FINAL

BAYOU MANCHAC WATERSHED TMDL
FOR BIOCHEMICAL OXYGEN-DEMANDING SUBSTANCES – PHASE I

SUBSEGMENTS 040201

SURVEYED June 5 – 7, 2007

TMDL REPORT

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TECHNICAL SUMMARY

Bayou Manchac, Subsegment 040201, was on the 2006 Integrated Report (combined 305(b) and 303(d) reports) and the Consent Decree. Subsegment 040201 was found to be "not supporting" any of its designated uses of Primary Contact Recreation, Secondary Contact Recreation and Fish and Wildlife Propagation. Bayou Manchac was subsequently scheduled for Total Maximum Daily Load (TMDL) development with other listed waters in the Lake Pontchartrain Basin. The suspected causes of impairment are low dissolved oxygen (DO), and elevated nitrate/nitrite, total phosphorous, chlorides, sulfates, total dissolved solids, total ammonia, and total fecal coliform. All nutrient impairments were based on evaluative assessments. Nutrient data was not used in the assessments. The Louisiana Department of Environmental Quality (LDEQ) and the Environmental Protection Agency (EPA) anticipate the removal of all nutrient impairments in the 2010 Integrated Report. The suspected sources are Site Clearance (Land Development or Redevelopment), On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Sanitary Sewer Overflows (Collection System Failures), and unknown sources. This TMDL report addresses the organic enrichment/low DO impairment.

Oxygen-demanding parameters modeled included CBOD1, CBOD2, NBOD, and DO. Conservative parameters modeled include conductivity and chlorides.

Subsegment 040201 lies within East Baton Rouge, Ascension, and Iberville Parishes. Subsegment 040201 also drains into the Amite River, which is the border between Livingston Parish and East Baton Rouge and Ascension Parishes.

LDEQ is utilizing a phased TMDL approach for Bayou Manchac as shown in Table 1. This approach provides LDEQ with the opportunity to revise the DO criteria and at the same time, allows LDEQ to develop a meaningful and implementable DO TMDL based upon the appropriate DO criteria and in accordance with the Consent Decree deadlines. At the same time, it will lead to improved water quality while providing local governments and businesses the opportunity to prepare and adjust to the new permit requirements that will be implemented as a result of the TMDL developed in Phases I and II.

Phase I will include the development of loading values for the existing DO criteria for Bayou Manchac. The resulting permit limits for a criterion of 5.0 mg/L are presented in Tables 4 and 5. However, full implementation of permit limits will occur in a phased manner. Phase I will serve as the first step towards meeting the DO criteria. The implementation of permit limits will occur according to the following strategy.

Table 1. Bayou Manchac Phased TMDL Approach

Stage / Phase	DO Criteria (mg/L)	Implementation Date
Phase I	**5.0**	**Phase I implementation required upon EPA approval of the TMDL and subsequent update of Louisiana's Water Quality Management Plan**
Primary Activities - Ecoregion-based UAA developed and DO criteria revised and promulgated; Secondary Activities - complete projects laid out under the Consent Decree between East Baton Rouge Parish and EPA/LDEQ; Ascension Parish develops a regional sewage collection and treatment system		
Phase II	**Appropriate DO criteria based on UAA**	**Phase II implementation required upon EPA approval of Phase II of the TMDL and subsequent update of Louisiana's Water Quality Management Plan**

<u>Phase I Permit Implementation</u>

All TMDL, permitting, and enforcement activities will be conducted in accordance with the Clean Water Act, the Louisiana Environmental Regulatory Code, and applicable state laws.

1. New discharges of oxygen-demanding loads:

   In general, LDEQ does not intend to permit additional discharges of oxygen-demanding loads. However, in the event that one the following requirements can be attained, LDEQ may permit the new discharge. The typical permit limits will be 5 mg/L BOD_5 / 2 mg/L NH_3 / 5 mg/L DO. Such new facilities may be required to submit an environmental impact assessment to LDEQ's permitting staff, which will conduct a thorough evaluation of the proposed facility based on environmental impacts, economic benefits, an analysis of alternatives, and other pertinent factors.

   a. The facility demonstrates that it will provide a significant load reduction of man-made oxygen-demanding constituents to the impaired watershed(s) serviced by the facility. The facility must also contribute to a reduction in the number of facilities discharging to the watershed(s). Facilities that may be considered for permits under this provision include, but are not limited to:

i. A facility that will provide improved sewage treatment to multiple subdivisions previously serviced by wastewater treatment plants that are incapable of treating to tertiary limits.

ii. A facility that will provide sewage collection and treatment to previously unsewered areas in which many of the sanitary discharges from permitted facilities and individual home treatment units were entering an impaired watershed. As a result, the facility would be expected to provide more efficient treatment to the wastewater and reduce the net loading of oxygen-demanding substances in the watershed.

b. The facility demonstrates that its wastewater will not leave the facility or its property. Significant stormwater events do not apply to this provision. For the purpose of this provision, a significant stormwater event is defined as the 25 year, 24 hour rainfall event or its numerical equivalent, as defined by the Southern Regional Climate Center.

i. Facilities that may be considered under this provision include, but are not limited to:

a. Effluent reduction systems that have been approved by the Louisiana Department of Health and Hospitals.

b. Wastewater treatment plants equipped with overland flow systems in which the effluent will not leave the facility.

c. Wastewater treatment plants equipped with holding ponds that will retain the effluent such that the effluent will not leave the facility.

ii. LDEQ recognizes that some local governments are in the process of building or expanding regional sewage collection and treatment systems. In such areas, LDEQ may, on a limited basis, grant permits of limited durations to facilities that agree to tie into a regional collection and treatment system when it becomes available. LDEQ must have absolute assurance that the regional collection system will be available to the facility and the facility will connect to the regional collection system on or before the expiration date of the permit. Such assurance may include a formal agreement between the facility, the owner and operator of the regional wastewater treatment system, and LDEQ. The regional system must have the capacity to treat the additional wastewater. Such a permit may have a duration of less than five years or it may have a five year duration with interim permit limits. The permit will be written based on projected completion dates for the construction of the collection and treatment system. The facility will be required to cease all wastewater discharges to the Bayou Manchac watershed and transfer the discharge to the regional collection system once the permit or interim limits expire or the collection system is available to the facility, whichever comes first. If the permit or interim limits expire, but, due to unforeseen circumstances, the availability of the collection system has been temporarily delayed, the duration of the permit or interim limits may be extended. If the availability of the collection system has been indefinitely delayed, the facility may be required to cease all discharges to the Bayou Manchac watershed. Such facilities may resort to options covered in item 1.b.i. above.

c. LDEQ reassesses Subsegment 040201 (Bayou Manchac). LDEQ determines that Subsegment 040201 is meeting the appropriate DO criteria and designated uses.

2. Existing discharges of oxygen demanding loads:

Below are the reductions for existing dischargers in the Bayou Manchac TMDL. Existing facilities discovered to be discharging oxygen-demanding loads without LPDES permits as of the TMDL approval date are to be permitted in accordance with the limits established for existing facilities with permits. Unpermitted facilities that are newly activated or reactivated and discharging after the TMDL approval date may be subjected to enforcement actions and will be required to tie into regional collection and treatment systems, once those systems are available.

a. Facilities (with effluent flow less than or equal to 25,000 gpd) with monthly average limitations of 30 mg/L BOD_5 or weekly average limitations of 45 mg/L BOD_5 will receive a compliance schedule of up to 3 years with final limitations of 10 mg/L BOD_5 / 2 mg/L NH_3 / 5 mg/L DO (with post aeration);

b. Facilities (with effluent flow greater than 25,000 gpd) with limitations of 10 mg/L BOD_5 will receive a compliance schedule of up to 3 years with final limitations of 5 mg/L BOD_5 / 2 mg/L NH_3 / 5 mg/L DO (with post aeration);

c. The Landing at Mallard Lakes (AI# 154124) will have permit limits of 10 mg/L BOD_5 / 2 mg/L NH_3/ 5 mg/L DO.

3. Nutrient monitoring (i.e., reporting for Total Nitrogen and Total Phosphorus) will be required for individual permits. Nutrient monitoring will be added to the general permit

series (LAG530000, LAG540000, LAG560000, and LAG570000) upon the next scheduled renewal of each series.

Phase II will be developed based on the outcome of an ecoregion-based use attainability analysis (UAA) that is currently under development. Based on existing data, this UAA is expected to propose new DO criteria for many of the Pontchartrain Basin TMDLs that are currently being developed. These TMDLs have a state target completion date of March 31, 2011 and a EPA backstop due date of March 31, 2012. This new DO criteria is expected to be developed and promulgated within the next two to three years.

In the event the new criteria is not developed and promulgated within five years from the TMDL approval date, LDEQ intends to proceed in the following manner:

Case 1: The UAA study indicates that the current DO criterion is appropriate - the TMDL will be fully implemented based on the existing DO criteria.
Case 2: The UAA is not likely to be completed and/or approved - the TMDL will be fully implemented based on the existing DO criteria.
Case 3: The UAA is in process and is expected to be approved – Phase II of the TMDL will be postponed for a maximum period of 2 years. If the UAA has not been completed at the end of this period, the UAA status will be reviewed again according to Cases 1 - 3.

LDEQ recognizes there may be many unpermitted sources of oxygen-demanding loading within the Lake Pontchartrain Basin. These sources may include unpermitted facilities (privately owned treatment units for subdivisions or businesses). LDEQ has been locating unpermitted facilities and updating location information on permitted facilities in the Lake Pontchartrain Basin. The unpermitted facilities are required to apply for the appropriate LPDES (Louisiana Pollutant Discharge Elimination System) permits. LDEQ plans to conduct such activities within the Bayou Manchac watershed in the future. These unpermitted sources of oxygen-demanding loading may also include individual treatment units for residential homes and small businesses. The ability to accurately quantify the loads provided from these systems is extremely difficult due to lack of reliable information regarding the number of units and the loading provided by each individual unit. These unpermitted sources of loading add to the uncertainty of this TMDL and provide additional justification for the use of the phased TMDL approach.

LDEQ believes that the primary solutions to the water quality problems for Subsegment 040201 include the large-scale regionalization of sewage treatment and the rehabilitation and upgrade of existing problematic (leaks, overflows, improperly sized pipes, etc.) sewage collection systems. In addition, nonpoint loading may contribute to the water quality impairments in Subsegment 040201. This includes loading contributed by the MS4 permits for East Baton Rouge and Ascension Parishes.

After all projects and recommendations are complete, the loading conditions for Bayou Manchac may be substantially different. Such changes may render the current models innappropritate. At that time, Bayou Manchac should be reassessed and resurveyed so that a fair and balanced TMDL can be implemented. An ecoregion-based UAA should be conducted on this waterbody to develop a more appropriate dissolved oxygen standard.

The final TMDL loading for Phase I is presented in Table 3. The MS4 loading was partitioned from the nonpoint loading, based on drainage areas.

Loading attributed to any MS4 will be included in the WLA. This loading is not intended to be converted into permit limits. The WLA represents the nonpoint loading present within the stream under critical, low-flow conditions, therefore, the WLA does not include stormwater. The MS4 permittee must apply the appropriate BMPs to reduce the nonpoint source loading into the watershed as well as eliminate illicit dischargers. It is recognized that many permitted and unpermitted facilities discharge into the areas regulated by MS4 permits. Dischargers affected by this TMDL are presented in Tables 4 and 5.

Table 2. Summary of MS4 loading for Bayou Manchac

Urban Area	Permit Number	MS4 area (acres)	Summer MS4 (lbs/day)	Winter MS4 (lbs/day)
East Baton Rouge Parish	LAS000101	60744.57	1152	1074
Ascension Parish	LAR041034	5836.91	111	103

Table 3. Total Maximum Daily Load (Sum of UCBOD[1], UNBOD, and SOD) for a 5.0 mg/L dissolved oxygen standard

ALLOCATIONS	SUMMER		WINTER	
	% Reduction Required	(MAY-OCT) (lbs/day)	% Reduction Required	(NOV-APR) (lbs/day)
Point Source Wasteload Allocation (WLA)	100	0	100	0
Point Source Reserve MOS (20%)		0		0
East Baton Rouge Parish MS4 WLA (Nonpoint Loads)	100	1152	100	1074
East Baton Rouge Parish MS4 MOS (Nonpoint Source Reserve MOS) (20%)		0		0
Ascension Parish MS4 WLA (Nonpoint Loads)	100	111	100	103
Ascension Parish MS4 MOS (Nonpoint Source Reserve MOS) (20%)		0		0
Nonpoint Loads	0	830	0	774
Nonpoint Source Reserve MOS (20%)				
TMDL		2093		1951

***Note1: UCBOD as stated in this allocation is Ultimate CBOD.
UCBOD to $CBOD_5$ ratio = 2.3 for all treatment levels
Permit allocations are generally based on $CBOD_5$***

Table 4. TMDL Summary 040201 – Point Sources included in the model vs. a DO Criterion of 5.0 mg/L

FACILITY	AI NO./ PERMIT NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIP-TION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL FLOW	TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
East Baton Rouge Parish Stormwater	90427, 113707, 113708/ LAS000101	5/31/2015	Stormwater	N/A	Ditches to Bayou Manchac	Bayou Manchac	N/A	N/A		N/A	N/A	N/A	N/A	MS4 addressed in model and TMDL. This TMDL will not impose permit limits; includesCity of Baton Rouge/Parish of East Baton Rouge, LA DOTD, and LSU.
Ascension Parish Stormwater	115006/ LAR041034	12/4/2012	Stormwater	N/A	Ditches to Bayou Manchac	Bayou Manchac	N/A	N/A		N/A	N/A	N/A	N/A	MS4 addressed in model and TMDL. This TMDL will not impose permit limits.
St. Andrews Subdivision	43879/ LAG540829	6/30/2013	STP	001	Local drainage to Bayou Manchac	Bayou Manchac	12000	30		12,000	0	0	N/A	Modeled
Manchac Plantation Subdivision	43883/ LAG570096	4/30/2014	STP	001	Unnamed ditch to Bayou Manchac	Bayou Manchac	49600	10		49,600	0	0	N/A	Modeled
Manchac Crossing Subdivision	43884/ LAG570097	4/30/2014	STP	001	Unnamed ditch to Bayou Manchac	Bayou Manchac	49600	10		49,600	0	0	N/A	Modeled
United/Anco Services Inc	126685/ LAG541276	6/30/2013	STP	001	Local drainage to Bayou Manchac	Bayou Manchac	9000	30		9,000	0	0	N/A	Modeled
Perkins Condos	132934/ LAG541468	6/30/2013	STP	001	Local drainage to Bayou Manchac	Bayou Manchac	19200	30		19,200	0	0	N/A	Modeled
Landing At Mallard Lakes	154124/ LAG570437	4/30/2014	WWTP	001	Unnamed ditch to Bayou Manchac	Bayou Manchac	9600	10		9,600	0	0	N/A	Modeled

[a] This TMDL was developed for critical low-flow conditions (7Q10). Therefore the WLAs for all stormwater discharges will be 0.0 lb/d.

Table 5. TMDL Summary 030701 – Point Sources within the watershed but not included in the model

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			MODELING COMMENTS
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	
Kleinpeter Farms Dairy LLC	1694/ LA0037923	1/31/2015	STP	001	Drainage ditch, Old Ward's Creek, Ward's Creek Diversion Canal	Ward's Creek Diversion Canal	864	30		0	0	N/A	Not Modeled. Included in TMDL
Industrial Electric Motor Service, Inc. (Outfall 001) Treated Sanitary Wastewater	13756/ LA0103071	7/31/2013	STP	001	Into Ward's Creek via local drainage, then into Bayou Manchac	Ward's Creek Diversion Canal	3,000	30		0	0	N/A	Not Modeled
Motel 6 LP	18100/ LAG540519	6/30/2013	STP	001	Ward's Creek then to Bayou Manchac	Ward's Creek Diversion Canal	13,750	30		0	0	N/A	Not Modeled
EDO Specialty Plastics-Perkins Road Facility	22750/ LAG53510	11/30/2012	STP	001	Ward's Creek	Ward's Creek Diversion Canal	1,020	30		0	0	N/A	Not Modeled
McBR Management Company-McDonald's	42439/ LAG530364	11/30/2012	STP	001	Highway 948 roadside ditch, then to Ward's Creek, then to Bayou Manchac	Ward's Creek Diversion Canal	4,300	30		0	0	N/A	Not Modeled
LA Concrete Products	69881/ LAG110042	3/14/2014	STP	001	Local drainage to Ward's Creek	Ward's Creek Diversion Canal	950	30		0	0	N/A	Not Modeled
Barringer Foreman Technology Park LLC	87100/ LAG531652	11/30/2012	STP	001	Unnamed ditch to Ward's Creek to Bayou Manchac	Ward's Creek Diversion Canal	2,000	30		0	0	N/A	Not Modeled
Cloverhill Subdivision STP	100324/ LA0117731	4/30/2015	STP	001	Local Drainage to Ward's Creek Diversion Canal	Ward's Creek Diversion Canal	36,000	10		0	0	N/A	Not Modeled
Commercial Sewage Treatment Plant	108610/ LAG541143	6/30/2013	STP	001	Local Drainage to Wards's Creek to Bayou Manchac	Ward's Creek Diversion Canal	5,220	30		0	0	N/A	Not Modeled
Cyrus Bonakchi Retail Complex WWTS	116991/ LAG541139	6/30/2013	STP	001	Roadside ditch to Ward's Creek to Ward's Creek Diversion Canal to Bayou Manchac	Ward's Creek Diversion Canal	16,000	30		0	0	N/A	Not Modeled

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Parks Apartments II-WWTP	**117999/ LAG541362**	**6/30/2013**	**STP**	**001**	**Unnamed Ditch to Dawson Creek to Ward Creek to Ward Creek Diversion to Bayou Manchac**	**Ward's Creek Diversion Canal**	**6,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Cypress Heights Academy	**120032/ LAG531605**	**11/30/2012**	**STP**	**001**	**Local Drainage to Ward's Creek to Bayou Manchac**	**Ward's Creek Diversion Canal**	**2,790**	**30**		**0**	**0**	**N/A**	**Not Modeled**
US Postal Service-Commerce Park Post Office	**125092/ LAG532510**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Dawson Creek to Ward Creek to Ward Creek Diversion to Bayou Manchac**	**Ward's Creek Diversion Canal**	**2,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
The Lakes at Jamestown-WWTP	**154703/ LAG570450**	**4/30/2014**	**STP**	**001**	**Ditch to Ward's Creek to Bayou Manchac**	**Ward's Creek Diversion Canal**	**33,200**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Bethany World Prayer Center	**86631/ LAG531911**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Ward's Creek Diversion Canal to Bayou Manchac**	**Ward's Creek Diversion Canal**	**1,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Giovanni Mucciacciaro-GE Railroad Property	**87066/ LAG531134**	**11/30/2012**	**STP**	**001**	**Parish Ditch to Diversion Canal to Bayou Manchac**	**Ward's Creek Diversion Canal**	**480**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Donna l. Kleinpeter, DVM	**87818/ LAG532233**	**11/30/2012**	**STP**	**001**	**Diversion Canal to Bayou Manchac**	**Ward's Creek Diversion Canal**	**2,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Home Depot Out Parcels/Restaurant & Retail	**135121/ LAG570362**	**4/30/2014**	**STP**	**001**	**Storm Drain, Local Drainage, Ward Creek**	**Ward's Creek Diversion Canal**	**33,012**	**10**		**0**	**0**	**N/A**	**Not Modeled**
On The Run-Exxon RAS# 70132	**118197/ LAG480347**	**9/13/2009**	**STP**	**001**	**Unnamed Ditch to Bayou Manchac**	**Ward's Creek Diversion Canal**	**4,080**	**30**		**0**	**0**	**N/A**	**Not Modeled**
The Reserve at Jefferson Crossing Subdivision	**156279/ LA0124303**	**4/30/2014**	**STP**	**001**	**Local Drainage to Ward's Creek**	**Ward's Creek Diversion Canal**	**56,400**	**10**		**0**	**0**	**N/A**	**Not Modeled**

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Industrial Coatings Contractors, Inc.	**1980/ LAG531612**	**11/30/2012**	**STP**	**001**	**Local Drainage to Welsh Gully to Bayou Manchac**	**Welsh Gully**	**400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Perkins Oak Subdivision	**18601/ LAG570086**	**9/14/2009**	**STP**	**001**	**Unnamed Ditch then to Welsh Gully**	**Welsh Gully**	**78,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Wal-Mart Supercenter #5056	**79062/ LAG541339**	**6/30/2013**	**STP**	**001**	**Welsh Gully to Bayou Manchac**	**Welsh Gully**	**14,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Prairieville Plaza Shopping Center	**106648/ LAG541224**	**6/30/2013**	**STP**	**001**	**Roadside Ditch, Welsh Gully**	**Welsh Gully**	**10,700**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Ultima Plaza	**119486/ LAG531797**	**11/30/2012**	**STP**	**001**	**Welsh Gully to Bayou Manchac**	**Welsh Gully**	**4,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Domino's Pizza	**121616/ LAG531813**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch then to Welsh Gully**	**Welsh Gully**	**800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Ascension Marketplace	**133959/ LAG532007**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch, Welsh Gully, Bayou Manchac**	**Welsh Gully**	**400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Prairieville Retail Center	**136481/ LAG532107**	**11/30/2012**	**STP**	**001**	**Pipe to Welsh Gully**	**Welsh Gully**	**4,895**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Iberia Bank	**137952/ LAG532063**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Welsh Gully**	**Welsh Gully**	**200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Oak Grove Village & Professional Park	**144464/ LAG541519**	**6/30/2013**	**STP**	**001**	**Roadside Ditch, Welsh Gully**	**Welsh Gully**	**6,960**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Learning Tree Daycare	**149454/ LAG532230**	**11/30/2012**	**STP**	**001**	**Highway 73 Ditch to Welsh Gully**	**Welsh Gully**	**2,010**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Maplewood Estates Subdivision	**153571/ LAG570425**	**4/30/2014**	**STP**	**001**	**Ditch to Slough to Welsh Gully to Bayou Manchac**	**Welsh Gully**	**44,800**	**10**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Oak Grove Primary School	**120263/ LAG541321**	**6/30/2013**	**STP**	**001**	**Unnamed Ditch to Unnamed Canal to Bayou Manchac**	**Welsh Gully**	**14,255**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Frank's Restaurant & Banquet Hall	**121672/ LAG541219**	**6/30/2013**	**STP**	**001**	**Local Drainage then to Bayou Manchac**	**Welsh Gully**	**10,355**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Montrachet Subdivision	**153573/ LAG570424**	**4/30/2014**	**STP**	**001**	**Ditch to Slough to Bayou Manchac**	**Welsh Gully**	**51,200**	**10**		**0**	**0**	**N/A**	**Not Modeled**
BellSouth Telecommunications/Bell South-K3278	**6872/ LAG530705**	**11/30/2012**	**STP**	**001**	**Local Drainage to Bayou Fountain**	**Bayou Fountain**	**1,300**	**30**		**0**	**0**	**N/A**	**Not Modeled**
LSU Fire & Emergency Training Institute	**29822/ LAG531105**	**11/30/2012**	**STP**	**001**	**Elbow Bayou then into Bayou Fountain**	**Bayou Fountain**	**3,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Arlington Preparatory Academy	**41334/ LAG530181**	**11/30/2012**	**STP**	**001**	**Unnamed ditch, Bayou Fountain, Bayou Manchac**	**Bayou Fountain**	**1,740**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Campus Crossing at Brightside LLC	**42009/ LAG570195**	**4/30/2014**	**STP**	**001**	**Elbow Bayou then into Bayou Fountain**	**Bayou Fountain**	**90,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
RCS Land Company LLC-Family Dollar	**105695/ LAG532053**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Bayou Fountain to Bayou Manchac**	**Bayou Fountain**	**200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Chase Highland Branch	**117898/ LAG531533**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Bayou Fountain to Bayou Manchac**	**Bayou Fountain**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
The Highlands @ New Richmond	**151923/ LAG532296**	**11/30/2012**	**STP**	**001**	**Bayou Fountain**	**Bayou Fountain**	**440**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Legacy Oaks	**151924/ LAG532294**	**11/30/2012**	**STP**	**001**	**Bayou Fountain**	**Bayou Fountain**	**380**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Highlandia Office/Retail Center	**127204/ LAG541297**	**6/30/2013**	**STP**	**001**	**Unnamed Ditch, then to Highway Ditch, then to Bayou Manchac**	**Bayou Fountain**	**20,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Arlington Creek Centre-Burbank & Lee Investors LLC	**153967/ LA0123676**	**8/31/2013**	**STP**	**001**	**Arlington Creek**	**Bayou Fountain**	**70,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Lake Market Grocery	**42238/ LAG530981**	**11/30/2012**	**STP**	**001**	**Unnamed Drainage to White Cypress Swamp**	**Bayou Fountain**	**2,985**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Gonzales Industrial X-Ray, Inc.	**10356/ LAG530223**	**11/30/2012**	**STP**	**001**	**Airline Highway Roadside Ditch, then to Muddy Creek, then to Bayou Manchac**	**Muddy Creek**	**260**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Woodhaven Subdivision	**18589/ LAG540163**	**2/28/2008**	**STP**	**001**	**Ditch, Muddy Creek, Bayou Manchac**	**Muddy Creek**	**20,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Jefferson Estates Subdivision	**18950/ LAG540152**	**2/28/2008**	**STP**	**001**	**Highway 73 Roadside Ditch, then to an unnamed Ditch, then to Muddy Creek, then to Bayou Manchac**	**Muddy Creek**	**16,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Cypress Lake Subdivision	**41307/ LAG540885**	**6/30/2013**	**STP**	**001**	**Muddy Creek**	**Muddy Creek**	**22,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
The Reserve at Willow Lake	**43147/ LAG540929**	**6/30/2013**	**STP**	**001**	**Local Drainage then into Muddy Creek**	**Muddy Creek**	**16,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Ridgewood Subdivision STP	**43864/ LAG540820**	**6/30/2013**	**STP**	**001**	**Local Drainage then into Muddy Creek**	**Muddy Creek**	**12,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Jefferson Oaks Subdivision STP	**43877/ LAG570298**	**4/30/2014**	**STP**	**001**	**Local Drainage, then into Muddy Creek, then into Bayou Manchac**	**Muddy Creek**	**30,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Hunter's Trace Subdivision STP	**43880/ LAG570079**	**4/30/2014**	**STP**	**001**	**Local Drainage then into Muddy Creek**	**Muddy Creek**	**40,800**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Willow Cove Subdivision STP	**43882/ LAG540818**	**6/30/2013**	**STP**	**001**	**Local Drainage then into Muddy Creek**	**Muddy Creek**	**8,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
River City Equestrian Center LLC	**52328/ LA0110817**	**4/30/2006**	**STP**	**001**	**Muddy Creek**	**Muddy Creek**	**200**	**30**		**0**	**0**	**N/A**	**Not Modeled**

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Jefferson Crossing LLC	**86645/ LAG570271**	**4/30/2014**	**STP**	**001**	**Local Drainage to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**72,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Le Chenier	**93789/ LAG570291**	**4/30/2015**	**STP**	**001**	**Muddy Creek to Bayou Manchac**	**Muddy Creek**	**60,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Meadow Ridge	**93823/ LA0124753**	**4/30/2015**	**STP**	**001**	**Muddy Creek to Bayou Manchac**	**Muddy Creek**	**41,200**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Village at Willow Lake	**93873/ LAG541262**	**6/30/2013**	**STP**	**001**	**Unnamed Ditch to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**24,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Manchac Harbor	**93884/ LAG570302**	**4/30/2014**	**STP**	**001**	**Muddy Creek to Bayou Manchac**	**Muddy Creek**	**98,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Prairieville Middle School	**97865/ LAG541211**	**6/30/2013**	**STP**	**001**	**Local Drainage to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**12,580**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lynch's Mobile Home Park	**98734/ LAG541133**	**6/30/2013**	**STP**	**001**	**Local Drainage to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**19,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Kinder Garden LLC	**119612/ LAG532019**	**11/30/2012**	**STP**	**001**	**Local Drainage to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**2,040**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Arlington Plantation Condos	**125403/ LAG541268**	**6/30/2013**	**STP**	**001**	**Parish Drainage then into Muddy Creek**	**Muddy Creek**	**19,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Manchac Harbor Subdivision-3rd and 4th Filings	**127036/ LAG541461**	**6/30/2013**	**STP**	**001**	**Muddy Creek to Bayou Manchac**	**Muddy Creek**	**23,600**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Wrenwood Subdivision	**132705/ LAG570416**	**4/30/2014**	**STP**	**001**	**Ditch to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**26,800**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Quail Hollow Subdivision STP	**139566/ LAG541469**	**6/30/2013**	**STP**	**001**	**Muddy Creek**	**Muddy Creek**	**13,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
The Business Park at Oak Grove	**143945/ LAG532143**	**11/30/2012**	**STP**	**001**	**Parish Drainage, Muddy Creek**	**Muddy Creek**	**300**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Helena Place	**152058/ LAG570431**	**11/30/2012**	**STP**	**001**	**Unnamed Slough to Muddy Creek**	**Muddy Creek**	**22,800**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Twelve Oaks Subdivision STP	**93828/ LAG570300**	**4/30/2014**	**STP**	**001**	**Bayou Manchac**	**Muddy Creek**	**60,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Burger King Restaurant #10762	**43456/ LAG540704**	**6/30/2013**	**STP**	**001**	**Highway 73 Roadside Ditch, then to Johnson Bayou, then to Jim Bayou, then by Local Drainage to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**8,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lake at Twin Oaks Subdivision STP	**43881/ LAG540830**	**6/30/2013**	**STP**	**001**	**Local Drainage then into Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**13,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town Tiger Mart	**79176/ LAG532331**	**11/30/2012**	**STP**	**001**	**Effluent Pipe to Hwy 73 Ditch to Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**2,160**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town High School	**90164/ LAG570217**	**4/30/2014**	**STP**	**001**	**Johnson Bayou to Jim Bayou to Bluff Swamp**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**31,600**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Cobblestone Parc Subdivision STP	**93814/ LAG570278**	**4/30/2014**	**STP**	**001**	**Unnamed Ditch to Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**50,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Lakes at Ascension Subdivision STP	**93821/ LAG570272**	**4/30/2014**	**STP**	**001**	**Local Drainage to Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**50,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Lakes at Dutch Town Subdivision	**103849/ LAG570237**	**4/30/2014**	**STP**	**001**	**Unnamed Ditch to Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**45,600**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town Villas Subdivision STP	**118381/ LAG570308**	**4/30/2014**	**STP**	**001**	**Local Drainage to Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**30,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town Baptist Church-WWTP	**121645/ LAG531650**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch, then Jim Bayou, then Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**2,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Legacy Hills Subdivision STP	**125432/ LAG570333**	**4/30/2014**	**STP**	**001**	**Unnamed Ditch, then to Johnson Bayou, then to Jim Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**26,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Gulf Coast Event Services	**129104/ LAG531991**	**11/30/2012**	**STP**	**001**	**Local Drainage, to roadside ditch, to Johnson Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Moss Point Subdivision	**137507/ LAG570415**	**4/30/2014**	**STP**	**001**	**Ditch to Johnson Bayou to Jim Bayou to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**39,600**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town Gardens Subdivision	**154183/ LAG541631**	**6/30/2013**	**STP**	**001**	**Ditch to Johnson Bayou to Jim Bayou to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**18,800**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Lamonte Subdivision STP	**43865/ LAG540819**	**6/30/2013**	**STP**	**001**	**Local Drainage then into Jim Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**10,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Crestview Estates Subdivision STP	**118273/ LAG541269**	**6/30/2013**	**STP**	**001**	**Local Drainage to Jim Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**18,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Bluff Meadows Subdivision STP	**124896/ LAG541266**	**6/30/2013**	**STP**	**001**	**Parish Drainage then into Jim Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**8,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Oaks on the Bluff	**143343/ LAG570400**	**4/30/2014**	**STP**	**001**	**Parish Drainage to Jim Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**56,400**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Taco Bell	**147413/ LAG532678**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Jim Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**2,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Ohmstede, LTD-St. Gabriel Plant	**2283/ LA0059544**	**10/31/2013**	**STP**	**001**	**Bayou Braud into Spanish Lake**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**2,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Willow Lake Subdivision	**20039/ LAG570082**	**3/14/2009**	**STP**	**001**	**Open Ditch, then to Unnamed Ditch, Local Drainage, then to Spanish Lake**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**91,200**	**10**		**0**	**0**	**N/A**	**Not Modeled**
American Alloy Steel, Inc.	**88249/ LAG531172**	**11/30/2012**	**STP**	**001**	**Bayou Braud into Spanish Lake**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**160**	**30**		**0**	**0**	**N/A**	**Not Modeled**
LA Towing	**124899/ LAG531704**	**11/30/2012**	**STP**	**001**	**Local Drainage, Bayou Paul, Bayou Braud, Spanish Lake**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**40**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lakes at Dutch Town Subdivision	**146248/ LAG541586**	**6/30/2013**	**STP**	**001**	**Jim Bayou to Bluff Swamp to Spanish Lake to Alligator Bayou to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**14,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town Baptist Church-WWTP	**3521/ LAG550123**	**11/30/2012**	**STP**	**001**	**Geigy Road Ditch to Hwy 30 Ditch to Bayou Braud to Alligator Bayou to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**200**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	
Dana Suttles Truck Leasing LLC	**26632/ LAG530539**	**11/30/2012**	**STP**	**001**	**Highway Ditch then Tributary of Bayou Braud**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**1,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Plantation Gardens Subdivision	**40464/ LAG540067**	**6/30/2013**	**STP**	**001**	**Unnamed Ditch then into Bayou Paul**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**19,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Manchac Highlands Subdivision	**43148/ LAG540927**	**6/30/2013**	**STP**	**001**	**Local Drainage then into Alligator Bayou**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**14,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dutch Town Gardens Subdivision	**43648/ LAG530565**	**11/30/2012**	**STP**	**001**	**Ditch, then to Bayou Paul, then to Bayou Braud, then to Alligator Bayou, then to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**160**	**30**		**0**	**0**	**N/A**	**Not Modeled**
The Lake at Manchac Subdivision	**41303/ LAG570143**	**3/14/2009**	**STP**	**001**	**Highway Ditch then into Bluff Swamp**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**39,600**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Raybons Village	**43000/ LAG540943**	**6/30/2013**	**STP**	**001**	**Through Local Drainage then into Bluff Swamp**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**12,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Shaw Constructors, Inc.-Equipment Yard	**85011/ LAG480200**	**9/13/2009**	**STP**	**001**	**Unnamed Ditch to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**4,510**	**30**		**0**	**0**	**N/A**	**Not Modeled**
McDonald’s	**85526/ LAG531084**	**11/30/2012**	**STP**	**001**	**Local Drainage to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**3,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dynasty Restaurant LLC	**86559/ LAG531113**	**11/30/2012**	**STP**	**001**	**Ditch Along Airline Highway to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**4,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Bluff Oaks Plantation Subdivision STP	**86995/ LAG70279**	**4/30/2014**	**STP**	**001**	**Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**26,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
The Bluffs Subdivision STP	**90596/ LAG541264**	**6/30/2013**	**STP**	**001**	**Unnamed Ditch to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**24,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Spanish Oaks Subdivision STP	**93827/ LAG570281**	**4/30/2014**	**STP**	**001**	**Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**32,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Manchac Place Subdivision STP	**93885/ LA0124761**	**3/31/2015**	**STP**	**001**	**Unnamed Ditch to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**50,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Fountain Hill Subdivision STP	**93886/ LAG570274**	**4/30/2014**	**STP**	**001**	**Local Drainage to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**72,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Achord's Bluff Road Trailer Park	**120065/ LAG541320**	**6/30/2013**	**STP**	**001**	**Unnamed ditch to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**13,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Oak Grove Courtyard	**127024/ LAG541489**	**6/30/2013**	**STP**	**001**	**Local Drainage to Bluff Swamp to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**6,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
CVS Pharmacy	**136290/ LAG531998**	**11/30/2012**	**STP**	**001**	**Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**160**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Retreat at Ascension Subdivision	**143342/ LAG541533**	**6/30/2013**	**STP**	**001**	**Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**8,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Dutch Town Point Shopping Center WWTP	**148008/ LAG532198**	**11/30/2012**	**STP**	**001**	**Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**1,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Louisiana Machinery Company LLC	**155461/ LAG532584**	**11/30/2012**	**STP**	**001**	**Pond to Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**1,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Roofing Solutions LLC-Unauthorized Solid Waste Site	**133058/ LAG532323**	**11/30/2012**	**STP**	**001**	**Ditch at Swamp Road to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**1,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Southern Kumforts Bar Room	**85770/ LAG531131**	**11/30/2012**	**STP**	**001**	**Ditch Along Airline Highway to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**2,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Royal Motel	**43308/ LAG530653**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch then to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**4,300**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Greg Martrain Strip Shopping Mall	**127459/ LAG541328**	**6/30/2013**	**STP**	**001**	**Highway 190 Roadside Ditch then to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**6,120**	**30**		**0**	**0**	**N/A**	**Not Modeled**
LA Grove Fuel Lube & Carwash	**148996/ LAG750597**	**3/14/2014**	**STP**	**001**	**Unnamed Ditch to Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**100**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lasalle Point Subdivision	**154024/ LAG541638**	**6/30/2013**	**STP**	**001**	**Bluff Swamp, Bayou Manchac**	**Johnson, Jim, Alligator Bayou, Spanish Lake, Bayou Braud, Bluff Swamp**	**20,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Tall Timbers Subdivision	**18626/ LAG540161**	**2/28/2008**	**STP**	**001**	**Highway 42 Roadside Ditch, then to Henderson Bayou, then to the Amite River**	**Henderson Bayou drains directly into the Amite River although it is located in the Manchac Basin**	**20,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
TNT Performance & Repair LLC-Diesel Performance Facility	**104416/ LAG531406**	**11/30/2012**	**STP**	**001**	**Unnamed Ditch to Bayou Manchac**	**Bayou Manchac Directly**	**140**	**30**		**0**	**0**	**N/A**	**Not Modeled**
ExxonMobil Pipeline Baton Rouge Office	**40136**	**11/30/2012**	**STP**	**001**	**Ward's Creek Diversion Canal to Bayou Manchac**	**Ward's Creek Diversion Canal**	**3,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Trailerland Subdivision	**51909**	**1/31/2015**	**STP**	**001**	**North Branch Welsh Gully to Bayou Manchac**	**North Branch Welsh Gully**	**65,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Manchac Harbor Crossing	**151677/ LA0123684**	**2/28/2015**	**STP**	**001**	**Ditch to Cotton Bayou to Bayou Manchac**	**Cotton Bayou**	**29,200**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Degage Condos	**158088/ NA**	**No approved permit**	**STP**	**001**	**Ditch to Muddy Creek to Bayou Manchac**	**Muddy Creek**	**8,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Weston Court	**159628/ NA**	**No approved permit**	**STP**	**001**	**Local Drainage to Muddy Creek**	**Muddy Creek**	**14,400**	**30**		**0**	**0**	**N/A**	**Not Modeled**
LA Lagniappe Restaurant	**134379/ LAG541547**	**Terminated**	**STP**	**001**	**Parish Ditch, Ward Creek**	**Ward's Creek Diversion Canal**	**7,335**	**30**		**0**	**0**	**N/A**	**Not Modeled**
S & T Properties	**43111/ LAG530821**	**Terminated**	**STP**	**001**	**Local Drainage to Old Ward's Creek**	**Ward's Creek Diversion Canal**	**3,200**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Mobil on the Run	**76416/ LAG532585**	**12/1/2012**	**STP**	**001**	**Jim Bayou via local drainage**	**Bayou Manchac**	**1,960**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Wal-Mart Store #5056	**79062/ LAG541339**	**7/1/2013**	**STP**	**001**	**Local drainage, into Welsh Gully, into Bayou Manchac**	**Welsh Gully**	**14,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Circle K Store #2709728	**79640/ LAG531701**	**3/15/2014**	**STP**	**001**	**Unnamed ditch, Ward's Creek Diversion Canal, to Bayou Manchac**	**Ward's Creek Diversion Canal**	**1,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Regal Nails, Salon & Spa, L.L.C.	**81542/ LAG533224**	**12/1/2012**	**STP**	**001**	**Unnamed ditch, thence into Ward Creek, thence into Bayou Manchac**	**Ward's Creek**	**480**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dixie Landin' LLC	**85249/ LA0109053**	**9/01/2014**	**STP**	**001**	**Parish drainage to Bayou Manchac**	**Bayou Manchac**	**35,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
ISC Properties, LLC	**85763/ LAG750363**	**3/15/2014**	**STP**	**002**	**Bayou Manchac**	**Bayou Manchac**	**1,300**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Greater Baton Rouge Flea Market	**86784/ LAG540999**	**7/1/2013**	**STP**	**001**	**Muddy Creek**	**Muddy Creek**	**13,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Town of St. Gabriel Carville WWTP	**92989/ LA0115771**	**11/1/2011**	**STP**	**001**	**Community Canal, into Bayou Braud, into Bayou Manchac**	**Bayou Braud**	**150,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Courtney Place Condominiums	**99187/ LAG541086**	**7/1/2013**	**STP**	**001**	**Bayou Fountain**	**Bayou Fountain**	**22,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
St. George Fire Protection District #2 – Highlandia Drive Station #68	**119110/ LAG570269**	**5/1/2014**	**STP**	**001**	**Bayou Manchac**	**Bayou Manchac**	**2,500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Ultima Plaza	**119486/ LAG531797**	**4/23/2014**	**STP**	**001**	**Welsh Gully**	**Welsh Gully**	**36,480**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Oak Plaza Shopping Center	**119845/ LAG541251**	**6/5/2013**	**STP**	**001**	**Jim Bayou**	**Jim Bayou**	**9,140**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lakes at Oak Grove	**119982/ LAG570297**	**4/23/2014**	**STP**	**001**	**Parish drainage, Bluff Swamp**	**Bluff Swamp**	**56,400**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Goodyear Tire and Rubber Co.	**152516/ LAG470247**	**9/01/2014**	**STP**	**001**	**Open ditch to Ward's Creek Diversion Canal**	**Ward's Creek Diversion Canal**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Dutchtown Gardens Subdivision	**154183/ LAG541631**	**7/1/2013**	**STP**	**001**	**Unnamed drainage to Johnson Bayou**	**Johnson Bayou**	**18,800**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Commerce Center	**154276/ LA0123749**	**3/01/2015**	**STP**	**001**	**Bluff Swamp**	**Bluff Swamp**	**200,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
The Reserve at Jefferson Crossing Subdivision	**156279/ LAG570501**	**5/01/2014**	**STP**	**001**	**Unnamed ditch to Ward's Creek Diversion Canal**	**Ward's Creek Diversion Canal**	**56,400**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Willowbrook/Old Jefferson Townhomes	**156386/ LAG570481**	**5/01/2014**	**STP**	**001**	**Detention pond to Azalea Lakes to Bayou Manchac**	**Bayou Manchac**	**68,000**	**10**		**0**	**0**	**N/A**	**Not Modeled**
Prairieville Office Park	**161065/ LAG533028**	**12/01/2012**	**STP**	**001**	**Unnamed pipe to Hwy 73 to Bayou Manchac**	**Bayou Manchac**	**320**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Prairieville Office Park	**161065/ LAG533028**	**12/01/2012**	**STP**	**002**	**Unnamed ditch to Hwy 61 to Bayou Manchac**	**Bayou Manchac**	**40**	**30**		**0**	**0**	**N/A**	**Not Modeled**

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Pelican Masonary, Inc	161878/ LAG532995	12/01/2012	STP	001	Welsh Gully to Bayou Manchac	Welsh Gully	2,080	30		0	0	N/A	Not Modeled
Burger King Commercial Center	162181/ LAG541707	12/01/2012	STP	001	Hwy 61 to Muddy Creek	Muddy Creek	6,420	30		0	0	N/A	Not Modeled
Turner Office Buildings	162400/ LAG541710	7/01/2013	STP	001	Parish Drainage to Ward's Creek to Bayou Manchac	Wards Creek	5,680	30		0	0	N/A	Not Modeled
Rotolo's Prairieville	163754/ LAG541733	7/01/2013	STP	001	Welsh Gully to Bayou Manchac	Welsh Gully	5,135	30		0	0	N/A	Not Modeled
Spanish Lake Primary	164098/ LAG541729	7/01/2013	STP	001	Parish drainage to Bayou Braud to Bayou Manchac	Bayou Braud	8,600	30		0	0	N/A	Not Modeled
Brightside Commons	165136/ LAG541740	7/01/2013	STP	001	Unnamed ditch to Bayou Fountain to Bayou Manchac	Bayou Fountain	5,250	30		0	0	N/A	Not Modeled
Prairieville Office Park	165871/ LAG533200	12/01/2012	STP	001	Hwy 73 ditch to Muddy Creek to Bayou Manchac	Muddy Creek	2,650	30		0	0	N/A	Not Modeled
Alligator Bayou Tours	166395/ LAG533286	12/01/2012	STP	001	Unnamed ditch to Frog Bayou to Bayou Manchac	Frog Bayou	435	30		0	0	N/A	Not Modeled
Neighbors Federal Credit Union	167098/ LAG533296	12/01/2012	STP	001	Hwy 61 to Muddy Creek to Bayou Manchac	Muddy Creek	160	30		0	0	N/A	Not Modeled
Alphabet Soup Learning Center	168071/ LAG533386	12/01/2012	STP	001	Hwy 42 ditch to Muddy Creek to Bayou Manchac	Muddy Creek	2,275	30		0	0	N/A	Not Modeled
Club Real	168462/ LAG533342	12/01/2012	STP	001	Unnamed ditch to Muddy Creek to Bayou Manchac	Muddy Creek	790	30		0	0	N/A	Not Modeled
Cypress Lake Animal Hospital	169716/ LAG533382	12/01/2012	STP	001	Hwy 929 to Muddy Creek to Bayou Manchac	Muddy Creek	2,500	30		0	0	N/A	Not Modeled
Old Galvez Town Mobile Home Estates	169877/ LAG541252	7/01/2013	STP	001	Hwy 42 ditch to unnamed ditch to Bayou Manchac	Bayou Manchac	9,900	30		0	0	N/A	Not Modeled
Gospel Light Baptist Church	170031/ LAG533405	12/01/2012	STP	001	Wards Creek Diversion Canal	Ward's Creek Diversion Canal	1,810	30		0	0	N/A	Not Modeled

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
George Bonfani Commerce Center	170461/ LAG533423	12/01/2012	STP	001	Bluff Swamp to Bayou Manchac	Bluff Swamp	400	30		0	0	N/A	Not Modeled
Little Prairie Apartments	171307/ LAG533478	12/01/2012	STP	001	Unnamed drainage ditch to Muddy Creek to Bayou Manchac	Muddy Creek	3,000	30		0	0	N/A	Not Modeled
Pinnace Entertainment Hotel and Casino Resort	171441/ LAG533659	12/01/2012	STP	001	Roadside ditch to Bayou Fountain to Bayou Manchac	Bayou Fountain	1,000	30		0	0	N/A	Not Modeled
Best Catered Events Commissary and Fringe Salon	173057/ LAG533592	12/01/2012	STP	001	Hwy 73 ditch to Welsh Gully to Bayou Manchac	Welsh Gully	140	30		0	0	N/A	Not Modeled
Reagant Chemical & Research Inc – St. Gabriel Facility	2407/ LA0059579	11/01/2015	STP	003	Local drainage to Bayou Braud	Bayou Braud	90	30		0	0	N/A	Not Modeled
Entergy Gulf States	2625/ LA0005851	11/01/2012	STP	102	Bayou Manchac via local drainage	Bayou Manchac	4,000	30		0	0	N/A	Not Modeled
LBC Baton Rouge LLC	3492/ LA0045942	7/01/2015	STP	005	Bayou Paul	Bayou Paul	3,000	30		0	0	N/A	Not Modeled
Allways Properties LLC	3521/ LAG530123	12/01/2012	STP	001	Geigy Road ditch to Hwy 30 ditch to Bayou Braud to Alligator Bayou to Bayou Manchac	Bayou Braud	200	30		0	0	N/A	Not Modeled
Brenntag Southwest	4339/ LA0103462	6/01/2014	STP	004	Unnamed ditch to Bayou Paul to Bayou Manchac	Bayou Paul	25	30		0	0	N/A	Not Modeled
Brenntag Southwest	4339/ LA0103462	6/01/2014	STP	005	Unnamed ditch to Bayou Paul to Bayou Manchac	Bayou Paul	20	30		0	0	N/A	Not Modeled
Aerial Access Equipment Inc	11081/ LA750452	3/15/2014	STP	002	Local drainage to Wards Creek	Wards Creek	200	30		0	0	N/A	Not Modeled
Southern Valve Service Inc	12340/ LAG480211	Admin Cont	STP	002	Unnamed ditch to Bayou Manchac	Bayou Manchac	450	30		0	0	N/A	Not Modeled
R. R. Cassidy Inc	14505/ LAG750386	3/15/2014	STP	002	Parish ditch to Bayou Manchac	Bayou Manchac	500	30		0	0	N/A	Not Modeled
Louisiana Lift & Equipment Inc	15121/ LAG750518	3/15/2014	STP	002	Parish drainage ditch to Bayou Manchac	Bayou Manchac	600	30		0	0	N/A	Not Modeled

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							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Check Engine	**16202/ LAG470175**	**9/01/2014**	**STP**	**001**	**Unnamed ditch to Welsh Gully to Bayou Manchac**	**Welsh Gully**	**280**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Autumn View Subdivision	**18595/ LAG533478**	**Admin Cont**	**STP**	**001**	**Muddy Creek**	**Muddy Creek**	**30,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lamar Advertising Co Inc	**19084/ LAG532986**	**12/01/2012**	**STP**	**001**	**Unnamed ditch to Ward Creek to Bayou Manchac**	**Ward Creek**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Lamar Advertising Co Inc	**19084/ LAG532986**	**12/01/2012**	**STP**	**001**	**Unnamed ditch to Ward Creek to Bayou Manchac**	**Ward Creek**	**1,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
EBR Sheriff's Office Kleinpeter Substation	**19731/ LA00530180**	**12/01/2012**	**STP**	**001**	**Unnamed ditch to Ward's Creek to Bayou Manchac**	**Ward Creek**	**300**	**30**		**0**	**0**	**N/A**	**Not Modeled**
LaQuinta Inn & Suites	**19909/ LA**	**7/01/2013**	**STP**	**001**	**Rieger Road ditch to Ward Creek to Bayou Manchac**	**Ward Creek**	**12,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Shaw Constructors	**22795/ LAG480226**	**Admin Cont**	**STP**	**001**	**Local drainage to Ward's Creek to Bayou Manchac**	**Ward Creek**	**3,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
SCS Iberville Coatings Inc	**24479/ LAG480008**	**Admin Cont**	**STP**	**001**	**Unnamed ditch to local drainage to Bayou Braud**	**Bayou Braud**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Louisiana Machinery Co LLC	**24528/ LAG750341**	**3/15/2014**	**STP**	**002**	**Hwy ditch to Smith Bayou**	**Smith Bayou**	**125**	**30**		**0**	**0**	**N/A**	**Not Modeled**
CMC Construction Services	**25186/ LAG532241**	**12/01/2012**	**STP**	**001**	**Local drainage to Bayou Manchac**	**Bayou Manchac**	**2,000**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Deep South Crane & Rigging	**25952/ LAG750366**	**3/15/2014**	**STP**	**001**	**Local drainage to Ward Creek**	**Ward Creek**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Deep South Crane & Rigging	**25952/ LAG750366**	**3/15/2014**	**STP**	**002**	**Local drainage to Ward Creek**	**Ward Creek**	**500**	**30**		**0**	**0**	**N/A**	**Not Modeled**
USDA ARS Honey Bee Breeding Lab	**26080/ LA0100901**	**11/01/2010**	**STP**	**001**	**Local drainage to Elbow Bayou to Bayou Fountain to Bayou Manchac**	**Bayou Fountain**	**1,050**	**30**		**0**	**0**	**N/A**	**Not Modeled**
Southern Valve Service Inc	**26617/ LAG480212**	**Admin Cont**	**STP**	**001**	**Unnamed ditch to Ward's Creek**	**Ward Creek**	**525**	**30**		**0**	**0**	**N/A**	**Not Modeled**

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			MODELING COMMENTS
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	
Lexus Toyota of Baton Rouge	**26662/ LAG470057**	**9/01/2014**	**STP**	**002**	**Local drainage to Ward Creek**	**Ward Creek**	**5,000**	**30**		**0**	**0**	**N/A**	
St. Gabriel Holdings – St. Gabriel Site	**26984/ LAG532773**	**12/01/2012**	**STP**	**001**	**From your facility via pipe to local drainage then into Bayou Braud**	**Bayou Braud**	**500**	**30**		**0**	**0**	**N/A**	
Geo Heat Exchangers LLC	**31120/ LA0103179**	**6/01/2013**	**STP**	**001**	**Local drainage then into Bayou Braud**	**Bayou Braud**	**3,200**	**30**		**0**	**0**	**N/A**	
Natural Resources Recovery Inc – Pecue Lane Site	**33567/ LA0092690**	**4/01/2016**	**STP**	**103**	**Into an unnamed drainage ditch then into Ward Creek then into Ward Creek Diversion Canal**	**Ward Creek**	**20**	**30**		**0**	**0**	**N/A**	
City of St. Gabriel – Sunshine WWTP	**33740/ LA0103845**	**11/01/2015**	**STP**	**001**	**Into a drainage canal then into Bayou Paul then into Bayou Braud then into Bayou Manchac**	**Bayou Paul**	**150,000**	**30**		**0**	**0**	**N/A**	
Analytic Stress Relieving	**34054/ LAG480240**	**Admin Cont**	**STP**	**001**	**From your facility to local drainage then to Bluff Swamp**	**Bluff Swamp**	**1,000**	**30**		**0**	**0**	**N/A**	
Analytic Stress Relieving	**34054/ LAG480240**	**Admin Cont**	**STP**	**002**	**From your facility to local drainage then to Bluff Swamp**	**Bluff Swamp**	**500**	**30**		**0**	**0**	**N/A**	
Popeye's	**37987/ LAG531072**	**12/01/2012**	**STP**	**001**	**From your facility through local drainage then to Bayou Manchac**	**Bayou Manchac**	**5,000**	**30**		**0**	**0**	**N/A**	
Entek Environmental Labs Inc	**38304/ LA0104701**	**3/01/2011**	**STP**	**001**	**Via pipe to local drainage then into Ward Creek**	**Ward Creek**	**1,000**	**30**		**0**	**0**	**N/A**	
Kinder Morgan Liquids Terminals St. Gabriel LLC	**39978/ LA0052353**	**10/01/2014**	**STP**	**202**	**Bayou Braud**	**Bayou Braud**	**1,000**	**30**		**0**	**0**	**N/A**	
Kinder Morgan Liquids Terminals St. Gabriel LLC	**39978/ LA0052353**	**10/01/2014**	**STP**	**004**	**Bayou Braud**	**Bayou Braud**	**2,000**	**30**		**0**	**0**	**N/A**	

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
Ascension Ready Mix Plant #1	**40625/ LAG110087**	**3/15/2014**	**STP**	**001**	**From your facility through local drainage then into Bluff Swamp**	**Bluff Swamp**	**5,000**	**30**		**0**	**0**	**N/A**	
Manchac Estate Campsites	**40646/ LAG540030**	**Admin Cont**	**STP**	**001**	**From your facility to local drainage then to Bayou Manchac**	**Bayou Manchac**	**30,000**	**30**		**0**	**0**	**N/A**	
Old Perkins Place Subdivision	**41853/ LAG540620**	**6/30/2013**	**STP**	**001**	**From your facility to an unnamed ditch then to Welsh Gully**	**Welsh Gully**	**10,000**	**30**		**0**	**0**	**N/A**	
Hydrochem Industrial	**41864/ LAG530700**	**12/01/2012**	**STP**	**001**	**From your facility to local drainage then into the Amite River**	**Amite River**	**1,000**	**30**		**0**	**0**	**N/A**	
Ruffino's Restaurant	**42561/ LAG540517**	**7/01/2013**	**STP**	**001**	**Bayou Manchac**	**Bayou Manchac**	**14,140**	**30**		**0**	**0**	**N/A**	
Sonic Drive-In	**43265/ LAG530838**	**12/01/2012**	**STP**	**001**	**From your facility through local drainage then into the Amite River**	**Amite River**	**1,500**	**30**		**0**	**0**	**N/A**	
City of St. Gabriel – WWTP	**43362/ LA0103853**	**11/01/2015**	**STP**	**001**	**Into a drainage canal then into Bayou Braud then into Bayou Manchac**	**Bayou Manchac**	**100,000**	**30**		**0**	**0**	**N/A**	
TT&H Warehouse	**43648/ LAG530565**	**12/01/2012**	**STP**	**001**	**Ditch then into Bayou Paul**	**Bayou Paul**	**160**	**30**		**0**	**0**	**N/A**	
Erin Estates Subdivision	**43872/ LAG540008**	**7/01/2013**	**STP**	**001**	**From your facility to an unnamed ditch then to Welsh Gully then to Bayou Manchac**	**Welsh Gully**	**24,000**	**30**		**0**	**0**	**N/A**	
LA Brothers LLC	**52326/ LAG540949**	**7/01/2013**	**STP**	**001**	**From your facility to an unnamed ditch then to Welsh Gully then to Bayou Manchac**	**Welsh Gully**	**8,240**	**30**		**0**	**0**	**N/A**	
The Pearce Foundry Inc	**52327/ LA0104973**	**9/01/2015**	**STP**	**002**	**To Muddy Creek via local drainage**	**Muddy Creek**	**150**	**30**		**0**	**0**	**N/A**	
The Pearce Foundry Inc	**52327/ LA0104973**	**9/01/2015**	**STP**	**003**	**To Muddy Creek via local drainage**	**Muddy Creek**	**50**	**30**		**0**	**0**	**N/A**	

FACILITY	AI NO.	PERMIT EXP DATE (MM/DD/YY)	FACILITY TYPE	OUT-FALL NO.	OUTFALL DESCRIPTION	RECEIVING WATER	CURRENT EXPECTED FLOW	CURRENT MONTHLY AVERAGE CONCENTRATION LIMITS		TMDL MONTHLY AVERAGE CONCENTRATION LIMITS			
							GPD	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	BOD5/ CBOD5, mg/L	NH_3-N, mg/L	DO, mg/L	MODELING COMMENTS
The Pearce Foundry Inc	**52327/ LA0104973**	**9/01/2015**	**STP**	**004**	**To Muddy Creek via local drainage**	**Muddy Creek**	**50**	**30**		**0**	**0**	**N/A**	
Galvez Super Stop	**74296/ LAG532160**	**12/01/2012**	**STP**	**001**	**From your facility via local drainage then to Muddy Creek**	**Muddy Creek**	**500**	**30**		**0**	**0**	**N/A**	

[a] This TMDL was developed for critical low-flow conditions (7Q10). Therefore the WLAs for all stormwater discharges will be 0.0 lb/d.

EXECUTIVE SUMMARY

This report presents the results of a watershed-based, calibrated modeling analysis of Bayou Manchac. The modeling was conducted to establish a TMDL for biochemical oxygen-demanding pollutants for the Bayou Manchac watershed. The model extends from just above Alligator Bayou to Amite River. The westernmost reach of Bayou Manchac, from the Mississippi River to Alligator Bayou, could not be surveyed because this reach of the waterbody is intermittent. Bayou Manchac is located in south Louisiana and this subsegment includes Bayou Fountain, Ward's Creek, Ward's Creek Diversion Canal, Welsh Gully, Cotton Bayou, Muddy Creek, and several unnamed tributaries. Bayou Manchac is in the Lake Pontchartrain Basin and this study includes Water Quality Subsegment 040201. The area is heavily populated and land use is primarily agriculture, grassland, vegetated urban, and wetland forest deciduous. Areas along the mainstem of Bayou Manchac are mostly comprised of wetland deciduous forest.

Due to limited resources, only the mainstem was surveyed. According to LDEQ's TEMPO database, there were 221 permitted dischargers located within this subsegment at the time of development of this TMDL. This includes two MS4 permittees. In addition, TEMPO indicated there were two facilities without an approved permit. This was too many facilities to sample and model. Therefore, a representative group of facilities was sampled. The same reductions apply to all facilities, modeled or unmodeled. These dischargers are accounted for as nonpoint loading through the process of calibration. Current permit information and discharge monitoring reports were reviewed for all of these facilities. Six dischargers were having a direct impact on Bayou Manchac and were included in the model.

The watershed drains areas that are regulated by two MS4 permits. The areas covered by these MS4 permits include many permitted and unpermitted facilities. While LDEQ does assume responsibility for these facilities, partial responsibility belongs to the MS4 permittee to ensure that water draining from the area of coverage does not impact the named waterbody. Reductions in the nonpoint loading presented in this report also apply to MS4 regulated areas.

The impact of stormwater loading on the waterbody under critical conditions is difficult to determine. Monitoring is monetarily and logistically prohibitive. Therefore it is impractical to set MS4 permit limits. However, appropriate BMP measures shall be incorporated into the MS4 permits to minimize the impacts of stormwater loads on water quality. Such BMP measures should include the location of all wastewater discharges, the elimination of illicit wastewater discharges, the regionalization of wastewater treatment, rehabilitating and upgrading sewer collection system lines, and other appropriate activities.

Input data for the calibration model was developed from data collected during the June 2007 intensive survey, data collected by LDEQ at WQN station 0142 in the watershed, and USGS drainage area and low flow publications. The nonpoint source loads included nonpoint loading not associated with flow. A satisfactory calibration was achieved for the main stem. Ambient temperature and dissolved oxygen records from WQN station 0142 was used for the projection models. The Louisiana Total Maximum Daily Load Technical Procedures, Revision 12, have been followed in this study.

The various spreadsheets that were used in conjunction with the modeling program may be found in the appendices. Projections are adjusted to meet the dissolved oxygen criteria by reducing total nonpoint source loads. At the time of the survey Bayou Manchac could not meet a 5.0 mg/L DO standard in any of the reaches.

Modeling was limited to low flow scenarios for both the calibration and the projections since the constituent of concern was dissolved oxygen and the available data was limited to low flow conditions. The model used was LAQUAL, a modified version of QUAL-TX, which has been adapted to address specific needs of Louisiana waters.

Bayou Manchac, Subsegment 040201, was on the 2006 Integrated Report and the Consent Decree. Subsegment 040201 is found to be "not supporting" any of its designated uses of Primary Contact Recreation, Secondary Contact Recreation and Fish and Wildlife Propagation. Bayou Manchac was subsequently scheduled for TMDL development with other listed waters in the Lake Pontchartrain Basin. The suspected causes of impairment are low dissolved oxygen, nitrate/nitrite, total phosphorous, chlorides, sulfates, total dissolved solids, total ammonia, and total fecal coliform. The suspected sources are Site Clearance (Land Development or Redevelopment), On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Sanitary Sewer Overflows (Collection System Failures), and unknown sources.

This TMDL establishes load limitations for oxygen-demanding substances and goals for reduction of those pollutants. LDEQ's position is that when oxygen-demanding loads from point and nonpoint sources are reduced in order to ensure that the dissolved oxygen criterion is supported, nutrients are also reduced. The implementation of this TMDL through wastewater discharge permits and implementation of best management practices to control and reduce runoff of soil and oxygen-demanding pollutants from nonpoint sources in the watershed will also reduce the nutrient loading from those sources.

Louisiana does not have numeric nutrient criteria at the present time. The original nutrient impairment for this waterbody was not based on a quantitative assessment of historical nutrient data. The impairment was based on an evaluative assessment that may have included dissolved oxygen. LDEQ and EPA plan to reevaluate the previous nutrient impairments for this waterbody. As a result, both EPA and LDEQ expect the nutrient impairment to change from category 5 (impairment exists; TMDL required) to category 3 (insufficient data) for the 2010 Integrated Report. A TMDL for dissolved oxygen should adequately address any potential nutrient impairments, in the absence of numeric nutrient criteria and a quantitative assessment.

LDEQ is developing numeric nutrient criteria for waterbody types based on ecoregions in accordance with LDEQ's plan "Developing Nutrient Criteria for Louisiana 2006" which can be found at:

> http://www.deq.louisiana.gov/portal/Portals/0/planning/LA%20Nutrient%20Strategy%20Plan%20Final%20FOR%20WEB.pdf.

Water body types for nutrient criteria development in Louisiana are 1) inland rivers and streams; 2) freshwater wetlands; 3) freshwater lakes and reservoirs; 4) big rivers and floodplains/boundary rivers and associated water bodies; and 5) estuarine and coastal waters (including up to Louisiana's three mile boundary in the Gulf of Mexico). Proposed approaches for nutrient criteria development are currently under review by LDEQ and EPA. Nutrient criteria can be implemented upon state promulgation and EPA approval as per 40 CFR 131.21.

Upon development of nutrient criteria, a subsequent quantitative assessment of the waterbodies, and the development of full nutrient models, nutrient limits may be established for all facilities discharging to impaired waterbodies in the Lake Pontchartrain Basin. LDEQ recommends that all facilities discharging to impaired waterbodies take a proactive approach and prepare to receive nutrient limitations in the near future. Such a proactive approach should include nutrient monitoring and documentation through facility Discharge Monitoring Reports (DMRs) in order to assess their nutrient loads and the need to modify their treatment processes for nutrient removal.

A calibrated water quality model for the watershed was developed and projections were modeled to quantify the non-point source load reductions which would be necessary in order for Bayou Manchac, subsegment 040201 to comply with its established water quality standards and criteria. This report presents the results of that analysis.

This TMDL will implement a phased approach, as shown in Table 1. This report represents Phase I of the TMDL. For Phase I, 100% of the man-made load must be removed to achieve the current DO criterion of 5.0 mg/L. Such loading requirements would prohibit the discharge of oxygen-demanding effluent to the watershed. However, the implementation will occur in a phased manner. Phase II will be completed after the DO criterion has been revised and promulgated. The resulting allocations for Phase I are presented in Table 3.

LDEQ is in the process of reevaluating Lousiana's ecoregions and modifying the ecoregion boundaries where appropriate. Bayou Manchac appears to reside in the Lower Mississippi River Alluvial Plain (LMRAP) ecoregion. Therefore, the current dissolved oxygen criteria for Bayou Manchac may be inappropriate. Data for the LMRAP ecoregion indicates that the DO criteria may be 2.3 mg/L. As a result, LDEQ has run a preliminary summer projection based on the DO criteria of 2.3 mg/L. This projection is an indication of what the required load reductions may be if the DO criteria is revised for appropriate waterbodies in the Lake Pontchartrain Basin. The final required load reductions may be different based on the final DO criteria. Existing ecoregion data suggests that the summer and winter DO criterion should be 2.3 mg/L and 5.0 mg/L respectively, for the Lower Mississippi River Alluvial Plain Ecoregion. Based an a summer criterion of 2.3 mg/L, a 75% reduction of all man-made loading will be required.

In order to reasonably and equitably distribute the load reductions between the existing point and nonpoint sources, LDEQ determined that all facilities will be permitted according to the Phase I Implementation Plan as stated in the Technical Summary and Conclusion sections of this report.

LDEQ recommends that no additional oxygen-demanding loads be permitted to enter the Bayou Manchac watershed unless they conform to the Phase I Permit Implementation described in the Technical Summary.

The table used to develop point source allocations and modeling reductions is shown below.

Table 6. Point Source Allocations to Percent Reductions

RELATION OF POINT SOURCE ALLOCATIONS TO PERCENT REDUCTIONS FROM SECONDARY TREATMENT			
Point Source Allocation			% reduction from secondary treatment
CBOD5	NH3-N	UBOD	
30	15	133.5	
20	10	89	33%
10	10	66	51%
10	5	44.5	67%
10	2	31.6	76%
5	2	20.1	85%
0	0	0	100%
--- Other allocations of choice ---			
Point Source Allocation			% reduction from secondary treatment
CBOD5	NH3-N	UBOD	
5	5	33	75%
2	1	8.9	93%

Two situations are suspected of having major impacts on the degradation of Bayou Manchac. The first situation involves the sewer collection system overflows, leaks, and bypasses for the South Sewer Treatment Plant. Much of the loading is reaching Bayou Manchac via tributaries. Upgrades to the South Plant collection system that address unauthorized discharges from leaks, overflows, and bypasses should contribute to the recovery of Bayou Manchac water quality.

The second situation that is suspected of having a major impact on Bayou Manchac is the numerous individual package plants that are discharging directly and indirectly to Bayou Manchac. For East Baton Rouge Parish, LDEQ recommends incorporating such dischargers into the sewer collection system. For Ascension and Iberville Parishes, LDEQ recommends incorporating these facilities into a regional plant system.

After such recommendations are implemented, Bayou Manchac should be reassessed and resurveyed so that a more appropriate TMDL can be established.

DEQ will work with other agencies such as local Soil Conservation Districts to implement agricultural best management practices in the watershed through the 319 programs, where appropriate. LDEQ will also continue to monitor the waters to determine whether standards are being attained.

In accordance with Section 106 of the Federal Clean Water Act and under the authority of the Louisiana Environmental Quality Act, the LDEQ has established a comprehensive program for monitoring the quality of the state's surface waters. The LDEQ collects surface water samples at various locations, utilizing appropriate sampling methods and procedures for ensuring the quality of the data collected. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, to develop a long-term data base for water quality trend analysis, and to monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program is used to develop the state's biennial 305(b) report (*Water Quality Inventory*) and the 303 (d) list of impaired waters, also known as the Integrated Report. This information is also utilized in establishing priorities for the LDEQ nonpoint source program.

The LDEQ is continuing to implement a watershed approach to the surface water quality monitoring. Currently, LDEQ utilizes a four year sampling cycle. Approximately one quarter of the states watersheds will be sampled in each year so that all of the states watersheds will be sampled within the four year cycle. This will allow the LDEQ to determine whether there has been any improvement in water quality following implementation of the TMDLs. As the monitoring results are evaluated at the end of each year, waterbodies may be added to or removed from the 303(d) list.

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1. Introduction

Bayou Manchac, Subsegment 040201, was on the 2006 Integrated Report and the Consent Decree. Subsegment 040201 is found to be "not supporting" any of its designated uses of Primary Contact Recreation, Secondary Contact Recreation and Fish and Wildlife Propagation. The suspected causes of impairment are low dissolved oxygen, nitrate/nitrite, total phosphorus, chlorides, sulfates, total dissolved solids, total ammonia, and total fecal coliform. All nutrient impairments were based on evaluative assessments. Nutrient data was not used in the nutrient assessments. LDEQ and EPA anticipate the removal of all nutrient impairments in the 2010 Integrated Report. The suspected sources are Site Clearance (Land Development or Redevelopment), On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Sanitary Sewer Overflows (Collection System Failures), and unknown sources. Because of the impairment, this subsegment requires the development of a total maximum daily load (TMDL) for oxygen demand substances and nutrients. A calibrated water quality model for the Bayou Manchac, subsegment 040201 watershed was developed and projections for current dissolved oxygen standards were run to quantify the wasteload required to meet established dissolved oxygen criteria. This report presents the TMDL development and results.

2. Study Area Description

2.1 General Information

“The Lake Pontchartrain Basin, located in southeastern Louisiana, consists of the tributaries and distributaries of Lake Pontchartrain, a large estuarine lake. The basin is bounded on the north by the Mississippi state line, on the west and south by the east bank Mississippi River levee, on the east by the Pearl River Basin and on the southeast by Breton and Chandeleur Sounds. This basin includes Lake Borgne, Breton Sound, Chandeleur Sound and the Chandeleur Islands. The northern part of the basin consists of wooded uplands, both pine and hardwood forests. The southern portions of the basin consist of cypress-tupelo swamps and lowlands and brackish and saline marshes. The marshes of the southeastern part of the basin constitute the most rapidly eroding area along the Louisiana coast. Elevations in this basin range from minus five feet at New Orleans to over two hundred feet near the Mississippi border.” (LA DEQ, 2000)

This TMDL addresses Bayou Manchac, located in the Lake Pontchartrain Basin between the Mississippi River and the Amite River, south of Baton Rouge, Louisiana. This area is typical of the basin and is primarily comprised of pasture, wetlands, and residential as documented in Table 7 (LADEQ, 1999).

A detailed land cover map of Subsegment 040201 is also included in Appendix H2. Average annual precipitation in the segment, based on the nearest Louisiana Climatic Station, is 60 -64 inches based on a 30-year period of record (LSU, 1999). There is a Louisiana average annual precipitation map located in Appendix H3.

Table 7. Land Uses in Segment 040201

Land Type	Acres 040201	Percent Land use 040201
Agriculture/Cropland/Grassland	32597.70	29.53
Vegetated urban	25850.47	23.42
Wetland Forest Deciduous	23712.37	21.48
Non-Vegetated Urban	8249.95	7.47
Water	4904.69	4.44
Upland Forest Mixed	3295.22	2.99
Upland Forest Deciduous	3240.07	2.94
Wetland S/S Deciduous	2507.94	2.27
Upland Forest Evergreen	2193.48	1.99
Upland S/S Mixed	1876.12	1.70
Fresh Marsh	909.59	0.82
Upland Barren	514.18	0.47
Upland S/S Evergreen	342.27	0.31
Upland S/S Deciduous	164.35	0.15
Wetland Forest Mixed	24.69	0.02
Wetland Barren	7.78	0.01

2.2 Water Quality Standards

The Water Quality criteria and designated uses for Bayou Manchac Watershed are shown in Table 8. As noted in the table, Bayou Manchac, Subsegment 040201 has a year round dissolved oxygen standard of 5.0 mg/L.

Table 8. Water Quality Numerical Criteria and Designated Uses

Parameter	Value
Designated Uses	A B C
DO, mg/L	5.0
Cl, mg/L	25
SO_4, mg/L	10
pH	6.0 – 8.5
BAC	1*
Temperature, deg Celsius	32
TDS, mg/L	150

USES: A – primary contact recreation; B - secondary contact recreation; C – propagation of fish and wildlife; D – drinking water supply; E – oyster propagation; F – agriculture; G – outstanding natural resource water; L – limited aquatic life and wildlife use.

*Note 1 – 200 colonies/100mL maximum log mean and no more than 25% of samples exceeding 400 colonies/100mL for the period May through October; 1,000 colonies/100mL maximum log mean and no more than 25% of samples exceeding 2,000 colonies/100mL for the period November through April.

2.3 Wastewater Discharges

According to LDEQ's TEMPO database, there were 221 permitted dischargers located within this subsegment at the time of development of this TMDL. This includes two MS4 permittees. In addition, TEMPO indicated there were two facilities without an approved permit. This was too many facilities to sample. These dischargers are accounted for as nonpoint loading through the process of calibration. LDEQ recognizes that many of the dischargers may not individually impact the mainstem of Bayou Manchac during periods of low stream flow. However, the cumulative loading from many small dischargers can reach Bayou Manchac during storm events and have a residual impact throughout the year. Because of this and the large quantity of dischargers, LDEQ has associated discharger allocations with nonpoint load reductions. In the absence of regional plants, LDEQ believes that loading should be reduced equitably for all facilities. Six dischargers were included directly in the projection models (Table 9). Current permit information and discharge monitoring reports were reviewed for these facilities. The same reductions apply to all facilities, modeled or not.

LDEQ is not able to quantify the number of individual home sewer systems in the watershed. LDEQ realizes that home treatment systems may contribute to the loading. LDEQ believes that these home systems should be linked regional collection and treatment systems.

LDEQ is updating current information on permitted facilities and actively locating unpermitted facilities in the Pontchartrain Basin to get them permitted. Any newly permitted facilities will be subject to the same permits limits assigned to comparable facilities listed in this TMDL.

Phase I and II stormwater systems are additional possible point source contributors in the 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 National Pollutant Discharge Elimination System (NPDES) permit.

Under the NPDES stormwater program, operators of large, medium, and regulated small municipal separate storm sewer systems (MS4s) must obtain authorization to discharge pollutants. The Stormwater Phase I Rule (55 Federal Register 47990, November 16, 1990) requires all operators of medium and large MS4s to obtain an NPDES permit and develop a stormwater management program. Medium and large MS4s are defined by the size of the population within the MS4 area, not including the population served by combined sewer systems. A medium MS4 has a population between 100,000 and 249,999; a large MS4 has a population of 250,000 or more.

Phase II requires a select subset of small MS4s to obtain an NPDES stormwater permit. A small MS4 is any MS4 not already covered by the Phase I program as a medium or large MS4. The Phase II rule automatically covers all small MS4s in urbanized areas (UAs), as defined by the Bureau of the Census, and also includes small MS4s outside a UA that are so designated by NPDES permitting authorities, case by case (USEPA 2000).

In Louisiana, there are two ways that an MS4 can be identified as a regulated, small MS4. 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). MS4 permittees in the Bayou Manchac watershed include the city of Baton Rouge, Permit # LAS000101 and Ascension Parish, Permit # LAR041034.

The Baton Rouge MS4 permit covers the entire parish, however it can only regulate the urbanized areas (as defined by the 2010 U.S. Census). Ascension Parish has MS4 permit coverage but their permit coverage is limited to the unincorporated areas of Ascension Parish that lie within the Baton Rouge Urbanized Area plus discharges from the Town of Sorrento MS4. Allocations for each MS4 permit were provided by partitioning the nonpoint loading based on the percentage of the subsegment regulated by each MS4 permit. The Baton Rouge MS4 permit regulates approximately 55% of the subsegment, while the Ascension Parish MS4 permit regulates approximately 5.3% of the subsegment.

EPA's stormwater permitting regulations require municipalities to obtain permit coverage for all stormwater discharges from MS4s. For each MS4 in the basin, a gross load was computed by dividing the acreage of the permitted area in the subsegment by the total area of the subsegment and multiplying the nonpoint source allocation by this percentage. Note that these values are estimates that can be refined in the future as more information about MS4s and land-use-specific loadings becomes available. Note that MS4s are permitted dischargers but function similarly to nonpoint sources (through storm-driven processes). EPA and LDEQ expect that the MS4 WLAs will be achieved through BMPs and adaptive management.

The National Pollutant Discharge Elimination System (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 storm water pollution prevention plan (SWPPP) to implement any requirements of the total maximum daily load (TMDL) allocation. [See 40 CFR §130.]

Storm water discharges are highly variable both in terms of flow and pollutant concentration, and the relationships between discharges and water quality can be complex. For municipal stormwater discharges in particular, the current use of system-wide permits and a variety of jurisdiction-wide BMPs, including educational and programmatic BMPs, does not easily lend itself 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 recognized these problems and developed permitting guidance for stormwater permits. [See "Interim Permitting Approach for Water Quality-Based Effluent Limitations in Stormwater Permits" (EPA-833-D-96-00, Date published: 09/01/1996)]

Due to the nature of storm water discharges, and the typical lack of information on which to base numeric water quality-based effluent limitations (expressed as concentration and mass), LDEQ considers an interim permitting approach for NPDES storm water permits which is based on BMPs. (The interim permitting approach uses best management practices (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.) These BMPs should include the location of all wastewater

Table 9. Discharger Information for modeled dischargers for Bayou Manchac Subsegment 040201

Bayou Manchac Modeled Dischargers									
AI#	Facility	DMR Flow (gpd)	DMR Flow (cms)	Expected Flow (gpd)	Expected Flow (cms)	Permitted Flow (gpd)	Permitted Flow (cms)	Permitted BOD_5 (mg/L)	Path
43879	St Andrews Subdivision STP	13055.30	0.00057	12,000	0.00053	25000	0.00110	30	Local drainage then into Bayou Manchac
43883	Manchac Plantation Subdivision STP	36420.75	0.00160	49,600	0.00217	100000	0.00438	10	Unnamed ditch then into Bayou Manchac
43884	Manchac Crossing Subdivision STP	36663.46	0.00161	49,600	0.00217	100000	0.00438	10	Unnamed ditch then into Bayou Manchac
126685	United/Anco Services Inc	9000.00	0.00039	9000	0.00039	25000	0.00110	30	Local drainage then to Bayou Manchac
132934	Perkins Condos	8285.71	0.00036	19200	0.00084	25000	0.00110	30	Local drainage to Bayou Manchac
154124	Landing At Mallard Lakes - WWTP	NoDMRs		9600	0.00042	100000	0.00438	10	ditch to Bayou Manchac
Ultimate CBOD = BOD_5 * 2.3 Ultimate NBOD = NH_3 * 4.3									

discharges, elimination of all illicit discharges, regionalization of sewage collection and treatment, and the rehabilitation of all problematic sewage collection lines within the MS4 regulated area.

A monitoring component is also included in the recommended BMP approach. “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.” The details of this approach can be found in a guidance memo issued in 2002. [See Memorandum from Robert Wayland, Director of OWOW and James Hanlon, Director of OWM to Regional Water Division Directors: “Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit requirements Based on Those WLAs ” (Date published: 11/22/2002)] “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 storm water 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, LDEQ makes sure the TMDL reflect this.” This BMP-based approach to stormwater sources in TMDLs is also recognized and described in the most recent EPA guidance. [See “TMDLs To Stormwater Permits Handbook” (DRAFT), EPA, November 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.

2.4 Water Quality Conditions/Assessment

Bayou Manchac, subsegment 040201, of the Lake Pontchartrain Basin is listed on the 2006 Integrated Report and the Consent Decree. This subsegment is listed as not supporting Primary Contact Recreation, Secondary Contact Recreation, and Fish and Wildlife Propagation. The suspected causes of impairment are low dissolved oxygen, nitrate/nitrite, total phosphorous, chlorides, sulfates, total dissolved solids, total ammonia, and total fecal coliform. The suspected sources are Site Clearance (Land Development or Redevelopment), On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Sanitary Sewer Overflows (Collection System Failures), and unknown sources. Because of the impairment, this subsegment requires the development of a total maximum daily load (TMDL) for oxygen demand substances and nutrients. Because of the impairment, this subsegment requires the development of a total maximum daily load (TMDL) for oxygen demanding substances and nutrients.

The survey data was plotted with the last ten years of ambient data at site WQN0142. All survey data values fell within the same range as the ambient data at that station. The plots are presented in Appendix G5.

2.5 Prior Studies

This is the first TMDL study conducted on Bayou Manchac. No other studies have been conducted by LDEQ.

LDEQ has one monthly water quality sampling station on Bayou Manchac. LDEQ Water Quality Site 0142, Bayou Manchac near Prairieville, Louisiana, has a period of record from July 1985 to August 2005. Data collected during the Eularian survey conducted in June 2007, included discharge data, cross-section data, field in-situ data, continuous monitor data, two dye studies, and lab water quality data. This data was used to establish the input for the model calibration and is presented in Appendix F.

3. General TMDL Development Process

The development of a TMDL for dissolved oxygen generally occurs in 3 stages. Stage 1 encompasses the data collection activities. These activities may include gathering such information as stream cross-sections, stream flow, stream water chemistry, stream temperature and dissolved oxygen at various locations on the stream, location of the stream centerline and the boundaries of the watershed which drains into the stream, and other physical and chemical factors which are associated with the stream. Additional data gathering activities include gathering all available information on each facility which discharges pollutants in to the stream, gathering all available stream water quality chemistry and flow data from other agencies and groups, gathering population statistics for the watershed to assist in developing projections of future loadings to the water body, land use and crop rotation data where available, and any other information which may have some bearing on the quality of the waters within the watershed. During Stage 1, any data available from reference or least impacted streams which can be used to gauge the relative health of the watershed is also collected.

Stage 2 involves organizing all of this data into one or more useable forms from which the input data required by the model can be obtained or derived. Water quality samples, field measurements, and historical data must be analyzed and statistically evaluated in order to determine a set of conditions which have actually been measured in the watershed. The findings are then input to the model. Best professional judgment is used to determine initial estimates for parameters which were not or could not be measured in the field. These estimated variables are adjusted in sequential runs of the model until the model reproduces the field conditions which were measured. In other words, the model produces a value of dissolved oxygen, temperature, or other parameter which matches the measured value within an acceptable margin of error at the locations along the stream where the measurements were actually made. When this happens, the model is said to be calibrated to the actual stream conditions. At this point, the model should confirm that there is an impairment and give some indications of the causes of the impairment. If a second set of measurements is available for slightly different conditions, the calibrated model is run with these conditions to see if the calibration holds for both sets of data. When this happens, the model is said to be verified.

Stage 3 covers the projection modeling which results in the TMDL. The critical conditions of flow and temperature are determined for the waterbody and the maximum pollutant discharge conditions from the point sources are determined. These conditions are then substituted into the model along with any related condition changes which are required to perform worst case scenario predictions. At this point, the loadings from the point and nonpoint sources (increased by an acceptable margin of safety) are run at various levels and distributions until the model output shows that dissolved oxygen criteria are achieved. It is critical that a balanced distribution of the point and nonpoint source loads be made in order to predict any success in future achievement of water quality standards. At the end of Stage 3, a TMDL is produced which shows the point source permit limits and the amount of reduction in man-made nonpoint source pollution which must be achieved to attain water quality standards. The man-made portion of the NPS pollution is estimated from the difference between the calibration loads and the loads observed on reference or least impacted streams.

4. Calibration Model Documentation

4.1 Program Description

The model used for this TMDL was LA-QUAL, a steady-state one-dimensional water quality model. LA-QUAL has the mechanisms for incorporating tidal fluctuations, dispersion, and algal impacts in the analysis and was particularly suitable for use in modeling Bayou Manchac. For a history of LA-QUAL, refer to the LA-QUAL for Windows User's Manual (LDEQ, 2007).

4.2 Input Data Documentation

Data collected during an intensive survey conducted from June 5-8, 2007, was used to establish the input for the model calibration. The data is presented in Appendix F. The flows in each reach were based on the measured survey discharges. The headwater flow was calculated based upon the upper dye study.

Field and laboratory water quality data were entered in a spreadsheet for ease of analysis. Upon review of the measured CBOD daily values it became apparent that there were two distinct CBOD components, which had varying ultimate values as well as decay rates and lag times. The first component started its decay almost immediately while the second component had substantial lag times. The total CBOD curve presented in Appendix F5 is the sum of the two first order equations, which were derived using the Microsoft Excel Solver and were based on the measured daily CBOD values. These two CBOD components were modeled separately as CBOD1 and CBOD2 in the LAQUAL model. NBOD simulated organic nitrogen, ammonia nitrogen, and nitrate/nitrite nitrogen. The Louisiana BOD program was applied to the BOD data in a separate spreadsheet and values were computed for each sample taken of ultimate CBOD1, CBOD1 decay rate, CBOD1 lag time, ultimate CBOD2, CBOD2 decay rate, and CBOD2 lag time as well as the NBOD, NBOD decay rate, and NBOD lag time. The survey data was the primary source of the model input data for initial conditions, decay rates, mainstem water temperature, dissolved oxygen loading, headwater temperature, and DO data. It should be noted the survey was conducted at a time when the water level in the Amite River was decreasing and water may have begun to empty out of Bayou Manchac.

The survey data was also compared to the reference stream data. Most values for conservatives parameters, were considerably higher than the values found in the reference stream data. However, for samples collected near the Amite River, the values were lower than corresponding values at the upstream sites. Similar trends were observed for the nutrient parameters. These trends indicate the dispersive influence of the Amite River and possibly the degree to which Bayou Manchac is dominated by loading from point sources and urban nonpoint sources of loading. The reference stream data is provided in Appendix E6.

4.2.1 Model Schematics and Maps

A vector diagram of the modeled area is presented in Figure 1 and Appendix C1. The vector diagram shows the locations of survey stations, the reach/element design, and the locations of the tributaries. An ARCVIEW map of the stream and subsegment showing river kilometers, survey stations, subsegment boundary and other points of interest are also included in Figure 2 and Appendix H1.

4.2.2 Model Options, Data Type 2

Six constituents were modeled during the calibration process. These were dissolved oxygen, carbonaceous biochemical oxygen demand components 1 and 2, nitrogenous biochemical oxygen demand, chloride, and conductivity. The continuous monitors did show small diurnal swings indicative of algal activity. The algae cycle was not modeled; however, the measured chlorophyll A values were included in the initial conditions. This allowed the model to simulate the oxygen production associated with algae without modeling the entire algal cycle.

4.2.3 Program Constants, Data Type 3

A minimum K_L value of 0.7 m/day was used. This value is a conversion from 2.3 ft/day which is a Louisiana standard minimum. The K_2 maximum was set to 25 1/day at 20^o C which is the EPA Policy in the absence of a measured value.

The inhibition control value was set to option 3 which is all rates but sediment oxygen demand. The water column dissolved oxygen demand is assumed to come primarily from facultative bacteria under anoxic conditions and SOD is not influenced by modeled dissolved oxygen levels in the upper water column.

The hydraulic calculation method was set to option 2 or “widths and depths.” This was done because the low slopes in these waterbodies cause a substantial amount of water to be present in some reaches during critical flow. Using a modified Leopold relationship allows the model to predict a more accurate depth and width during low flow.

Two options are available for the settling rate units. Option 1 is to be used when the model utilizes a setting velocity. This option essentially ties the setting rate to the stream depth. Option 2 is to be used when the model utilizes a settling rate. Option 2 states that a defined percentage of the constituent will settle out of the water column in one day. Option 2 was used for Bayou Manchac.

The algae oxygen production was set to zero so that LDEQ could model to a large diurnal variation in dissolved oxygen.

Dispersion equation 3 was used to account for all modes of transport.

Figure 1. Model Layout

Bayou Manchac Model Layout
Subsegment 040201
RKM 16.7 to RKM 0.0

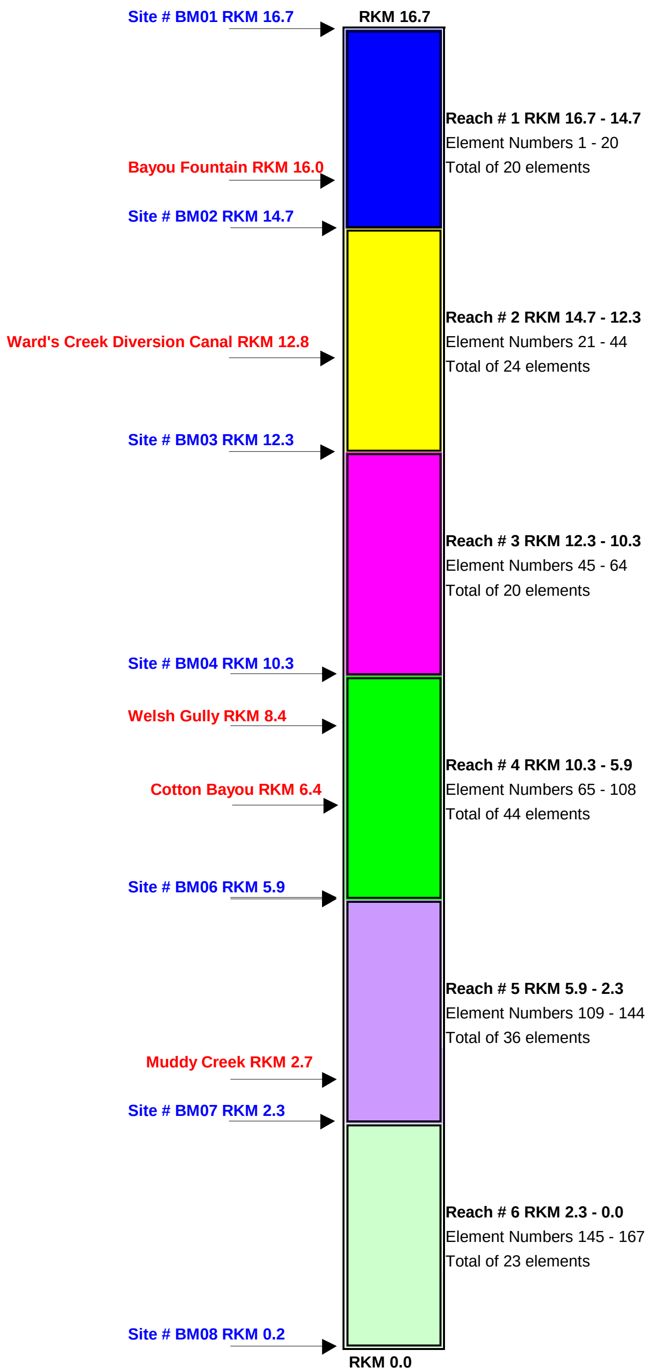
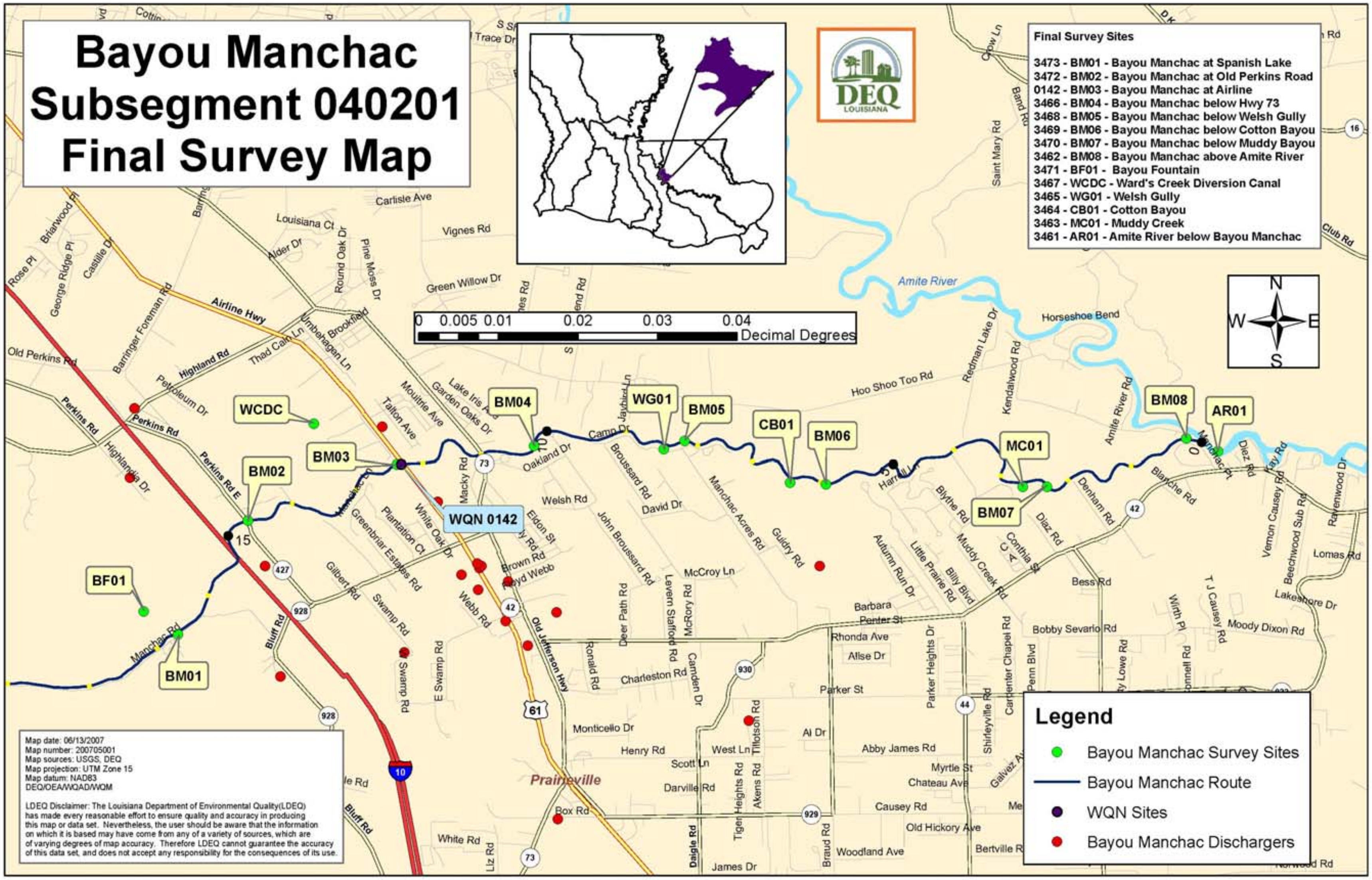


Figure 2. Map of Study Area



4.2.4 Temperature Correction of Kinetics, Data Type 4

The temperature values computed are used to correct the rate coefficients in the source/sink terms for the other water quality variables. These coefficients are input at 20 °C and are then corrected to temperature using the following equation:

$$X_T = X_{20} * \text{Theta}^{(T-20)}$$

Where:

X_T = the value of the coefficient at the local temperature T in degrees Celsius
X_{20} = the value of the coefficient at the standard temperature at 20 degrees Celsius
Theta = an empirical constant for each reaction coefficient

In the absence of specified values for data type 4, the model uses default values. A complete listing of these values can be found in the LA-QUAL for Windows User's Manual (LDEQ, 2004). For this model all values used were LA-QUAL default values.

4.2.5 Reach Identification Data, Data Type 8

A diagram of the modeled area is presented in Appendix C1. The vector diagram shows the reach/element design and the location of Bayou Fountain, Ward's Creek Diversion Canal, Welsh Gully, Cotton Bayou, and Muddy Bayou. The modeled area is characterized by 8 sample sites. Bayou Manchac is an intermittent waterbody between the Mississippi River and Alligator Bayou. This reach of the Bayou is usually dry during periods of critical flow. Therefore, the model begins just above Alligator Bayou and extends to the Amite River. This calibrated model includes 6 reaches, 167 elements, and one headwater. A digitized map of the stream showing river kilometers and the June 2007 survey sampling sites are included in Figure 2 and Appendix H1.

4.2.6 Advective Hydraulic Coefficients, Data Type 9

The Leopold equations are used to scale the velocity (U), width (W), and depth (H) of a free flowing stream from a lower value of flow to a higher value or from a higher value of flow to a lower value. Note that the exponents add to one and the coefficients multiply to 1. This is known as the rule of ones. This method is not appropriate for streams which are not dependent entirely on flow such as waterbodies where flow approaches zero, but contain some depth.

$$U = aQ^b \qquad H = cQ^d \qquad W = eQ^f$$

$$b + d + f = 1 \qquad (a)(c)(e) = 1$$

The Leopold equations presume that the water surface width and average depth of a stream are zero at zero flow. Most Louisiana streams, such as Bayou Manchac, retain a significant width and depth at zero flow. The equations have therefore been modified to allow for a zero flow width and depth. The rule of ones does not apply to the modified equations. The modified Leopold equations are:

$W = aQ^b + c$ $H = dQ^e + f$ $U = gQ^h$

The width and depths were assumed to be independent of flow and relatively constant. Consequently, the modified Leopold coefficients and exponents were not calculated for this model.

4.2.7 Dispersive Hydraulic Coefficients, Data Type 10

There were two dye studies conducted during the survey. The upper dye study was located between BM02 and BM03. The lower dye study was located just below BM06. Dye concentrations for the upper portion were recorded in three separate runs which covered approximately 72 hours. For the lower dye study, concentrations were recorded in two separate runs which covered approximately 48 hours.

The dispersion in both cases was estimated based on the dye study. Both dye studies were conducted using the moving site method. Based on the data retrieved the final dye run was determined to be most representative of the stream. This was because the final dye run had the longest run time. The longer time frame gave the dye a longer time to become more uniformly dispersed in the river. The Kd value for the upper reach was determined to be 0.290. The Kd value for the lower reach was determined to be 0.554. All documentation can be found in Appendix F6.

To account for all modes of transport, equation 3, ($D_L = aH^bQ^cV_M^d$) in LA-QUAL was used. Using b=5/6, c=0, and d=1 will take into account all modes of transport in the manner of the Tracor and QUAL2E equations. The value for coefficient "a" was calibrated to within the boundaries of the final dye run by setting all other parameters to the previously mentioned values. All documentation can be found in Appendix F6.

4.2.8 Initial Conditions, Data Type 11

The initial conditions are used to reduce the number of iterations required by the model. The values required for this model were temperature and DO by reach. The input values came from the survey station(s) located closest to the reach.

When the continuous monitoring dissolved oxygen (DO) data for at least one diurnal cycle is available and the diurnal variation is less than 2 mg/L, it is standard practice for LDEQ to calibrate to the mean DO. In this case, a diurnal variation greater than 2 mg/L was encountered. The standard LDEQ practice for this is as follows:

1. Calibrate without simulating algal production as follows:

Range of DO cycle	Calibrate
0 – 2 mg/l	Mean DO for one or more full cycles
2 – 9 mg/l	One mg/l over minimum DO
>9 mg/l	0.11*DO cycle over minimum DO

These practices were followed for this model. The input data and sources are shown in Appendix B2.

Chlorophyll a values were also used since the mild effects of algae on the dissolved oxygen concentrations were also simulated with this model. The initial conditions are only a starting point for the model, therefore, all values were set to the measured values. The input data and sources are shown in Appendix B2.

4.2.9 Reaeration Rates, Data Type 12

The applicability of the various reaeration equations was examined. The Louisiana Equation considered to be the most the most applicable to Bayou Manchac for all reaches. This equation is based on empirical data collected by the Louisiana DEQ. The equation is stated below.

$$K2 = \frac{0.664\ (1 + 21.52\ V)}{D}$$

where: V = stream velocity
D = stream depth

4.2.10 Sediment Oxygen Demand, Data Type 12

The SOD values were achieved through calibration. The SOD value for each reach is shown in Appendix B2. The values were considered to be reasonable for this type of stream. A large part of the stream is high canopy. The high canopy means large amounts of leaf fall to the stream are present, leaving bottom sediments. The conversion ratio of settled CBOD and settled NBOD to SOD was considered to be zero for all reaches due to the resuspension of bottom sediments.

4.2.11 Carbonaceous BOD Decay and Settling Rates, Data Type 12

The decay rates used were based on the bottle rates from the survey. Review of the measured CBOD daily values revealed two distinct CBOD components, which had varying decay rates and lag times. The first component started its decay almost immediately with decay rates ranging from 0.1081 to 0.3070 per day. The second component had decay rates from 0.0298 to 0.0398 per day. The total CBOD curves presented in Appendix F5 are the sum of the two first order equations, which were derived using the Microsoft Excel Solver and were based on the measured daily CBOD values. These two components were modeled separately as CBOD1 and CBOD2 in the LA-QUAL model. The decay and settling rates used for each reach are shown in Appendix F5.

4.2.12 Nitrogenous BOD Decay and Settling Rates, Data Type 15

These rates are labeled NBOD Decay and Settling in the model. The decay rates used were based on the bottle rates from the survey. NBOD decay rates were fairly consistent with main stem rates ranging from 0.1184 to 0.2387. The decay and settling rates used for each reach are shown in Appendix F5.

4.2.13 Incremental Conditions, Data Types 16, 17, and 18

The incremental conditions were used in the calibration to represent nonpoint source loads associated with flows. It was determined from the flow measurements along the mainstem, the presence of bank flow, and an evaluation of the water chemistry confirmed this assumption. The temperature, salinity, dissolved oxygen, CBOD1, CBOD2, and NBOD were assumed to be the measurements obtained in the reaches. The data and its source for each reach are presented in Appendix B2.

4.2.14 Nonpoint Sources, Data Type 19

Nonpoint source loads which are not associated with a flow are input into this part of the model. These can be most easily understood as resuspended load from the bottom sediments and are modeled as SOD, CBOD1, CBOD2, and NBOD loads. These values are achieved through calibration. The loads determined through calibration were reasonable for a waterbody with low slope and velocity and bed sediment composed primariy of silt and clay.

4.2.15 Headwaters, Data Types 20, 21, and 22

The headwater flow was determined from the upper dye study. The data and sources are presented in Appendix B2.

4.2.16 Wasteloads, Data Types 23, 24, and 25

According to LDEQ's TEMPO database, there were 221 permitted dischargers located within this subsegment at the time of development of this TMDL. This includes two MS4 permittees. In addition, TEMPO indicated there were two facilities without an approved permit. This was too many facilities to sample and model. These dischargers are accounted for as nonpoint loading through the process of calibration. Six dischargers were included directly in the projection models.

All tributaries that were flowing during the survey (low flow, high temperature) were sampled and included in the model as boundary loads. In order to do this, they had to be included in Data Types 23, 24, and 25. As a result, LDEQ captured all of the loading transported by such tributaries to Bayou Manchac.

4.2.17 Boundary Conditions, Data Type 27

The headwater boundary and lower boundary conditions were assumed to be equivalent to the measurements taken at survey stations BM01 and BM08, respectively. As stated above, all flowing tributaries were included as boundary loads.

4.3 Model Discussion and Results

The calibration model input and output is presented in Appendix B. The overlay plotting option was used to determine if calibration had been achieved. A plot of the dissolved oxygen concentration versus river kilometer is presented in Figure 3. The calibration points for temperature were calculated based on the average continuous monitor readings. The dissolved oxygen readings at all sites had a diurnal swing of larger than 2 and less than 9. Therefore, the calibration points for dissolved oxygen were based on the minimum DO + 1. The calibration points for CBOD1, CBOD2, and NBOD were the measured values obtained from the water quality samples. The calibration points for conductivity were based on the insitu readings. The calibration points for the chlorides and chlorophyll A were the measured values obtained from the water quality samples. The graph for DO is presented in Figure 3.

The model was adequately calibrated for DO, UCBOD1, UCBOD2, and NBOD on the main stem. The calibration model shows that during June 2007 survey period, the DO standard of 5 mg/l was not being met in subsegment 040201 in any of the modeled reaches. The calibration model minimum DO on the main stem was 1.06 mg/l.

The Louisiana Reaeration Equation was used in this model. Based on the depth and velocity of the water in Bayou Manchac, this equation was determined to be the most appropriate of the 22 equations available within the LAQUAL modeling software. The use of this equation produced a calibration model with reasonable values for both sediment oxygen demand (SOD) and nonpoint loading.

Plots showing the level of oxygen demand were high throughout the waterbody, indicating that waterbody never fully recovered from the loading conditions present at the time of the survey. Bayou Manchac may occasionally receive discharge from neighboring wetlands, including Alligator Bayou and Spainsh Lake. However, the survey for this TMDL was conducted under critical low-flow conditions, and any residual impacts from potential wetland discharges are expected to be minimal. It is the determination of LDEQ that a significant portion of the loading comes from man-made sources, including many permitted and unpermitted dischargers located within the watershed. The decay and settling rates and SOD were achieved through calibration. The resulting values were reasonable for a waterbody with with low slope and stream velocity and bed sediment composed primarily of silt and clay.

5. Water Quality Projections

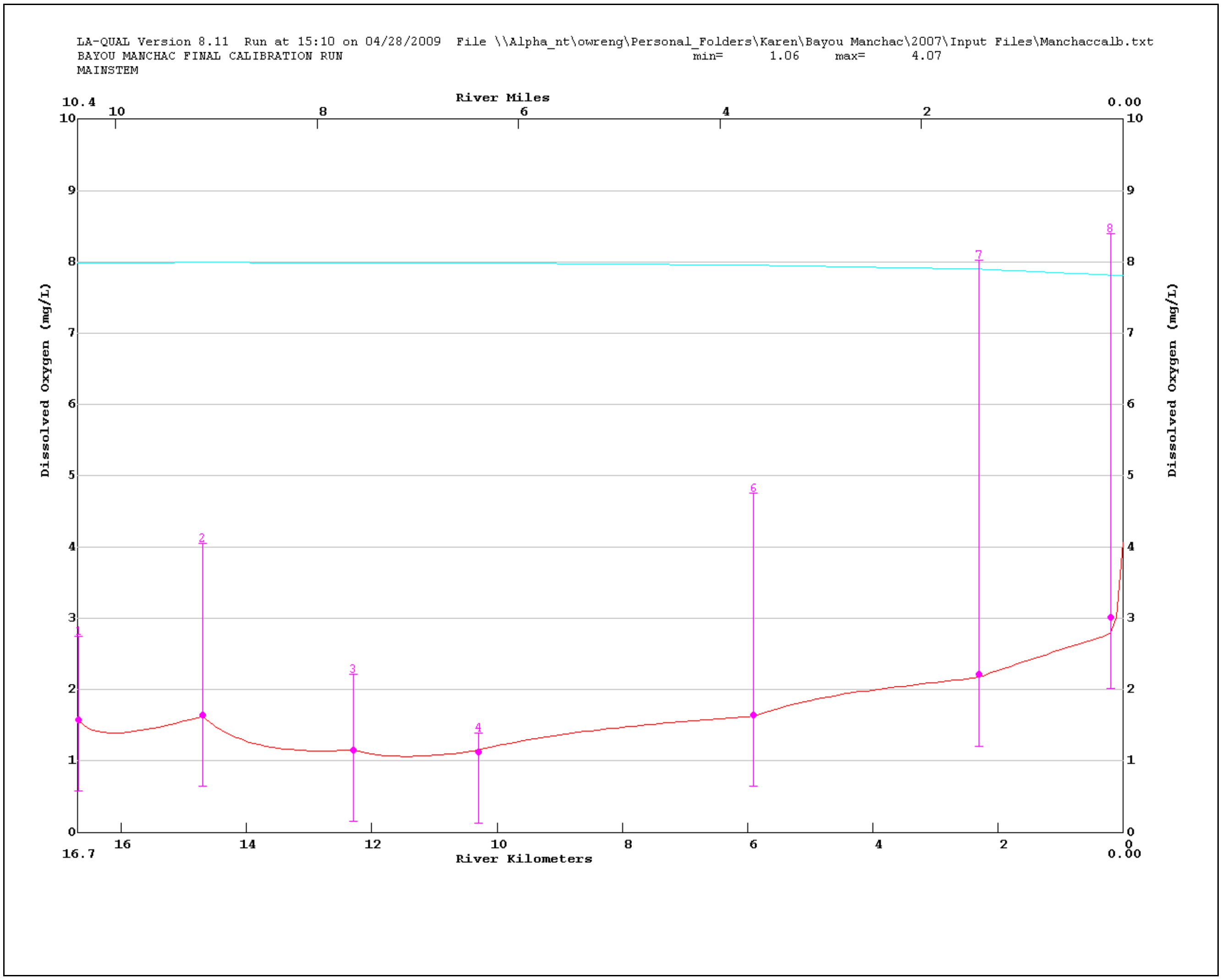
The traditional summer critical projection loading scenario was performed at the current annual DO standard. This scenario was based on reduced total nonpoint loads at summer season critical conditions (ie. 90^{th} percentile seasonal temperatures and summer default flows) in accordance with the Louisiana Technical Procedures (LTP) . A winter projection was run based on the percent reduction of total nonpoint loads required for the summer critical projections.

5.1 Critical Conditions, Seasonality and Margin of Safety

The Clean Water Act requires the consideration of seasonal variation of conditions affecting the constituent of concern, and the inclusion of a margin of safety (MOS) in the development of a TMDL. For the Bayou Manchac, subsegment 040201 TMDL, an analysis of LDEQ ambient data has been employed to determine critical seasonal conditions and an appropriate margin of safety.

Critical conditions for dissolved oxygen were determined for Bayou Manchac using water quality data from Ambient Water Quality Network Site No. 0142 on the LDEQ Ambient Monitoring Network. The 90^{th} percentile temperature for each season and the corresponding 90% of saturation DO was determined. Ambient temperature data, critical temperature and DO saturation determinations are shown in Appendix G1.

Figure 3. Calibration Model Dissolved Oxygen versus River Kilometer



- numbered points indicate survey stations
- vertical lines indicate beginning of reach
- the horizontal line indicates the DO Criterion
- upper plotted line indicates DO saturation
- lower plotted line indicates calibration model output

Graphical and regression analysis techniques have been used by LDEQ historically to evaluate the temperature and dissolved oxygen data from the Ambient Monitoring Network and run-off determinations from the Louisiana Office of State Climatology water budget. Since nonpoint loading is conveyed by run-off, this was a reasonable correlation to use. Temperature is strongly inversely proportional to dissolved oxygen and moderately inversely proportional to run-off. Dissolved oxygen and run-off are also moderately directly proportional. The analysis concluded that the critical conditions for stream dissolved oxygen concentrations were those of negligible nonpoint run-off and low stream flow combined with high stream temperature.

When the rainfall run-off (and non-point loading) and stream flow are high, turbulence is higher due to the higher flow and the temperature is lowered by the run-off. In addition, run-off coefficients are higher in cooler weather due to reduced evaporation and evapotranspiration, so that the high flow periods of the year tend to be the cooler periods. Reaeration rates and DO saturation are, of course, much higher when water temperatures are cooler, but BOD decay rates are much lower. For these reasons, periods of high loading are periods of higher reaeration and dissolved oxygen but not necessarily periods of high BOD decay.

This phenomenon is interpreted in TMDL modeling by assuming that nonpoint loading associated with flows into the stream are responsible for the benthic blanket which accumulates on the stream bottom and that the accumulated benthic blanket of the stream, expressed as SOD and/or resuspended BOD in the calibration model, has reached steady state or normal conditions over the long term and that short term additions to the blanket are off set by short term losses. In waterbodies dominated loading from point source discharges, these point sources may also contribute to the benthic blanket. This accumulated loading has its greatest impact on the stream during periods of higher temperature and lower flow. The manmade portion of the NPS loading is the difference between the calibration load and the reference stream load where the calibration load is higher. The only mechanisms for changing this normal benthic blanket condition is reduce the amount of loading from both point and nonpoint source discharges. This may be done through the implementation of best management practices for nonpoint source loads and more stringent permit limits for point source loads

Critical season conditions were simulated in the Bayou Manchac, subsegment 040201 dissolved oxygen TMDL projection modeling by using the LTP seasonal defaults for all flows, and the 90^{th} percentile temperature. For the headwater DO, the 90% of DO Sat from the ambient monitoring site was used.

In reality, the highest temperatures occur in July-August, the lowest stream flows occur in October-November, and the maximum point source discharge occurs following a significant rainfall, i.e., high-flow conditions. The summer projection model is established as if all these conditions happened at the same time. The winter projection model accounts for the seasonal differences in flows and BMP efficiencies. Other conservative assumptions regarding rates and loadings are also made during the modeling process. In addition to the conservative measures, an explicit MOS of 20% was used for all loads to account for future growth, safety, model uncertainty and data inadequacies.

5.2 Input Data Documentation

The LTP states that the flow for summer critical conditions should be 0.1 cfs or the 7Q10, whichever is greater. For winter conditions, the critical flow should be 1.0 cfs or the 7Q10, whichever is greater. In the absence of historical data, a 7Q10 value could not be determined for Bayou Manchac. Therefore, the summer and winter critical flows were set to 0.1 cfs and 1.0 cfs, respectively.

Three tributaries have dischargers located along them. For this reason, the tributaries are assumed to contribute flow in the projections. For Ward’s Creek Diversion Canal, the 7Q10 of 0.038 cms for Ward’s Creek was used. For Welsh Gully and Muddy Creek, the flow from the dischargers was less than the LTP default of 0.1 cfs. Therefore, the flow for Welsh Gully and Muddy Creek were set to 0.1 cfs.

Critical conditions include dissolved oxygen, temperature and flow. Pollutant loading is adjusted in the projection models to meet the dissolved oxygen criteria.

The calibration values were retained for the remaining parameters and used as input values in the summer and winter projections. The model adjusts the input values for SOD, CBODU decay, and NBODU decay based upon the input temperature. The width and depth values were retained from the calibration model.

5.2.1 Model Options, Data Type 2

Four constituents were modeled during the projection process. These were dissolved oxygen, the two components of carbonaceous biochemical oxygen demand, and nitrogenous biochemical oxygen demand.

5.2.2 Temperature Correction of Kinetics, Data Type 4

The temperature correction factors specified in the LTP are entered in the model.

5.2.3 Reach Identification Data, Data Type 8

The reach-element design from the calibration was used in the projection modeling.

5.2.4 Advective Hydraulic Coefficients, Data Type 9

The hydraulic coefficients, exponents, and constants determined for the calibration were used in the projection model.

5.2.5 Initial Conditions, Data Type 11

The initial conditions were set to the 90th percentile critical season temperature in accordance with the LTP. For summer, the temperature was set to 29.00^{o}C. For winter, the temperature was set to 21.22^{o}C. The dissolved oxygen values for the initial conditions were set at the stream criteria (5mg/L) with the exception of the headwater dissolved oxygen value. The headwater DO was set to 90% DO Sat for WQN 0142. The headwater DO for summer was set to 6.90 mg/L. The headwater DO for winter was set to 7.97 mg/L.

5.2.6 Reaeration Rates, Carbonaceous BOD Decay and Settling Rates, Nitrogenous BOD Decay and Settling Rates, Data Type 12 and 15

The reaeration rate equations, CBOD1 and CBOD2 decay and settling rates, NBOD decay and settling rates, and the fractions converting settled CBOD and settled NBOD to SOD were not changed from the calibration.

5.2.7 Sediment Oxygen Demand, Nonpoint Sources, Headwaters, Wasteloads, Data Type 12, 19, 20, 21, 22, 24, 25, and 26

The NPS values were calculated for each projection scenario using a load equivalent spreadsheet. An analysis was made of the calibration NPS and SOD loads in terms of loading in units of gm-O_2/m^2/day. The same spreadsheet also calculated load reductions for the headwaters and wasteloads. The values and sources of the input data and the load analyses are presented in Appendix D for each of the projection runs.

LDEQ has collected and measured the CBOD and NBOD oxygen demand loading components for a number of years. These loads have been found in all streams including the non-impacted reference streams. It is LDEQ's opinion that much of this loading is attributable to run-off loads which are flushed into the stream during run-off events, and subsequently settle to the bottom in our slow moving streams. These benthic loads decay and breakdown during the year, becoming easily resuspended into the water column during the low flow/high temperature season. This season has historically been identified as the critical dissolved oxygen season.

LDEQ simulates part of the non-point source oxygen demand loading as resuspended benthic load and SOD. The calibrated non-point loads, UCBOD, UNBOD and SOD, are summed to produce the total calibrated benthic load. The total calibrated benthic load is then reduced by the total background benthic load (determined from LDEQ's reference stream research) to determine the total manmade benthic loading. The manmade portion is then reduced incrementally on a percentage basis to determine the necessary percentage reduction of manmade loading required to meet the water body's dissolved oxygen criteria. These reductions are applied uniformly to all reaches sharing similar hydrology and land uses.

Following the same protocol as the point source discharges, the total reduced manmade benthic load is adjusted for the margin of safety by dividing the value by one minus the margin of safety. This adjusted load is added back to the total background benthic value to obtain the total projection model benthic load. This total projection benthic load is then broken out into its components of SOD, resuspended CBOD and resuspended NBOD by multiplying the total projection benthic load by the ratio of each calibrated component to the total calibrated benthic load.

LDEQ has found variations in the breakdown of the individual CBOD and NBOD components. While the total BOD is reliable, the carbonaceous and nitrogenous component allocation is subject to the type of test method. In the past, LDEQ used a method which suppressed the nitrogenous component to obtain the carbonaceous component value, which was then subtracted from the total measured BOD to determine the nitrogenous value. The suppressant in this method was only reliable for twenty days thus leading to the assumption that the majority of the carbonaceous loading was depleted within that period of time. The test results supported this assumption. A new method was found in Standard Methods for testing long term BODs and was implemented in 2000. This new method was necessary because the nitrogen suppressant started failing around day seven and the manufacturer of the suppressant will only guarantee it's potency for a five day period. LDEQ felt a five day test would not adequately depict the water quality of streams.

This proposed method is a sixty day test which measures the incremental total BOD of the sample while at the same time measuring the increase in nitrite/nitrate in the sample. This increase in nitrite/nitrate allows LDEQ to calculate the incremental nitrogenous portion by multiplying the increase by 4.57 to determine the NBOD daily readings. These NBOD daily readings are then subtracted from the daily reading for total BOD to determine the CBOD daily values. A curve fit algorithm is then applied to the daily component readings to obtain the estimated ultimate values of each component as well as the decay rate and lag times of the first order equations.

The results obtained using the new method showed that a portion of the CBOD first order equation does begin to level off prior to the twentieth day, however a secondary CBOD component begins to use dissolved oxygen sometime between day ten and day twenty-five. This secondary CBOD component was not being assessed as CBOD using the previous method but was being included in the NBOD load. Thus the CBOD and NBOD component loading used in the reference stream studies is not consistent with the results using the new proposed 60 day method and the individual values should not be used to determine background values for samples processed using the new test methods. However, the sum of CBOD and NBOD should be about the same for both new and old test methods. For this reason LDEQ decided to use the average of reference stream benthic loads as background values.

The projections show that Bayou Manchac cannot meet the current 5.0 mg/L standard without significant load reductions. Since LDEQ assumes these benthic loads are long-term loads brought to the stream by various sources throughout the year, the same percentage reductions were made in the winter projection model as were in the summer critical projection model. These reductions met the summer dissolved oxygen criteria and well surpassed requirements in the non-critical winter projection.

The reductions were determined using the calibrated values for nonpoint CBOD1, CBOD2, and NBOD. These values were summed by reach, as justified above and adjusted for the margin of safety. Each reach's total benthic nonpoint load was then reduced to meet the dissolved oxygen criteria in each reach. Using the ratios determined in calibration, this reduced total nonpoint load was then broken into its components of CBOD1, CBOD2, NBOD, and SOD. The percentage reduction within the mainstem was calculated based on the comparison of the reduced total nonpoint benthic load to the calibration total nonpoint benthic load. These calculations are shown in Appendix E. The value and sources of CBOD1, CBOD2, and NBOD for each projection run are presented in Appendix F5.

5.2.8 Boundary Conditions, Data Type 27

The lower boundary conditions were set at the 90^{th} percentile critical season temperature, the dissolved oxygen criteria, and the measured stream UCBOD and UNBOD loads for all projections and scenarios.

5.3 Model Discussion and Results

LDEQ developed several projection models with varying levels of load reductions. Reference stream data was used to aid in the development of the projection models and estimate the natural background and man-made loads. In the absence of having one particular reference stream that is most representative of Bayou Manchac, LDEQ used a background benthic load of 2.0 gm O_2/m^2/day. This value was obtained from a compilation of reference stream studies. LDEQ determined that the waterbody could not achieve a dissolved oxygen criteria of 5 mg/L without a 100% reduction of man-made loading. Several model runs were conducted at 50%, 75%, 85%, and 100% reductions in man-made loading with appropriate reductions in permit limits. As occurred in the calibration model, a significant dissolved oxygen sag was noted in the area between Alligator Bayou and US Hwy 61. This area appears to be where most of the loading from permitted and unpermitted dischargers was entering

Bayou Manchac. Bayou Manchac does seem to recover as it approaches the Amite River, but only with these drastic load reductions. It should be noted that the collection system for the East Baton Rouge Parish Regional Plant occasionally bypasses to Bayou Manchac tributaries during storm events and has numerous leaks. These bypasses and leaks could be a significant contributing factor to the high loading in the waterbody. This collection system is currenly undergoing repairs and upgrades, which are expected to contribute to load reductions within Bayou Manchac. The projection model input and output data sets are presented in Appendix D. The reference stream data is located in Appendix E6.

5.3.1 Summer Projection

Under this Scenario, the SOD, NPS, headwater and wasteload values were reduced to reference stream values except where the calibration value was less than the reference stream value. This summer projection revealed that 100% removal of man-made nonpoint sources would result in a minimum DO of 5.67 mg/l. Such large reductions usually indicate the DO criteria is inappropriate. LDEQ is in the process of reevaluating the DO criteria for waterbodies in this ecoregion. The ongoing ecoregion study indicates the summer season should be May through November for the Lower Mississippi River Alluvial Plains Ecoregion and the criterion should be 2.3 mg/L. The same study indicates the winter season should be October through April and the winter criterion should be 5.0 mg/L. The recommended criteria were derived through the application of EPA approved statistical methods. This TMDL supports the revision of the summer season criterion for DO.

A graph of the dissolved oxygen concentration versus river kilometer for the summer projection is presented in Figure 4.

5.3.2 Alternate Projection

An additional summer critical season projection was run to based on alternate DO targets. For a DO target of 2.3 mg/L, a 75% reduction in man-made loading is required. This is shown in Figure 5.

5.3.3 Winter Projection

Winter runs were made at the same level of reduction as the summer runs. A graph of the dissolved oxygen concentration versus river kilometer for the winter projections are presented in figures 6 and 7.

Figure 4. Summer Projection at 100% Removal of Man-Made Loads to meet a DO Criteria of 5.0 mg/L

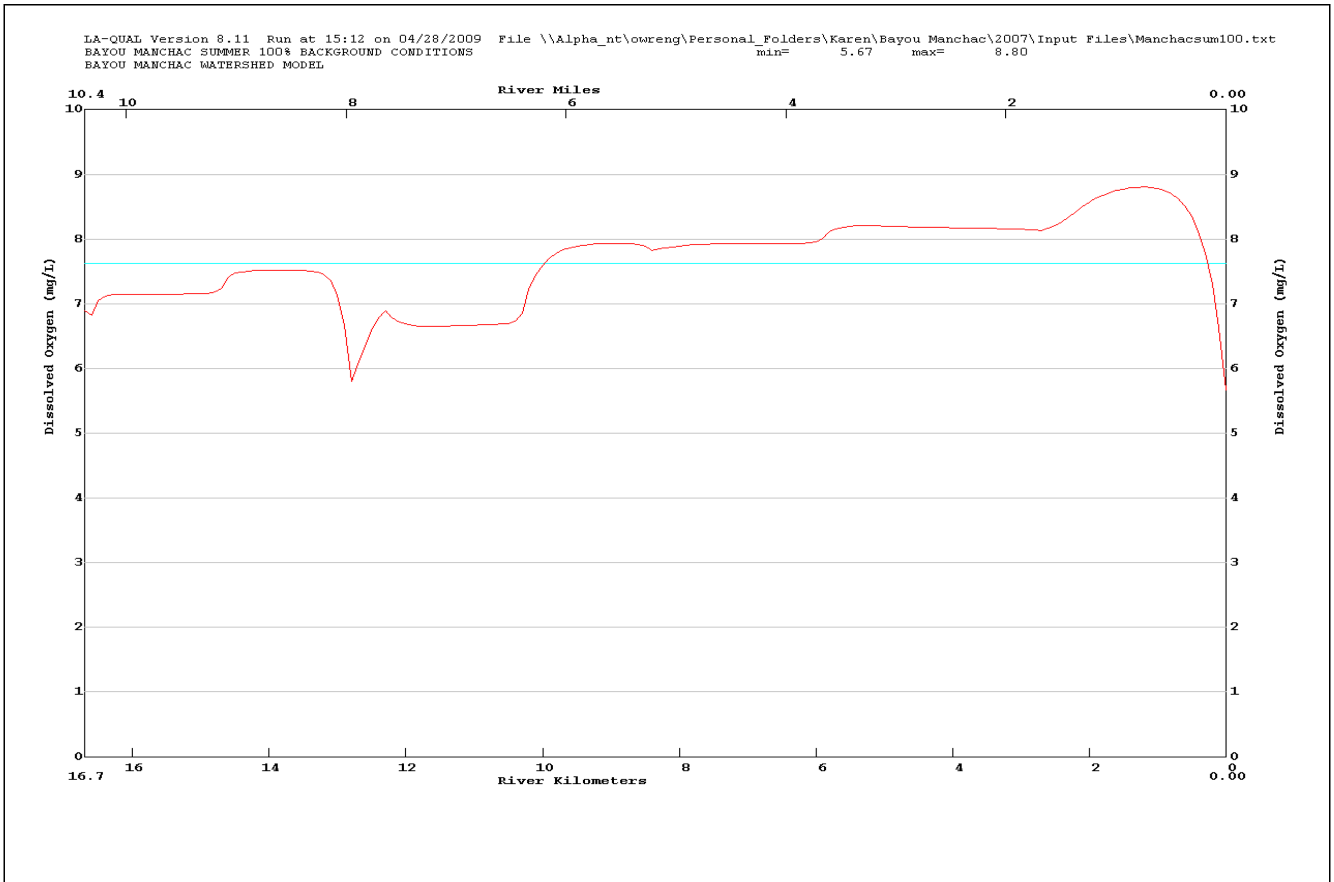


Figure 5. Summer Projection at 75% Removal of Man-Made Loads to meet a DO Criteria of 2.3 mg/L

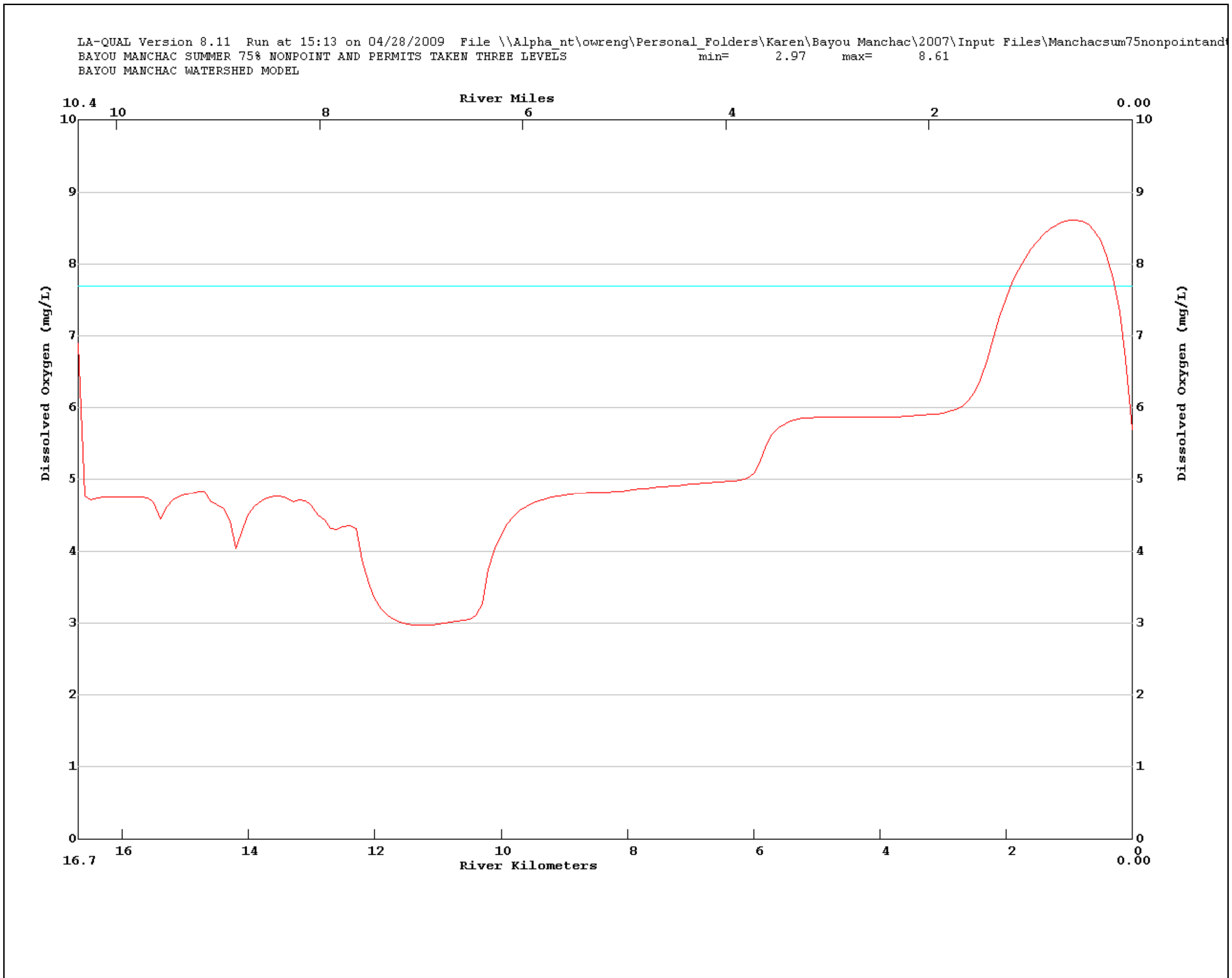


Figure 6. Winter Projection at 100% Removal of Man-Made NPS Loads to meet 5.0 mg/L DO Criteria for Summer Season and 5.0 mg/L DO Criteria for Winter Season

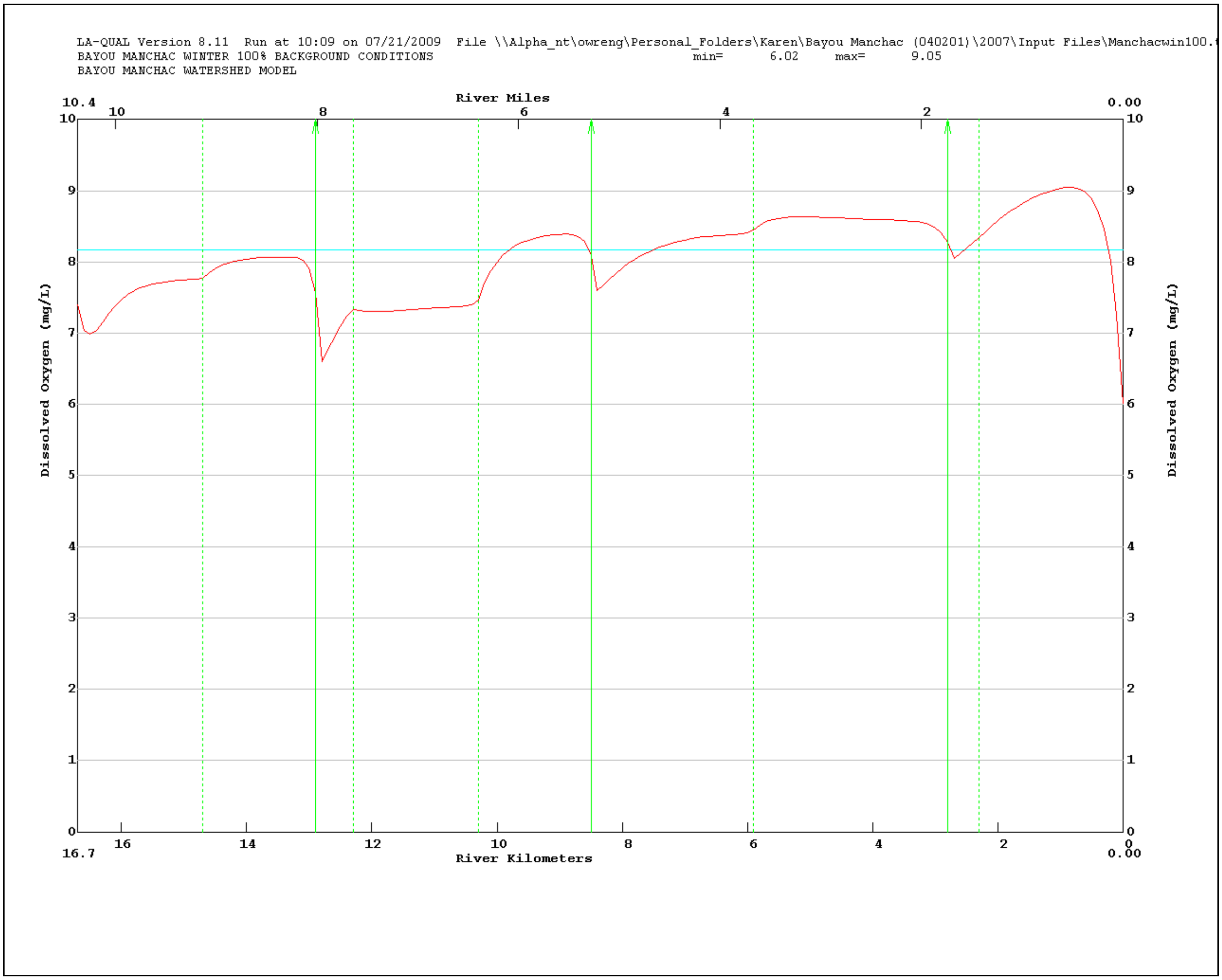
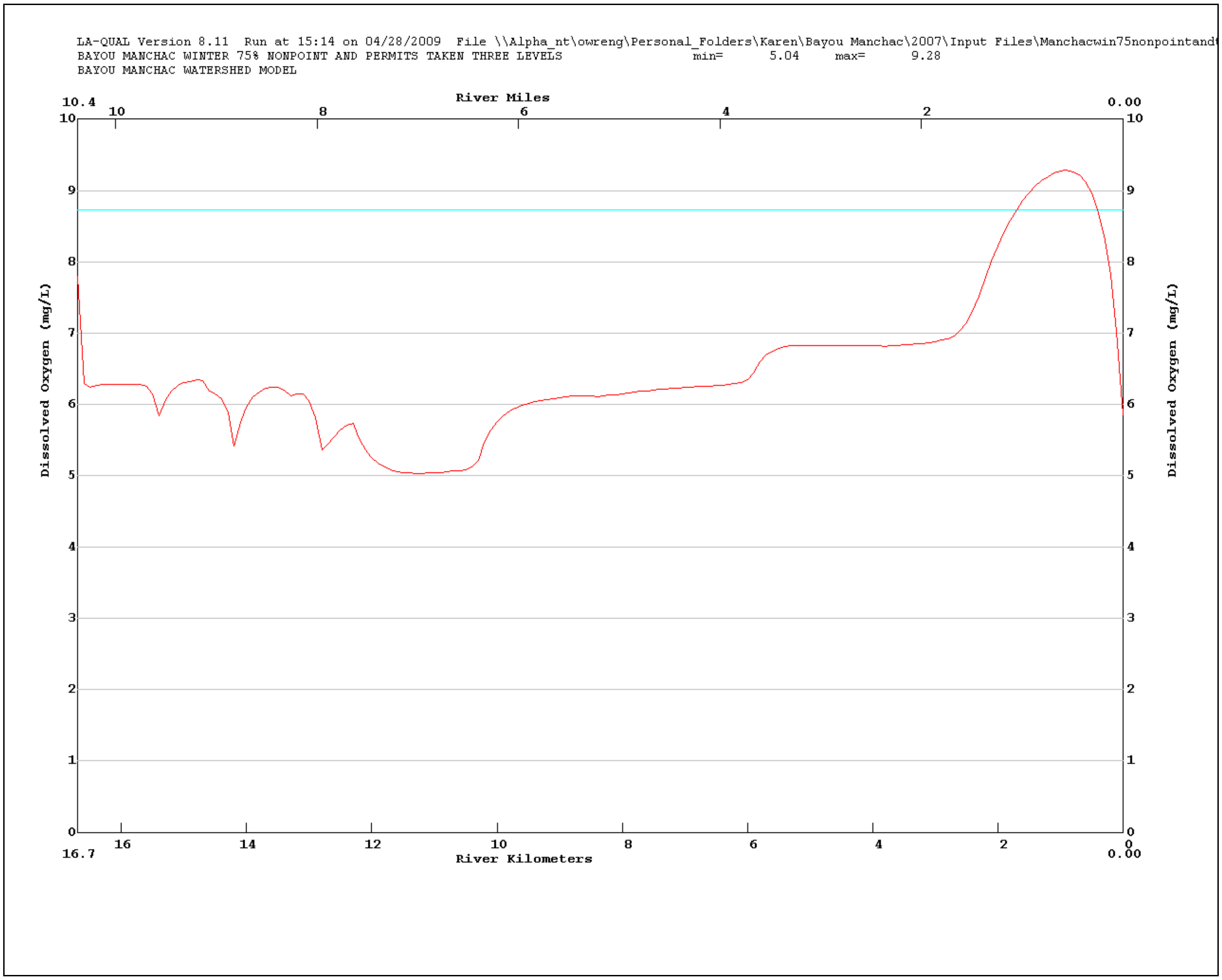


Figure 7. Winter Projection at 75% Removal of Man-Made NPS Loads to meet 2.3 mg/L DO Criteria for Summer Season and 5.0 mg/L DO Criteria for Winter Season



5.4.2 Bayou Manchac Subsegment 040201 TMDL

EPA's stormwater permitting regulations require municipalities to obtain permit coverage for all stormwater discharges from MS4s. For each MS4 in the basin, a gross load was computed by dividing the acreage of the permitted area in the subsegment by the total area of the subsegment and multiplying the nonpoint source allocation by this percentage. Note that these values are estimates that can be refined in the future as more information about MS4s and land-use-specific loadings becomes available. Note that MS4s are permitted dischargers but function similarly to nonpoint sources (through storm-driven processes). EPA and LDEQ expect that the MS4 WLAs will be achieved through BMPs and adaptive management. The MS4 loads are presented in Table 2.

TMDLs for the biochemical oxygen demanding constituents (CBOD, NBOD, and SOD), have been calculated for the summer and winter critical seasons based on current and proposed dissolved oxygen criteria. They are presented in Appendix A by reach. A summary of the loads is presented in Table 3.

6. Sensitivity Analysis

All modeling studies necessarily involve uncertainty and some degree of approximation. It is therefore of value to consider the sensitivity of the model output to changes in model coefficients, and in the hypothesized relationships among the parameters of the model. The LAQUAL model allows multiple parameters to be varied with a single run. The model adjusts each parameter up or down by the percentage given in the input set. The rest of the parameters listed in the sensitivity section are held at their original projection value. Thus the sensitivity of each parameter is reviewed separately.

A sensitivity analysis was performed on the calibration. The sensitivity of the model's minimum DO projections to these parameters is presented in Appendix I2. Parameters were varied by +/- 30%, except temperature, which was adjusted +/- 2 degrees Centigrade.

Values reported in Appendix I2 are percentage variation of minimum DO in the main stem Bayou Manchac. As shown in Table 10, stream reaeration, and benthal demand are the parameters to which DO is most sensitive. The model is moderately sensitive to stream base flow, stream velocity, initial temperature, and stream depth. The model is slightly sensitive to insensitive to the remaining parameters.

7. Conclusions

This TMDL establishes load limitations for oxygen-demanding substances and goals for reduction of those pollutants. LDEQ's position is that when oxygen-demanding loads from point and nonpoint sources are reduced in order to ensure that the dissolved oxygen criterion is supported, nutrients are also reduced. The implementation of this TMDL through wastewater discharge permits and implementation of best management practices to control and reduce runoff of soil and oxygen-demanding pollutants from nonpoint sources in the watershed will also reduce the nutrient loading from those sources.

Table 10. Summary of Calibration Model Sensitivity Analysis

SENSITIVITY ANALYSIS SUMMARY

MAINSTEM
BAYOU MANCHAC FINAL CALIBRATION RUN

Plot 1 Base Model Minimum DO = 1.06

Parameter	%Param Chg	Min D.O.	%D.O. Chg	%Param Chg	Min D.O.	%D.O. Chg
Stream Baseflow	30.	1.41	32.2	-30.	0.61	-42.2
Initial Chlorophyll a	30.	1.06	0.0	-30.	1.06	0.0
Stream Velocity	30.	1.34	25.8	-30.	0.67	-37.0
Initial Temperature	2.	0.73	-31.3	-2.	1.44	35.8
CBOD Aerobic Decay Rate	30.	0.92	-13.4	-30.	1.24	16.5
CBOD2 Aerobic Decay Rate	30.	1.02	-4.2	-30.	1.11	4.3
CBOD Settling Rate	30.	1.11	4.2	-30.	1.01	-4.7
CBOD2 Settling Rate	30.	1.06	0.0	-30.	1.06	0.0
NBOD Decay Rate	30.	1.05	-1.3	-30.	1.08	1.5
NBOD Settling Rate	30.	1.07	0.3	-30.	1.06	-0.3
Benthal Demand	30.	0.45	-57.7	-30.	1.58	48.6
Stream Dispersion	30.	1.06	0.0	-30.	1.06	0.0
Stream Reaeration	30.	1.58	48.6	-30.	0.25	-76.7
Headwater Flow	30.	1.15	8.4	-30.	0.97	-8.6
Headwater DO	30.	1.07	0.5	-30.	1.06	-0.5
Headwater CBOD	30.	1.04	-2.3	-30.	1.09	2.2
Headwater CBOD2	30.	1.06	-0.7	-30.	1.07	0.7
Headwater NBOD	30.	1.06	-0.2	-30.	1.07	0.2
Stream Depth	30.	0.70	-34.0	-30.	1.58	48.6
Wasteload Flow	30.	1.06	0.0	-30.	1.06	0.0
Wasteload Temperature	2.	1.06	0.0	-2.	1.06	0.0
Wasteload DO	30.	1.06	0.1	-30.	1.06	-0.1
Wasteload CBOD	30.	1.06	-0.2	-30.	1.06	0.2
Wasteload CBOD2	30.	1.06	0.0	-30.	1.06	0.0
Wasteload NBOD	30.	1.06	0.0	-30.	1.06	0.0
Lower Boundary Temperature	2.	1.06	0.0	-2.	1.06	0.0
Lower Boundary DO	30.	1.06	0.0	-30.	1.06	0.0
Lower Boundary CBOD	30.	1.06	0.0	-30.	1.06	0.0
Lower Boundary CBOD2	30.	1.06	0.0	-30.	1.06	0.0
Lower Boundary NBOD	30.	1.06	0.0	-30.	1.06	0.0

A calibrated water quality model and projections were developed for the watershed to quantify the non-point source load reductions which would be necessary in order for Bayou Manchac, subsegment 040201, to comply with its established water quality standards and criteria. This report presents the results of that analysis.

LDEQ is utilizing a phased TMDL approach for Bayou Manchac as shown in Table 1. This approach provides LDEQ with the opportunity to revise the DO criteria and at the same time, allows LDEQ to develop a meaningful and implementable DO TMDL based upon the appropriate DO criteria and in accordance with the Consent Decree deadlines. At the same time, it will lead to improved water quality while providing local governments and businesses the opportunity to prepare and adjust to the new permit requirements that will be implemented as a result of the TMDL developed in Phases I and II.

Phase I will include the development of loading values for the existing DO criteria for Bayou Manchac. However, full implementation of permit limits will occur in a phased manner. Phase I will serve as the first step towards meeting the DO criteria or Bayou Manchac. This approach gives local governments and stakeholders time to make the necessary adjustments to meet these limits. The implementation of permit limits will occur in according to the following strategy:

Phase I Permit Implementation

All TMDL, permitting, and enforcement activities will be conducted in accordance with the Clean Water Act, the Louisiana Environmental Regulatory Code, and applicable state laws.

1. New discharges of oxygen-demanding loads:

   In general, LDEQ does not intend to permit additional discharges of oxygen-demanding loads. However, in the event that one the following requirements can be attained, LDEQ may permit the new discharge. The typical permit limits will be 5 mg/L BOD_5 / 2 mg/L NH_3 / 5 mg/L DO. Such new facilities may be required to submit an environmental impact assessment to LDEQ's permitting staff, which will conduct a thorough evaluation of the proposed facility based on environmental impacts, economic benefits, an analysis of alternatives, and other pertinent factors.

   a. The facility demonstrates that it will provide a significant load reduction of man-made oxygen-demanding constituents to the impaired watershed(s) serviced by the facility. The facility must also contribute to a reduction in the number of facilities discharging to the watershed(s). Facilities that may be considered for permits under this provision include, but are not limited to:

      i. A facility that will provide improved sewage treatment to multiple subdivisions previously serviced by wastewater treatment plants that are incapable of treating to tertiary limits.

      ii. A facility that will provide sewage collection and treatment to previously unsewered areas in which many of the sanitary discharges from permitted facilities and individual home treatment units were entering an impaired watershed. As a result, the facility would be expected to provide more efficient treatment to the wastewater and reduce the net loading of oxygen-demanding substances in the watershed.

   b. The facility demonstrates that its wastewater will not leave the facility or its property. Significant stormwater events do not apply to this provision. For the purpose of this provision, a significant stormwater event is defined the 25 year, 24 hour rainfall event or its numerical equivalent, as defined by the Southern Regional Climate Center.

i. Facilities that may be considered under this provision include, but are not limited to:

   a. Effluent reduction systems that have been approved by the Louisiana Department of Health and Hospitals.

   b. Wastewater treatment plants equipped with overland flow systems in which the effluent will not leave the facility.

   c. Wastewater treatment plants equipped with holding ponds that will retain the effluent such that the effluent will not leave the facility.

ii. LDEQ recognizes that some local governments are in the process of building or expanding regional sewage collection and treatment systems. In such areas, LDEQ may, on a limited basis, grant permits of limited durations to facilities that agree to tie into a regional collection and treatment system when it becomes available. LDEQ must have absolute assurance that the regional collection system will be available to the facility and the facility will connect to the regional collection system on or before the expiration date of the permit. Such assurance may include a formal agreement between the facility, the owner and operator of the regional wastewater treatment system, and LDEQ. The regional system must have the capacity to treat the additional wastewater. Such a permit may have a duration of less than five years or it may have a five year duration with interim permit limits. The permit will be written based on projected completion dates for the construction of the collection system. The facility will be required to cease all wastewater discharges to the Bayou Manchac watershed and transfer the discharge to the regional collection system once the permit or interim limits expire or the collection system is available to the facility, whichever comes first. If the permit or interim limits expire, but, due to unforeseen circumstances, the availability of the collection system has been temporarily delayed, the duration of the permit or interim limits may be extended. If the availability of the collection system has been indefinitely delayed, the facility may be required to cease all discharges to the Bayou Manchac watershed. Such facilities may resort to options covered in item 1.b.i. above.

c. LDEQ reassesses Subsegment 040201 (Bayou Manchac). LDEQ determines that Subsegment 040201 is meeting the appropriate DO criteria and designated uses.

2. Existing Discharges of oxygen demanding loads:

   Below are the reductions for existing dischargers in the Bayou Manchac TMDL. Existing facilities discovered to be discharging oxygen-demanding loads without LPDES permits as of the TMDL approval date are to be permitted in accordance with the limits established for existing facilities with permits. Unpermitted facilities that are newly activated or reactivated and discharging after the TMDL approval date may be subjected to enforcement actions and will be required to tie into regional collection and treatment systems, once those systems are available.

   a. Facilities (with effluent flow less than or equal to 25,000 gpd) with monthly average limitations of 30 mg/L BOD_5 or weekly average limitations of 45 mg/L BOD_5 will receive a compliance schedule of up to 3 years with final limitations of 10 mg/L BOD_5 / 2 mg/L NH_3 / 5 mg/L DO (with post aeration);

   b. Facilities (with effluent flow greater than 25,000 gpd) with limitations of 10 mg/L BOD_5 will receive a compliance schedule of up to 3 years with final limitations of 5 mg/L BOD_5 / 2 mg/L NH_3 / 5 mg/L DO (with post aeration);

   c. The Landing at Mallard Lakes (AI# 154124) will have permit limits of 10 mg/L BOD_5 / 2 mg/L NH_3/ 5 mg/L DO

3. Nutrient monitoring (i.e. reporting for Total Nitrogen and Total Phosphorus) will be required for individual permits. Nutrient monitoring will be added to the general permit series (LAG530000, LAG540000, LAG560000, and LAG570000) upon the next scheduled renewal of each series.

Phase II will be developed based on the outcome of an ecoregion-based use attainability analysis (UAA) that is currently under development. Based on existing data, this UAA is expected to propose new DO criteria for many of the Lake Pontchartrain Basin TMDLs that are currently being developed. These TMDLs have an interim (state) deadline of March, 2011 and a final deadline of March, 2012. This new DO criteria is expected to be developed and promulgated within the next two to three years.

In the event the new criteria is not developed and promulgated within five years from the TMDL approval date, LDEQ intends to proceed in the following manner:

Case 1: The UAA study indicates that the current DO criterion is appropriate - the TMDL will be fully implemented based on the existing DO criteria.
Case 2: The UAA is not likely to be completed and/or approved - the TMDL will be fully implemented based on the existing DO criteria.

Case 3: The UAA is in process and is expected to be approved – Phase II of the TMDL will be postponed for a maximum period of 2 years. If the UAA has not been completed at the end of this period, the UAA status will be reviewed again according to Cases 1 - 3.

Louisiana does not have numeric nutrient criteria at the present time. The original nutrient impairments for the Pontchartrain Basin were not based on quantitative assessments of historical nutrient data. The impairments were based on evaluative assessments that may have included dissolved oxygen. LDEQ and EPA plan to reevaluate the previous nutrient impairments in the Pontchartrain Basin. As a result, both the EPA and LDEQ expect the nutrient impairments to change from category 5 (impairment exists; TMDL required) to category 3 (insufficient data). Therefore LDEQ believes that TMDLs for dissolved oxygen should adequately address any potential nutrient impairments, in the absence of numeric nutrient criteria and quantitative assessments.

LDEQ is developing numeric nutrient criteria for waterbody types based on ecoregions in accordance with LDEQ's plan "Developing Nutrient Criteria for Louisiana 2006" which can be found at:

http://www.deq.louisiana.gov/portal/Portals/0/planning/LA%20Nutrient%20Strategy%20Plan%20Final%20FOR%20WEB.pdf.

Water body types for nutrient criteria development in Louisiana are 1) inland rivers and streams; 2) freshwater wetlands; 3) freshwater lakes and reservoirs; 4) big rivers and floodplains/boundary rivers and associated water bodies; and 5) estuarine and coastal waters (including up to Louisiana's three mile boundary in the Gulf of Mexico). Proposed approaches for nutrient criteria development are currently under review by LDEQ and EPA. Nutrient criteria can be implemented upon state promulgation and EPA approval as per 40 CFR 131.21

Upon development of nutrient criteria, a subsequent quantitative assessment of the waterbodies, and the development of full nutrient models, nutrient limits may be established for all facilities discharging to impaired waterbodies in the Pontchartrain Basin. LDEQ recommends that all facilities discharging to impaired waterbodies take a proactive approach and prepare for the possibility of nutrient limitations in their wastewater discharge permits in the near future. Such a proactive approach should include nutrient monitoring and documentation through facility Discharge Monitoring Reports (DMRs) in order to assess their nutrient loads and the need to modify their treatment processes for nutrient removal.

LDEQ recognizes there may be many unpermitted sources of oxygen-demanding loading within the Lake Pontchartrain Basin. These sources may include unpermitted facilities (privately owned treatment units for subdivisions or businesses). LDEQ has been locating unpermitted facilities and updating location information on permitted facilities in the Pontchartrain Basin. The unpermitted facilities are required to apply for the appropriate NPDES (National Pollutant Discharge Elimination System) permits. LDEQ plans to conduct such activities within the Bayou Manchac watershed in the future. These unpermitted sources of oxygen-demanding loading may also include individual treatment units for residential homes and small businesses. The ability to accurately quantify the loads provided from these systems is extremely difficult due to lack of reliable information regarding the number of units and the loading provided by each individual unit. These unpermitted sources of loading add to the uncertainty of this TMDL and provide additional justification for the use of the phased TMDL approach.

LDEQ believes that the primary solutions to the water quality problems for Bayou Manchac include the large-scale regionalization of sewage treatment and the rehabilitation and upgrade of existing problematic (leaks, overflows, improperly sized pipes, etc.) sewage collection systems. In addition, nonpoint loading may contribute to the water quality impairments in Bayou Manchac. This includes loading contributed by the MS4 permit for Baton Rouge.

After all projects and recommendations are complete, the loading conditions for Bayou Manchac may be substantially different. Such changes may render the current modeling inappropritate. At that time, Bayou Manchac should be reassessed and resurveyed so that a fair and balanced TMDL can be implemented. An ecoregion-based UAA should be conducted on this waterbody to develop a more appropriate dissolved oxygen standard.

LDEQ recommends that no additional loading be permitted to enter the Bayou Manchac watershed. This includes new dischargers and increases in existing dischargers.

The watershed drains areas that are regulated by two MS4 permits. The areas covered by these MS4 permits include many permitted and unpermitted facilities. While LDEQ does assume responsibility for these facilities, partial responsibility belongs to the MS4 permittee to ensure that water draining from the area of coverage does not impact the named waterbody. Reductions in the nonpoint loading presented in this report should apply to MS4 regulated areas.

The impact of stormwater loading on the waterbody under critical conditions is difficult to determine. Monitoring is monetarily and logistically prohibitive. Therefore it is impractical to set MS4 permit limits. However, appropriate BMP measures shall be incorporated into the MS4 permits to minimize the impacts loads eminating from the MS4 reagulated areas on the water quality in Bayou Manchac. Such BMP measures may include the elimination of illicit wastewater discharges, the regionalization of wastewater treatment, rehabilitating and upgrading sewer collection system lines, and other appropriate activities. BMPs included in MS4 permits should also include measures to reduce the impact of stormwater loading on the water quality of Bayou Manchac.

LDEQ is updating current information on permitted facilities and actively locating unpermitted facilities in the Pontchartrain Basin. The unpermitted facilities are encouraged to apply for the appropriate NPDES permit.

LDEQ has developed this TMDL to be consistent with the state antidegradation policy (LAC 33:IX.1109.A).

LDEQ will work with other agencies such as local Soil Conservation Districts to implement agricultural best management practices in the watershed through the 319 programs. LDEQ will also continue to monitor the waters to determine whether standards are being attained.

In accordance with Section 106 of the federal Clean Water Act and under the authority of the Louisiana Environmental Quality Act, the LDEQ has established a comprehensive program for monitoring the quality of the state's surface waters. The LDEQ collects surface water samples at various locations, utilizing appropriate sampling methods and procedures for ensuring the quality of the data collected. 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 is used to develop the state's biennial 305(b) report (*Water Quality Inventory*) and the 303(d) list of impaired waters. This information is also utilized in establishing priorities for the LDEQ nonpoint source program.

The LDEQ is continuing to implement a watershed approach to surface water quality monitoring. In 2004 a four year sampling cycle replaces the previous five year cycle. Approximately one quarter of the states watersheds will be sampled each year so that all of the state's watersheds will be sampled within the four year cycle. This will allow LDEQ to determine whether there has been any improvement in water quality following implementation of the TMDLs. As the monitoring results are evaluated by LDEQ and approved by EPA, waterbodies may be added to or removed from the 303(d) list.

8. References

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