DRAFT
TMDLs for Total Suspended Solids, Sediment, and Turbidity for Selected Subsegments in the Lake Pontchartrain Basin, Louisiana

(040301, 040401, and 040903)

Prepared for:

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EXECUTIVE SUMMARY

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA's) Water Quality Planning and Management Regulations (at Title 40 of CFR [*Code of Federal Regulations*] section 130.7) apply to waterbody-pollutant pairs on the approved 303(d) impaired waters list, even if pollutant sources have implemented technology-based controls. A total maximum daily load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can assimilate while still meeting the water quality standard for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources (USEPA 1991).

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources, and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody, and it may include a future growth (FG) component. The components of the TMDL calculation are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS + FG$$

The area for this TMDL includes subsegments 040301, 040401, and 040903 within the Lake Pontchartrain Basin in southeastern Louisiana. Subsegment 040301 is divided between East Feliciana and St Helena parishes, and incorporates the Amite River from the northern Mississippi/Louisiana border to Louisiana Highway 37. This subsegment has an area of 204.78 square miles that is predominantly covered by forest (33.6 percent), followed by wetlands (31.4 percent) and grass/shrub (20.7 percent). Subsegment 040401 is located in portions of Livingston, Ascension, and St. John the Baptist parishes, and includes the Blind River from the Amiter River Diversion Canal to Lake Maurepas. This subsegment has an area of 26.80 square miles and is mostly wetlands (93.8 percent). Subsegment 040903 is located in St. Tammany Parish and incorporates Bayou Cane from its headwaters to U.S. Route 190. It has an area of 7.65 square miles and is predominantly forested land (50.2 percent), followed by wetlands (23.4 percent) and grass/shrub (21.6 percent).

The Louisiana Department of Environmental Quality (LDEQ) has included subsegments 040301, 040401, and 040903 on the state's 2010 section 303(d) list of impaired waterbodies for various impairments (*Draft 2010 Integrated Report*) (LDEQ 2010b) (Table ES-1). This TMDL addresses total suspended solids (TSS) for subsegments 040301, sediments for 040401, and turbidity for all three of the selected subsegments. The designated uses for the three subsegments are primary contact recreation (PCR), secondary contact recreation (SCR), fish and wildlife propagation (FWP), and outstanding natural resource waters (ONR). All three subsegments have impaired designated uses of fish and wildlife propagation (FWP), and outstanding natural resource (ONR).

Table ES-1. The subsegments and impairments addressed in this report

Subsegment	Subsegment name	Subsegment description	Designated uses [a, b]				Causes of impairment		
			PCR	SCR	FWP	ONR	TSS	Sedimentation/ siltation	Turbidity
040301	Amite River	Mississippi state line to LA-37 (scenic)	F	F	N	N	X		X
040401	Blind River	Amite River Diversion Canal to Lake Maurepas (scenic)	F	F	N	N		X	X
040903	Bayou Cane	Headwaters to US-190 (scenic)	F	F	N	N			X

Source: LDEQ 2010b

[a] PCR = primary contact recreation, SCR = secondary contact recreation, FWP = fish and wildlife propagation, ONR = outstanding natural resource water

[b] F = fully supporting designated use, N = not supporting designated use

The numeric water quality criteria that apply to the impaired subsegments in the Lake Pontchartrain Basin and that were used to calculate the total allowable loads are presented in Table ES-2.

Because turbidity and sediment cannot be expressed as a mass load, the turbidity and sediment TMDLs are expressed using TSS as a surrogate for turbidity to establish a loading for the TMDLs. Historical water quality data were analyzed for relationships between turbidity and TSS. A regression between turbidity and TSS was developed for subsegments 040301, 040401, and 040903 using turbidity and TSS data from those subsegments, resulting in surrogate TSS targets that are presented in Table ES-3.

Table ES-2. Numeric water quality criteria for the listed subsegments

Subsegment	Subsegment name	Turbidity (NTU)
040301	Amite River	50.0
040401	Blind River	25.0
040903	Bayou Cane	50.0

Source: LDEQ 2011
NTU = nephelometric turbidity units

Table ES-3. Numeric water quality targets for the listed subsegments

Subsegment	Subsegment name	TSS (mg/L)
040301	Amite River	428.49
040401	Blind River	99.83 [a]
040903	Bayou Cane	868.07

[a] The sediment value is expressed as a TSS concentration for calculation of this TMDL.

The TMDLs were not developed for a particular season and apply year-round. TMDLs for turbidity (subsegments 040301, 040401, 040903) were developed using a mass balance for a steady-state condition using a calculated daily flow based on the water yield from the state's Climatology Office. The main land type within subsegment 040401 is wetlands (93.8 percent), where streamflow is a negligible component of hydrology and is influenced by tidal action. Subsegment 040903 is also influenced by tidal action.

In developing the TMDL, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis for establishing water quality-based controls. WLAs were given to permitted point source discharges, including regulated stormwater. The LAs include background loadings, as well as human-induced nonpoint sources. An explicit MOS of 10 percent and a FG component of 10 percent were also included. Table ES-4 presents summaries of the TMDLs for the subsegments addressed in this report.

Table ES-4. Summary of TSS TMDLs, WLAs, LAs, MOS, and FG for selected subsegments of the Lake Pontchartrain Basin

Subsegment	Pollutant	TMDL (lb/d)	WLA (lb/d)	LA (lb/d)	Explicit MOS (lb/d)	FG (lb/d)
040301	TSS (turbidity)	1,257,198.00	14.25	1,005,747.00	125,718.38	125,718.38
040401	TSS (sediment, turbidity)	45,206.54	7,285.06	30,337.19	3,792.15	3,792.15
040903	TSS (turbidity)	95,183.61	38.31	76,116.25	9,514.53	9,514.53

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1. INTRODUCTION

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA's) Water Quality Planning and Management Regulations (at Title 40 of the *Code of Federal Regulations* [CFR] section 130.7) for waterbody-pollutant pairs apply to the approved 303(d) impaired waters list even if pollutant sources have implemented technology-based controls. A total maximum daily load (TMDL) is a calculation of the maximum allowable load (in mass per unit time) of a pollutant that a waterbody is able to assimilate while still supporting its designated uses. The maximum allowable load is determined on the basis of the relationship between pollutant sources and in-stream water quality. A TMDL provides the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources (USEPA 1991).

The text of 40 CFR 130.7 has been affected by several Federal District Court suits, appeals rulings, and a Supreme Court ruling mandating that TMDL must be described in terms of mass per day. According to 40 CFR 130.7, if EPA does not approve a TMDL submitted by a state, EPA is responsible for developing a TMDL. In a District Court case regarding the TMDL program in Louisiana (*Sierra Club and Louisiana Environmental Action Network, Inc. v. EPA*, Civil Action Number: 96-0527), EPA was listed as the sole defendant. That case resulted in the April 1, 2002, consent decree approved by the judge. A consent decree is a negotiated set of actions to satisfy the plaintiff. In many situations, the actions are more stringent than the established regulation. For example, most consent decrees require an annual report to the plaintiff summarizing the work done in the year; that is not required by any regulation and will cease when the consent decree is closed.

The 2002 consent decree between EPA and the plaintiffs establishes a fixed set of waterbody-pollutant pairs for which TMDLs are to be established or approved, and it establishes a timeline for each set of TMDLs. Each set is determined to be complete when every waterbody-pollutant pair either has a TMDL established or approved, or a subsequent approved 303(d) list has removed the waterbody-pollutant pair. The TMDLs in this report are part of that consent decree. Because the original court suit was initiated because of a lack of progress in establishing TMDLs, the date when a TMDL is established or approved is not easy to extend, and an extension would require another agreement with the plaintiffs.

In most circumstances, a variety of scientifically acceptable methods can be used for developing a TMDL, wasteload allocation (WLA), and load allocation (LA). For these TMDLs, a spreadsheet model was used. It should be noted that because some acceptable TMDL calculation methods appear simple, that does not imply their results are not valid. Models vary in the amount of necessary resources (e.g. training, setup/computational time, personnel, expense), required input and background data, questions answered, and output capability (e.g., charts, tables, data files). The final result of these TMDLs (and any TMDL) is a plan adopted into the Water Quality Management Plan (WQMP) to achieve the TMDL. Stakeholder involvement and additional information, such as monitoring data, might lead to an update of the WQMP and in turn a proposal for a different plan to meet water quality objectives. Such a WQMP update receives the same public participation as the original TMDL and WQMP review and approval.

For the TMDL discussed in this report, monitoring data collected by the Louisiana Department of Environmental Quality (LDEQ) indicate that observed turbidity data sometimes exceed the state's water quality criteria within subsegments 040301, 040401, and 040903 of the Lake Pontchartrain Basin. This report addresses consent decree TMDLs for subsegments 040301, 040401, and 040903. The impaired designated uses for the three subsegments include fish and wildlife propagation, and outstanding natural resource waters. The suspected pollutants causing these impairments are sediment, total suspended solids (TSS), and/or turbidity. Table 1-1 presents information from Louisiana's 2010 section 303(d) list (as included in the *Draft 2010 Integrated Report*) for the three subsegments. One of the subsegments identifies *unknown sources* as the cause for impairment, which indicates that various sources might be present, but not enough data are available to identify them.

Table 1-1. Section 303(d) listing information for subsegments included in this report

Subsegment number	Subsegment name	Subsegment description	Suspected cause of impairment	Impaired designated use[a]	Suspected sources of impairment
040301	Amite River	Mississippi state line to LA-37	Turbidity, TSS	ONR, FWP	Mine tailings
040401	Blind River	Amite River Diversion Canal to Lake Maurepas	Turbidity, sediment	ONR, FWP	Drainage/filling/loss of wetlands; site clearance (land development or redevelopment)
040903	Bayou Cane	Headwaters to US-190	Turbidity	ONR, FWP	Drainage/filling/loss of wetlands; site clearance (land development or redevelopment); sources unknown

Source: LDEQ 2010b
[a] FWP = fish and wildlife protection, ONR = outstanding natural resource waters

2. BACKGROUND INFORMATION

2.1 General Description

The Lake Pontchartrain Basin is an estuarine system covering approximately 4,700 square miles (mi^2), within which rivers, canals, wetlands, and bayous drain the southeastern portion of Louisiana into a series of connected lakes, and eventually flow into the Gulf of Mexico (USGS 2002). The basin's northern boundary is defined by the Mississippi state line; the Mississippi River levees form the western and southern border of the basin; the Pearl forms the eastern edge; and the Breton and Chandeleur sounds are on the southeastern portion of the Lake Pontchartrain Basin (LDEQ 2010a, LPBF 2009). The three lakes in the watershed, from west to east, are Lakes Maurepas, Pontchartrain, and Borgne. The main rivers contributing fresh water to Lake Marepas are the Amite, Tickfaw, Natalbany, and Comite Rivers. Lake Maurepas and the Tangipahoa, Tchefuncta, and Bogue Falaya Rivers flow into Lake Pontchartrain. The lakes themselves contain brackish water due to mixing with waters from the Gulf (USGS 2002). Portions of several rivers within the selected subsegments of the Lake Pontchartrain Basin are tidally influenced. Land in the northern part of the basin includes forests, pastures, and dairies, whereas the southern section contains large areas of brackish and saline marshes (LDEQ 2010a). Elevations in the basin range from minus 5 feet at New Orleans to greater than 200 feet near the Mississippi River (LDEQ 2010a).

Subsegment 040301 (Amite River from the Mississippi state line to LA-37) is in East Feliciana and St. Helena parishes and has an area of 204.78 mi^2 (530.39 square kilometers [km^2]). Subsegment 040401 (Blind River from Amite River Diversion Canal to Lake Maurepas) covers portions of Livingstion, Ascension, and St. John the Baptist parishes, and encompasses 26.80 mi^2 (69.41km^2). Subsegment 040903 (Bayou Cane from headwaters to US-190) is in St. Tammany Parish and has an area of 7.65 mi^2 (19.8 km^2). Figure 2-1 shows the locations of the subsegments within the Lake Pontchartrain Basin.

2.2 Land Use

Land use data were obtained from the 2006 U.S. Geological Survey (USGS) National Land Cover Data set (NLCD) (Table 2-1; Figures 2-2 and 2-3). The predominant land use in subsegment 040301 is forest (33.6 percent), followed by wetlands (31.4 percent) and grass/shrub (20.7 percent). Subsegment 040903 has a similar land use distribution, with forest as the predominant land cover (50.2 percent), followed by wetlands (23.4 percent) and grass/shrub (21.6 percent). Subsegment 040401 is mostly wetlands (93.8 percent).

Table 2-1. Percent land use per subsegment

Land use	Percent coverage by subsegment number		
	040301	040401	040903
Open water	1.5	2.2	0.3
Developed	3.9	0.9	4.4
Barren land	1.5	0	0
Forest	33.6	0.2	50.2
Grass/shrub	20.7	0	21.6
Pasture/hay	5.5	0.4	0.1
Cultivated crops	1.9	2.5	0
Wetlands	31.4	93.8	23.4
Total	100.00	100.00	100.00

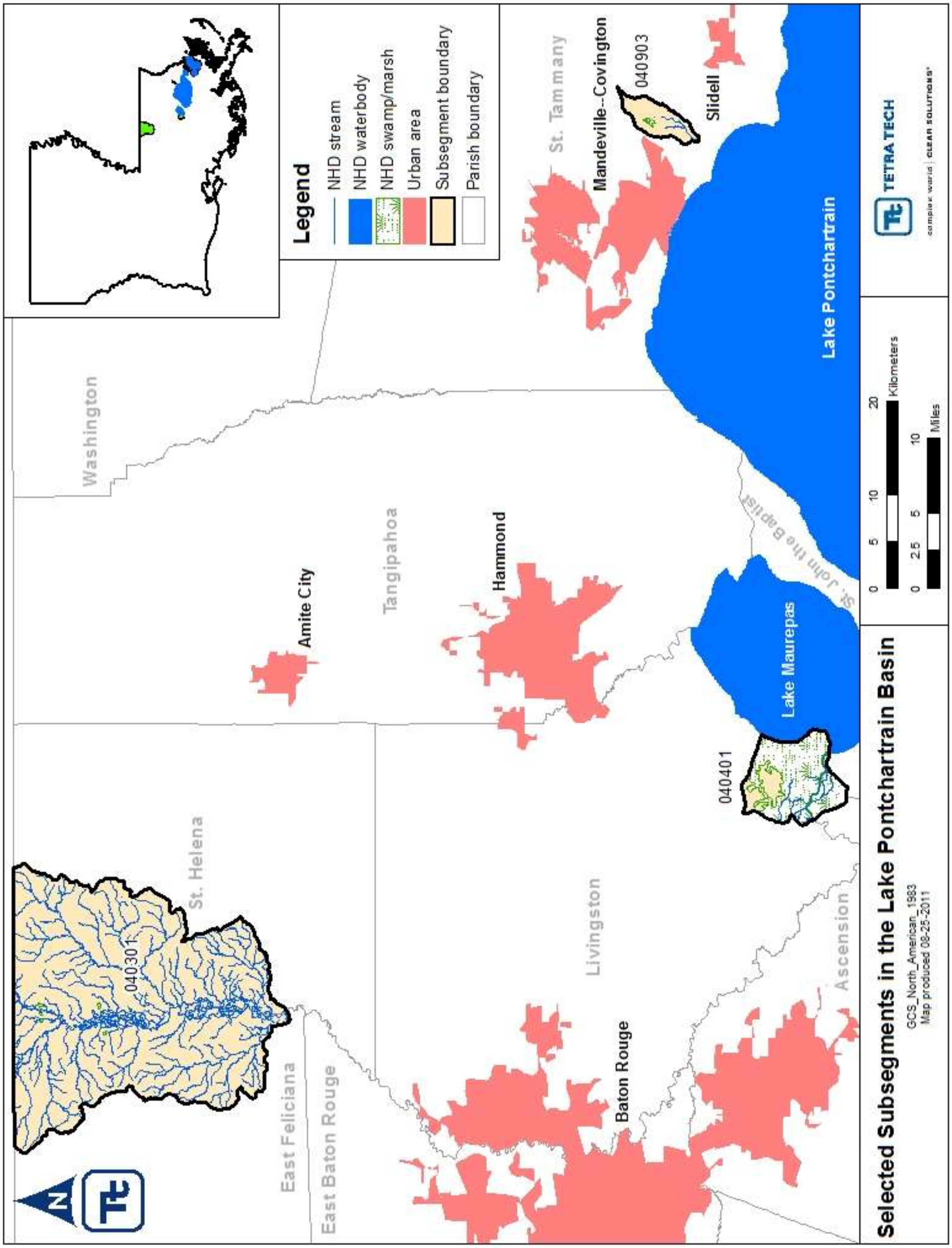

Figure 2-1. Locations of selected Lake Pontchartrain Basin subsegments.

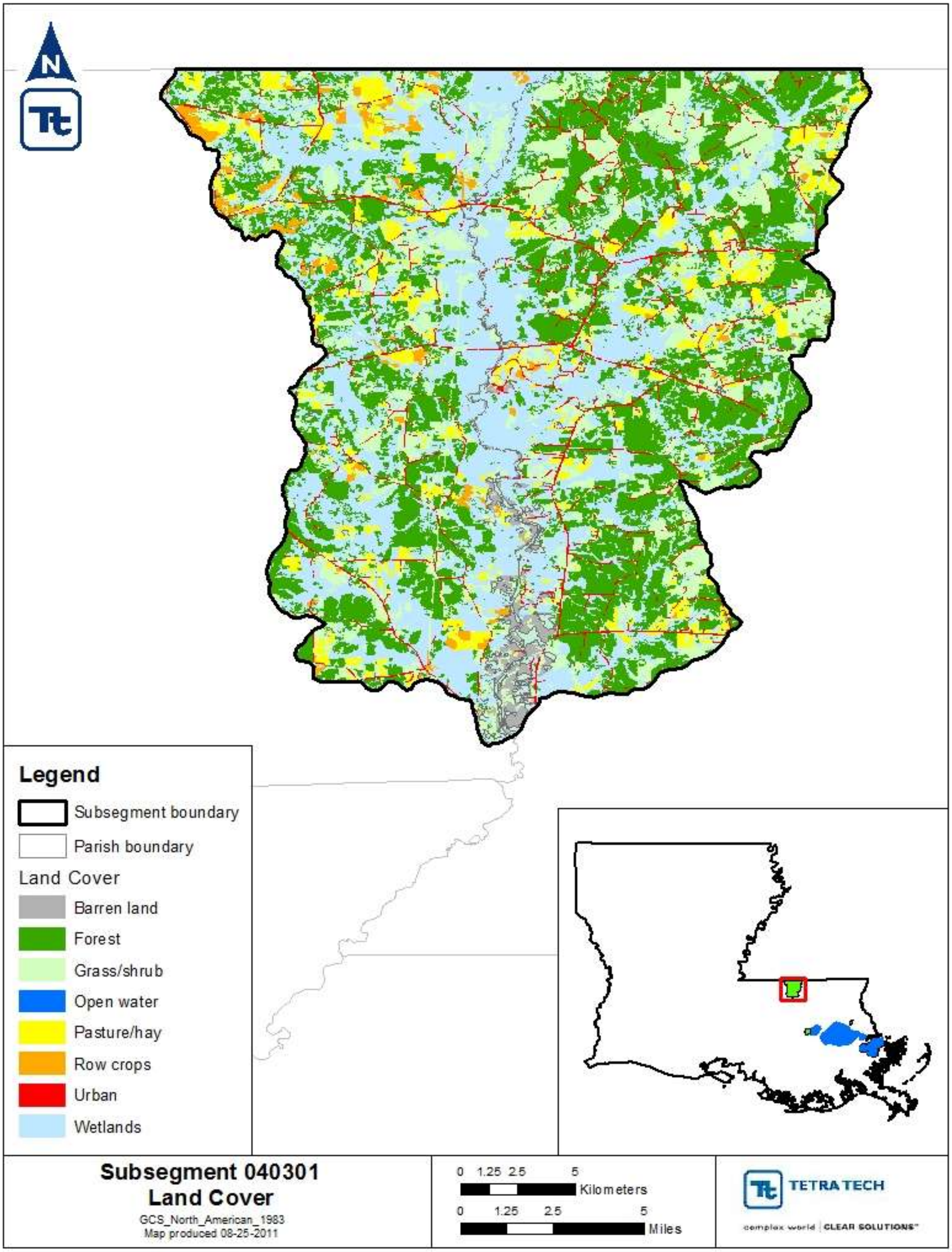

Figure 2-2. Land use within subsegment 040301 of the Lake Pontchartrain Basin.

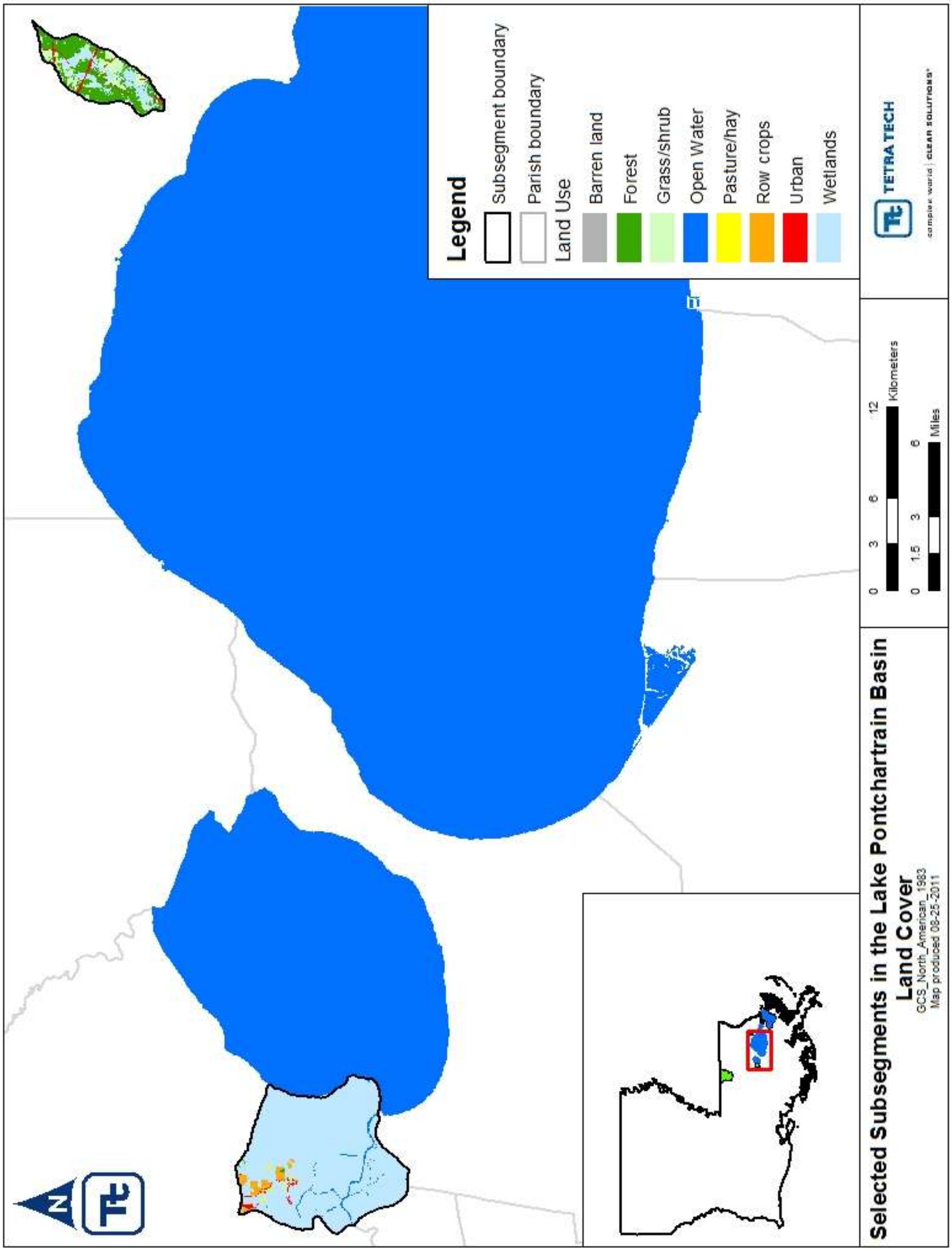

Figure 2-3. Land use within subsegments 040401 and 040903 of the Lake Pontchartrain Basin.

2.3 Soils

General soils data for the United States are provided as part of the Natural Resources Conservation Service's (NRCS's) State Soil Geographic (STATSGO) database. Soils data from this database and geographic information system (GIS) coverage from NRCS were used to characterize soils within the turbidity-impaired subsegments 040301, 040401, and 040903.

One of the soil characteristics included in the STATSGO database is the K-factor. The K-factor is a component of the Universal Soil Loss Equation (USLE) (Wischmeier and Smith 1978). The K-factor is a dimensionless measure of a soil's natural susceptibility to erosion, and values can range from 0 to 1.00. In practice, maximum factor values generally do not exceed 0.67. Large K-factor values reflect greater inherent soil erodibility. The distribution of K-factor values in the surface soil layers of the selected subsegments within the Lake Pontchartrain Basin are shown in Figure 2-4. The figure indicates that, on average, soils in the basin have K-factors that range from 0.32 to 0.42. Erosion is influenced by a number of other factors, including rainfall and runoff, land slope, vegetation cover, and land management practices.

The hydrologic soil group classification is another commonly used soil characteristic included in the STATSGO database. The hydrologic soil group is a means for grouping soils by similar infiltration and runoff characteristics. Clay soils that are poorly drained tend to have the lowest infiltration rates, whereas sandy soils that are well-drained have the highest infiltration rates. NRCS has defined four hydrologic groups for soils (Table 2-2). The STATSGO data were summarized using the major hydrologic group in the soil surface layers (Figure 2-5).

Subsegment 040401 (Blind River) is dominated by hydrologic soil group D. This suggests that this subsegment is characterized by very slow infiltration rates and high clay content soils with poor drainage. Subsegment 040301 has slightly more soils classified as group C than group B, and subsegment 040903 is considered entirely within the C hydrologic soil group (suggesting that this subsegment is characterized by slow to very slow infiltration rates and fine-textured or clay soils with poor drainage).

Table 2-2. Hydrologic soil groups

Hydrologic soil group	Description
A	Soils with high infiltration rates. Usually deep, well-drained sands or gravels. Little runoff.
B	Soils with moderate infiltration rates. Usually moderately deep, moderately well-drained soils.
C	Soils with slow infiltration rates. Soils with finer textures and slow water movement.
D	Soils with very slow infiltration rates. Soils with high clay content and poor drainage. High amounts of runoff.

2.4 Hydrologic Setting

One active USGS flow-monitoring gage (07377000) is available for subsegment 040301. USGS gage 07377000 has a drainage area of 580 mi^2 and an average flow of 908.21 cubic feet per second (cfs). No gages are available for subsegments 040401 or 040903. Figure 2-6 shows the location of the USGS gage.

As part of an estuarine system, portions of waterbodies within the Lake Pontchartrain Basin subsegments are influenced by tidal action, especially those close to lakes Maurepas, Pontchartrain, or Borgne. In portions of the Blind River (subsegment 040401), tidal influences are believed to occur most of the time, fading out if the River is high. In Bayou Cane, (subsegment 040903), tidal action is believed to occur south of U.S. Route 190. Lower reaches of the Amite River are believed to be influenced by tides (Max Forbes, LDEQ, personal communication, May 31, 2011).

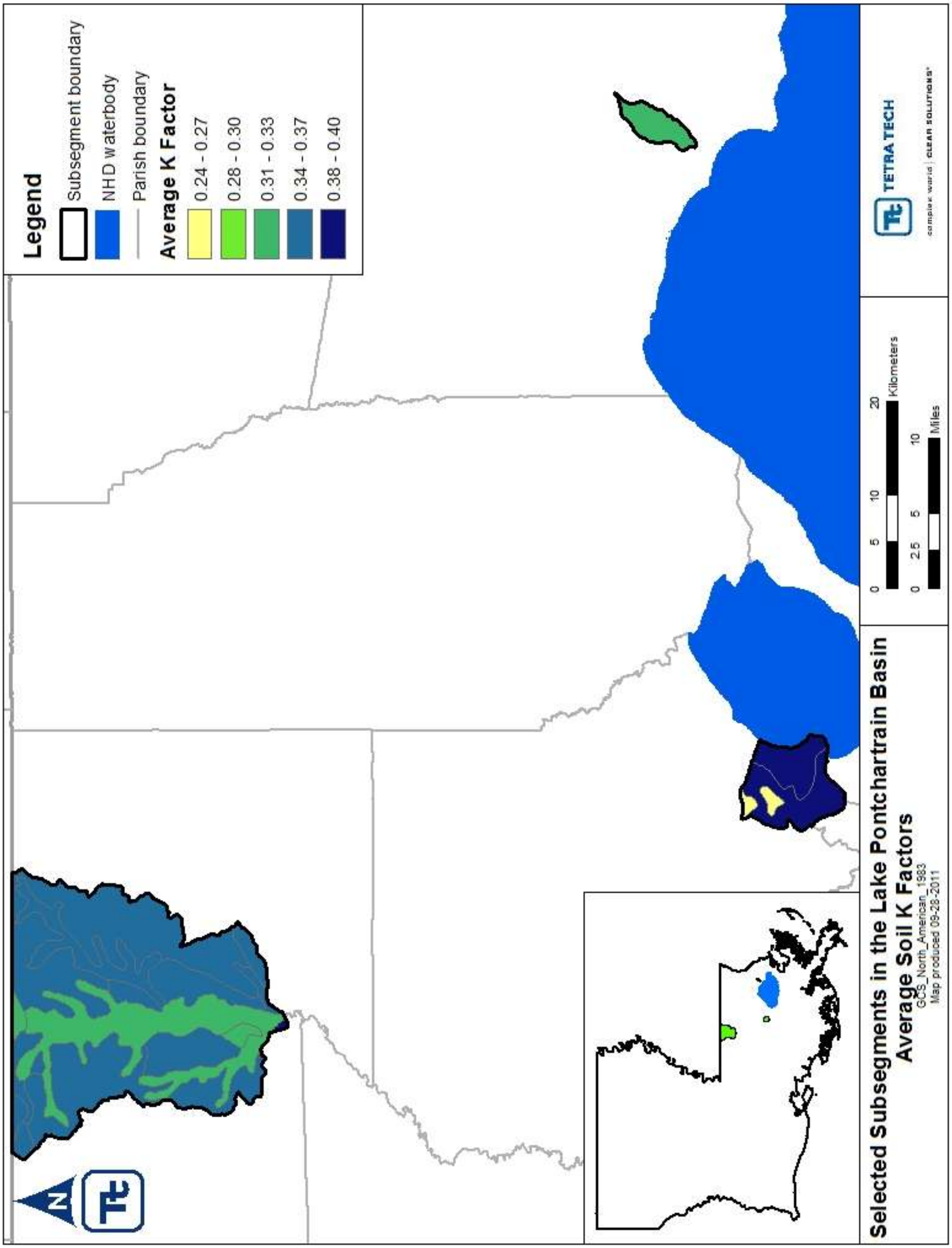

Figure 2-4. Average soil K-factors within selected subsegments of the Lake Pontchartrain Basin.

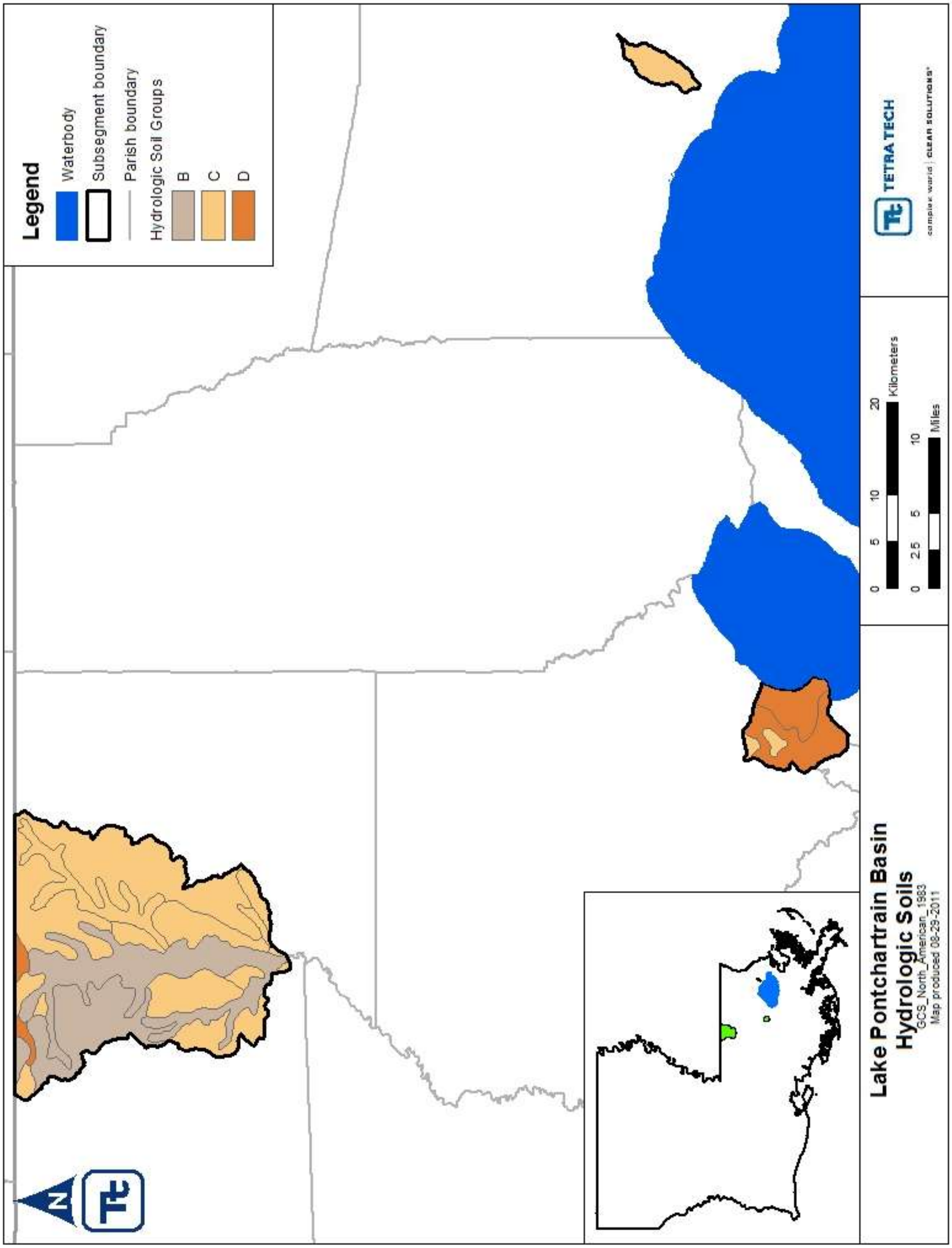

Figure 2-5. Hydrologic soil groups within selected subsegments of the Lake Pontchartrain Basin.

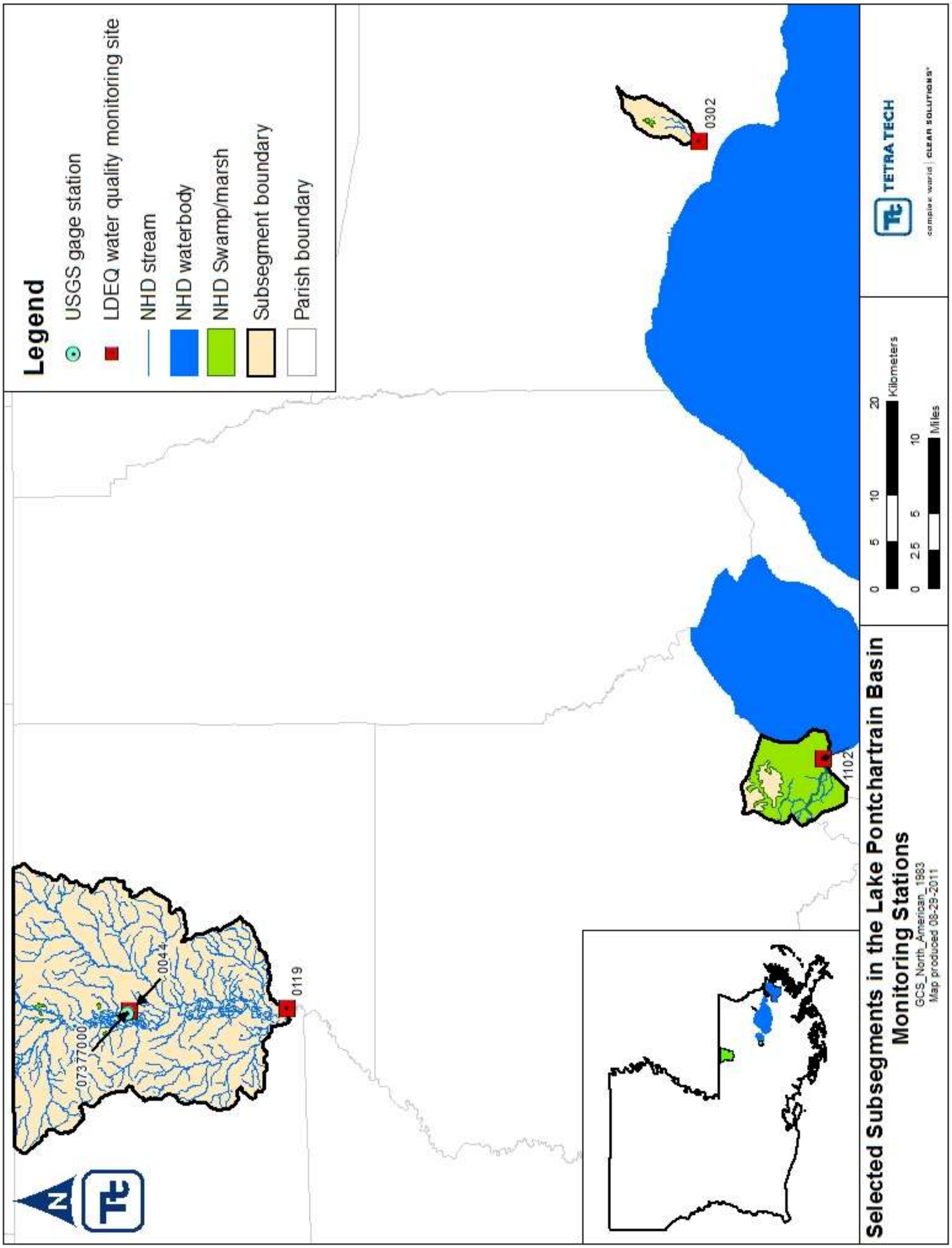

Figure 2-6. Locations of USGS flow gages and LDEQ water quality sampling stations within the Lake Pontchartrain Basin.

2.5 Designated Uses

Louisiana's 2010 section 303(d) list (as included in the *Draft 2010 Integrated Report*) indicates that designated uses for the selected Lake Pontchartrain Basin subsegments are primary contact recreation, secondary contact recreation, fish and wildlife propagation, and outstanding natural resource waters.

Primary contact recreation includes any recreational or other water contact involving full-body exposure to water and a considerable probability of ingesting water. Examples of this use are swimming and water skiing.

Secondary contact recreation involves activities like fishing, wading, or boating, whereby water contact is accidental or incidental, and the chance of ingesting appreciable amounts of water is minimal.

Fish and wildlife propagation includes the use of water for aquatic habitat, food, resting, reproduction, cover, or travel corridors by any indigenous wildlife and aquatic life species associated with the aquatic environment. The fish and wildlife propagation use also includes maintaining water quality at a level that prevents damage to native wildlife and aquatic species associated with the aquatic environment, and prevents contamination of aquatic life consumed by humans.

Outstanding and natural resource waterbodies are identified for preservation, protection, reclamation, or enhancement based on certain highly valued characteristics including wilderness, aesthetic, or ecological. Some of these selected waterbodies may also be designated under the Louisiana Natural and Scenic Rivers System or by the Office of Environmental Compliance as significant ecological systems (LDEQ 2010b).

2.6 Water Quality Criteria and Targets

The numeric water quality criteria in Table 2-3 were used in conjunction with the assessment methodology presented in LDEQ's 305(b) report (LDEQ 2010b, 2011). The assessment methodology specifies full support for the designated uses of primary contact recreation, secondary contact recreation, fish and wildlife propagation, and outstanding natural resource waters. The impaired designated uses are listed in Table 1-1. To fully support the designated use of fish and wildlife propagation, no more than 30 percent of turbidity values may exceed the criteria, and to fully support the use as an outstanding natural resource, no more than 10 percent of turbidity values may exceed the criteria.

Table 2-3. Numeric water quality criteria for the listed subsegments

Subsegment number	Subsegment name	Turbidity (NTU)
040301	Amite River	50.0
040401	Blind River	25.0
040903	Bayou Cane	50.0

Source: LDEQ 2011

Louisiana's water quality standards state, "[t]urbidity other than that of natural origin shall not cause substantial visual contrast with the natural appearance of the waters of the state or impair any designated water use" (LDEQ 2011). LDEQ (2011) has a numerical criterion of 50 nephelometric turbidity units (NTU) for specifically identified rivers, including the Amite River, in addition to bayous in the state. LDEQ set a numerical criterion of 25 NTUs for designated scenic streams and outstanding natural resource waters not specifically listed. The criterion of 50 NTUs is applied to subsegments 040301 and 040903, and the criterion of 25 NTUs is applied to subsegment 040401.

Table 2-4 lists the numeric targets for TSS, for which Louisiana's Water Quality Standards (LDEQ 2011) do not specify a numeric criterion. Because turbidity cannot be expressed as a mass load, the turbidity TMDL is expressed using TSS as a surrogate for turbidity to establish a loading for the TMDL. Historical water quality data were analyzed for relationships between turbidity and TSS. Regressions between turbidity and TSS were developed for all three selected subsegments using turbidity and TSS data from each subsegment, resulting in surrogate TSS water quality targets (Table 2-4).

Table 2-4. Numeric water quality targets for the listed subsegments

Subsegment	Subsegment name	TSS (mg/L)
040301	Amite River	428.49
040401	Blind River	99.83 [a]
040903	Bayou Cane	868.07

[a] The sediment value is expressed as a TSS concentration for calculation of this TMDL.

No numeric criterion is specified for sediment or TSS. Instead, the state's sediment criteria are narrative and are specified as follows (LDEQ 2011):

> Floating, Suspended, and Settleable Solids. There shall be no substances present in concentrations sufficient to produce distinctly visible solids or scum, nor shall there be any formation of long-term bottom deposits of slimes or sludge banks attributable to waste discharges from municipal, industrial, or other sources including agricultural practices, mining, dredging, and the exploration for and production of oil and natural gas. The administrative authority may exempt certain short-term activities permitted under Sections 402 or 404 and certified under Section 401 of the Clean Water Act, such as maintenance dredging of navigable waterways or other short-term activities determined by the state as necessary to accommodate legitimate uses or emergencies or to protect the public health and welfare.

The Louisiana water quality standards also include an antidegradation policy (*Louisiana Administrative Code* [LAC] Title 33, Part IX, Section 1109.A), which specifies that state waters exhibiting high water quality should be maintained at that high level of water quality. If that is not possible, water quality of a level that supports the designated uses of the waterbody should be maintained. The designated uses of a waterbody may be changed to allow a lower level of water quality only through a use attainability study.

2.7 Identification of Sources

2.7.1 Point Sources

LDEQ stores permit information using internal databases. LDEQ generated a list of point source discharges within the subsegments by using the TEMPO database. Information on point source discharges to the listed subsegments was obtained from the Integrated Compliance Information System - National Pollutant Discharge Elimination System (ICIS-NPDES) and Louisiana's Electronic Document Management System (EDMS). Data were pulled from ICIS for the list of permits generated by LDEQ, and data were confirmed through EDMS. Each facility was evaluated on the basis of its discharges and permit limits to determine whether the facility should be used in developing the TMDLs. The evaluation identified eight active permitted point source dischargers within subsegment 040301, eighteen active permitted point source dischargers (four terminated permits) within subsegment 040401, and two permits within subsegment 040903 (Tables 2-5 through Table 2-7). Figure 2-7 shows the locations of permitted dischargers within the selected subsegments of the Lake Pontchartrain Basin that are addressed in this report.

Table 2-5. Active point source discharge permit information for 040301

AI	Permit #	Outfall	Outfall type	Facility name	Expiration date	Receiving waterbody
18594	LAG560028	001	treated sanitary wastewater	Wood Acres Subdivision	5/31/14	Clayton Creek to Amite River
19086	LAG540215	001	treated sanitary wastewater	Calloway's Court Club	6/30/13	Clayton Bayou to Amite River
19889	LAG540148	001	treated sanitary wastewater	Country Bend Subdivision	4/30/08	Clayton Creek to Amite River
41086	LAG480418	001	Equipment washwater, stormwater runoff, and hydrostatic testing wastewater from Outfall 101	Colonial Pipeline Co – Felixville Station	07/31/06	Local drainage –Amite River
41086	LAG480418	101	Hydrostatic testing wastewater	Colonial Pipeline Co – Felixville Station	07/31/06	Local drainage –Amite River
41536	LAR05P371		MSGP stormwater	Fleniken Sand & Gravel – Flenrock Lease	07/08/05	Mill Creek
51974	LA0110868	001	Treated groundwater, from this groundwater remediation site, from the groundwater treatment system area	Lookout LA Release Site	05/31/12	Onsite private manmade pond and onsite spray irrigation system –Darling Creek
124925	LAG490045	001A	Process wastewater & stormwater	Barber Brothers Contracting Co LLC – Kent # 3 Lease	03/13/15	Open ditch – Amite River
124925	LAG490045	001B	Process wastewater & stormwater	Barber Brothers Contracting Co LLC – Kent # 3 Lease	03/13/15	Open ditch – Amite River
165040	LAG490105	001	process wastewater and process area stormwater	Tri-State Resources LLC - Mine #1	1/31/15	Amite River
165040	LAG490105	002	process wastewater and process area stormwater	Tri-State Resources LLC - Mine #1	1/31/15	Amite River
165040	LAG490105	003	process wastewater and process area stormwater	Tri-State Resources LLC - Mine #1	1/31/15	Amite River
165040	LAG490105	004	treated sanitary wastewater	Tri-State Resources LLC - Mine #1	1/31/15	Amite River
165040	LAG490105	005	stormwater	Tri-State Resources LLC - Mine #1	1/31/15	Amite River

Table 2-6. Active point source discharge permits information for 040401

AI	Permit #	Outfall	Outfall type	Facility name	Expiration date	Receiving waterbody
2218	LA0097161	001	industrial specialty gases, fromaldehyde and methanol manufacturing	Praxair Inc - Geismar HYCO Facility	2/28/13	New River via local drainage, thence to Petite Amite River, thence to Blind River
2218	LA0097161	003	industrial specialty gases, fromaldehyde and methanol manufacturing	Praxair Inc - Geismar HYCO Facility	2/28/13	New River via local drainage, thence to Petite Amite River, thence to Blind River
2218	LA0097161	008	industrial specialty gases, fromaldehyde and methanol manufacturing	Praxair Inc - Geismar HYCO Facility	2/28/13	New River via local drainage, thence to Petite Amite River, thence to Blind River
2218	LA0097161	011	industrial specialty gases, fromaldehyde and methanol manufacturing	Praxair Inc - Geismar HYCO Facility	2/28/13	New River via local drainage, thence to Petite Amite River, thence to Blind River
2218	LA0097161	012	industrial specialty gases, fromaldehyde and methanol manufacturing	Praxair Inc - Geismar HYCO Facility	2/28/13	New River via local drainage, thence to Petite Amite River, thence to Blind River
2532	LA0004847	105	Stormwater from areas south of the facility and gypsum stacks, equipment and material storage areas, employee parking lots, railcar activity areas	Mosaic Fertilizer LLC – Uncle Sam Plant	07/31/15	Bayou des Acadiens – Blind River

AI	Permit #	Outfall	Outfall type	Facility name	Expiration date	Receiving waterbody
2532	LA0004847	205	Stormwater from areas west of the gypsum stacks	Mosaic Fertilizer LLC – Uncle Sam Plant	07/31/15	Bayou des Acadiens – Blind River
2532	LA0004847	305	Stormwater from areas north of the gypsum stacks	Mosaic Fertilizer LLC – Uncle Sam Plant	07/31/15	Bayou des Acadiens – Blind River
3400	LA0002933	002	organic and inorganic chemcial manufacturing	OxyChem - Geismar Plant	8/30/12	Smith Bayou to Blind River
7991	LAG530234	001	Treated sanitary wastewater	Sorrento Office Building – Kinder Morgan Bulk Term Inc	11/30/12	Ditches and channel from back of facility across I10 to Bayou Conway to Blind River
9871	LAR05M758		MSGP	Gonzales Center – United Parcel Service	07/02/05	Ditch to Bayou Boyle
18596	LAG540153	001	treated sanitary wastewater	Kathryndale Subdivision	8/27/02	Blind River
18600	LAG560030	001	treated sanitary wastewater	Rockford Place Subdivision	8/27/02	Amite River
18602	LAG540156	001	treated sanitary wastewater	Lake Village Subdivision	8/27/02	roadside ditch to Babin Canal
31241	LAG560023	001	treated sanitary wastewater	Green Bayou Subdivision	5/31/14	New River to Blind River
38470	LAG540761	001	treated sanitary wastewater	Fairhaven Trailer Park	6/30/13	Grand Goudine Bayou to New River
40609	LAG750154	001	exterior vehicle and equipment wash wastewater	Buffy's Car Wash	3/14/14	Bayou Narcisse
40609	LAG750154	002	treated sanitary wastewater	Buffy's Car Wash	3/14/14	Bayou Narcisse
40609	LAG750154	003	treated sanitary wastewater	Buffy's Car Wash	3/14/14	Bayou Narcisse
40609	LAG750154	004	commingled discharges of treated vehicle wash and sanitary wastewater	Buffy's Car Wash	3/14/14	Bayou Narcisse
40609	LAG750154	005	wastewaters from portable washing operations	Buffy's Car Wash	3/14/14	Bayou Narcisse
40903	LAG540203	001	treated sanitary wastewater	Cajon Trailer Park	6/30/13	Black Bayou to Sevario Canal to New River Canal to Amite River
41084	LAG540235	001	treated sanitary wastewater	Colonial Oaks Subdivision	6/30/13	Bayou Narcisse to Black Bayou to Old New River
41838	LAG540618	001	treated sanitary wastewater	Hillshire Subdivision	6/30/13	Grand Goudine Bayou to New River to Blind River
42239	LAG540019	001	treated sanitary wastewater	Lake Martin Trailer Court	6/30/13	Bayou Vicknair
43060	LAG110095	001	process wastewater and process area stormwater	RJ Daigle & Sons Contractors Daigle Plant # 1	3/14/14	New River
43060	LAG110095	002	process area stormwater	RJ Daigle & Sons Contractors Daigle Plant # 1	3/14/14	New River
43060	LAG110095	003a	stormwater and aggregate spray	RJ Daigle & Sons Contractors Daigle Plant # 1	3/14/14	New River
43060	LAG110095	003b	stormwater and aggregate spray	RJ Daigle & Sons Contractors Daigle Plant # 1	3/14/14	New River
43060	LAG110095	004	nonprocess area stormwater from cement, concrete, and asphalt facilities	RJ Daigle & Sons Contractors Daigle Plant # 1	3/14/14	New River
43060	LAG110095	005	treated sanitary wastewater	RJ Daigle & Sons Contractors Daigle Plant # 1	3/14/14	New River
43060	LAG110095	006	washrack and shop floor washdown	RJ Daigle & Sons	3/14/14	New River

AI	Permit #	Outfall	Outfall type	Facility name	Expiration date	Receiving waterbody
			wastewater discharges from cement, concrete, and asphalt facilities	Contractors Daigle Plant # 1		
43064	LAG540615	001	treated sanitary wastewater	Riverlands Apartments	6/30/13	Blind River
43263	LAG540651	001	treated sanitary wastewater	Sno's Seafood & Steakhouse Inc.	6/30/13	ditch to Bayou Narcisse

Table 2-7. Active point source discharge permit information for 040903

AI	Permit #	Outfall	Outfall type	Facility name	Expiration date	Receiving waterbody
9371	LA0049671	001	treated sanitary wastewater	Southeast Louisiana Hospital	4/30/16	Bayou Cane to Lake Pontchartrain
165696	LAG570500	001	treated sanitary wastewater	Lakeshore High School	4/30/14	Ditch to Cane Bayou

Table 2-8. Terminated point source discharge permits for 040401

AI	Permit #	Facility name	Expiration date
42526	LAU009465	LA Ready Mix	Terminated
154502	LAR10G408	Gator Environmental Solutions – Proposed Type III C&D Landfill	Terminated
1276	LAR05N052	Imperial – Savannah LP	Terminated 2/2011
32814	LAR10B026	CS Metals of LA LLC – Convent Facility	Terminated

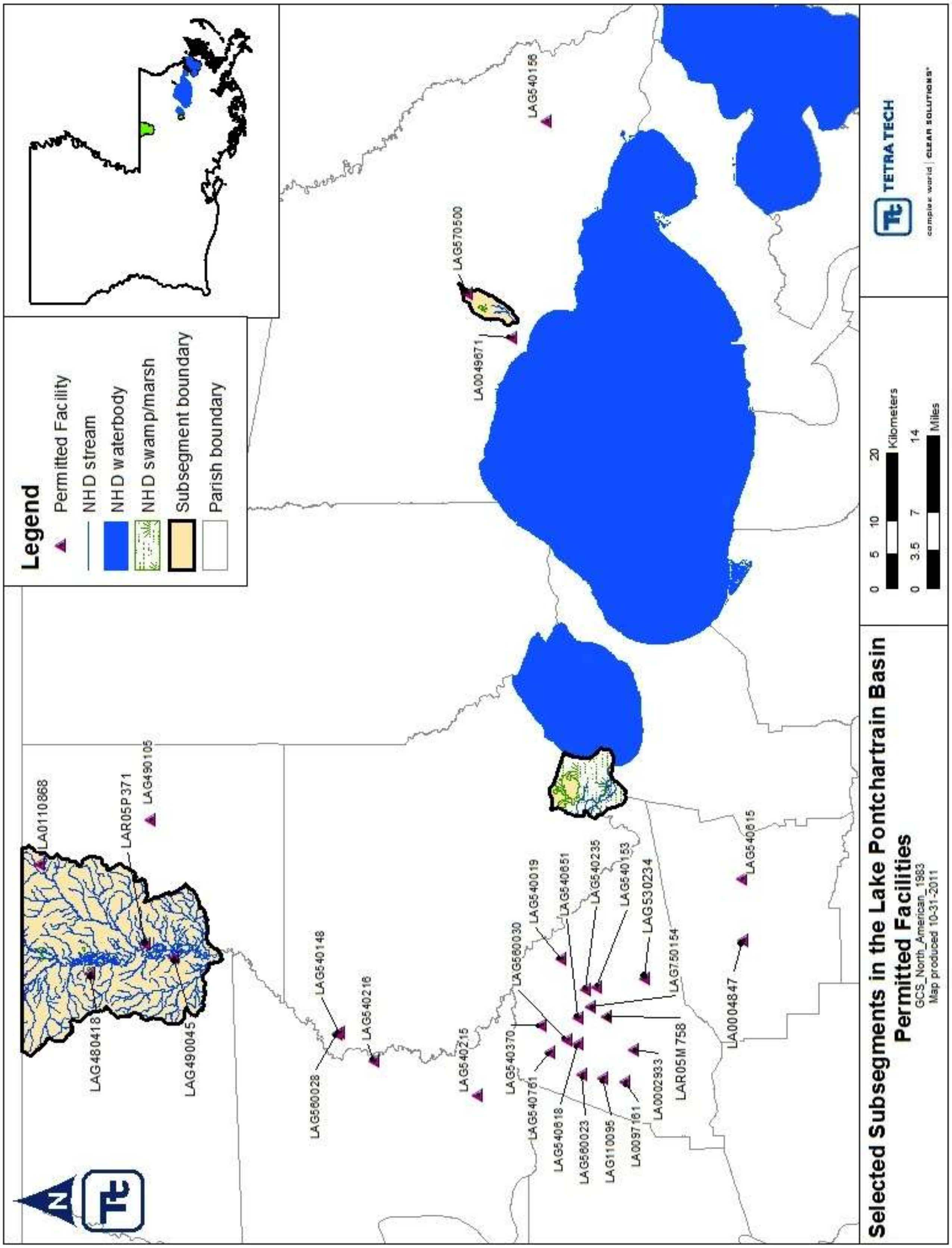

Figure 2-7. Locations of LDEQ permitted facilities within the Lake Pontchartrain Basin.

Phase I and II stormwater systems are additional possible point source contributors within the Lake Pontchartrain Basin. Stormwater discharges are generated by runoff from urban land and impervious areas such as paved streets, parking lots, and rooftops during precipitation events. These discharges often contain high concentrations of pollutants that can eventually enter nearby waterbodies. Most stormwater discharges are considered point sources and require coverage by a NPDES permit.

In Louisiana, a MS4 can be identified as a regulated, small MS4 in two ways. This category includes all cities within UAs and any small MS4 area outside UAs with a population of at least 10,000 and a population density of at least 1,000 people per square mile (LDEQ 2002). Within the Lake Pontchartrain Basin are 24 regulated MS4s; however, no permitted MS4s are in subsegments 040301, 040401 or 040903 at the time of this report.

2.7.2 Nonpoint Sources

Louisiana's 2010 section 303(d) list (*Draft 2010 Integrated Report*) identifies suspected causes for the TSS impairment in subsegment 040301 as *mine tailings*, which is pollution from residues separated during processing of mineral ores (LDEQ 2010b). EPA identifies a wide variety of resource extraction activities as nonpoint sources, including surface mining, subsurface mining, placer mining, dredge mining, petroleum activities, mill tilling, and mine tailings (LDEQ 2010c). Although mine tailings are considered a nonpoint source, they are usually found near the extraction sites. Mine tailings are derived from a slurry of fine-grained rock and process water during separation of ore-bearing materials from rock using a floatation technique. More modern operations remove water from the tailings slurry prior to discarding them in impoundments; however, in historical operations, tailing slurries would sometimes be discarded near riparian areas, potentially allowing their entry into nearby streams during rain events (LDEQ 2010b).

Louisiana's 2010 section 303(d) list (*Draft 2010 Integrated Report*) identifies suspected causes for the sediment and turbidity impairments in subsegments 040401 and 040903 as *drainage/filling/loss of wetlands* (LDEQ 2010b). Draining, filling, or loss of wetlands can impact associated wetland functions such as water storage, sediment trapping, recharge, and habitat (FISRWG 1998).

One of the suspected causes for impairment within subsegment 040903 is *site clearance (and development or redevelopment)*. Site clearance activities occur at urban areas and industrial parks or other construction sites outside of municipalities (LDEQ 2010b). Site clearance related to new construction or filling in of vacant lands within areas of previous development (redevelopment) often involves converting pervious land types to more impervious land cover (USEPA 1992). Development often results in alteration of physical, chemical, and biological characteristics of a watershed. Examples of hydrological impacts include increased runoff volumes, altered channel geometry, sedimentation, and contamination (FISRWG 1998). Increased impervious cover also prevents rain from recharging groundwater, which can lead to lower baseflows in streams, especially during long dry periods (FISRWG 1998). Various construction activities are now regulated as Phase II stormwater regulations (LDEQ 2010b).

Subsegment 040903 also identifies *unknown sources* as an additional cause for impairment, which indicates that various sources might be present, but not enough data are available to identify them.

3. CHARACTERIZATION OF EXISTING WATER QUALITY

3.1 Water Quality Data

Water quality data were obtained from LDEQ's routine ambient water quality monitoring program. Four water quality stations (44, 119, 1102, 302) furnished data relevant to the subsegments addressed in this report (040301, 040401, and 040903) (Figure 2-6). Tables 3-1 and 3-2 summarize the observations at LDEQ water quality stations within the selected subsegments, including the number of observations and the minimum, maximum, and average concentrations of TSS. Appendix A presents the raw water quality data.

Table 3-1. Available TSS data for selected subsegments of the Lake Pontchartrain Basin

Subsegment	Station	Station name	Period of record	No. of obs.	TSS min. (mg/L)	TSS max. (mg/L)	TSS ave. (mg/L)
040301	44	Amite River west of Darlington, Louisiana	05/08/78–05/11/98	228	1	264	29.2
	119	Amite River at Grangeville, Louisiana	01/01/68–10/05/10	340	2	436	40.1
040401	1102	Blind River near confluence with Lake Maurepas	01/16/01–11/22/10	35	4.1	50	17.8
040903	302	Cane Bayou east of Mandeville, Louisiana	01/15/91–10/12/10	68	1	6,107	117.5

Table 3-2. Available turbidity data for selected subsegments of the Lake Pontchartrain Basin

Subsegment	Station	Station name	Period of record	No. of obs.	Turbidity min. (NTU)	Turbidity max. (NTU)	Turbidity ave. (NTU)
040301	44	Amite River west of Darlington, Louisiana	03/06/78–05/11/98	237	1.5	312	21.7
	119	Amite River at Grangeville, Louisiana	01/01/68–10/ 05/10	369	2	509	29.9
040401	1102	Blind River near confluence with Lake Maurepas	01/16/01–11/22/10	34	4	67	16.3
040903	302	Cane Bayou east of Mandeville, Louisiana	01/15/91–10/12/10	69	1.6	90	20.0

3.2 Comparison of Observed Data to Criteria and Targets

Louisiana's draft 2010 section 303(d) list identifies subsegments 040301, 040401, and 040903 within the Lake Pontchartrain Basin for turbidity impairments. The list also indicates that subsegment 040301 is impaired for TSS, and subsegment 040401 is impaired for sedimentation/siltation (LDEQ 2010b). Monitoring data obtained indicate that observed turbidity concentrations sometimes do not meet the state's water quality criteria for subsegments 040301, 040401, and 040903. The water quality criteria and targets are presented in Tables 2-3 and 2-4.

While some data points appear to be outliers, these were retained in the data analysis to be conservative. It is not known if conditions on the days the outliers were sampled differed from conditions on other monitoring days. Those points could represent conditions that might not have occurred during the other monitoring events, but are representative of conditions at other times throughout the year. Given the absence of specific details about the day sampling occurred, those samples were retained in the analysis.

3.3 Trends and Patterns in Observed Data

The turbidity and TSS concentrations were plotted over time for subsegments 040301 and 040903 (Appendix B). Water quality data were plotted over a continuous time scale and by sampling month. On both sets of charts, no distinct seasonal or temporal trends or patterns are evident in the water quality data.

4. TMDL DEVELOPMENT

A TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while still achieving water quality standards. In TMDL development, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis for establishing water quality-based controls.

A TMDL for a given pollutant and waterbody is calculated using the sum of individual WLAs for point sources and LAs for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody, and it may include a future growth (FG) component. TMDLs are typically expressed on a mass loading basis (e.g., pounds per day). The components of the TMDL calculation are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS + FG$$

4.1 TMDL Analytical Approach

Turbidity is a measure of the water's optical properties that cause light to be scattered or absorbed. Turbidity can be affected by clay, silt, and microorganisms, which are also components of a TSS concentration. Turbidity has water quality criteria, but it cannot be expressed as mass per unit time. Because a TMDL must be provided as mass per time, the TMDL was developed using TSS as a surrogate parameter for turbidity.

For this TMDL, the water quality targets of each subsegment (Table 2-4) were multiplied by the average daily runoff to determine the TMDL loading (Appendix C). Because of the lack of flow information and flow dynamics within subsegments 040401 and 040903 where stream flow could not be used, the monthly water yield was used to obtain TMDL loadings. Monthly water yields for the East Central and South East Climate Divisions were obtained from the Louisiana Office of State Climatology and used to characterize conditions within the selected subsegments. The monthly water yield was divided by the number of days in the month to obtain runoff intensity. Available data from 1980 to 2003 were averaged to obtain an annual average of 2.509 millimeters per day (mm/day) for subsegments 040301 and 040903, and 2.482 mm/day for subsegment 040401.[1] Flows from point sources were not incorporated in the water yield. This method produces loading on the basis of expected average flows, and does not rely on expected point source flows to meet water quality criteria.

Louisiana has not developed numeric criteria for TSS; therefore, a linear regression analysis of turbidity and TSS data was performed on available data to determine a relationship between TSS and turbidity (see Sections 4.1.1 through 4.1.3) for each subsegment. That relationship can then be used to predict a TSS concentration for a given turbidity value. In expressing the turbidity TMDL as an allowable load of TSS, EPA does not intend to assign numeric TSS criteria for Louisiana waterbodies. It is a widely accepted practice to express TMDLs using surrogate parameters for which no numeric criteria have been established in the state water quality standards. The water quality targets in this TMDL are valid for these subsegments only.

4.1.1 Regression Analysis of Turbidity and TSS in Subsegment 040301

As shown in Figure 4-1, the regression equation for subsegment 040301 was determined to be $Ln(TSS) = 0.3775 + 0.881 \times Ln(turbidity)$, with an $R^2 = 0.4798$. The correlation between turbidity and TSS for subsegment 040301 was considered acceptable; the R^2 value for this regression (0.48) is similar to R^2 values for turbidity and TSS from other approved TMDLs in Louisiana, and is based on observed water quality data within the subsegment. In

[1] The Louisiana Office of State Climatology did not respond to requests for updated data.

this scenario, R^2 value is the percentage of variation in TSS accounted for by turbidity, with the remaining variation unexplained.

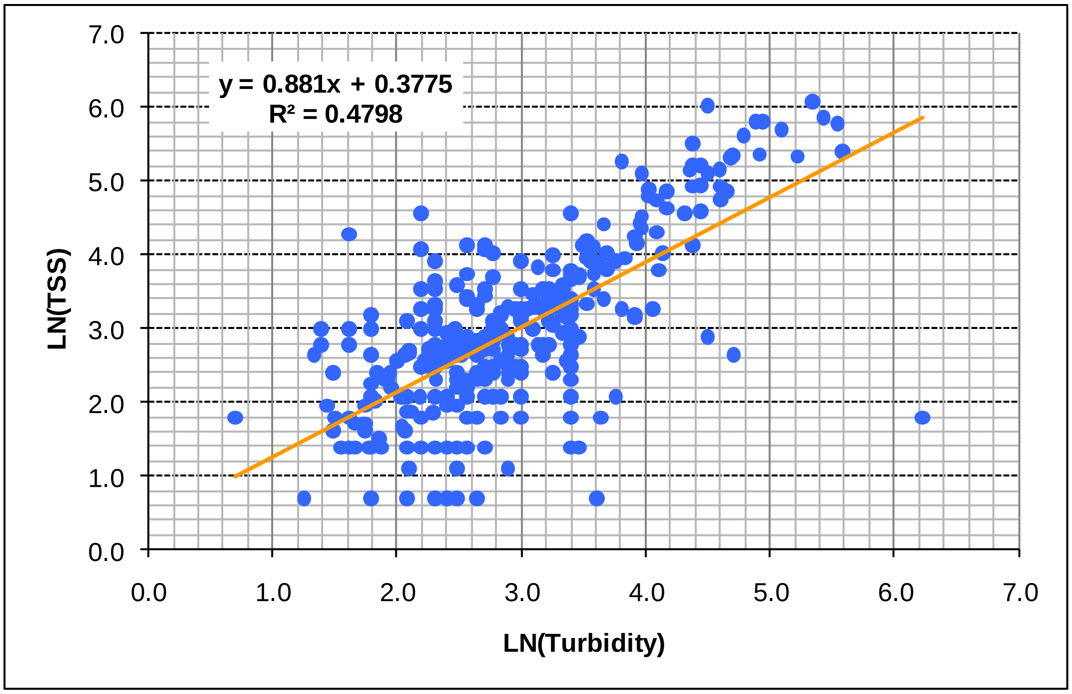

Figure 4-1. Turbidity/TSS regression for subsegment 040301.

The 95 percent upper prediction limit was determined for the relationship. By substituting the turbidity criterion of 50 NTUs in the equation, it can be expected with 95 percent confidence that future TSS values associated with this turbidity will be below 428.49 mg/L TSS. The calculated TSS target of 428.49 mg/L was compared to existing TSS data for TMDL calculations (Appendix C). Results from those calculations are used in this report and as the loads assigned to the subsegments.

The statistical significance of the regression was evaluated by computing the *P value* for the slope of the regression line. The P value is the probability that the slope of the regression line is actually zero. A low P value indicates that a non-zero slope calculated from the regression analysis is statistically significant. The P value for subsegment regression is 2.49E-49, which is small, and is considered good.

4.1.2 Regression Analysis of Turbidity and TSS in Subsegment 040401

As shown in Figure 4-2, the regression equation for subsegment 040401 was determined to be $Ln(TSS) = 0.1642 + 0.8651 \times Ln(turbidity)$, with an $R^2 = 0.6062$. The correlation between turbidity and TSS for subsegment 040401 was considered acceptable; the R^2 value for this regression (0.61) is similar to R^2 values for turbidity and TSS from other approved TMDLs in Louisiana and is based on observed water quality data within the subsegment. In this scenario, R^2 value is the percentage of variation in TSS accounted for by turbidity, with the remaining variation unexplained.

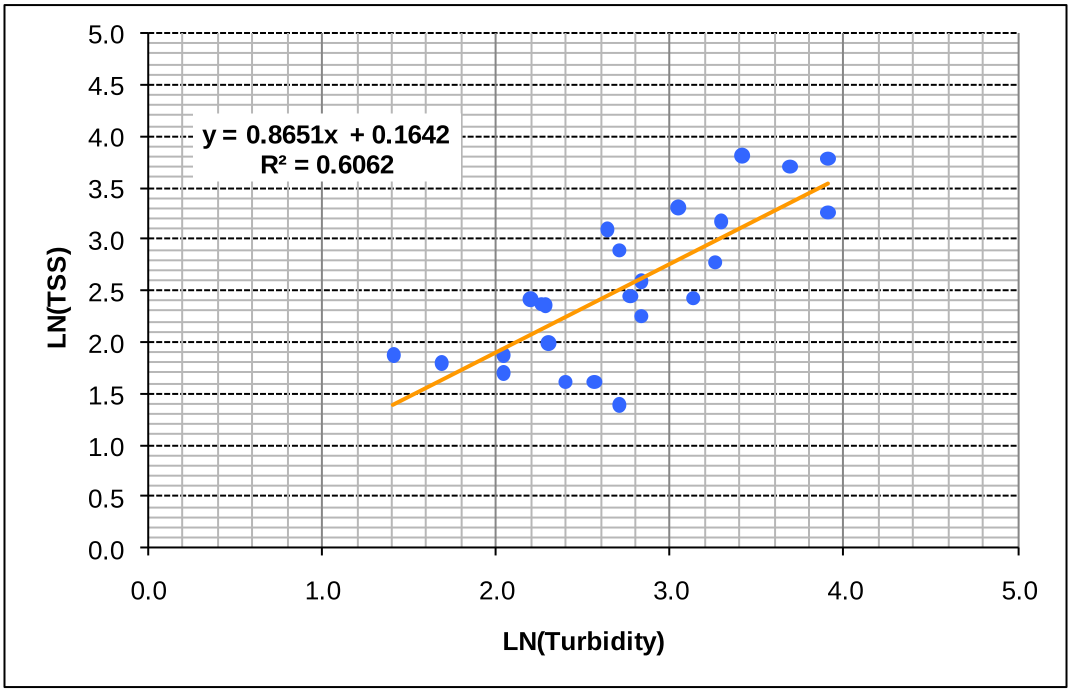

Figure 4-2. Turbidity/TSS regression for subsegment 040401.

The 95 percent upper prediction limit was determined for the relationship. By substituting the turbidity criteria of 25 NTUs in the equation, it can be expected with 95 percent confidence that future TSS values associated with this turbidity will be below 99.83 mg/L TSS. The calculated TSS target of 99.83 mg/L was compared to existing TSS data for TMDL calculations (Appendix C). Results from those calculations are used in this report and as the loads assigned to the subsegments.

The statistical significance of the regression was evaluated by computing the *P value* for the slope of the regression line. The P value for subsegment regression is 7.45E-06, which is small, and is considered good.

4.1.3 Regression Analysis of Turbidity and TSS in Subsegment 040903

As shown in Figure 4-3, the regression equation for subsegment 040903 was determined to be *Ln(TSS) = 0.9303 + 0.7283 × Ln(turbidity)*, with an R^2 = 0.2957. The correlation between turbidity and TSS for subsegment 040903 was considered acceptable; the R^2 value for this regression (0.30) is similar to R^2 values for turbidity and TSS from other approved TMDLs in Louisiana and is based on observed water quality data within the subsegment. In this scenario, R^2 value is the percentage of variation in TSS accounted for by turbidity, with the remaining unexplained.

The 95 percent upper prediction limit was determined for the relationship. By substituting the turbidity criteria of 50 NTUs in the equation, it can be expected with 95 percent confidence that future TSS values associated with this turbidity will be below 868.07 mg/L TSS. The calculated TSS target of 868.07 mg/L was compared to existing TSS data for TMDL calculations (Appendix C). Results from those calculations are used in this report and as the loads assigned to the subsegments.

The statistical significance of the regression was evaluated by computing the *P value* for the slope of the regression line. The P value for subsegment regression is 1.65E-06, which is small, and is considered good.

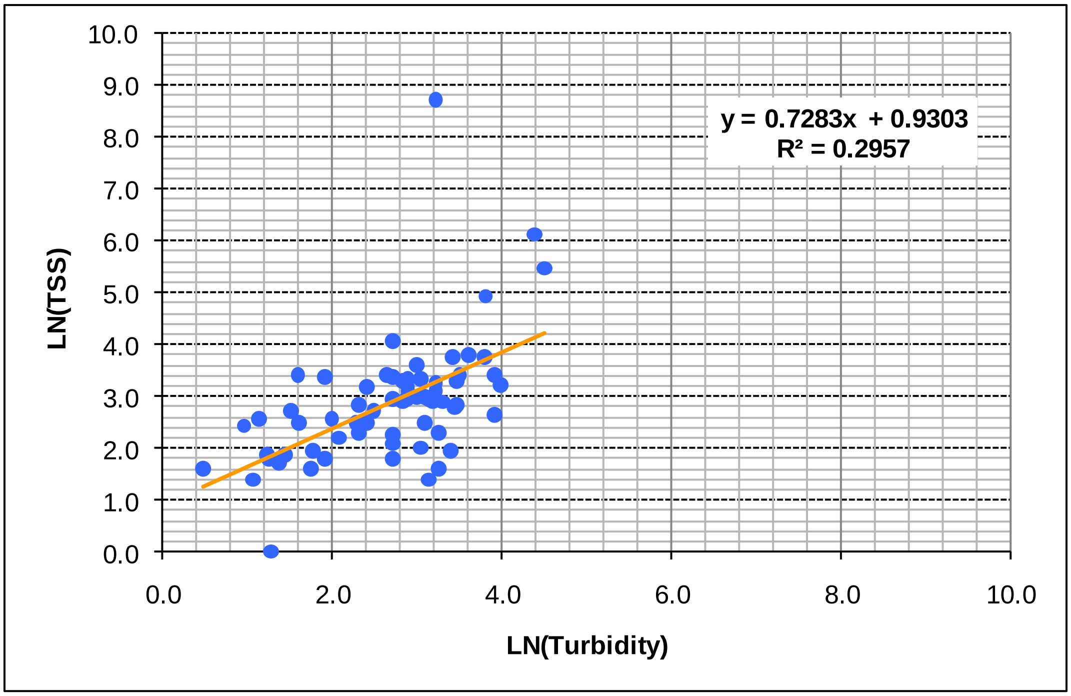

Figure 4-3. Turbidity/TSS regression for subsegment 040903.

4.1.4 Regression Discussion

The turbidity and TSS regressions show that the variability of the turbidity can be explained by the TSS concentrations. Many factors can affect that relationship. To fully explain the relationship between turbidity measurements and TSS concentrations would require obtaining and analyzing a large amount of additional data. Turbidity can be affected by different suspended particles such as clay, silt, and microorganisms, many of which are the same substances that form TSS. A partial list of additional items affecting the turbidity/TSS relationship is as follows:

- Waterbody/flow characteristics
  - Velocity and flow of the waterbody during sampling
  - Stream hydrograph and position on the hydrograph (rising limb, falling limb) during sampling
  - Number of overlapping rainfall events represented by the sample day
  - Magnitude of each rainfall event represented by the sample day
  - Lags of the overlapping rainfall events represented by this sample day

- TSS characteristics
  - Shape, size, and surface characteristics of suspended solids
  - Organic component mass (dissolved organics that can absorb more light than inorganics)
  - Grain size distribution of the inorganic portion (smaller particle sizes have larger effect on turbidity)
  - Specific gravity of the different sizes of inorganic particles
  - Mass of material passed through the filter during the TSS analysis

- Water quality factors
  - Carbonaceous biochemical oxygen demand
  - Nutrients (ammonia nitrate phosphorus)
  - Dissolved solids
  - Algal and bacteria mass
  - Color

Additional data would not change the fact that inorganic particles represented in the TSS measurements are the major contributor to the turbidity reading, and are the major constituent reduced when sediment best management practices (BMPs) are applied to nonpoint sources.

The nonpoint source BMPs for sediment also reduce the load of many of the unexplained contributors in the regression. The effort to attain a perfect explanation of turbidity might not result in a better selection of BMPs. The regression presented above between TSS and turbidity is adequate for preparation of this TMDL. A stakeholder group of knowledgeable persons from the watershed might need additional information to set a plan of action for the TMDL.

The regression between turbidity and TSS was developed for subsegments 040301, 040401, and 040903 using turbidity and TSS data from those subsegments, resulting in surrogate TSS targets (Table 4-1).

Table 4-1. Numeric water quality targets for the listed subsegments

Subsegment	Subsegment name	TSS (mg/L)
040301	Amite River	428.49
040401	Blind River	99.83 [a]
040903	Bayou Cane	868.07

[a] The sediment value is expressed as a TSS concentration for calculation of this TMDL.

4.2 TMDL, WLA, and LA

The TSS TMDLs for subsegments 040301, 040401, and 040903 within the Lake Pontchartrain Basin were calculated based on each subsegment's water quality target and average local water yield. For each subsegment, the water quality target was multiplied by the average water yield and the calculated drainage area to estimate the total allowable load. Table 4-2 summarizes the TMDLs for the selected subsegments in this report. Water quality targets are discussed in Section 2.6 and in Section 4.1. WLAs are discussed in Section 4.2.1, and LAs are discussed in Section 4.2.2. The MOS and FG of the TMDLs are discussed in Sections 4.4 and 4.5, respectively.

Table 4-2. Summary of TSS TMDLs, WLAs, LAs, MOS, and FG for selected subsegments of the Lake Pontchartrain Basin

Subsegment	Pollutant	TMDL (lb/d)	WLA (lb/d)	LA (lb/d)	Explicit MOS (lb/d)	FG (lb/d)
040301	TSS (turbidity)	1,257,198.00	14.25	1,005,747.00	125,718.38	125,718.38
040401	TSS (turbidity)	45,206.54	7,285.06	30,337.19	3,792.15	3,792.15
040903	TSS (turbidity)	95,183.61	38.31	76,116.25	9,514.53	9,514.53

4.2.1 Wasteload Allocation

The WLA portion of the TMDL equation is the total loading of a pollutant that is assigned to point sources. Examples of point sources include sanitary and industrial wastewater facilities, and industrial stormwater. This TMDL provides allocations as a starting point for permit writing, and carries assumptions as to which permits received allocations and the targets and flow used in the allocation. Due to the limited numbers of permit holders and the lack of information regarding existing permitted facilities, WLAs were available only for subsegment 040401. These WLAs and TMDLs can be revised in the future when more information is available. The individual WLAs for each point source included in these TMDLs are presented in Table 4-3.EPA's stormwater permitting regulations require municipalities to obtain permit coverage for all stormwater discharges from MS4s. Currently, no permitted MS4s are within subsegment 040301, 040401, or 040903.

In calculating the WLAs, the preferred facility flow was the facility design or expected flow. Since design flow was not available, the average (expected or observed) flow was used to calculate the WLA along with the monthly average permit limit for TSS.

WLAs should be confirmed during the permitting process. To avoid an unnecessary permitting process or unintended monitoring requirements for a number of sources that may not be discharging the pollutants of concern, LDEQ will review these WLAs during the permitting process on a case-by-case basis. LDEQ then will determine if a permit limit is appropriate or if the permittee reasonably could cause or contribute to a water quality violation (with LDEQ ensuring that the goals of the TMDL are still being met). As long as existing or future point source discharges contain concentrations at or below water quality criteria or target, they should not cause a violation of water quality targets. Although the derived WLAs are for TSS, meeting the WLAs might not be necessary if alternative remediation and future monitoring indicate control of TSS concentrations without reduction of WLAs. The decision to specify a WLA for those point sources does not reflect any EPA determination of a required effluent limit in their respective NPDES permits.

Table 4-3. Summary of TSS WLAs for permitted facilities within selected subsegments of the Lake Pontchartrain Basin

AI	Permit #	Facility name	Outfall	Outfall type	Flow type	Flow (gpd)	Permit type	TSS (mg/L)	TSS Load (lb/d)
Subsegment 040301									
18594	LAG560028	Wood Acres Subdivision	001	treated sanitary wastewater	Design	25,400	Monthly Average	20	4.239
19086	LAG540215	Calloway's Court Club	001	treated sanitary wastewater	Design	25,000	Monthly Average	30	6.259
19889	LAG540148	Country Bend Subdivision	001	treated sanitary wastewater	Average	15,000	Monthly Average	30	3.755
41086	LAG480418	Colonial Pipeline Co – Felixville Station	001	Equipment washwater, stormwater runoff, and hydrostatic testing wastewater from Outfall 101	Not found				
41086	LAG480418	Colonial Pipeline Co – Felixville Station	101	Hydrostatic testing wastewater	Not found				
41536	LAR05P371	Fleniken Sand & Gravel – Flenrock Lease		MSGP stormwater	Not found				
51974	LA0110868	Lookout LA Release Site	001	Treated groundwater, from this groundwater remediation site, from the groundwater treatment system area	Average	10,000			
124925	LAG490045	Barber Brothers Contracting Co LLC – Kent # 3 Lease	001A	Process wastewater & stormwater	Not found				
124925	LAG490045	Barber Brothers Contracting Co LLC – Kent # 3 Lease	001B	Process wastewater & stormwater	Not found				
165040	LAG490105	Tri-State Resources LLC - Mine #1	001	process wastewater and process area stormwater	Not found		Monthly Average	25	
165040	LAG490105	Tri-State Resources LLC - Mine #1	002	process wastewater and process area stormwater	Not found		Monthly Average	25	
165040	LAG490105	Tri-State Resources LLC - Mine #1	003	process wastewater and process area stormwater	Not found		Monthly Average	25	
165040	LAG490105	Tri-State Resources LLC - Mine #1	004	treated sanitary wastewater	Average	5,000	Daily Max	45	1.878
165040	LAG490105	Tri-State Resources LLC - Mine #1	005	stormwater	Not found		Monthly Average	25	
Subsegment 040401									

AI	Permit #	Facility name	Outfall	Outfall type	Flow type	Flow (gpd)	Permit type	TSS (mg/L)	TSS Load (lb/d)
2218	LA0097161	Praxair Inc - Geismar HYCO Facility	001	industrial specialty gases, fromaldehyde and methanol manufacturing	Not found				
2218	LA0097161	Praxair Inc - Geismar HYCO Facility	003	industrial specialty gases, fromaldehyde and methanol manufacturing	Not found				
2218	LA0097161	Praxair Inc - Geismar HYCO Facility	008	industrial specialty gases, fromaldehyde and methanol manufacturing	Not found				
2218	LA0097161	Praxair Inc - Geismar HYCO Facility	011	industrial specialty gases, fromaldehyde and methanol manufacturing	DMR	6,785.7			
2218	LA0097161	Praxair Inc - Geismar HYCO Facility	012	industrial specialty gases, fromaldehyde and methanol manufacturing	Not found				
2532	LA0004847	Mosaic Fertilizer LLC – Uncle Sam Plant	105	Stormwater from areas south of the facility and gypsum stacks, equipment and material storage areas, employee parking lots, railcar activity areas	DMR	5,269,000	Monthly Average	30	1,319
2532	LA0004847	Mosaic Fertilizer LLC – Uncle Sam Plant	205	Stormwater from areas west of the gypsum stacks	DMR	95,000			
2532	LA0004847	Mosaic Fertilizer LLC – Uncle Sam Plant	305	Stormwater from areas north of the gypsum stacks	DMR	781,000			
3400	LA0002933	OxyChem - Geismar Plant	002	organic and inorganic chemcial manufacturing	DMR	1,310,769.2			
7991	LAG530234	Sorrento Office Building - KINDER MORGAN BULK TERM INC	001	treated sanitary wastewater	DMR	600			
9871	LAR05M758	GONZALES CENTER - UNITED PARCEL SERVICE		MSGP	Not found				
18596	LAG540153	Kathryndale Subdivision	001	treated sanitary wastewater	DMR	7,400	Monthly Average	30	1.853
18600	LAG560030	Rockford Place Subdivision	001	treated sanitary wastewater	DMR	14,400	Monthly Average	20	2.403
18602	LAG540156	Lake Village Subdivision	001	treated sanitary wastewater	DMR	7,200	Monthly Average	30	1.803
31241	LAG560023	Green Bayou Subdivision	001	treated sanitary wastewater	Expected	26,800	Monthly Average	20	4.473
38470	LAG540761	Fairhaven Trailer Park	001	treated sanitary wastewater	DMR	4,000	Monthly Average	30	1.001
40609	LAG750154	Buffy's Car Wash	001	exterior vehicle and equipment wash wastewater	DMR	37,214.3	Daily Max	45	1,978.738
40609	LAG750154	Buffy's Car Wash	002	treated sanitary wastewater	Permit Max	5,000	Weekly average	45	1.878
40609	LAG750154	Buffy's Car Wash	003	treated sanitary wastewater	Permit Max	25,000	Monthly Average	30	6.259
40609	LAG750154	Buffy's Car Wash	004	commingled discharges of treated vehicle wash and sanitary wastewater	Permit Max	25,000	Daily Max	45	1,978.738
40609	LAG750154	Buffy's Car Wash	005	wastewaters from portable washing operations	Not found		Daily Max	45	
40903	LAG540203	Cajon Trailer Park	001	treated sanitary wastewater	Expected	10,500	Monthly Average	30	2.629

AI	Permit #	Facility name	Outfall	Outfall type	Flow type	Flow (gpd)	Permit type	TSS (mg/L)	TSS Load (lb/d)
41084	LAG540235	Colonial Oaks Subdivision	001	treated sanitary wastewater	DMR	4,110	Monthly Average	30	1.029
41838	LAG540618	Hillshire Subdivision	001	treated sanitary wastewater	DMR	3,660	Monthly Average	30	0.916
42239	LAG540019	Lake Martin Trailer Court	001	treated sanitary wastewater	DMR	2,900	Monthly Average	5	0.121
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	001	process wastewater and process area stormwater	Not found		Daily Max	50	
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	002	process area stormwater	Not found		Daily Max	45	
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	003a	stormwater and aggregate spray	DMR	8,155.6			
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	003b	stormwater and aggregate spray	DMR	23,871.7			
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	004	nonprocess area stormwater from cement, concrete, and asphalt facilities	Not found				
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	005	treated sanitary wastewater	Permit Max	5,000	Weekly Average	45	1.878
43060	LAG110095	RJ Daigle & Sons Contractors Daigle Plant # 1	006	washrack and shop floor washdown wastewater discharges from cement, concrete, and asphalt facilities	Not found		Daily Max	45	
43064	LAG540615	Riverlands Apartments	001	treated sanitary wastewater	DMR	12,980	Monthly Average	30	3.250
43263	LAG540651	Sno's Seafood & Steakhouse Inc.	001	treated sanitary wastewater	DMR	777.6	Monthly Average	30	0.195
Subsegment 040903									
9371	LA0049671	Southeast Louisiana Hospital	001	Treated sanitary wastewater	Design	280,000	Monthly Average	15	35.051
165696	LAG570500	Lakeshore High School	001	Treated sanitary wastewater	Average	26,000	Monthly Average	15	3.255

4.2.2 Load Allocation

The LA is the portion of the TMDL assigned to natural background loadings, as well as nonpoint sources urban runoff and other anthropogenic sources. For this TMDL, the LA was calculated by subtracting the WLA, MOS, and FG from the total TMDL. LAs were not allocated to separate nonpoint sources because of a lack of available source characterization data. The LAs are presented in Table 4-2.

4.3 Seasonality and Critical Conditions

The federal regulations at 40 CFR 130.7 require that TMDLs include seasonal variations and take into account critical conditions for streamflow, loading, and water quality parameters. For this TMDL, TSS sampling results were plotted over time and reviewed for any seasonal patterns (see Section 3.2). The water quality targets for TSS apply all year, accounting for seasonal variations. These TMDLs were developed over a several-year period, therefore accounting for seasonal variations.

4.4 Margin of Safety

Section 303(d) of the Clean Water Act and the regulations at 40 CFR 130.7 require that TMDLs include a MOS to account for uncertainty in available data or in the actual effect that controls will have on the loading reductions and quality of the receiving water. The MOS may be expressed explicitly as unallocated assimilative capacity or implicitly using conservative assumptions in establishing the TMDL. In addition to the MOS, a FG component may be added to account specifically for FG within the TMDL area. For this analysis, the MOS is explicit: 10 percent of each targeted TMDL was reserved as the MOS to account for any uncertainty in the TMDL. Using 10 percent of the TMDL load provides an additional level of protection to the designated uses of the subsegments of concern.

4.5 Future Growth

The MOS is an allocation for scientific uncertainly, while the FG is an allocation for growth. Ten percent of the load was allocated for FG in the area covered by the TMDL. This growth includes future urban development, including point sources, MS4 areas, agriculture, and other nonpoint sources. The FG could also be used for unaccounted or unknown sources not included in the TMDL.

5. FUTURE ACTIVITIES

This section discusses TMDL implementation strategies, environmental monitoring activities, and stormwater permitting requirements and presumptive BMPs for the TMDL within subsegments 040301, 040401, and 040903.

5.1 TMDL Implementation Strategies

Current TMDL requirements do not require inclusion of implementation plans in TMDL reports. Louisiana is responsible for developing and implementing the TMDL implementation plans. Section 303(d) of the Clean Water Act and the implementing regulations at 40 CFR 130.7 specify that EPA has no authority to approve or disapprove TMDL implementation plans.

WLAs will be implemented through LPDES permit procedures. LDEQ was delegated to manage the NPDES program in August 1996, and LDEQ is responsible for all permits covered by the delegation package. As part of that designation, a Memorandum of Agreement (MOA) was established between LDEQ and EPA. The designation and memorandum were revised in April 2004. In accordance with Section 1.C of the NPDES MOA between LDEQ and EPA (Revision 1, April 28, 2004), EPA has the responsibility of providing continued technical and other assistance, including interpreting and implementing federal regulations, policies, and guidelines on permitting and enforcement matters. The MOA further states that LDEQ has primary responsibilities for implementing the LPDES program in Louisiana, including applicable sections of the federal Clean Water Act, applicable state legal authority, the applicable requirements of 40 CFR Parts 122–125, and any other applicable federal regulations establishing LPDES program priorities with consideration of EPA Region 6 and national NPDES goals and objectives. For details on the designation and agreement, see the EPA Region 6 website at http://www.epa.gov/region6/water/lpdes/.[2] LDEQ's position is that, if any unresolved LDEQ comments on these TMDLs become the basis for an EPA Region 6 objection to an LDEQ-drafted permit or permittee objection/appeal of an LDEQ drafted permit, LDEQ may relinquish permitting authority to EPA Region 6.

LAs will be addressed through the LDEQ Nonpoint Source Management Program. Louisiana's *Nonpoint Source Management Plan* (LDEQ 2010a) states that TMDLs are being developed through a close relationship between LDEQ and EPA Region 6. It further states that, "[m]anagement strategies outlined within this document (both statewide and watershed) will be implemented in each of the watersheds where water quality problems have been attributed to nonpoint sources of pollution." On page ii, Objective 3 of the watershed management strategies is to, "utilize pollutant load reductions of the TMDL to develop nonpoint source pollution reduction strategies for each of the watersheds...that have water quality problems identified."

The plan includes a discussion of a number of nonpoint source activities and provides BMPs that can be used to achieve the nonpoint source load reductions established in these TMDLs. The plan broadly discusses programs to address agriculture, forestry, hydromodification, urban runoff, construction, and resource extraction. Provided with each BMP is an evaluation of the BMP's effectiveness, ranked as high, medium, or low. Additional evaluations should be conducted to determine the most likely source of impairment within this watershed and to identify localized hot spots to be targeted for effective BMP implementation. These and other BMPs can be implemented at a scale adequate to achieve the load reductions established in the TMDL.

5.2 Water Quality Monitoring Activities

LDEQ uses funds provided under section 106 of the Clean Water Act and under the authority of the Louisiana Environmental Quality Act to run a program for monitoring the quality of Louisiana's surface waters. The LDEQ Surveillance Section collects surface water samples at various locations using appropriate sampling methods and

[2] Accessed January 11, 2011.

procedures to ensure the quality of the data obtained. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, to develop a long-term database for water quality trend analysis, and to monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program are used to develop the state's biennial section 305(b) report (*Water Quality Inventory*) and section 303(d) list of impaired waters (*Draft 2010 Integrated Report*).

LDEQ has implemented a rotating approach to surface water quality monitoring. Through the rotating approach, the entire state is sampled on a 4-year cycle. Long-term trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the 4-year cycle. Sampling is conducted monthly during a water year (October through September) to yield approximately 12 samples per site during each year the site is monitored. Sampling locations are selected as representative of the waterbody. Under the current monitoring schedule, approximately one-half of the state's waters are newly assessed for section 305(b) and section 303(d) listing purposes for each biennial cycle. Monitoring allows LDEQ to determine whether any improvement in water quality occurred after the TMDLs had been implemented. LDEQ evaluates the monitoring results to generate the Integrated Report submitted by April 1 on even-numbered years. More information can be found in *Louisiana's Water Quality Assessment Method and Integrated Report Rationale: 2010 Water Quality Integrated Report* (LDEQ 2010b). Monitoring will allow LDEQ to determine whether water quality improves following TMDL implementation. As the monitoring results are evaluated at the end of each year, waterbodies might be added to or removed from the section 303(d) list of impaired waterbodies.

5.3 Stormwater Permitting Requirements and Presumptive Best Management Practices Approach

5.3.1. Background

The NPDES permitting program for stormwater discharges was established under the Clean Water Act as the result of a 1987 amendment. The Act specifies the level of control to be incorporated into the NPDES stormwater permitting program depending on the source (industrial versus municipal stormwater). These programs contain specific requirements for the regulated communities/facilities to establish a comprehensive stormwater management program (SWMP) or stormwater pollution prevention plan (SWPPP) to implement any requirements of the TMDL allocation (see 40 CFR Part 130).

Stormwater discharges vary significantly in flow and pollutant concentrations, and relationships between discharges and water quality can be complex. For municipal stormwater discharges in particular, use of system-wide permits and a variety of jurisdiction-wide BMPs, including educational and programmatic BMPs, do not easily accommodate to the existing methodologies for deriving numeric water quality-based effluent limitations. These methodologies were designed primarily for process wastewater discharges, which occur at predictable rates with predictable pollutant loadings under low-flow conditions in receiving waters. EPA has recognized such problems and has developed permitting guidance for stormwater permits (USEPA 1996).

Because of the nature of stormwater discharges, and the typical lack of information on which to base numeric water quality-based effluent limitations (expressed as concentration and mass), EPA recommends basing an interim permitting approach for NPDES stormwater on BMPs. EPA permitting guidance states that, "[t]he interim permitting approach uses BMPs in first-round storm water permits, and expanded or better-tailored BMPs in subsequent permits, where necessary, to provide for the attainment of water quality standards" (USEPA 1996).

A monitoring component is also included in the recommended BMP approach. According to EPA permitting guidance, "each storm water permit should include a coordinated and cost-effective monitoring program to gather necessary information to determine the extent to which the permit provides for attainment of applicable water quality standards and to determine the appropriate conditions or limitations for subsequent permits" (USEPA 1996). This approach was further elaborated in a guidance memo issued in 2002: "The policy outlined in this memorandum affirms the appropriateness of an iterative, adaptive management BMP approach, whereby permits include effluent limits (e.g., a combination of structural and nonstructural BMPs) that address stormwater discharges, implement mechanisms to evaluate the performance of such controls, and make adjustments (i.e., more stringent controls or specific BMPs) as necessary to protect water quality. … If it is determined that a BMP approach (including an iterative BMP approach) is appropriate to meet the storm water component of the TMDL, EPA recommends that the TMDL reflect this" (Wayland and Hanlon 2002). This BMP-based approach to stormwater sources in TMDLs is also recognized and described in the most recent EPA guidance (USEPA 2008).

This TMDL adopts the EPA-recommended approach and relies on appropriate BMPs for implementation. No numeric effluent limitations are required or anticipated for municipal stormwater discharge permits.

5.3.2 Specific SWMP/SWPPP Requirements

As discussed in the Louisiana Small MS4 NPDES permit, if a TMDL assigns an individual WLA specifically to a MS4's stormwater discharge, LDEQ's permit specifies that the WLA must be included as a measurable goal for the SWMP.

Examples of activities that the MS4 may conduct to be consistent with the WLA include:

- Monitoring to evaluate program compliance, the appropriateness of identified BMPs, and progress toward achieving identified measurable goals
- Development of a schedule for implementation of additional controls and/or BMPs, if necessary, on the basis of monitoring results, to ensure compliance with applicable TMDLs.

6. PUBLIC PARTICIPATION

Federal regulations require EPA to notify the public and seek comments concerning the TMDLs it prepares. These TMDLs were developed under contract to EPA, and EPA held a public review period seeking comments, information, and data from the public and any other interested parties. The notice for the public review period is tentatively scheduled to be published in the *Federal Register* on November 15, 2011, and the review period tentatively set to close on December 31, 2011. Any comments will be reviewed, and these TMDLs may be revised if appropriate. If any comments are submitted they, will be included in a new appendix in the final TMDL along with EPA responses.

EPA will submit the final TMDL to LDEQ for implementation and incorporation into LDEQ's current water quality management plan.

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APPENDIX A:
Turbidity and TSS Water Quality Data

Table A-1. Turbidity observations for LDEQ station 44 in subsegment 040301.

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
3/6/78	9			
4/10/78	6			
5/8/78	22			
6/12/78	17			
7/10/78	21			
8/14/78	16			
9/11/78	9			
10/9/78	8.2			
11/13/78	8			
12/11/78	84			
1/8/79	11			
2/12/79	16			
3/12/79	12			
4/18/79	11			
5/16/79	18			
6/13/79	8			
7/9/79	15			
9/10/79	30			
10/8/79	11			
11/5/79	9			
12/10/79	11			
1/14/80	77			
2/11/80	100			
3/11/80	15			
4/14/80	23			
5/12/80	8.5			
9/15/80	10			
10/13/80	6			
11/18/80	33			
12/8/80	8			
1/12/81	3			
2/9/81	18			
3/9/81	16			
4/13/81	5			
5/11/81	15			
6/8/81	28			
7/13/81	18			
8/10/81	2.3			
9/14/81	10			
10/12/81	5.8			
11/16/81	5			
12/14/81	6			
1/11/82	31			
2/8/82	17			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
3/8/82	30			
4/13/82	10			
5/11/82	10			
6/15/82	5.4			
7/13/82	44			
8/10/82	17			
9/13/82	5.9			
10/11/82	9.3			
11/15/82	3.4			
12/14/82	18			
1/11/83	32			
2/7/83	85			
3/14/83	15			
4/12/83	24			
5/9/83	4.6			
6/13/83	10			
7/11/83	14			
8/8/83	44			
9/12/83	4.1			
10/10/83	1.5			
11/14/83	5.1			
12/12/83	130			
1/9/84	13			
2/13/84	312			
3/14/84	140			
4/9/84	23			
5/14/84	5.4			
7/9/84	8.9			
9/10/84	14			
10/9/84	6.1			
11/13/84	10			
12/10/84	21			
1/14/85	5.2			
2/11/85	222			
3/11/85	14			
4/8/85	5.4			
5/13/85	5.2			
6/10/85	11			
7/8/85	14			
8/12/85	11			
9/9/85	88			
10/14/85	7.9			
11/18/85	11			
12/9/85	11			
1/13/86	13			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
2/18/86	17			
3/18/86	8.2			
4/15/86	7			
5/13/86	16			
6/10/86	18.5			
7/15/86	7			
8/12/86	13			
9/9/86	9			
10/14/86	13			
11/17/86	10			
12/8/86	12			
1/12/87	24			
2/16/87	84			
3/9/87	46			
4/13/87	11			
5/11/87	11			
6/8/87	7.3			
7/13/87	6.9			
8/10/87	28			
9/14/87	9.3			
10/12/87	4.2			
11/16/87	12			
12/14/87	4.8			
1/11/88	11			
2/8/88	23			
3/14/88	16			
4/11/88	25			
5/9/88	6.1			
6/13/88	6.9			
7/11/88	20			
8/8/88	11			
9/12/88	34			
10/10/88	11			
11/14/88	72			
12/12/88	34			
1/9/89	15			
2/13/89	11			
3/14/89	11			
4/10/89	12			
5/8/89	36			
6/13/89	23			
7/11/89	49.5			
8/15/89	5.8			
9/12/89	13			
10/9/89	6.3			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
11/13/89	7.5			
12/11/89	35			
1/8/90	75			
2/12/90	50			
3/12/90	12			
4/9/90	6.9			
5/14/90	15			
6/11/90	25			
7/9/90	12			
8/13/90	11			
9/10/90	10			
10/15/90	5.7			
11/13/90	6			
12/10/90	10			
1/15/91	21			
2/5/91	25			
3/12/91	9.2			
4/16/91	64			
5/14/91	19			
6/11/91	8			
7/16/91	7.6			
8/13/91	24			
9/10/91	21			
10/15/91	5.8			
11/19/91	6			
12/10/91	11			
1/6/92	6.2			
2/11/92	17			
3/10/92	27			
4/7/92	5.8			
5/12/92	7.6			
6/16/92	14			
7/14/92	8			
8/11/92	10			
9/15/92	7.9			
10/13/92	5.6			
11/17/92	14			
12/15/92	14			
1/12/93	76			
2/9/93	9			
3/9/93	17			
4/13/93	20			
5/11/93	10			
6/15/93	6.5			
7/13/93	14			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
8/10/93	13			
9/14/93	6			
10/12/93	5			
11/16/93	102			
12/14/93	40			
1/11/94	12			
2/8/94	30			
3/15/94	13			
4/12/94	13			
5/10/94	45			
6/14/94	12			
7/12/94	62			
8/9/94	7			
9/13/94	13			
10/11/94	10			
11/15/94	12			
12/13/94	23			
1/10/95	18			
2/14/95	17			
3/14/95	110			
4/4/95	15			
5/9/95	60			
6/13/95	12			
7/11/95	8.4			
8/15/95	16			
9/12/95	10			
10/10/95	5.1			
11/13/95	9.5			
12/11/95	20.5			
1/9/96	7			
2/12/96	13			
3/11/96	18			
4/9/96	13			
5/13/96	6.5			
6/10/96	14			
7/8/96	7.1			
8/12/96	15			
9/9/96	6			
10/14/96	4.2			
11/18/96	4.7			
12/9/96	6.4			
1/6/97	8.7			
2/17/97	27			
3/10/97	15			
4/14/97	22			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
5/12/97	6			
6/9/97	29			
7/15/97	35			
8/11/97	31			
9/8/97	7			
10/13/97	5.1			
11/17/97	5.8			
12/8/97	14			
1/12/98	92			
2/9/98	9.4			
3/9/98	65			
4/13/98	5.8			
5/11/98	8			

Table A-2. TSS observations for LDEQ station 44 in subsegment 040301.

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
5/8/78	24		ppm		
7/10/78	34		ppm		
8/14/78	20		ppm		
9/11/78	10		ppm		
10/9/78	2		ppm		
11/13/78	14		ppm		
12/11/78	12		ppm		
1/8/79	18		ppm		
3/12/79	10		ppm		
6/13/79	12		ppm		
10/8/79	30		ppm		
11/5/79	16		ppm		
12/10/79	12		ppm		
1/14/80	120		ppm		
2/11/80	206		ppm		
3/11/80	28		ppm		
4/14/80	30		ppm		
5/12/80	6		ppm		
6/10/80	16		ppm		
9/15/80	2		ppm		
12/8/80	2		ppm		
1/12/81	6		ppm		
2/9/81	10		ppm		
3/9/81	20		ppm		
4/13/81	18		ppm		
5/11/81	28		ppm		
6/8/81	40		ppm		
7/13/81	16		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
8/10/81	20		ppm		
9/14/81	18		ppm		
10/12/81	4		ppm		
11/16/81	16		ppm		
12/14/81	22		ppm		
1/11/82	32		ppm		
2/8/82	26		ppm		
3/8/82	30		ppm		
4/13/82	8		ppm		
5/11/82	6		ppm		
6/15/82	9		ppm		
7/13/82	84		ppm		
8/10/82	28		ppm		
9/13/82	7		ppm		
10/11/82	8		ppm		
11/15/82	1		ppm		
12/14/82	19		ppm		
1/11/83	27		ppm		
2/7/83	132		ppm		
3/14/83	17		ppm		
4/12/83	35		ppm		
5/9/83	18		ppm		
6/13/83	9		ppm		
7/11/83	12		ppm		
8/8/83	42		ppm		
9/12/83	16		ppm		
10/10/83	4		ppm		
11/14/83	4		ppm		
12/12/83	152		ppm		
1/9/84	4		ppm		
2/13/84	260		ppm		
3/14/84	152		ppm		
4/9/84	23		ppm		
5/14/84	7		ppm		
7/9/84	8		ppm		
9/10/84	3		ppm		
10/9/84	4		ppm		
11/13/84	12		ppm		
12/10/84	18		ppm		
1/14/85	7		ppm		
2/11/85	256		ppm		
3/11/85	10		ppm		
4/8/85	6		ppm		
5/13/85	8		ppm		
6/10/85	8		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
7/8/85	13		ppm		
8/12/85	8		ppm		
9/9/85	106		ppm		
10/14/85	10		ppm		
11/18/85	10		ppm		
12/9/85	2		ppm		
1/13/86	10		ppm		
2/18/86	4		ppm		
3/18/86	2		ppm		
4/15/86	12		ppm		
5/13/86	26		ppm		
6/10/86	22		ppm		
7/15/86	10		ppm		
8/12/86	4		ppm		
9/9/86	6		ppm		
10/14/86	32		ppm		
11/17/86	12		ppm		
12/8/86	16		ppm		
1/12/87	6		ppm		
2/16/87	264		ppm		
3/9/87	106		ppm		
4/13/87	10		ppm		
5/11/87	14		ppm		
6/8/87	10		ppm		
7/13/87	8		ppm		
8/10/87	40		ppm		
9/14/87	28		ppm		
10/12/87	9		ppm		
11/16/87	5		ppm		
12/14/87	14		ppm		
1/11/88	11		ppm		
2/8/88	44		ppm		
3/14/88	22		ppm		
4/11/88	21		ppm		
5/9/88	14		ppm		
6/13/88	10		ppm		
7/11/88	26		ppm		
8/8/88	13		ppm		
9/12/88	40		ppm		
10/10/88	16		ppm		
11/14/88	176		ppm		
12/12/88	76		ppm		
1/9/89	19		ppm		
2/13/89	16		ppm		
3/14/89	13		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
4/10/89	14		ppm		
5/8/89	56		ppm		
6/13/89	30		ppm		
7/11/89	126		ppm		
8/15/89	12		ppm		
9/12/89	16		ppm		
10/9/89	5		ppm		
11/13/89	4		ppm		
12/11/89	38		ppm		
1/8/90	124		ppm		
2/12/90	62		ppm		
3/12/90	10		ppm		
4/9/90	9		ppm		
5/14/90	14		ppm		
6/11/90	29		ppm		
7/9/90	10		ppm		
8/13/90	12		ppm		
9/10/90	16		ppm		
10/15/90	5		ppm		
11/13/90	8		ppm		
12/10/90	14		ppm		
1/15/91	39		ppm		
2/5/91	33		ppm		
3/12/91	8		ppm		
4/16/91	138		ppm		
5/14/91	26		ppm		
6/11/91	5		ppm		
7/16/91	2		ppm		
8/13/91	28		ppm		
9/10/91	32		ppm		
10/15/91	3		ppm		
11/19/91	9		ppm		
12/10/91	12		ppm		
1/6/92	6		ppm		
2/11/92	18		ppm		
3/10/92	35		ppm		
4/7/92	9		ppm		
5/12/92	8		ppm		
6/16/92	8		ppm		
7/14/92	4		ppm		
8/11/92	8		ppm		
9/15/92	38		ppm		
10/13/92	3		ppm		
11/17/92	6		ppm		
12/15/92	6		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
1/12/93	158		ppm		
2/9/93	4		ppm		
3/9/93	16.5		ppm		
4/13/93	21		ppm		
5/11/93	9		ppm		
6/15/93	9		ppm		
7/13/93	15		ppm		
8/10/93	11		ppm		
9/14/93	4		ppm		
10/12/93	4		ppm		
11/16/93	176		ppm		
12/14/93	64		ppm		
1/11/94	4		ppm		
2/8/94	23		ppm		
3/15/94	9		ppm		
4/12/94	14		ppm		
5/10/94	81		ppm		
6/14/94	8		ppm		
7/12/94	112		ppm		
8/9/94	6		ppm		
9/13/94	91		ppm		
10/11/94	11		ppm		
11/15/94	6		ppm		
12/13/94	13		ppm		
1/10/95	16		ppm		
2/14/95	9		ppm		
3/14/95	262		ppm		
4/4/95	8		ppm		
5/9/95	80		ppm		
6/13/95	14.5		ppm		
7/11/95	10		ppm		
8/15/95	27		ppm		
9/12/95	12		ppm		
10/10/95	8		ppm		
11/13/95	12		ppm		
12/11/95	21.3		ppm		
1/9/96	3		ppm		
2/12/96	8		ppm		
3/11/96	14		ppm		
4/9/96	12		ppm		
5/13/96	9		ppm		
6/10/96	15		ppm		
7/8/96	36		ppm		
8/12/96	20		ppm		
9/9/96	7		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
10/14/96	3		ppm		
11/18/96	8.5		ppm		
12/9/96	4		ppm		
1/6/97	9		ppm		
2/17/97	29		ppm		
3/10/97	6.5		ppm		
4/14/97	14		ppm		
5/12/97	4		ppm		
6/9/97	18		ppm		
7/15/97	25		ppm		
8/11/97	23.9		ppm		
9/8/97	7		ppm		
10/13/97	4		ppm		
11/17/97	4		ppm		
12/8/97	9		ppm		
1/12/98	126		ppm		
2/9/98	7		ppm		
3/9/98	77.5		ppm		
4/13/98	5		ppm		
5/11/98	6.5		ppm		

Table A-3. Turbidity observations for LDEQ station 119 in subsegment 040301.

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
1/1/68	80			
2/1/68	30			
3/1/68	30			
4/1/68	30			
5/1/68	30			
6/1/68	25			
7/1/68	30			
8/1/68	30			
9/1/68	30			
10/1/68	30			
11/1/68	30			
12/1/68	25			
1/1/69	30			
2/1/69	30			
3/1/69	85			
4/1/69	30			
5/1/69	30			
6/1/69	30			
7/1/69	30			
8/1/69	30			
9/1/69	30			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
10/1/69	30			
11/1/69	30			
12/1/69	30			
1/1/70	30			
2/1/70	30			
3/1/70	30			
4/1/70	30			
5/1/70	30			
6/1/70	30			
7/1/70	30			
8/1/70	30			
9/1/70	30			
10/1/70	30			
11/1/70	19			
12/1/70	8			
1/1/71	50			
2/1/71	31			
3/1/71	35			
4/1/71	30			
5/1/71	4			
6/1/71	15			
7/1/71	5			
8/1/71	10			
9/1/71	6			
10/1/71	10			
11/1/71	5			
12/1/71	15			
1/1/72	25			
2/1/72	10			
3/1/72	90			
4/1/72	25			
5/1/72	10			
6/1/72	10			
7/1/72	5			
8/1/72	6			
9/1/72	10			
10/1/72	10			
11/1/72	5			
12/1/72	15			
1/1/73	20			
2/1/73	10			
3/1/73	6			
4/1/73	45			
5/1/73	50			
6/1/73	38			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
7/1/73	6			
8/1/73	10			
9/1/73	9			
10/1/73	28			
11/1/73	2			
12/1/73	13			
1/2/74	30			
2/4/74	30			
3/4/74	9			
4/1/74	8			
5/1/74	6			
6/4/74	16			
7/30/74	10			
9/3/74	8			
10/3/74	5			
11/4/74	5			
12/2/74	16			
12/31/74	9			
2/3/75	13			
3/3/75	8			
3/31/75	13			
4/30/75	22			
6/2/75	15			
6/30/75	33			
8/1/75	30			
9/1/75	32			
10/1/75	30			
11/5/75	37			
12/2/75	32			
1/5/76	62			
3/8/76	13			
4/5/76	27			
6/1/76	16			
7/14/76	26			
8/5/76	15			
9/3/76	24			
10/7/76	18			
11/9/76	12			
12/14/76	28			
1/3/77	20			
2/10/77	32			
3/30/77	32			
5/4/77	25			
5/31/77	9			
9/6/77	40			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
10/10/77	60			
12/8/77	30			
1/4/78	20			
3/6/78	12			
4/10/78	6			
5/8/78	53			
7/1/78	19			
8/14/78	12			
9/11/78	11			
10/9/78	9			
1/8/79	11			
2/12/79	25			
3/12/79	15			
4/18/79	11			
6/13/79	10			
7/9/79	10			
9/10/79	82			
10/8/79	12			
12/10/79	12			
1/14/80	125			
2/11/80	14			
3/11/80	18			
4/14/80	160			
5/12/80	16			
9/15/80	10			
10/13/80	8			
11/18/80	20			
12/8/80	6			
1/12/81	6			
2/9/81	20			
3/9/81	24			
4/13/81	5			
5/11/81	14			
6/8/81	28			
7/13/81	18			
8/10/81	4			
9/14/81	7.9			
10/12/81	3.8			
12/14/81	16			
1/11/82	36			
2/8/82	28			
3/8/82	37			
4/13/82	11			
5/11/82	10			
6/15/82	5			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
7/13/82	21			
8/10/82	17			
9/13/82	6.7			
10/11/82	4.5			
11/15/82	3.5			
12/14/82	53			
1/11/83	63			
2/7/83	110			
3/14/83	15			
4/12/83	60			
5/9/83	6.4			
6/13/83	12			
7/11/83	14			
8/8/83	80			
9/12/83	111			
10/10/83	4.4			
11/14/83	5.3			
12/12/83	256			
1/9/84	18			
3/14/84	266			
4/9/84	46			
5/14/84	5.7			
7/9/84	13			
9/10/84	14			
10/9/84	14			
11/13/84	18			
12/10/84	34			
1/14/85	18			
2/11/85	185			
3/11/85	19			
4/8/85	16			
5/13/85	20			
6/10/85	17			
7/8/85	28			
8/12/85	17			
9/9/85	61			
10/14/85	12			
11/18/85	65			
12/9/85	13			
1/13/86	18			
2/18/86	20			
3/18/86	14			
4/15/86	12			
5/13/86	20			
6/10/86	58			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
7/15/86	20			
8/12/86	9			
9/9/86	9			
10/14/86	23			
11/17/86	12			
12/8/86	14			
1/12/87	43			
2/16/87	90			
3/9/87	78			
4/13/87	14			
5/11/87	14			
6/8/87	9.6			
7/13/87	11			
8/10/87	26			
9/14/87	13			
10/12/87	4.2			
11/16/87	11			
12/14/87	4.4			
1/11/88	12			
2/8/88	36			
3/14/88	26			
4/11/88	29			
5/9/88	7			
6/13/88	6.8			
7/11/88	25			
9/12/88	51			
10/10/88	16			
11/14/88	228			
12/12/88	56			
1/9/89	14			
2/13/89	15			
3/14/89	23			
4/10/89	13			
5/8/89	30			
6/13/89	34			
7/11/89	56			
8/14/89	11			
9/12/89	39			
10/10/89	7.6			
11/13/89	11.5			
12/11/89	40.8			
1/8/90	120			
2/12/90	85			
3/12/90	24			
4/9/90	17			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
5/14/90	22			
6/11/90	17			
7/9/90	18			
8/13/90	11			
9/10/90	11			
10/15/90	7.4			
11/13/90	7.8			
12/10/90	14			
1/15/91	43			
2/4/91	50			
2/5/91	36			
3/12/91	16			
4/16/91	108			
5/14/91	34			
6/11/91	12			
7/16/91	11			
8/13/91	25			
9/10/91	20			
10/15/91	6			
11/19/91	7.1			
12/10/91	12			
1/6/92	7.7			
2/11/92	25			
3/10/92	53			
4/7/92	15			
5/12/92	17			
6/16/92	18			
7/14/92	13			
8/11/92	15			
9/15/92	8.1			
10/13/92	8.1			
11/17/92	19			
12/15/92	20			
1/12/93	85			
2/9/93	13			
3/9/93	23			
4/13/93	29			
5/11/93	16			
6/15/93	13			
7/13/93	14			
8/10/93	15			
9/14/93	7			
10/12/93	5.9			
11/16/93	137			
12/14/93	75			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
1/11/94	15			
2/8/94	40			
3/15/94	15			
4/12/94	19			
5/10/94	65			
6/14/94	15			
7/12/94	99			
8/9/94	8			
9/13/94	14			
10/11/94	14			
11/15/94	16			
12/13/94	20			
1/10/95	26			
2/14/95	29			
3/14/95	80			
4/4/95	26			
5/9/95	90			
6/13/95	16			
7/11/95	25.1			
8/15/95	14			
9/12/95	10			
10/10/95	10			
11/13/95	20			
12/11/95	24			
1/9/96	18			
2/12/96	18			
3/11/96	22			
4/9/96	16			
5/13/96	9.2			
6/10/96	13			
7/8/96	9			
8/12/96	17			
9/9/96	7			
10/14/96	6.2			
11/18/96	6			
12/9/96	5.6			
1/6/97	9.9			
2/17/97	40			
3/10/97	18			
4/14/97	18			
5/12/97	12			
6/9/97	100			
7/15/97	45			
8/11/97	36			
9/8/97	8.9			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
10/13/97	5.7			
11/17/97	6.5			
12/8/97	13			
1/12/98	105			
2/9/98	11			
3/9/98	100			
4/13/98	6.4			
5/11/98	9.9			
1/9/01	7.9			
2/13/01	39			
3/13/01	210			
4/9/01	9.6			
5/8/01	12			
6/12/01	132			
7/18/01	20			
8/14/01	140			
9/10/01	52			
10/9/01	6.3			
11/6/01	5.7			
12/3/01	7.7			
1/22/07	163		C	Unfiltered
2/12/07	10.4		C	Unfiltered
3/12/07	5.3		C	Unfiltered
4/2/07	8.1		C	Unfiltered
4/23/07	7.1		C	Unfiltered
5/14/07	10.1		C	Unfiltered
6/4/07	4.7		C	Unfiltered
6/25/07	509		C	Unfiltered
7/16/07	79.7		C	Unfiltered
8/6/07	12.4		C	Unfiltered
8/27/07	11.8		C	Unfiltered
9/24/07	8.3		C	Unfiltered
10/5/10	6.41		C	

Table A-4. TSS observations for LDEQ station 119 in subsegment 040301.

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
1/1/68	246		ppm		
2/1/68	6		ppm		
4/1/68	4		ppm		
5/1/68	42		ppm		
6/1/68	34		ppm		
7/1/68	16		ppm		
8/1/68	26		ppm		
9/1/68	24		ppm		
10/1/68	6		ppm		
11/1/68	20		ppm		
12/1/68	26		ppm		
1/1/69	42		ppm		
2/1/69	14		ppm		
3/1/69	98		ppm		
4/1/69	14		ppm		
6/1/69	44		ppm		
7/1/69	10		ppm		
8/1/69	28		ppm		
9/1/69	18		ppm		
10/1/69	8		ppm		
1/1/70	4		ppm		
2/1/70	16		ppm		
3/1/70	4		ppm		
5/1/70	12		ppm		
6/1/70	16		ppm		
7/1/70	18		ppm		
8/1/70	10		ppm		
9/1/70	28		ppm		
10/1/70	16		ppm		
11/1/70	12		ppm		
12/1/70	4		ppm		
1/1/71	23		ppm		
2/1/71	42		ppm		
3/1/71	50		ppm		
4/1/71	20		ppm		
5/1/71	20		ppm		
6/1/71	34		ppm		
7/1/71	16		ppm		
8/1/71	50		ppm		
9/1/71	24		ppm		
10/1/71	38		ppm		
12/1/71	62		ppm		
1/1/72	22		ppm		
2/1/72	16		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
3/1/72	18		ppm		
4/1/72	34		ppm		
5/1/72	8		ppm		
6/1/72	34		ppm		
7/1/72	6		ppm		
8/1/72	4		ppm		
9/1/72	20		ppm		
10/1/72	28		ppm		
12/1/72	4		ppm		
1/1/73	8		ppm		
2/1/73	2		ppm		
3/1/73	2		ppm		
4/1/73	192		ppm		
5/1/73	24		ppm		
6/1/73	6		ppm		
7/1/73	2		ppm		
8/1/73	22		ppm		
9/1/73	34		ppm		
10/1/73	24		ppm		
11/1/73	6		ppm		
12/1/73	62		ppm		
1/2/74	96		ppm		
2/4/74	30		ppm		
3/4/74	20		ppm		
4/1/74	8		ppm		
5/1/74	4		ppm		
7/1/74	10		ppm		
7/30/74	4		ppm		
9/3/74	22		ppm		
11/4/74	72		ppm		
12/2/74	40		ppm		
12/31/74	96		ppm		
2/3/75	42		ppm		
3/3/75	2		ppm		
3/31/75	16		ppm		
4/30/75	32		ppm		
6/2/75	10		ppm		
6/30/75	62		ppm		
8/1/75	30		ppm		
9/1/75	18		ppm		
10/1/75	16		ppm		
11/5/75	2		ppm		
12/2/75	4		ppm		
3/8/76	30		ppm		
4/5/76	28		ppm		
6/1/76	20		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
7/14/76	44		ppm		
8/5/76	58		ppm		
9/3/76	14		ppm		
10/7/76	12		ppm		
11/9/76	18		ppm		
12/14/76	36		ppm		
1/3/77	15		ppm		
2/10/77	40		ppm		
3/30/77	42		ppm		
5/4/77	30		ppm		
5/31/77	4		ppm		
10/10/77	114		ppm		
1/4/78	24		ppm		
5/8/78	164		ppm		
6/12/78	20		ppm		
8/14/78	2		ppm		
9/11/78	2		ppm		
10/9/78	26		ppm		
9/15/80	38		ppm		
10/13/80	8		ppm		
12/8/80	20		ppm		
1/12/81	14		ppm		
2/9/81	34		ppm		
3/9/81	34		ppm		
4/13/81	20		ppm		
5/11/81	14		ppm		
6/8/81	32		ppm		
7/13/81	16		ppm		
8/10/81	16		ppm		
9/14/81	14		ppm		
10/12/81	14		ppm		
12/14/81	56		ppm		
1/11/82	42		ppm		
2/8/82	34		ppm		
3/8/82	49		ppm		
4/13/82	14		ppm		
5/11/82	26		ppm		
6/15/82	4		ppm		
7/13/82	26		ppm		
8/10/82	25		ppm		
9/13/82	10		ppm		
10/11/82	6		ppm		
11/15/82	2		ppm		
12/14/82	92		ppm		
1/11/83	56		ppm		
2/7/83	208		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
3/14/83	12		ppm		
4/12/83	74		ppm		
6/13/83	9		ppm		
7/11/83	15		ppm		
8/8/83	62		ppm		
9/12/83	14		ppm		
10/10/83	5		ppm		
11/14/83	4		ppm		
12/12/83	320		ppm		
1/9/84	12		ppm		
2/13/84	390		ppm		
3/14/84	220		ppm		
4/9/84	52		ppm		
5/14/84	5		ppm		
7/9/84	9		ppm		
9/10/84	10		ppm		
10/9/84	11		ppm		
11/13/84	14		ppm		
12/10/84	28		ppm		
1/14/85	12		ppm		
2/11/85	206		ppm		
3/11/85	16		ppm		
4/8/85	8		ppm		
5/13/85	11		ppm		
6/10/85	19		ppm		
7/8/85	19		ppm		
8/12/85	6		ppm		
9/9/85	44		ppm		
10/14/85	14		ppm		
11/18/85	102		ppm		
12/9/85	4		ppm		
1/13/86	12		ppm		
2/18/86	26		ppm		
3/18/86	28		ppm		
4/15/86	36		ppm		
5/13/86	24		ppm		
6/10/86	26		ppm		
7/15/86	6		ppm		
8/12/86	6		ppm		
9/9/86	12		ppm		
10/14/86	46		ppm		
11/17/86	4		ppm		
12/8/86	6		ppm		
1/12/87	8		ppm		
2/16/87	408		ppm		
3/9/87	170		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
4/13/87	14		ppm		
5/11/87	14		ppm		
6/8/87	14		ppm		
7/13/87	16		ppm		
8/10/87	44		ppm		
9/14/87	16		ppm		
10/12/87	7		ppm		
11/16/87	8		ppm		
12/14/87	11		ppm		
1/11/88	3		ppm		
2/8/88	60		ppm		
3/14/88	54		ppm		
4/11/88	30		ppm		
5/9/88	11		ppm		
6/13/88	10		ppm		
7/11/88	34		ppm		
9/12/88	64		ppm		
10/10/88	20		ppm		
11/14/88	352		ppm		
12/12/88	120		ppm		
1/9/89	2		ppm		
2/13/89	16		ppm		
3/14/89	28		ppm		
4/10/89	31		ppm		
5/8/89	39		ppm		
6/13/89	52		ppm		
7/11/89	132		ppm		
8/14/89	13		ppm		
9/12/89	82		ppm		
10/10/89	8		ppm		
11/13/89	16		ppm		
1/8/90	276		ppm		
2/12/90	140		ppm		
3/12/90	16		ppm		
4/9/90	13		ppm		
5/14/90	27		ppm		
6/11/90	8		ppm		
7/9/90	3		ppm		
8/13/90	13		ppm		
9/10/90	19		ppm		
10/15/90	13		ppm		
11/13/90	8		ppm		
12/10/90	17		ppm		
1/15/91	50		ppm		
2/4/91	70		ppm		
2/5/91	50		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
3/12/91	22		ppm		
4/16/91	202		ppm		
5/14/91	66		ppm		
6/11/91	10		ppm		
7/16/91	4		ppm		
8/13/91	29		ppm		
9/10/91	50		ppm		
10/15/91	8		ppm		
11/19/91	9		ppm		
12/10/91	11		ppm		
1/6/92	8		ppm		
2/11/92	32		ppm		
3/10/92	78		ppm		
4/7/92	31		ppm		
5/12/92	20		ppm		
6/16/92	27		ppm		
7/14/92	42		ppm		
8/11/92	8		ppm		
9/15/92	15		ppm		
10/13/92	3		ppm		
11/17/92	12		ppm		
12/15/92	12		ppm		
1/12/93	184		ppm		
2/9/93	10		ppm		
3/9/93	16		ppm		
4/13/93	23		ppm		
5/11/93	15		ppm		
6/15/93	8		ppm		
7/13/93	17		ppm		
8/10/93	8		ppm		
9/14/93	9		ppm		
10/12/93	4		ppm		
11/16/93	212		ppm		
12/14/93	96		ppm		
1/11/94	4		ppm		
2/8/94	45		ppm		
3/15/94	18		ppm		
4/12/94	26		ppm		
5/10/94	128		ppm		
6/14/94	15		ppm		
7/12/94	172		ppm		
8/9/94	6.5		ppm		
9/13/94	10		ppm		
10/11/94	14		ppm		
11/15/94	11		ppm		
12/13/94	16		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
1/10/95	21		ppm		
2/14/95	13		ppm		
3/14/95	184		ppm		
4/4/95	11		ppm		
5/9/95	164		ppm		
6/13/95	12		ppm		
7/11/95	16		ppm		
8/15/95	26		ppm		
9/12/95	12		ppm		
10/10/95	14		ppm		
11/13/95	23		ppm		
12/11/95	26		ppm		
1/9/96	14		ppm		
2/12/96	11		ppm		
3/11/96	20		ppm		
4/9/96	17		ppm		
5/13/96	13		ppm		
6/10/96	18		ppm		
7/8/96	59		ppm		
8/12/96	24		ppm		
9/9/96	9		ppm		
10/14/96	7.5		ppm		
11/18/96	9.5		ppm		
12/9/96	5.5		ppm		
1/6/97	11.5		ppm		
2/17/97	56		ppm		
3/10/97	10		ppm		
4/14/97	18		ppm		
5/12/97	7		ppm		
6/9/97	138		ppm		
7/15/97	26		ppm		
8/11/97	34		ppm		
9/8/97	8		ppm		
10/13/97	5.5		ppm		
11/17/97	4		ppm		
12/8/97	6		ppm		
1/12/98	128		ppm		
2/9/98	7		ppm		
3/9/98	116		ppm		
4/13/98	4.5		ppm		
5/11/98	6.4		ppm		
1/9/01	5		ppm		
2/13/01	30		ppm		
3/13/01	436		ppm		
4/9/01	15.3		ppm		
5/8/01	16		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
6/12/01	332		ppm		
7/18/01	22		ppm		
8/14/01	328		ppm		
9/10/01	83		ppm		
10/9/01	11		ppm		
11/6/01	7		ppm		
12/3/01	5.3		ppm		
1/22/07	296		mg/L	C	Unfiltered
2/12/07	15		mg/L	C	Unfiltered
3/12/07	5.5		mg/L	C	Unfiltered
4/2/07	14.5		mg/L	C	Unfiltered
4/23/07	9		mg/L	C	Unfiltered
5/14/07	10		mg/L	C	Unfiltered
6/4/07	4		mg/L	C	Unfiltered
6/25/07	6		mg/L	C	Unfiltered
7/16/07	137		mg/L	C	Unfiltered
8/6/07	14		mg/L	C	Unfiltered
8/27/07	20		mg/L	C	Unfiltered
9/24/07	6.5		mg/L	C	Unfiltered
10/5/10	4		mg/L	C	

Table A-5. Turbidity observations for LDEQ station 1102 in subsegment 040401.

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
1/16/01	10			
2/20/01	23			
3/20/01	27			
4/16/01	11			
5/15/01	9			
6/19/01	14			
7/24/01	16			
8/21/01	17			
9/18/01	15			
10/16/01	50			
11/13/01	5.4			
12/11/01	7.7			
1/10/06	15	1		Unfiltered
2/7/06	50	1		Unfiltered
3/7/06	26	1		Unfiltered
3/21/06	21	1		Unfiltered
4/4/06	17	1		Unfiltered
4/18/06	9.6	1		Unfiltered
5/2/06	40	1		Unfiltered
6/13/06	4.1	1		Unfiltered
7/31/06	13	1		Unfiltered
9/6/06	9.8	1	C	Unfiltered

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
11/16/06	30.5	1	C	Unfiltered
12/19/06	7.7	1	C	Unfiltered
1/13/10	12.7		C	Unfiltered
2/2/10	33.7		C	Unfiltered
3/3/10	50		C	Unfiltered
4/20/10	17.4		C	Unfiltered
5/13/10	11		C	Unfiltered
6/8/10	14.7		C	Unfiltered
7/20/10	7.71		C	Unfiltered
8/16/10	9.41		C	Unfiltered
9/14/10	5.68		C	Unfiltered
10/19/10	4.53		C	Unfiltered
11/22/10	6.77		C	Unfiltered

Table A-6. TSS observations for LDEQ station 1102 in subsegment 040401.

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
1/16/01	7.3		ppm		
2/20/01	11.3		ppm		
3/20/01	24		ppm		
4/16/01	5		ppm		
5/15/01	11.2		ppm		
6/19/01	22		ppm		
7/24/01	11.5		ppm		
8/21/01	9.5		ppm		
9/18/01	4		ppm		
10/16/01	44		ppm		
11/13/01	6		ppm		
12/11/01	6.5		ppm		
2/7/06	26	4	ppm		Unfiltered
4/4/06	13.3	4	ppm		Unfiltered
3/7/06	16	4	ppm		Unfiltered
1/10/06	18	4	ppm		Unfiltered
4/18/06	10.7	4	ppm		Unfiltered
5/2/06	40.7	4	ppm		Unfiltered
7/31/06	5	4	ppm		Unfiltered
6/13/06	6.5	4	ppm		Unfiltered
2/2/10	15		mg/L	C	Unfiltered
9/6/06	10.5	4	mg/l	C	Unfiltered
11/16/06	45	4	mg/L	C	Unfiltered
12/19/06	5.5	4	mg/L	C	Unfiltered
1/13/10	11		mg/L	C	Unfiltered
3/21/06	27.3	4	ppm		Unfiltered
5/13/10	10		mg/L	C	Unfiltered
7/20/10	12		mg/L	C	Unfiltered

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
4/20/10	12		mg/L	C	Unfiltered
3/3/10	67		mg/L	C	Unfiltered
6/8/10	12		mg/L	C	Unfiltered
9/14/10	9		mg/L	C	Unfiltered
8/16/10	4		mg/L	C	Unfiltered
10/19/10	15		mg/L	C	Unfiltered
11/22/10	NONDETECT			C	Unfiltered

Table A-7. Turbidity observations for LDEQ station 302 in subsegment 040903.

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
1/15/91	18			
3/12/91	23			
5/14/91	20			
7/16/91	11			
9/10/91	18			
11/19/91	11			
1/7/92	17			
3/10/92	21			
5/12/92	25			
7/14/92	25			
9/15/92	10			
11/17/92	22			
1/12/93	22			
3/9/93	54			
5/11/93	33			
7/13/93	14			
9/14/93	20			
11/15/93	32			
1/10/94	90			
3/14/94	50			
5/10/94	37			
7/12/94	15			
9/13/94	15			
11/15/94	12			
1/10/95	26			
3/14/95	24			
7/11/95	6.7			
9/12/95	4.5			
11/14/95	8			
1/8/96	15			
3/11/96	25			
5/14/96	3.5			
7/8/96	3.6			
9/10/96	4.9			

Collection Date	Result (NTU)	MDL (NTU)	Analytical Fraction	Filtration Method
11/18/96	2.6			
1/7/97	15			
3/11/97	27			
5/13/97	10			
7/15/97	45			
9/9/97	5			
11/17/97	50			
1/13/98	31			
3/9/98	23			
5/11/98	17			
1/16/01	15			
2/13/01	18			
3/20/01	21			
4/17/01	12			
5/15/01	15			
6/12/01	5.7			
7/17/01	5.9			
8/14/01	80			
9/11/01	15			
10/9/01	4.2			
11/6/01	3.4			
12/11/01	2.9			
1/30/07	32		C	Unfiltered
2/27/07	17.6		C	Unfiltered
3/20/07	44.7		C	Unfiltered
4/10/07	7.3		C	Unfiltered
5/1/07	9.7		C	Unfiltered
5/22/07	30.6		C	Unfiltered
6/12/07	29.7		C	Unfiltered
7/10/07	25.8		C	Unfiltered
7/31/07	6.7		C	Unfiltered
8/21/07	3.1		C	Unfiltered
9/19/07	1.6		C	Unfiltered
10/10/07	3.9		C	Unfiltered
10/12/10	8.92		C	

Table A-8. TSS observations for LDEQ station 302 in subsegment 040903.

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
1/15/91	22		ppm		
3/12/91	19		ppm		
5/14/91	20		ppm		
7/16/91	12		ppm		
9/10/91	24		ppm		
11/19/91	24		ppm		
1/7/92	18		ppm		
3/10/92	28		ppm		
5/12/92	26		ppm		
7/14/92	22		ppm		
9/15/92	17		ppm		
11/17/92	20		ppm		
1/12/93	12		ppm		
3/9/93	25		ppm		
5/11/93	30		ppm		
7/13/93	30		ppm		
9/14/93	37		ppm		
11/15/93	17		ppm		
1/10/94	236		ppm		
3/14/94	30		ppm		
5/10/94	45		ppm		
7/12/94	19		ppm		
9/13/94	8		ppm		
11/15/94	15		ppm		
1/10/95	10		ppm		
3/14/95	18		ppm		
7/11/95	29		ppm		
9/12/95	15		ppm		
11/14/95	9		ppm		
1/8/96	6		ppm		
3/11/96	6107		ppm		
5/14/96	6		ppm		
7/8/96	1		ppm		
9/10/96	30		ppm		
11/18/96	11.3		ppm		
1/7/97	18.7		ppm		
3/11/97	18		ppm		
5/13/97	10		ppm		
7/15/97	138		ppm		
9/9/97	12		ppm		
11/17/97	14		ppm		
1/13/98	16		ppm		
3/9/98	4		ppm		
5/11/98	27		ppm		

Collection Date	Result	MDL	Units	Analytical Fraction	Filtration Method
1/16/01	9.5		ppm		
2/13/01	28		ppm		
3/20/01	7.4		ppm		
4/17/01	15.4		ppm		
5/15/01	58		ppm		
6/12/01	5		ppm		
7/17/01	7		ppm		
8/14/01	456		ppm		
9/11/01	29		ppm		
10/9/01	6.5		ppm		
11/6/01	6.5		ppm		
12/11/01	4		ppm		
1/30/07	27		mg/L	C	Unfiltered
2/27/07	19		mg/L	C	Unfiltered
3/20/07	42.5		mg/L	C	Unfiltered
4/10/07	13		mg/L	C	Unfiltered
5/1/07	12		mg/L	C	Unfiltered
5/22/07	42.5		mg/L	C	Unfiltered
6/12/07	7		mg/L	C	Unfiltered
7/10/07	5		mg/L	C	Unfiltered
7/31/07	6		mg/L	C	Unfiltered
8/21/07	13		mg/L	C	Unfiltered
9/19/07	5		mg/L	C	Unfiltered
10/10/07	5.5		mg/L	C	Unfiltered
10/12/10	21.5		mg/L	C	

APPENDIX B: Turbidity and TSS Figures for the Lake Pontchartrain Basin

FIGURES

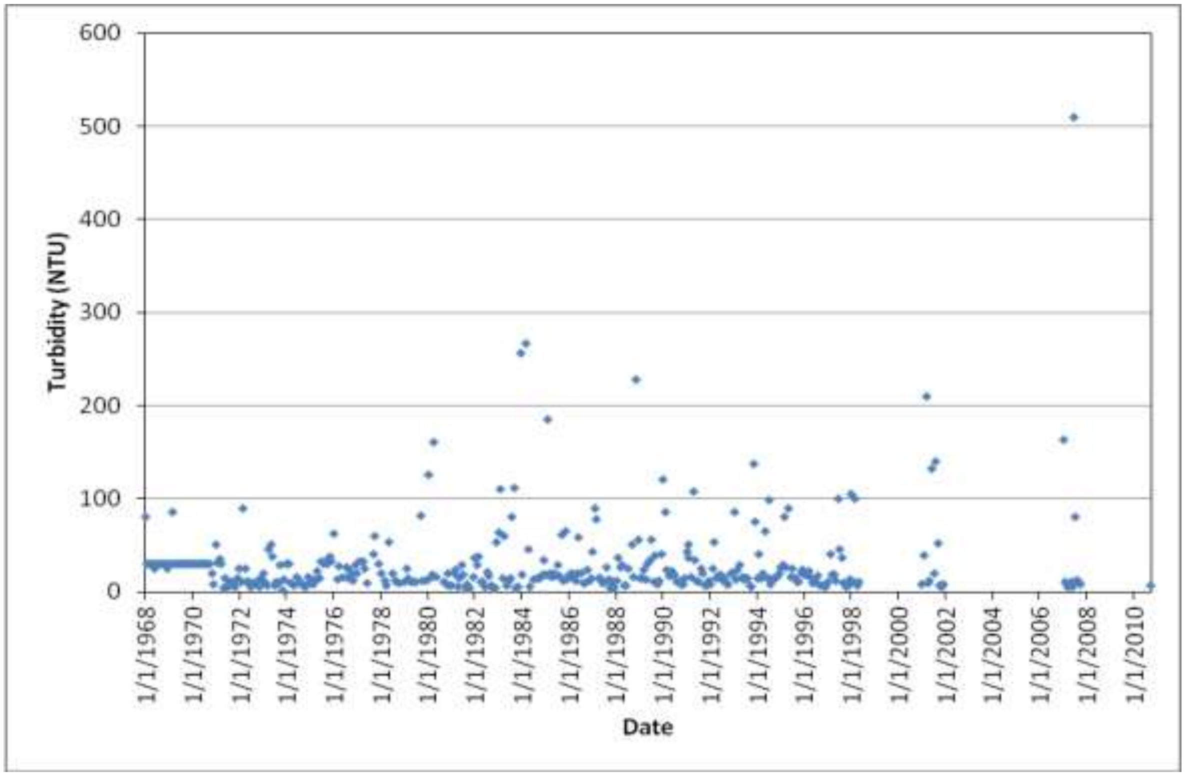

Figure B-1. Turbidity observations over time at Amite River at Grangeville, Louisiana (subsegment 030101, station 119).

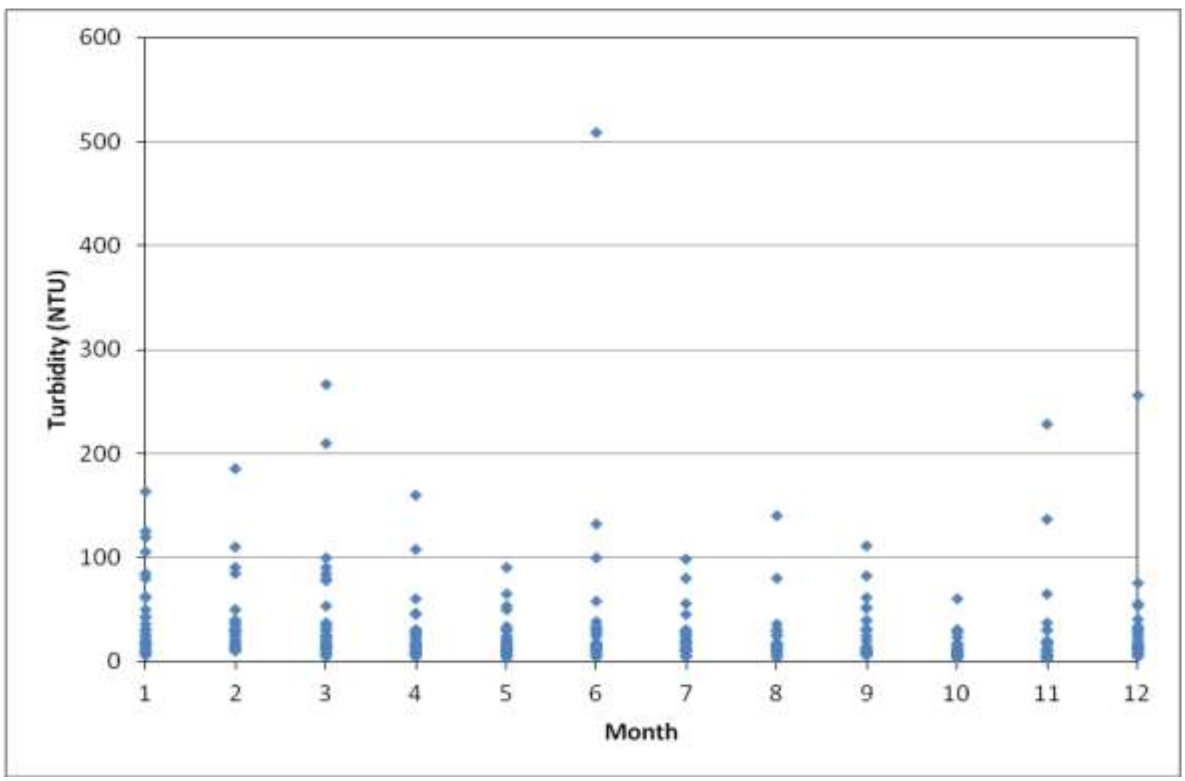

Figure B-2. Seasonal turbidity observations at Amite River at Grangeville, Louisiana (subsegment 030101, station 119).

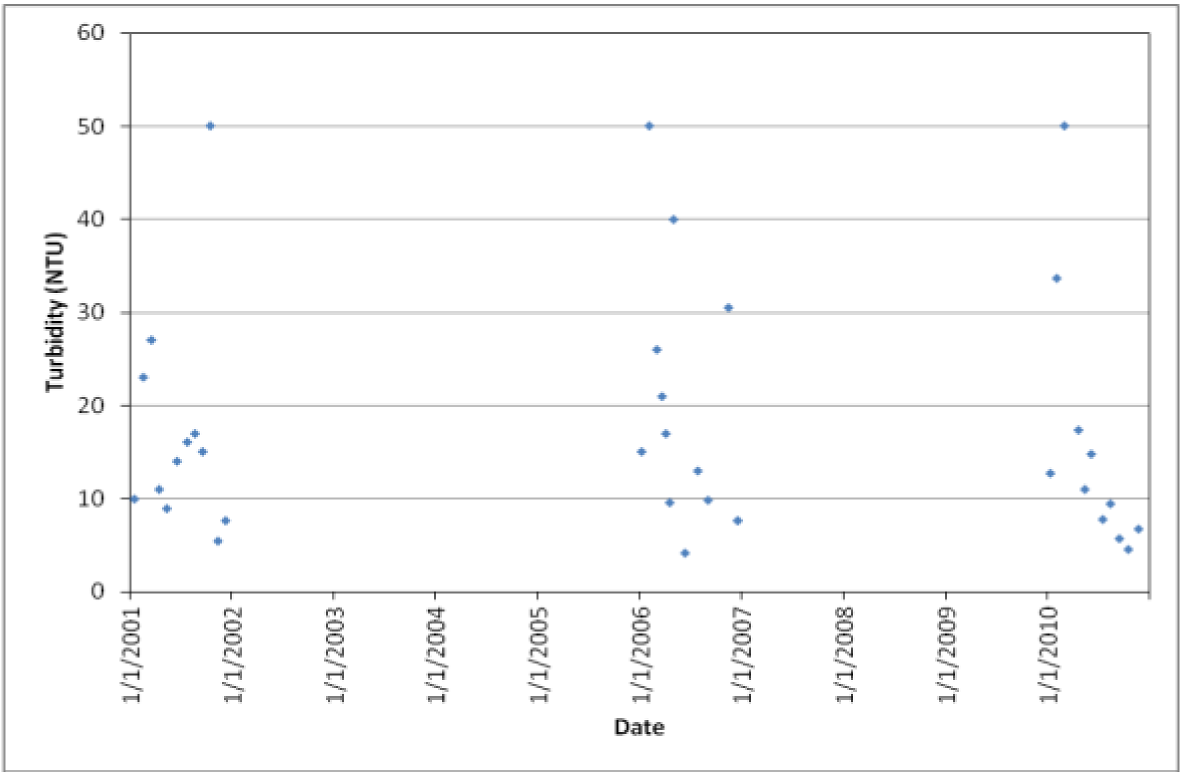

Figure B-3. Turbidity observations over time at Blind River near confluence with Lake Maurepas (subsegment 040401, station 1102).

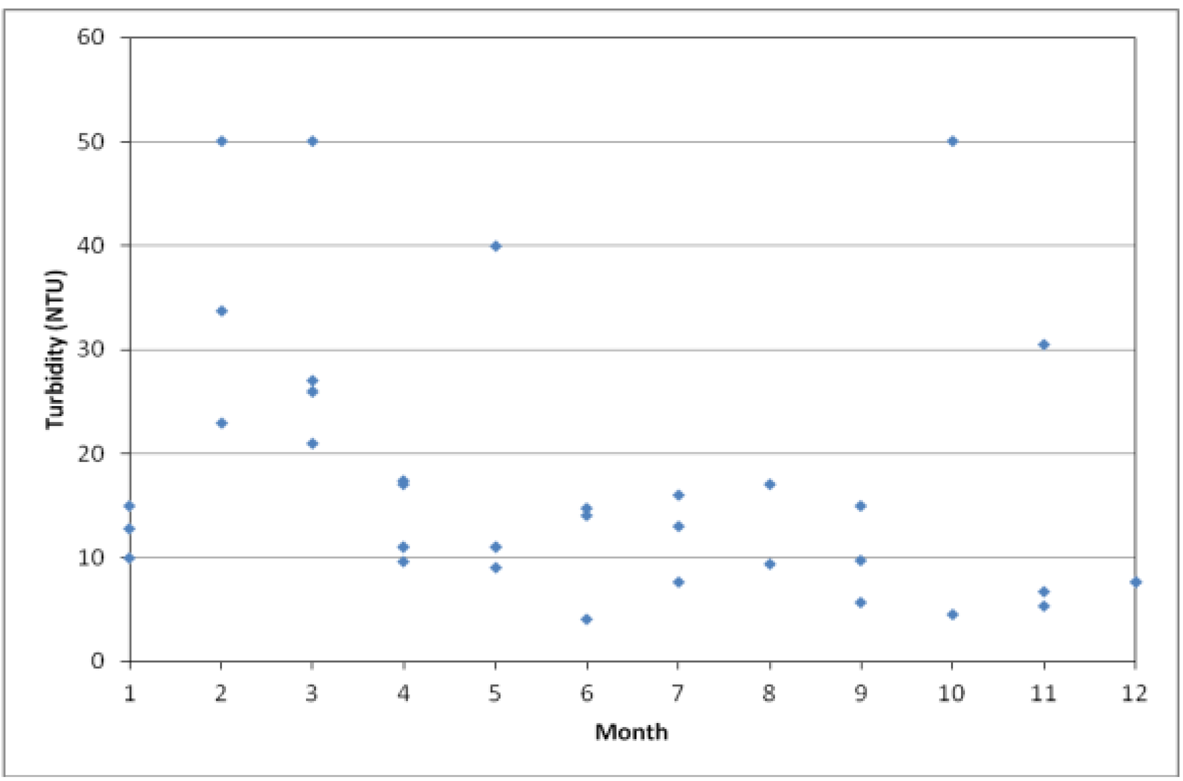

Figure B-4. Seasonal turbidity observations at Blind River near confluence with Lake Maurepas (subsegment 040401, station 1102).

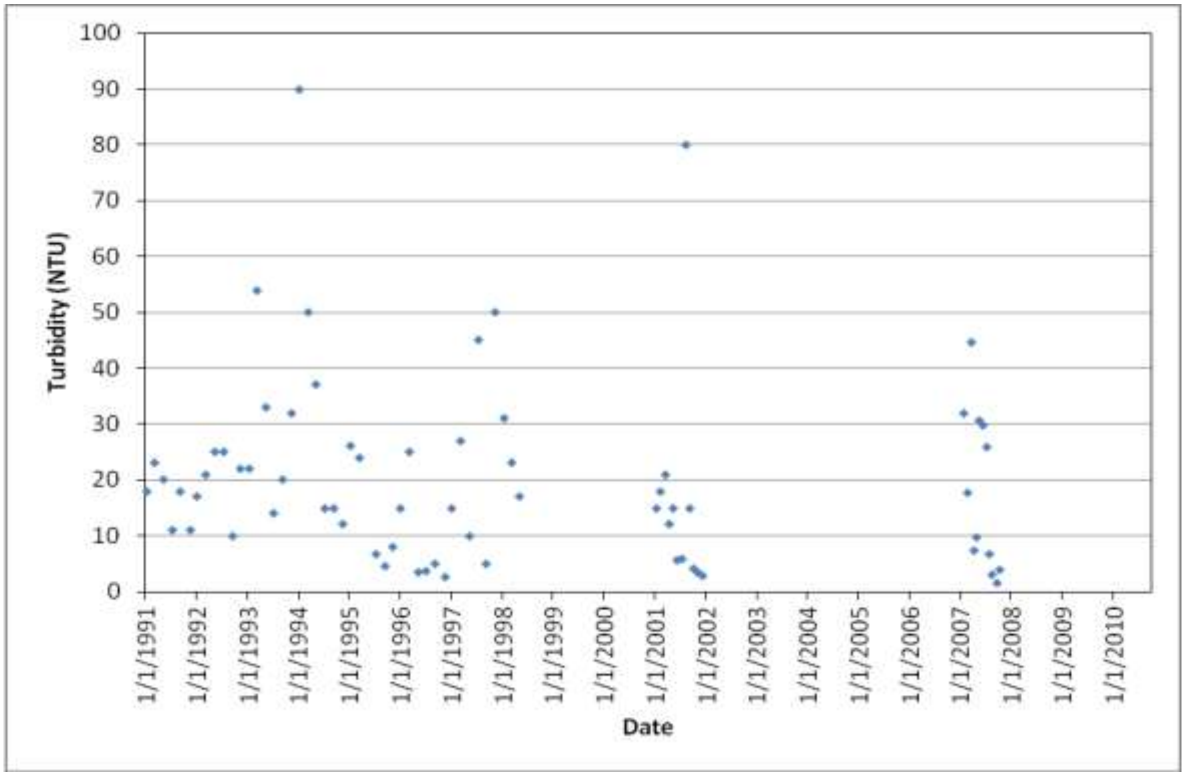

Figure B-5. Turbidity observations over time at Cane Bayou east of Mandeville, Louisiana (040903, station 302).

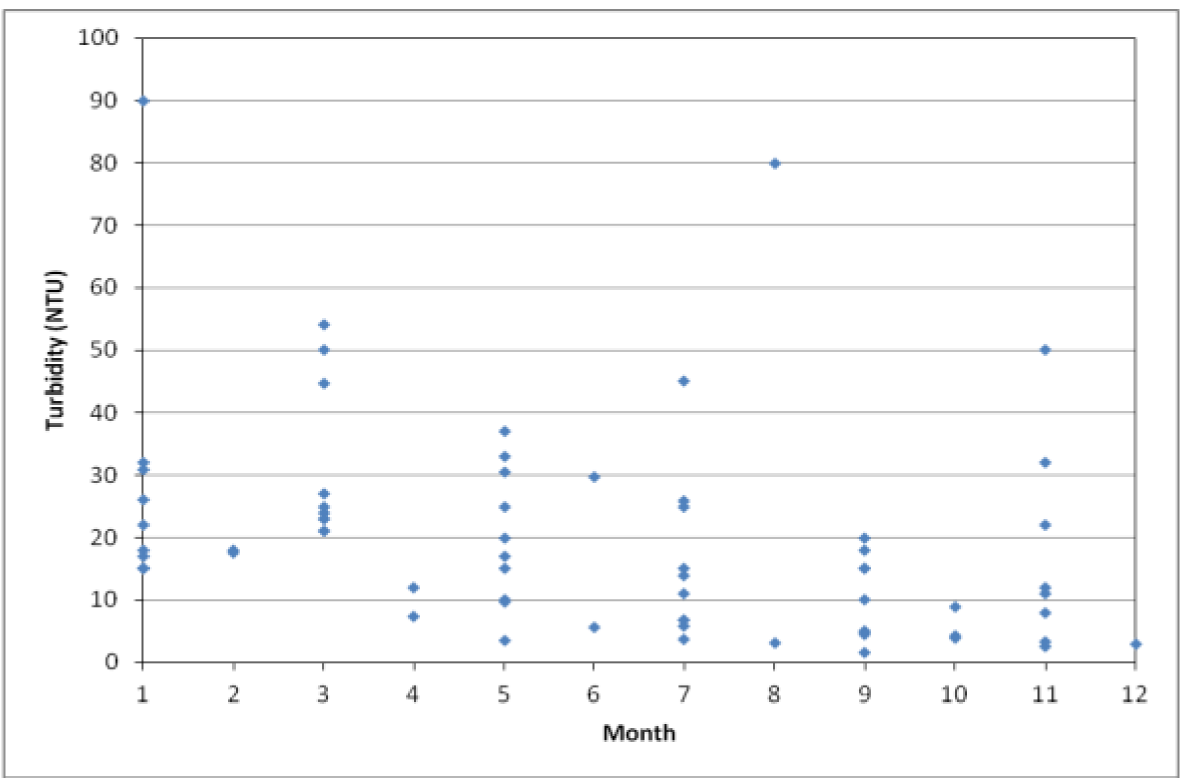

Figure B-6. Seasonal turbidity observations at Cane Bayou east of Mandeville, Louisiana (040903, station 302).

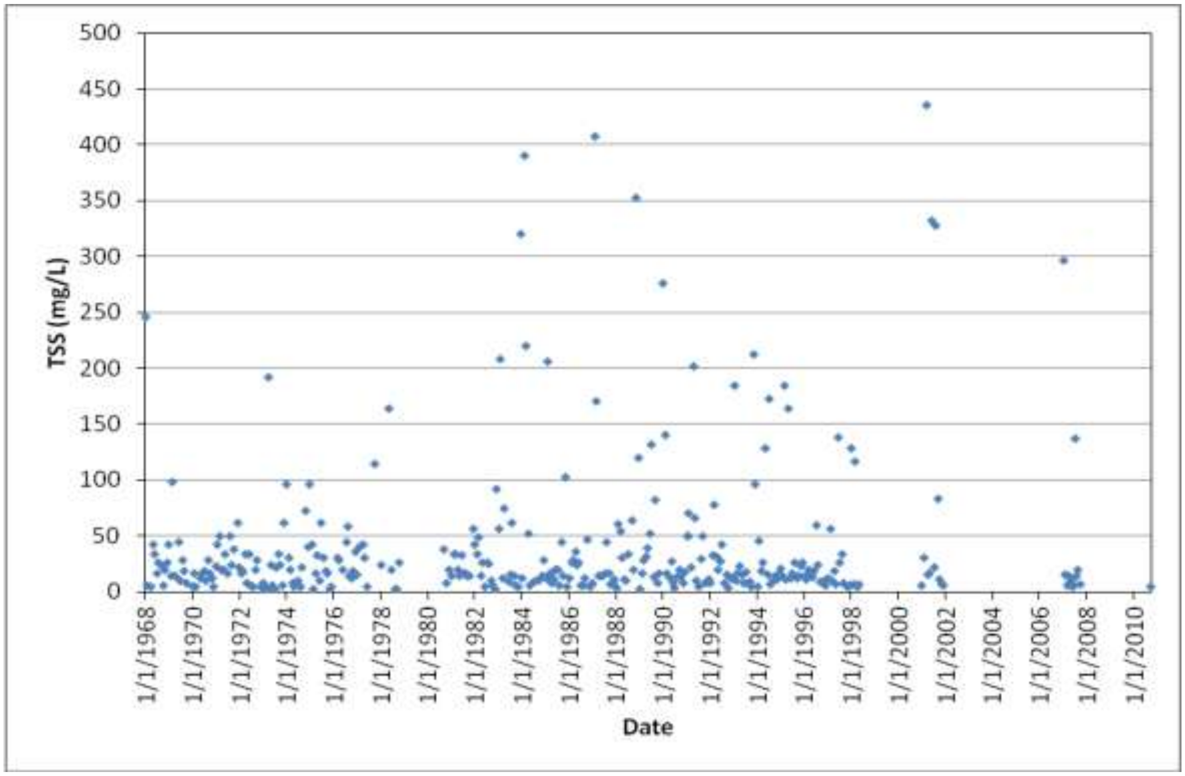

Figure B-7. TSS observations over time at Amite River at Grangeville, Louisiana (subsegment 040301, station 119).

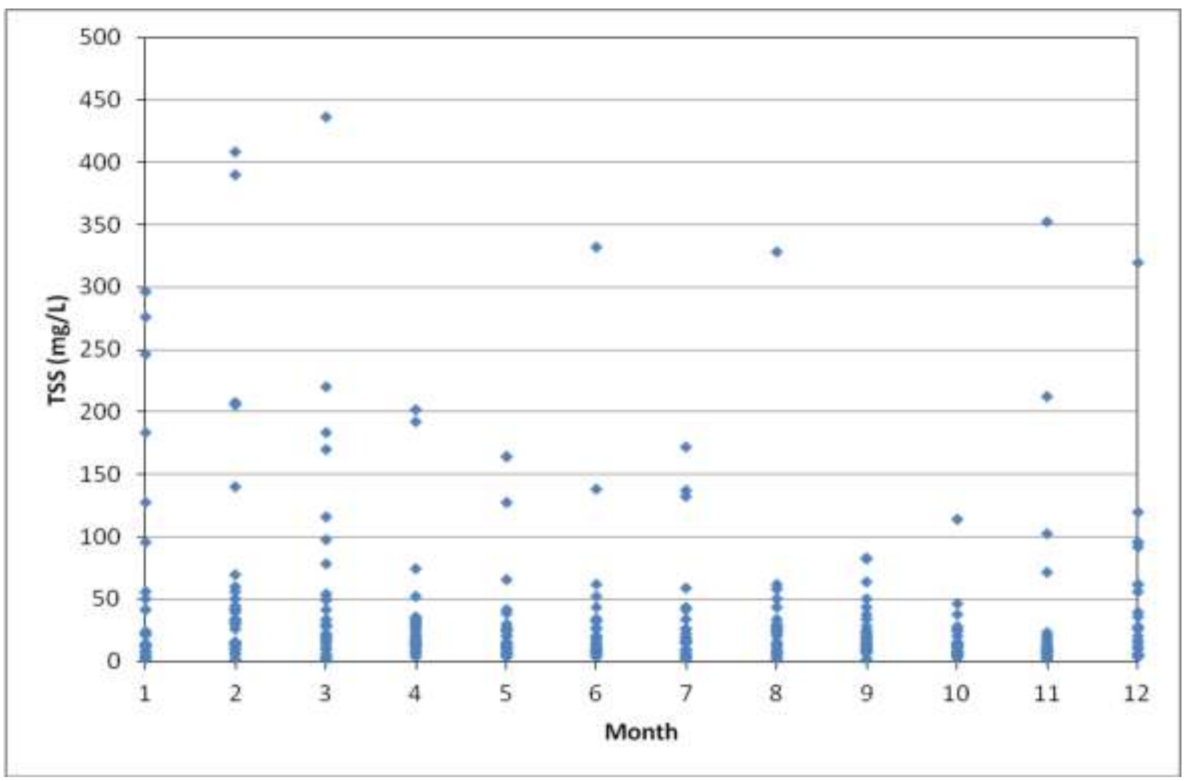

Figure B-8. Seasonal TSS observations at at Amite River at Grangeville, Louisiana (subsegment 040301, station 119).

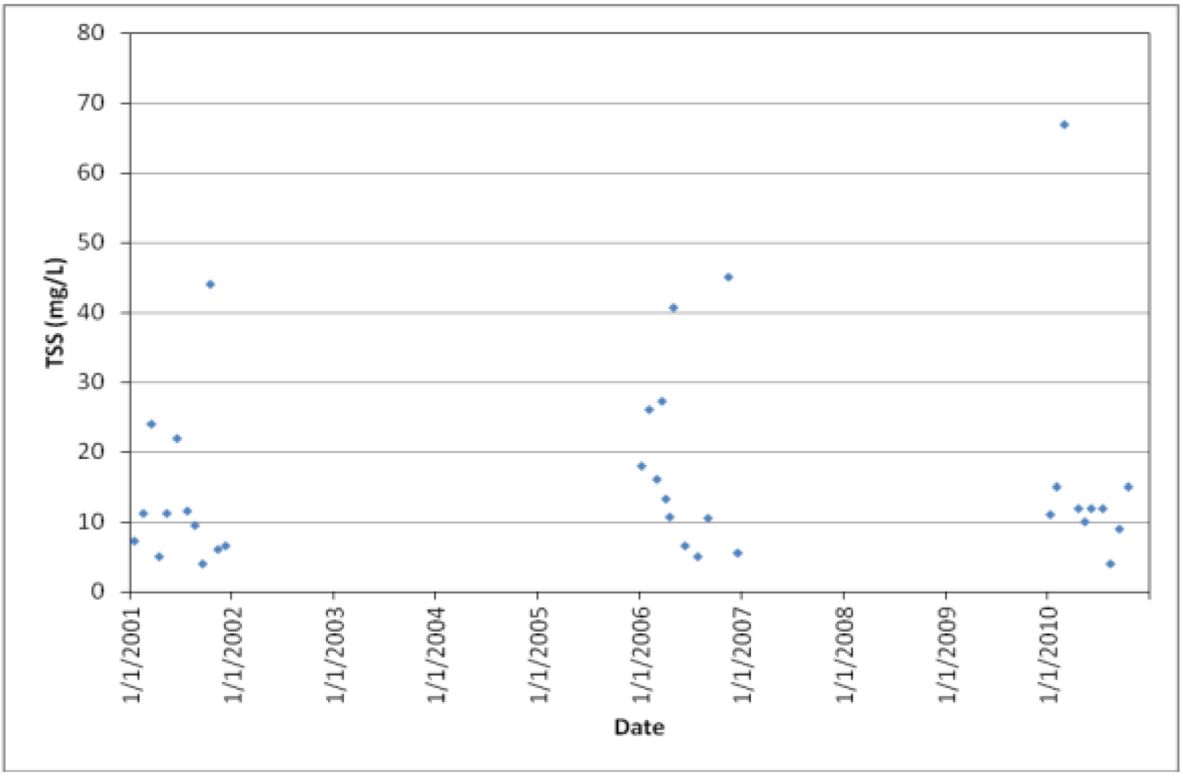

Figure B-9. TSS observations over time at Blind River near confluence with Lake Maurepas (subsegment 040401, station 1102).

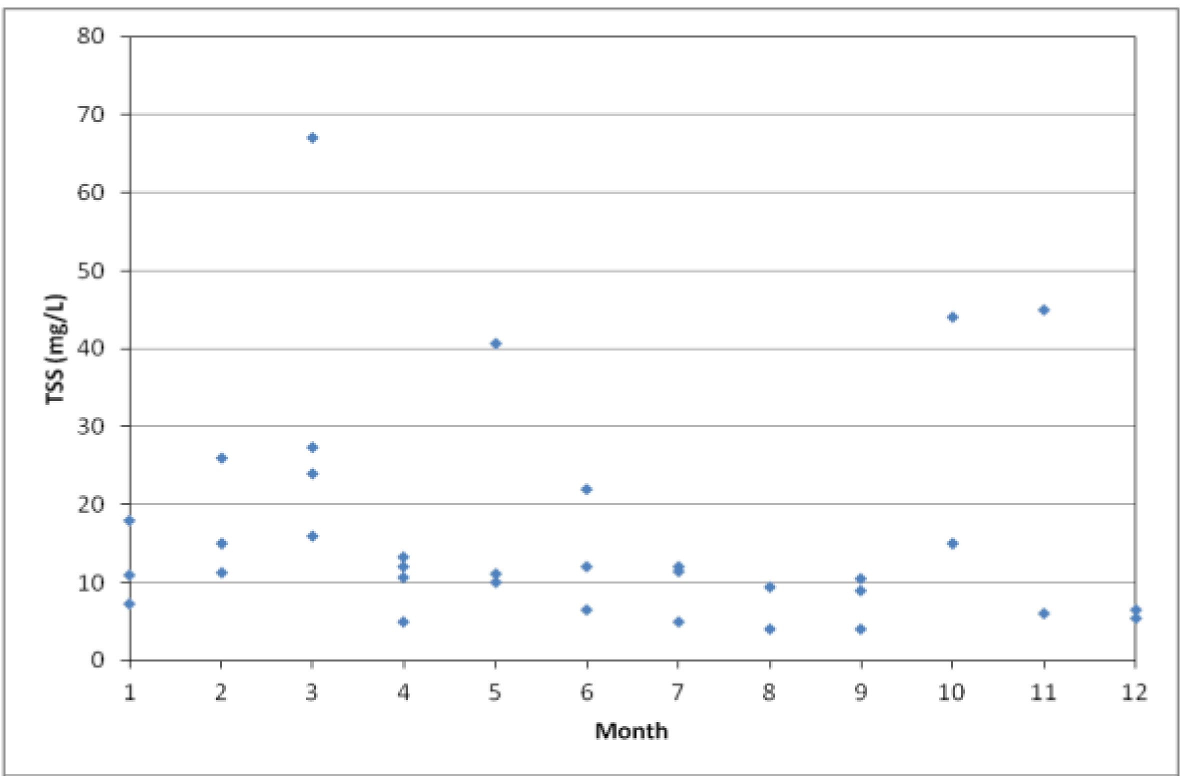

Figure B-10. Seasonal TSS observations at Blind River near confluence with Lake Maurepas (subsegment 040401, station 1102).

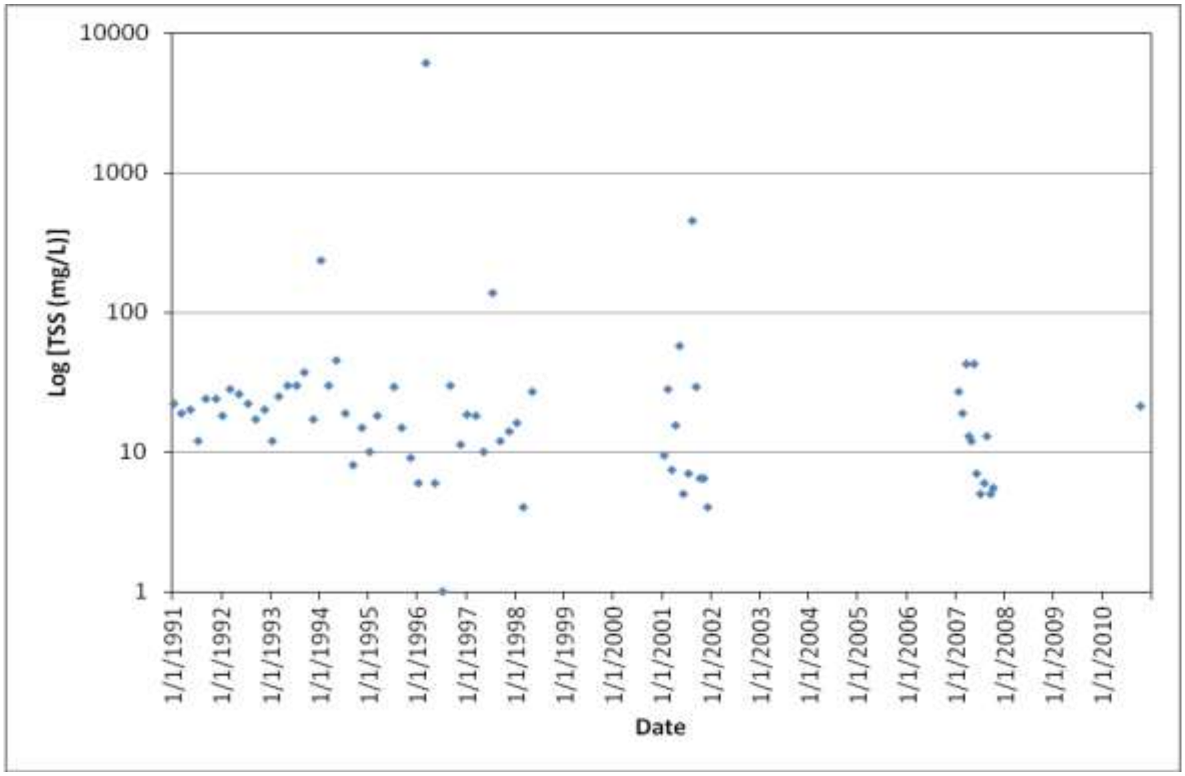

Figure B-11. TSS observations over time at Cane Bayou east of Mandeville, Louisiana (subsegment 040903, station 302).

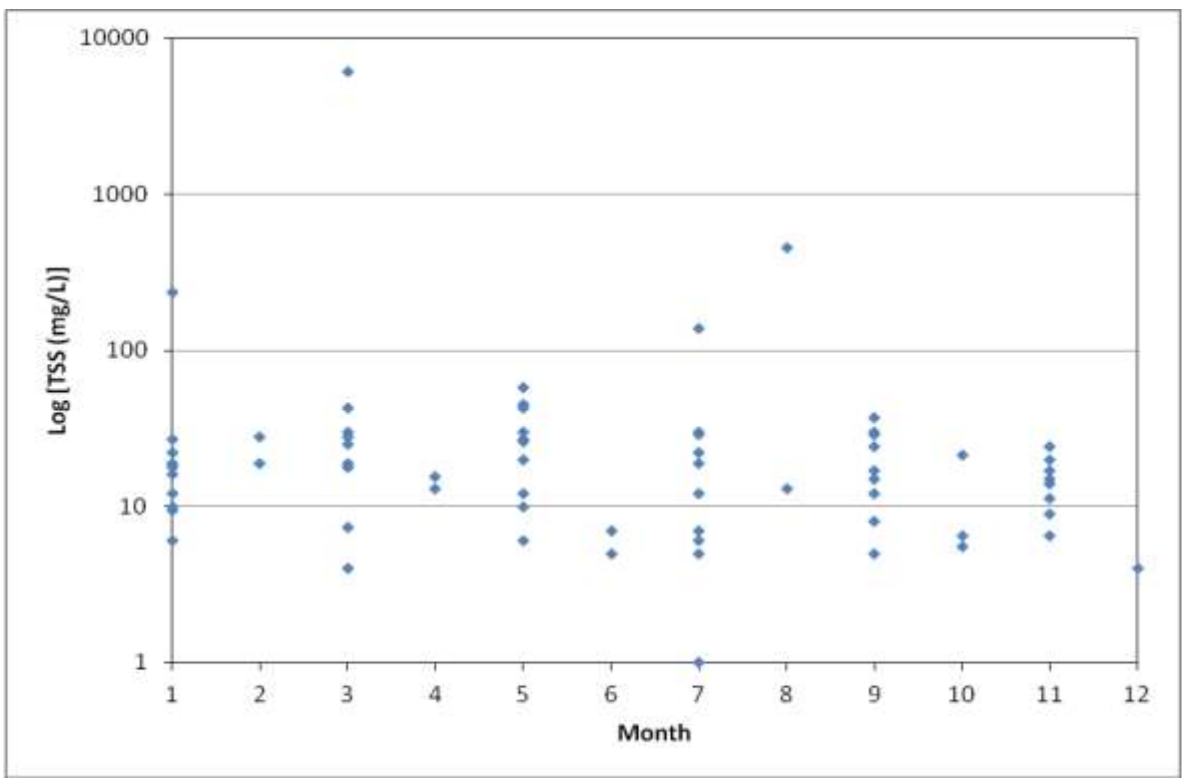

Figure B-12. Seasonal TSS observations at Cane Bayou east of Mandeville, Louisiana (subsegment 040903, station 302).

APPENDIX C: TSS TMDL Calculations for Selected Subsegments in the Lake Pontchartrain Basin

Table C-1. TSS concentrations before and after reductions for subsegment 040301 station 119

Date	TSS concentration before reduction (mg/L)	TSS concentration after reduction (mg/L)	TSS loading before reduction (lb/d)	TSS loading after reduction (lb/d)
1/1/1968	246	241.763	721,760.607	709,328.320
2/1/1968	6	5.897	17,603.917	17,300.691
4/1/1968	4	3.931	11,735.945	11,533.794
5/1/1968	42	41.277	123,227.421	121,104.835
6/1/1968	34	33.414	99,755.531	98,037.248
7/1/1968	16	15.724	46,943.779	46,135.175
9/1/1968	24	23.587	70,415.669	69,202.763
10/1/1968	6	5.897	17,603.917	17,300.691
11/1/1968	20	19.656	58,679.724	57,668.969
12/1/1968	26	25.552	76,283.641	74,969.660
1/1/1969	42	41.277	123,227.421	121,104.835
2/1/1969	14	13.759	41,075.807	40,368.278
Most of the cells in this spreadsheet have been hidden for brevity.				
2/12/07	15	14.742	44,009.793	43,251.727
4/2/07	15	14.250	42,542.800	41,810.003
5/14/07	10	9.828	29,339.862	28,834.485
6/25/07	6	5.897	17,603.917	17,300.691
3/12/07	6	5.405	16,136.924	15,858.967
6/4/07	4	3.931	11,735.945	11,533.794
9/24/07	7	6.388	19,070.910	18,742.415
8/6/07	14	13.759	41,075.807	40,368.278
8/27/07	20	19.656	58,679.724	57,668.969
4/23/07	9	8.845	26,405.876	25,951.036
10/5/10	4	3.931	11,735.945	11,533.794

Table C-2. Lead TMDL summary table for subsegment 040301

Average water budget (mm/day)		2.51
Subsegment area (acres)		131,059
Calculated flow (cfs)		544.0
Turbidity criteria (NTU)		50.0
TSS target (mg/L)		428.5
TSS target as loading (lb/d)		1,257,183.750
Wasteload allocation (lb/d)		14.2540
Point source flow (MGD)		0.11
	Before reduction	After reduction
Average concentration (mg/L)	40.0853	39.3948
Average loading (lb/d)	117,609.700	115,583.8794
TMDL (lb/d)	1,257,198.004	1,257,198.004

Table C-3. TSS concentrations before and after reductions for subsegment 040401 station 1102

Date	TSS concentration before reduction (mg/L)	TSS concentration after reduction (mg/L)	TSS loading before reduction (lb/d)	TSS loading after reduction (lb/d)
1/16/2001	7.3	7.3	2,773	2,773
2/20/2001	11.3	11.3	4,292	4,292
3/20/2001	24	24.0	9,117	9,117
4/16/2001	5	5.0	1,899	1,899
5/15/2001	11.2	11.2	4,254	4,254
6/19/2001	22	22.0	8,357	8,357
7/24/2001	11.5	11.5	4,368	4,368
8/21/2001	9.5	9.5	3,609	3,609
9/18/2001	4	4.0	1,519	1,519
10/16/2001	44	44.0	16,714	16,714
11/13/2001	6	6.0	2,279	2,279
12/11/2001	6.5	6.5	2,469	2,469
2/7/2006	26	26.0	9,876	9,876
4/4/2006	13.3	13.3	5,052	5,052
3/7/2006	16	16.0	6,078	6,078
1/10/2006	18	18.0	6,837	6,837
4/18/2006	10.7	10.7	4,065	4,065
5/2/2006	40.7	40.7	15,460	15,460
7/31/2006	5	5.0	1,899	1,899
6/13/2006	6.5	6.5	2,469	2,469
2/2/2010	15	15.0	5,698	5,698
9/6/2006	10.5	10.5	3,989	3,989
11/16/2006	45	45.0	17,094	17,094
12/19/2006	5.5	5.5	2,089	2,089
1/13/2010	11	11.0	4,178	4,178
3/21/2006	27.3	27.3	10,370	10,370
5/13/2010	10	10.0	3,799	3,799
7/20/2010	12	12.0	4,558	4,558
4/20/2010	12	12.0	4,558	4,558
3/3/2010	67	67.0	25,451	25,451
6/8/2010	12	12.0	4,558	4,558
9/14/2010	9	9.0	3,419	3,419
8/16/2010	4	4.0	1,519	1,519
10/19/2010	15	15.0	5,698	5,698

Table C-4. Lead TMDL summary table for subsegment 040401

Average water budget (mm/day)		2.48
Subsegment area (acres)		17,152
Calculated flow (cfs)		70.4
Turbidity criteria (NTU)		25.0
TSS target (mg/L)		99.8
TSS target as loading (lb/d)		37,921.483
Wasteload allocation (lb/d)		7,285.0588
Point source flow (MGD)		7.69
	Before reduction	After reduction
Average concentration (mg/L)	16.2882	16.2882
Average loading (lb/d)	6,187.259	6,187.2587
TMDL (lb/d)	45,206.542	45,206.542

Table C-5. TSS concentrations before and after reductions for subsegment 040903 station 302

Date	TSS concentration before reduction (mg/L)	TSS concentration after reduction (mg/L)	TSS loading before reduction (lb/d)	TSS loading after reduction (lb/d)
1/15/1991	22	3.1	2,411	343
3/12/1991	19	2.7	2,083	296
5/14/1991	20	2.8	2,192	312
7/16/1991	12	1.7	1,315	187
9/10/1991	24	3.4	2,631	374
11/19/1991	24	3.4	2,631	374
1/7/1992	18	2.6	1,973	280
3/10/1992	28	4.0	3,069	436
5/12/1992	26	3.7	2,850	405
7/14/1992	22	3.1	2,411	343
9/15/1992	17	2.4	1,863	265
11/17/1992	20	2.8	2,192	312
1/12/1993	12	1.7	1,315	187
3/9/1993	25	3.6	2,740	389
5/11/1993	30	4.3	3,288	467
7/13/1993	30	4.3	3,288	467
9/14/1993	37	5.3	4,055	576
11/15/1993	17	2.4	1,863	265
1/10/1994	236	33.5	25,867	3,677
3/14/1994	30	4.3	3,288	467
5/10/1994	45	6.4	4,932	701
7/12/1994	19	2.7	2,083	296
9/13/1994	8	1.1	877	125
11/15/1994	15	2.1	1,644	234
1/10/1995	10	1.4	1,096	156
3/14/1995	18	2.6	1,973	280
7/11/1995	29	4.1	3,179	452
9/12/1995	15	2.1	1,644	234
11/14/1995	9	1.3	986	140
1/8/1996	6	0.9	658	93

Date	TSS concentration before reduction (mg/L)	TSS concentration after reduction (mg/L)	TSS loading before reduction (lb/d)	TSS loading after reduction (lb/d)
3/11/1996	6,107	868.1	669,361	95,145
7/8/1996	1	0.1	110	16
9/10/1996	30	4.3	3,288	467
11/18/1996	11.3	1.6	1,239	176
1/7/1997	18.7	2.7	2,050	291
3/11/1997	18	2.6	1,973	280
5/13/1997	10	1.4	1,096	156
7/15/1997	138	19.6	15,126	2,150
9/9/1997	12	1.7	1,315	187
11/17/1997	14	2.0	1,534	218
1/13/1998	16	2.3	1,754	249
3/9/1998	4	0.6	438	62
1/16/2001	9.5	1.4	1,041	148
2/13/2001	28	4.0	3,069	436
3/20/2001	7.4	1.1	811	115
4/17/2001	15.4	2.2	1,688	240
5/15/2001	58	8.2	6,357	904
6/12/2001	5	0.7	548	78
7/17/2001	7	1.0	767	109
8/14/2001	456	64.8	49,980	7,104
9/11/2001	29	4.1	3,179	452
10/9/2001	6.5	0.9	712	101
11/6/2001	6.5	0.9	712	101
12/11/2001	4	0.6	438	62
7/10/2007	5	0.7	548	78
5/11/1998	27	3.8	2,959	421
5/14/1996	6	0.9	658	93
1/30/2007	27	3.8	2,959	421
4/10/2007	13	1.8	1,425	203
5/1/2007	12	1.7	1,315	187
5/22/2007	42.5	6.0	4,658	662
3/20/2007	42.5	6.0	4,658	662
2/27/2007	19	2.7	2,083	296
7/31/2007	6	0.9	658	93
6/12/2007	7	1.0	767	109
8/21/2007	13	1.8	1,425	203
10/10/2007	5.5	0.8	603	86
9/19/2007	5	0.7	548	78
10/12/2010	21.5	3.1	2,357	335

Table C-6. Lead TMDL summary table for subsegment 040903

Average water budget (mm/day)		2.509
Subsegment area (acres)		4,896
Calculated flow (cfs)		20.3
Turbidity criteria (NTU)		50.0
TSS target (mg/L)		868.1
TSS target as loading (lb/d)		95,145.308
Wasteload allocation (lb/d)		38.3054
Point source flow (MGD)		0.31
	Before reduction	After reduction
Average concentration (mg/L)	117.4971	16.7014
Average loading (lb/d)	12,878.337	1,830.5704
TMDL (lb/d)	95,183.613	95,183.613