

PART II. BACKGROUND

Chapter 1: Louisiana Resources

Louisiana Geography and Climate

Louisiana lies entirely in the Gulf Coastal Plain physiographic province and can be divided into five natural physiographic regions: Coastal Marsh, Mississippi Alluvial Valley, Red River Valley, Terraces and Hills. The state has twelve major river basins, which are described in Appendix A. Maximum elevations in Louisiana are located in the hills of the northwest, where the state's oldest geologic formations are found. The highest elevation in the state is only 535 feet. The lowest elevations in the state are found in the Coastal Marsh area, which extends across the southern portion of Louisiana and represents a valuable fisheries and wildlife resource. Because Louisiana's coastal resources differ significantly in physical, chemical and hydrological characteristics from upland resources, the atlas information provided below for lakes and wetlands has been broken down into two categories: inland and coastal. Those categorized as coastal receive some tidal influx, even though some of the coastal lakes and wetlands are characterized by fresh water vegetation.

Louisiana has a humid subtropical climate, which is influenced by the extensive landmass to the north, the Gulf of Mexico to the south and the subtropical latitude. Prevalent winds from the south/southeast bring in warm, moist air from the Gulf, resulting in abundant rainfall. The statewide annual average precipitation varies from 48 inches in the northwestern part of the state near Shreveport to 64 inches in the southeastern coastal plains near Thibodaux.

Louisiana Resources Atlas

State Population (1993 Estimate)	4,295,0000	
State Surface Area (Land)	44,521	square miles
Percent Land	93%	
State Surface Area (Water)	3,100	square miles
Percent Water	7%	
Major Water Basins	12	
<u>Rivers:</u>		
Total River Miles	66,294	miles
Perennial	32,955	miles
Intermittent	20,667	miles
Ditches/Canals	12,672	miles
<u>Border Miles:</u>		
Names and Mileage of Border Rivers		
Total Mileage	484	miles
Pearl River	74	miles
Mississippi River	200	miles
Sabine River (includes Toledo Bend Reservoir)	210	miles
<u>Lakes:</u>		
Total Number of Fresh water Lakes/Reservoirs	6,603	
Total Acres of Fresh water Lakes/Reservoirs	1,078,031	acres
Number of Inland Fresh water Lakes/Reservoirs > 1 sq. mi.	62	
Acres of Inland Fresh water Lakes/Reservoirs > 1 sq. mi.	474,506	acres
Number of Coastal Fresh water Lakes/Reservoirs	39	
Acres of Coastal Fresh water Lakes/Reservoirs	239,213	acres

<u>Wetlands:</u>		
Fresh Water Inland Wetlands	3,000,130	acres
Tidal Wetlands	2,550,821	acres
Swamp (Coastal)	392,109	acres
Fresh Marsh (Coastal)	533,577	acres
Intermediate	441,046	acres
Brackish Marsh	820,378	acres
Salt Marsh	363,711	acres
 <u>Estuaries/Bays:</u>	7,656	square miles
 <u>Coastal Miles:</u>	397	miles
 <u>Total Miles of Shoreline:</u> (includes islands, bays, rivers and bays up to head of tide water)	7,721	miles

Summary of Classified Uses

Table 2.1.1

Total sizes of Louisiana water bodies classified for various designated uses (Louisiana Environmental Regulatory Code 33:IX.1123).

Classified Uses	Water body Type			
	River (miles)	Lakes (acres)	Estuaries (sq. miles)	Wetlands (acres)
Primary contact recreation	9,360	660,284	4,953	1,025,280
Secondary contact recreation	9,477	660,284	4,953	1,036,288
Fish and wildlife propagation	9,447	660,284	4,953	1,036,288
Drinking water supply	1,311	251,717	-0-	464,000
Oyster propagation	547	-0-	4,268	-0-
Agriculture	2,041	425,998	-0-	-0-
Outstanding natural resource	1,587	-0-	-0-	-0-
Limited aquatic life and wildlife	30	-0-	-0-	-0-

Chapter 2. Water Pollution Control Program

Watershed Approach to Water Pollution

LDEQ reports on water quality in the State by basin subsegment. Louisiana is divided into 12 major watershed basins, and each basin is further divided into water body subsegments. This subsegment approach divides the State's waters into discrete hydrologic units. The plan for this approach was presented in the 1978 Water Quality Management Plan, and underwent a major revision in 1985 to increase hydrologic consistency within each named subsegment. The final draft of the Louisiana Basin Subsegment plan was completed in 1990, and is reviewed periodically to ensure that subsegments are distinct and consistent representations of the state's hydrology. The water body subsegment system within each watershed basin provides a workable framework to evaluate the state's waters. Subsegments are periodically added or removed as water quality standards related to a subsegment or group of subsegments are revised.

Water Quality Standards Program

Use Attainability Analyses (UAAs)

Section 101(a)(2) of the CWA states it is the National goal that "wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water be attained..." To achieve the National goal, all Louisiana streams were originally assigned designated uses that were applied statewide. Criteria to support the designated uses were also assigned statewide in response to Federal regulations promulgated to achieve CWA goals. Since that time, both State and Federal agencies have recognized the need to establish site-specific standards. Federal and State regulations provide a mechanism for change to a designated use and or supporting criteria when that use or criteria is unattainable (40 CFR §131.10, LAC 33:IX.1109.B.3). The mechanism for change is a Use Attainability Analysis (UAA).

UAAs are conducted to determine the uses and criteria an individual water body can attain. According to the regulations, a UAA is defined as a "structured scientific assessment of the factors affecting the attainment of a use that may include physical, chemical, biological, and economic factors" (See also 40 CFR §131.3(g) and LAC 33:IX.1105). The UAA process entails the methodical collection of data that is scientifically analyzed, summarized and used to make recommendations for site-specific uses and the criteria to support them. Designated uses or criteria which are not existing uses or criteria may be removed from water bodies if a UAA demonstrates the designated use or criteria has not been attained, is prevented from being attained, or is not feasible to attain for any one of six reasons found in LAC 33:IX.1109.B.3.a-f. Acceptable methods used in conducting the UAA process are more thoroughly described in U.S. EPA guidance documents (See also 40 CFR §131.10 and LAC 33:IX.1109.B.3).

UAAs for site-specific criteria and uses may be developed for a specific water body or for a watershed. In Louisiana, some water bodies have natural characteristics or physical limitations that prevent attainment of certain water quality criteria and uses. These water bodies may qualify for an excepted use classification (See LAC 33:IX.1109.C). LDEQ has developed excepted use categories in the water quality standards for intermittent streams, man-made water bodies, and naturally dystrophic waters. As with the development of site-specific UAAs, proposed uses and criteria based on any of the excepted use categories also require a UAA. To date, 42 water bodies in Louisiana have criteria and uses assigned to them based on UAAs approved by U.S. EPA. The U.S. EPA must approve any revisions to the water quality standards, uses, or criteria before they are implemented.

UAAs typically include historical and current data and information gathered from existing sources. When existing data are insufficient, LDEQ will conduct additional physical, chemical, and/or biological sampling at sites where designated uses and/or criteria changes are being considered. Frequently this type of site-specific data collection is performed in conjunction with LDEQ's TMDL program intensive survey work.

Antidegradation

Antidegradation refers to actions taken to maintain existing uses and water quality in the Nation's waters. States are required to adopt an antidegradation policy stating that, except in certain limited situations, water quality cannot be degraded below that required to uphold existing uses. Antidegradation provides a legal framework for the basic maintenance and protection of all designated uses. Louisiana's antidegradation framework is contained within both § 1109 (antidegradation policy) and § 1119 (antidegradation plan). Antidegradation encompasses almost every aspect of the State's water quality management: the Water Quality Inventory, the Continuing Planning Process, the Water Pollution Control Plan, monthly monitoring activities, intensive surveys, investigating pollution complaints, and compliance monitoring.

Louisiana's Nutrient Criteria Development Strategy

In 1998, the Office of the President announced "The Clean Water Action Plan" that included a requirement that States' develop and adopt numerical nutrient criteria. LDEQ has been working with U.S. EPA Region 6 to accomplish this goal. It has been recognized that a "one size fits all" National criteria for nutrients will not be appropriate, and that each State's nutrient criteria will need to be water body specific and site-specific. U.S. EPA has published numeric nutrient criteria recommendations for several National ecoregions. These recommendations were developed using a statistical methodology in which the twenty-fifth percentile of all water bodies of like type in a region is taken as the "criteria". U.S. EPA issued further guidance in the form of a memorandum in November 2001. This memorandum clarified the flexibility that States' have to develop their own defensible criteria, and extended the deadline for developing criteria to December 2004.

LDEQ has evaluated the nutrient data and criteria recommendations made using U.S. EPA's methodology, and has concluded that the methodology is not suitable for developing appropriate, defensible nutrient criteria for Louisiana's water bodies. LDEQ is now evaluating and assessing how to proceed with developing scientifically defensible and appropriate criteria for Louisiana's water bodies. In this regard, LDEQ is working closely with the Louisiana academic community to incorporate the latest scientific research in developing defensible approaches to nutrient criteria development. LDEQ also continues public outreach efforts to educate, inform and seek input from Louisiana stakeholders about nutrient criteria development for Louisiana water bodies. LDEQ has prepared a "Nutrient Criteria Development Plan" as suggested in U.S. EPA's latest memo and forwarded that plan to U.S. EPA Region 6. More information on the National Nutrient Strategy is available at <http://www.epa.gov/ost/standards/nutrient.html>.

Point Source Control Program

Introduction

Louisiana's water pollution control program is carried out through the Louisiana Department of Environmental Quality (LDEQ). LDEQ acts to preserve the integrity of the state's waters through the use of various point and nonpoint source programs. Following the reengineering of LDEQ, the responsibility for these programs is dispersed among the major offices of the department. These include the Office of Management and Finance (Municipal Facilities Revolving Loan Program), the Office of Environmental Services (municipal and industrial wastewater discharge permitting), the Office of Environmental Compliance (surveillance and enforcement of permit requirements and pollution control regulations, investigation of complaints and spills), and the Office of Environmental Assessment (regulation development, water quality assessment, review and recommendation of standards and nonpoint source programs). Brief descriptions of the various facets of the water pollution control program and recent activities are provided in the following sections.

Municipal Facilities Revolving Loan Fund

The Municipal Facilities Revolving Loan Fund Program provides financial assistance for the construction of projects to enhance and improve water quality in Louisiana. Loans are below market rate, and may be used for water quality improvement projects in Louisiana communities.

Monies for the Revolving Loan Program originated with the 1987 amendments to the Clean Water Act. A new authority was created, allowing EPA to make grants to capitalize State Water Pollution Control Revolving Funds. On the state level, R.S. 30:2011(D)(4), R.S. 30:2074(A)(4) and (B)(6), and R.S. 30:2078 provided for the establishment of the Municipal Facilities Revolving Loan Fund and provision for the required matching state funds.

Loans are made for no longer than 20 years and may be repaid through sales taxes, user fees, ad valorem taxes or a combination of funds. After a two year construction period loan recipients begin repayment of principal and interest to LDEQ, and that money is then available for loan to other communities. Thus the revolving loan fund will be a permanent source of funds for Louisiana municipalities.

As of October 2002, the EPA has awarded \$220,277,868 in Fund capitalization grants to Louisiana. With the required 20% state match of \$44,055,574, less 4% for administration fees makes \$255,522,327 available for loans to communities. As of October 2002, sixty-eight loans to communities, totaling \$314,972,900 have been closed. Another fourteen loans have been received or are in the application process.

Water Discharge Permits

Wastewater permits are official authorization developed and promulgated by the Office of Environmental Services of LDEQ. The LPDES (Louisiana Pollutant Discharge Elimination System) permit establishes the wasteload content of wastewaters discharged into waters of the state. The permitting process allows the state to control the amounts and types of wastewaters discharged into its surface waters. A permit is required for every point source discharge into waters of the state of Louisiana. In 1996, LDEQ assumed responsibility for administering the permitting, compliance, and enforcement activities of this National Pollutant Discharge Elimination System (NPDES) program, from the U.S. EPA. U.S. EPA retained responsibility for the sewage sludge disposal program, municipal separate storm sewer system and authority for offshore discharges past the 3-mile territorial seas limit. From October 1997 to September 1999, the following permits were prepared:

Table 2.2.1

State Permits issued by Louisiana Department of Environmental Quality, July 1999 to July 2002 (includes re-issuance of water general permits).

State Permit	Number of Permits
Industrial Major	57
Industrial Minor	630
Municipal Major	55
Generals	2704
Totals	

Compliance Assurance Inspections

Municipal and industrial point source dischargers are monitored to verify compliance with permitted effluent limitations and compliance schedules. Major dischargers are inspected annually (with sampling when necessary) to ensure compliance with applicable effluent limitations and state and federal permit requirements. The information derived from this program can also be applied to the interpretation of state

water quality trend data and can be used as input to planning and water quality control program development. The types of compliance assurance activities undertaken by the Surveillance Section include the following:

1. Compliance Evaluation Inspections (CEI): Non-sampling inspections designed to verify permittee compliance with applicable LPDES/state permit requirements and compliance schedules.
2. Compliance Sampling Inspections (CSI): Samples of the influent and/or effluent are collected and analyzed to determine permit compliance, in addition to the inspection activities performed in the CEIs.
3. Toxics Inventory (TI): Samples of effluent are collected and analyzed for speciated organic compounds.

The following compliance assurance activities were conducted during Federal fiscal years 1998 through 1999. Updated information was not available at the time of release but will be provided when it is available.

Table 2.2.2

Compliance assurance activities conducted by Louisiana Department of Environmental Quality, Office of Environmental Compliance, October 1997 - September 1999.

Compliance Evaluation Inspections	October 1997 - September 1998	October 1998 - September 1999
Industrial Major	108	19
Industrial Minor	1296	108
Municipal Major	71	15
Municipal Minor	267	8
Federal Major	0	0
Federal Minor	9	1
Totals	1751	151
Compliance Sampling Inspections	October 1997 - September 1998	October 1998 - September 1999
Industrial Major	16	3
Industrial Minor	138	6
Municipal Major	26	4
Municipal Minor	70	2
Federal Minor	2	0
Totals	252	15

Complaint Investigations

The Surveillance Section of the Office of Environmental Services received and responded to over 2,700 complaints during the fiscal years 1998-99. Each complaint requires a complaint form and a field investigation. If further action is necessary following the initial investigation, the investigator makes the appropriate recommendations for enforcement action, permit action, compliance actions or additional sampling and analysis. Complaints include reports of oil spills, chemical spills, fish kills, unusual coloring in a stream and illegal discharges.

Following the LDEQ reengineering and reorganization, initial spill reports and complaints are now made to a Single Point of Contact, since the old media divisions no longer exist. Initial reports of emergencies are reported to the Louisiana State Police, and non-emergency conditions are reported to the LDEQ Hotline. Updated information was not available at the time of release but will be provided when it is available.

	October 1997- August 1999
Complaint Investigations	1,692
Spill Investigations	1,021
Total	2,713

Water Quality Certification

Water quality certification is an activity of the Office of Environmental Services (Permits Division, Registrations and Certifications Section) of LDEQ. Certification is required for any activity that results in a discharge or a potential change to the waters of the state, including land clearing and drainage of agricultural lands, coastal use, certain highway construction and sewage collection projects and bridge construction. Water quality certification is required by Section 401 of the Clean Water Act for all Section 402 (National Pollutant Discharge Elimination System) or Section 404 (dredge/fill) permits and, therefore, applies to both point source and nonpoint source discharges. Through the certification process, the Office of Environmental Services is involved in the review of all environmental impact statements in order to assess potential impacts of any proposed project on waters of the state.

	October 1999- October 2002
Water Quality Certifications	2,221

Enforcement

The enforcement activities of the Office of Environmental Compliance, Enforcement Section are designed to ensure that all water quality standards, rules, and regulations are handled in a rapid and consistent manner. To prevent pollution of the waters of the state and to ensure remediation in the event of pollution, the Enforcement Section coordinates its enforcement activities with other sections in LDEQ, especially the Permits Section in the Office of Environmental Services and the Surveillance Section of the Office of Environmental Compliance. Field investigations, file reviews, permit non-compliances and reviews of discharge monitoring reports (DMRs) are all used to initiate enforcement actions. The Enforcement Section initiates all formal enforcement actions and follows the actions through all appropriate levels to ensure full compliance with state laws and regulations. LDEQ seeks to provide a clean, healthy environment through protection of the state's water resources by the reduction of pollution; education of the public; and consistent, open and accountable application of standards, rules and regulations. Between October 1999 and August 2002, the following activity was recorded:

Enforcement Action Type	Number
Notice Of Violations	17
Compliance Orders	659
Orders	9
Orders For Information	0
Penalties	10
Settlement Agreements	9
Cease and Desist	2

Penalties	Dollar Value
Penalties Issued	\$2,354,012
Penalties Paid	\$1,487,347
Penalties Appealed	\$662,051
In Bankruptcy	\$142,490
Payments From Settlement Agreements	\$971,505
Total Value of BEPs*	\$2,235,820
*Beneficial Environmental Projects	

Nonpoint Source Control Program

Introduction

Both national and state water quality assessment reports indicate that even when all of the point sources of pollution from industrial and municipal discharges have been controlled, the nation's water bodies will still not meet their designated uses for fishing and swimming. These remaining water quality problems have been associated with storm water runoff from land-use activities, which transport sediments, nutrients, metals, organic material and bacteria into water bodies throughout the state and across the country. This type of pollution is called *nonpoint source pollution*. The types of land-use activities that have been identified as contributing to nonpoint source pollution (NPS) include: **agriculture, forestry, urban, home sewage systems, construction, hydromodification, and resource extraction (sand and gravel mining)**.

For purposes of implementing NPS pollution provisions in the Water Quality Act, NPS pollution is defined by the EPA as follows:

NPS pollution is caused by diffuse sources that are not regulated as point sources and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological and radiological integrity of water. In practical terms, NPS pollution does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation. It must be kept in mind that this definition is necessarily general; legal and regulatory decisions have sometimes resulted in certain sources being assigned to either the point or nonpoint source categories because of considerations other than their manner of discharge. For example, irrigation return flows are designated as "nonpoint sources" by Section 402(l) of the Clean Water Act, even though the discharge is through a discrete conveyance.

Section 319 of the Clean Water Act

Section 319 of the Clean Water Act was enacted to specifically address problems related to NPS pollution. The objective of the Act is to restore and maintain the chemical, physical and biological integrity of the nation's waters. It mandated the Nonpoint Source Management Program (LDEQ, 1987b), which instructed the governor of each state to prepare and submit a program for control and reduction of NPS pollution from nonpoint sources into navigable waters within the state by implementation of a four-year management plan.

In response to this federal law, the state of Louisiana passed Revised Statute 30:2011, signed by the governor in 1987 as Act 272. This law directed the LDEQ, designated as the lead agency for the NPS program, to develop and implement a NPS Management Program. The NPS Management Program was developed to facilitate coordination with appropriate state agencies including, but not limited to, the Louisiana Department of Natural Resources (LDNR), the Louisiana Department of Wildlife and Fisheries (LDWF), the Louisiana Department of Agriculture and Forestry (LDAF) and the state Soil and Water Conservation Committee, in those areas pertaining to their respective jurisdictions.

Nonpoint Source Assessment

Section 319(A) required that the states prepare a Nonpoint Source Assessment Report, which included the following elements:

1. an identification of those navigable waters within the state which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of this Act;
2. an identification of those categories and subcategories of nonpoint sources which add significant pollution to each portion of the navigable waters identified under subparagraph (A) in amounts which contribute to such portion not meeting such water quality standards or such goals and requirements;
3. a description of the process, including intergovernmental coordination and public participation, for identifying best management practices and measures to control each category and subcategory of nonpoint sources and, where appropriate, particular nonpoint sources identified under subparagraph (B) and to reduce to the maximum extent practicable the level of pollution resulting from each category, subcategory or source; and
4. an identification and description of state and local programs for controlling pollution added from nonpoint sources to, and improving the quality of, each such portion of the navigable waters, including but not limited to those programs which are receiving federal assistance under subsections (h) and (I).

Nonpoint Source Pollution Management Program

Section 319(B) required that the states prepare a Nonpoint Source Management Plan, which included the following elements:

1. an identification of BMPs and measures which will be undertaken to reduce pollutant loadings resulting from each category, subcategory or particular NPS designated under paragraph (1)(B), taking into account the impact of the practice on ground water quality;
2. an identification of programs (including, as appropriate, non-regulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer and demonstration projects) to achieve implementation of the best management practices by categories, subcategories and particular nonpoint sources designated under subsection (A);
3. a schedule containing annual milestones for (i) utilization of the program implementation methods identified in subparagraph (B) and (ii) implementation of the best management practices identified in subparagraph (A) by the categories, subcategories or particular nonpoint sources designated under paragraph (1)(B). Such schedule shall provide for utilization of the BMPs at the earliest practicable date;
4. a certification of the attorney general of the state or states (or the chief attorney of any state water pollution control agency which has independent legal counsel) that the laws of the state or states, as the case may be, provide adequate authority to implement such management program or, if

there is not such adequate authority, a list of such additional authorities as will be necessary to implement such management program, and a schedule and commitment by the state or states to seek such additional authorities as expeditiously as practicable;

5. sources of federal and other assistance and funding (other than assistance provided under sections (h) and (I) which will be available in each of such fiscal years for supporting implementation of such practices and measures and the purposes for which such assistance will be used in each of such fiscal years; and
6. an identification of federal financial assistance programs and federal development projects for which the state will review individual assistance applications or development projects for their effect on water quality pursuant to procedures set forth in Executive Order 12372 as in effect on September 17, 1983, to determine whether such assistance applications or development projects would be consistent with the program prepared under this subsection; for the purposes of this subparagraph, identification shall not be limited to the assistance programs or development projects subject to Executive Order 12372 but may include any programs listed in the most recent Catalog of Federal Domestic Assistance which may have an effect on the purposes and objectives of the state's NPS pollution management program.

In 1993, the U.S. Environmental Protection Agency approved Louisiana's Nonpoint Source Assessment Report and Management Plan. During the last seven years, LDEQ has worked cooperatively with other federal, state, local agencies and non-profit organizations to implement the goals and objectives of the 1993 documents. In July 1999, LDEQ submitted a revised NPS Management Plan that addressed the 9 key elements that the U.S. Environmental Protection Agency required of all states in order to upgrade their programs. These 9 key elements have been summarized here:

EPA's Nine Key Elements

In 1997, EPA Headquarters issued revised guidance to the states, which described the process that states should utilize to upgrade their Nonpoint Source Management Plans. This revision process would be based on 9 key elements, which EPA wants to see included in the revised programs. The key elements will more clearly identify the programmatic goals that the states have for reduction of nonpoint source pollution and improvement of water quality. The nine key elements include:

1. The State program contains explicit short- and long-term goals, objectives, and strategies to protect surface and ground water.
2. The State strengthens its working partnerships and linkages with appropriate State, Tribal, regional, and local entities (including conservation districts), private sector groups, citizen groups, and Federal agencies.
3. The State uses a balanced approach that emphasizes both statewide nonpoint source programs and on-the-ground management of individual watersheds where waters are impaired and threatened.
4. The State program (a) abates know water quality impairments from nonpoint source pollution and (b) prevents significant threats to water quality from present and future activities.
5. The State program identifies waters and their watersheds impaired by nonpoint source pollution and identify important unimpaired waters that are threatened or otherwise at risk. Further, the State establishes a process to progressively address these identified waters by conducting more detailed watershed assessments and developing watershed implementation plans and then by implementing the plans.
6. The State reviews, upgrades, and implements all program components required by section 319(b) of the Clean Water Act, and establishes flexible, targeted, and iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable. The State programs include:

- (a) A mix of water quality-based and/or technology-based programs designed to achieve and maintain beneficial uses of water; and
 - (b) A mix of regulatory, non-regulatory, financial and technical assistance as needed to achieve and maintain beneficial uses of water as expeditiously as practicable.
7. The State identifies Federal lands and activities, which are not managed consistently with State nonpoint source program objectives. Where appropriate, the State seeks EPA assistance to help resolve issues.
 8. The State manages and implements its nonpoint source program efficiently and effectively, including necessary financial management.
 9. The State periodically reviews and evaluates its nonpoint source management program using environmental and functional measures of success, and revises its nonpoint source assessment and its management program at least every five years.

Clean Water Action Plan

In February 1998, the Clean Water Action Plan was signed by EPA and USDA as co-leaders in the effort to restore the nation's waters through a watershed restoration process. This document contained more than 100 action items aimed at restoring water quality and habitat in watersheds across the nation. One of the action items was for the states to develop a Unified Watershed Assessment (UWA) Document that would identify which watersheds within the state were impaired. LDEQ met with the U.S. Department of Agriculture's Natural Resource Conservation Service to begin the process for development of the state's Unified Watershed Assessment. The basis for the document was the 1998 303(d) list of impaired water bodies. NRCS reviewed this priority water body list and concurred with LDEQ that these were the areas within the state where efforts needed to be made to improve the water quality and restore watersheds.

On June 24, 1998, LDEQ and NRCS hosted a public meeting at the Louisiana State Archives Building in Baton Rouge to present the information and the map and tables for the Unified Watershed Assessment. There were more than 75 people in attendance at the meeting, representing federal, state, local agencies, private and non-profit organizations, and the general public. The draft UWA was made available throughout the state for 30-day public review and comment. LDEQ responded to the comments that were received and changes were made to the draft map and tables that were submitted to EPA in October 1998. The resulting document was printed and has been included here within this document.

USDA has agreed to work with LDEQ on targeting the federal funds that they receive through EQIP into the state's priority watersheds. LDEQ targets the federal funds that they receive through Section 319 into these watersheds also. Other federal and state agencies are also working with these two agencies to target resources into the priority watersheds that were included in the 1998 303(d) list and the Unified Watershed Assessment document.

Watershed Restoration Action Strategies

USEPA has required that the states develop and implement watershed restoration action strategies (WRAS) in order to reduce and control the nonpoint sources of pollution at the watershed level. There are 10 key elements included within the WRAS as an outline for the steps that should be followed to manage and restore the water quality at the watershed level. The 10 elements include:

1. Identification of measurable environmental and programmatic goals;
2. Identification of Sources of Water Pollution and the Relative Contribution of Sources;

3. Implementation of pollution control and natural resource restoration measures (e.g. permit revisions, implementation of best management practices and buffer strips) to achieve clean water and other natural resource goals, especially those measures, which will achieve multiple environmental and public health benefits;
4. Schedules for Implementation of Needed Restoration Measures and Identification of appropriate lead agencies to oversee implementation, maintenance, monitoring, and evaluation;
5. Implementation of total maximum daily loads (TMDLs) for pollutants exceeding state water quality standards;
6. Implementation of Source Water Assessment and Protection Programs;
7. Needed Monitoring and Evaluation to Assess Progress Towards Achieving Environmental and Programmatic Goals;
8. Funding Plans to Support the Implementation and Maintenance of Needed Restoration Measures;
9. A Process for Cross-Agency (federal, state, interstate, tribal, and local) Coordination to Help Implement Watershed Restoration Action Strategies;
10. A Process for Public Involvement.

Implementation

The primary objective of the Nonpoint Source Management Program is to implement BMPs that will reduce the level of NPS pollution in the surface and ground waters of the state. In addition to BMP implementation, educational programs are held at the local level, in order to educate residents about NPS pollution problems and about BMPs recommended by state and federal agencies to reduce and/or correct these problems. Demonstration projects are also an important component of the implementation process. These projects function as an educational tool through demonstration of the recommended management practice to the general public or landowners regarding a specific NPS problem. These projects also allow LDEQ the opportunity to gather quantitative data and information on the effectiveness of the management practice recommended for reduction of NPS pollution (sediments, nutrients, pesticides and metals). This evaluation of BMPs is reported back to the interagency committee through a feedback loop that allows continuous adjustment of the management practice recommended for NPS abatement. Through this implementation process, corrective measures to reduce the level of sediments, metals, nutrients and pesticides entering surface and ground waters of the state have been initiated. For this program to be successful, it will take the continued cooperative efforts of the government agencies that have authority and management responsibilities for state, federal and private lands within Louisiana. More information on implementation of LDEQ's Nonpoint Source Program can be found in the Nonpoint Source Management Plan and the Annual Report for the program or through the internet at: <http://nonpoint.deq.state.la.us>.

Coordination With Other Agencies

The LDEQ, Office of Environmental Assessment (OEA) coordinates their activities with various other federal, state, and local agencies and organizations. This coordination takes a number of different forms.

As a result of federal grants administered by EPA, LDEQ must work closely with EPA personnel to ensure that all obligations and goals of the grants are fulfilled. LDEQ in turn utilizes these grant funds to support its programs and implement nonpoint source management and demonstration projects through a variety of contractors, consultants, citizen groups and university researchers. The Nonpoint Source Program (NPS program), within the Environmental Planning Division, administers many of these projects in an effort to find solutions to nonpoint source pollution in the state. The section entitled Nonpoint Source Control Program in this chapter has details on a variety of activities undertaken by the NPS program.

In addition to LDEQ's NPS Program, LDEQ staff sits on several national, state and regional task forces, committees, and programs. Among these are the Gulf of Mexico Program (GOMP), which is aimed at focusing awareness of the Gulf's pollution, habitat, fisheries and other problems, and finding workable solutions to them. Another program supported by personnel from LDEQ is the Lower Mississippi River Conservation Committee (LMRCC). Like the GOMP, the LMRCC's goal is to identify and find solutions to problems that exist among states along the lower Mississippi River south of the Ohio River. LDEQ also represents the state on the Coastal Wetlands Conservation and Restoration Task Force and Project Restore. Both groups are state efforts to address coastal land loss. LDEQ also maintains representation on the Lake Pontchartrain Basin Foundation (LPBF) board. The LPBF is charged with seeking solutions to and raising citizen awareness of pollution problems in Lake Pontchartrain and the surrounding watershed. Finally, the Southern States Mercury Task force includes personnel from LDEQ. This task force serves as a forum for exchange of information between states concerning the problem of mercury contamination of fish tissue.

Another aspect of coordination between LDEQ and other agencies is in the area of direct field research. For example, OEA is working with the USGS in an effort to link LDEQ's ambient water quality data with stream flow data. Under this arrangement, USGS personnel determine stream flow at selected LDEQ water sample sites. This information is later provided to LDEQ so that stream flow can be included with water quality data. Through this project, LDEQ personnel and other researchers will be able to analyze in-stream loading of water parameters in addition to simple concentrations. The stream flow data is also utilized by OES permit writers in deriving effluent limitations for wastewater discharges.

A final area of coordination involves LDEQ, the Louisiana Department of Health and Hospitals (LDHH), and the Department of Wildlife and Fisheries (LDWF) in the setting of fish consumption and swimming advisories. Under this arrangement, water and fish samples are generally collected by LDEQ. Water samples are tested for the presence of fecal coliform bacteria by LDHH laboratories and results shared by LDEQ and LDHH. Fish tissue samples are analyzed by either LDEQ or contract laboratories with results provided to LDHH for risk analysis. After a decision has been reached on the need for fish consumption or swimming advisories, the LDWF is also notified so that informational bulletins can be provided when fishing licenses are purchased. A news release is then prepared describing the advisory, why it was established, and the source of the problem, if known. More information on fish consumption and swimming advisories in Louisiana can be found in Part 3, Chapter 7, and on the LDEQ Website at www.deq.state.la.us.

Chapter 3: Cost/Benefit Assessment.

Cost Information

This assessment has not been updated since the 1996 305(b) report, when an attempt was made to develop a comprehensive cost/benefit assessment. Due to recent reengineering of the LDEQ, responsibility for protecting water quality in Louisiana has now been split into several different multi-media Offices and Divisions within the Department. As a result, it is difficult if not impossible to separate out the costs attributable to water related pollution control efforts. The benefits protected by LDEQ are not expected to have changed significantly.

A true cost/benefit assessment for the LDEQ is difficult if not impossible to obtain. This is due to the fact that research on the economic value of incremental improvements in water quality is not currently available. While recent economic research has begun to place monetary values on otherwise intangible environmental benefits such as wilderness for non-consumptive recreation, such efforts have not taken place in the area of water quality. In addition to the lack of economic assessments, water quality assessment methodologies presently provide only a "snapshot" look at water quality as directed by Section 305(b) guidance provided by the EPA. Some effort has been made to compare these biennial assessments in order to determine changes in water quality over time. However, this has been largely unsuccessful due to changes in evaluation protocols. Therefore, in lieu of a formal cost/benefit assessment of water quality improvements, the LDEQ has provided a description of its sources of funding and some of the successes derived from this funding. In order to place these expenditures in perspective, estimates of some of the economic and intangible benefits placed on water resources in the state are also provided.

For fiscal year (FY) 1995 the former LDEQ Office of Water Resources (OWR) operated on a budget of over \$8.5 million. This represents the total expenditure for surface water activities and does not include the Groundwater Division, or the Barataria-Terrebonne Estuary Program. For FY 1996 this was projected to be \$13.4 million. Much of this budget is self-generated through permit fees and enforcement actions; however, a portion is derived through federal grants. These included the Section 106 grant for water pollution control activities; the Section 104 grant for research investigations, training and informational demonstrations; the Section 319 grant for nonpoint source management issues and the Section 604 grant for state water quality management planning activities. Money from each of these grants is divided throughout the office, as directed by each grant, and provides funding for personnel, equipment, survey and research work, and ambient monitoring. Shown below are a few of the programs and activities supported by each of these grants.

Notable among these grants in its achievements is the Section 319 grant for nonpoint source management issues. The Nonpoint Source Unit, which is funded by Section 319 monies, has recently reported success in the area of rice farming discharges in the Mermentau River Basin. This work has been achieved through the research and farming efforts of a number a groups. Part II, Chapter Two, Nonpoint Source Pollution Control has more information on this topic as well as other efforts by the Nonpoint Source Program at LDEQ.

Research monies provided by Section 104 grants have been very helpful in aiding the LDEQ in assessing the overall quality and ecological characteristics of Louisiana's water bodies. In particular, money provided by the Section 104 grant has been used in continued development of the LDEQ's ecoregion project. The ecoregion project is expected to provide Louisiana with baseline biological, chemical and physical information for minimally impacted streams, which can then be applied to similar streams in the same ecoregions.

Section 604 grant monies are used to enable survey work on streams not meeting designated uses. These surveys provide data for development of total maximum daily loads (TMDL) and wasteload allocations (WLA) that are designed to assist permit writers in establishing water quality protective effluent limits for dischargers.

Finally, the 106 grant provides funding for the entire water pollution control/water quality management program. Activities funded under the 106 grant include ambient water quality monitoring; assessment of ambient water quality data; development of the biennial *Water Quality Inventory*; revision of Louisiana's Water Quality Management Plan; development and revision of surface water quality standards; development and issuance of waste water discharge permits; compliance inspections; complaint investigations and development of enforcement actions. In summary, the \$8.5 million the OWR spent in FY 95 and the \$13.4 million budgeted for FY 96 was used either directly or indirectly, in the protection of Louisiana's vast water resources.

For the 1998 *Water Quality Inventory*, information provided by EPA and originating with the Bureau of the Census has been included to provide estimates of the costs to industry related to water quality protection and improvement. For 1993, industry in Louisiana spent a total of \$449.5 million in capital expenditures to protect water quality (U.S. Bureau of the Census, 1994). This was divided into \$361.8 million in end of pipe technologies and \$87.7 million in production process enhancements. For the same period, water quality related operating expenses for Louisiana totaled \$362.5 million. This represents an \$812.0 million expenditure for water pollution control related expenses. In an attempt to place these state and industry expenditures in perspective, and to provide an approximation of a cost/benefit assessment, information on the size of Louisiana's water resources and its economic benefits to the state, both directly and indirectly, is provided below.

Benefits Information

Louisiana's water resources occupy 3,100 square miles of the total state surface area of 44,521 square miles (LDEQ, 1992b). As a result, the LDEQ is responsible for the protection of 7% of the total surface area of the state. In many instances protection of surface waters also involves the management of storm water runoff from land based activities such as farming, aquaculture and forestry. This greatly increases the effective area for which the LDEQ is either directly or indirectly responsible.

Information provided by the Louisiana Department of Wildlife and Fisheries (LDWF, 1994a) indicated that in 1991 an estimated 899,000 adults, 130,000 of whom were from out of state, used the water resources of Louisiana for fishing. In 1992, persons engaged in sport fishing contributed \$686 million to Louisiana's state and local economies (Brian McManus, LDWF, Personal communication). Commercial marine fishing in Louisiana had an estimated dockside value of \$340 million in 1994 (Brian McManus, LDWF, Personal communication). Together, recreational and commercial fishing contributed over \$1.0 billion to the economy of Louisiana.

Both recreational and commercial fishing have an obvious relationship to Louisiana's water resources. Not so obvious is the connection between hunting/non-consumptive wildlife activities and water resources. Over 332,000 hunters participated in hunting activities during 1991 (LDWF, 1994b). During that same year, 1.06 million non-consumptive recreational enthusiasts such as birdwatchers, campers and hikers participated in these activities (LDWF, 1994c). In 1992 these activities provided \$434 million from hunting and \$222 million from non-consumptive uses to Louisiana's economy. This resulted in a total of \$656 million. While hunting and non-consumptive wildlife activities are not often directly associated with water quality, it must be recognized that terrestrial wildlife and especially waterfowl are dependant on the availability of high quality waters. Further, hunters and non-consumptive users alike are less likely to participate in their preferred activities in areas of questionable water and aesthetic quality. In a holistic approach to environmental and resource management, consideration must be given to all wildlife, both aquatic and terrestrial, because all require clean water for their survival.

If the \$1.0 billion in commercial and recreational fishing is combined with the \$656 million spent on hunting and non-consumptive uses you arrive at a total value to Louisiana's economy of \$1.6 billion. When the total economic impact to Louisiana is considered spending on recreational and commercial fishing, hunting and non-consumptive use will have an economic impact in excess of \$2.8 billion (Brian McManus, LDWF, Personal communication). While this entire total cannot be directly related to water resources, much of it can be associated with the need for clean water. This places the LDEQ, in the position of protecting over \$2.8 billion in Louisiana water resource benefits with from \$8.5 million to \$13.4 million in

annual funding, depending on the year in question. If the \$812.0 million in environmental protection capital and operational expenses are added in, based on this assessment, it can clearly be seen that the beneficial efforts of the LDEQ, are well worth the costs incurred.

In addition to the direct monetary benefits described above, Louisiana travelers have an additional impact on many local economies. While monetary estimates of travel expenditures are not readily available, traveler perception ratings are available from the Department of Culture, Recreation and Tourism, Office of Tourism. Travel statistics for 1992 indicate that Louisiana's popularity for wildlife viewing and fishing ranked slightly above national norms (Louisiana Office of Tourism, 1993a). Thirteen percent of Louisiana travelers engaged in outdoor recreational activities, which is above the 9% of travelers nationally (Louisiana Office of Tourism, 1993b). Twenty-eight percent of all Louisiana travelers listed outdoor recreation as a highlight of their trip (Louisiana Office of Tourism, 1993b). This ranks third, behind local cuisine (61%) and entertainment/nightlife (43%). Forty percent of summer travelers ranked outdoor recreation as a highlight of their trip. This is also behind local cuisine (57%), but ahead of entertainment/nightlife (36%). Although all of the outdoor recreation may not be water-based, it can easily be assumed that water quality is a factor in the overall environmental perception of travelers. Therefore, outdoor recreation represents an important part of Louisiana's tourism industry. Because water quality often plays an important part in this recreation, it is imperative that it be enhanced and protected.

As can be seen, the LDEQ and Louisiana industry invests a great deal of money in their efforts to enhance and maintain water quality in Louisiana. In return, the citizens of Louisiana derive a number of benefits, both financial and aesthetic, from the state's abundance of water bodies. With the combined efforts of the LDEQ, industry and, most importantly, the citizens of Louisiana, our waters will continue to provide abundant recreational and commercial benefits for everyone.

Chapter 4: Special State Concerns and Recommendations

Summary of Mississippi River Studies and Programs

As a result of Louisiana's position along the Mississippi River and the uses imposed upon the river, a great deal of interest and concern is often centered there (LDEQ, 1996). Therefore, LDEQ has had, and continues to have, a number of monitoring efforts focusing on the Mississippi River in Louisiana. These monitoring efforts are designed to assess the quality of the water and, when necessary, provide a basis for action on problems as they arise. The most recent Mississippi River monitoring efforts were described in the 2000 Water Quality Inventory (LDEQ, 2000). As an extension of the Mississippi River Biototoxicity Study, LDEQ continues to test three Mississippi River sites on a monthly basis. Regular monitoring of the Mississippi River for a variety of organic compounds was begun in the early 1980s as a result of taste and odor problems in drinking water. Regular monitoring at 10 water intakes (5 industrial, 5 public water works) continues to be done for a number of compounds as part of the Early Warning Organic Compound Detection System (EWOCDS) (LDEQ, 1996). Three ambient monitoring sites are sampled quarterly for organic compounds and pesticides. In the rare instance when these compounds are detected they are found to be below Louisiana criteria for drinking water sources.

Delisting of Priority Organics

As early as the 1990 305(b) report, priority organics was included as a suspected cause of impairment for Mississippi River subsegments. This inclusion was done by Regional Coordinators as part of their evaluative assessments, and was done in consideration of the large number of industrial facilities located along the river between Baton Rouge and New Orleans. Monitoring results from both the EWOCDS program and the ambient monitoring program have displayed significant improvements in the water quality of the Mississippi River over the past 10 years (LDEQ, 2000). In January 2001, LDEQ petitioned EPA to remove priority organics as a suspected cause of impairment for the following subsegments: 070201-Mississippi River from Old River Control Structure to Monte Sano Bayou; 070301-Mississippi River from Monte Sano Bayou to Head of Passes. After the required public notice and comments period, EPA approved the petition and priority organics was officially removed from the Court-Ordered § 303(d) list for these two subsegments.

Early Warning Organics Compound Detection System

Early Warning Organics Compound Detection System (EWOCDS), a collaboration between LDEQ, LSU, and various municipal and industrial facilities along the Mississippi, was established in 1986. Since its initiation, the program has been considered a success and has shown the number of detections of compounds in the Mississippi River to drop dramatically over the past 15 years. The purpose of the program is to warn downstream water suppliers of high levels of problematic organic compounds. EWOCDS sample sites were originally located at 10 locations between Baton Rouge and St. Bernard Parish, including 5 drinking water intakes and 5 industrial water intakes (LDEQ, 1996). In 2001, the Monte Santo site experienced equipment failure and did not collect samples. Public Water Supply Company (PWSCO) withdrew from the program entirely, leaving the number of sample sites at 8 in 2001. In 2000, the number of compounds (listed below) analyzed by this program increased from 20 to 26. This increase is due to drinking water criteria being developed for more compounds.

Table 2.4.1

Compounds tested for as part of Louisiana's Early Warning Organic compounds Detection System.

Vinyl Chloride	1,2-Dichloropropane	Bromoform
Trichloroethene	Bromodichloromethane	1-1-Dichloroethene
Dichloromethane	Toluene	Benzene
trans-1-2-Dichloroethene	1,1,2-Trichloroethane	Styrene
cis-1-2-Dichloroethene	Tetrachloroethene	1,2,4-Trichlorobenzene
Chloroform	Dibromochloromethane	1,2-Dichloroethane
1,1,1-Trichloroethane	Chlorobenzene	Ethylbenzene
1,3-Dichlorobenzene (m-Dichlorobenzene)	Dimethylbenzene(s) (m,o, and p Xylenes)	Carbon Tetrachloride
1,4-Dichlorobenzene (p-Dichlorobenzene)	1,2-Dichlorobenzene (o-Dichlorobenzene)	

In the year 2000, 5,067 samples were taken and analyzed for the 26 compounds. One or more compounds were detected in eighty, approximately 1.6 %, of the samples. In the year 2001, one or more compounds were detected in 37 of 5,560 samples (0.7 % of the samples). For more information about the EWOCDS program, contact the Office of Environmental Compliance, Surveillance Division at (225) 765-0634 or send mail to surveillance@deq.state.la.us.

Summary of Louisiana Mercury Studies

Mercury contamination of fish is a widespread problem throughout much of the United States and the world. Levels of mercury in fish sufficient to exceed the FDA action level of 1 ppm have been found in many water bodies, including some in Louisiana. In 1992, the first advisory in Louisiana for mercury was issued for a stretch of the Ouachita River from the Arkansas border to the lock and dam at Columbia. Since then, nineteen additional mercury advisories have been posted to date in Louisiana. Besides posing a human health risk, elevated levels of mercury in fish can also have ecologically significant effects, such as affecting reproduction in fish and wildlife (Beckvar et al., 1994). LDHH and LDEQ coordinate in the assessment of data for health risks and jointly issue advisories if warranted. The two agencies will *consider* issuing a health advisory limiting fish consumption for pregnant or lactating women and young children for locations where the average concentration of mercury exceeds 0.5 ppm in fish and shellfish. At average concentrations of 1.0 ppm, the agencies will consider recommending no consumption for pregnant or lactating women and young children and limited consumption for the general population.

Methyl mercury is the form of mercury predominantly picked up by fish and stored in muscle tissue. Methylation of inorganic mercury seems to be enhanced by the presence of clear, low pH water. Methylation rates of mercury also tend to be higher in fresh water compared to salt water, and in low oxygen conditions compared to waters with high dissolved oxygen levels. There are numerous potential sources of mercury in Louisiana waters, including atmospheric deposition, natural geologic deposits, industrial/municipal discharges, and previously contaminated sediment. However, atmospheric deposition is considered the primary source of mercury in Louisiana and much of the nation. EPA is in the process of proposing regulations to control mercury emissions from coal and oil-fired power plants (one of the primary sources of atmospherically deposited mercury). Final regulations are expected to be released on December 15, 2004.

Inorganic mercury in water bodies is primarily bound to sediments, with little mercury found in water (Beckvar et al., 1994). The presence of mercury in sediments of a water body is not alone sufficient to produce a contamination problem in fish. Water conditions must also be conducive to methylation of inorganic mercury for significant accumulations to occur. LDEQ has issued grant money to Louisiana State University (LSU) to study factors affecting the methylation process, such as pH, organic carbon, sediment qualities, etc. LDHH is also conducting surveys of sensitive populations, which include testing for mercury levels in the blood.

Beginning in May 1994, a statewide mercury study was initiated with the assistance of the U.S. Geological Survey (LDEQ, 1996). As of March 2002, over 416 sites on 210 water bodies were sampled. Most sites are now sampled on a three-year rotating basis (approximately one hundred sites are sampled per year). The advisory sites are sampled once per year with the exception of Henderson Lake, which is sampled once per quarter in an effort to detect seasonal trends in mercury concentration. LDEQ will continue to coordinate with LDHH in assessing data derived from this study in order to determine the need for health advisories. For more information, please visit the LDEQ Website at www.deq.state.la.us/surveillance.