Louisiana's Nonpoint Source Management Program's Annual Report

1999

Louisiana NPS Management Program 1999 Annual Report

Introduction:

During 1999, Louisiana's Nonpoint Source Management Program implemented both statewide and watershed programs across the state to reduce nonpoint sources of pollution and to improve water quality. The statewide programs focused primarily on *agriculture, forestry, urban storm water, hydromodification and resource extraction.* The watershed programs were targeted within the Mermentau River, Vermilion-Teche River, Ouachita River, Red River, Barataria-Terrebonne and the Lake Pontchartrain Basins. The principle focus of each of these projects and programs was to educate the public on what nonpoint source pollution is and the specific steps or actions that they could take to reduce pollution from their community, farm, forest or mining operation. Each of the projects was managed by the Nonpoint Source Unit staff within the Louisiana Department of Environmental Quality (LDEQ), but was implemented by federal, state, local agencies, private landowners and the concerned citizens of Louisiana. Through these collective efforts, best management practices have been implemented, nonpoint source pollutants have been reduced and water quality improvements have been made.

During this past year, LDEQ has had many challenges including federal lawsuits on total maximum daily loads (TMDLs) and re-engineering of each of the Offices and Divisions that are responsible for the programs aimed at protecting the environment across Louisiana. The results of the lawsuits have imposed tight schedules on both EPA Region 6 and LDEQ to collect data and analyze it for each of the water bodies that appeared on the state's 303(d) list of impaired waters. Once all of the water quality data and analysis has been completed, then total maximum daily loads are developed for each of the impaired water bodies. Through the TMDL process, the allowable point source and nonpoint source pollutant loads for each of the impaired water bodies is estimated. Results of the TMDLs for the Mermentau and Vermilion-Teche River Basins have been incorporated into the watershed section of this report. It is the responsibility of the NPS Unit to develop and implement watershed strategies that when implemented will reduce and control these nonpoint source pollutant loads. Examples of these management strategies have also been included within the watershed section of the Annual Report.

The Nonpoint Source Unit has remained within the Planning and Assessment Section, but has been shifted into the Environmental Planning Division and the Office of Environmental Assessment. A chart (Appendix) has been inserted into this document to illustrate this new organizational structure. During 1999, the staff within the NPS Unit has managed 60 projects and $15 million in federal grant funds. The NPS Management Program document has been revised and the FY 2000 Section 319 grant has been submitted to EPA Region 6 for funding consideration. All of these activities continue to indicate that Louisiana has an effective NPS Management Program that continues to make improvements in the water quality across the state.

Louisiana NPS Management Program 1999 Annual Report

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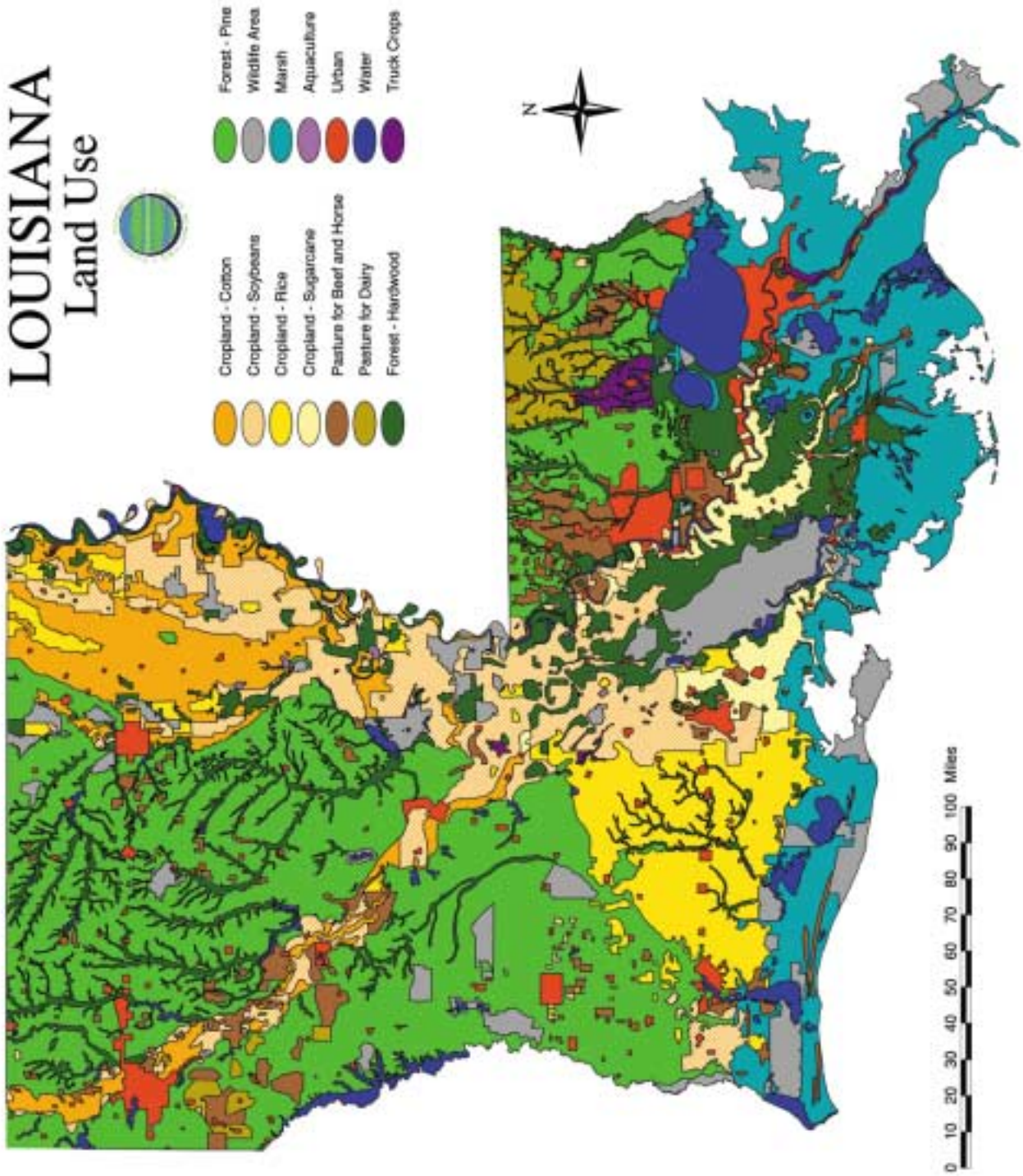
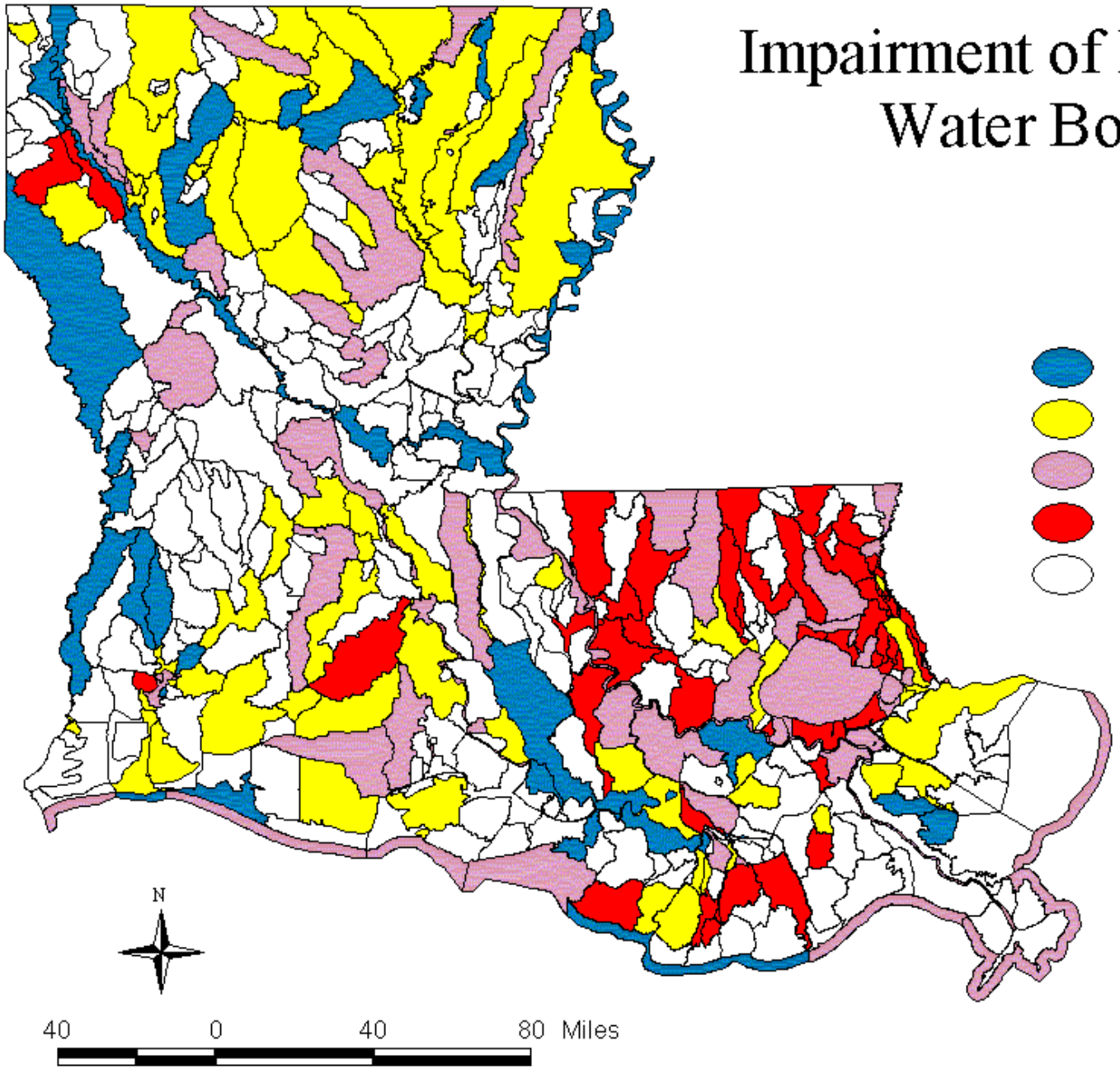

LOUISIANA
Land Use
Cropland - Cotton
Cropland - Soybeans
Cropland - Rice
Cropland - Sugarcane
Pasture for Beef and Horse
Pasture for Dairy
Forest - Hardwood
Forest - Pine
Wildlife Area
Marsh
Aquaculture
Urban
Water
Truck Crops
N
0 10 20 30 40 50 60 70 80 90 100 Miles

Impairment of Louisiana Water Bodies

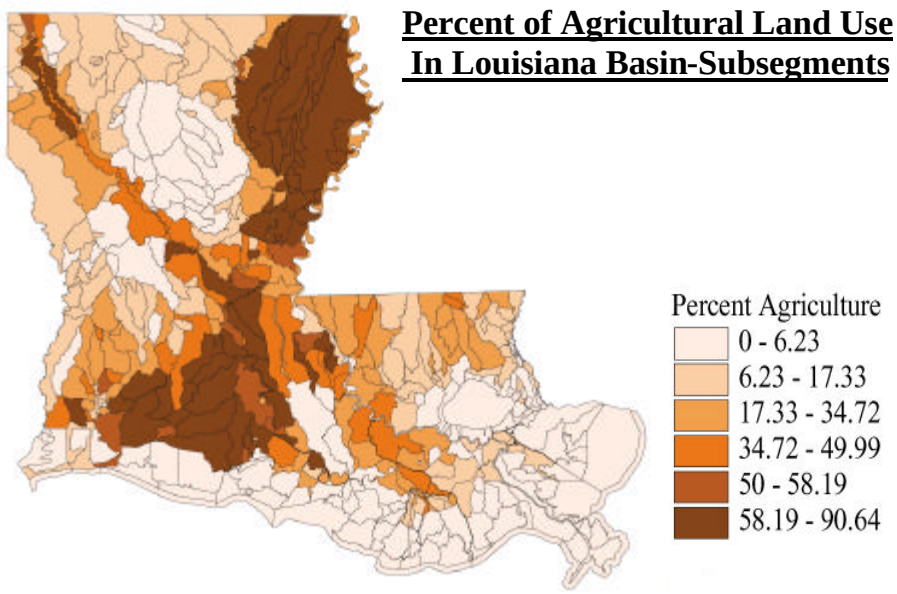


Legend

- Fully Meeting Needs
- Threatened
- Partially Meeting Needs
- Not Meeting Needs
- Insufficient Data

Environmental Planning Division
Map No. 1999-02-044
July 1999

Statewide Agricultural Program



Percent of Agricultural Land Use In Louisiana Basin-Subsegments

NRCS 1999 EQIP Funding
Statewide Priorities

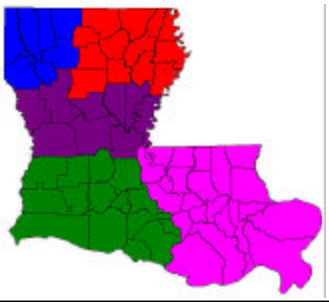
Northwest: 3,566 acres / $89,700

Northeast: 6,220 acres / $214,149

Central: 2,228 acres / $81,434

Southwest: 27,615 acres / $332,148

Southeast: 8,382 acres / $214,149



Problems:

Louisiana's diverse geographic makeup gives rise to a wide variety of agricultural practices. Each region of the state boasts its own specialty – ranging from cotton in the northeast to rice in the southwest, from poultry in the northwest to dairies in the southeast. Just as each industry has its own cultural practices, they also have their own water quality impacts. Monitoring and tracking those impacts, and working with growers and industry representatives on a wide variety of problems is a challenge to all agencies involved.

Despite numerous crops and circumstances, many of the underlying water quality problems associated with agriculture are the same across the state. Runoff from fields, pastures, and animal feeding operations causes excessive sedimentation, nitrification, biochemical oxygen demand, and elevated coliform levels. These impairments, along with others, can have a detrimental effect on not only the receiving waterbody, but its tributaries as well.

Solutions:

The most effective method of controlling agricultural NPS pollution has been increased implementation of best management practices (BMPs). BMPs offer a range of both efficient and cost effective solutions to water quality problems. Demonstration projects play a vital part in developing and proving the effectiveness of BMPs. Education and outreach are the keys to ensuring the agricultural industry adopts and implements these practices in sufficient numbers to positively impact water quality.

BMP demonstration projects combined with educational outreach projects, and cost share assistance programs are all integral parts of a successful implementation program. LDEQ focuses a significant amount of its NPS resources each year to these types of projects.

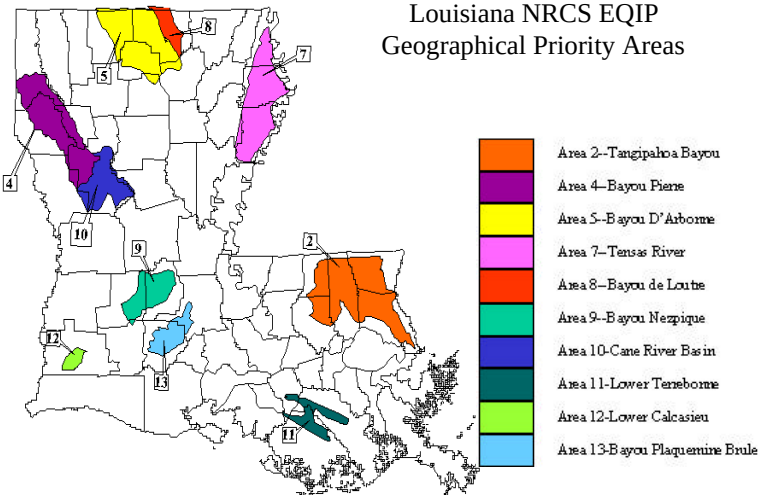
Statewide Agricultural Program

Cooperating Partners and Programs:

Successful solutions to the State's agricultural NPS problems take cooperation and contribution form several different agencies. Close relationships with the USDA's Natural Resources Conservation Service, the Farm Services Agency, the Louisiana Department of Agriculture and Forestry's Office of Soil and Water Conservation, and Louisiana State University's Agriculture Center and Cooperative Extension Service have enabled LDEQ to greatly expand the reach of it's NPS programs. These partners provide funding through cost-share assistance, expertise through technical assistance, and education through information outreach programs to farmers. These agencies not only assist with LDEQ's NPS 319 programs, they are increasingly developing and implementing projects and programs of their own that focus on increasing awareness and reducing nonpoint pollution.

Progress:

LDEQ's relationship with NRCS has proven invaluable in implementing projects throughout the state. NRCS works very closely with the local Soil and Water Conservation Districts to design a wide variety of programs that address specific local agricultural problems. NRCS's Environmental Quality Incentive Program (EQIP) consistently focuses its resources to reduce pollution in areas of the state which it has identified as Geographical Priority Areas (GPA's). These GPA's are selected using the state's 303(d) list. They frequently include LDEQ in the selection process of these GPAs, as well as in the review of their recommended practices and project results.



LOUISIANA BMP MANUALS

Row Crops (Cotton, Corn, Soybeans)
Small Grains (Sorghum, Wheat, Oats, Rye)
Sugarcane
Rice
Vegetables and Small Fruits
Sweet Potatoes

Poultry
Dairy
Aquaculture

The LSU Agricultural Center is currently in the process of updating BMP manuals for all Louisiana's major agricultural commodities. Upon completion, these documents will become an integral tool in LDEQ's agricultural NPS efforts. Careful attention has been given to ensure that these manuals not only address the nonpoint issues that agriculture is facing, but that they are easy to read and understand, and give detailed instructions on implementation. LDEQ and other agencies were given the opportunity to review draft versions of these manuals and provide input on their content. Completed manuals will feature in-depth descriptions, photographs and diagrams.

The Louisiana Department of Agriculture and Forestry's Office of Soil and Water Conservation is conducting a technical assistance program. This program is designed to raise awareness of agriculture nonpoint issues through demonstration events, workshops, BMP field days, and water resource education activities. Special emphasis is placed on conducting work within the NRCS Priority Areas, as well as in wellhead protection areas. This project has been very successful in assisting LDEQ to inform farmers and landowners about nonpoint issues.

Statewide Forestry Program

Problems:

Nearly 500 million acres of forested lands are managed for timber production in the U.S. Although only a very small percentage is harvested each year, forestry activities can cause significant water quality problems if improperly conducted. It is estimated that 4-9% of water quality problems in streams and rivers is caused by forestry.

Field trips demonstrate the connection between the land-use and the in-stream biota.

Solutions:

In Louisiana, 62% of the state's commercial forestland is owned by private landowners. In order to provide outreach on NPS water quality to landowners, foresters, and loggers, the Louisiana DEQ partnered with the LSU School of Forestry, Wildlife & Fisheries to develop a series of regional workshops. Each of the workshops conducted consisted of a morning lecture session and an afternoon field trip. Morning lectures were presented by a host of speakers from various backgrounds. Their talks provided information on the following topics:

1. NPS pollution in Louisiana Watersheds
2. Measuring water quality
3. Streamside management zones
4. Best management practices
5. Stream ecology and habitat
6. A forester's perspective
7. A landowner's perspective
8. State landowner assistance programs
9. Federal landowner assistance programs

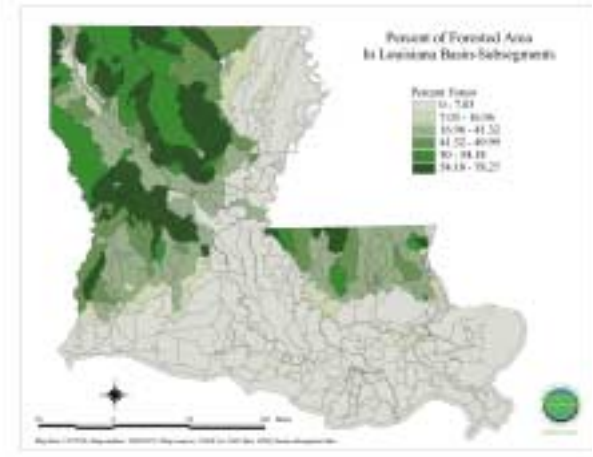
During field trips, LSU stream ecologists demonstrate stream sampling techniques.

Field trips were led by two LSU stream ecologists. Demonstrations were provided on water quality monitoring techniques; sampling and identification of fish and invertebrates; construction of water bars and other best management practices (BMPs). Proper management of streamside management zones was an integral part of the field trips. This portion of the workshop emphasized the connection between land disturbance and in-stream biology.

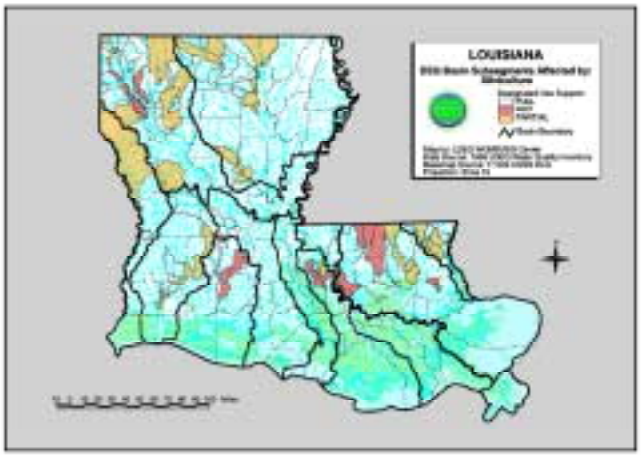
If properly managed, forestry harvesting operations can have a minimal impact on water quality.

During 1999, workshops were held in Ruston, Natchitoches, Covington and Winnfield. Over 200 participants attended. A workshop finale, which is scheduled for June 8, will include speakers from forestry groups in the state as well as representatives from both LDEQ and the USEPA.

Statewide Forestry Program



Maps depicting percentage of forestry in each basin-subsegment helped to identify regions with the most silvicultural activity.



Maps of impaired watersheds affected by silviculture helped to identify locations where conferences should be held.

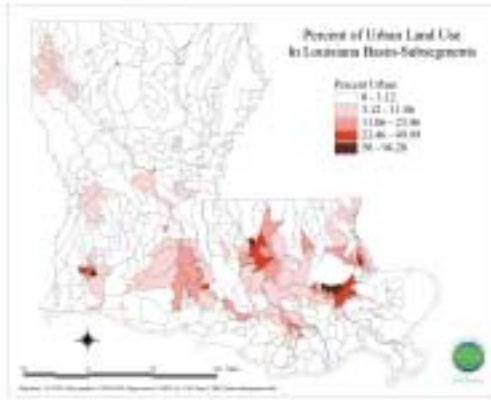
These workshops have been largely successful. Attendees were a mixture of private non-industrial forest landowners, foresters, loggers, environmentalists, and conservationists. In workshop surveys, 75% of the attendees reported that they had increased their understanding of water quality. In addition, 91% of surveyed participants said they were more aware of the importance of BMPs as a result of the workshops.

Dragonfly larvae: indicator of medium water quality

Midge fly larvae: indicator of low water quality

Stonefly larvae: indicator of high water quality

Statewide Urban Program



Problems:

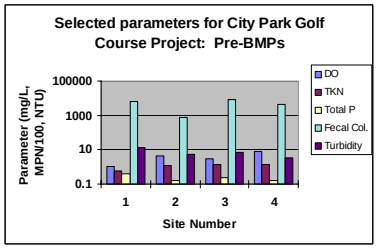
Land-use problems in Louisiana include development and construction within the urban environment. Contaminants include nutrients (fertilizers) and bacteria (pets and septic tanks). Specific parameters that are being used to assess these problems are Total suspended solids, metals, fecal coliforms, Total Kjeldahl Nitrogen, and nitrate and nitrite.

Statewide Educational Programs rely on demonstration projects, coalitions, and educational programs. These types of programs inform the general public and decision-makers about how nonpoint pollution impacts water quality and how they can take steps reduce these impacts.

In 1999 LDEQ focused more on coastal urban areas in the formation of two new urban NPS coalitions. In the year 2000 LDEQ will work to implement these new coalitions.

Baton Rouge Golf Course:

In 1999 LDEQ successfully completed a project to implement BMPs on the golf course on City Park Lake in Baton Rouge, Louisiana. The goal was to implement structural BMPs and conduct outreach about alternative golf management practices. BMPs included infiltration trenches, a sediment detention pond, paved cart paths, water bars, and a bulkhead. Outreach included signs on the golf course and an interpretive scorecard.



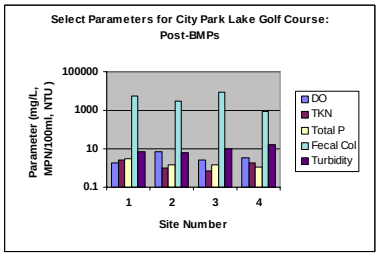


Diagram of West Monroe Nature Park

West Monroe Urban Detention:

This project entailed the construction of an urban detention area and nature park. The detention area serves as a nature park providing wildlife habitat and stormwater treatment. The city is working with Louisiana Tech University on monitoring stormwater entering and leaving the project area. Data collected at the site is being used to conduct an ongoing educational program with schools in the surrounding area.

Cross Lake Watershed:

Cross Lake is located in the northwest part of the state and provides drinking water for Shreveport, Louisiana. The main goals of this project are to conduct a comprehensive land-use analysis in the watershed, implement a water quality monitoring system within the lake, locate priority problem areas, then provide outreach to landowners and citizens in those areas. In 1999 meetings were conducted with forest landowners and forest industry personnel, public meetings were held to elicit public support, a storm drain stenciling program was implemented, a sewage inspection program was initiated, and school outreach programs were started. Data collected by the USGS on the lake are currently being analyzed for contaminant loading and priority areas.

Sampling site on Cross Lake

Statewide Urban Program

Outreach component of the Bayou Lafourche Coalition

St. Tammany Parish Coalition meeting with town leaders

Bayou Lafourche Area Nonpoint Source Coalition:
Louisiana DEQ and South Central Planning and Development Commission formed a NPS coalition. Pollution problems in this region are related to eutrophication, leaking septic tanks, hydromodification, agriculture, and boat dumping. The goal of this project is to educate local governments and the general public on urban nonpoint source pollution. Coalition meetings on education outreach, hydromodification, urban and construction, septic systems, and local NPS regulations were held to familiarize members with problems and solutions associated with land uses in the basin. During the meeting on local NPS regulations, members decided that there was not enough public support to pursue NPS regulations. Instead, the coalition moved forward with the education component. This has been accomplished through workshops in schools and presentations to public and private organizations. The next step is a series of public meetings which will be held to discuss the findings of the coalition.

St. Tammany Nonpoint Source Coalition:
This coalition began in response to the rapid urban development in St. Tammany Parish and consequent water pollution problems. The goal of the St. Tammany Parish NPS Coalition was to establish and maintain a local NPS coalition that reviews local concerns and then implements BMPs. The Coalition consists of individuals from local entities including St. Tammany Parish Police Jury, Mandeville, Covington, Slidell, Abita Springs, Madisonville, and Folsom and the general public.

In 1999, meetings included subjects on home sewage systems, hydromodification, construction and urban runoff, individual land use practices, need for local regulation, and general public outreach.

Several coalition actions were adopted by St. Tammany Parish. One action is a comprehensive planning process. LDEQ received a project proposal from the parish to work on a more comprehensive sewer inspection program and another to delineate critical areas and habitats. These actions adoption by St. Tammany Parish reflect a great success.

Calcasieu River Basin Coalition:
In 1999, EPA and LDEQ agreed to pursue a local nonpoint source coalition for Calcasieu Parish.

Vermillion-Teche Basins Coalition:
The Acadiana Resource Conservation and Development District submitted a project to implement a series of demonstration projects and education programs on urban nonpoint source pollution and home sewage systems.

Partners:

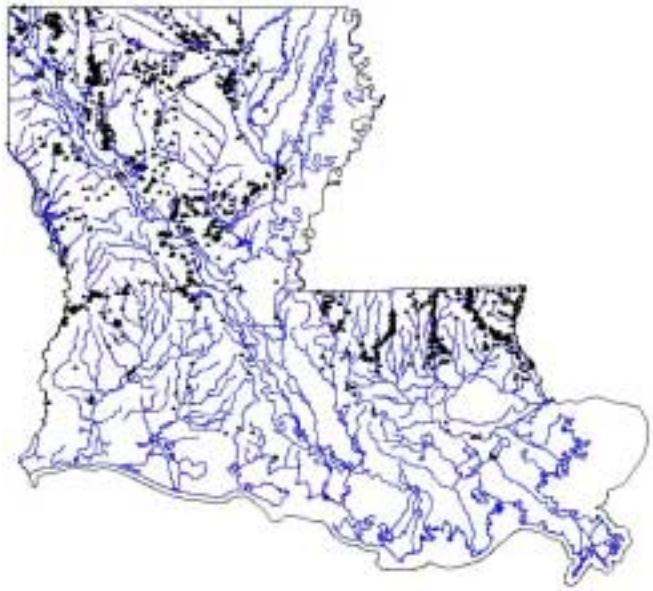
East Baton Rouge Recreation and Park Commission
South Central Planning and Development Commission
Acadiana Resource Conservation and Development District
City of West Monroe
Cross Lake Advisory Committee

Statewide Resource Extraction Program

Problems:

Resource Extraction has been identified by the Nonpoint Program as one of the eight land use categories that contribute to water quality impairment. Although sand and gravel mining operations in Louisiana require a permit for wastewater discharge, they are not presently required to restore the site after mining. Therefore, many of the abandoned mine sites have little or no vegetation, large piles of spoil material, and acres of sand that become sources of nonpoint pollution during rainfall events. Increased turbidity levels have been recorded in water bodies where there is a high density of sand and gravel mining operations. The figures show the extent of the sand and gravel mining operations along an upper section of the Amite River (at right), statewide (below), and specifically in the Amite and Comite River Basins (below right).

This aerial photograph from the late 1980's shows the effect of some of the sand and gravel mining operations on the upper Amite River watershed.



This map show the extent of sand and gravel mining in Louisiana. Black triangles show present and abandoned sites.

This figure shows a closer view of the extent of the sand and gravel mining operations in the upper Amite and Comite Rivers.

Solutions:

In order to reduce these water quality impacts, LDEQ's NPS Management Program has worked with the Office of Conservation (DNR) to implement a statewide assessment. The primary purpose of this assessment is to better quantify the degree of impact that sand and gravel mining have on the state's waterbodies. Once the data have been collected and analyzed, the results will be synthesized into a comprehensive report. This report will provide the Office of Conservation the necessary information to recommend additional regulations that would require BMPs on active and abandoned sand and gravel mine sites. LDEQ's NPS Program presently has 4 projects directed at reduction and controlling the erosion associated with sand and gravel mining operations and is in dialogue with the Corps of Engineers in New Orleans about a watershed restoration project for the Amite River.

Statewide Resource Extraction Program

Projects:

Non-Coal Surface Mining Impact Assessment:
This project is in its second phase. The first phase classified the extent of sand and gravel mining within the various watersheds and river basins that exist across Louisiana. The data collected (see table at right) indicated that there are approximately 1,218 sand and gravel mine sites on over 111,711 acres across the state. Total sites and total acres are reported for each of the state's twelve river basins. During the second phase, turbidity data will be collected from 176 sites randomly selected across the state. All 1,200 sites will be ranked on a scale from 0-3, depending on the site's impact on water quality. This information will then be synthesized in a final report that can be submitted to the Office of Conservation at the Louisiana Department of Natural Resources.

Basin	Total Sites	Total Acres
1 Atchafalaya	3	507
2 Barataria	2	12
3 Calcasieu	44	4,222
4 Pontchartrain	198	19,160
5 Mermentau	6	88
6 Vermilion-Teche	52	6,552
7 Mississippi	47	6,415
8 Ouachita	323	26,335
9 Pearl	130	13,782
10 Red	339	30,055
11 Sabine	68	3,933
12 Terrebonne	6	650
Totals	1,218	111,711

Amite River Sand and Gravel Mine Reclamation Project Demonstration Project:
The Amite River Sand & Gravel Mine Reclamation Demonstration project, which evaluated the effectiveness of BMPs was completed in September 1999 and EPA has approved the final report. The project was implemented on private land along the Amite River where sand and gravel mining had been conducted during the late 1980's and early 1990's, with mining ceasing by 1992. The site consisted of large spoil banks and sand bars and was virtually devoid of vegetation due to the low fertility of the fine to medium sized sand grains of the remaining tailings. In order to restore the site, organic material in the form of pelletized poultry litter was added to the site. Other practices which also proved essential in reclamation of the tailings piles included grading and contouring, surface roughening, temporary ground cover establishment, and permanent vegetative cover planting. Contour culti-packing was utilized for surface roughening through formation of a groove and mound patterned surface which traps soil moisture. Those species found to be most applicable for reclamation efforts include common bermudagrass, gulf ryegrass, crimson clover, and browntop millet. These efforts have shown that reclaimed areas can support a productive post-mining land use.

Surface roughening and cultipacking at demonstration site

Demonstration project with (left) and without (right) pelletized poultry litter additions.

Additional Projects:

Within the 1999 Section 319 workplan and grant, LDEQ and EPA Region 6 agreed to continue this restoration work in the Calcasieu and Ouachita River Basins. These projects provide valuable data on the effectiveness of BMPs in reducing pollution and improving water quality. They also provide the opportunity for landowners and the sand and gravel industry to see the types of BMPs that should be implemented.

Statewide Hydromodification Program

Background:

Much of the landscape in the state is dominated by water. Because of its geologic location, almost two-thirds of all runoff in North America drains through the state's rivers. As a result, the environment has evolved to support some of the most highly diverse and productive ecological systems. Primarily wetland environments, these systems are known as swamps, estuaries, coastal plains, deltas, and bottomland hardwoods. Their unique habitats are home for many species of fisheries and wildlife, as well as an abundance of natural resources.

Often waterways are modified to accommodate the growth of people and their economic needs. Flow alteration, streambank modification, erosion and dam constructions are types of hydromodification. Hydromodification can lead to degradation and impairment of water quality in the receiving stream along with natural habitat loss.

Problems:

Most naturally occurring habitats have the ability to absorb hydraulic energy and filter pollutants from runoff. Whether directly or indirectly, land use practices such as forestry, agriculture, and mining often modify the state's natural waterways. Changes in flow rate and flow volume promote destabilization of streambanks and bordering wetlands. This consequence increases sediment erosion, accelerates sediment transport, and interrupts sediment deposition.

Land development in the state continues to increase. Removing large tracts of forested land increases runoff rates and the runoff amounts. In order to reduce flooding, waterways are widened and/or straightened to promote conveyance. Streambanks are often disturbed, including removal of trees and vegetation and changes to the slope of the streambank. Best management practices (BMPs) for erosion control can be utilized to restore bank stability and riparian habitat.

High-volume floodwaters and increased flow rates have taken a toll on this streambank.

Solutions:

In an effort to remediate streambank instability problems while reducing in-stream sediment loading, LDEQ encourages the use bioengineering or more natural methods of streambank stabilization. Through the collaborated efforts of LDEQ and the U.S. Forest Service at Kisatchie, one such project, the "Goldonna Boat Ramp Bioengineering Streambank Stabilization" project demonstrates innovative and effective techniques for streambank stabilization. By maximizing the use of natural material and strategically placing fill material, this eroded streambank is being restored. Root wads that would have typically been disposed of at a landfill, buried, or burned are utilized followed by an application of fill material. Additional steps could include cover. Covering the restoration site insures longevity and stability of fill material by minimizing erosion. Native vegetation and geotextiles are commonly used for this task.

The streambank is being restored utilizing alternative and innovative techniques. Root wads and logs normally destined for landfill are utilized, followed by fill and cover vegetation.

Statewide Hydromodification Program

Problems:

With more than 60 inches of rainfall a year, flood control and adequate drainage are primary issues within the state. Local drainage districts and police juries have the principal authority and responsibility for ensuring that rivers, streams, bayous, and ditches can accommodate the required volumes of drainage and flow velocities necessary to prevent flooding. Maintenance often entails chemical applications and/or mechanical techniques for controlling vegetation along drainage areas. These techniques are costly and are usually ineffective. Chemical applications can contaminate the waterway leading to deteriorated water quality and can promote erosion. Mechanical/physical removal of vegetation tends to stimulate the growth of nuisance vegetation, which guarantees future costs and maintenance requirements.

During a storm event, streambanks having vegetation are known to have less sediment runoff. Recent studies have indicated that streambanks colonized with vegetation have high nutrient assimilation potential, thereby minimizing water pollution and preventing erosion. Native wetland plants, commonly growing in these waterways, are known to reduce the amount of suspended solids in the runoff. Native wetland plants, when allowed to propagate streambanks and waterways, will out-compete nuisance vegetation. In most cases these plants trap pollutants and aid in biochemical processes that degrade pollutants, thus remediating the receiving stream of potentially polluted stormwater runoff.

Solutions:

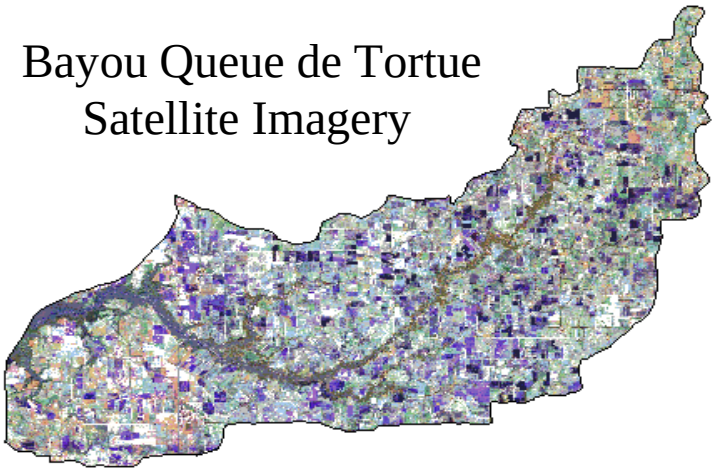
Currently LDEQ is working with Southeastern Louisiana University to explore alternate ways of maintaining local drainage ditches and drainage canals. The demonstration project, "Natural Vegetation Control in Tangipahoa Parish Drainage Ditches", works to identify techniques that control growth of nuisance vegetation known to impede flow, by promoting growth of Bermuda grass and other desirable grasses or other native plants. Routine maintenance of the waterways often entails full cover chemical spray and/or mechanical/physical removal methods. The experimental test sites utilize actual roadside drainage canals and drainage ditches. The waterways were mechanically cleared of nuisance vegetation and cultivated with Bermuda grass. In most cases Bermuda grass grows naturally along roadside ditches. The grass holds streambank sediment in place without impeding the flow of drainage runoff. Erosion and pollutant loading are minimized. Results have been promising. "Selective chemical spraying" of nuisance vegetation, while preserving beneficial wetland plants which do not impede flow, seems to have the greatest cost benefits. "Beneficial wetland plants" can vary between drainage system types based on their flow, volume, and rate.

This project demonstrates a low cost and natural technique for maintaining parish drainage ditches while conserving the water quality of the receiving stream. It indicates that it is important to preserve, if not encourage, growth of "select" natural vegetation along drainage ditches and canals when compared to "full-cover" chemical applications and/or mechanical control.

Full chemical spray techniques can eliminate all vegetation, reduce bank stability, and deteriorate water quality.

Select spray techniques eliminate nuisance vegetation which could restrict flow. Here, native plants maintain bank stability while enhancing water quality without impeding flow.

Bayou Queue de Tortue Watershed Program



Bayou Queue de Tortue spans 61 miles within the Mermentau River Basin, through Acadia, Cameron, Lafayette and Vermilion parishes.

Problems:

The bayou is the receiving water body for 195,000 acres, approximately 90% of which is cropland, primarily rice and soybeans. The entire stream segment is classified as impaired, with high turbidity, metals, suspended and dissolved solids, elevated fecal coliform levels and low dissolved oxygen cited as causes. Studies indicate that both agricultural discharges and channelization are major contributing factors to declining water quality. Nearly 70,000 acres of rice are flood irrigated each year. Traditional production techniques, including the practice of water leveling or "mudding in" and rapid discharge of sediment-laden water from fields have a dramatic effect on the receiving water bodies. Rice field discharges from February through May result in high loading of suspended and dissolved solids, biochemical oxygen demand, turbidity and metals.

Solutions:

The primary project objective is to improve water quality by reducing the sediment-laden discharges from cropland. Cost share assistance is provided to producers who agree to implement selected best management practices aimed at reducing or eliminating the negative effects of their production activities on neighboring waterbodies. Aside from working with the producers participating in the project, the facilitators are organizing field days and demonstrations to educate more growers, both within and outside the watershed, on the advantages, impacts and cost effectiveness of implementing the recommended practices.

Producers choose from the following BMPs:

1) Integrated Crop Management System
2) Crop Residue Reuse
3) Record Keeping
4) Irrigated Water Management
- A) Water Planting into Previous Crop Residue
- B) Retention of Flood Water in a Closed Levee System for a Specified Period During and After Soil Disturbing Activities
- C) Clear Water Planting into a Prepared Seedbed

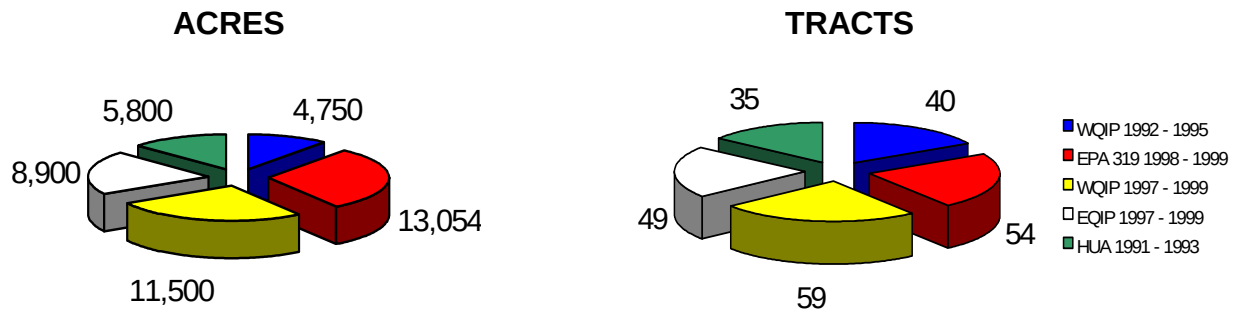
5) Wildlife Wetland Habitat Management
6) Grade Stabilization / Water Control Structures

Bayou Queue de Tortue Watershed Program

Cooperating Partners and Programs:

The success of the project depends on the hard work and cooperation of all parties involved, beginning with the most important members, the growers, who ultimately decide the outcome of the project. Several agencies and groups have combined efforts to ensure the success of the project.

The Farm Service Agency
Louisiana Cooperative Extension Service
Louisiana State University Rice Research Station
Natural Resource Conservation Service
Louisiana Department of Environmental Quality
Acadia, Lafayette, and Vermilion SWCD

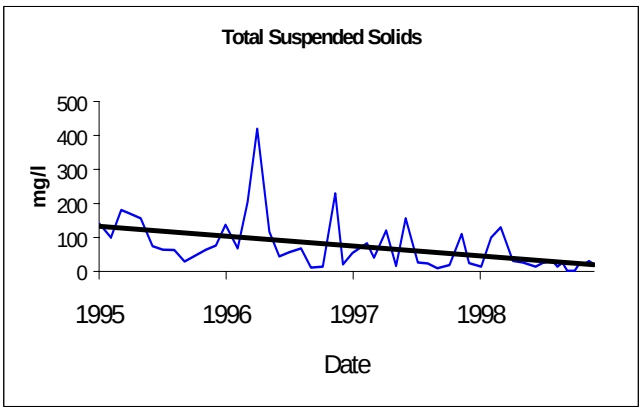


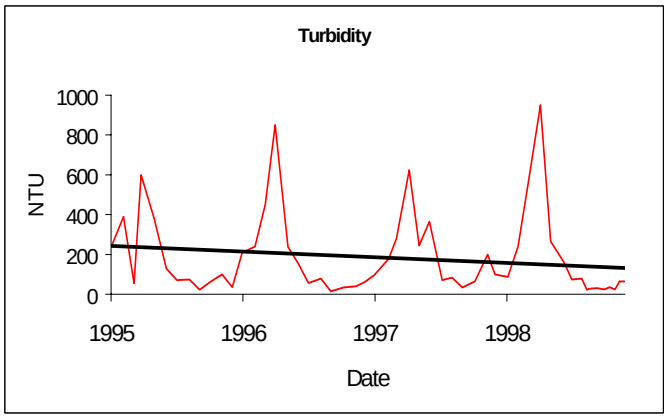
Numerous water quality programs have been implemented in the watershed throughout the past decade.

These agencies have helped to implement other programs within the watershed, also aimed at improving both land and water quality within the watershed. In all, over 340 tracts and 60,000 acres have been enrolled in these programs from 1991-1999.

Progress:

As the project enters its second year, 54 RMS plans are in effect on 54 tracts of land, comprising 13,054 acres. In fact, the growers are only receiving cost share assistance for 4,781 acres. Improvements in water quality have been documented over the last several years, especially in turbidity, suspended and dissolved solids, nitrite-nitrate, and TKN. The drought conditions that have plagued the region in the last three years have made it more difficult to show noticeable improvement in dissolved oxygen and fecal coliform levels.





Field days and outreach activities will continue to play a vital role in expanding upon the successes of the combined efforts in the Bayou Queue de Tortue watershed. As more complete data become available from the recent TMDL activities in the area and the ongoing watershed modeling program, cooperating agencies will be better equipped to identify the most troublesome stream segments and pinpoint sources of pollution. As a result, these agencies will be able to concentrate their efforts on those areas in most need of resource management and BMP implementation.

Bayou Plaquemine Brule Watershed Program

Background:

Bayou Plaquemine Brule (subsegment 050201) is located in Southwest Louisiana, adjacent to Bayou Queue de Tortue. The bayou is included on the 1998 303 (d) list as impaired, not meeting its designated uses for primary and secondary contact recreation. The land is primarily utilized for rice production, with soybeans and crawfish grown in rotation. The land-use within the watershed is approximately 89% agriculture, 3.5% urban, and 3.8% forested lands. The bayou flows 50 miles through St. Landry and Acadia Parishes, in the Mermentau River Basin.

The 1998 305 (b) report indicates the suspected causes of water quality impairment in the bayou include metals, nutrients, organic enrichment/low dissolved oxygen, pathogen indicators, and turbidity. The suspected sources for these impairments include agricultural production, urban runoff, atmospheric deposition, and both natural and unknown causes.

Watershed Restoration Action Strategy:

The Bayou Plaquemine Brule Watershed Restoration Action Strategy (WRAS) was initiated in 1999. A major element of the plan is the identification of sources and quantification of impairments. Through detailed land-use information provided by Spot TM merged data from the LDEQ GIS Center as well as ground truthing conducted by the Louisiana Department of Agriculture Office of Soil and Water Conservation, a more thorough analysis of the various land use and crop types present in the watershed can be completed. This invaluable information will be the backbone of the watershed modeling portion of the plan as well as the TMDL implementation. The combination of these and the remaining implementation, education and monitoring aspects of the WRAS, will allow LDEQ to establish both point and nonpoint source management strategies to restore the Bayou Plaquemine Brule Watershed.

April 20, 1998

August 28, 1998

October 13, 1998

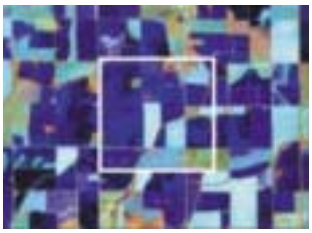
December 16, 1998

Landsat Thematic Mapper Satellite Imagery:

The above images are subsets of Landsat Thematic Mapper scenes acquired throughout 1998. This technology is being used to identify land use. Comparisons of each plot of land throughout the growing seson make it possible to identify which crop or crops, if any, are being produced. A significant amount of crop rotation and double cropping occur in the watershed, making it necessary to compare images from different dates throughout the year. In 1998 the dominant crops in Acadia Parish were rice, soybeans, aquaculture, and beef production, with approximately 12,000 head of cattle present. In St. Landry Parish, dominant crops were soybeans, corn, rice, sugarcane and aquaculture, plus approximately 14,500 head of cattle. The four images clearly show seasonal changes in agricultural land use occurring in the Bayou Plaquemine Brule wastershed.

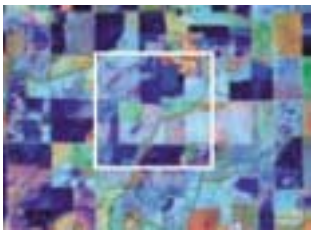
Bayou Plaquemine Brule Watershed Program

The above images are representative of different perspectives of the same agricultural area within the watershed. The first image is a portion of a Landsat Thematic Mapper scene acquired on April 20, 1998. The second image is an enlargement of a high altitude infrared aerial photograph taken by a NSAS ER-2 earth resource mapping aircraft. The third image is an oblique low altitude aerial photograph taken during the month of March 1999. The final image is a ground photograph taken during the month of February 1999. These four images are examples of the corroborative resources that can be used as interpretive aids during the classification of multi-spectral satellite imagery.


April 20, 1998

August 26, 1998

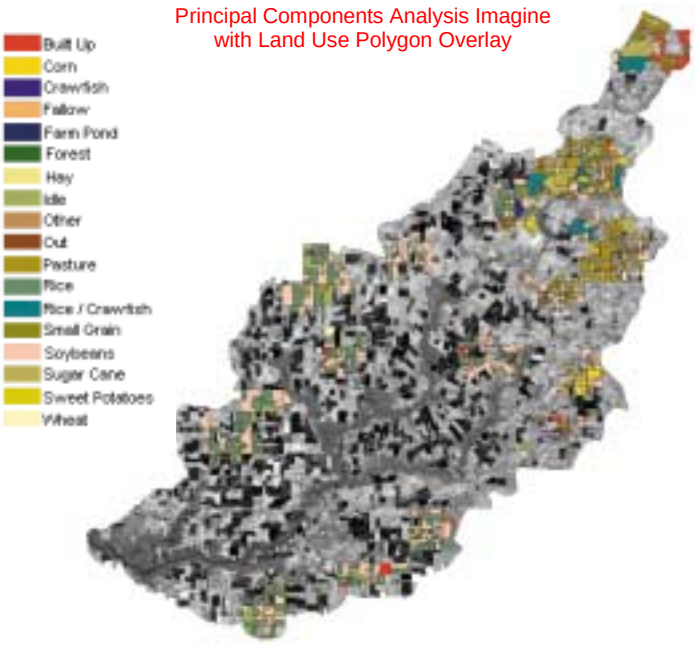
October 13, 1998


December 16, 1998

The series of images above graphically demonstrate the utility of multi-temporal Landsat Thematic Mapper satellite imagery for agricultural land use classification. The white squares delineate an area of agricultural production as it appears during different stages of the crop calendar (and different seasons of the year). The outlined area is located in the southwest portion of the Mermentau Basin. By comparing the images, one can easily see the potential of this technology for classifying agricultural land use, as well as the necessity of using a sequence of images from different dates. If only a single date is used for classification purposes, as is often the case, the true nature of an agricultural are can be overlooked.

Seventeen field maps were provided by the Louisiana Department of Agriculture and Forestry, Office of Soil and Water Conservation. The focus of each field map was a core area of 1280 acres selected against a backdrop of merged multi-spectral imagery. Selection of the geographic location of each field plot was based upon analyses of the spectral diversity of satellite imagery.

Field staff provided ground truthing of land uses for each of the fields on each map. Their data were then heads-up digitized in Arc View into ESRI shapefiles, then converted into ArcInfo coverage. Once in polygon coverage format, the field data can be introduced into ERDAS Imagine imaging software. The coverage will allow an initial automated evaluation of spectral signatures created by classifying satellite imagery of the study area. This will be accomplished through the GIS Analysis feature of the Image Interpreter module of ERDAS Imagine.



Upper Mermentau River Basin Program

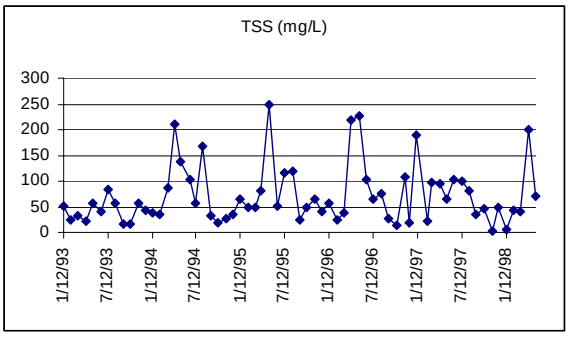
Summary of Problem:

Rice is one of Louisiana's most important crops in both acreage grown and for its economic value. The main nonpoint source problem associated with rice production in Louisiana is the discharge of water from rice fields during the periods of February through May. These discharges can result in a high loading of total suspended solids (TSS), total dissolved solids (TDS), biological oxygen demand (BOD), turbidity, and metals to the receiving waters. This coincides with the post flood, pre-plant, soil-disturbing activities that are used in seedbed preparation. The discharge of rice irrigation water high in solids and temperature, the lack of wind mixing, and decreased re-aeration potential through low flow all contribute to a high sediment oxygen demand and very low dissolved oxygen levels.

Water Body	Length (miles)	Not meeting uses for:	Partially meeting uses for:	Suspected causes:
Bayou Duralde-Des Cannes	54	Primary contact recreation, fish and wildlife propagation	Secondary contact recreation	Crop production, organic enrichment/low dissolved oxygen, pathogen indicators, oil and grease, and turbidity
Bayou Nezpique	65	Primary contact recreation, fish and wildlife propagation	Secondary contact recreation	Organic enrichment/low dissolved oxygen, pathogen indicators, suspended solids, and turbidity
Bayou Mallet	23	Primary contact recreation	Secondary contact recreation, fish and wildlife propagation	Organic enrichment/low dissolved oxygen, habitat alteration, pathogen indicators, oil and grease, suspended solids, and turbidity

Land Use:

The map at right shows the land uses throughout the Upper Mermentau Basin. The area is heavily agricultural; rice is the most important crop in this region.



The above graph shows the trends in Total Suspended Solids (TSS) from 1993-1998. These data are for water quality monitoring station number 58010005 located in Bayou Nezpique, north of Basile, Louisiana. There appears to be annual increases in TSS concentrations which occur during the spring. This corresponds to the discharge of water from rice fields.

Upper Mermentau River Basin
Land Use

Upper Mermentau River Basin Program

The following table is a summary of the TMDL (total daily maximum loads) which were calculated for the Mermentau River Basin and submitted to EPA by LDEQ in December 1999 (EPA completed TMDLs not included):

Subsegments	Parameter	Reductions	Land use/type
050101 (Bayou Des Cannes)	DO	50% load reduction of all man made NPSs in reaches 1-7, 75% in reaches 7&8	Agriculture, forestry, and rural residences (contributing animal waste and impacts from septic tanks/fields). The number 1 land use was agriculture.
050201 (Bayou Plaquemine Brule)	DO Nitrogen	50% load reduction of all man made NPSs in tributaries and upper reaches of Plaquemine Brule and 30% in the main channel for DO and N	Agriculture, urban runoff and rural residences (contributing animal waste and impacts from septic tanks/fields). The number 1 land use was agriculture.
050301, 050302, 050303, 050304 (Bayou Nezpique Watershed)	DO	85%-90% reduction of all manmade NPS throughout the watershed.	Agriculture, forestry, and rural residences (contributing animal waste and impacts from septic tanks/fields). The number 1 land use was agriculture.
050501 (Bayou Queue de Tortue)	DO Nitrogen	60% reduction of man made NPS load reduction	Agriculture, primarily rice and soybean production> Rive irrigation is a major source. The watershed has been heavily hydromodified except for the upper and lower reaches.
050401 (Mermentau River)	DO Nitrogen	30% reduction of man made NPS. Assumes NPS reductions in Nezpique, Des Cannes, Plaquemine Brule, and Queue de Tortue	Agriculture, urban runoff and rural residences (contributing animal waste and impacts from septic tanks/fields).

Project Objectives:

LDEQ is working with the St. Landry Soil and Water Conservation District to implement the "Upper Mermentau River Water Quality Project". The overall objective is to improve water quality in Bayou Duralde-Des Cannes, Bayou Nezpique, and Bayou Mallet. To accomplish this, sedimentation discharges from cropland must be reduced. Another major objective is to demonstrate that water quality can be improved by individual conservation practices.

Technical Practices to be Implemented:

Nutrient Management
Pest Management
Conservation Cropping Sequence
Crop Residue
Record Keeping
Irrigation Water Management
Wildlife Wetland Habitat Management

Partners:

LDEQ
St. Landry Soil and Water Conservation District
Louisiana Cooperative Extension Service
Natural Resources Conservation Service

Project Status:

St. Landry Soil and Water Conservation District has completed a sign-up period for farmers to participate in the project and is in the process of selecting participants based on the established ranking criteria.

Vermilion-Teche River Basin Program

Summary of Problem:

The Vermilion-Teche River Basin is primarily comprised of the Vermilion River and Bayou Teche which flow through south central Louisiana. The upper end of the basin lies in the central part of the state near Alexandria, and the basin extends southward to the Gulf of Mexico. The 1998 305(b) Report identified that portions of 5 water bodies were partially meeting their designated uses (Bayou Cocodrie, Vermilion River, New Iberia Southern Drainage Canal, Bayou Teche, Intracoastal Waterway) and two water bodies were listed as fully meeting their uses, but were threatened (Bayou Boeuf and Bayou Courtableau).

The Nonpoint Program is targeting urban storm runoff, home sewage systems, hydromodification, and agricultural runoff in this basin. Attention to these main areas should lead to improvements in water quality throughout the Vermilion-Teche Basin.

The Vermilion-Teche was included in the first year of the new 5-year basin cyclic monitoring program that LDEQ initiated in June 1998. All of the data for each of the watersheds on the 303(d) list were collected and analyzed for development of total maximum daily loads (TMDLs) which were completed in December 1999.

The following table is a summary of the TMDLs which were calculated for the Vermilion-Teche River Basin and submitted to EPA by LDEQ in December 1999 (EPA completed TMDLs not included):

Subsegments	Parameter	Reductions	Land use/type
060401, 060501 (Bayou Teche)	DO Nitrogen	Assumes NPS reductions in Cocodrie/Boeuf system. No NPS load reduction identified.	Agriculture, urban runoff and rural residences. Primary impact is likely septic tanks/fields and domestic animals located adjacent to the bayou.
060208 (Bayou Boeuf)	DO	50% reduction of man made NPS	Agriculture (soybeans, corn and other row crops), forestry and urban runoff from Alexandria.
060102, 060201, 060203 (Bayou Cocodrie watershed –includes Cocodrie Lake, Bayou Cocodrie and Chicot Lake	DO	68% reduction of man made NPS May-Oct, 51% Nov-Apr	Agriculture, forest, and heavy hydromodification
060204 (Bayou Courtableau)	DO	30% reduction of NPS to meet current criteria (5.0 mg/L), 15% reduction to meet proposed criteria (4.0 mg/L June-July, 5.0 mg/L Sept-May)	Agriculture (corn, soybean and milo production) and extensive hydromodification
060702 (Lake Fausse Point and Dauterive Lake)	DO Nitrogen	17% reduction of man made NPS May-Oct, no reduction in winter	Agriculture, wetlands, and water

Vermilion-Teche River Basin Program

Projects:

Teche-Vermilion Project:
LDEQ's Nonpoint Program is currently cooperating with Acadiana Resouces Conservation and Development Council to implement the Teche-Vermilion Project. The Teche-Vermilion Blue Thumb program is recently underway and will be a three-year nonpoint source pollution education project. The objective is to educate the public about their impact on surface water. It will be divided into two main components: 1) urban best management practices educational program (targeting Lafayette, New Iberia, Breaux Bridge, and Abbeville) 2) home sewage educational program (targeting key locations throughout the entire watershed).

This project will include water quality monitoring, storm drain stenciling, youth and adult educational activities, water quality training, home sewage demonstration projects, water quality workshops, conferences, and the production of newsletters and brochures. This project will build on work that was completed for the Bayou Vermilion Macroinvertebrate Sampling Education Project.

Volunteers gather at BVD Lake in Lafayette for a Volunteer Monitoring Training Session

Volunteers at BVD Lake in Lafayette search samples for macroinvertebrates for a Volunteer Monitoring Training

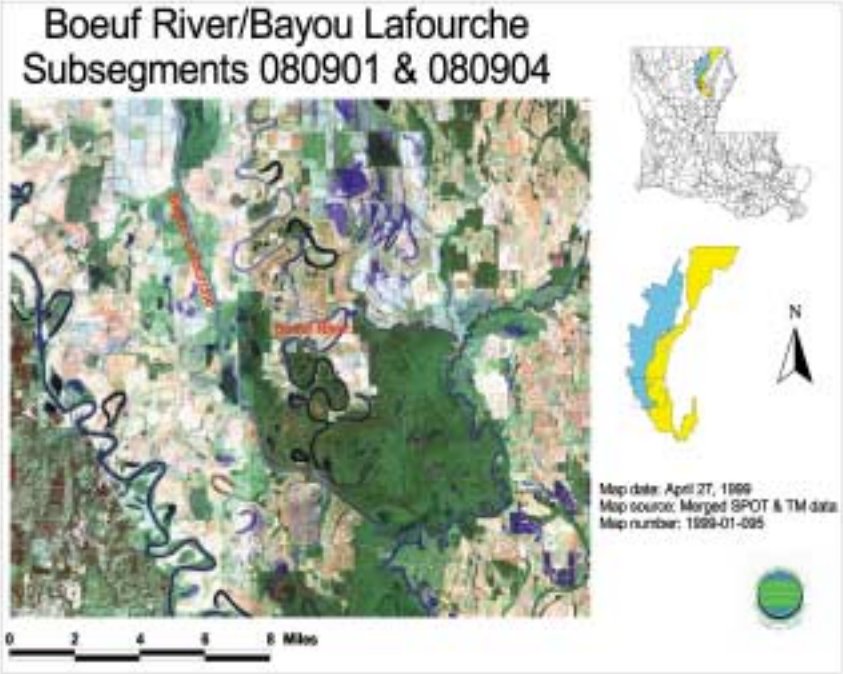
Bayou Vermilion Macroinvertebrate Sampling Education Project:
The final report for this project was submitted at the beginning of this year. The main goal of this project was to educate the community, particularly youth and others who use the Acadiana Park Nature Station which was the location for the activity. This biological monitoring educational activity was well received by participants and was an effective program to be incorporated into the urban nonpoint source pollution program. The community was educated about stream ecology, watershed concepts, and best management practices (BMPs) that could be implemented to reduce the impact of urban nonpoint source pollution.

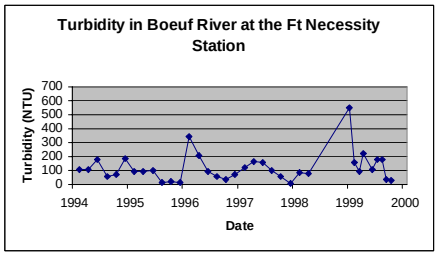
Also, quality controlled data were collected which provided information for evaluative-type assessments of the water body.

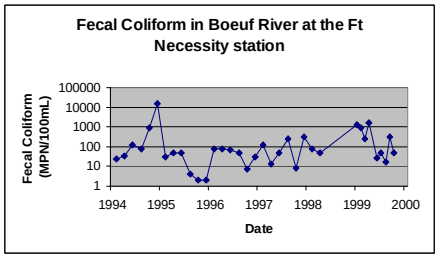
Model Sustainable Farm for Practical Water Quality Management:
This project, which started May 1, 2000, will evaluate the effectiveness of several BMPs at an experimental farm. The University of Louisiana at Lafayette's (ULL) Cade Farm will serve as the site where the BMPs will be implemented. There are four main BMPs that will be examined. They include: 1) The effects of intensive controlled-rotational grazing by beef cattle on soil and water quality 2) The effects of sugarcane residue management on water quality 3) The effects of selected forage species for crawfish on water quality 4) The impact of a grass filter strip on water quality improvement from sugarcane field runoff.

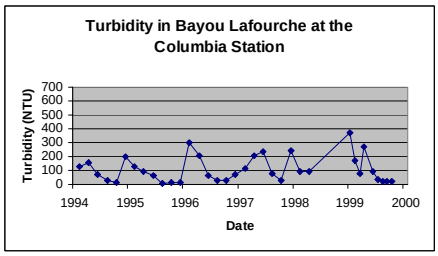
Vermilion-Teche River Basin Water Quality Monitoring Project:
This project will start in June, 2000. The University of Louisiana at Lafayette (ULL) will be identifying a representative subwatershed within the Vermilion-Teche basin to measure nonpoint source pollutant reduction loads on a smaller scale and compare them to the types of nonpoint loads that exist for the larger river basin. They will also analyze data to determine land use and critical areas of concern that contribute to the nonpoint pollutant loads. With these data, ULL will be able to measure the effectiveness of BMP implementation on reducing sediment and nonpoint pollutant loadings.

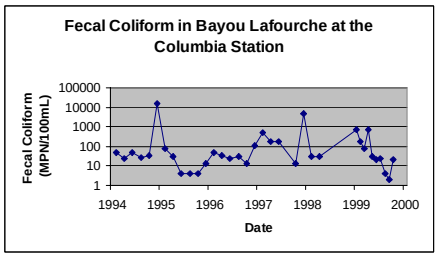
Bayou Lafourche/Boeuf River Watershed Program











Background:

The water bodies that drain this project area include the Boeuf River (subsegment 080901) and Bayou Lafourche (subsegment 080904). In the 1998 305(b) Report, both sub-segments are listed as threatened. Land use in the Boeuf River sub-basin includes 87% agriculture, 12% hardwood forests, and 0.2% urban areas. Suspected causes of impairment in the Boeuf River include ammonia, sulfates, nutrients, and organic enrichment/low DO. Bayou Lafourche is threatened due to organic enrichment/low DO and metals primarily from industrial point sources and other unidentified sources. This area is comprised of 66% agriculture, 18% forests, and 7% urban land use.

Cotton runoff plots

Watershed Restoration Action Strategy for Bayou Lafourche and the Boeuf River:
The objective of this project is to improve water quality within the Boeuf River/Bayou Lafourche watersheds. The WRAS will organize agricultural cost share projects and urban projects within the watershed. An agricultural project with the S&WCDs will utilize technical and cost share assistance to landowners for BMP implementation. Other projects include a decision model for BMP implementation within the watershed, and a Model Golf Course project with BMPs.

Analysis of the Effects of BMPs in Cotton on Runoff Quality:
The objectives of this project were to demonstrate cotton BMPs, gather runoff water quality data concerning the BMPs effectiveness, perform an economic evaluation concerning the BMPs, conduct an educational program to encourage the use of BMPs, and to develop a watershed protection strategy for the Bennett's Bayou Watershed. The project has been completed with two years of runoff data. This project demonstrated that conservation tillage combined with a winter cover crop can result in a 67% reduction in total suspended solids, and a 45 – 60% reduction in runoff of soil applied pesticides.

Bayou Lafourche/Boeuf River Watershed Program

A wetland BMP on a golf course

Reduction in Nutrient and Pesticide Runoff from a Municipally Operated Golf Course in the Ouachita River Basin:
The objectives of this project are to conduct a best management practice demonstration project on a municipally operated golf course in the Ouachita River Basin considering erosion of soil sediments, nutrients and pesticides effects on water quality and to educate industry managers, and area consumers on the effects of best management practices on runoff water quality. Although this project has not yet begun, it is anticipated that it will provide valuable information about the impact of nutrient and sediment runoff from golf courses.

Urban Nonpoint Water Quality Educational Program for Household Living Along Portions of Bayou Desiard and Ouachita Parish:
The objectives of this project are to reduce pollution associated with lawn, home and garden care practices, and to promote further implementation of BMPs through education and site demonstrations. Currently two homes have been selected for the demonstration/tour sites. A demonstration was conducted and area residents were provided with helpful tips on how to control runoff by implementing various BMPs around their home.

Homes along Bayou Desiard

A Water Quality Decision Model for the Identification of Priority Sites For Implementation of Best Management Practices to Maintain Dissolved Oxygen Levels In the Ouachita River Basin:
This project will generate a computer model that can be used to make predictions about land-use impact on water quality, use the model to locate priority problem areas, and to educate landowners within the priority sub-watersheds with the model.

Partners:

City of Monroe
Bayou Lafourche Soil and Water Conservation District
Boeuf River Soil and Water Conservation District
Louisiana State University Department of Civil and Environmental Engineering
Louisiana State University Cooperative Extension Service

Future Projects and Activities:

The watershed effort in the Bayou Lafourche/Boeuf River watersheds will be driven by the local Soil and Water Conservation districts for agriculture and the city of Monroe in urban areas. Utilizing the decision model the LDEQ will be able to determine the location of the most severely polluted subsegments within the Ouachita River Basin.

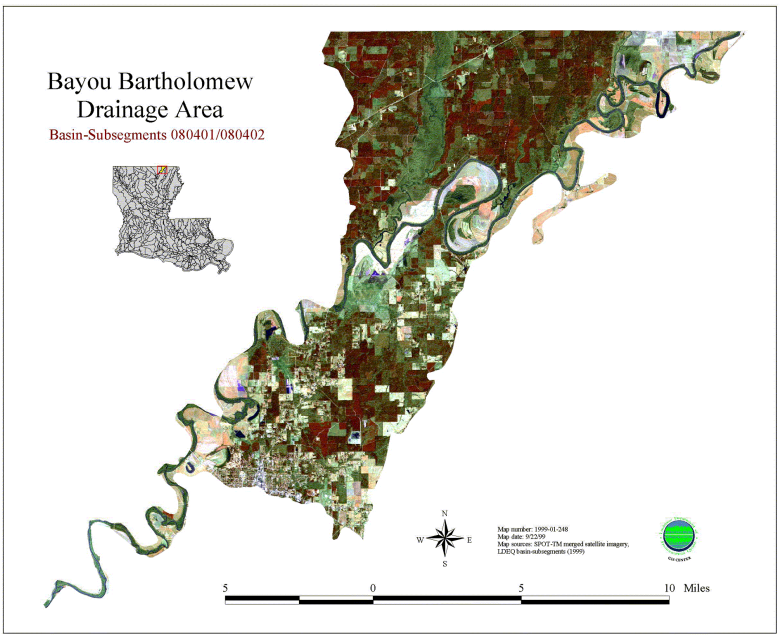
Bayou Bartholomew/Bayou Macon Watershed Program

Problems:

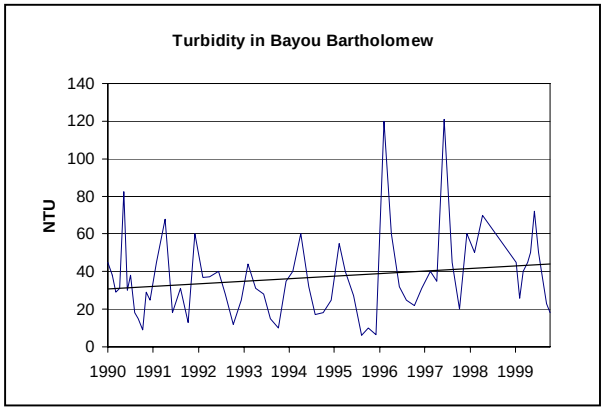
Bayou Bartholomew is designated as a scenic stream that is fully meeting its uses for secondary contact recreation and fish and wildlife propagation, but is only partially meeting its use for primary contact recreation due to elevated levels of fecal coliform. Pesticides, inorganics, pH, organic enrichment, suspended solids and turbidity have been identified as causes of impairment for Bayou Bartholomew. The bayou is also not considered to be meeting its designation as an outstanding natural resource (ONR) due to high turbidity.

Row crop agriculture is a viable part of the economic base of this watershed. There are 172 agricultural producers growing primarily cotton and sweet potatoes. Cattle production also has a large interest within the basin.

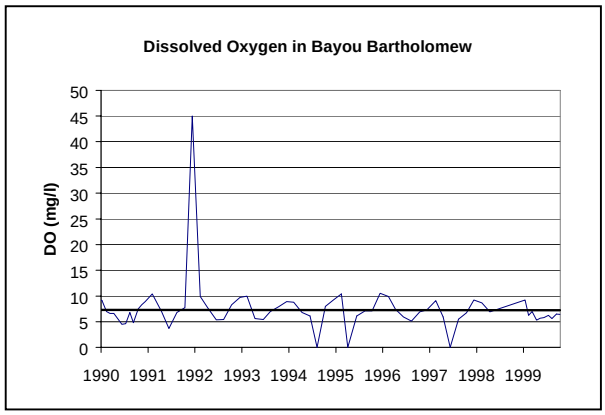
The purpose of this watershed project is to demonstrate the use of best management practices that will reduce levels of sediments and other pollutants entering Bayou Bartholomew.



Landuse within the Bayou Bartholomew watershed is approximately 62.1% agriculture, 14.9% forests, and 21.3% wetlands.



Turbidity in Bayou Bartholomew is listed as a cause of impairment.



Expected benefits from implementation of BMPs include improvements in dissolved oxygen.

Solutions:

A state-wide multi-agency effort is being conducted to provide information, education and technical assistance to producers about practices to improve water quality. The Louisiana Department of Environmental Quality worked with the LSU Agricultural Center on a compilation of best management practices that should be implemented throughout Louisiana to reduce agricultural pollution from row crop agriculture, vegetable production and pasture land management. The Louisiana Forestry Association and the Louisiana Office of Forestry have also recommended best management practices for harvesting and reforestation.

The goal of this watershed project will be achieved through demonstration of best management practices on agricultural lands within the watershed. Partnering with the Louisiana Department of Environmental Quality, the Morehouse Soil and Water Conservation District will develop three-year long-term agreements for individual farms to promote implementation

of conservation practices needed to improve water quality. In addition, an information, education and technical assistance program will be implemented in which a minimum of two field days will be conducted. Fact sheets that highlight the conservation practices that are being recommended through the project will be designed and disseminated in the project area.

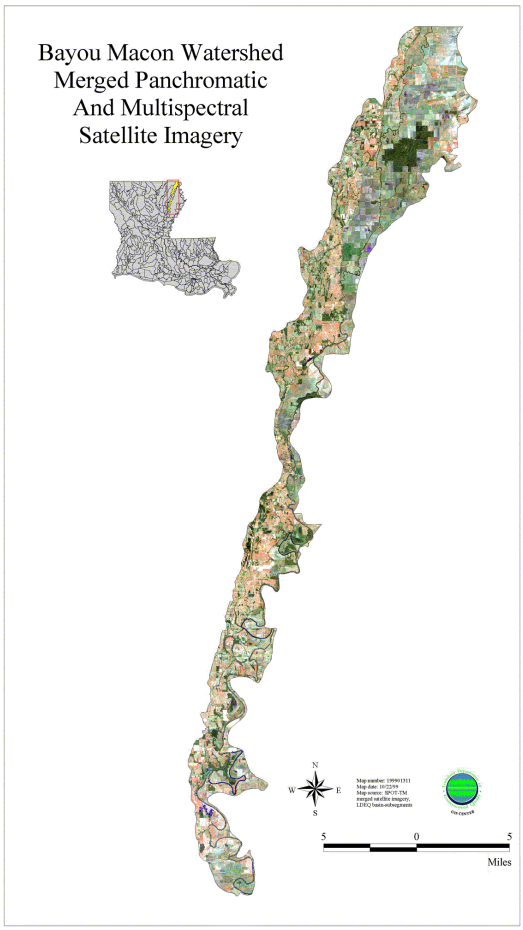
The first sign up period was June 7 – June 24, 1999, during which time applications were taken on 24 farms. Participants were contacted individually to review their applications and practices. Land slope was shot on participating farms prior to developing individual farm plans. In early 2000, all plans had been drafted and were in the process of being reviewed and signed by participants. Many farms have initiated implementation of best management practices.

Vegetative filter strips are just one of the many best management practices to be implemented as part of this project.

The filter strip in this photo has obstructed the flow of sediment during a rain event.

Agriculture best management practices are also being implemented in the Bayou Macon watershed, which drains portions of the Mississippi River delta that historically existed as a forested wetland, as well as portions of the Macon Ridge, which consists primarily of loess (wind blown) deposits. Most of the area is now in agricultural production.

Model farms have been chosen in five parishes partially drained by the bayou to demonstrate the effectiveness of best management practices. Conservation Management Plans were developed for each farm to outline practices to be implemented such as conservation tillage, conservation crop rotation and nutrient management. Best management practices installed on the model farms will be used to demonstrate their effectiveness to other farmers in the region who need more education and demonstration before they are convinced that the practices being recommended will work on their land. The long-term goal of this project is to encourage implementation of these practices within the Bayou Macon watershed by as many farmers as possible.



Primary landuse within the Bayou Macon watershed is 90.2% agriculture and 8.1% forestry.

Tensas River Watershed Program

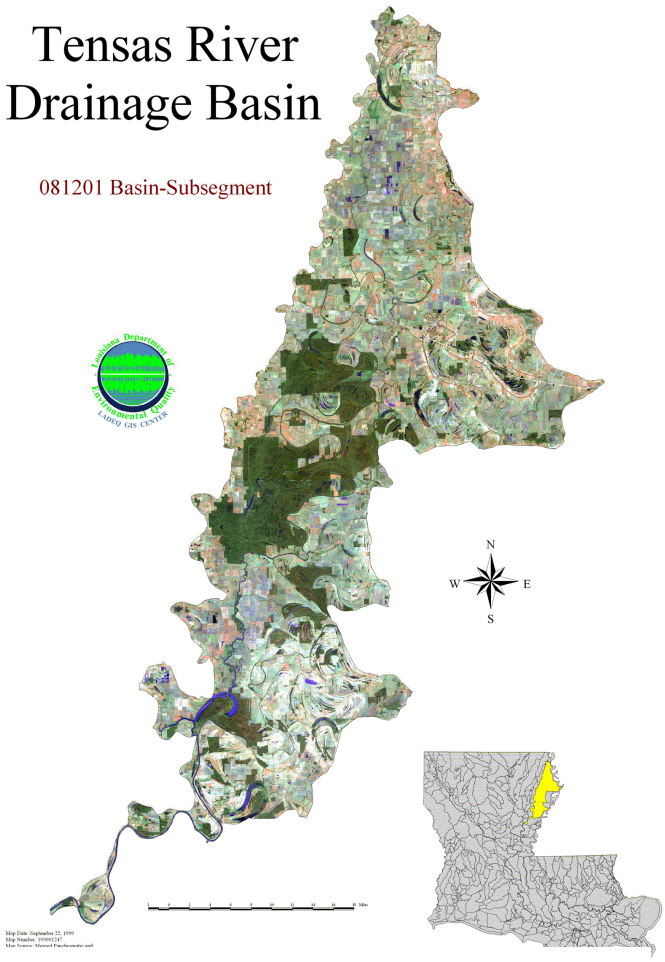
Problems:

The Tensas River Basin comprises nearly 700,000 acres of land in Louisiana's Mississippi alluvial plain. This land was once predominantly bottomland hardwood forests. During the 1960-70's, up to 75% of the bottomland hardwoods were converted to row-crop agriculture. Sediment and other pollutants such as pesticides and nutrients that flow to the Tensas during rainfall events threaten the health of the river.

Interest by local, state, and federal entities in addressing water quality problems, natural resource concerns and economic uncertainty ultimately resulted in formation of the Tensas River Basin Technical Steering Committee.

The Tensas Technical Steering Committee routinely meets to plan projects in the Tensas River Basin.

Many farmers in the Tensas River Basin implement best management practices to prevent soil erosion such as the use of winter cover crops.



Over 70% of the Tensas River Basin is currently used for row-crop agriculture.

Partners:

To address environmental issues within the basin, LDEQ is working in close partnership with other members of the committee to improve water quality primarily through implementation of agriculture best management practices. Examples of these practices include nutrient and pesticide management, conservation tillage and the use of cover crops.

The committee and its member organizations work with landowners to improve conditions within the basin by providing technical and economic support. Committee members promote conservation measures through education outreach, as well as by administering existing agricultural, wetland and wildlife incentive programs.

Tensas River Watershed Program

Projects:

Mike Adcock, Tensas Basin Coordinator, is demonstrating the use of automatic sampling equipment near a cotton field.

Category	Contracts	Acres
Wetland Reserve Program	120	45,000
Conservation Reserve Program	337	15,000
Louisiana Waterfowl Program	n/a	4,500
USFWS Partners Program	n/a	400
Mitigation Banking	n/a	200
USFWS Fish & Wild Fowl Program	n/a	650
Waterbank Program	24	3,500
Water Quality Incentive Program	175	50,000
Environmental Quality Incentive Program	424	27,500

Member agencies on the Tensas Technical Steering Committee implement numerous programs beneficial to water quality in the Tensas River basin.

LDEQ's presence in the basin is supported by its sponsorship of several water quality projects, including one that funds a Tensas River Basin Coordinator. LDEQ's Nonpoint Source Pollution Unit is working with the Natural Resources Conservation Service to implement best management practices throughout the basin and to monitor water quality effectiveness of conservation practices. Studies that monitor agricultural runoff in the basin are also funded through the USEPA Gulf of Mexico program. The Department is also working with the LSU Wetland Biogeochemistry Institute to demonstrate water quality functions of reforested wetlands by comparing them to natural hardwood wetland sites. Additionally, LDEQ promotes forestry best management practices in the basin by providing funding to maintain a forester from the Louisiana Department of Agriculture and Forestry in the basin to provide technical assistance and education to forest landowners.

These monitoring well are part of a project between LDEQ and the LSU Wetland Biogeochemistry Institute to demonstrate the effectiveness of bottomland hardwood reforestation techniques for restoring water quality functions.

Runoff from a cotton field, in which best management practices have been implemented, is directed through a drop pipe. This practice is used to prevent gully erosion.

Members of the Tensas Technical Steering Committee are working to improve conditions in the Tensas River Basin. Tens of thousands of acres of bottomland hardwoods have been restored and best management practices have been implemented throughout the basin. Moreover, farmers continue to be educated about the production, economic and environmental benefits that can result from conservation practices. It is expected that current monitoring efforts will show the relative contributions of these conservation measures to water quality improvement.

Bayou Dorcheat Demonstration Project

Background:

Gravel mining is a type of surface mining activity. Abandoned gravel mines can have a negative impact to water quality. In most cases, trees and other native vegetation have been removed from the surface mining sites. Without vegetation, much soil and sediment are directly exposed to the force of wind and water. Accelerated rates of erosion are the primary result. Loss of soil has been shown to exceed a rate of 50 tons per acre. This consequence contributes to land loss and sediment loading to the receiving stream. Water quality becomes degraded, and the aquatic habitat is depleted. The natural environment looses its ability to maintain a natural equilibrium and buffer negative impacts.

Gravel Dredging Operations

Problems:

Digging and dredging, which is a common surface mining operation alters the topography and hydrology of the land. During the gravel mining process, over-burden is cleared and piled out of the path. Most often sand and silt are byproducts of the gravel mining process. Having less economic value, sand and silt materials are usually left behind. Abandoned piles and steep banks of sand and other sedimentary materials remain. Each time a storm event occurs, the effects of erosion can be dramatic. Excessive amounts of sediment wash into the waterway.

In addition, harvesting gravel near a streambed can alter the stream's natural hydrology. Streambanks become destabilized. During a flood event, greater amounts of rushing floodwaters move over the land washing large quantities of sediment downstream. In some cases, entire streambanks are washed away. Rivers can change their course causing unexpected problems downstream. De-vegetated riverbanks can not adequately absorb hydrologic energy and trap sediment. The waterway becomes wider and shallower; sinuosity decreases; flow rate increases. These consequences contribute to water quality degradation.

Abandoned piles of sediment and steep banks cause highly turbid waters. Sediment loadings can be continuous and long-term.

Many of the mining operators and/or mining contractors, along with the public, may not be aware of these consequences until problems have occurred. There are no requirements for restoring abandoned gravel-mining sites. Sediment loadings to the receiving stream from these areas are classified as nonpoint source pollution. By helping to make mining operators and contractors aware of the problems before they occur and educating them about best management practices helps in prevention. Encouraging public awareness can also help in prevention.

Sediment is directly exposed to the forces of wind and water.

Bayou Dorcheat Demonstration Project

Solutions:

Efforts should be made to restore the abandoned mining sites. Minimal efforts, such as grading leftover piles of sedimentary materials, can yield large returns. Grading barren piles of sedimentary material left over from the mining process is a recommended best management practice (BMP). Land grades should be in such a way to mimic the area's natural topography. These practices reduce sediment runoff potential. "The Resource Extraction and Demonstration Project" under the LDEQ and the Dorcheat Soil and Water Conservation District demonstrates the use of these BMPs for reclaming and restoring abandoned mining sites.

Further efforts should include restoring plant vegetation. Plant roots help hold sediment in place and trap sediment suspended in stormwater runoff. Studies have shown that native plants seem to be most effective. Native plants are acclimated to tolerate greater amounts of stress associated with a particular environment when compared to non-native plants. Sand piles usually lack the nutrients sufficient to promote plant growth. Soil amendments are sometimes required. Alternatives could include utilizing other plant species (non-nuisance) better suited for growing in the altered environment. If the riparian habitats have been removed or disturbed, actions should be taken to restore and/or enhance the area. They serve as a buffer between the waterway and the area of impact. Healthy riparian habitats are very important for protecting water quality and enhancing area wildlife.

Abandoned surface mining sites are becoming more recognized as a contributor to nonpoint source pollution. Public outreach is an important tool for creating public awareness in local communities. Local citizens need to become more aware of the problems and how to solve them. Demonstration tours of disturbed sites and restoration sites help the public understand more about what needs to be done. Once aware of the problems, their collaborated efforts can be instrumental for the success of restoration projects, as well as future mining activities. Surface mining operators need to be educated on best management practices (BMPs) relative to their operational activity. Many operators and contractors are not aware of BMPs. Outreach programs should conduct BMP workshops for training these workers.

Land contouring is a BMP used for reducing slopes of steep banks.

Vegetation is used to stabilize the surface

Local citizens along with gravel contractors and operators discuss problems and solutions

Red Chute Bayou/Flat River Watershed Program

Red Chute Bayou (DEQ Subsegement 100402) and Flat River (DEQ Subsegment 100406) span approximately 35 miles through Bossier Parish in Northwest Louisiana.

Problems:

Red Chute Bayou and Flat River are the receiving streams for 108 square miles of surface runoff. The 1993 Nonpoint Source Assessment Report identified non-irrigated crop production, pasture, urban runoff, channelization and the removal of riparian vegetation as suspected pollution sources entering these streams. Suspected pollutants from these sources include pesticides, nutrients, sediments, habitat alteration, and pathogen indicators. The Northern portion of this watershed is experiencing rapid suburban growth, which is increasing runoff to these streams, and directly affecting introduction of pollutants to the stream. The Southern portion of the watershed is predominantly agricultural land. Water quality data collected form the Southern half of this watershed shows that Total Suspended Solids and Phosphorus are consistently high.

Solutions:

Improvement of the water quality in these streams is dependent upon the reduction of soil loss by erosion. This is being accomplished by construction of thirty grade stabilization structures to prevent gully erosion and implementation of Best Management Practices for agricultural production. The cooperating members will work with growers to select sites and contract construction of the grade stabilization structures. NRCS will provide technical assistance to the growers for implementation of the Best Management Practices. In addition to sediment reduction these sites will be used as an educational tool through field days to encourage use of the grade stabilization structures and best management practices.

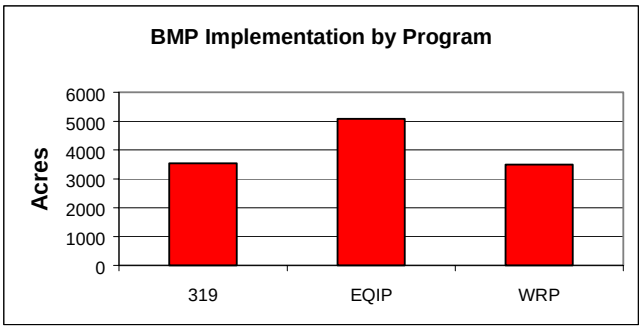
Planned Distribution of Best Management Practices

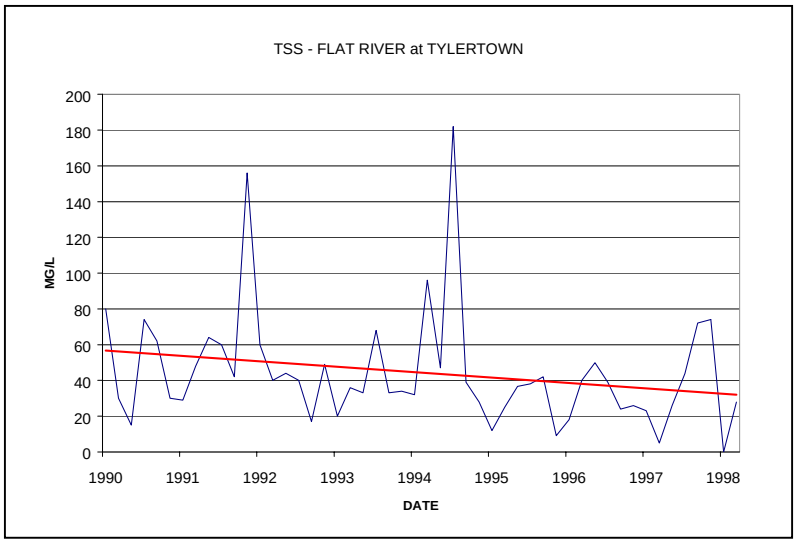
Crop Residue Use	**500 acres**
Pesticide Management	**900 acres**
Seedbed Preparation	**200 acres**
Nutrient Management	**900 acres**
Pasture and Hayland Management	**640 acres**
Pasture and Hayland Planting	**200 acres**
Delayed Seedbed Preparation	**200 acres**
Riparian Restoration	

Red Chute Bayou/Flat River Watershed Program

Cooperating Partners and Programs:

The success of this program depends upon the cooperation of the agencies and landowners involved in the program. Through the cooperation of LDEQ, NRCS, the Bodcau SWCD, and the Bossier Parish Levee District this project will be a success. The Environmental Quality Incentive program is also being utilized to address some of the same issues as EPA 319 and is now encompassing 5077 acres within Bossier Parish and the Wetland Reserve Program encompasses 3,500 acres.





Progress:

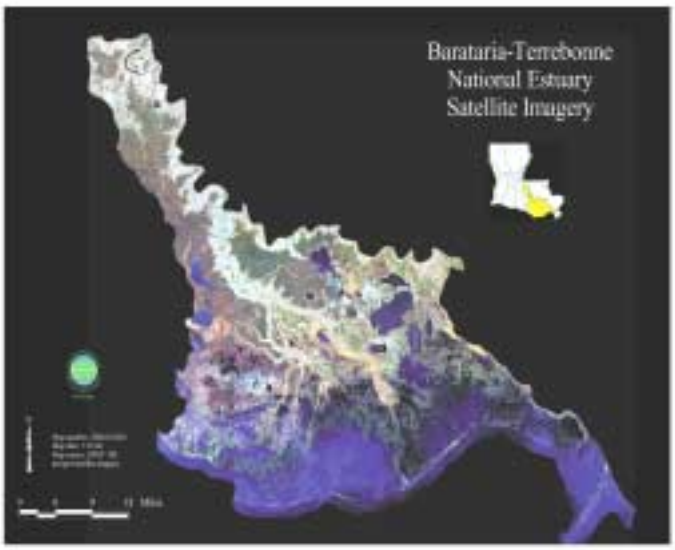
Since 1997, 55% of the proposed work is now complete. Eleven (11) grade stabilization structures have been completed. Eight (8) have been installed in pastureland and three (3) in agricultural fields. To date 827 acres of cropland and pastureland are utilizing conservation practices where the grade stabilization structures have been installed. Furthermore as a result of a new contract, four (4) new structures will be installed and two (2) prior installations will be repaired. Field Days have also been used to further educate farmers on the benefits of conservation practices and increase implementation.

Water Quality and Crop Production Response to the Use of Best Management Practices and Poultry Litter Project:

Louisiana DEQ began working with the LSU Red River Research Station in 1997 to look at ways to appropriately dispose of poultry waste and decrease runoff from cotton fields. The objectives of the project are to 1) Demonstrate the beneficial use of poultry litter for crop production and improvement of water quality within the Red River Basin of Louisiana, 2) Quantify nutrient and pesticide loss in surface runoff and leachate for crop production on a major land resource area, 3) Demonstrate selected BMPs (conservation tillage) for crop production and organic waste use, and 4) Disseminate information on the beneficial uses of organic waste and selected BMPs in crop production. Unfortunately, each year that the project has been active has been a drought year. As a result, there have been very few rainfall events when runoff data have been collected. So far, no significant differences have been revealed in runoff data between conventional plots and plots with BMPs. Nevertheless, the production data demonstrate that there is higher productivity in cotton grown on poultry amended plots than on conventionally produced plots. Outreach on this project has been successfully completed through LSU agricultural magazines and field day demonstrations. Farmers are reconsidering the use of poultry litter as a viable soil amendment rather than a waste product.

Dr. Millhollon describes runoff plots at the annual Red River Field Day.

Barataria-Terrebonne Basin Program

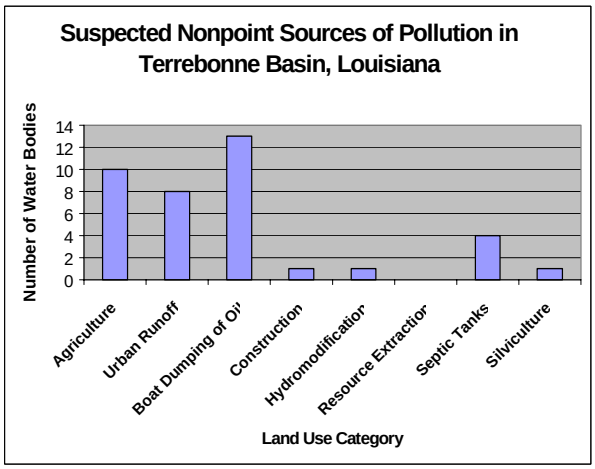


Background:

The Barataria-Terrebonne National Estuary Complex includes over 4.1 million acres, which is bordered on the east by the Mississippi River, and on the west by the Atchafalaya Basin. More than three-quarters of the Barataria-Terrebonne area, or 3.2 million acres, are classified as open water or wetlands, leaving approximately one million acres for urban or agricultural use. Some studies indicate that about 95% of the finfish and shellfish harvested in the coastal areas of Louisiana were dependent on the estuarine habitats of the Barataria-Terrebonne system. Discharges from septic tanks and leaking sewer lines are contaminating oysters, making them unfit for human consumption. Nonpoint source runoff containing fertilizers causes excessive algal growth, depletes oxygen in the water, and ultimately can result in fish kills (The Estuary Compact, 1995).

Problems:

In the Louisiana 1998 303(d) List, Boat Dumping of Oil, Agriculture, and Urban Runoff were listed as the three major sources of NPS pollution, respectively, for the Terrebonne Basin. Likewise, Septic Tanks, Boat Dumping of Oil, and Urban Runoff were listed as the three major sources of NPS pollution, respectively for the Barataria Basin.



Progress:

BTNEP Home Sewage Project:

In 1997 LDEQ NPS began working closely with the Barataria-Terrebonne National Estuary Program (BTNEP) on a project to find an effective alternative home/camp sewage treatment system. A review team was formed to look at the existing problems and to help focus the project. The review team decided that a survey of existing sewage technologies should be made as a first step. Based on the survey the review team decided to focus the project on a Marsh Upwelling System (MUS) as the technology that is capable of treating camp waste.

The function of the MUS is based on the density differences between saline marsh groundwater and fresh sewage wastewater. After running the waste through a settling tank, the wastewater is injected downward into the marsh and the saline marsh groundwater forces the wastewater upward through marsh sediment. The residence time of the upward moving wastewater combined with the natural filtering of the marsh soil treats the contaminants in the sewage and protects local surface waters.

Camps along Bayou Segnette

In addition to selecting MUS technology for the project, the review team selected the Bayou Segnette waterway as a site for a demonstration project. Bayou Segnette has a high cluster of camps and has exhibited problems for sewage pollution. This project has a great potential for improving human fecal coliform problems in coastal Louisiana surface waters. The concept is simple and the materials are inexpensive compared to other systems.

BTNEP Urban Stormwater Runoff Project:

As part of the same grant as the Home Sewage project LDEQ is working with BTNEP on an Urban Stormwater Runoff prevention project. The project is education-based. The BTNEP has acquired an Americorp Volunteer who has been going to schools giving presentations with an Enviroscape Model and discussing NPS Pollution. As part of this project the BTNEP is also working with a local environmental group named "Les Reflections du Bayou" (LRDB). The LRDB ias mainly composed of Americorp Volunteers who will be assisting the BTNEP in making NPS presentations to schools and other outreach.

South Central Planning and Development District:

DEQ began working with the South Central Planning and Development Commission in 1997. The project was designed to address the following major issues:

- Watersheds in the 1996 and 1998 303(d) assessment not supporting their designated uses.
- Problems with fecal coliform contamination of shellfish/oyster producing waterbodies
- Rapid urban development in Barataria-Terrebonne area
- Anticipated Phase II stormwater regulations
- Ability to implement Phase II stormwater regulations

Outreach to schools on NPS pollution

The objective of the coalition is to motivate local decision-makers to adopt measures that address and control NPS pollution. The strategy of the coalition contains two components, general education and a coalition. During the coalition meetings, the coalition met on the following subjects: 1) Educational outreach to schools, 2) Urban Stormwater Runoff and Construction Runoff, 3) Home Sewage, 4) Hydrologic Modification, and 5) Local Sediment and NPS Pollution Ordinances. During the meeting on Local Sediment and NPS Pollution Ordinances, the coalition decided that approaching local government to encourage the development of local ordinances would be futile. They encouraged implementation of the public outreach and education campaign to build support for the local ordinances. Outreach to the schools and the general public has been very successful. To date, 4,974 children and 145 adults have attended the presentations and participated in the public outreach component of the project.

LSU Atrazine in Sugarcane Project:

This project began when atrazine levels above 2µg/L (EPA standards) appeared in surface drinking water sources of Iberville Parish near the community of Indian Village. Louisiana DEQ began work with the LSU Agronomy Department to complete the following objectives: 1) Measure atrazine and metribuzin in surface water runoff and remaining in soil from sugarcane grown under conventional and best management practices (BMPs) and 2) Make a recommendation on a BMP that is effective in significantly reducing atrazine runoff. The project utilized treatments such as burn versus no-burn to simulate current sugarcane practices. Even with BMPs such as band application, there were still high atrazine values in the subsoil and the runoff. This project is providing insight into the low effectiveness of BMPs in controlling atrazine runoff.

Sugarcane combine harvester

Future Projects and Activities:

The Barataria-Terrebonne Basins will be the site of concentrated work in the future. Currently LDEQ is conducting TMDL sampling in the Barataria and Terrebonne Basins. As part of the 2000 workplan LDEQ will work to implement a WRAS in the watershed. The WRAS will coordinate work being done by the BTNEP, SCPDC and local school boards in addition to other statewide agencies. Under a newly proposed project, the SCPDC would develop a new office location that will feature BMPs on-site during and after its construction. As part of future work with the BTNEP a citizen's monitoring project is planned in conjunction with GIS mapping to locate specific problem sites along Bayou Lafourche.

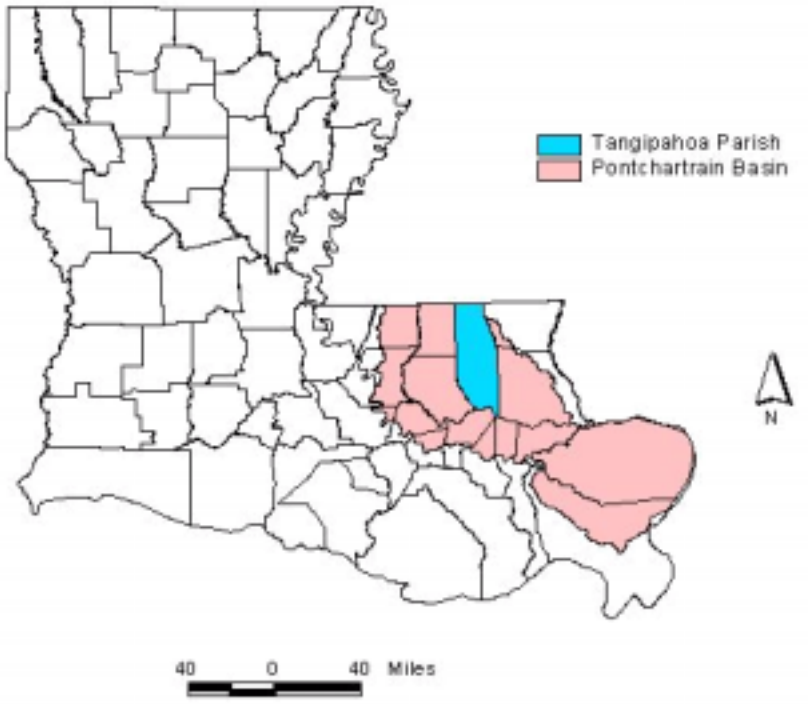
Macroinvertebrate sampling along Bayou Lafourche

Tangipahoa River Watershed Program

Problems:

The Lake Pontchartrain Basin in southeast Louisiana has the highest concentration of dairy producers in the state. There are over 250 individual dairies within Tangipahoa Parish alone. Prior to 1988, dairy producers either had no system to treat animal waste or they used a two-cell oxidation pond that discharged effluent to the river.

The Tangipahoa River in Louisiana is located almost entirely within Tangipahoa Parish. In 1988 the Louisiana Department of Environmental Quality and the Louisiana Department of Health and Hospitals issued a health advisory for primary and secondary contact recreation on the Tangipahoa River. Elevated levels of fecal coliform bacteria were found in the river at levels exceeding Louisiana Water Quality Standards. The 1988 *305(b)* report listed improperly treated wastewater from agricultural operations as one of the sources of the pollution.



The Lake Ponchartrain Basin in southeast Louisiana has the highest concentration of dairies in the state. Tangipahoa Parish, which encompasses most of the Tangipahoa River watershed, is home to some 250 dairies.

Providing an alternate water source keeps these cows out of nearby streams.

Solutions:

The Louisiana DEQ, in cooperation with other agencies such as the NRCS, Dept. of Health and Hospitals, Dept. of Agriculture and Forestry, the Cooperative Extension Service, La. Farm Bureau, local governments, and federal agencies developed a plan to address the problems associated with dairy waste. The plan entailed the implementation of no-discharge lagoon systems using cost-share, technical assistance, education outreach, and demonstration projects for animal waste management and pastureland runoff. In the no-discharge lagoon system, the solid waste settles to bottom and the effluent water is pumped out and applied to fields.

Local, state, federal, and private moneys have been spent correcting the agricultural-related water quality concerns in the Tangipahoa basin. Since 1988, over 220 no-discharge lagoons have been constructed in the Tangipahoa basin. Approximately 80% of the dairies in the Tangipahoa basin have installed or are currently installing a no-discharge waste system.

Tangipahoa River Watershed Program

Monies Spent on Dairy Waste Projects

Category	Monies Spent
*Animal Waste Managemet Systems Assistance	$2,100,000
#Pastureland Runoff Systems Assistance	$1,120,802
Outreach and Watershed Demonstration	$660,000

*Federal cost-share/technical assistance
#LDEQ/EPA cost-share or demonstration funds

Enforcement actions against dairies in the Tangipahoa River basin were part of a statewide effort to control runoff from these operations. These enforcement actions included 42 Notices of Violations, 34 Administrative Orders, 54 Compliance Orders, and 4 penalty assessments.

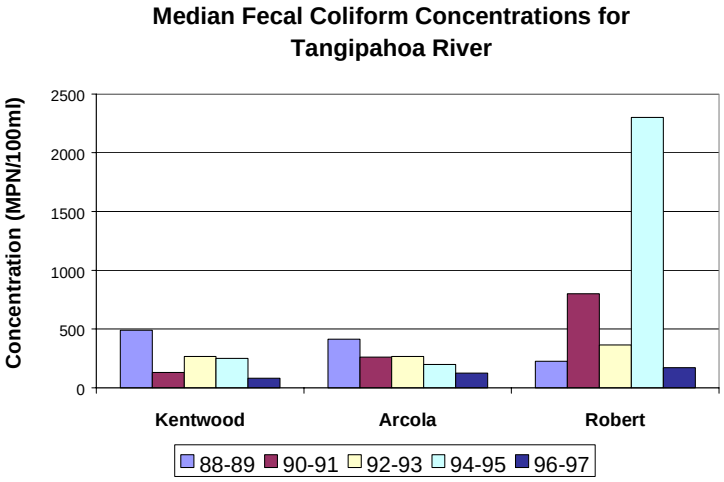
Washwater from dairy barns and holding lots is directed away from nearby waterways and into storage lagoons.

Water from storage lagoons is used to irrigate forage crops such as ryegrass.

LDEQ's Nonpoint Program continues its presence in the Tangipahoa River Basin by funding a project through the Louisiana Department of Agriculture and Forestry. As part of this project, two technicians working with the local Soil and Water Conservation District aided area dairies by providing technical assistance to farmers installing dairy lagoons and implementing other best management practices.

Overview of Dairy Lagoon Assistance Provided by Technicians During 1999

Activity	Number
Planning of Lagoons	60
Survey and/or Design Work	53
Construction of Lagoons	75
Lagoon Operation Assistance	99
Inspection of Lagoons	22



From 1988 through 1998, decreases in bacteria have been noted at the Kentwood and Arcola sampling locations in northern Tangipahoa Parish. In 1998 LDEQ shifted to a 5-year basin cyclic water quality monitoring program. The new monitoring plan is part of LDEQ's effort to more thoroughly assess the state's waterbodies and to develop Total Maximum Daily Loads. Under this monitoring plan, the Lake Ponchartrain Basin, including the Tangipahoa River, is scheduled to be extensively monitored in 2001.