

Mississippi's Nonpoint Source Management Program



2010 Annual Report



MISSISSIPPI DEPARTMENT OF
ENVIRONMENTAL QUALITY

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Mississippi's 2010 Nonpoint Source (NPS) Program Annual Report



Oyster Bayou
Harrison County

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Executive Summary

Nonpoint Source (NPS) Pollution, also known as polluted runoff, has an adverse impact on the State's water resources. Unlike pollutants from point sources that enter the environment from well-defined discharge points, pollutants from nonpoint sources find their way to surface and ground waters via rainwater runoff or percolation. The polluted runoff can contain sediment, nutrients, bacteria, or toxic materials. Runoff from the seven major land-use categories listed below potentially impacts the State's water bodies. These categories consist of agriculture, forestry, mining, construction activities, urban runoff, hydrologic modifications, and land disposal activities. Polluted runoff is a significant cause of water-quality problems in Mississippi. The NPS Pollution Control Program seeks to reduce or eliminate polluted runoff that degrades water bodies in Mississippi.

The State's NPS Management Plan incorporates a strategy for the management and abatement of NPS pollution and relies on statewide and targeted-watershed approaches. These approaches are implemented through both regulatory and non-regulatory programs on the federal, state, and local levels. Some of the activities regulated by the State include: construction, stormwater, mining, and hydrologic modifications. The strategy for the management of these activities is to continue to develop and implement educational programs and to continue to issue permits and maintain compliance and enforcement activities. The implementation of program activities for land-use categories that are not regulated will rely primarily on the voluntary cooperation of stakeholders and will be supported financially through federal assistance programs such as Section 319 and other state resources. The strategy for addressing NPS pollution on a statewide level includes education/outreach, assessment and monitoring, use of Best Management Practices (BMPs) demonstrations, BMP compliance, technology transfer, consensus building, and partnering.

The NPS Management Program also implements a strategy that targets priority watersheds. Prioritization of these watersheds is done by multi-agency teams in the *Basin Management Approach* (BMA). Within priority watersheds, activities will be implemented to address parameters of concern that appear on the State's 303(d) list. The State's NPS Program also incorporates the *Coastal NPS Program Strategy*, the recently developed *Mississippi Delta Nutrient Reduction Strategy*, *Basin-wide Approach Strategy*, and the State's strategy for the development and implementation of NPS Total Maximum Daily Loads (TMDLs). These strategies will be modified as more data and new issues are identified under the BMA. The NPS Program continues to be implemented in cooperation with several agencies, organizations, and groups at all levels of government and in the private sector. A great focus is given to activities that promote consensus building and partnering to increase the overall effectiveness of the State's NPS Program.

This report relates several accomplishments during calendar year 2010 that directly relate to and support the long-term and short-term action strategies identified in the State's NPS Management Program. The 2006 agreement between MDEQ and the United States Geological Service USGS continues to provide assessment/monitoring support to priority watersheds. The USGS, along with a number of watershed teams, coordinates the development and implementation of monitoring plans to document water-quality improvements. Other major accomplishments include the completion of nine stressor identification reports in 2010 that spanned the Tombigbee River, Coastal Streams, Yazoo River, and Big Black Basins. With the completion of these reports, MDEQ completed 19 TMDLs. Regarding assessment and monitoring efforts, other major work includes developing nutrient, water-quality criteria standards. In the education/outreach area, MDEQ enjoys the continued success of the musical puppet-play *Watershed Harmony* that shows grade-school students the importance of controlling NPS pollution. Other important accomplishments include the further development and use of two major tools: 1) the *Mississippi Watershed Characterization and Ranking Tool* (MWCRT) and; 2) *The NPS Watershed Resource Management System* (WRMS).

In addition to these activities, there continues to be much progress in the protection and restoration efforts of specific watershed projects. The Fourteen Mile/Bakers Creek Watershed in Hinds County was completed in 2010. Erosion was occurring at an alarming rate and degrading the natural-resource base of both of these creeks. Fifty-seven BMPs were implemented and reduced pollutant loadings of both nitrogen and phosphorous by 5,017 lbs/yr and by 2,599 lbs/yr, respectively. The Red Creek Watershed Project in Stone County was completed in 2010 and included multiple education and outreach events, as well as the conservation of 57.7 acres located along the stream bank. The Magee's Creek Watershed Project located in Walthall County was highlighted by EPA as a success story for 2010. The project included 114 best management practices which were installed over 3,355 acres. The Buttahatchie River-Bank Demonstration/Stabilization Project, located in Lowdes County is designed to stabilize 600 feet of eroding stream bank. The site consists of five separate BMPs for stabilization purposes installed along the 600 feet of eroding bank. The Steele Bayou Watershed Project, which ended in September of 2009, consisted of 30 BMPs installed on priority sites. The best management practices included over-fall pipes, rip-rap weirs, and rip-rap energy pools. The Turkey Creek Watershed Project is located in Harrison County and is an EPA and MDEQ priority watershed. The primary objective of the project is to establish and maintain a greenway to help protect water quality and the culture and historic value of the community. The Ross Barnett Reservoir Initiative (RBRI) was initiated in 2009 and focuses on the restoration of the 33,000-acre lake in order to aid economical development within the local economy. In 2010, the MDEQ and the Pearl River Valley Water Supply District have been working towards finalizing plans to restore and protect water quality within the Reservoir. The NPS program will continue to collaborate with resource partners to foster stewardship of the state's water resources by supporting education and outreach, assessment and monitoring, and watershed protection and restoration efforts.

What is Nonpoint Source Pollution?

Nonpoint source (NPS) pollution, also known as polluted runoff, has an adverse impact on the State's water resources (see www.epa.gov/owow/nps/whatis.html). Unlike pollutants from point sources that enter the environment from well defined discharge points, pollutants from nonpoint sources find their way to surface and ground waters via rainwater runoff or percolation. The polluted runoff can contain sediment, nutrients, bacteria, or toxic materials. This runoff comes from seven major land-use categories and can potentially impact the State's water bodies. These seven categories are: agriculture, forestry, mining, construction activities, urban runoff, hydrologic modifications, and land-disposal activities. Polluted runoff is a significant cause of water-quality problems in Mississippi. The Nonpoint Source Pollution Control Program seeks to reduce or eliminate polluted runoff that degrades water bodies in Mississippi.

Mississippians enjoy a rich heritage of natural resources. From headwater streams to the Gulf of Mexico, Mississippi's land has been blessed. The charge given to the MDEQ is to conserve the environment while allowing economic development to occur in concert with good environmental practices.



The Mission of the NPS Pollution Control Program in Mississippi is to conserve and improve state waters for man's use and the sustainment and propagation of wildlife and aquatic life, through focused research, responsible regulation, widespread education, and cooperation with other agencies and the public."



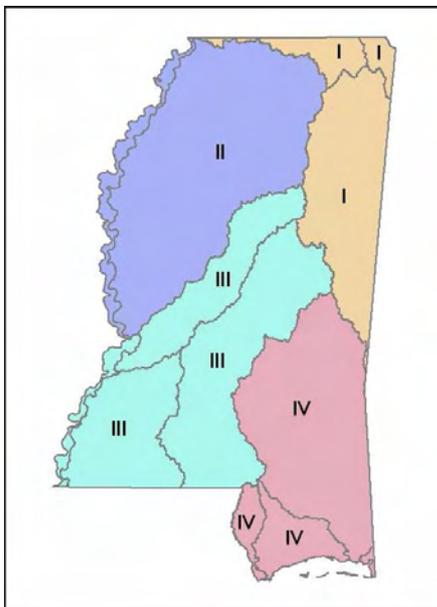
History of NPS Program

First Ten Years...

The 1987 Amendments to the Clean Water Act (CWA) established a national policy that programs be developed to control nonpoint sources of pollution. Congress inserted Section (§) 319 in order to establish a national program to address nonpoint source pollution. It authorized the EPA to issue grants to states and, in order for the states to receive these grants, required the states to assess NPS pollution problems and causes within the State, and to implement a management program to control NPS pollution. Every few years, the states must document their efforts and results in assessing pollution problems and implementing their management programs. A NPS assessment document and a management plan was developed and approved by the Environmental Protection Agency and Mississippi's NPS Management Program began in August, 1989. To date, MDEQ has successfully secured 21 annual grants from the EPA to run its NPS program.

The NPS Program was originally established to provide education and outreach, demonstrate the effectiveness of Best Management Practices (BMPs), investigate the ability of new practices and technologies to reduce NPS pollution, and to assess NPS sources and impacts to waters of the State. In 1999, the NPS Program began to change its focus as the Total Maximum Daily Load (TMDL) issue gained national attention. Questions were raised at both the state and the federal level as to how to address any NPS pollution reductions that might be required in a TMDL. MDEQ answered the question by developing the Basin Management Approach (BMA).

Moving into the future...



The mission of the BMA 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 comprised 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 BMA also encourages and provides the opportunity for basin-team members to pool both technical and financial resources to address priority watersheds. More information on Mississippi's BMA and the NPS Program can be found on MDEQ's website: www.deq.state.ms.us. Information on the long-term goals of the NPS Program can be found in the quick-links section of the NPS home page on the MDEQ website (See NPS Related Links).

Highlights of the Year

Assessment & Monitoring/ TMDL Activity

Total Maximum Daily Loads

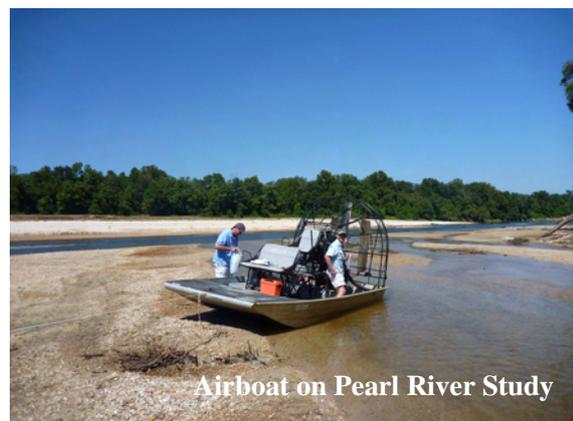
A total maximum daily load (TMDL) is the greatest amount of a pollutant that a water body can accept and still meet water-quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, fishing, swimming, and recreation. A TMDL specifies how much of that pollutant can come from point sources, such as industry and communities, and nonpoint sources, such as storm-water runoff from urban areas or agriculture. The TMDL provisions require states to identify and list water bodies that are not meeting water-quality standards and provide direction for restoring the nation's waters.

Under [Section 303\(d\)](#) of the [Clean Water Act](#) (CWA), states are required to develop a list of waters that are not in compliance with water-quality standards and establish a total maximum daily load (TMDL) for each pollutant causing the impairment. MDEQ, biennially, creates a list of these impaired waters called the 303(d) List of Impaired Waters. MDEQ's 2010 list is pending approval from EPA.

As of July 2009, MDEQ fulfilled a federal-consent, decree requirement that mandated 2,700 TMDLS be completed by 2009. Because MDEQ is no longer under this consent decree, expanded efforts for more accurate data collection have been underway. In 2008, the Mississippi Benthic Index of Stream Quality (M-BISQ) was recalibrated using data and information collected from 2001-2006. Under the guidelines of this updated biological monitoring methodology, MDEQ continues to sample biological communities to provide an indicator of instream water quality. In addition to the biological sampling, the TMDL program has conducted more in-depth diel sampling (24 hr data measurements) of several water-quality parameters. By using these combined data collection efforts, MDEQ has been able to better identify the overall health of several water bodies.

MDEQ completed nine stressor identification reports in 2010 that spanned the Tombigbee River, Coastal Streams, Yazoo River, and Big Black River Basins. With the completion of these reports, MDEQ completed 19 TMDLs in 2010.

Another program of MDEQ's TMDL Program is Waste Load Allocations (WLAs). Data collected from WLA Studies are input into a computer model to determine the impacts of various water-quality parameters on the biological community in response to effluent from wastewater dischargers. This year, the collective efforts of the Standards Modeling, and TMDL Branch (SMTB), the Fields Services Division (FSD), and the Office of Land and Water (OLW) were used for studies on water bodies such as the Pearl River (Georgia Pacific), Big Bogue Creek (Duck Hill), and Lake George (Simmons Catfish).



Airboat on Pearl River Study

Stressor Identification Program

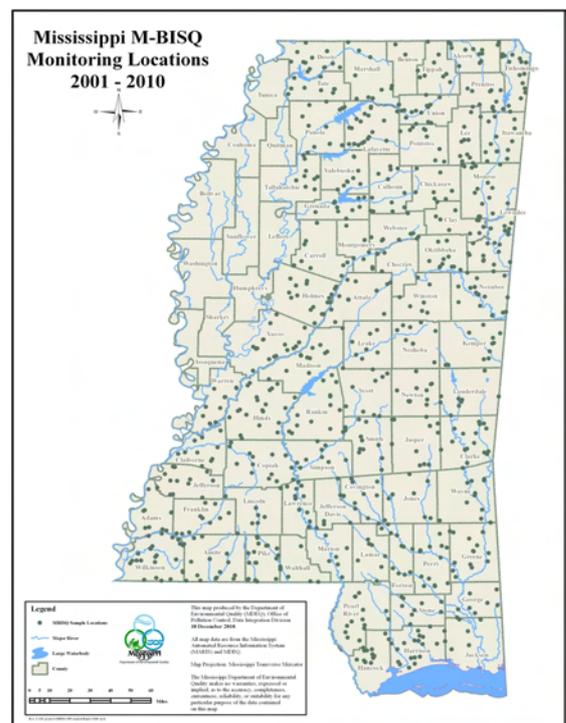
As required by §303(d), TMDL development is to be undertaken for applicable pollutants identified through the 303(d) listing process. However, TMDLs cannot be computed on §303(d) listings identified as biological impairment because the actual stressors causing the impairment were not known. Beginning in 2001, MDEQ conducted statewide biological monitoring using benthic macroinvertebrates as an indicator to develop a regionally-calibrated Index of Biological Integrity (IBI) for wadeable streams. This IBI is known as the *Mississippi Benthic Index of Stream Quality* (M-BISQ). M-BISQ is used to provide a credible and scientifically defensible assessment of the biological integrity of Mississippi's streams and rivers.

During the last reporting period, the M-BISQ was re-calibrated to account for the growing data set and to accurately reflect regional variations across the State. This required extensive statistical analysis to identify relationships and metrics that demonstrate a biological response to potential stressors. Additionally, the Stressor Identification Process was expanded to include additional monitoring activities to assess water bodies during periods of critical stress including low-flow and high temperatures. A total of nine stressor identification analyses were completed for water bodies that were prioritized for TMDL development.

The Stressor Identification Program supports activities to identify potential causes and sources of biological impairment as identified through the M-BISQ project for impaired water bodies across the State so that appropriate restoration measures may be taken. Resulting data will also be used in subsequent §305(b) assessment efforts for reporting causes and sources of impairment. Based on the stressor identification analysis, TMDLs will be developed for applicable pollutants with management and implementation strategies. The strategies will be recommended for the segment having existing and potential loadings of point and nonpoint source pollution.

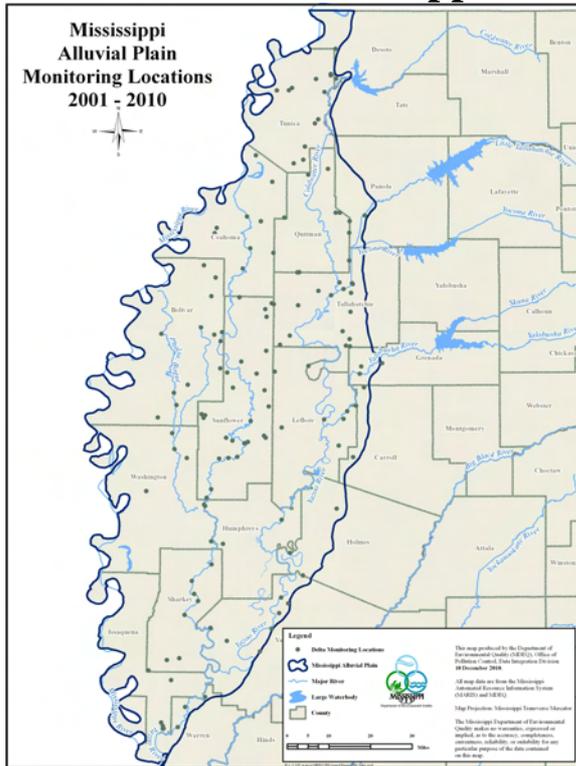
Mississippi Benthic Index of Stream Quality

In 2001, MDEQ developed the *Mississippi Benthic Index of Stream Quality, Development and Application of the Mississippi Benthic Index of Stream Quality (M-BISQ)* (MDEQ 2003b). This *Index of Biological Integrity (IBI)* is used to assess all wadeable, non-tidal streams in Mississippi with the exception of those located in the Mississippi Alluvial Plain. Monitoring efforts completed have greatly increased the number of biological assessments conducted on State waters. The *M-BISQ* sampling program and the established sampling and analytical methodology contained therein now serves as the foundation for routine biological monitoring in MDEQ's statewide *Status and Trends Ambient Monitoring Network*. The *IBI* index was originally developed using biological and environmental data collected from 463 stream locations. Since 2001, 1,112 biological samples have been collected from 848 sites. It is common practice to re-calibrate IBIs every 3-5 years to ensure that the index continues to accurately reflect stream health. As such, in 2008, the *M-BISQ* was recalibrated using data that were collected since the original development of the index in 2003. These additional data were used to both test the



performance of the original *M-BISQ* and to recalibrate the index. As part of MDEQ's routine monitoring program, about 100 samples are scheduled for collection annually. Figure 1 shows all of the *M-BISQ* monitoring locations where samples have been collected from 2001-2010.

Mississippi Alluvial Plain Monitoring



In 2002, MDEQ began collecting biological community, physical, chemical, and habitat data on wadeable streams in the Mississippi Alluvial Plain, commonly referred to as the Mississippi Delta. These data, along with historical monitoring in the Mississippi Alluvial Plain were used to develop a preliminary index of biological integrity for the Mississippi Delta. In addition, the data collected are also being used to evaluate the dissolved oxygen criteria in the Delta as well as support nutrient criteria development. With each new set of data collected annually during September – October, the preliminary index will be refined and when finalized, biological monitoring in the Mississippi Delta will be incorporated into MDEQ's *Ambient Monitoring Program*. Since monitoring was initiated in 2002, a total of 96 sites have been monitored. The effort to develop an index of biological integrity for the Mississippi Alluvial Plain is an ongoing effort with the USGS.

Geographic Information Systems Mapping of NPS Projects

The NPS Program continues to use Geographic Information Systems (GIS) for its watershed projects. Some of the major ways GIS is used are: 1) housing and maintaining a geodatabase of locational information for current and historical Best Management Practice (BMP) installations (Figure 4); 2) storing information regarding assessment and monitoring of NPS projects and; 3) facilitating watershed characterization and project prioritization. Grant tracking and reporting are presently separate from the spatial geodatabase, but as reporting requirements have changed, the need for an integrated and automated BMP tracking system has increased. To satisfy these requirements and facilitate BMP tracking, the NPS has contracted Cengea Systems Incorporated (Cengea) to develop an implementation of the *Watershed-the System* software (*Watershed*) for use in Mississippi. The custom-built version of *Watershed* for Mississippi is known as *The NPS Watershed Resource Management System (WRMS)*.

WRMS is a comprehensive, GIS-enabled solution originally developed for soil and water conservation agencies, but many parts of *WRMS* meet current needs of the NPS Program. It is designed to assist the NPS

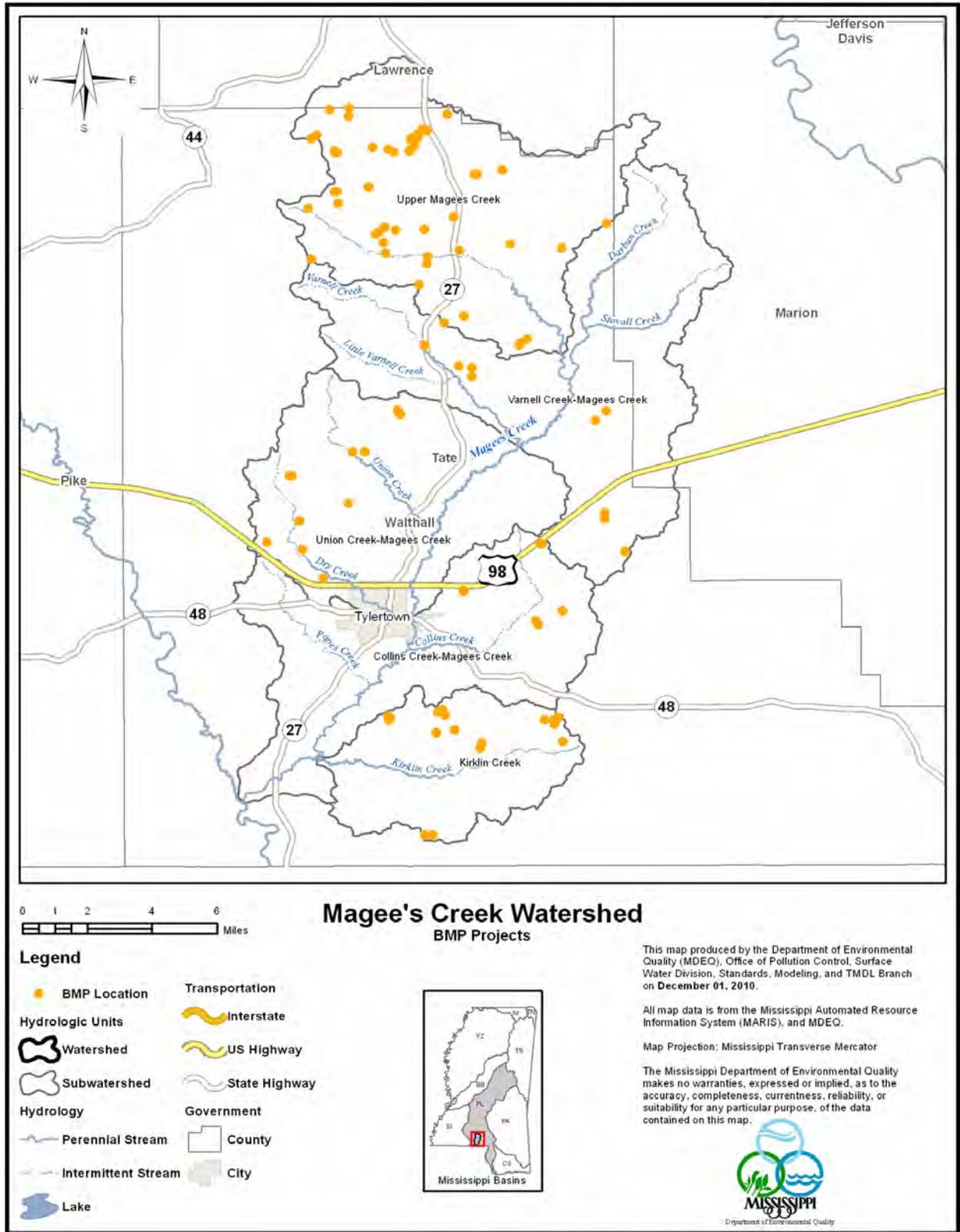
Management Branch in entering, managing, mapping, analyzing, and reporting information about its NPS 319 program, budget, and activities. This system is composed of seven (7) modules. The modules are: 1) Cooperators; 2) Planner; 3) Watershed Projects; 4) Cooperator Projects; 5) Fund Manager; 6) Map and; 7) Reporting. The software has more modules, but these are the main ones that concern NPS Branch users.

The *WRMS* takes a project-oriented approach. It takes funds granted using the **Fund Manager Module** and parses them into projects in the **Watershed Projects** and **Cooperator Projects** modules. NPS staff uses the **Fund Manager Module** to record MDEQ Division Codes (DC) that funnel 319 Grant funds into the NPS Program. The **Watershed Projects Module** is used to allocate DC funds into NPS Program work-element projects. These projects are organized around the grant-budget work elements. Projects in the **Watershed Module** are usually planning accounts for money awarded and spent through contracts or agreements with external parties (Cooperator Projects). The **Cooperator Projects Module** consists of projects that are usually sub-grant awards or contracts let to State agencies or other entities (third parties) with NPS pollution-control goals and objectives similar to the MDEQ NPS Program. MDEQ awards money for a cooperator project within the *WRMS* in which a third party has agreed to perform the work. When the work is completed, the third party is reimbursed for the effort. *WRMS* is used to track these activities and their funding.

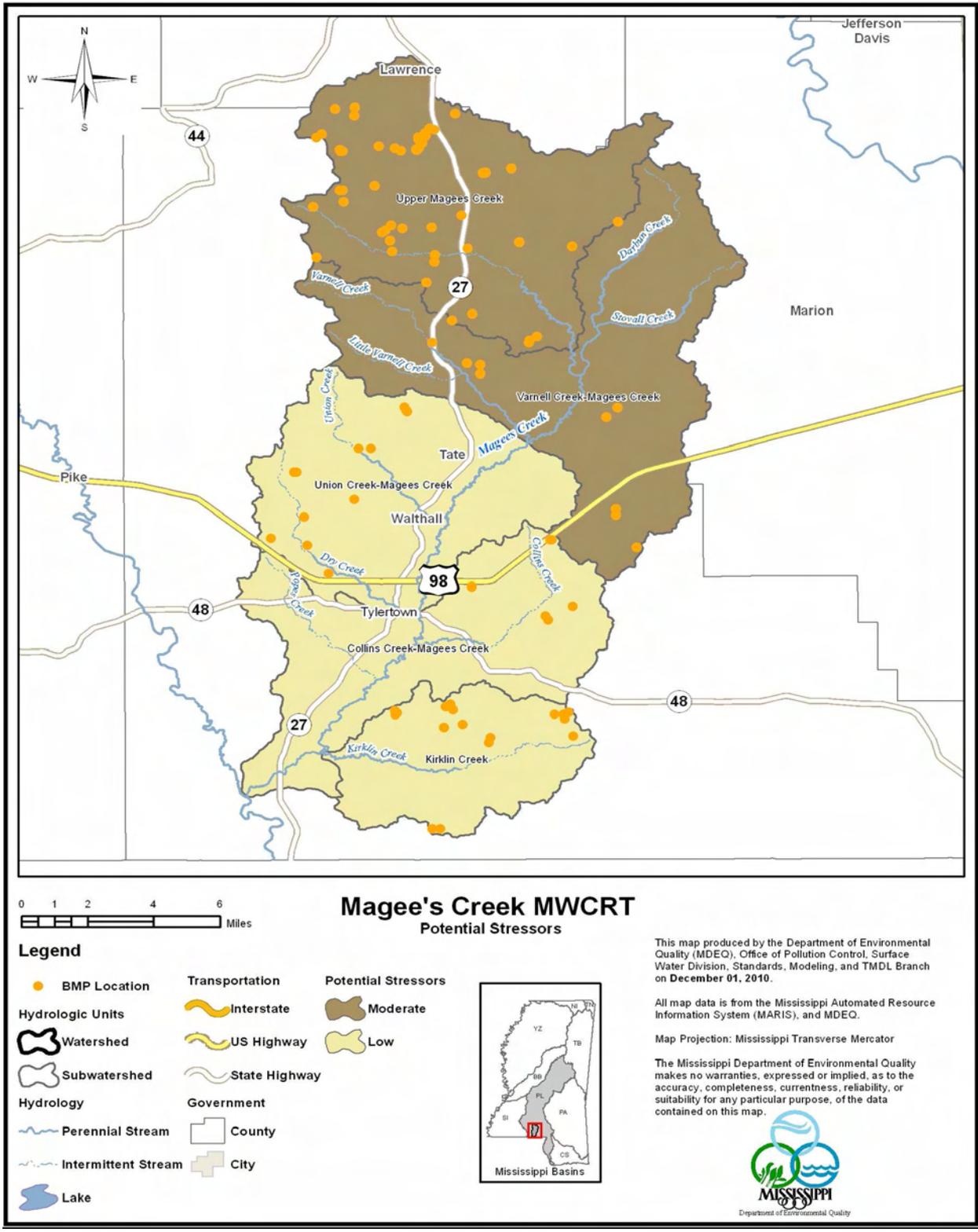
The **Cooperators Module** holds a list of organizations and contacts involved with activities of the NPS Management Branch. MDEQ communicates with *Project* contractors or partnering agencies who, in turn, will communicate with members of the public who also participate in projects by various means. Activities include constructing or maintaining BMPs, education/outreach events, water-quality monitoring or assessments, to name a few. The **Planner Module** allows users of the application to create and manage a set of goals and objectives for the NPS Program. The **Map Module** uses a GIS service to view surface features in Mississippi and record or see and analyze where NPS Program activities have taken place. Finally, the **Reporting Module** is used to run either canned reports or ad hoc reports from queries run against data in the *WRMS*.

Another GIS tool used by the NPS Program is the *Mississippi Watershed Characterization and Ranking Tool (MWCRT)*. The *MWCRT* is a spatially-based tool used to characterize the sub-watersheds within the major river basins in Mississippi. The general parameters of the tool are used to assess readily available statewide spatial data within the sub-watersheds or 12-digit hydrologic unit codes (See figure 3). The assessments are used to characterize the sub-watershed within each river basin. Each spatial layer is placed into a broad category to determine its resource value on the environment and human welfare and to assess the stressors placed on each sub-watershed. These characterizations are then used to calculate a score for each sub-watershed. The score of each sub-watershed is based on raw, spatial data in the form of points, lines, and polygons. The data are calculated as observations (counts), linear miles, and acres of data. Raw data values are normalized and weighted by relative importance to create the ranking system. Each data layer can then be assessed individually or combined to produce a ranking of each sub-watershed. The *MWCRT* provides a scientific method that allows managers to identify watersheds of interest, make meaningful decisions, and prioritize watersheds for restoration and protection activities. Mississippi has over 1,350 individual sub-watersheds. The *MWCRT* has allowed MDEQ and its partners to shorten the evaluation time for identifying priority watersheds.

The *MWCRT* has been recently updated to include the most current landuse *National Landuse Classification Dataset* (NLCD), 2001), *Certified Watershed Boundary Dataset* (WBD, 2006), cropland *National Agriculture Statistic Service Cropland Data* (NASS CDL), 2008), and *Livestock Data* (USDA Census of Agriculture, 2007). Using existing methods developed for a basin-wide approach, the updated *MWCRT* has been reconfigured to help project managers at the MDEQ and National Resource Conservation Service (NRCS) find potential project areas on the sub-basin level.



GIS mapping shows locations of BMPs in the Magee's Watershed.



Map of Magee's Creek MWCRT Potential Stressors Output.

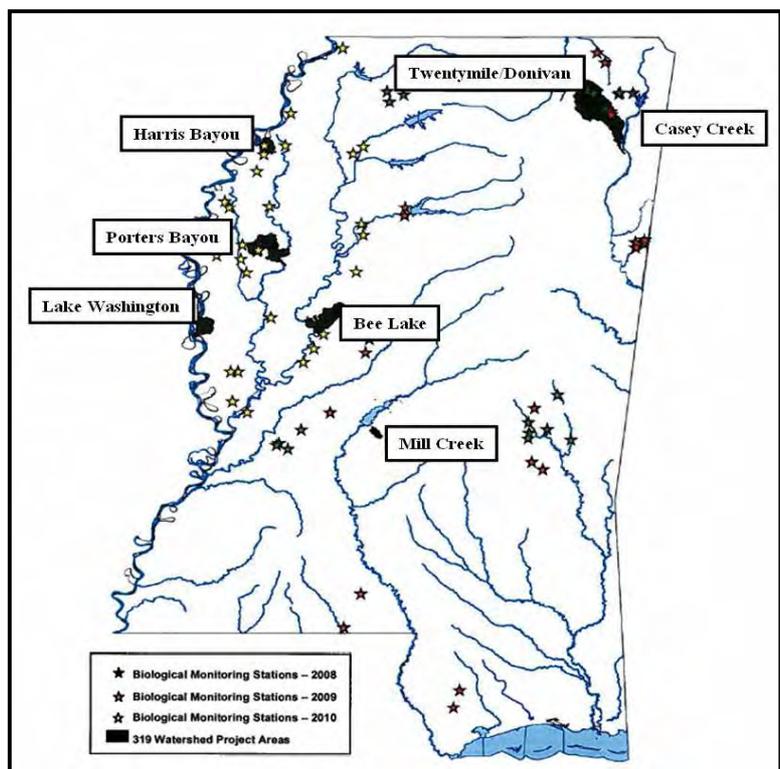
Mississippi Agrichemical Groundwater Monitoring Program

The *Mississippi Agricultural Chemical Groundwater Monitoring Program* is an on-going program initiated in March, 1989, for the purpose of determining if the use of agricultural chemicals is impacting groundwater quality in Mississippi. During the calendar year 2010, samples have been collected from a total of 43 wells. Included in this total were 5 private, drinking-water wells sampled throughout the State and 38 high-volume irrigation and fish-culture wells located in the highly agricultural Mississippi Delta. Three of these drinking-water wells and nine of the high-volume wells were re-sampled to determine if water quality had changed during the year. In addition to these well samples, four samples were collected from surface-water sources in support of groundwater activities. Analyses of these 59 samples did not detect any agricultural chemicals or other organic compounds exceeding *Federal Primary Drinking Water Standards* and/or *State of Mississippi Groundwater Standards*.

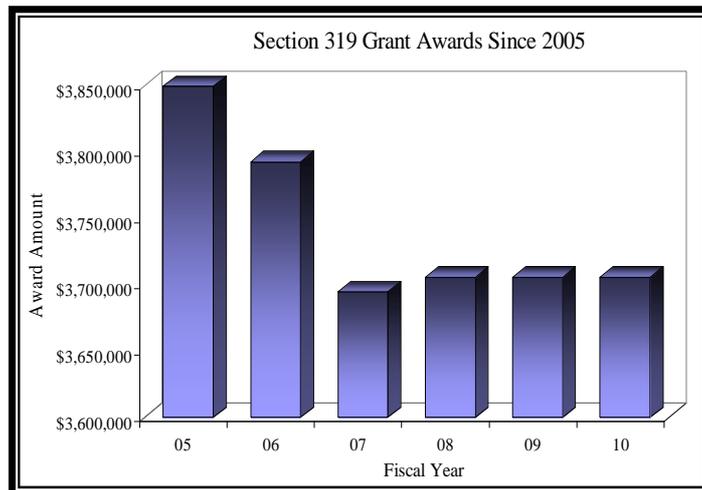
In addition to simply monitoring groundwater, the AgChem Program actively participates in other programs involved in protecting groundwater in Mississippi. One of these programs is the *Mississippi Pesticide Container Recycle Program*. During the calendar year 2010, a total of seven days have been spent out of the office in field activities related to this program. Although complete results are not yet available, it is estimated that a total of over 600,000 pounds of plastic, pesticide containers will be recycled during this calendar year.

Supplemental Watershed Implementation Project Monitoring

MDEQ continues to maintain a supplemental monitoring agreement with the U.S. Geological Survey (USGS). Each agency shares 50 percent of the costs with \$319 NPS funds contributing its share to develop pre- and post-implementation monitoring plans in priority watersheds. The monitoring aids in quantifying water-quality improvements over time. These plans are developed in collaboration with local Watershed Implementation Teams and serve as the monitoring component of the respective Watershed Implementation Plan. Development of a QAPP for each monitoring plan is also required. The recurring annual agreement calls for approximately \$255,000 from each participating organization. Where possible, funding for the actual implementation of the monitoring plan will be included in the incremental \$319 NPS contract for each project. To date, monitoring is ongoing in five watersheds across the State: 1) Mill Creek; 2) Harris/Porters Bayous; 3) Twentymile/Donivan/Casey Creeks; 4) Bee Lake and; 5) Lake Washington.



Section 319 Watershed Projects



Program Funding

Since the inception of the §319 Nonpoint Source Program in 1990, various types of projects have been funded, including demonstrations of BMPs in watersheds; agricultural/chemical waste disposal; alternatives for converting dairy-cow wastes into electrical power and preventing possible stream pollution from those wastes; industrial-plant demonstrations that focused on preventing NPS pollution in industrialized watersheds; coastal streams ecosystem restoration; and conservation easements that encouraged and assisted farmers to place lands into riparian-buffer strips. In recent years, §319 NPS funding has been used more and more to support large-scale watershed restoration and protection projects. The strategy behind this approach is to use the committed §319 resources to attract additional leveraging opportunities, that together, create a greater potential to achieve quantifiable reductions in pollutant concentrations/loadings. With these large-scale projects, it is anticipated that a heightened focus on pre- and post-implementation monitoring will document the improvements in resulting water quality.

Nutrient Reduction Strategy

Mississippi's approach to reduce nutrient loadings within basins and to the Gulf of Mexico is a highly collaborative, stakeholder-supported process centered on the development and implementation of comprehensive nutrient reduction strategies for nonpoint and point sources of pollution. The approach is built upon three foundational planning components: 1) The Gulf Hypoxia Action Plan for Reducing, Mitigating, and Controlling Hypoxia in the Northern Gulf of Mexico and Improving Water Quality in the Mississippi River Basin; 2) The Gulf of Mexico Alliance's Governors' Action Plan for Healthy and Resilient Coasts and; 3) Nutrient TMDLs developed under *EPA's Federal Consent Decree*. To implement these plans successfully, over 20 state- and federal-resource agencies, nongovernmental stakeholder organizations, and local watershed teams in Mississippi are working together to develop and implement

nutrient reduction strategies. The strategies are being developed using an ecoregional approach that fosters local stakeholder involvement, addresses varying land uses between ecoregions, and maximizes regional partnering and leveraging opportunities. A nutrient reduction strategy has been completed for the Mississippi Delta, the primary area of row-crop agriculture and aquaculture in the State. Also, a nutrient-reduction, strategy template was developed for coastal watersheds. Development of this template was a Gulf of Mexico-wide effort in which all five Gulf Coast states participated to establish a consistent, aligned approach. Each of these strategies addresses both nonpoint and point sources of pollution. The coastal-strategy template also addresses atmospheric deposition. During 2010, work began on the development and implementation of upland strategies that will address upland nutrient stressors within the State, i.e. cattle, forestry, poultry. The coastal template is also being applied to develop and implement coastal, nutrient-reduction strategies for the coastal watersheds in Mississippi. The strategies for the three areas of the State will be combined in 2011 resulting in comprehensive strategies useful in all ecoregions of the State.

Basin Management Approach

Basin Group 1 (Tombigbee River, Tennessee River, and North Independent Streams) is a revised basin group. The biggest project for this basin team is the restoration and protection activities in Pickwick Lake Watershed in the Tennessee River Basin. This project is located in an EPA, Region 4-priority watershed. The Pickwick Lake Watershed Team, under the leadership of the Tennessee Valley Authority (TVA), has developed a multi-faceted Watershed Implementation Plan. The team is composed of 11 partners working with local landowners to contribute over \$1,467,850 (\$837,325 in 319 monies) in current funding for monitoring, education, and on-the-ground activities in the Pickwick Lake area. The agencies and organizations participating on the Pickwick Lake Watershed Team are the U. S. Environmental Protection Agency, EPA Region 4, Geological Survey of Alabama, MDEQ, Mississippi Department of Health, Mississippi Forestry Commission, Mississippi Rural Water Association, Mississippi Soil & Water Conservation Commission (MSWCC) and Conservation Districts, USDA-Natural Resources Conservation Service, The Nature Conservancy-Mississippi Chapter, U. S. Fish & Wildlife Service, and TVA.

In 2009, a watershed coordinator was hired to organize partnership members and various project activities. The coordinator will represent interests of all partnership members as outlined in a jointly established job description and work plan. Several agricultural BMPs have been installed, an update of the Yellow Creek Source Water Assessment completed, and a Source Water Protection Plan is in progress. TVA developed a water-quality monitoring plan and has been collecting samples in accordance with its schedule.

Watershed restoration projects for Donovan and Twentymile Creeks and Browns Creek are also in the Tombigbee River Basin and showed significant progress, although hampered by wet-weather conditions. Landowner response for the Donovan and Twentymile Creek project was so promising that the contract was modified to increase funding by \$40,000. The money was taken from the Browns Creek project where the recession has caused landowner interest to be less than originally shown.

Basin Group 2 (Yazoo River) is the focus of several, large-scale watershed projects designed to implement nutrient and sediment TMDLs. Objectives of these projects include implementation of the *Mississippi Delta Nutrient Reduction Strategies* to answer the following key questions:

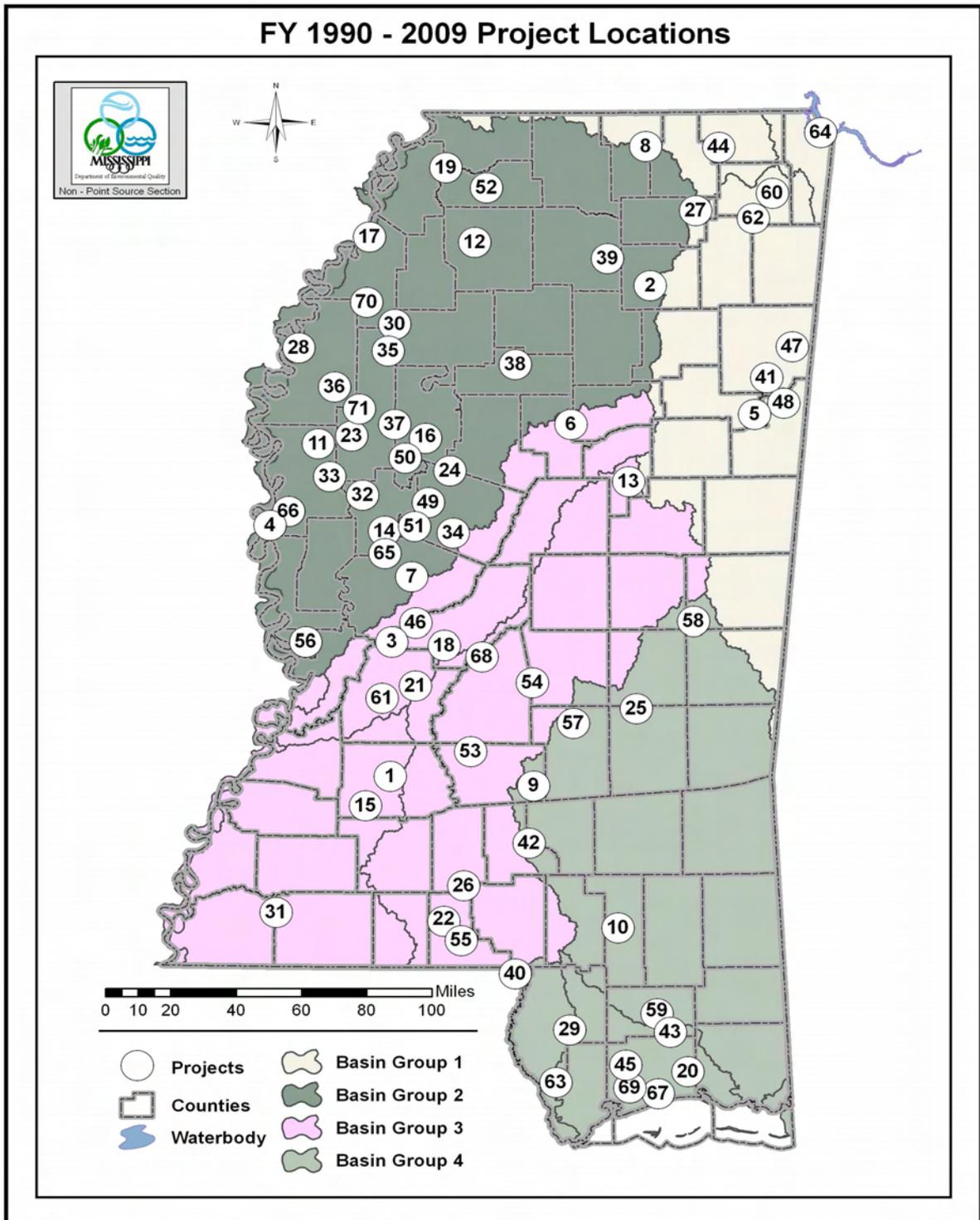
- What nutrient load reductions are achievable?
- What will these reductions cost?
- What is the value to each stakeholder from these reductions?
- How to best implement in the future?

These projects provide useful information for the ongoing nutrient-criteria development effort. The watersheds addressed by these projects include Harris Bayou, Porter Bayou, Bee Lake, Lake Washington, Wolf/Broad Lakes, and Steele Bayou. Significant leveraging of non-319 resources has been directed toward these projects. Harris Bayou, Porter Bayou, Bee Lake, Lake Washington, and Steele Bayou are EPA-priority watersheds. Other completed watershed projects using 319 NPS funding include Hickahala and Senatobia Creeks, Tchula Lake–Abiaca Creek, and Deer Creek.

Basin Group 3 (Pearl River, Big Black River and South Independent Streams) has realized significant focus through the planning activities of the *Ross Barnett Reservoir Initiative*. The Barnett Reservoir, Mississippi's largest surface-drinking water source, is also the catalyst of a great deal of recreational activity and suburban growth. Implementation of the initiative is funded by FY09 NPS funds. *WaterFest 2010* was the signature event of the educational and outreach campaign of the above initiative and attracted more than 3,000 people who learned about the importance of protecting the water quality of the reservoir at the all-day, multi-activity event. Completed 319 NPS-funded projects include the installation of sediment-reduction agricultural BMPs in the Fannegusha Creek Watershed, and in the Magees Creek Watershed project

Basin Group 4 (Pascagoula River, and Coastal Streams) has received the emphasis of more protection-oriented watershed projects. These projects have focused on the acquisition of conservation easements and have also included installation of BMPs at Turkey Creek, Oakahay Creek, Pascagoula and Escatawpa Rivers, Red Creek, Chunky River, and Okatibbee Creek/Lake. Turkey Creek is an EPA-priority watershed. The projects are currently in the implementation phase.

FY 1990 - 2009 Project Locations



**Locations of watershed projects in Mississippi since the NPS program's inception.
An index of all the numbered locations is shown on the following two pages.**

Watershed Projects	Project Name
1	1990 Lake Hazle
2	1990 Swine Production Waste Management
3	1992 Bogue Chitto Watershed
4	1992 Lake Washington
5	1993 Luxipalila Watershed
6	1993 NPS Demo Farm
7	1993 NPS Demo Farm
8	1994 Muddy Creek Demo
9	1994 Okatoma Creek Demo
10	1995 Catfish Pond Nutrient Removal
11	1995 Irrigation Return Flow Water Quality Demo
12	1995 McIvor Creek Watershed
13	1995 Surface Water/Groundwater Interaction
14	1995 Wolf lake NPS Demo
15	1996 Copiah-Lincoln Golfcourse BMP Demo
16	1996 Impact of Flooding on Nitrogen Discharge (Roebuck Lake)
17	1996 Moon Lake Demo
18	1996 Urban Resource Conservation Plan, Madison
19	1997 Cane Musscacunna Creeks
20	1997 Land Acquisition
21	1997 Model Stormwater BMP Demo - Lefluer's Bluff
22	1997 Pushepatapa Watershed
23	1998 MSEA (Beasley Lake) Project
24	1998 MSEA (Deep Hollow Lake) Project
25	1998 Souinlovey Creek
26	1998 Ten Mile Creek Demo
27	1998 Ten Mile/Donivan Creek
28	1998 Upper Bogue Phalia Watershed
29	1999 Coastal Streams
30	1999 Delta F.A.R.M. Project
31	1999 East Fork Amite River Watershed
32	1999 MSEA (Thighman Lake) Project
33	2000 Alternative BMPs in Bogue Phalia
34	2000 Big Cypress Creek
35	2000 Bogue Phalia/ Coldwater River Watershed
36	2000 Mound Bayou
37	2000 MSVU Water Quality Demo
38	2000 Riverdale Creek
39	2001 Cane - Duncans Watershed Demo
40	2001 Lower Pearl River Watershed Demo

Watershed Projects	Project Name
41	2001 Luxapalila/Yellow Creek Watershed Demo
42	2001 Middle/West Bowie Creek Watershed Demo
43	2001 Old Fort Bayou
44	2001 Tuscumbia River Watershed Demo
45	2001 Beauvoir's Oyster Bayou Restoration Project
46	2002 Bogue Chitto Creek Watershed
47	2002 Buttahatchee River Watershed
48	2002 Luxipalila Watershed
49	2003 Abiaca Creek/ Tchula Lake
50	2003 Bear Creek
51	2003 Bee Lake
52	2003 Hickahala Creek
53	2004 Fannegusha Creek Watershed NPS Project
54	2004 Magees Creek Watershed NPS Project
55	2004 Strong River NPS Project
56	2005 Steele Bayou
57	2005 Oakahay Creek
58	2005 Chunky-Okatibee
59	2005 Red Creek
60	2006 Browns Creek Watershed
61	2006 Fourteen Mile/Baker Creek Watershed
62	2006 Twenty Mile/Donivan Creek Watershed
63	2006 Dead Tiger/Orphan Creek Watershed
64	2007 Pickwick Lake Project
65	2007 Wolf Lake Project
66	2007 Lake Washington
67	2007 Turkey Creek Watershed
68	2008 Ross Barnett Reservoir
69	2008 Wolf River Watershed
70	2009 Harris Bayou
71	2009 Porter Bayou

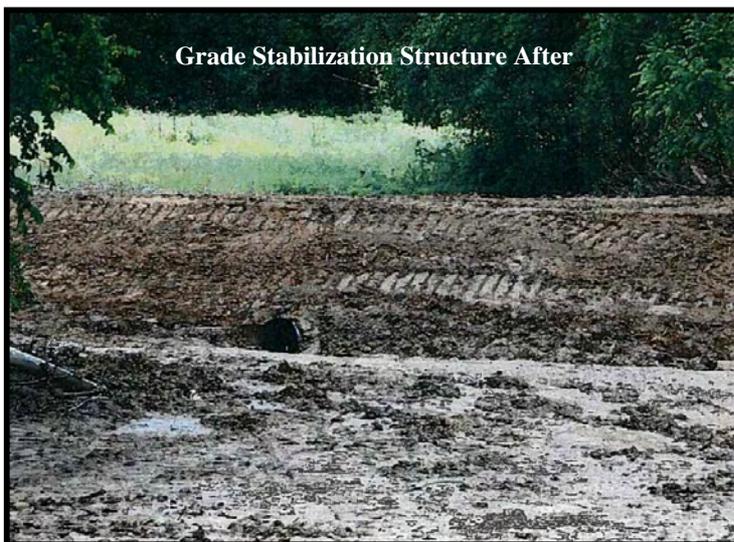
Showcased Section 319 Projects

MDEQ had six active grants in 2010 totaling \$22.5 million in federal funds. During 2010, thirty-three (33) projects/activities totaling \$4.1 million were completed with about 40 projects/activities still ongoing. Those that are ongoing may take from one to four years to complete. The following is a highlight of some of the projects.

Fourteen Mile/Bakers Creek

The Fourteen Mile/Bakers Creek Watershed in Hinds County, Mississippi, is approximately 168,220 acres. The drainage area of the watershed is comprised of about 58 percent agricultural lands, 31% timberland and, 11% other lands.

The predominant pollution problem of concern is the mobilization of sediment from agricultural lands within the watershed. Erosion was occurring from cropland in the project area at the rate of 12 tons per acre per year and from pasture land at a rate of five tons per acre per year. Sediment-laden runoff from the above sources entered Fourteen Mile/ Bakers Creek and associated tributaries and was causing degradation of the resource base. Erosion of the soil removes nutrients, reduces water-holding capacity, undermines plant rooting systems, reduces the soil's organic-matter content, reduces soil tilth, and degrades water quality within the project area. Sediment runoff coupled



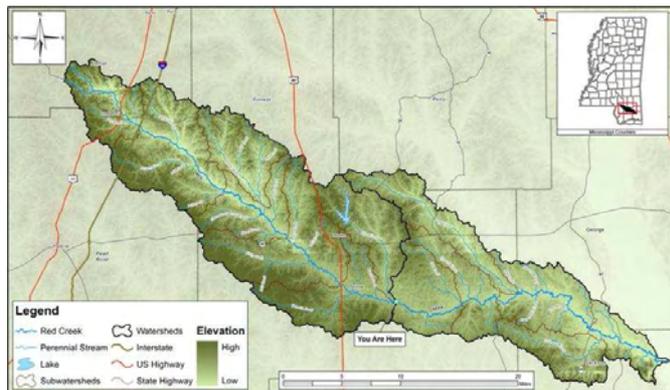
with leaching of nutrients and pesticides have been directly linked to problems such as ground-water contamination, increased water-treatment cost, and eutrophication.

This project implemented 57 Best Management Practices (BMPs) on targeted areas in the Fourteen Mile/Bakers Creek Watershed. The selected BMPs can be credited for reducing pollutant loadings of nitrogen by 5,017 lbs/yr, phosphorus by 2,599 lbs/yr, and sediment by 29,490 total tons saved, that would have subsequently ended up in Fourteen Mile/Bakers or its

tributaries.

Red Creek Watershed

The Red Creek Watershed is located in south Mississippi, in the counties of Lamar, Stone, George and Jackson. It is an important sub-basin of the Pascagoula River Watershed, a nationally significant eco-



system, and the largest unimpeded watershed in the continental United States. In September of 2006, the Land Trust for the Mississippi Coastal Plain (LTMCP) began work on a multi-phase project designed to improve water quality and educate landowners and stakeholders in the Red Creek Watershed. Since that time, they have worked with local and regional agencies as well as private citizens in the area to successfully restore and enhance an eroded streambank after major bank failure. In addition to the structural repair and

enhancement of the streambank, the effort allowed opportunity for public outreach and education since the project was visibly located near a public boat ramp. Outstanding educational products from the project include two, ceramic-tile murals created with the help of local stakeholders, artists, and schoolchildren. These attractive and informative murals remain on public display. In addition, an entertaining documentary film entitled *The Search for Red Bluff* was produced and widely distributed. This film includes a rich historical narrative of the watershed and describes the potential outcome of poor management of our natural resources and lack of proper BMP implementation.

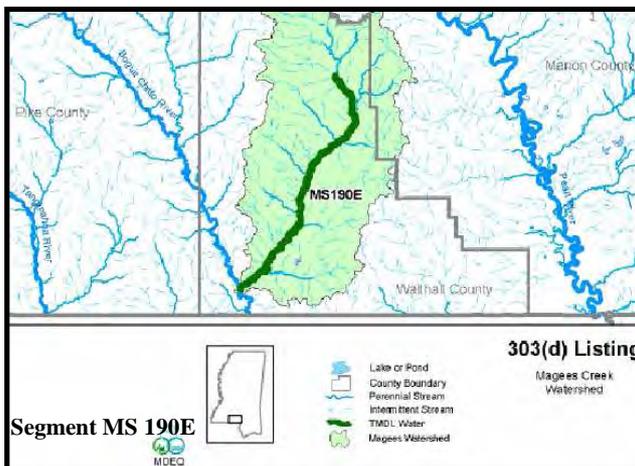
The MDEQ, in partnership with LTMCP, recently acquired the Ramsey Springs property, a 57.75-acre parcel of land on Red Creek. The property has about 700 feet of streamside frontage on both sides of the creek. A baseline study and management plan was developed for the property including recommendations for restoration and best management practices. The property has been transferred to the



Secretary of State. A partnership with the county Board of Supervisors, US Forest Service, LTMCP, and the Secretary of State will develop programs for reforesting a clear-cut area on this land with longleaf pine. The above agencies will improve the area around the natural springs and remove invasive plants and trees. This was the site for an *Adopt-a-Stream* workshop that took place in July of 2010, which included more than 25 local volunteers.

Magees Creek Watershed

The Magees Creek Watershed in Walthall County is about 143,000 acres; the creek flows in a southwesterly direction from its headwaters north of Darbun, Mississippi, to the mouth at the Bogue Chitto River. Predominantly rural, the current land uses in the watershed include 7,136 acres of cropland; 82,182 acres of pasture land; 46,461 acres of timberland; 483 acres of urban land; 349 acres of barren land; 6,424 acres of wetlands and; 231 acres of water.



Waterbody Improved

Fecal coliform from agricultural-animal areas, wildlife populations, and other sources caused Magees Creek to violate water-quality standards. As a result, the MDEQ placed segment MS 190E of the creek on the 1998/2000 Section 303(d) list of impaired waters for pathogens. Under the Clean Water Act (CWA), section 319, and matching funds from partnering agencies, 114 best management practices (BMPs) were installed over 3,355 acres at participating sites. Water quality improved and Magees Creek now meets standards for fecal-coliform levels.

Results

Evidence supports that BMPs installed in Magees Creek Watershed have significantly effected restoration. The geometric means listed in Table 1 indicate that the maximum allowable level of fecal coliform is not exceeding 200 colonies per 100 ml, nor do the data violate a colony count of 400 per 100 ml more than 10 percent of the time. In addition, the installed BMPs not only reduced nutrients and pathogens, but also reduced the amount of sediment going into Magees Creek. This amount of sediment savings amounted to 7,840 tons. In conclusion, Magees Creek is attaining water-quality standards as a direct result of the implemented BMPs. Based on the fecal-coliform data currently available for Magees Creek, this water body is attaining its designated use for recreation. This assessment will be included in Mississippi's 2012 Section 305(b) Report.

90 th Percentile	Geometric Mean	Sample Dates
69	50.62	06/04/2008 – 06/25/2008
81.5	59.51	02/04/2009 – 02/25/2009
82.5	50.20	06/24/2009 – 07/20/2009
278	165.95	01/25/2010 – 02/10/2010
328	187.24	06/17/2010 – 07/13/2010



Buttahatchie River Project

The Buttahatchie River-Bank Demonstration/Stabilization Project is designed to stabilize about 600 feet of eroding streambank. The demonstration site is located in Lowndes County, immediately east of State Route 45, and on the south bank of the Buttahatchie River. This area has been subject to rapid erosion and mass wasting for the past 20 to 30 years.

The project uses a variety of techniques designed to show habitat-oriented options to stream and river stabilization. About 500 feet of additional river bank have been stabilized using rock at the toe of the slope.

The site consists of five separate BMPs for stabilization purposes and installed “in series” along 600 feet of an eroding bendway in the river. The unstable bank material was excavated and removed from the site. The banks were regraded and stabilized through the BMP



techniques. Materials and practices included erosion-control blankets, willow stakes, root wads, willow-brush rows, native groundcover vegetation and trees, brush layers, and broken concrete. Major construction of the project was completed on October 30, 2010. Additional tree planting is continuing.

The project has a strong educational component and tours will be conducted for local landowners and other interested parties. Recently, a professor from Mississippi State University toured the site with an engineering class. Mossy Oak Productions has filmed the progress of the construction and is planning to air a show about the project on their television program *A Fist Full of Dirt*, which is carried on the *Pursuit* cable channel.

The project has received substantial local support. Donors and partners include MDEQ, the Lowndes County School District, Ellis Construction, Lowndes County Wildlife Federation, Wallace Environmental, Mossy Oak, Phillips Contracting, and the Tombigbee River Valley Watershed Management District. In addition, a private donation of \$15,000 was given by an individual donor. The donor is an 87-year-old woman, an artist, and retired college teacher.

Steele Bayou

Steele Bayou flows through the southwestern portion of the Mississippi Delta and drains 202,000 acres of farmland and bottomland hardwoods in four counties. In addition to drainage, the Bayou provides a source for irrigation and recreational activities such as fishing and hunting. The U.S. Army Corps of Engineers (USACE) began collecting various sediment and nutrient-related data in the 1990s with the implementation of its projects on Upper Steele Bayou. One segment of Steele Bayou (MS404E) was listed on Mississippi's 2006 Section 303(d) List as having aquatic-life support impaired due to nutrients, organic enrichment, low DO, and sediment. Although numerous BMPs have been installed over the years, sediment and nutrient loading have remained primary concerns in the watershed.

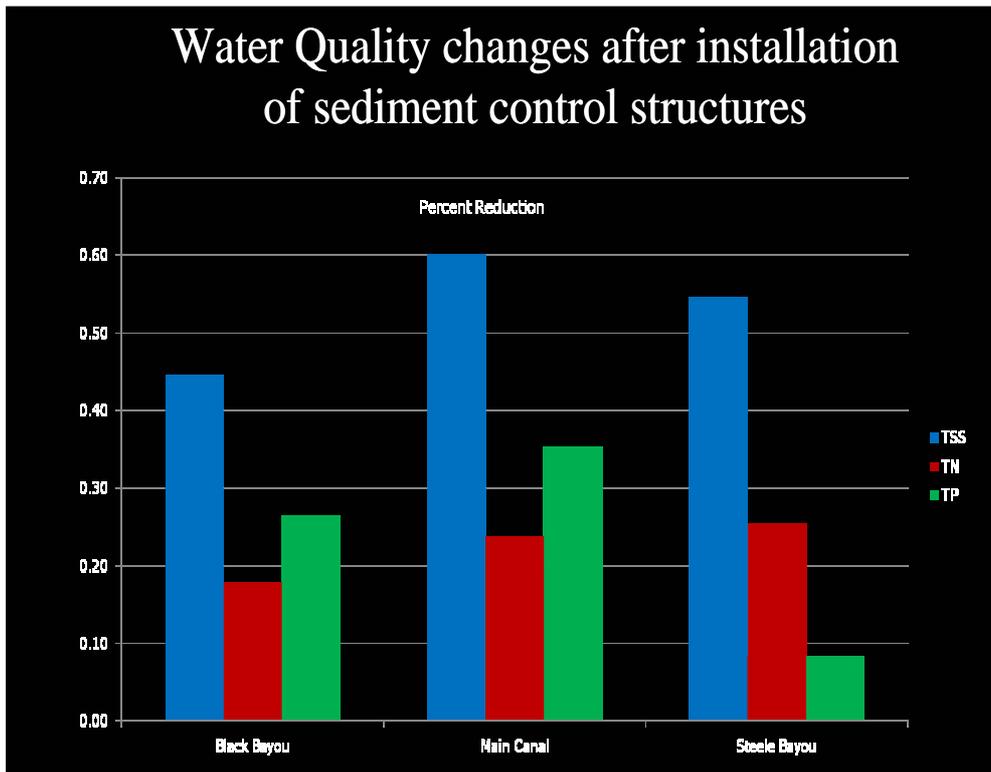
In 2007, a Steele Bayou Watershed Implementation Team consisting of professional, resource-agency staff, landowners, and other stakeholders [led by Delta Farmers Advocating Resource Management (F.A.R.M.)] convened to develop the Steele Bayou Watershed Implementation Plan (WIP). The WIP initially provided guidance for implementation of the *Steele Bayou Water-Quality Improvement Project*, yet it was a living document throughout the project period and not finalized until the project's completion in 2009. The WIP identified and prioritized issues including sediment loading, noxious-aquatic weeds, drainage, irrigation, and fisheries management. Delta F.A.R.M. staff immediately began surveying farmland and prioritizing BMP locations for implementation. Sites were prioritized based on sediment contribution and their proximity to Steele Bayou. Work began immediately to address noxious-aquatic weeds, specifically water hyacinth. Mats of hyacinth were restricting drainage, threatening the integrity of bridge crossings, and causing drastic reductions in dissolved oxygen.



Implementation of structural BMPs to reduce sedimentation began in January 2008. By the end of the project period in September of 2009, 30 BMPs funded by \$319 had been installed on priority sites. BMPs consisted of over-fall pipes, rip-rap weirs, and rip-rap energy pools. The pipe structures installed by Delta F.A.R.M. were generally two feet or smaller in diameter. During the same period, the USACE installed structures that were three feet or larger in diameter. Partnerships were also developed with the Mississippi Levee Board, Washington County Drainage District, and the Mississippi Department of Transportation to address water hyacinth concerns. Mechanical removal and chemical control began in the fall of 2007 and continued throughout 2008.

Project funding came from several sources: \$300,000 was made available by EPA through MDEQ; \$170,400 was made available by the USACE for cooperative water-quality monitoring; \$60,286 was provided by Delta F.A.R.M. for project administration and travel and; \$824 was provided by the MS Levee Board. In-kind contributions totaled \$195,000, bringing the total project cost to approximately \$726,510.

To document water quality improvements in Steele Bayou, the USGS developed and implemented a water-quality monitoring plan. Funded by the USACE and MDEQ, the study documented water-quality improvements and the effectiveness of specific BMPs. As demonstrated in Figure 1, BMPs are having a positive impact; sediment loading into Steele Bayou has decreased by over 50%. The *RUSLE* soil loss model projects that 4,033 tons of sediment have been stopped annually by §319-funded BMPs implemented through this project.



Water-quality monitoring by USGS shows percent reduction of TSS, TN, and TP in the area where USACE had a five-million dollar project to install control structures three feet or larger in diameter. MDEQ's project occurred simultaneously but focused on Steele Bayou and installed structures two feet or smaller in diameter.

USGS also gathered data to determine the effectiveness of one of the smaller §319-funded control structures. Data collected from April – June of 2008, just prior to BMP installation, were compared with data collected after BMP installation and with April – June of 2009. Sediment loading dropped dramatically after the BMP was installed. Sediment concentration during rainfall events decreased dramatically after installation of a §319-funded control structure.

Joint efforts to control water hyacinth have also been a great success. Acres of water hyacinth coverage have been reduced by approximately 95%, allowing previously infested portions of Steele Bayou to meet their designated use.



Evidence suggests that the Steele Bayou Water-Quality Improvement Project is achieving its purpose of improving water quality. Steele Bayou has been delisted for OE/low DO, and monitoring by USGS shows significant reductions of sediment and nutrient loading.

Turkey Creek Watershed

Turkey Creek is located in Harrison County, Mississippi, and flows in a southeasterly direction from its headwaters to its confluence with Bernard Bayou. The greater Turkey Creek watershed drains about 31,000 acres (50 square miles). The historic community of Turkey Creek is located at the lower end of the Turkey Creek Watershed and uses the waterway for fishing, swimming, and canoeing.

The Turkey Creek Community was first established in 1866 by a group of emancipated African-Americans. This group developed the land into a self-sufficient community rich in culture and biological resources. Over the following century, land was inherited through generations and remained virtually unchanged. In the mid 1980's, municipal annexation and commercial and industrial expansion took place in the City of Gulfport. In 2001, the Mississippi Heritage Trust listed the entire Turkey Creek Community as one of the *State's Ten Most Endangered Historic Places*.



Turkey Creek Initiatives (TCCI) is a recognized 501c3 corporation. It is an innovative, community-development corporation engaged in the comprehensive revitalization of the Community and watershed in terms of its economy, history, and social/cultural attributes. In 2003, TCCI partnered with the LTMCP to develop a WIP to protect and restore Turkey Creek. In 2004, EPA awarded a \$150,000 Clean Water Act (CWA) Section 104(b)(3) grant to the LTMCP to build watershed partnerships

in six watersheds, including Turkey Creek. Under this grant, the WIP was completed in October, 2006, with the involvement of numerous local and state stakeholders.

In April of 2008, The MDEQ entered a Memorandum of Agreement with the LTMCP. Since the beginning of the project, several notable milestones have been accomplished. The Land Trust and its partners have acquired land in the watershed to help protect and restore Turkey Creek. Additionally, several community-outreach events were held and an educational video was produced to help raise awareness about the importance of the Turkey Creek Watershed.

Recently, MDEQ in partnership with LTMCP, acquired a 6-acre parcel located on Rippy Road, just down the street from Mt. Pleasant United Methodist Church, which is the focal point for water-quality initiatives in the Turkey Creek Watershed. The property is one of the 40 original land-grant properties from the early 1800s. Because of its locality, the property serves as a prime opportunity to both preserve and restore the ecological integrity of the watershed and to promote partnerships actively involved in its health and water-quality improvement. The 6-acre parcel provides an opportunity to partner with the Biloxi-Gulfport Airport Authority to extend their proposed nature trail. The MDEQ, EPA, and other resource partners also will be actively involved in the community through the revision of the WIP and the Brownfield visioning process. This visioning will give the citizens of the watershed an opportunity to visualize how they see their environment progressing in future years.

On August 4, 2010, EPA Region 4 presented the first annual *Regional Watershed Partnership Award* to the Turkey Creek WIT located in Harrison County. The *Regional Watershed Partnership Award* recognizes groups that have demonstrated inclusive governance, initiative, and results in leading watershed improvement efforts. The award was presented at the *Gulf of Mexico Alliance* meeting in Biloxi. The meeting was attended by over 400 people from the five U.S. Gulf Coast states and officials from Veracruz, Mexico. Eight members of the watershed team, representing seven different



organizations (community groups, environmental groups, the local church, and city and county governments) received the award on behalf of the team.

In 2010, EPA identified the Turkey Creek and North Gulfport Community as one of its priorities for the *Interagency Partnership for Sustainable Communities (PSC)*. The PSC is a partnership established in 2009 between the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Transportation

(DOT), and EPA. Its intention is to encourage better coordination of projects and funding among federal agencies to enhance outcomes. As a result, in October 2010, EPA selected Moore, Iacofano, Goltsman, Inc. to be the recipient of a \$25,000 contract to help the Turkey Creek and North Gulfport Community with community planning activities. The project will enable the communities to revisit their vision and

priorities from the 2006 community-planning process, consider new interests, determine which to pursue first, and to develop plans for those projects.

In October 2010, EPA awarded the Center for Environmental and Economic Justice, Inc. a *Community Action for a Renewed Environment* (CARE) cooperative agreement in the amount of \$100,000. The project will create a multi-stakeholder partnership to help the Turkey Creek and Turkey Creek Southwest Communities of Gulfport to identify their environmental-health issues and concerns, assess and prioritize the associated risks, and develop and implement plans to reduce their exposure to toxins in the environment.

Turkey Creek is an EPA- and MDEQ-priority watershed. Stakeholder interest continues to grow, as the MDEQ and its partners strive to protect the water quality and ecological integrity of the watershed for the betterment of the community.

Ross Barnett Reservoir Foundation Formation

The Ross Barnett Reservoir is a vital resource to central Mississippi. It is the largest source of drinking water in the State, supplying over 15-million gallons of water to local residents, businesses, and industries. The EPA has designated this area as a priority watershed. The reservoir welcomes in excess of 2.5 million visitors annually and many consider it to be the premier recreational water body in Mississippi. Since its development almost 50 years ago, it has provided immeasurable benefits to the local economy.



Local communities are continuing to benefit from increased residential and commercial growth, largely attributable to the reservoir. This year, the MDEQ and the Pearl River Valley Water Supply District (PRVWSD), have been working towards finalizing plans to restore and protect water quality within the Ross Barnett Reservoir. This project, called the *Ross Barnett Reservoir Initiative* focuses on six priority issues in the watershed that reduce and control: 1) watershed erosion and sedimentation; 2) pathogens; 3) litter/trash in the reservoir and around the shoreline; 4) nutrients/organic enrichment; 5) invasive species and; 6) pesticides. As part of this initiative, MDEQ has developed a comprehensive watershed restoration and protection plan. This effort also included the development of a water-quality monitoring plan, a source-water protection plan (SWPP), and a comprehensive, education and outreach plan for the reservoir. The watershed protection and restoration plan uses *EPA's Nine Key Elements of Watershed Protection* to identify potential pollutant sources in the watershed. The plan also recommends a set of conservation measures to address the priority-pollutant issues and ensure that these measures are implemented. MDEQ and PRVWSD have developed these plans that incorporate workgroups that use technical expertise from various state agencies, local agencies, and local stakeholders. Recently, the MDEQ and the PRVWSD announced the official founding of two organizations that will benefit the Ross

Barnett Reservoir and have a positive impact to the areas surrounding the 33,000-acre lake. The “*Ross Barnett Reservoir Foundation*” was created on the concept of having input from citizens whom have an interest in providing support and guidance for future economic-development needs. The foundation offers an excellent opportunity for community leaders, stake holders, and the general public to have a voice on decisions being made by state agencies. The primary purpose of the “*Ross Barnett Reservoir Foundation*” is multifaceted and will be to: 1) promote public interest in the Ross Barnett Reservoir; 2)



raise funds for projects, studies, designs and equipment; 3) preserve and enhance the water quality; 4) provide a vision for the future and address needs that will improve the quality of life for residents and; 5) enhance recreational opportunities for visitors. *Keep the Reservoir Beautiful* has officially become an active affiliate of *Keep America Beautiful*, the largest nationwide volunteer organization of its kind, which will help promote beautification efforts in and around the reservoir. The newly formed group

will emphasize improvements to public places, waste reduction, and recycling. Training for this group will be provided by *Keep America Beautiful* and funding is being provided through a \$319 grant. Together, *Keep the Reservoir Beautiful* and *Keep America Beautiful* foundations will aid in the preservation and restoration of the 33,000-acre reservoir.

NPS Education/Public Outreach

Adopt-A-Stream

Adopt-A-Stream (AAS) is a program that promotes environmental stewardship by training citizens about stream ecology, aquatic life, and water chemistry. Volunteers attend water-education workshops or training sessions to learn how to monitor a stream, conduct a stream-cleanup event, or mark storm drains. The Mississippi Wildlife Federation partners with MDEQ in the presentation of these educational sessions. Topics covered include effects of point and nonpoint source pollution on water quality, watershed mapping and delineation, water chemistry, and use of macroinvertebrate surveys as biological indicators of water quality. Field work at a stream is also part of the training events. In 2010, twelve people attended the traditional two-day AAS workshop and 114 participants attended seven 1-day workshops held in 8 Mississippi counties. In addition, more than 10,500 individuals were exposed to the *Adopt-A-Stream Program* at educational events around the State. Fourteen *Envirothon* training workshops for 320 students were conducted for high-school students and stream clean-ups were conducted in Jackson, MS and Barnett Reservoir areas. Also, audience-specific, water-quality training sessions, school group training, scout troop trainings, workshops, watershed projects, and large venue events were conducted. Complimentary water-quality test kits were distributed to interested individuals during several environmental-education events throughout the year. The distribution of these simple, inexpensive, but accurate test kits will allow more widespread monitoring activities and increase public awareness about stream stewardship.



Envirothon Competition



Envirothon is a competitive learning event for high-school students. The competition tests the student's knowledge of environmental resources including soils, forestry, wildlife, and a special environmental topic each year. During 2010, there were 420 high-school students (70 teams), and 95 team advisors from all regions of Mississippi who were active in the Mississippi *Envirothon* competitions (regional and state levels). Twenty-five teams participated in the state competition where the winning teams received scholarships and the number one team went on to compete at the International Canon *Envirothon* competition in California in the summer of 2010 where groundwater was the special topic. MDEQ assists with the *Envirothon* training, steering committee, and

statewide competition. In the Fall of 2010, the Mississippi Envirothon partnered with the Mississippi Environmental Education Alliance, MDEQ, and the Department of Marine Resources to present a two-day conference/teacher workshop at the Grand Bay National Estuarine Research Reserve Center near Moss Point, Mississippi which featured the 2011 special topic on freshwater and saltwater estuaries.

Watershed Harmony Musical Puppet Theater



MDEQ and Bayou Town Productions completed the *Watershed Harmony Musical Puppet Theater* in October 2003. Since that time, the performance has reached more than 60,000 students, teachers, and others. During the 2010 tour, approximately 8,500 people enjoyed the show. Pre-test/post-test scores revealed a significant increase in knowledge and awareness of water-pollution problems, solutions, and stewardship. The play focuses on the prevention of polluted runoff by promoting the use of best BMPs and individual stewardship to improve water quality. The *Watershed Harmony Musical Puppet Theater* conforms to the 4th- and 5th-grade *Mississippi Framework Curriculum* and the

National Science Standards. The performance is frequently used as a school presentation and as a part of environmental field-day student events. In addition to students, the show is enjoyed and seen by all ages and many groups, including civic clubs, special-event groups, summer reading programs, scout troops, and summer camps. The play is 30 minutes in length and is performed on a multi-level, 12'x12' stage with seven songs and dialog that convey a water-quality stewardship theme. Additional time may be included for extra activities.

Mississippi Urban Forestry Council

Several *Mississippi Urban Forestry Training Workshops* were held in 2010 one of which involved intensive training on green laws, ordinances, and stormwater retrofitting of parking lots and street-scapes held in Jackson, Mississippi at the Natural Science Museum with about 50 people in attendance. Several MDEQ documents are made available at these trainings and are used by communities to guide in planning and managing urban forests. These include: *Introduction to Urban Community Forestry*; *Urban Forestry*, *Mississippi Urban and Community Forestry Management Manual* (191 pages); *The Community Forest Booklet*; and *Preserving Trees in Construction Sites*. These are available from the Mississippi Forestry Commission. A great web site for information on ordinances is "Green Laws".

Storm Water Workshops

In 2010, MDEQ participated in and supported the development of *Green Infrastructure Training Workshops* in Mississippi with four pilot training workshops being conducted in 4 different regions of the state. A 3-day workshop was held in Union County, New Albany, Mississippi where a green infrastructure plan for the Little Tallahatchie river watershed was developed. A 2.5-day workshop was

held at the Ross Barnett Reservoir in Jackson, Mississippi which resulted in the production of a “Green Infrastructure Plan” which involved input from county officials, the Pearl River Valley Water Supply District, Engineering firms, private environmental consultants, natural resource/environmental agency representatives and the general public. The Ross Barnett Reservoir region is a rapidly developing suburban/urban center in Mississippi where action is needed to improve and maintain quality of life. A “Keep the Rez Beautiful” Chapter was also begun on the Barnett Reservoir in 2010. In addition, one-day green infrastructure workshops were held in Greenwood and Corinth, Mississippi. The purpose of the green infrastructure pilot workshops is to develop a watershed conservation plan to improve water quality, to address land use issues, and to increase the quality of life for citizens in a community regional watershed area . Green Infrastructure Training is being developed in Mississippi using the “Conservation Fund” Model where large maps are used by participants to circle green hubs such as wildlife refuges, parks, and public lakes; and then, the green hubs are connected with green corridors such as stream riparian zones, the Natchez Trace, utility corridors and others. The plans can also assist with decision making about where to expend resources to fill in the gaps for connection corridors such as restoring streamside vegetation in riparian zones.

Project Earth Teacher Workshops

During 2010, about 912 educators participated in 49 environmental education teacher workshops, each of which is approved for Continuing Education Credits (CEUs). Under the umbrella of the *Project Earth Teacher Workshops*, and the Mississippi Environmental Education Alliance several curriculums are offered throughout the state that include: 1) *Project Learning Tree*; 2) *Project Food, Land, and People*; 3) *Project WET* (Water Education for Teachers); 4) *Project Wild*; 5) *Project Aquatic Wild*; 6) *Growing Up Wild* (for young children); and 6) *Private Eye*. The curriculums of these covered such subjects as NPS pollution prevention, land use, water chemistry, macroinvertebrates, and natural-resource concepts and stewardship. Under the sponsorship and guidance provided by MDEQ, several state agencies or universities conducted these workshops. The agencies or universities included: Hinds County Soil/Water Conservation District, Northwest Mississippi Resource Conservation/Development Council (NWRC&D), and Alcorn State University.

Mississippi and Yazoo River Tours

A NPS project to educate students about the Mississippi and Yazoo River watersheds began in the fall of 2008. During 2010, a total of 54 educational boat tours were conducted on the two rivers with 2208 students and teachers participating. The students viewed land uses on the shore, water uses in the two rivers, and the industrial harbor that might impact water quality in the two watersheds. Pre-test/Post-test scores indicate an increased knowledge and awareness as a result of the tours. Students also gained a new perspective about water quality in their communities.

Secchi Day 2010

Fishermen (and women), students, and families joined together in 2010 for Secchi Day on Pickwick Lake at J. P. Coleman State Park in Tishomingo County. Boaters attended a short training session before launching their boats and heading out on the lake. At the assigned site each team recorded the depth in the water at which the secchi disk seemed to disappear. This year 35 sites on Yellow Creek, Bear Creek and Pickwick Lake were tested. The secchi teams were happy to report that many of the locations had seen some improvement over last year. Resulting data were sent to Kent State to be included in the data base of secchi readings for more than 10,000 lakes, rivers and streams across the country.



After a morning spent out on the lake collecting data, teams, their families, and the public enjoyed the many educational booths. Adding to the fun of the day, many also participated in a miniature golf tournament and a watermelon seed-spitting contest. Estimated attendance was 150. The next Secchi Day will be September 17, 2011, at J. P. Coleman State Park.

Environmental Education Camps

During the summer of 2010, a total of 179 students participated in a total of 10, one-week, environmental-camp sessions coordinated by two Mississippi universities and the Natural Science Museum through a partnership with MDEQ. The camp sessions included: 1) The University of Mississippi Wetland and Water Resources Institute conducting five *Ecology Day-Camp* sessions with over 87 students from grades 2-10; 2) Mississippi State University Forestry Department conducting one session with 26 students participating and; 3) Mississippi State University Wildlife, Fisheries and Aquaculture Department conducting two, one-week *Wildlife-Camp* sessions with 66 participants.

Environmental Education Events

MDEQ staff reached over approximately 4,100 students, teachers, and the general public, with water-pollution prevention and water-quality presentations. The water models are frequently used with most of these educational activities.



Battle on the Bayou

The first annual *Battle on the Bayou Kayak and Canoe Race* was held on Saturday, March 6, 2010 in Ocean Springs. The race began at Gulf Hills Hotel and ended at The Shed/Camp Journey's End. Over 150 racers attended this exciting new event which was hosted by Gulf Coast Kayakaholics (local Paddling Club), South Coast Paddling Company, Gulf Hills Hotel, The Shed, Camp Journeys End, City of Ocean Springs, Ocean Springs Chamber of Commerce, and MDEQ. All proceeds went to benefit the Land Trust



for the Mississippi Coastal Plain, a conservation nonprofit organization dedicated to preserving open spaces and green places. Paddlers enjoyed a beautiful, challenging course covering approximately 12 miles of black-water bayou through estuarine marsh and maritime forest.

***WaterFest* Event on the Barnett Reservoir** **Clean Water....Our Legacy**

WaterFest 2010 was an exciting conservation event held at Lakeshore Park located on the Ross Barnett Reservoir. The event highlighted the need to protect and improve water quality within the priority watershed. The event featured fun, educational/interactive activities, exhibits, food, music, demonstration areas, and more.

This year's attendance tripled in participation from previous years making 2010 the festivals banner year. The Reservoir's official mascot was unveiled and *Mr. Whiskers* made his long awaited debut. *Mr. Whiskers* is personified as a very wise and experienced catfish, who donated his time to posing for pictures the entire afternoon.



Rezonate, the Ross Barnett Reservoir Initiative, was also developed in 2010 by MDEQ and PRVWSD as an environmental initiative designed to promote awareness of the importance of protecting and restoring the drinking-water source for the city of Jackson and surrounding counties.

Mississippi Environmental Education Alliance (MEEA)

As president of the MEEA organization of environmental educators in Mississippi, MDEQ's Nonpoint Source Pollution Education Administrator has affiliated the annual 2010 MEEA conference/teacher workshop with the Mississippi and International *Envirothon* Competition special topic "Estuaries, Marine and Freshwater". About 40 teachers and environmental educators participated in the 2010 MEEA conference/workshop. Field trips were made on a boat to an estuary near the hosting facility, the *Grand Bay National Estuarine Research Reserve* near Moss Point and to a long-leaf pine, savannah, ecological system located on the reserve where several varieties of pitcher plants and other carnivorous plants thrive. Interactive sessions included the identification of several lab specimens of fish, crabs, invasive plants and bird wings. Other sessions included a bird-photo presentation, nutrients, and the food chain of an estuary. A teaching session through teleconferencing featured *freshwater estuaries* which are where rivers run into the Great Lakes in the United States and where the word "estuary" originated. Next year's *Envirothon* special topic is "Nonpoint Source Pollution and Low Impact Development," which will be featured at the 2011 MEEA Conference.

Make-A-Splash Event

MDEQ and the Mississippi Natural Science Museum partnered to host this water-related educational event which was held both outside and inside the Museum on September 24, 2010. A total of eight schools attended, two from the Pearl River Watershed and six from the Yazoo River Watershed of the Mississippi Delta Region of the State which included a total of 495 students and 44 teachers.

Rain Barrel Pilot Project

MDEQ, in partnership with North Central Mississippi Resource Conservation and Development Council, and Pontotoc County Soil and Water Conservation District (SWCD), conducted a rain-barrel project primarily in the Chiwapa Creek Watershed in Pontotoc County. A total of 250 rain barrels were distributed through this project. Homeowners were taught how to make rain barrels and a total of 100 barrels were distributed at four workshops which included: 1) the Pontotoc Rain Barrel Workshop; 2) the Pontotoc Environmental Education Teacher Workshop; 3) the Desoto County SWCD Fish Pond/Rain-Barrel Field Day and; 4) the Tippah County Master Gardeners event. One-hundred-fifty (150) rain barrels were distributed through the *Rain Barrel Homeowner Incentive Program*. An attractive rain-barrel brochure was developed called *Chiwapa Creek Rain Barrel Project*.

Storm Drain Marking Program



MDEQ assisted local resource people in conducting storm-drain marking projects in which discs with the message “No Dumping, Drains to River” were attached to storm drains. High-school students and scouts glued the markers to about 510 storm drains and distributed door hangers in several state neighborhoods during 2009. Communities and university campuses that participated were the cities of Ridgeland, Jackson, Hernando, Starkville, and Alcorn State University. When possible, the students and scouts talked with residents about storm-water runoff and the need to prevent pollutants from entering storm drains.

Videos and Manuals

Reigning over Runoff video is a production of the Natural Resources Initiative of Mississippi. By using superb footage of select streams, rivers, wildflowers, and more, this short film focuses in a compelling way on a few practices that homeowners and communities can use to enhance water quality.

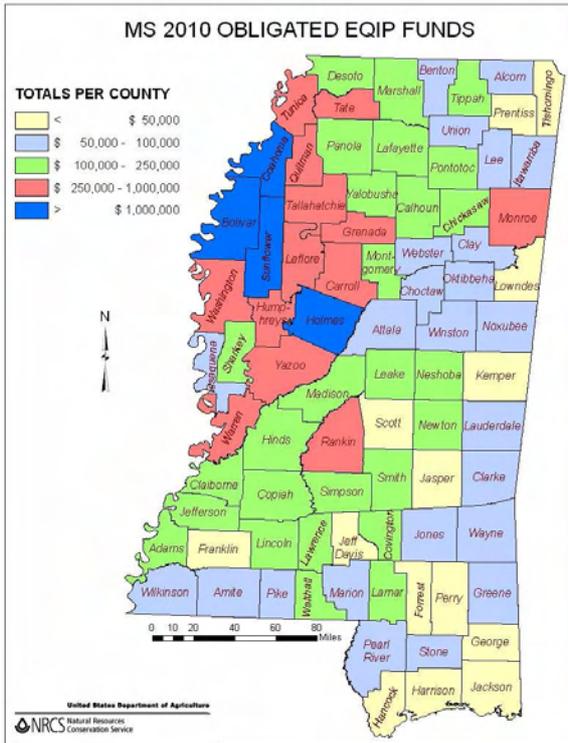
Ross Barnett Reservoir Initiative, Rezonate - As part of the *Rezonate* project, MDEQ developed an Education and development video that contains footage depicting Ross Barnett Reservoirs ecosystem, urban development, parks, and recreation. The video was created in 2010 to help aid in the preservation, protection, and water-quality improvement throughout the Ross Barnett Reservoir.

Turkey Creek Video project began in January 2009 and has been widely distributed to stakeholders and community members. The Turkey Creek Watershed is located in Harrison County near the Mississippi Gulf Coast, north of Gulfport. It is predominantly an African-American community.

Red Creek Video - an entertaining documentary film entitled “*The Search for Red Bluff*” was produced and widely distributed. This film includes a rich historical narrative of the watershed and describes the potential outcome of poor management of our natural resources and lack of proper BMP implementation.

Planning & Design Manual for the Control of Erosion -Stormwater management at construction sites, in urban areas, and commercial developments often requires innovative application of art and science to help insure people are held safe, property is protected, and the environment is not adversely affected. To help with this management task, MDEQ collaboratively developed a document titled *Planning & Design Manual for the Control of Erosion, Sediment and Stormwater*. The first edition of the “Manual” was implemented in April 1994, and it has served as a guidance document for mitigating stormwater and sediment management issues since that time. However, EPA is expanding the promulgation of stormwater regulations throughout the country. As a result, more municipalities in the state are falling under the requirements for adequate stormwater planning and a greater range of construction and develop activities must be managed under the regulatory authority of MDEQ. There have been substantial advances in the state-of-the-art in runoff management and environmental protection related to erosion mitigation and stormwater pollution. As a result, MDEQ recently elected to initiate a process of review and improvement of the current Manual, with significant input from MDOT and USDA. The Manual is expected to be completed by summer of 2011.

NPS - Related Programs



Agricultural NPS Advances in Mississippi

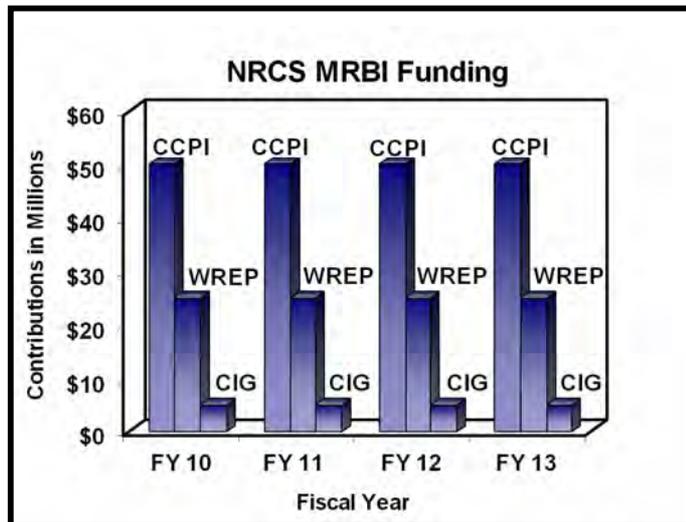
The Farm Security and Rural Investment Act of 2008 is landmark legislation for conservation funding and for focusing on environmental issues. The conservation provisions assist farmers and ranchers in meeting environmental challenges on their land. This legislation simplifies existing programs and creates new programs to address high priority environmental and production goals. The 2008 Farm Bill enhances the long-term quality of our environment and conservation of our natural resources. Under the Farm Bill, a number of programs were introduced and implemented in Mississippi. Under one such program, the Environmental Quality Incentives Program (EQIP), 155,980 acres were enrolled for a total funding of \$18,792,165 million. The Wildlife Habitat Incentive Program (WHIP) awarded \$3,093,946 million for the enlistment of 53,332 acres.

Healthy Watershed initiative

The NRCS is partnering with Mississippi and other states to improve water quality within watersheds of the Mississippi River Basin. Through the partnership, the NRCS has created the *Mississippi River Basin Healthy Watershed Initiative* (MRBI). This initiative will implement voluntary conservation practices by landowners, state agencies, and federal agencies that will concentrate practices by containing nutrients rather than controlling them. This initiative will also significantly decrease all runoff and improve water quality within the Mississippi River Basin.

Nutrient loadings from pollutants such as nitrogen and phosphorous from nonpoint sources will be minimized downstream due mainly to containment practices. To implement practices that improve soil quality, control soil erosion, and provide wildlife habitat, the NRCS will provide assistance to landowners, producers, and others. This will not only reduce runoff but improve water quality within the watershed.

The reduction in nutrient loadings from the Mississippi River Basin will be accomplished by coordinating with producers, NRCS, partners, State agencies, and Federal agencies in the 12 participating states: Arkansas, Kentucky, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Ohio, Tennessee, and Wisconsin. The *Cooperative Conservation Partnership Initiative (CCPI)*, the *Wetlands Reserve Enhancement Program (WREP)*, *Conservation Innovation Grants (CIG)* are just a few of the programs the initiative will build upon. The NRCS will offer the initiative in the fiscal years of 2010 through 2013 and dedicating at least \$80 million in financial assistance each fiscal year. This will be in addition to funding from Federal agencies, States, partners, and the contributions of producers. The \$80 million will accompany regular NRCS programs in the 12 Initiative States, and will be supported with needed technical assistance.



The Mississippi 319 Waste-Pesticide Disposal Program

Mississippi farmers continue to take advantage of economical ways to address waste-pesticide disposal problems and improve water quality in their watersheds at the same time. Through a 319 grant from MDEQ, an additional waste-pesticide disposal-collection event was planned and held in 2010. The event was coordinated by the MSU Extension Service, with assistance from the Bureau of Plant Industry, a division of the Mississippi Department of Agriculture and Commerce. Since MDEQ's annual



report in 2009, one disposal event was held in Hernando. Almost 30,000 pounds of waste-pesticide products were brought to the collection site by farmers from five counties where the products were

collected and properly disposed of by a licensed, hazardous-waste contractor. The event saved farmers \$30,000 in disposal fees that would have incurred in the absence of the program. These results reflect a positive collaboration of farmers, farm-support groups, educational institutions, and environmental agencies.

These programs and prior ones funded by 319 grants have had a positive impact on reducing environmental risks and improving water quality in rural Mississippi while providing farmers an economical way to dispose of waste-pesticide products. Since the inception of the program, over 1.2 million pounds of waste-pesticides have been collected from more than 540 farmers in 75 counties. In addition to reducing potential environmental risks associated with these waste products, the events collectively saved farmers more than \$1,237,000 in disposal costs. Additional disposal events will be held in January and February of 2011 and hopefully in future years. These events will be welcomed to further reduce environmental, water-quality, and health-related risks in agricultural areas of the State.

Water-Pollution Control Revolving-Loan Fund

The Water Pollution Control Revolving Loan Fund program provides low-interest loans to public entities in the State for the construction, repair, or replacement of wastewater, storm water, and nonpoint source pollution-control projects. Funding for these projects comes from federal capitalization grants from EPA, state match, loan repayments, and interest earnings on deposits. During 2010, MDEQ funded 27 new projects for a total of \$72,815,936 from the Water Pollution Control Revolving Loan Fund Program.

Through this program, non-point source needs for the State were estimated in the 2008 *Clean Water Needs Survey*. MDEQ contracted with FTN Associates to estimate BMP needs and costs for water bodies with a Total Maximum Daily Load (TMDL). FTN also did this for water bodies listed on the Section 303(d) report as impaired, but where a TMDL had not yet been written. The strategy used was to identify the pollutant causing the impairment, identify or determine the recommended load reduction, conduct a GIS analysis of the watershed to estimate the number and type of BMPs needed, and using NRCS cost figures to calculate total costs. Sanitary surveys from the Mississippi Department of Health were also reviewed to estimate needs and repair costs for areas with high rates of failing, onsite-treatment systems. The resulting assesses needs and costs were:

- Croplands \$ 72,000,000
- Livestock \$ 251,000,000
- Silviculture \$ 16,000,000
- Stream bank Restoration \$ 1,420,000,000
- Onsite Wastewater \$ 154,000,000

The Gulf Region Water and Wastewater Plan

Update for 2007

The *Gulf Region Water and Wastewater Plan* was approved by HUD in early 2007. The five County Utility Authorities (CUAs), as well as the municipalities in Jackson County, received their initial grant awards during the spring and summer months. Environmental review and preliminary-design work began in earnest on most of the 65 projects identified in the Plan. Two projects, a new well and tank in Poplarville (owned by the Pearl River CUA), and a new Reverse Osmosis water-treatment plant in Moss Point began construction in late 2007.

Update for 2008

Environmental review and design work of the above projects continued throughout 2008 with the bulk of the work completed by mid-year. During that year, the arduous task of acquiring sites for the multitude of facilities began. The well and tank project in Pearl River County was completed in 2008. In the fall of 2008, nearly half of the projects were advertised for bid, a majority using the “term-bid” method in an effort to expedite construction.

Update for 2009

The CUAs and cities continued with design and land acquisition on all projects. All projects were under construction by the end of 2009. Grant recipients are now faced with the task of completing land acquisition and managing construction of these projects. Approximately \$180 million has been expended on project- related costs through this year.

Update for 2010

The CUAs and cities continued acquiring sites and easements to facilitate construction as well as issued multiple work orders for all projects. Gautier, Ocean Springs, and Moss Point completed all of their projects, and Pascagoula, Jackson CUA, Harrison CUA, Hancock CUA and Pearl River CUA completed at least one project each under their purview. Further environmental review was conducted due to change orders and other scopes of work. Approximately \$371 million has been expended on project-related costs thus far, an average expenditure of \$15.9 million per month for the past year.

Source Water Assessment Program

The *Federal Safe Drinking Water Act (SDWA)*, reauthorized by Congress in 1996 added provisions for the states to develop *Source Water Assessment Programs (SWAPs)*. The clear intent of Congress was to compel states to devise and adopt measures to enhance the protection of all public water systems from potential contaminant sources. The Source Water Protection Strategy for the four public surface-water-system intakes used in the State involves integrating drinking-water protection into Mississippi’s Basin Management Approach that was designed to protect and restore the quality of the State’s water resources. This strategy has been completed and integration efforts are underway with the Basin Management Teams. Mississippi has accepted EPA Region IV’s offer to assist with these projects. Tennessee Valley Authority (TVA) offered assistance and is now participating in these projects as well.

Meetings with the three public surface-water systems operating in the State have been completed; additional meetings are anticipated. At the present time, SWAPs have been completed for community

water systems in all 82 counties. MDEQ has provided the public water-supply operators in the State with their SWAP reports. Since July 1, 2005, preliminary-assessment reports have been required for all new water-well permits. This pre-SWAP report is used to critique proposed well sites to avoid the drilling of new wells into known plumes of contamination or too close to identified Potential Contaminant Sources (PCSs). The TVA has completed SWAPs for three surface-water source systems in the State.

A data tracking system has been designed to comply with EPA's Source Water Program Activities Measures. This GIS application allows MDEQ to track which systems have implemented source-water protection strategies.

Storm Water Program

The following is a summary of Mississippi's Regulatory Storm Water Program in 2010. The Environmental Permits Division of MDEQ, as of November 30, 2010, has issued the following coverages (authorizations) under several storm-water general permits: 208 construction projects of five acres and greater, 78 regulated industrial facilities, and 92 mining sites. In addition, the Baseline Industrial Storm-Water General Permit was reissued on September 29, 2010. Approximately 209 industrial facilities have been recovered under this reissued general permit.



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