean Water and Drinking Water Revolving Loan Program, both funded by the US Environmental Protection Agency and administered by MDEQ, and the Solid Waste Assistance Grant Program.

The Section 319 program requires a 40 percent non-federal match. Non-point source pollution is defined in general as pollution from diffuse sources that are not regulated as point sources and normally is associated with agriculture, forestry, urban runoff, and runoff from construction activities.

The Comprehensive Multimedia Pollution Prevention Assistance Program is an outreach and assistance program that focuses on helping businesses identify and reduce generated wastes and identifies and encourages recycling opportunities.

Low interest loans are available for wastewater and drinking water projects. MDEQ administers the Water Pollution Control Revolving Loan Fund for wastewater collection and treatment systems. The Mississippi State Department of Health has contracted with MDEQ to manage the Drinking Water Systems Improvements Revolving Loan Fund for drinking water facilities and infrastructure. Emergency loans are also available for both wastewater and drinking water projects.

The Coastal Impact Assistance Program (CIAP) is being administered by MDEQ. This program involves the distribution of over $24,000,000 in federal grants for coastal projects derived from off shore oil and gas exploration. These projects involve infrastructure and water quality projects. (www.deq.state.ms.us)

*Governor Ronnie Musgrove signing the Coastal Impact Assistance Program proposal*

## *Mississippi Department of Agriculture and Commerce*

The Pesticide and Plant Protection Division is responsible for licensing pesticide applicators, as well as providing applicator training in conjunction with the Agricultural Extension Service. Technical assistance is also provided on a case-by-case basis to farmers experiencing pesticide application problems, as well as those needing assistance with the disposal of obsolete pesticides. (www.mdac.state.ms.us)

## *Mississippi Agricultural and Forestry Experiment Station*

The MAFES was established for the expressed purpose of conducting scientific research in agriculture, forestry and related sciences. Both basic and applied research are a focus of the agency. Program areas that MAFES is actively pursuing include environment and natural resources planning, new food and nutrition products research, analyses of economic and social issues, animal production systems research, and crop production systems research. (www.mafes.msstate.edu)

## *Mississippi State Department of Health*

The Bureau of Environmental Health, within MSDH, has the responsibility of developing, implementing, and enforcing regulations pertaining to on-site wastewater disposal. County health officials are available to assist and inform the public regarding on-site wastewater treatment requirements. (www.msdh.state.ms.us)

## *Mississippi Forestry Commission*

MFC provides technical assistance for state and federal programs relating to non-point source pollution from forestry activities. Major programs include the Federal Forestry Incentive Program, Agricultural Conservation Program, Reforestation of Timberlands Act, and Cooperative Forest Management Program. MFC, in cooperation with the U.S. Forest Service and the Mississippi Forestry Association, developed a set of best management practices for forestry activities, which is available to the public. (www.mfc.state.ms.us)

## *Mississippi Soil and Water Conservation Commission*

MSWCC is designated as the management agency for agricultural non-point source pollution in the state. The agency provides educational programs and agricultural non-point source assessments and facilitates projects designed to demonstrate the effectiveness of implemented best management practices. (www.mswcc.state.ms.us)

## *Mississippi State University Extension Service*

The MSU Extension Service conducts outreach programs and facilitates demonstration projects designed to encourage the use of best management practices for erosion control and management of nutrients, pesticides, and animal wastes. The

Extension Service has also developed an educational program called "Something's Fishy in Mississippi" which teaches children about fisheries resource, aquatic science, water quality, and conservation in the Pascagoula River Basin. (www.msucares.com)

### *Planning and Development Districts*

Three Planning and Development Districts serve the Basin as regional planning organizations to serve local governments in their districts. The Districts offer professional and technical assistance such as land use planning, zoning, developing subdivision regulations, computer mapping, and other services. The Districts also address non-point source pollution issues in their planning efforts. (www.decd.state.ms.us/main/existing/exist_questions_pdds.htm)

### *Resource Conservation and Development Councils*

Five Resource Conservation and Development Council Areas cover the Basin. These councils promote the improvement of rural economic, social, and environmental conditions throughout their districts. Projects include emergency flood control and drainage work, establishing recreational areas, and erosion control. Activities of these councils are administered by NRCS. (www.msrcd.org)

### *Soil and Water Conservation Districts*

Soil and Water Conservation Districts are established in each of the 82 counties of the state. The districts assist landowners in developing and implementing soil erosion control and water conservation plans. (www.mswcc.state.ms.us)

### *Mississippi Department of Wildlife, Fisheries, and Parks*

This legislation created the Scenic Streams Stewardship Program that began in August of 1999. The goal of the program is to foster voluntary private conservation efforts by riparian (streamside) landowners. Presently there are several efforts underway to establish Scenic Stream Stewardships within the Pascagoula River Basin. (www.mdwfp.state.ms.us)


*The Souinlovey Creek 319 project in Jasper County conserved approximately 20,000 tons of topsoil from erosion.*

In an effort to enhance the effectiveness and efficiency of these management/assistance programs, collaboration of these programs will be a focus of the Basin Management Approach.

## Federally-Administered Management/Assistance Programs

A number of management/assistance programs administered by the federal government also exist in a variety of federal agencies. In an effort to enhance the effectiveness and efficiency of these management/assistance programs, collaboration of these programs will also be a focus of the Basin Management Approach. Brief descriptions of these programs follow.

### *Natural Resources Conservation Service*

NRCS provides a number of management/ assistance programs. The Environmental Quality Incentives Program (EQUIP) which, since its

inception, has provided technical, educational, and financial assistance to 917 projects covering 32,957 acres in the basin to face the most serious threats to soil, water, and related natural resources. Another is the Watershed Protection and Flood Prevention Program which works with other state and local agencies to plan and carry out work to improve soil conservation and for other purposes, such as flood prevention, conservation, development, and water utilization. NRCS has had three Wetland Reserve Program (WRP) projects in the basin totaling 875 acres since its inception that were developed to protect, restore, and enhance the functions and values of wetland ecosystems. Other NRCS management and assistance programs include 2262 projects for 117,336 acres for all years in the Conservation Reserve Program (CRP). The CRP was developed to cost-effectively reduce water and wind erosion, create and enhance wildlife habitat, and encourage more permanent conservation practices and tree planting. The Forestry Incentives Program (FIP), with 684 projects on 25,135 acres during 1999-2000, and the Emergency Conservation Program are designed to rehabilitate farmland damaged by natural disasters and to carry out emergency water conservation measures during periods of severe drought. (www.nrcs.usda.gov)

## *Cooperative State Research, Education, and Extension Service*

This federal program provides educational and technical assistance to farmers for voluntary implementation of improved management practices that enhance and protect water quality and by addressing agricultural non-point source pollution problems. (www.reeusda.gov)

## *U.S. Forest Service*

In cooperation with the Mississippi Forestry Commission and the Mississippi Forestry Association, this federal agency assisted in the development of a set of best management practices for forestry activities, which is available to the public. (www.fs.fed.us)

## *Agricultural Research Service*

ARS measures the impacts of farming and ranching practices and other processes on water quality and assesses processes that control the fate and transport of chemicals and other contaminants. Using this information, the agency develops effective alternative practices designed to protect and enhance water quality. (www.msa.ars.usda.gov/area-bio/ns/ms_nsl.htm)

## *U.S. Army Corps of Engineers, Mobile District*

In addition to thier regulatory functions, the Corps, provides assistance through nine programs or authorities designed as cost share programs. These authorities include projects addressing flood control, navigation, environmental improvements, and aquatic ecosystem restoration, among others. (www.usace.army.mil)

## *U.S. Fish and Wildlife Service*

USFWS provides a number of management and assistance programs. One of these programs is the Partners for Fish and Wildlife Program. This program restores habitat for federal trust species through voluntary agreements with private landowners. Another program is the Off-Refuge and On-Refuge Investigation Programs that are designed to protect and enhance the quality of habitat and environment for fish and wildlife in and near Natural Wildlife Refuges. (www.fws.gov)

## *U.S. Geological Survey*

USGS works to identify the status and trends in water quality and quantity conditions and the human and natural conditions that cause existing water quality and quantity problems. The agency communicates these findings to resource managers and policy-makers. (www.usgs.gov)

# Basin-Specific Agencies and Management Programs That Address Water Quality

Additionally, several agencies and programs are specific to the Pascagoula River Basin or the Mississippi Gulf Coast and are described in more detail below.

## *Pat Harrison Waterway District*

Fifteen Southeast Mississippi counties formed the Pat Harrison Waterway District (PHWD) in 1962 to provide local input and development for water resource concerns in Southeast and East Central Mississippi. PHWD is supported by local property taxes from the member counties and is controlled by a board of directors appointed by the county supervisors of the member counties. The PHWD office is located at Hattiesburg in Forrest County.

PHWD works to develop watershed projects designed to benefit water supply, water drainage, navigation, flood control, recreation, conservation and development. Many of the Pat Harrison Waterway District water parks offer very high quality recreational opportunities while serving as flood control and water supply reservoirs. PHWD also coordinates with local development districts and agencies to promote wise conservation while planning development projects. (www.waterparkin.com)

*PHWD Managed, Dunn's Falls Water Park*

## *Mississippi-Alabama Sea Grant Consortium*

The Consortium supports scientific research, education and outreach efforts that foster the conservation, sustainable development and use of oceanic and coastal resources for the benefit of both the economy and the environment in Mississippi and Alabama. The Consortium, established in 1972, is comprised of nine universities and research laboratories, two marine extension programs in Biloxi, MS and Mobile, AL, and a Sea Grant Legal Program at the University of Mississippi. (www.masgc.com)

## *Mississippi Department of Marine Resources*

Created in 1994 as an independent state agency from the Bureau of Marine Resources, the Department of Marine Resources (DMR) manages our coastal resources through the authority of the Commission on Marine Resources (CMR.)

The DMR is dedicated to enhancing, protecting and conserving the marine interests of Mississippi for present and future generations. It manages all marine life, public trust wetlands, adjacent uplands and waterfront areas for the long-term recreational, educational, commercial and economic benefit of everyone. The DMR and the Commission on Marine Resources play an important role in administering Mississippi Seafood Laws, the Mississippi Coastal Wetlands Protection Act, the Public Trust Tidelands Act, the Boat and Water Safety Act, the Derelict Vessel Act, the Non-Point Source Pollution Act, the Magnuson Act, the Wallop-Breaux Sportsfish Restoration Act, Marine Litter Act and other state and federal mandates. The DMR also manages the Coastal Preserve Program, which encompasses over 14,000 acres in the basin. (www.dmr.state.ms.us)

## *The Nature Conservancy*

Although this non-profit organization is statewide, they have several nature reserves in the basin. They also coordinate wetland mitigation through their Old

Fort Bayou Mitigation Bank. The preserves that they manage conserve critical habitat for plants and wildlife while allowing public use. (www.tnc.org/states/mississippi)

# Identifying, Evaluating, and Addressing Issues of Concern Through the Basin Management Approach

A major focus of the Basin Management Approach process is the identification, evaluation, and prioritization of issues of concern within a basin. The ultimate goal is the development of a basin management plan designed to address the prioritized and quantified (through data collection and assessment) issues of concern. Issues of concern within the Pascagoula River Basin were identified by basin stakeholders and resource agency partners.

## *Identification, Evaluation, and Prioritization of Issues*

All of the identified issues will be reviewed and evaluated to ensure that an adequate description was developed, to determine if data were available to assess them, and to establish a relative ranking of priority for each issue based upon their potential impact on public health and water quality.

**Initial Issues.** Issues collected thus far from stakeholders and resource agencies are:

- Potential Nutrification of MS Sound
- Coastal Wetlands Restoration and Protection
- Unsewered Communities/Failing Septic Tanks
- Intensive Development Pressure/Urban Sprawl
- Water Quantity Impacts on Water Quality
- House Boats and Fishing Camps with Improper Wastewater Treatment
- Protection of Unique and High Quality Areas of Fish and Wildlife Habitat and Recreation

## *Data Collection Plan Development*

The next major milestone for the Pascagoula River Basin Team will be the preparation and implementation of a Data Collection Plan to evaluate the priority basin issues of concern. For each priority issue, the Data Collection Plan will identify what information is needed and why, who will collect the information, by what means and methods, over what period of time, and how the information will be stored and managed.

*One of the many "House Boat Villages" along the Pascagoula River*

A primary use of the Data Collection Plan will be to provide a central point of reference for all basin planning partners as well as the public. This should help to improve the coordination and efficiency of data collection and evaluation.

## *Stakeholder Involvement*

A basin stakeholder is a person who lives or works in the basin, recreates on its waters, or has an interest in the basin. The Basin Team will work with stakeholders in the Pascagoula River Basin through each phase of the basin management cycle. The Basin Team will seek both resource agency and stakeholder input on development of a Data Collection Plan that is needed to guide data collection efforts to address the priority basin issues of concern. Stakeholders will also be given the opportunity to help gather appropriate information during the data collection process and will be informed of data collection results once the Basin Team has evaluated the information.

During the development of the basin management plan, stakeholder input will be solicited and assistance requested for the identification of management strategies. The Basin Team will provide technical assistance. When completed, public meetings will be held to review the plans and obtain additional public input. Stakeholders will be encouraged to actively participate in outreach and implementation activities, during implementation of the basin management plan.

# What Can You Do To Help?

Steady progress is being made in solving water quality problems in the Pascagoula River Basin. However, we all need to do more to protect our water resources for future generations.

## *Public Involvement and Participation*

Because public involvement is a cornerstone of the Basin Management Approach, your participation and support is essential to meet the goals and objectives of the process. There are a number of things that you can do:

## *Get Informed*

Attend stakeholder meetings and actively participate. Find out about your local water resource problems. A database for basin stakeholders has been established for mailing information about meetings and other Basin Management Approach activities in the Pascagoula River Basin.

## *Properly Dispose of Wastes*

Don't accept the illegal dumping of non-toxic and toxic wastes in your community as a way of life. Non-toxic wastes include household garbage and inert debris like stumps and concrete. Toxic wastes include solvents, paints, oil, pesticides, and many cleaning agents. Encourage those in your community to find out the locations of non-toxic waste collection facilities and free collection days where you can bring in toxic materials for disposal.

## *Use Best Management Practices*

Many management practices have been developed and proven to reduce pollution of our water resources. Many of our resource agencies have programs designed to help the public learn about appropriate management practices for a range of land uses. Contact them, they will be glad to help.

## *Conserve Water—Inside and Out*

By conserving the amount of water we use, we reduce the amount that must be treated and discharged. We also place less stress on our ground water aquifers and help to maintain stream levels.

## *Get Involved*

Join or form a local watershed group. A key element of the Basin Management Approach is the formation of local watershed groups to assist in planning, monitoring, and implementation activities. This is an opportunity for you to make a difference.

# Who Can You Contact To Learn More?

If you or your organization would like assistance with forming a local watershed group, notification of upcoming stakeholder meetings, or simply desire information concerning the Pascagoula River Basin Management Approach, please contact the following person:

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**Pascagoula River Basin Coordinator**

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**E-mail: Jackie_Key@deq.state.ms.us**