

Mississippi's Nonpoint Source Management Program



2013 Annual Report



MISSISSIPPI DEPARTMENT OF
ENVIRONMENTAL QUALITY

**Prepared Pursuant to Section 319 of the Clean Water Act
Mississippi Department of Environmental Quality
December 2013**

Mississippi's 2013 Nonpoint Source Program Annual Report

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Photo By: Rex Allan Jones

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 strategies for the management of these activities are to continue developing and implementing educational programs and to continue issuing permits and maintaining 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 strategies for addressing NPS pollution on a statewide level include education/outreach, assessment and monitoring, use of Best Management Practice (BMP) and nutrient reduction 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).

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. One key partnership to increase this overall effectiveness is with the USDA Natural Resources Conservation Service (NRCS). MDEQ and NRCS have recently signed a three-year \$600K per year memorandum of agreement (MOA). The MOA provides for Section 319 funds to be used for assessment and monitoring of National Water Quality Initiative (NWQI) sites where the NRCS has or will implement various conservation practices such as cover crops, filter strips, and terraces.

MDEQ's program strategy will be implemented to meet the long-term goals of the program. The long-term goals will, in turn, be achieved by implementing five-year action plans. These plans will be modified as more data and new issues are identified under the BMA.

This report relates several accomplishments during calendar year 2013 that directly relate to and support the long-term and short-term action strategies identified in the State's NPS Management Program. These

accomplishments include characterization, assessment/monitoring, and protection/restoration of impeded water bodies. Of course, education and outreach activities are inherent to each protection/restoration project so as to gain local stakeholder support and involvement.

Characterization, Assessment/Monitoring. Major assessment and monitoring accomplishments include two systems: 1) the further development, refinement, and use of the *Mississippi Benthic Index of Stream Quality (M-BISQ)*; and 2) an *Index of Biological Integrity (IBI)*, which is used to assess all Wadeable, non-tidal streams in Mississippi with the exception of those located in the Mississippi Alluvial Plain (aka The Mississippi Delta). Monitoring within the Mississippi Delta has been occurring since 2002 when MDEQ began collecting biological community, physical, chemical, and habitat data on the Delta's Wadeable streams. Both of these major assessment/monitoring systems have greatly increased the number of biological assessments conducted on State waters.

Protection/Restoration. In addition to the above activities, there continues to be much progress in the protection and restoration efforts of specific watershed projects. Four projects are showcased in this report and include: 1) Bell Creek – West Prong Muddy Creek; 2) Rotten Bayou; 3) Tarebreeches Creek-Tuscumbia River Canal Watershed; and 4) Dead Tiger/Orphan Creek Watershed.

Bell Creek-West Prong Muddy Creek is located in the northwestern portion of Tippah County, Mississippi. There are 19,277 acres located within the watershed boundaries. This project will implement selected Best Management Practices (BMPs) on targeted areas in the Muddy Creek Watershed that will result in reduced pollutant loadings from agricultural nonpoint sources. Of primary concern are animal-waste runoff and the animal access to streams from cattle operations in the watershed. To date, the BMPs that have been installed are: 1,583 feet of *stream bank and shoreline protection*, 9 *grade stabilization structures*, and 16 acres of *pasture and hay land planting*. Nutrient- load reductions for the stated BMPs have already begun to show reductions of over 523 lbs/yr of phosphorous, 1,041 lbs/yr of nitrogen and 571 tons/yr of sediment in Mississippi waters.

Rotten Bayou is a Mississippi coastal watershed containing 22,246 acres and is a tributary to St. Louis Bay. Here, a *Coastal Nutrient Reduction Plan* is being implemented. Nutrient TMDLs have been developed for this watershed and will be used for the load-reduction targets in the watershed implementation plan. Tributaries of St. Louis Bay, including Rotten Bayou, have a TMDL for organic enrichment, low dissolved oxygen (DO), and nutrients. MDEQ is leveraging with nine different federal, state, local government, and non-profit organizations to implement the *Coastal Nutrient Reduction Strategy* that addresses livestock, forestry, urban stormwater, and atmospheric deposition.

Tarebreeches Creek-Tuscumbia River Canal Watershed was identified as a priority watershed by The Mississippi Department of Environmental Quality. Tuscumbia River Canal is listed on Mississippi's 303(d) list of impaired waters for biological impairment due to sediment, nutrients, and low DO and organic enrichment. The Tuscumbia River Canal watershed is approximately 204,311 acres. A list of installed practices through 319 funding includes 19.4 acres of *Nutrient Management*, 4 *grade stabilization structures* and 46 acres of *pasture and hay land planting*. Nutrient- load reductions for the stated BMPs have already begun to show reductions of over 309 lbs/yr of phosphorous, 582 lbs/yr of nitrogen and 177 tons/yr of sediment in Mississippi waters.

Dead Tiger/Orphan Creek Watershed is an impaired system about 25,000 acres in size and located in Hancock County in South Mississippi. It mostly consists of timberland (54%), pastureland (44%), and wetlands, urban, and other lands (2%). MDEQ is partnering with several federal, state, and local agencies to improve water quality through the installation of several BMPs. To date, 43 BMPs have been installed that improve water quality on 533 acres. BMP installation has saved a total of 4,881 tons of sediment per year.

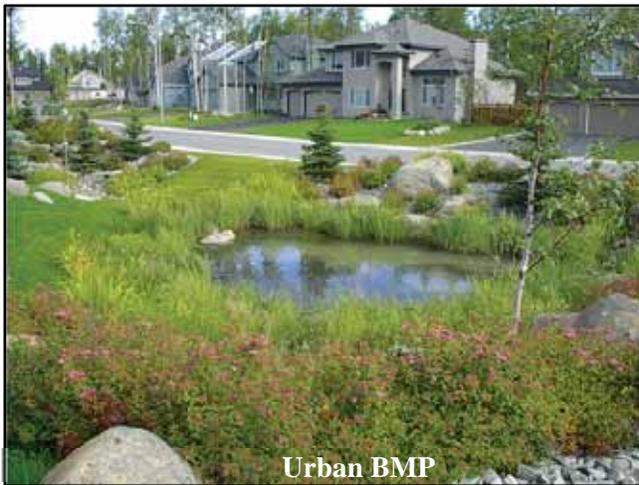
Education and Outreach. Education and outreach activities are inherent to each of MDEQ's protection and restoration projects that have been selected from a list of priority watersheds. These activities become a part of the watershed implementation plan for that project. For example, *Adopt-A-Stream* is a program that includes water-education workshops on streams themselves. Streams having protection/restoration projects are given priority for locating and conducting these workshops. Similarly, other education/outreach activities are treated in the same way as much as possible. There are some activities that are generic and have statewide applicability. Activities in addition to *Adopt-A-Stream* described in this report include: 1) *Envirothon Competition*; 2) *Environmental Teacher Workshops and Student Environmental Camps*; 4) *Blueways*; 5) *WaterFest Event on the Ross Barnett Reservoir*; 6) *Watershed Harmony Musical Puppet Theater*; 7) *Student environmental day camps*; 8) *Make-A-Splash*; 9) *Enviroscape and Groundwater Models* and; 10) the *Storm Drain Marking Program*.

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."



Urban BMP



Construction BMP



Agricultural BMP

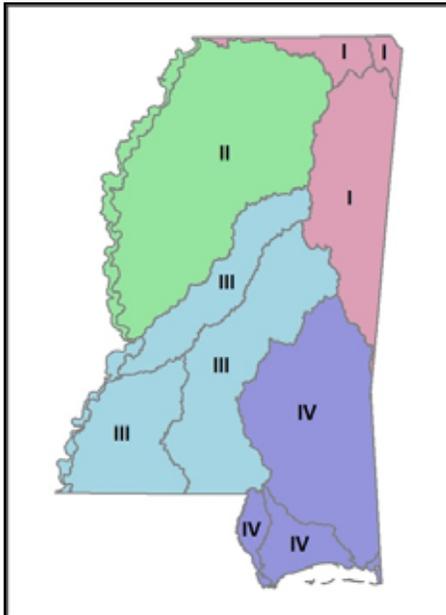
History of NPS Program

History

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 23 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: <http://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 Activities

Total Maximum Daily Load and Modeling Section

[The Total Maximum Daily Load \(TMDL\)](#) is a calculation of the greatest amount of any single pollutant that can assimilate in surface waters while continuing to meet water quality standards. The TMDL also determines how much of the pollutant comes from point sources, such as industry and communities, or nonpoint sources, such as storm-water runoff from urban areas or agriculture.

Water bodies that do not meet water-quality standards are identified as "impaired" for the particular pollutants of concern. Under Section 303(d) of the Clean Water Act (CWA), states are required to develop a list of impaired waters needing TMDLs. MDEQ, biennially, creates this 303(d) List of Impaired Waters. MDEQ's 2012 list was adopted by the Mississippi Commission on Environmental Quality on June 28, 2012. In addition, MDEQ completed 7 TMDLs between July 2012 and June 2013.

Sediment TMDLs in the Tombigbee River Basin

The Stressor Identification Process and Total Maximum Daily Load Projects

Due to biological impairment, MDEQ has three water-body segments, Greenwood Creek, Robert's Branch, and Tubbalubba Creek listed on the Mississippi 2012 Section 303(d) List of Impaired Water Bodies. Biological monitoring in these streams indicated that something was stressing the environment. After finding impairment in the stream, MDEQ scientists and engineers began looking for the cause of the problem and potential solutions. EPA provides a formula for identifying the biological problems in a stream. The Stressor Identification (SI) Process takes a comprehensive look at all of the available information about the stream, the biota present, the land use in the watershed, and any historical data available to come up with the best answers to the environmental problems found in the stream. The SI process for these three segments identified an overabundance of sediment as a probable primary stressor present in the streams.

Sediment is the clay, sand, and silt transported by the stream. It is caused by erosion of stream banks or the movement of the stream bed downstream after a heavy rainfall. Sediment transport is a natural process in a meandering stream, but it can be harmful to the biota present when the sediment load overwhelms the natural habitat.

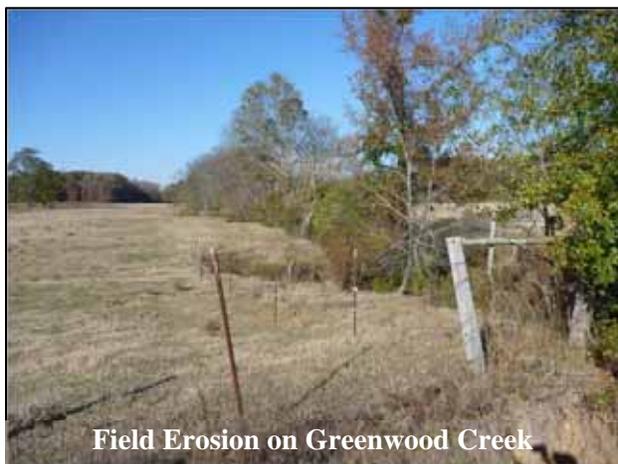


Tubbalubba Creek

MDEQ regulations do not include a numerical water-quality standard for sediment load transport, but there is a narrative standard for the protection of aquatic life which was used to justify the development of a TMDL for sediment. However, the narrative standard does not provide a numerical target, which is a critical component for TMDL development.

The sediment transport target for the TMDL is based on reference sediment yields developed by the Channel and Watershed Processes Research Unit (CWPRU) at the National Sedimentation Laboratory (NSL) located in Oxford, MS. CWPRU developed reference sediment yields, or targets, for each level III ecoregion within Mississippi. These yields were derived from the empirical analysis of historical flow- and sediment-transport data for stable streams in each level III ecoregion.

The methods used to develop the level III reference yields are described in detail in the reports entitled, *“Reference” and “Impacted” Rates of Suspended-Sediment Transport for Use in Developing Clean Sediment TMDLs: Mississippi and the Southeastern United States* (Simon, et al., 2002) and *Actual and Reference Sediment Yields for the James Creek Watershed – Mississippi* (Simon, et al., 2002).



According to 40 CFR §130.2(i), TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures. The sediment TMDLs are expressed as the tons of sediment that can be discharged from an acre of a sub-watershed during a day (tons/acre/day) at the effective discharge of a stream and still attain the applicable water-quality standard. This method results in a range of acceptable reference yields of 0.0004 to 0.0018 tons per acre per day at the effective discharge. The effective discharge is the channel-forming flow of a stream or the flow that transports or moves the most sediment.

The effective discharge is obtained by combining flow frequency data with sediment transport relationships. These TMDL ranges are not applicable on an annual basis because the effective discharge only occurs statistically once every one and a half years, not on a daily basis. However, because the effective discharge is the critical condition, compliance with the TMDL at effective discharge will result in the attainment of the water-quality standards at all times.

For many impaired streams in the Tombigbee River Basin, sediment data were either not available or were insufficient to calibrate a water-quality model for prediction of existing sediment loads. Therefore, the TMDL does not provide an existing load specific to each water body segment. However, a source assessment is included. In addition, CWPRU also estimated the typical range for unstable streams within each level IV ecoregion in the Tombigbee River Basin. A range of unstable values was assigned to these three segments based on the level IV ecoregion.

These unstable ranges are representative of the existing loads that would be expected for these segments. The unstable range is 0.002 to 0.054 tons per acre per day at the effective discharge. The unstable yields are larger than the target yields; therefore, a reduction plan is recommended for the watersheds. Based on the ranges of stable and unstable yield values, a sediment load reduction of 77% to 97% is needed.

The TMDL concludes with a recommendation that the three watersheds be considered a priority for stream bank and riparian buffer-zone restoration. This recommendation includes any sediment reduction BMPs, especially for the road crossings and agricultural and construction activities. The implementation

of these BMP activities should reduce the sediment load entering the streams. The reduction of the sediment load in the watersheds to equal that of a relatively stable stream will allow the streams to approach stable conditions. This will provide improved habitat for the support of aquatic life in the water bodies and will result in the attainment of the applicable water-quality standards.

MDEQ has adopted the *Basin Approach to Water Quality Management*, a plan that divides Mississippi's major drainage basins into four groups. During the next monitoring phase in the Tombigbee River Basin, these watersheds may receive additional monitoring to identify any changes or improvements in water quality.

For land disturbing activities related to silviculture, construction, and agriculture, it is recommended that practices detailed in one or more of the following references be used: 1) "*Mississippi's BMPs: Best Management Practices for Forestry in Mississippi*" (MFC, 2000); 2) "*Planning and Design Manual for the Control of Erosion, Sediment, and Stormwater*" (MDEQ, et. al, 1994) and; 3) "*Field Office Technical Guide*" (NRCS, 2000).

Modeling Permit Limits

The TMDL section is working in accordance with guidelines detailed in the *National Pollutant Discharge Elimination System* (NPDES). Pursuant to guidelines within this system, permitted facilities help communities meet upcoming nutrient criteria, existing nutrient TMDLs, and new oxygen-permit limits. These "life changing" limits potentially strain the existing capacity for treatment at many small towns in Mississippi. The TMDL section is working with all of these communities to improve the existing computer models through new survey methods and more intensive monitoring and research. These actions will ensure accuracy in the development of water-quality based limits for these facilities.

Numeric Nutrient Criteria Development

In 2013, MDEQ continued development of numeric nutrient criteria for Mississippi's water bodies. MDEQ's mission is to develop scientifically defensible criteria that are appropriate and protective of Mississippi's waters using a process that is transparent, replicable, and based on the latest technical guidance. Criteria for each water-body type will be coordinated with those of other waters to ensure consistency and to protect downstream uses.

Highlights of MDEQ's numeric nutrient criteria development efforts within 2013 include:

- The Mississippi Nutrient Technical Advisory Group (hereafter called the TAG) held four meetings in 2013. The mission of the TAG is to provide technical expertise and regional knowledge to MDEQ for the development of scientifically defensible numeric nutrient criteria. The TAG consists of over 30 members representing a broad range of scientific and engineering technical expertise from multiple state and federal agencies and four of Mississippi's universities. The 2013 TAG meetings focused on providing continued technical input on developing nutrient criteria for Mississippi's wadeable and non-wadeable streams, lakes and reservoirs, coastal and estuarine waters, and Mississippi Delta waters. MDEQ continues to analyze data based on recommendations from the TAG. The TAG will continue to meet regularly throughout the criteria-development process.
- In 2013, MDEQ continued to hold *Nutrient Criteria Update Sessions* for Mississippi stakeholders. The objectives of the update sessions were to both provide stakeholders with an

update regarding the development of the criteria as well as promote open communication among MDEQ staff and stakeholders. MDEQ plans to hold update sessions regularly with this group throughout the derivation process of numeric nutrient criteria development. MDEQ's goal is to promote transparency of the process and provide stakeholders an opportunity to ask questions and provide feedback to MDEQ and the TAG.

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 determine the status or overall health of all wadeable, non-tidal streams in Mississippi with the exception of those located in the Mississippi Alluvial Plain. The monitoring locations for the biological sampling have been targeted to ensure that, where possible, all 12-digit watersheds have biological samples for the main-stem drainage of that watershed. The data collected and resulting water quality assessments are critical in measuring success for MDEQ water



programs. Monitoring efforts completed with the support of this funding 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 M-BISQ was originally developed using biological and environmental data collected from 463 stream locations. Since 2001, more than 1,600 biological samples have been collected from 935 sites. As part of routine index maintenance, it is a 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 re-calibrate the index. Over the past several years, MDEQ has been targeting wadeable streams in blackwater systems. Using these data, MDEQ is in the process of re-calibrating the M-BISQ again to investigate the applicability of a separate site class for blackwater systems. If successful, this will increase the sensitivity of the index. The ongoing re-calibration of the MBISQ is scheduled for completion in January 2014. As part of MDEQ's routine monitoring program, about 100 samples are scheduled for collection annually.

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. When the index is finalized, biological monitoring in the Mississippi Delta will be incorporated

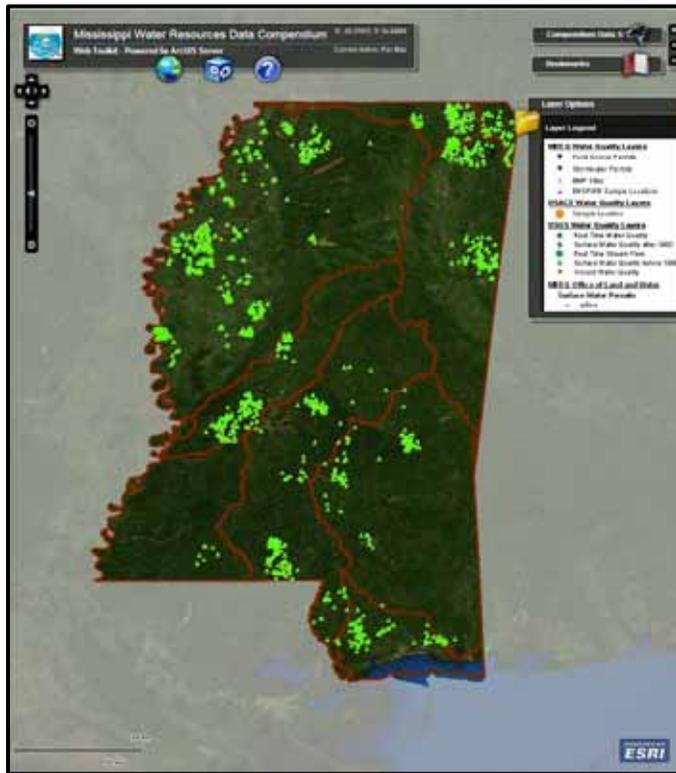
into MDEQ's *Ambient Monitoring Program*. The resulting index will allow successful water-quality assessments of MDEQ water programs. Since monitoring was initiated in 2002, a total of 113 sites have been monitored. With the availability of *Light Detection and Ranging* (LIDAR) data for the Mississippi Alluvial Plain, MDEQ has used that data to establish drainage areas and perform land-use analyses for each of the monitoring locations. The results from these analyses were used to further refine the preliminary index, which is now in draft form and under review by MDEQ. The effort to develop an *Index of Biological Integrity* for the Mississippi Alluvial Plain is an ongoing effort with the USGS; approximately 25 sites are monitored annually. The current index should be available for external review in 2014.

Geographic Information Systems (GIS) and Mapping of NPS Projects

GIS is used extensively by NPS staff in watershed project planning, data delivery, monitoring, and budget tracking. The NPS Branch uses a collection of GIS tools along with available data to accomplish its goals, but this section will highlight three applications: 1) *The Mississippi Water Quality Data Compendium*; 2) *The Mississippi Watershed Characterization and Ranking Tool* (MWCRT); and 3) *The NPS Watershed Resource Management System* (WRMS). In support of these tools, the NPS program maintains a geodatabase of locational information for all current and historical Best Management Practice (BMP) installations and also stores information regarding assessment and monitoring of NPS projects by the MDEQ and its partners.

Mississippi Water Quality Data Compendium

In 2013, the NPS Branch continued support of the *Mississippi Water Quality Data Compendium* (The Compendium) by updating existing USGS Well Locations and updating the application to newer underlying architecture. These enhancements were done to promote greater use of the tool during project planning and data mining. The Compendium was developed in an effort to coordinate a wide variety of data collection activities and improve inter-agency communication and coordination concerning water-quality data collection among the U.S. Army Corps of Engineers (USACE), U.S. Geological Survey (USGS), and the Mississippi Department of Environmental Quality (MDEQ), but has added some water-quantity elements (Ground and Surface Water Permitted locations, respectively). The Compendium is a web-based GIS application that shows the location of data collection sites or projects. It provides a description of the data including contact information to obtain necessary water-quality data. The Compendium includes information on the existing water-quality data in a simple user-friendly interface.



The goal(s) of *The Compendium* are:

- Foster increased access and use of the existing data;
- Identify gaps and/or overlaps in data collection;
- Promote collaboration and coordination of monitoring activities to improve data collection
- Planning and maximize efficient use of available resources;
- Establish a sustainable process to routinely update the data compendium; and
- Improve natural resource management.

Data sets are categorized, described, listed and geographically queried and to serve users.

The Compendium also provides the ability to zoom to a specific area and filter out all the available water-quality data in the specified area. The user will also be able to generate reports and maps. In addition, The Compendium provides website links for additional information and brief descriptions

of each project along with respective data layers. These are listed below:

Data Search Layers

MDEQ Data: Point Source Permits, Stormwater Permits, Section 319 BMP Sites, enSPIRE Sites, MDEQ Office of Land and Water - Surface Water and Groundwater Permits

USACE Data: Yazoo Basin Sites

USGS Data: Real-Time Water Quality Sites, Real-Time Stream Flow, Surface Water Quality after 1980, Surface Water Quality before 1980, Groundwater Quality Sites

Background Layers

303d Impaired Waters, Drainage Areas, NLCD 2006 Landuse, Water Designated Uses

Click on the link below to access the data compendium: [Mississippi Water Quality Data Compendium](#)

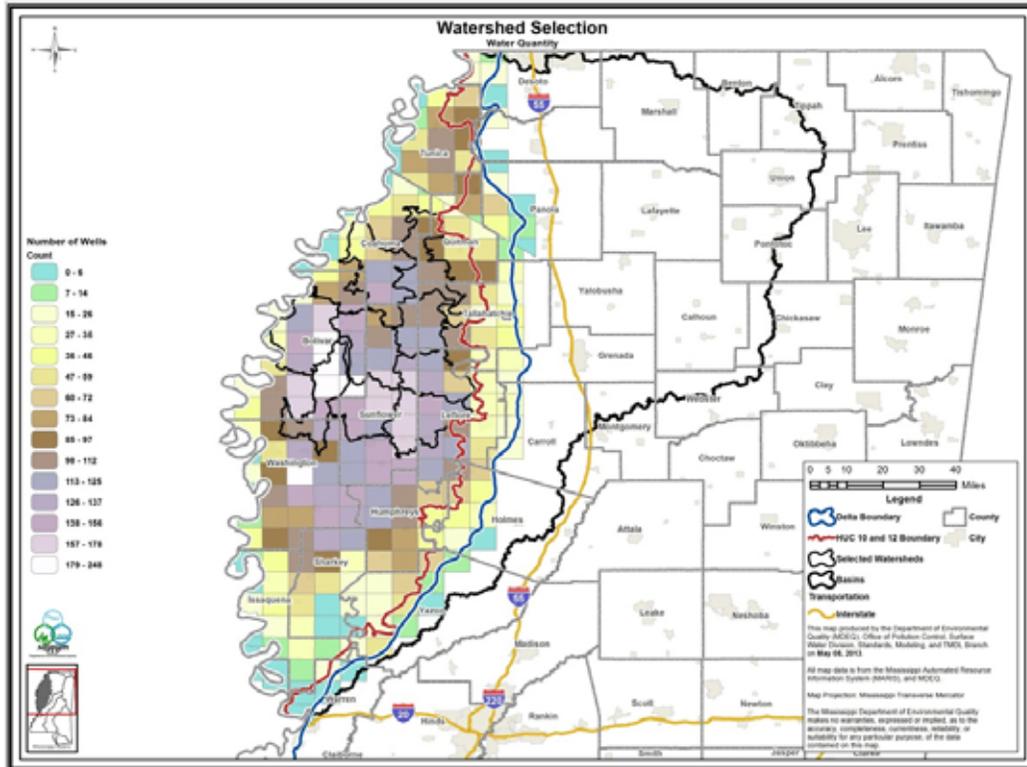
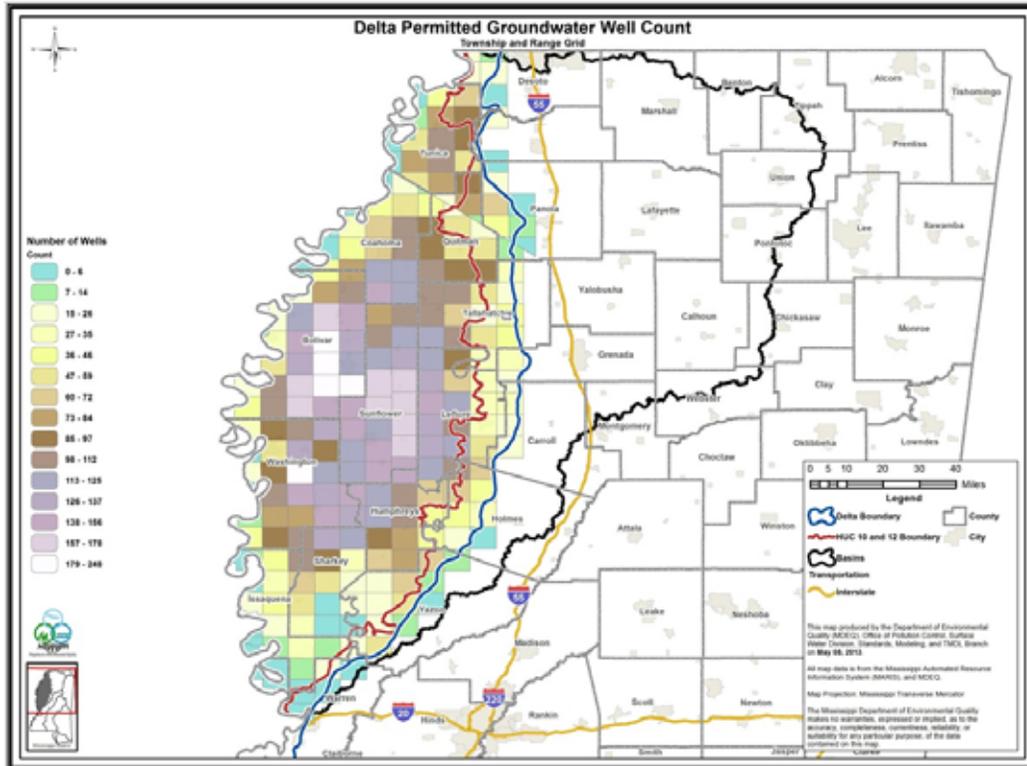


Figure 2. Maps of Water Quantity for Yazoo Delta HUC 10s and 12s.

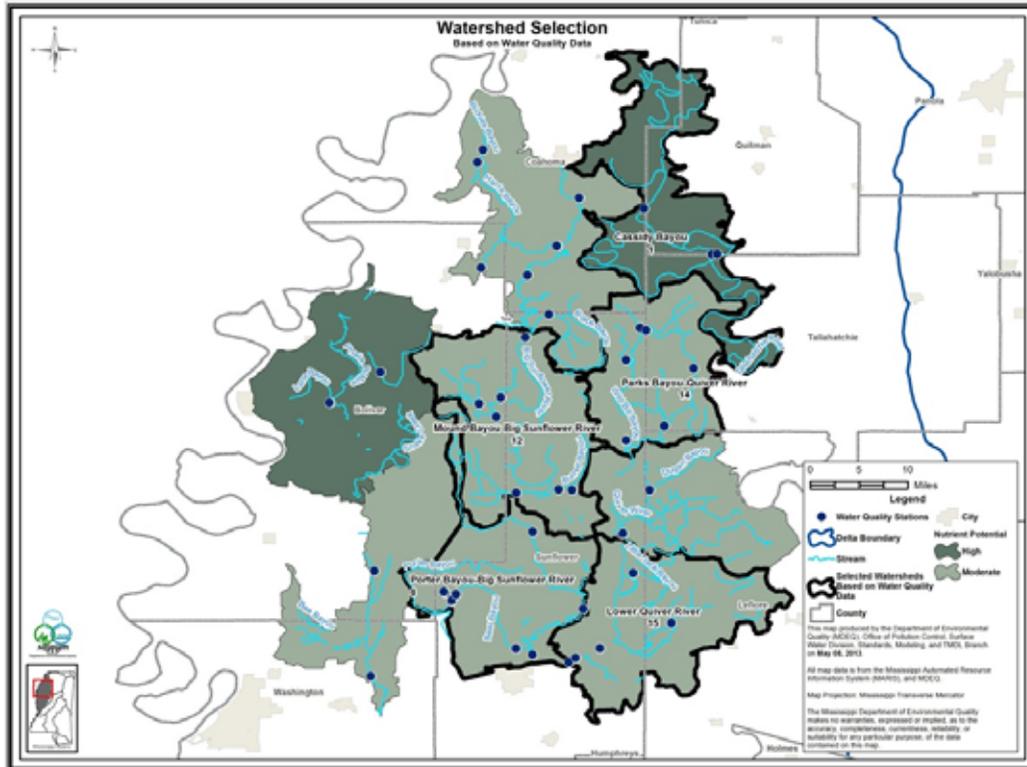
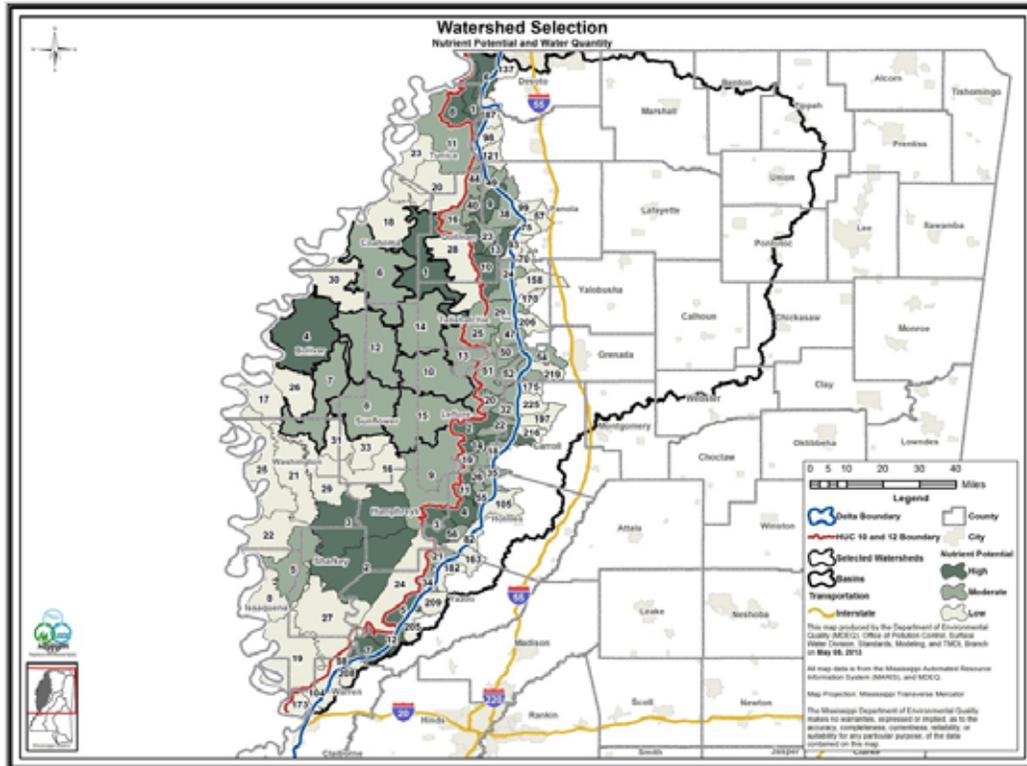


Figure 3. Maps of Water Quantity, Nutrient Potential, and Water Quality data for Yazoo Delta HUC 10s and 12s.

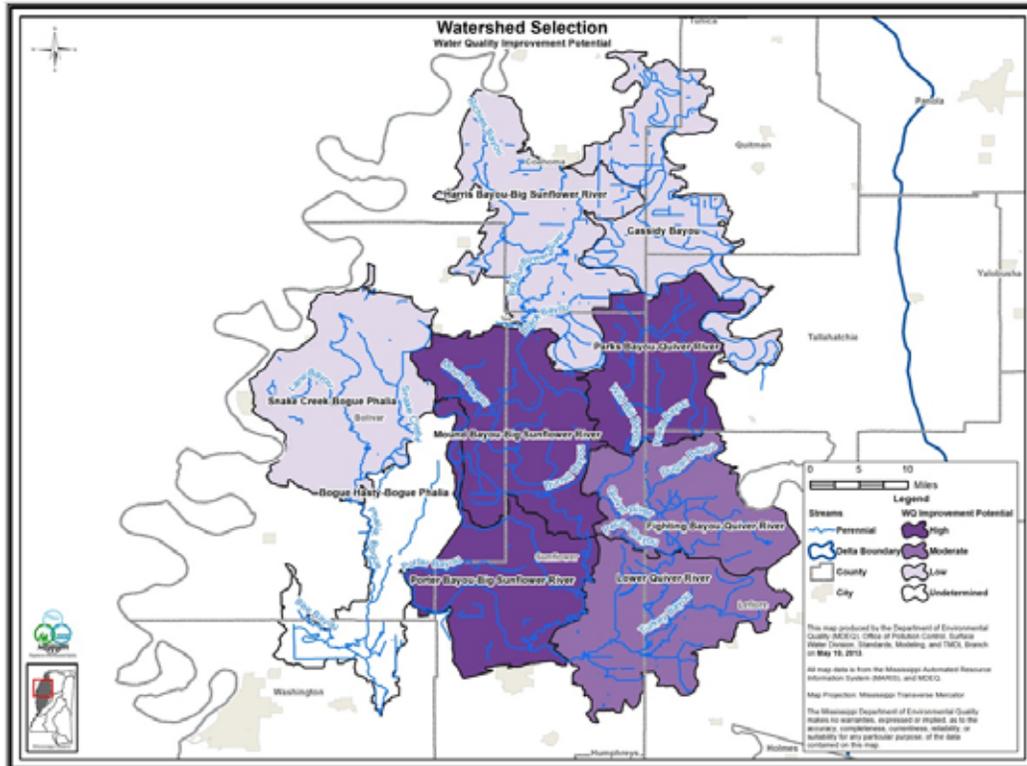


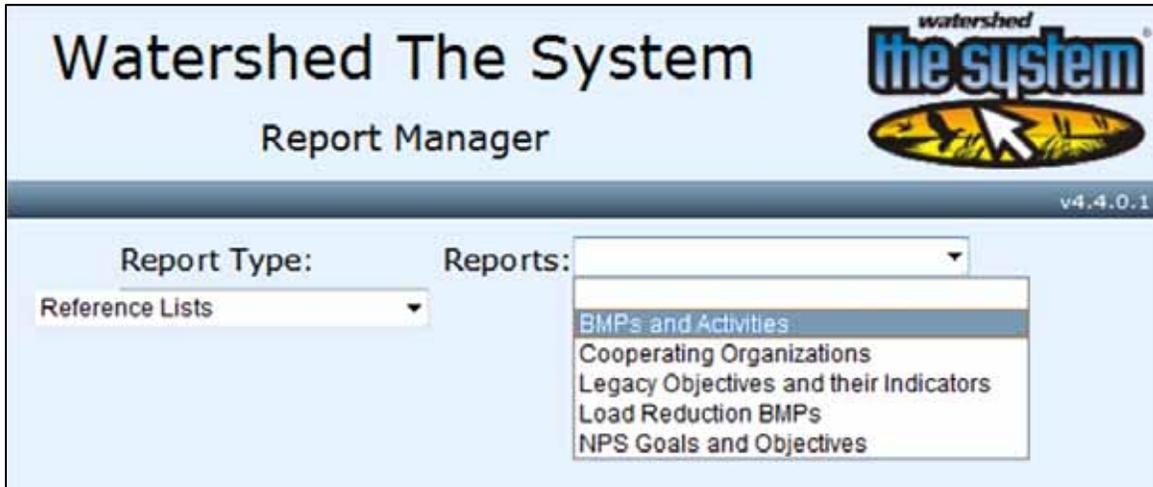
Figure 4. Maps of Water Quality Improvement Potential for Yazoo Delta HUC 10s and 12s.

WRMS

Water Resources Management System (WRMS) is a custom implementation of *Watershed-The System*, a GIS-enabled solution developed by Cengea Solutions, Inc. MDEQ contracted *Cengea* to support configuration of the software to help meet grant tracking obligations for the NPS Management Program. The NPS Management Branch uses the WRMS to enter, manage, map, analyze, and report information about the NPS program, budget, and activities. The WRMS uses seven modules to track the NPS Management Program. These modules are: 1) Cooperators; 2) Planner; 3) Watershed Projects; 4) Cooperator Projects; 5) Fund Manager; 6) Map and; 7) Reporting Modules.

The WRMS was originally configured to take a project-driven approach. In terms of budgeting, it remains primarily project oriented and facilitates monitoring of funds through four stages: Granted, Planned, Awarded, and Spent. For each grant supporting the NPS Management Program, four work-elements are created, premised on the budget work-elements in the grant. In the WRMS, these elements are further sub-divided into program areas such as in-house versus 3rd-party activities, Education/Outreach projects, CZARA projects, and Protection/Restoration projects. The sub-grants and contracts that are let out to third parties are organized as projects in the above structure. The WRMS is used to track these activities and their funding.

This year, the NPS Program tested and began to use two new features with respect to project-orientation. The first simplifies the relationship that defines project groups. The second allows a view into the data that is independent of projects altogether. It enables expression of watershed and/or regional plans that may be only part of a project, and/or may involve multiple projects. This new feature allows analysis and reporting of action plans established in the State, irrespective of the projects involved.



During 2013, the Planner Module was used to associate the goals and objectives of the NPS Management Program with its projects. This allowed for a preliminary tweaking of the list of goals and objectives in the WRMS Planner Module and can be used to support the effort to establish goals, objectives, and measurable, dated milestones for the new 2014 NPS Management Plan. The module identifies which projects have been associated with these objectives and can record indicators considered useful for measuring progress toward fulfilling the objectives. At this time, no such lists of indicators have been created, but the data in the WRMS can serve as a draft list of which indicators are likely to have been used so far for which objectives.

NPS GOALS AND OBJECTIVES AND THEIR MEASURABLE RESULTS	
Characterize/Quantify NPS Pollution Impacts	
<u>OBJECTIVE</u>	<u>OBJECTIVE DESCRIPTION</u>
Priority Watershed Assessment	Periodic assessment of water quality in priority waters.
<u>MEASURABLE RESULTS:</u>	Adopt-a-Stream participation, FSD Monitoring/Assessment activities, Third-party projects that include pre-assessment of field conditions.

Since the Map Module was converted to use an in-house GIS service, the module has proven serviceable and has been made to display watershed and regional plans. BMPs and activities (BMPA) associated with them can also be displayed. Approximately 1,000 BMPA were migrated into the map during 2013. Additionally, three other accomplishments were made: 1) a protocol for submittal and migration of BMPs related to pollution load reductions was implemented; 2) a spreadsheet template was developed to support this and; 3) a WRMS report was written for Quality Assurance (QA) of the migrated data. Due to lack of resources, beyond the above progress, GIS features that will support spatial analysis and reporting of NPS activities and strategies have yet to be implemented.

Project Closeouts Preview by PO Enter prompt values.

Selecting the Report ...

Restrict project list by Status. Project Status

Statutes to Include:

<p>Available Values:</p> <ul style="list-style-type: none"> Approved Behind Schedule Completed Completed Pending Payment 	<input type="button" value="➔"/>	<p>Selected Values:</p> <ul style="list-style-type: none"> Approved Behind Schedule On Schedule Revised
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Grants List Grants and Projects/Grants and Projects - PRJ_GRANT_YR

Select Grant(s):

<p>Available Values:</p> <ul style="list-style-type: none"> 1975 2003 2005 2008 	<input type="button" value="➔"/>	<p>Selected Values:</p> <ul style="list-style-type: none"> 2010
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Project Officers List Project Officers

Select Project Officers:

<p>Available Values:</p> <ul style="list-style-type: none"> MDEQ Project Officer, Nick Hatten, MDEQ SW NPS MDEQ Project Officer, Richard Ingram, MDEQ MDEQ Project Officer, Ronn Killebrew, MDEQ SW NPS MDEQ Project Officer, Steven Utroska, MDEQ NPS 	<input type="button" value="➔"/>	<p>Selected Values:</p> <ul style="list-style-type: none"> MDEQ Project Officer, Steven Utroska, MDEQ NPS
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The WRMS Cooperators Module is used to maintain contact information for the many partnering agencies, contractors, and sub-grantees that have varying relationships to NPS Management Program projects. Each project has its own list of the cooperators involved with it and identifies the roles they play. Two positions and the roles they play have always been set apart as critical: 1) the primary contact for the sub-grantee or contractor and; 2) the NPS Branch project officer in charge of overseeing the project. To these, a third critical position and role has been added-- that of watershed coordinator. This identifies the staff with functional oversight for MDEQ of the watershed where project activities take place.

Finally, the Reporting Module is being used to run about 36 canned reports in eight categories that have been written for specific MDEQ NPS needs. Two dozen of these reports were added in 2013. In 2013, noteworthy reports are in place that can do several things. For example, they can ensure that project data are received and entered in a timely manner during the year and that budget data is accurate and up to date. Furthermore, they can ensure that BMPs are accurately migrated and mapped and that all pertinent data has been entered for closed-out projects. These reports are intended to be used during the year before using the WRMS for end-of-year reporting requirements.

Mississippi Agricultural Chemical Groundwater Monitoring Program

The Mississippi Agricultural Chemical Groundwater Monitoring (AgChem) Program was initiated in March, 1989, for the purpose of determining if the use of agricultural chemicals is impacting groundwater quality in Mississippi. Thus far, the sampling of over 1,840 groundwater sources throughout the State does not indicate any significant impacts directly attributable to agricultural practices.

During the calendar year 2013, 48 samples have been collected for analysis. Included in this total were 41 drinking-water samples, and 7 irrigation, fish culture or wild-life management samples, including one surface-water sample. The program remains committed to testing wells statewide as well as those located in the highly agricultural Mississippi Delta. Two samples of the 48 analyzed detected organic compounds in excess of *Federal Primary Drinking Water Standards*. However, the subsequent resampling of these two wells found no detects of the original organic compounds. Analyses of the other samples performed by the Ag-Chem program did not detect any agricultural chemicals or other organic compounds exceeding *Federal Primary Drinking Water Standards* and/or *State of Mississippi Groundwater Standards*. One public supply well reported 5.0 mg/L for Nitrate-Nitrite-Nitrogen. Though below the *Federal Primary Drinking Water Standard* of 10.0 mg/L, this well may require periodic checking due to the combination of local surface geology and surrounding poultry industry.

Supplemental Watershed Implementation Project Monitoring

The U.S. Geological Survey (USGS) - Mississippi Water Science Center MDEQ have an ongoing partnership to implement monitoring plans for selected 319-funded restoration projects. To date, monitoring is ongoing in seven watersheds. Two watershed projects were recently completed with data collection and the projects are in the data-analysis and report-writing phase. Biological monitoring is performed annually at various locations throughout the State in waters that have been assessed as impaired and BMPs have been implemented in the recent past. This progress report summarizes efforts from all watershed projects, to date, as well as statewide biological monitoring efforts. Final data and interpretations will be published as an interpretive report at the conclusion of each individual project.

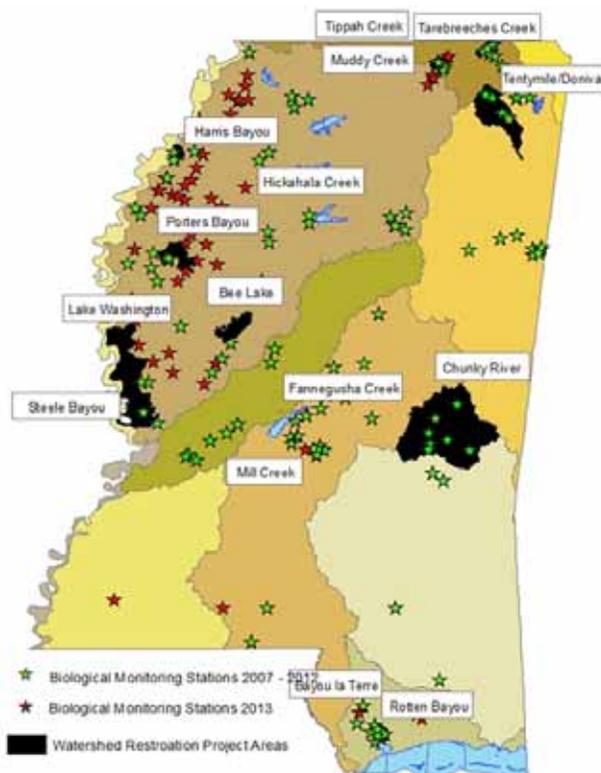
ONGOING

- Harris Bayou
- Porters Bayou
- Bee Lake
- Tarebreeches Creek
- Muddy Creek
- Rotten Bayou
- Lake Washington (just re-started)

DATA COLLECTION

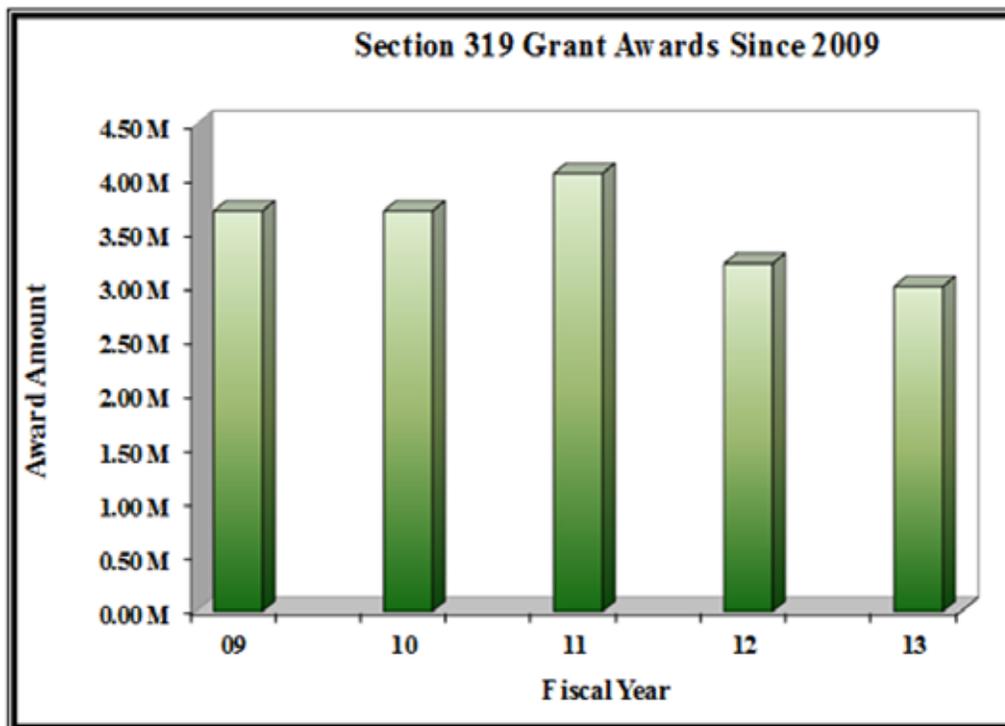
COMPLETE: REPORT WRITING

- Mill Creek
- Casey Creek (Twentymile/Donivan)



The Mississippi Delta (hereafter called Delta) has been experiencing declines in both surface water and groundwater for several decades. These declines have reached levels that potentially place agricultural production, community welfare, and environmental quality at risk. These declines have also added an additional level of complexity and influenced the approaches MDEQ and its partners have developed to reduce excessive nutrient loadings in the Delta. To address these issues, a *Delta Sustainable Water Resources Task Force* has been formed to develop and implement approaches that will restore and sustain surface and groundwater resources in perpetuity. Technical support is needed to develop, expand and/or implement scientifically sound, economically feasible, and socially acceptable strategies that can be implemented in the Delta, adding further to the *Delta Nutrient Reduction Strategies* developed in 2009. Many of the strategies and practices being implemented through the *Delta Nutrient Reduction Strategies* reduce nutrients, but also conserve water. *The Path Forward* concept was developed by the Conjunctive Water Management Work Group of the Delta Sustainable Water Resources Task Force in order to apply quantitative ranking criteria to prioritize alternative water supplies and to develop a metric(s) that is quantitative and consensus-based as well as illustrating sustainable water resources in the Delta. Through this concept, numerous strategies will be advanced and implemented including: watershed characterization; current and historical trends; economic incentives and funding; stakeholder awareness/education/outreach; best management practices; monitoring, and; analytical tools. In 2013, the Conjunctive Water Management Work Group prepared the *Phase 1 Evaluation of Water Supply and Management Alternatives* for the Delta Sustainable Water Resources Initiative Task Force. The evaluation included conservation practices and alternatives that were identified in the work group's synthesis paper developed in March 2012.

Program Funding

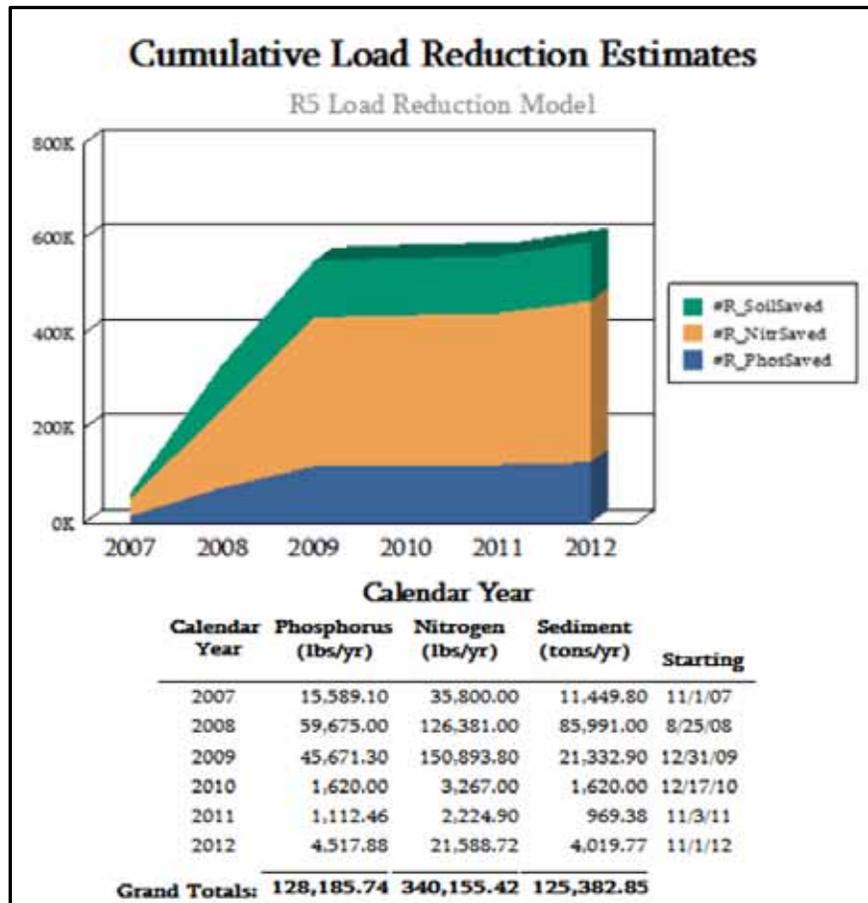


Since the inception of the §319 Nonpoint Source Program in 1990, various types of projects have been funded, including demonstrations of BMPs in watersheds; agricultural/chemical waste disposal; alternatives for converting dairy-cow wastes into electrical power and preventing possible stream

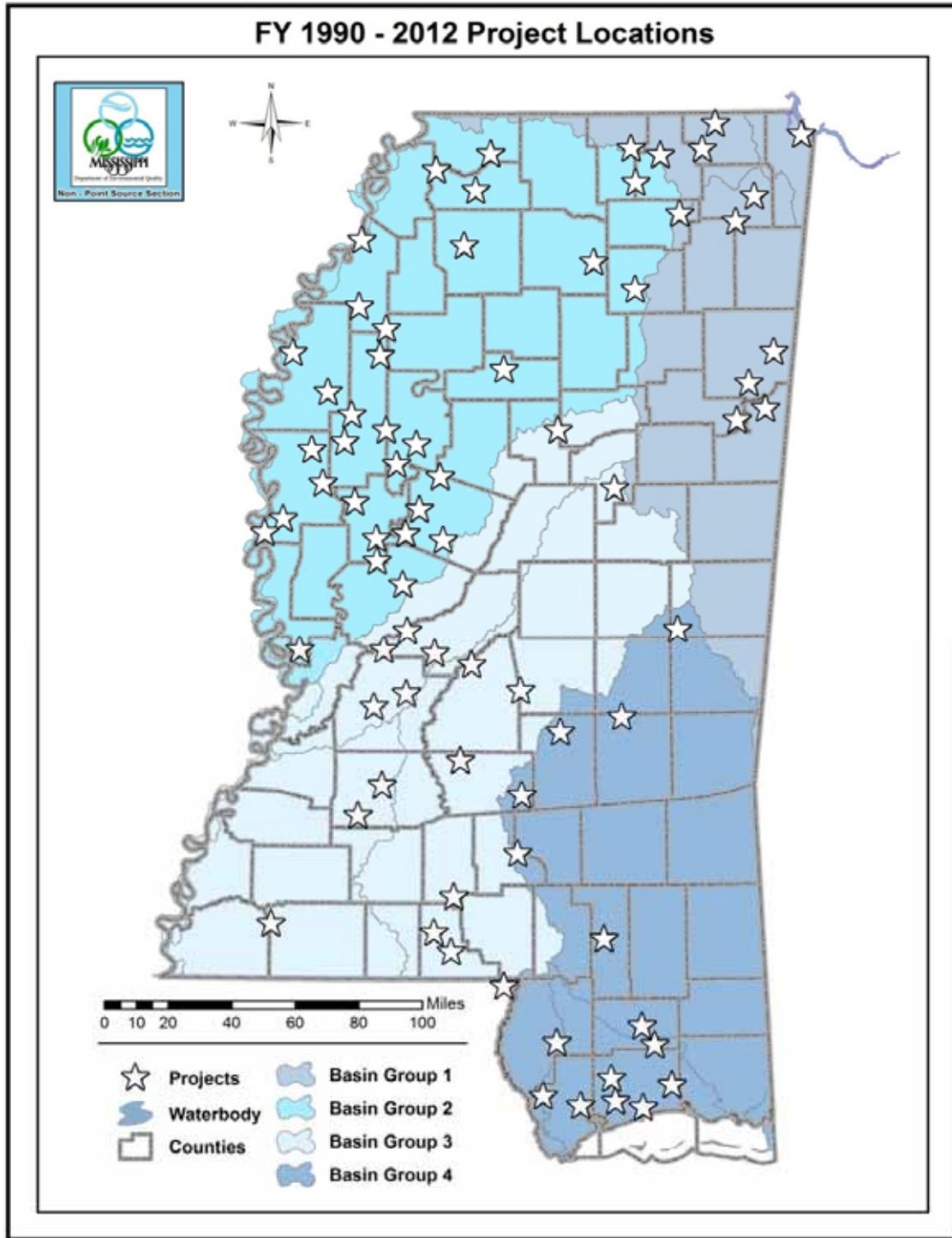
pollution from those wastes; industrial-plant demonstrations that focused on preventing NPS pollution in industrialized watersheds; coastal streams ecosystem restoration; conservation easements that encouraged and assisted farmers to place lands into riparian-buffer strips; development and implementation of approaches that will restore and sustain surface and groundwater resources in perpetuity in the Mississippi Delta and; a variety of educational and outreach projects. One recent and salient development includes the planning of *Low Impact Development* (LID) features in an urban area on the Gulf Coast. In recent years, §319 NPS funding has been used more and more to support nutrient reductions in large watersheds. 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 nutrient concentrations/loadings. A special effort is focused on the *Mississippi River Basin Initiative* (MRBI). This initiative, in turn, focuses on reduced nutrient input from agricultural lands that drain into the Mississippi River and contribute to the Gulf of Mexico’s hypoxia problem. As a part of the MRBI, NPS funds are being used to elucidate problems and solutions concerning conjunctive water uses in the Delta that threaten water tables. Another important initiative is a partnership with NRCS relative to their *National Water Quality Initiative* (NWQI). In this effort, NPS funds are being used to support monitoring efforts on NWQI sites where the NRCS has implemented BMPs. 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. In 2013, during the second year of the NWQI, a total of \$1,152,505 was allocated in two priority watersheds treating 1,344 acres in order to reduce sediment and nutrients delivered to impaired water bodies.

Estimated Nonpoint Source Load

The goal of many §319 funded projects is to control, reduce, and alleviate pollution loads into Mississippi’s lakes, rivers, and streams. The use of BMPs such as soil stabilization, weirs, and filter-strips is the leading strategy for reducing NPS pollution impacts. These types of BMPs are easily recognized and their effectiveness is often easily calculated using the Region 5 (R5) mathematical model. The load reductions estimated in the R5 model include phosphorous, nitrogen, and sediment. The fundamental methodology of this model is based on *Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual* (Michigan DEQ, June 1999). Although the R5 model is an imperative tool in nutrient-reduction calculations, it is not inclusive of all BMPs. There



are many other highly effective agricultural BMPs with impacts that are not as easily estimated, such as prescribed grazing, heavy-use area protection, and livestock fencing. The data calculated through the R5 model are entered into the Environmental Protection Agency's *Grants Reporting and Tracking System* (GRTS) so that the load reductions are available within the database. The total reductions for projects as of the 2012 grant year closeout were: phosphorous-128,186 lbs/yr; nitrogen-340,155 lbs/yr; and sediment- 125,383 tons/yr.



Nutrient Reduction Strategies

Mississippi's collaborative, leveraged approach to reduce excessive nutrients and their impacts focus on the development and implementation of appropriate nutrient reduction strategies. During 2009, strategies were developed to reduce excessive nutrient loadings for the Mississippi Delta, the primary region of row-crop agriculture and aquaculture in the State. This effort was co-led by MDEQ and Delta F.A.R.M. (Farmers Advocating Resource Management). During late 2009, MDEQ, working through the Gulf of Mexico Alliance's Nutrients Team, facilitated the development of a common template for Gulf of Mexico States to encourage a consistent, aligned approach to reduce excessive nutrients regionally. This template is now being implemented in Mississippi and Louisiana as both states use it to guide them in developing state-specific nutrient reduction strategies for their coastal watersheds. In Mississippi, this effort is co-led by MDEQ and the Mississippi Department of Marine Resources (MDMR). During September 2010, MDEQ, working through the Hypoxia Task Force, facilitated the development of a common framework for states within the Mississippi/Atchafalaya River Basin to reduce excessive nutrients and mitigate Gulf hypoxia. Additionally, in a similar effort, Mississippi also developed nutrient reduction strategies for the upland areas of the State.



In 2013, strategies for the Delta, the Coast, and Mississippi Uplands continued to be implemented in watersheds in each region to establish a comprehensive, state-level approach to reduce nutrient loadings from nonpoint and point sources

Basin Management Approach

The mission of the Basin Management Approach is to foster stewardship of Mississippi's water resources through collaborative watershed planning, education, protection and restoration initiatives. To accomplish this, ten of Mississippi's major river basins have been organized into four basin groups. Each basin group has a basin team of state and federal agencies, non-governmental organizations, and other stakeholders.

Implementing Nutrient Reduction Strategies and TMDLs on the Mississippi Coast

Basin Group 4 (Pascagoula River, Coastal Streams, and Lower Pearl) has received the emphasis of more protection-oriented watershed projects in contrast to restoration-oriented projects. These projects have focused on the acquisition of conservation easements and have also included the installation of BMPs at Dead Tiger/Orphan Creek, Red Creek, and Turkey Creek. Turkey Creek is an EPA- and MDEQ-priority watershed. These projects are currently in the implementation phase. The Wolf River Conservation Society has completed a Watershed Implementation Plan that includes both 1) Protection and Restoration Projects and; 2) Education and Outreach Projects.



Mississippi Gulf Coast

A *Coastal Mississippi Nutrient Reduction Strategy* has been developed by MDEQ and their partners. This *Coastal Nutrient Reduction Strategy* is currently being implemented in a coastal Mississippi watershed project in Rotten Bayou. See **Rotten Bayou Watershed Project** below. The fourth annual *Battle on the Bayou* was held on the Old Fort Bayou Blueway where over 200 canoes and kayaks paddled down a 9½-mile trail. Blueways, which are paddling trails on waterways, have now been developed on Old Fort Bayou, the Pascagoula River, Red Creek, and the Jourdan River. Blueways are also planned for Turkey Creek, Tchoutacabouffa River, and the Wolf River.

Implementing Nutrient Reduction Strategies and TMDLs in the Mississippi Uplands

The *Upland Nutrient Reduction Strategy Implementation* in the North Independent Streams Basin has been progressing according to schedule. Two watersheds have been selected for installation of BMPs that will reduce nutrient pollution. These are the Bell-Muddy Creek Watershed in Tippah County and Tarebreeches Creek Watershed in Alcorn County. BMPs installed in the Bell-Muddy Watershed are: 1) 3,895 feet of stream-bank and shoreline protection; 2) three water and sediment-control basins; 3) 16 grade-stabilization structures; 5) 1,132 feet of fencing; 6) 14.5 acres of critical-area planting; 7) 27 acres of pasture and hay-land planting and; 8) 40 acres of nutrient management. The Tarebreeches Creek Watershed has the following BMPs: 1) 381.9 acres of pasture and hay-land planting; 2) three heavy- use area protections; 3) one tank/trough; 4) 550 feet of lined waterway; 5) 10 grade-stabilization structures; 6) 40 feet of stream-bank and shoreline protection and; 7) 170.4 acres nutrient management. All the project funds have either been expended or are committed and all BMPs should be on-the-ground within the project period. The program was so successful that additional requests have been made beyond what funding will allow.



Field day demonstrations of Agricultural BMPs.

USGS has monitoring sites in both of the above watersheds. USGS is anticipated to capture the change in runoff due to the installation of these BMPs. Remaining BMPs to be implemented over the course of this project will also be monitored. Monitoring began in February 2012 on both watersheds and consisted of sampling for nutrients, sediment, and biological integrity.

Implementing Nutrient Reduction Strategies and TMDLs in the Mississippi Delta

Seven watersheds in the Yazoo River Basin (Basin Group II) have been identified for implementation of the *Delta Nutrient Reduction Strategies*. These include three (3) new projects in the Harris Bayou, Porter Bayou, and Coldwater River watersheds and the expansion of four existing sediment-reduction projects in Bee Lake, Lake Washington, Steele Bayou, and Wolf/Broad Lake watersheds.

The initial *Harris Bayou* project consists of two project areas, a treatment area of 1,700 acres and a control area of 1,300 acres. Installation of nutrient-reduction BMPs in the treatment area was completed during 2012. Installed BMPs included the following: 1) a five acre tail-water recovery system; 2) a 16.75 acre on-farm storage reservoir; 3) 210 acres of land formed; 4) six low-grade weirs; 5) 14 water-control structures; 6) 10,000 feet of a two-stage ditch and; 7) 600 feet of grassed waterway. No BMPs were installed in the control area in order to maintain it as an area for comparison. Also, collection of nutrient data for this project is currently ongoing.



The initial *Porter Bayou* project consists of a north project area (1,000 acres) and a south project area (2,500 acres). Installations of nutrient reduction BMPs in the north project area were completed in 2011. Installations of BMPs in the south project area were completed during 2012. Installed BMPs included: 1) a two-acre tail-water recovery system; 2) eight (8) acres of an on-farm storage reservoir; 3) 100 acres of land formed; 4) five (5) low-grade weirs; 5) 88 water-control structures and; 6) 24,156 feet of a two-stage ditch. Collection of nutrient data for this project is currently ongoing.

The ongoing *Coldwater River* project includes three sites. Several nutrient reduction BMPs were installed at these sites during 2012. Installed BMPs included: 1) two (2) on-farm storage reservoirs/ tail-water recovery systems; 2) 240 acres of land formed; 3) three (3) low-grade weirs; 4) 11 water-control structures and; 5) 3,000 feet of a two-stage ditch. Also, collection of nutrient data for this project began in February 2013.



The ongoing *Bee Lake* phase II project is comprised of one project area (740 acres). Several nutrient reduction BMPs were installed in the project area during 2012. The installed BMPs included: 1) three (3) low-grade weirs; 2) 15 water-control structures and; and 3) 5,000 feet of a two-stage ditch. Also, collection of nutrient data for this project is currently ongoing.

The post-BMP monitoring of *Lake Washington* project began this year. Also, nutrient-reduction BMPs were implemented in the existing *Steele Bayou* project; installed

BMPs included two-stage ditches and low-grade weirs.

In addition, development of three new watershed implementation plans for more nutrient-reduction BMPs is currently ongoing in the *Harris Bayou* and *Porter Bayou* watersheds.

Implementing Nutrient Reduction Strategies and TMDLs in the Big Black, Pearl River, and South Independent Streams

The Mississippi Department of Environmental Quality (MDEQ) and Pearl River Valley Water Supply District (PRVWSD), along with other partners, has finalized plans to restore and protect water quality within the Ross Barnett Reservoir (hereafter called the Reservoir). This initiative, which is known as *Rezonate*, focuses on six priority issues in the watershed: 1) 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.

The education/outreach goal through the end of this campaign is to move a large percentage of the target audience(s) through the stages of awareness, retention, and finally to acceptance. The implementation of behavior-change plans that target a smaller audience and require outreach on a more personal level will focus on attitude change (desire) and behavior change (action). Another goal of the awareness campaign is to maximize limited resources. Implementation of the plan has begun and work is ongoing. The aim of the three-year campaign period is to reach the target audience(s) on a consistent basis to increase awareness.

In 2012, MDEQ and PRVWSD agreed to demonstrate techniques to stabilize eroding stream banks and reduce sedimentation and NPS pollution that drains into the Reservoir Watershed. Due to NPS pollution from sediment and nutrients, primarily as a result of urbanization and recreation, various BMPs need to be implemented that can reduce sediment and peak, storm-water flow loadings. Throughout 2013, site selection for the three demonstration areas has continued and is currently ongoing.

The PRVWSD and the Barnett Reservoir Foundation, a newly formed non-profit organization established to promote the Reservoir and surrounding businesses, hosted their 2nd Annual Independence Day Celebration. In conjunction with this celebration, the 7th Annual Waterfest event was hosted by

MDEQ on the Reservoir at Old Trace and Lakeshore Parks in Madison and Rankin Counties. The dual event was held on June 29, 2013. *WaterFest*, the signature event for *Rezonate*, is an annual event that spotlights the importance of protecting, restoring, and improving the water quality of the Ross Barnett Reservoir. Event activities included educational exhibits, kid zones, water slides, interactive displays, live music, food vendors, a classic car cruise-in, and static military displays. Through the efforts of the Barnett Reservoir Foundation, patrons of both parks viewed the 2nd annual lighted boat parade and a grand fireworks display that climaxed the evening's activities. An estimated 10,000 people attended the dual event.



Photo by Jim Logan

Ross Barnett Reservoir

Showcased Section 319 Projects

Bell Creek-West Prong Muddy Creek NPS Project



The Muddy Creek Watershed is approximately 63,682 acres in size. The land-uses for the Muddy Creek Watershed include 12,692 acres of pastureland (19.9%), 24,982 acres of forestlands (39.2%), 7,724 acres of cropland (12.1%), and 18,284 acres of urban, wetlands and other (all together 28.7%). Bell Creek-West Prong Muddy Creek is located in the northwestern portion of Tippah County, Mississippi. There are 19,277 acres located within the watershed boundaries. This watershed is located in a rural area with a population of about 2,380. Therefore, people live throughout the watershed. The town of Falkner is located in this watershed. Economic conditions that influence this watershed include the closing of industry jobs and low timber prices. There have been no significant changes in land use in this watershed in the last 20 years.

This project will implement selected BMPs on targeted areas in the Muddy Creek Watershed that will result in reduced pollutant loadings from agricultural nonpoint sources. The targeted area within this watershed will focus on nutrient loadings from agricultural nonpoint sources. Of primary concerns are animal waste runoff and the animal access to streams from cattle operations in the watershed. Also, soils in the watershed are very erosive, with sheet and gully erosion occurring on sloping hay land and pastureland. Erosion is occurring from pasture

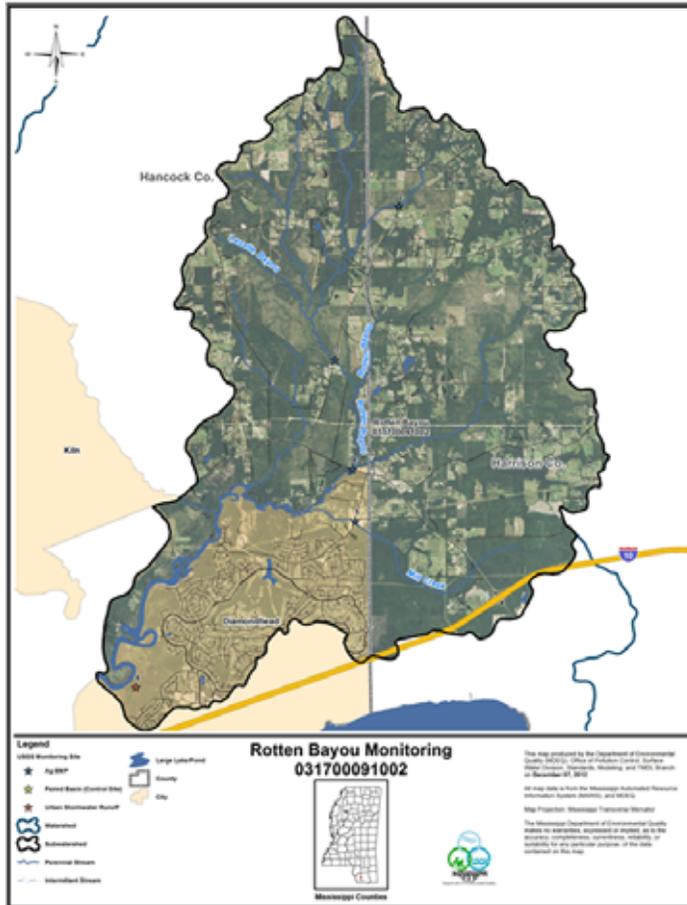
and hay land in the project area at the rate of 8-10 tons per acre per year. Nutrients and pathogens from animal waste as well as sediment contained in runoff is entering Muddy Creek and its tributaries causing degradation of the resource base. The erosion of the soil resource base removes nutrients, 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.

To date, the BMPs that have been installed are: 1) 1,583 feet of stream bank and shoreline protection; 2) nine (9) grade stabilization structures and; 3) 16 acres of pasture- and hay-land planting. All the money has been obligated in this project. A field day was held on March 6, 2013 with 25 people in attendance. Nutrient- load reductions for the stated BMPs have already begun to show reductions of over 523 lbs/yr of phosphorous, 1,041 lbs/yr of nitrogen, and 571 tons/yr of sediment in Mississippi waters.



Rotten Bayou

The Rotten Bayou Watershed Project was developed to implement the *Coastal Nutrient Reduction Strategy*. This strategy used the Gulf of Mexico Alliance (GOMA) Coastal Template and leveraged on work done in the Delta with the *Delta Nutrient Reduction Strategy*. The *Coastal Nutrient Reduction Strategy* was developed through local



workshops with coastal stakeholder input. Various issues relative to livestock, forestry, urban stormwater, and atmospheric deposition were included in the strategy. As part of the federal government's efforts to recover from the Deepwater Horizon oil spill, NRCS announced the start of an innovative water- and wildlife-conservation effort along the Gulf Coast, called the *Gulf of Mexico Initiative (GoMI)*. NRCS developed *GoMI* in close collaboration with local, state, and federal partners. It is a new approach to better target conservation activities in the Gulf Coast region to improve the health of the Coast's rivers, wetlands, and estuaries that are integral to jobs and the economy in the Gulf. Because MDEQ had already developed and begun implementation of the *Coastal Nutrient Reduction Strategy* in Rotten Bayou Watershed, NRCS targeted it for their *GoMI* Project. The Mississippi Soil and Water Conservation Commission, the Soil and Water Conservation District, and NRCS, have been working with local landowners in the Rotten Bayou Watershed to install agricultural BMPs. Some of the available BMPs to landowners in the watershed are: 1)

pasture and hay planting; 2) nutrient management; 3) tank/ troughs; 4) tree and shrub establishment; 5) forest harvest trails and landings and; 6) vegetative barriers. To develop a Watershed Implementation Plan for this project, the Land Trust for the Mississippi Coastal Plain is working with local residents to form three teams: a watershed team, a technical team, and an education team. These teams will provide input to the plan. A kickoff watershed-team meeting was held at the Diamondhead Country Club on October 10, 2012. Also as part of this project, the Department of Landscape Architecture at Mississippi State University is working with the City of Diamondhead to develop Low Impact Development Urban BMPs for reducing stormwater NPS pollution.

Several meetings by various groups relative to the watershed have been held over this last year of 2013. A Rotten Bayou Watershed Steering Committee Meeting was held Thursday, March 21, 2013, at the Diamondhead City Hall. A Technical Advisory Team Meeting for the Rotten Bayou Watershed, was also held on Friday, March 22, 2013, at the Diamondhead City Hall. On Tuesday, August 13, 2013, a Rotten Bayou Watershed Partnership Meeting was held in the Activity Room, at the Diamondhead City Hall. It was the first meeting where the Education and Outreach Team joined the Steering Committee and the Technical Advisory Team.

Tarebreeches Creek – Tuscumbia River Canal Watershed Project



Tarebreeches Creek-Tuscumbia River Canal Watershed was identified as a priority watershed by MDEQ. Tuscumbia River Canal is listed on Mississippi's 303(d) list of impaired waters for biological impairment due to sediment, nutrients, and low DO/organic enrichment. The Tuscumbia River Canal watershed is approximately 204,311 acres in size.

The land uses for the Tuscumbia River Canal Watershed include 33,293 acres of pastureland (16.3%), 72,214 acres of forestlands (35.3%), 31,795 acres of cropland (15.6%), and 67,009 acres of urban and other (all together 32.8%).

The targeted area of this watershed is the Tarebreeches Creek Subwatershed. Tarebreeches Creek-Tuscumbia River Canal is located in the north to northwestern portion of Alcorn County, Mississippi. There are 16,721 acres located within the watershed boundaries. This watershed is located in a rural area with a population of about 300 people within its boundaries.

There are several different groups with responsibilities in this watershed. The Mississippi Soil and Water Conservation Commission (MSWCC) has the responsibility and role of administering the 319 project. The Tippah County Soil and Water Conservation District and the local NRCS staff have the role of technical assistance. The landowners have the responsibility of implementing BMPs in the project area. The Muddy Creek Watershed Implementation Team has the role of helping gather all the information needed to write the Watershed Implementation Plan. The MSWCC also has the responsibility of compiling all the information and writing the initial plan for the watershed. Other programs that are available to landowners in the watershed include EQIP, CRP, and WHIP. Under these three programs, there has been \$375,506.20 spent over the last three years with another \$150,000 projected to be spent over the next three years in Tippah County.

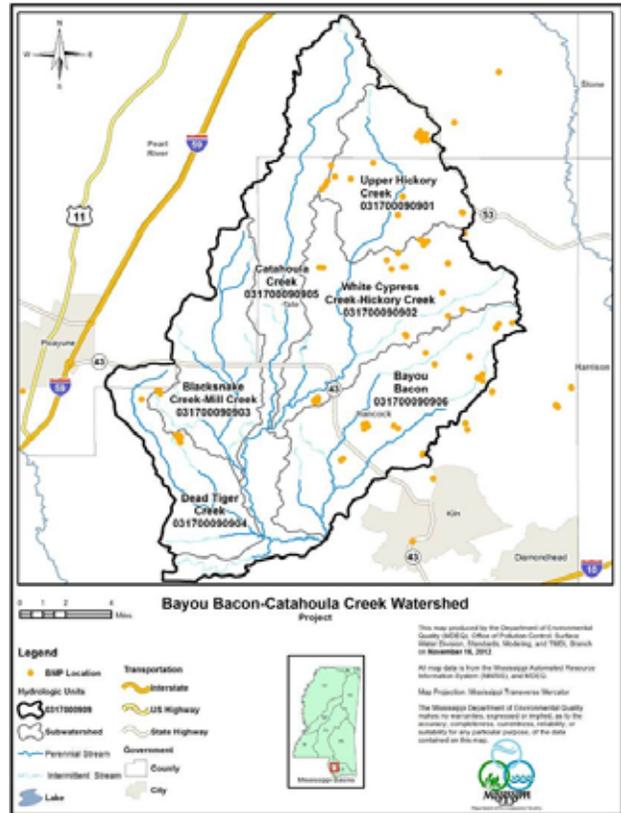
A list of installed practices through §319 funding includes 19.4 acres of nutrient management, four (4) grade stabilization structures and 46 acres of pasture and hay-land planting. A field day was held in this watershed on October 22, 2012 with 50 people in attendance. Nutrient- load reductions for the stated BMPs have already begun to show reductions of over 309 lbs/yr of phosphorous, 582 lbs/yr of nitrogen and 177 tons/yr of sediment in Mississippi waters.



Dead Tiger/Orphan Creek Watershed

The Dead Tiger/Orphan Creek Watershed is about 25,146 acres in size and located in Hancock County in south Mississippi. The Dead Tiger/Orphan Creek Watershed is comprised of the following: 44% pastureland, 54% timberland, and 2% wetlands, urban, and other. The majority of the timberland is in the buffer zone for Stennis Space Center.

Due to the high level of stakeholder interest and because the creek was listed on the 303(d) list, the project was a collective effort between the MSWCC, MDEQ, and the United States Environmental Protection Agency, the NRCS, and the Hancock County Soil and Water Conservation District. The total cost of the overall Dead Tiger/ Orphan Creek Watershed project was \$206,779; \$122,247 was funded by the §319 NPS Program. The §319 funds were expended in the following way: \$15,319 for technical assistance, \$3,273 for education and information outreach, and \$103,655 for BMP installation. Participating state and local stakeholders contributed a total of \$84,532 towards the implementation of the watershed project.



In 2009, MDEQ went back to the original sampling location from 2001 and 2003 in Orphan Creek to collect biological community data. The score was 76.5. Data were also collected at two new sites on Orphan Creek and scored 78.9 and 82. According to the 2009 data from the original sampling location and the two new sites, Orphan Creek was assessed as attaining the Aquatic Life Use in the 2012 305(b) report and removed from the impaired waters list.

A summary of the BMPs installed to date in the project area and the tons of soil being saved is shown below. All landowners and producers are greatly thanked for voluntarily installing BMPs on their land. The benefits of this project show that the continued use of BMPs will protect water quality and save valuable topsoil.

SUMMARY OF BEST MANAGEMENT PRACTICES INSTALLED TO DATE

Practice Name	Number of Practices	Number of Acres Affected	Total Tons of Soil Saved Per Year
342- Critical Area Planting	3	9	2,827.1
382- Fencing	8	15,884 feet	
590-Nutrient Management	18	409.5	1,607.2
512-1-Pasture and Hayland Planting	10	114.5	446.5
728-Stream Crossing	2		
614-Tank/Trough	2		
Totals	43	533	4,880.8

NPS Education/Public Outreach

Envirothon Competition– A Winning Team

The Mississippi Envirothon team from Oxford High School placed 5th in the International Competition 2013 which was held in Bozeman, Montana at Montana State University on August 9, 2013. The team placed 1st in the topic of aquatics and 2nd in oral presentation at the International Competition where they were competing with 57 teams from the U.S. and Canada. The Mississippi Competition is sponsored by MDEQ's Nonpoint Source Pollution Program and the Mississippi Association of Conservation Districts and is coordinated by MSWCC.

This competition tests student knowledge about water, soils, forestry, wildlife, and current environmental issues each year. In 2013, there were 294 high-school students (49 teams) and their advisors from 22 Mississippi counties who participated in four area competitions. A total of about 100 students (20 teams) participated at the state level competition. Oxford High School, being the winning team in Mississippi, traveled to Montana State University in Bozeman to compete in the North American Canon Envirothon Competition held in August 2013.



2013 team members are Yujing Zhang, Mark Zhao, Julie Shaw, Joshua Michael Redding, and Joelle Young. The team advisor (not pictured) is Renee Dayan.

Adopt-A-Stream

The Mississippi *Adopt-A-Stream Program* received a “First Place Civic Award” from *Keep Mississippi Beautiful* in the Spring of 2013. Mississippi's *Adopt-A-Stream*



(AAS) Program is sponsored and funded by MDEQ's §319 Program and implemented by the Mississippi Wildlife Federation (MWF), in cooperation with MDEQ. This program promotes environmental



stewardship by training volunteer citizens about stream ecology, aquatic life, and water chemistry. Volunteers attend a one- or two-day, water-education workshop to learn how to monitor a stream, conduct a stream cleanup, or mark storm drains. In 2013, fourteen (14) people attended the traditional 2-day workshop; and 138 people attended seven, 1-day workshops. Over 7,950 people were reached with the AAS Program statewide through 12 large-venue environmental events. Nineteen student

Envirothon teams were trained as well as 207 students and teachers in 24 aquatic-ecology classroom and field-trip settings. The *AAS Program* coordinator within the MWF also attends meetings and participates in community environmental activities that include stream cleanups, litter pick-ups, planting days, Eagle Scout projects and various conferences where conference displays are shown. This year, the coordinator assisted with a monofilament, fishing-line collection project on the Barnett Reservoir in the Jackson, Mississippi area.

Environmental Teacher Workshops and Student Environmental Camps

Teacher workshops are a major environmental education component of MDEQ's NPS grant each year. The workshops include classroom interactive instruction and field trips with some of the best



environmental/natural resource speakers in Mississippi instructing the classroom teachers and informal environmental educators. Topics include instruction in aquatic ecology, stream monitoring, watershed mapping, forestry, wildlife, soils, cultural resources; and, lesson plan curricula such as Project WET, Project WILD, Project Aquatic WILD, Project Learning Tree, Project Food, Land and People, Litter, Agriculture and others. During 2013, a total of 522 educators were trained in 22 teacher workshop venues that were held in various regions of the State

where teachers could obtain Continuing Education Units credit in order to maintain their teaching licenses and certifications.

Blueways



Red Creek Blueway

A project sponsored by a NPS grant introduced the concept of recreational paddling trails called *Blueways* to Mississippi citizens. This project was first introduced at Old Fort Bayou in Ocean Springs in which 13 miles were designated as a *Blueway*. Since that project, *Blueways* have become a well-known part of Mississippi's outdoor activities. Continuing the effort of providing recreational paddling trails in Mississippi, other *Blueways* have been added. The Lower Pascagoula River *Blueway* took place at Lighthouse Park in Pascagoula, and the Jourdan River *Blueway*

took place at McLeod State Park in Kiln. The Red Creek Watershed Project created a *Blueway* in Stone County which has included nearly 30 miles of beautiful scenic paddling trails thanks to a partnership with the local watershed group. The Wolf River Watershed



Project also added a *Blueway* component in order to engage local stakeholders and to improve the recreational use of the Wolf River and potentially in other southern Mississippi streams. *Blueway* designations provide for additional opportunities for eco-tourism while fostering stream stewardship. The NPS program will continue to promote the development of additional *Blueways*. Future *Blueways* on the horizon include the *Bogue Homa* and the *Upper Pascagoula*.

***WaterFest* Event on the Ross Barnett Reservoir**



The Ross Barnett Reservoir *WaterFest* 2013 was an exciting conservation event. For the first time ever, *WaterFest* was held in conjunction with the Annual Independence Day Celebration held at Old Trace Park located on the Ross Barnett Reservoir. The Pearl River Valley Water Supply District, Ross Barnett Reservoir Foundation and MDEQ partnered to create an exceptional event. *WaterFest*, the signature event for *Rezonate*, highlighted the need to protect and improve water quality within the Ross Barnett Watershed. This 7th annual *WaterFest* event featured fun, educational/interactive activities, and exhibits from over 25 exhibitors and food vendors.

The festival also included inflatables, waterslides, face painting, airbrushing, door prizes, and live music. A new addition to the festival this year was the “Water Is Right” game in which patrons who took the *Rezonate Pledge* to protect the Reservoir were randomly called to the stage to answer questions related to how they would protect the Reservoir. An estimated 10,000 people participated in the *WaterFest* and Independence Day activities held at Old Trace Park and Lakeshore Parks. Partnerships and sponsorships have continued to grow as a result of this event. The library systems of the tri-county area successfully aided us in promoting *WaterFest* and the Independence Celebration by distributing fliers for the event.



Watershed Harmony Musical Puppet Theater

MDEQ and Bayou Town Productions completed the first performance of the *Watershed Harmony Musical Puppet Theater* in October 2003. Since that time, performances have reached more than 120,000 students, teachers, and others. Since

mid-September of 2010, ninety-one performances were given with about 22,000 people enjoying the show (data through July 30, 2013). 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 BMPs and individual stewardship to improve water quality. The *Watershed Harmony Puppet Musical* 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 30-minute musical play is performed on a multi-level, 12'x12' stage that conveys a water-quality stewardship theme. The show has received numerous accolades and compliments to include the following quote from the Washington County Soil & Water Conservationist that illustrates its educational impact. *"The program was outstanding and made an impression on adults and children that will result in a change in a very positive way. We will all remember many of the educational points made by the performance. I believe there will be a reduction in littering and pollution because of this wonderful presentation. Good job!"*

Student Environmental Day Camps

Each year, campers are exposed to lectures, hands-on activities and field trips in aquatic biology, nonpoint source pollution, entomology, soils, wildlife, forestry, research projects, geography, journalism, and other topics. The University of Mississippi Field Station held its 12th annual Ecology Day Camp sessions from June 3 – July 8, 2013 with support from the MDEQ's NPS Program. A total of 72 students attended five, one-week sessions; three sessions were for students in grades 2 – 4, and two consisted of one-week sessions for students in grades 5-9. Field trips this year included a tour of the Oxford, Mississippi wastewater treatment plant and Sardis Dam and Reservoir.



Enviroscape and Groundwater Models

MDEQ staff reached over 4,500 students, teachers, and the general public in 2013 using presentations associated with water quality. Over 110 water models have been distributed throughout Mississippi to county Mississippi State University Extension Service Offices, Department of Health offices, Soil /Water Conservation Districts, Environmental Learning Centers, the Choctaw Indian Reservation, and other organizations.

Make-A-Splash Event

A *Water Education Event* is held each September at the Mississippi Museum of Natural Science in Jackson, Mississippi where students visit 20 different water-related interactive booths to learn about polluted runoff, wildlife, water use, groundwater, surface water, and macroinvertebrates, etc. Currently (in 2013), the eleven schools participating had 847 students who attended. The students were from nine schools in the Mississippi Delta (Yazoo River Watershed) and two schools in the Pearl River Watershed.

Storm Drain Marking Program

The *Storm Drain Marking Program* is another cooperative program between MDEQ and the MWF. MDEQ provides MWF funding for this through one of its Section 319 subgrant agreements. The program promotes awareness of the water-quality impacts of polluted runoff in urbanized communities. Small plastic disks are placed by local volunteers on storm drains with the message “*No Dumping, Drains to River.*” Volunteers glue the markers to storm drains and distribute door hangers to homes. Students and scouts also talk with residents about storm- water runoff and the need to prevent pollutants from entering storm drains. A brochure entitled *How to Conduct a Storm Drain Marking Project* can be found at the following web site: [Storm Drain Marking](#)



Let's get Outside, Mississippi Delta 2013

MDEQ joined the U.S. Fish and Wildlife Service, the Lower Mississippi River Conservation Committee, the U.S. Forest Service, the Mississippi Department of Wildlife, Fisheries, and Parks, and the Museum of Natural Science, and a number of other organizations for a summer conservation event on June 15th at the Panther Swamp National Wildlife Refuge Headquarters Complex located near Yazoo City. The event provided opportunities for kids to learn more about the environment and wildlife.



MDEQ exhibits featured educational presentations and information to the kids and their families on the importance of preserving the environment and protecting air, water, and land. Over 130 children, 75 adults, and 40 volunteers participated at the event. Also, 44 sponsors provided prizes and lunch to help participants enjoy this outdoor event.



NPS - Related Programs

Mississippi Coastal Cleanup

The 25th Annual Mississippi Coastal Cleanup was held on October 19th, 2013 and has been declared by the State's Governor, the Honorable Phil Bryant, as **MISSISSIPPI COASTAL CLEANUP DAY**. The organizers of the event repeatedly look forward to a productive, annual cleanup day that will benefit the environment and educate the public about the importance of being good stewards of our coastal resources. MDEQ is proud to be a contributor to this event through the NPS Program.

Despite heavy rains that persisted throughout the morning of October 19th, more than 1,260 volunteers donned slickers, rain ponchos and even trash bags, to clean Mississippi's beaches and waterways. The volunteers picked up marine litter at 49 designated cleanup sites during the Mississippi event, part of the International Coastal Cleanup—the world's largest volunteer effort to clean up the marine environment. During the 2013 Mississippi event, 1,266 volunteers picked up 934 bags of trash, including 119 bags of recyclables, and 75 tires along nearly 95 miles of coastal waterways in Hancock, Harrison, and Jackson Counties, totaling 15,135 pounds—that's 7.5 tons of marine litter. The cleanup is organized by the Mississippi Department of Marine Resources and the Mississippi Marine Debris Task Force. The Mississippi Coastal Cleanup recycling effort continues to grow with volunteers collecting recyclables at 17 sites this year. Volunteers who participated at these sites filled 119 bags with recyclable items such as cans and plastic.

The Mississippi Coastal Cleanup continues its partnership with Mississippi Power's *Renew Our Rivers Program*. Volunteers in that effort cleaned three coastal sites on the days leading up to Saturday's cleanup removing 8.7 tons of large debris that could not be bagged. Combined, both cleanup efforts resulted in 1,452 volunteers collecting 32,400 pounds of trash. This included items too large to fit in trash bags such as household appliances. Other items found were: a recliner; a large TV; a 1-foot by 4-foot broken mirror; a live opossum; a dead, baby great blue heron; a refrigerator drawer; two basketballs; a plastic hammer; six-pack holders and; beer cans. At Three Rivers Park in Gulfport—even a kitchen sink was found.

Healthy Watershed Initiative

The United States Department of Agriculture's NRCS is partnering with 12 states within the Mississippi River Watershed basin to improve water quality within the watershed. Through the partnership, the NRCS has created the *Mississippi River Basin Healthy Watershed Initiative* (MRBI) which will promote the implementation of voluntary conservation practices by landowners, state agencies, and federal agencies. These landowners and agencies will focus on practices that reduce nutrient influxes rather than completely controlling them. The initiative will significantly decrease polluted runoff in order to improve water quality within the basin and to control nutrient loading which contributes to the hypoxic zone in the Gulf of Mexico. The watersheds within the Mississippi Delta that have been selected to implement various conservation practices are Deer Creek-Steele Bayou Watershed, Big Sunflower River Watershed, and Upper Yazoo Watersheds. These conservation practices include systems that avoid, control, and trap nutrient runoff to improve the wildlife habitat and help maintain the agricultural productivity within the State.

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. They do this through waste-pesticide disposal events that have been held over the last several years.

Through a §319 subgrant from MDEQ, one additional waste-pesticide disposal-collection event was planned and held in Issaquena County in federal fiscal year 2013. This 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. A total of

approximately 38,000 pounds of waste-pesticide products were brought to the collection sites where the products were collected and properly disposed of by a licensed hazardous-waste contractor. Some 33 farmers from 9 counties participated in the event. This event saved farmers more than \$45,599 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, more than 1.33 million pounds of waste pesticides have been collected from more than 658 farmers in just about all of Mississippi.

In addition to reducing potential environmental risks associated with these waste products, the events collectively saved farmers about \$1.4 million in disposal costs. Additional disposal events will be held in early 2014 through an existing contract. These events will be welcomed to further reduce environmental, water-quality, and health-related risks in agricultural areas of Mississippi.

Water-Pollution Control Revolving-Loan Fund

The Water Pollution Control Revolving Loan Fund (WPCRLF) program provides low-interest loans to public entities in the State for construction, repair, or replacement of wastewater, stormwater, and nonpoint source pollution projects. Funding for these projects comes from federal grants, state match, repayments, and interest on deposits. Since 2010, additional subsidy funding provided through annual congressional appropriations, has also been made available to "Green- and "Small/Low-Income Community" WPCRLF projects. During 2013, MDEQ funded 16 new WPCRLF projects totaling \$76.1 million that included approximately \$2.4 million of Green or Small/Low-Income Community subsidies.

Water Pollution Control Emergency Loan Fund

The Water Pollution Control Emergency Loan Fund (WPCELF) program provides loans to communities for the emergency construction, repair, or replacement of wastewater collection and treatment facilities. The WPCELF has approximately \$3.1 million available for such emergency projects. MDEQ encourages communities throughout the State to utilize this program whenever funds for emergency wastewater projects are needed.

The Gulf Region Water and Wastewater Plan

During 2006, MDEQ developed the *Mississippi Gulf Region Water and Wastewater Plan* as directed by Governor Barbour in response to Hurricane Katrina. This plan recommended over \$600 million to fund water and wastewater projects in Pearl River, Stone, Jackson, Harrison, and Hancock Counties to: (1) support existing and future growth patterns, particularly as realized through new housing construction; (2) promote economic development and; (3) emphasize the regional concept for infrastructure management. The funding is provided by the U.S. Department of Housing and Urban Development (HUD) through the Disaster Recovery Community Development Block Grants (CDBG-DR).

Final engineering designs and all clearances for the Environmental Review Records have been completed for all original projects. More than 97% of the nearly 4,000 individual parcels, easements, and right-of-entries required for the projects have been acquired.

Environmental permits necessary for construction have been issued, including: National Pollutant Discharge Elimination System (NPDES), State of Mississippi Water Pollution Control Operating, MDEQ stormwater, the Corps of Engineers Section 404 wetlands, Section 401 water-quality certifications and MDEQ groundwater withdrawal permits. All original projects' scopes-of-work have been advertised, received construction bids, and contractors have commenced construction. To date, the sub-recipients (county utility authorities) have submitted closeout packages for 24 projects. The remaining projects are complete or nearly complete, with the owners of the complete projects working on closeout documentation.

The projects being constructed include 17 wastewater treatment facilities, 32 water wells, 32 elevated storage tanks, 68 sewage pumping stations, and more than 600 miles of water and sewer mains (roughly the distance of a round-trip between Biloxi and Memphis).

MDEQ has paid out in excess of \$606 million in program related expenses through the end of 2013. The County Utility Authorities (CUAs) achieved an average expenditure of \$3 million per month on construction-related activities during 2013. Due to outstanding rights-of-way and property acquisition matters, not as many closeouts occurred during 2013 as originally expected. However, 17 projects and one grant have closed out. The CUAs continue to work hard on start-up activities and ensuring the viability of their facilities. The CUAs also are busy seeking other funds for the construction of ancillary projects that will connect to the CDBG-DR-funded facilities. MDEQ anticipates that this program will have a very positive and lasting impact on the lives of coastal residents.

Source Water Assessment Program

The 1996 amendments to the Safe Drinking Water Act mandated states to develop and implement a Source Water Assessment Program (SWAP). The purpose of this program was to notify Public Water Systems (PWS) and customers regarding the relative susceptibility of their drinking-water supplies to contamination. Congress intended for these susceptibility assessments to encourage efforts that would enhance the protection of PWSs by managing identified potential contaminant sources of concern. In 1998, the Mississippi State Department of Health (MSDH) contracted with MDEQ to develop and administer the SWAP in Mississippi. Required elements of assessments include the following: 1) delineating Source Water Protection Areas around PWS wells; 2) inventorying potential contaminant sources in the protection areas; 3) assigning susceptibility rankings to wells and; 4) notifying the public regarding the availability of SWAP information.

Assessments in Mississippi use the following rankings to notify PWSs of their relative susceptibility: 1) Higher, 2) Moderate and, 3) Lower. Most of the public groundwater-system wells in the State have received a Moderate ranking (63%) while 29% have received Lower rankings and only 8% have received higher susceptibility rankings. Some of the criteria considered when assigning these rankings to public groundwater systems include aquifer confinement; MSDH minimum well-design criteria; potential contaminant sources identified within the delineated Source Water Protection Area and; abandoned wells within the protection area.

The size of a Source Water Protection Area is based on eight delineation scenarios that were developed using EPA's Wellhead Protection Area (WHPA code) computer program. The different scenarios are a result of countless computer modeling runs and an extensive data review of aquifer characteristics and well data from the USGS and MDEQ's Office of Geology and OLWR. The eight developed delineation scenarios incorporate differing model-input parameters, including well discharge, aquifer porosity and transmissivity, aquifer thickness, and time. The approved pumping scenarios are arranged according to well-discharge ranges with larger pump rates corresponding to larger Source Water Protection Areas. Assessments of all public groundwater systems and the three public, surface-water systems operating in the State have been completed. After MDEQ mailed the prepared assessment reports to the systems, it became their responsibility to notify their customers that a SWAP report was available for review upon request. As another reminder, the EPA required the annual Consumer Confidence Report (CCR) prepared by systems to include a reference regarding the SWAP report and a brief summary of the assessment findings.

The SWAP reports and corresponding maps of delineated Source Water Protection Areas are available online at the MDEQ website: [SWAP Resources](#). As a result of recent MDEQ regulatory changes, all new PWS wells now require that preliminary assessments be performed by MDEQ prior to the issuance of groundwater withdrawal permits. These preliminary assessments allow the suitability of proposed well sites to be screened prior to the drilling and completion of PWS wells.

Source Water Protection Strategy

Mississippi's Source Water Protection Strategy for PWS wells using unconfined aquifers involves the integration and coordination of protection efforts with various environmental regulatory programs within MDEQ, such as *UST*, *RCRA*, *CERCLA*, and Brownfields/Uncontrolled Sites, as well as the MSDH. The implementation of this strategy is initiated when the corresponding regulatory programs are provided a Source Water Assessment analysis of a PWS well from the Groundwater Planning Branch. This direct,

cross-program involvement should help to ensure that contaminant plumes do not degrade shallow groundwater sources used for public water supply. The strategy will be considered complete after MDEQ meets with representatives of systems to explain pertinent protection measures.

The protection strategy for public groundwater systems using deeper confined wells focuses on the hydro-geologic confinement (vulnerability) of their production aquifers. Adequate aquifer confinement is generally assumed if an overlying confining unit of clay is at least 30 feet in thickness and/or the corresponding potentiometric surface (head) extends at least 10 feet above the screened aquifer. The implementation of this strategy is considered complete when the confinement is verified and a system is identified of any abandoned (unplugged) wells that may pose public health issues.

The Source Water Protection Strategy for the four surface-water intakes used in the State involves the integration of public drinking-water protection into MDEQ's Basin Management Approach that is designed to protect and restore the quality of Mississippi's surface-water resources. This integration component was well received by the two pertinent Basin Management Teams that incorporated extra protection measures into their management plans to complete the strategy. EPA Region IV and the Tennessee Valley Authority are assisting MDEQ with these projects. Meetings with these PWS entities have been held and additional meetings to discuss protection measures are intended. The State is also participating in a national pilot project to address the integration of the SDWA and the CWA.

Storm Water Program

Implementation of Mississippi's Storm Water General Permits and regulations continued in Fiscal Year 2013.

- The Environmental Permits Division (EPD) issued general permit coverage for 193 large construction projects (five acres or greater). In addition, 20 construction projects were recovered under the current general permit and 45 others were modified.
- EPD issued general permit coverage for 48 regulated industrial facilities under the Baseline Storm Water General Permit for Industrial Activities, four (4) projects were recovered and one (1) was modified.
- EPD received and processed 33 "No Exposure Certifications" from potentially regulated industrial facilities. Facilities that certify "no exposure" of industrial activity to storm water are not required to obtain storm-water coverage under the Baseline General Permit.
- EPD re-issued the *Mining Storm Water, Dewatering, and No Discharge General Permit* on September 7, 2012. EPD has issued re-coverage certificates to 223 projects. In addition, EPD issued new general permit coverage for 84 surface mining operations (clay, gravel, sand, etc.) and modified 11 others.



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