

**TMDLS FOR FECAL COLIFORMS FOR
SUBSEGMENTS 090101, 090104, 090301,
090401, 090502, 090505, AND 090506
IN THE PEARL RIVER BASIN, LOUISIANA**

MARCH 31, 2008

TMDLS FOR FECAL COLIFORMS IN SUBSEGMENTS
090101, 090104, 090301, 090401, 090502, 090505, AND 090506
IN THE PEARL RIVER BASIN, LOUISIANA

US EPA Region 6
Water Quality Protection Division
Oversight and TMDL Team
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Contract No. 68-C-02-108
Task Order #134

Prepared by

FTN Associates, Ltd.
3 Innwood Circle, Suite 220
Little Rock, AR 72211

FTN No. 2110-623

March 31, 2008

EXECUTIVE SUMMARY

Section 303(d) of the Federal Clean Water Act requires states to identify waterbodies that are not meeting water quality standards, and to develop total maximum daily loads (TMDLs) for those waterbodies. A TMDL is the amount of pollutant that a waterbody can assimilate without exceeding the established water quality standard for that pollutant. Through a TMDL, pollutant loads can be allocated to point sources and nonpoint sources discharging to the waterbody. This report presents TMDLs for fecal coliforms for seven subsegments of the Pearl River basin in southeastern Louisiana. These seven subsegments are listed in Table ES.1.

Table ES.1. Subsegments for which TMDLs have been developed in this report.

Subsegment	Waterbody	Description
090101	Pearl River	Mississippi state line to Pearl River Navigation Canal
090104	Peters Creek	Headwaters to Pearl River
090301	Pushepatapa Creek	Mississippi state line to Pearl River floodplain
090401	Bogue Lusa Creek	Headwaters to Pearl River
090502	Big Silver Creek	Headwaters to Bogue Chitto River
090505	Bonner Creek	Headwaters to Bogue Chitto River
090506	Thigpen Creek	Headwaters to Bogue Chitto River

The seven subsegments listed in Table ES.1 are located in southeastern Louisiana, north and northeast of New Orleans. The portion of the Pearl River basin that is in Louisiana is bounded by the state of Mississippi on the north and east. A large area within Mississippi drains into this area, mostly through the Bogue Chitto River and the main stem of the Pearl River. These seven subsegments are primarily undeveloped areas with significant amounts of wetlands, forest, and grass/shrub in each subsegment. Some of the subsegments have significant numbers of dairy farms.

All seven of these subsegments were included on the Louisiana Department of Environmental Quality (LDEQ) final 2004 303(d) list as not supporting primary contact recreation and two of the subsegments (090301 and 090401) were also listed as not supporting secondary contact recreation. All of the subsegments were ranked as priority #2 for TMDL development. The suspected sources of impairment included on-site treatment systems (septic systems and similar decentralized systems), sanitary system overflows (collection system failures), sources upstream or outside state jurisdiction or borders, wildlife other than waterfowl, municipal point source discharges, and unknown sources.

LDEQ historical water quality data at monitoring locations located in the subsegments were analyzed for long-term trends, seasonal patterns, and relationships between fecal coliform counts and stream flow. No historical trends, seasonal patterns, nor relationships with flow were apparent in these data.

The TMDLs in this report were developed using the load duration curve methodology. This method determines the allowable loading at a wide range of stream flow conditions, rather than just a single critical flow. The steps for applying this methodology for the TMDLs in this report were:

1. Developing a flow duration curve,
2. Converting the flow duration curve to load duration curves,
3. Plotting observed loads with load duration curves,
4. Calculating the TMDL components, and
5. Calculating percent reductions.

Each of these steps was carried out separately for summer and for winter because the Louisiana water quality standards specify different numeric criteria for fecal coliforms for summer (May – October) and winter (November – April). The results of the TMDL calculations and percent reduction calculations are summarized in Table ES.2.

The percent reductions specified in Table ES.2 represent reductions that are needed from nonpoint sources. No point source reductions were specified for these TMDLs because LDEQ's policy is to require point source discharges with fecal coliforms in their effluent to meet water quality standards at the "end of pipe" (i.e., permit limits equal to water quality standards).

Table ES.2. Summary of TMDLs for fecal coliforms in the Pearl River basin.

Subsegment	Season	Loads (colonies/day)					Percent Reduction Needed
		WLA	LA	MOS	FG	TMDL	
090101 Pearl River	Summer	4.72E+10	4.31 E+15	5.39 E+14	5.39 E+14	5.39 E+15	55%
	Winter	4.72E+10	5.04 E+16	6.31 E+15	6.31 E+15	6.31 E+16	0%
090104 Peters Creek	Summer	6.91E+7	3.75 E+13	4.68 E+12	4.68 E+12	4.68 E+13	60%
	Winter	6.91E+7	3.52 E+14	4.40 E+13	4.40 E+13	4.40 E+14	0%
090301 Pushpatapa Creek	Summer	0	1.66 E+14	2.08 E+13	2.08 E+13	2.08 E+14	86%
	Winter	0	2.92 E+16	3.65 E+15	3.65 E+15	3.65 E+16	0%
090401 Bogue Lusa Creek	Summer	2.25E+8	6.91 E+13	8.63 E+12	8.63 E+12	8.63 E+13	98%
	Winter	2.25E+8	1.21 E+16	1.52 E+15	1.52 E+15	1.52 E+16	90%
090502 Big Silver Creek	Summer	8.33E+7	8.14 E+13	1.02 E+13	1.02 E+13	1.02 E+14	60%
	Winter	8.33E+7	8.26 E+14	1.03 E+14	1.03 E+14	1.03 E+15	90%
090505 Bonner Creek	Summer	2.95E+7	1.55 E+14	1.94 E+13	1.94 E+13	1.94 E+14	36%
	Winter	2.95E+7	1.57 E+15	1.97 E+13	1.97 E+13	1.97 E+14	0%
090506 Thigpen Creek	Summer	0	1.52 E+13	1.90 E+12	1.90 E+12	1.90 E+13	55%
	Winter	0	1.43 E+14	1.78 E+13	1.78 E+13	1.78 E+14	0%

Notes: WLA = Wasteload Allocation, LA = Load Allocation, MOS = Margin of Safety, FG = Future Growth, TMDL = Total Maximum Daily Load

Hurricane Katrina made landfall on Monday, August 29, 2005, as a Category 4 hurricane with the center of the storm passing through the Pearl River basin. The storm brought heavy winds and rain to southeast Louisiana, causing much flooding and washing large amounts of debris into waterbodies throughout the Pearl River basin in Louisiana (not just along the coast). Some of the coastal areas that were flooded in Hurricane Katrina were re-flooded by the storm surge from Hurricane Rita. Both Hurricanes Katrina and Rita have caused a significant amount

of change in water quality in south Louisiana. Many wastewater treatment facilities were temporarily or permanently damaged. Some wastewater treatment facilities will rebuild while others will relocate. Observations and field data collection by LDEQ and other organizations have shown that the wildlife and fisheries in the Pearl River basin were significantly impacted by the hurricanes. The hurricanes expedited the loss of coastal land and modified the hydrology of some of the coastal water bodies. Several federal and state agencies including the Environmental Protection Agency and LDEQ are engaged in collecting environmental data and assessing the recovery of the Gulf of Mexico waters. Most of the data used to develop the TMDLs in this report were collected prior to these hurricanes. Therefore, the post-hurricane conditions and other factors may require modifications of these TMDLs prior to their implementation. Any deviation from implementation of these TMDLs should be justified based on site-specific data and/or information.

TABLE OF CONTENTS

1.0	INTRODUCTION	1-1
2.0	BACKGROUND INFORMATION	2-1
2.1	General Information.....	2-1
2.2	Land Use	2-1
2.3	Stream Flow Data	2-2
2.4	Water Quality Standards	2-3
2.5	Nonpoint Sources.....	2-5
2.6	Point Sources	2-6
3.0	EXISTING WATER QUALITY	3-1
3.1	General Description of Data	3-1
3.2	Trends and Patterns	3-1
4.0	TMDL DEVELOPMENT.....	4-1
4.1	Seasonality and Critical Conditions.....	4-1
4.2	Methodology for TMDL Calculations	4-1
4.3	Flow Duration Curves.....	4-2
4.4	Load Duration Curves.....	4-2
4.5	Observed Loads	4-4
4.6	TMDL, MOS, and FG.....	4-5
4.7	Point Source Loads	4-5
4.8	Nonpoint Source Loads.....	4-6
4.9	Percent Reductions.....	4-6
5.0	OTHER RELEVANT INFORMATION	5-1
6.0	PUBLIC PARTICIPATION	6-1
7.0	REFERENCES	7-1

LIST OF APPENDICES

Appendix A:	Maps
Appendix B:	Point Sources/Permitted Facilities
Appendix C:	Water Quality Data Plots
Appendix D:	Flow Duration Calculations and Plots
Appendix E:	TMDL Calculations for Subsegment 090101 – Pearl River
Appendix F:	TMDL Calculations for Subsegment 090104 – Peters Creek
Appendix G:	TMDL Calculations for Subsegment 090301 – Pushepatapa Creek
Appendix H:	TMDL Calculations for Subsegment 090401 – Bogue Lusa Creek
Appendix I:	TMDL Calculations for Subsegment 090502 – Big Silver Creek
Appendix J:	TMDL Calculations for Subsegment 090505 – Bonner Creek
Appendix K:	TMDL Calculations for Subsegment 090506 – Thigpen Creek
Appendix L:	Public Comments and EPA Responses

LIST OF TABLES

Table ES.1	Subsegments for which TMDLs have been developed in this report	i
Table ES.2	Summary of TMDLs for fecal coliforms in the Pearl River basin	iii
Table 1.1	Subsegments and parameters for impairments addressed in this report	1-2
Table 2.1	Land use percentages for subsegments addressed in this report.....	2-2
Table 2.2	Use of USGS flow data for the TMDLs in this report.....	2-4
Table 3.1	Summary of LDEQ fecal coliform data (colonies/100 mL) for entire period of record.....	3-2
Table 3.2	Summary of LDEQ fecal coliform data collected since January 1, 1998 (colonies/100 mL).....	3-3
Table 4.1	Cumulative drainage area for each subsegment.....	4-3
Table 4.2	List of point sources included in the TMDL for subsegment 090101 (Pearl River).....	4-7
Table 4.3	List of point sources included in the TMDL for subsegment 090104 (Peters Creek).....	4-8
Table 4.4	List of point sources included in the TMDL for subsegment 090401 (Bogue Lusa Creek)	4-8
Table 4.5	List of point sources included in the TMDL for subsegment 090502 (Big Silver Creek)	4-9
Table 4.6	List of point sources included in the TMDL for subsegment 090505 (Bonner Creek).....	4-9
Table 4.7	Summary of fecal coliform TMDLs	4-10

1.0 INTRODUCTION

This report presents total maximum daily loads (TMDLs) for fecal coliform bacteria for seven subsegments in the Pearl River basin. These subsegments are located in southeastern Louisiana, north and northeast of New Orleans. All of the seven subsegments were included on the final 2004 303(d) list for Louisiana (Louisiana Department of Environmental Quality (LDEQ) 2005) as not supporting primary contact recreation. Primary contact recreation typically includes recreational activities where water contact involves full-body exposure to the water with the likelihood of the ingestion of water. In addition, two of the subsegments are also listed as not supporting secondary recreation. Secondary contact recreation includes activities where water contact is incidental and/or accidental so that the likelihood of ingesting water is minimal. Table 1.1 provides a summary of the designated uses that are not supported for each subsegment, as well as the suspected causes and sources of impairment. The TMDLs in this report were developed in accordance with Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency's (EPA) regulations in 40CFR 130.7.

The purpose of a TMDL is to determine the pollutant loading that a waterbody can assimilate without exceeding the water quality standard for that pollutant, and to establish the load reduction that is necessary to meet the water quality standard. The TMDL is the sum of the wasteload allocation (WLA), load allocation (LA), future growth (FG), and a margin of safety (MOS). The WLA is the load allocated to point sources of the pollutant of concern, and the LA is the load allocated to nonpoint sources, including natural background. The FG allows for future growth in loads to the waterbody. The MOS is a percentage of the TMDL that takes into account uncertainty concerning the relationship between pollutant loadings and water quality.

Table 1.1. Subsegments and parameters for impairments addressed in this report.

Subsegment Name and Number	Support of designated uses ¹		Suspected Cause of Impairment	Suspected Sources of Impairment	Priority (1 = Highest)
	PCR ²	SCR ³			
Pearl River – Mississippi state line to Pearl River Navigation Canal; 090101	N	F	Fecal Coliform	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	2
				Sources outside state jurisdiction or borders	
				Upstream source	
				Wildlife other than waterfowl	
Peters Creek – Headwaters to Pearl River; 090104	N	F	Fecal Coliform	On-site treatment systems (septic systems and similar decentralized systems)	2
Pushpatapa Creek – Mississippi state line to Pearl River floodplain (Scenic); 090301	N	N	Fecal Coliform	On-site treatment systems (septic systems and similar decentralized systems)	2
				Wildlife other than waterfowl	
Bogue Lusa Creek – headwaters to Pearl River; 090401	N	N	Fecal Coliform	Municipal point source discharges	2
				On-site treatment systems (septic systems and similar decentralized systems)	
				Sanitary sewer overflows (collection system failures)	
				Wildlife other than waterfowl	
Big Silver Creek – headwaters to Bogue Chitto River; 090502	N	F	Fecal Coliform	Source Unknown	2
Bonner Creek – headwaters to Bogue Chitto River; 090505	N	F	Fecal Coliform	Source Unknown	2
Thigpen Creek – headwaters to Bogue Chitto River; 090506	N	F	Fecal Coliform	Source Unknown	2

Notes: Source is LDEQ Final 2004 Integrated Report (LDEQ 2005)

1. N = Not supported and F = Fully Supported

2. PCR = Primary Contact Recreation

3. SCR = Secondary Contact Recreation

2.0 BACKGROUND INFORMATION

2.1 General Information

The study area for this report consists of the seven subsegments in the Pearl River basin that are listed in Table 1.1. These subsegments are located in southeastern Louisiana, north and northeast of New Orleans. The portion of the Pearl River basin that is in Louisiana is bounded by the State of Mississippi on the north and east (see Figure A.1 in Appendix A). A large area within Mississippi drains into the study area, mostly through the Bogue Chitto River and the main stem of the Pearl River. The seven subsegments addressed in this report are located mostly in Washington and St. Tammany Parishes, with a small area in Tangipahoa Parish. These subsegments are also located in United States Geological Survey (USGS) hydrologic units 03180004 and 03180005.

Subsegments 090301, 090104, and 090401 have drainage areas of 73.1 mi², 41.4 mi², and 76.3 mi², respectively. Each of these subsegments drains to the Pearl River in subsegment 090101. The area of subsegment 090101 itself is 90.4 mi², but with the addition of all upstream areas the cumulative drainage area at the downstream end of subsegment 090101 is 6719 mi² (USGS 1971). Subsegments 090502, 090505, and 090506 are headwater subsegments that drain to the Bogue Chitto River. The Bogue Chitto River ultimately drains to the Pearl River but the confluence is downstream of subsegment 090101. The drainage areas for subsegments 090502, 090505, and 090506 are 29.6 mi², 12.5 mi², and 16.3 mi², respectively.

2.2 Land Use

Land use characteristics for the study area were compiled using the 2001 National Land Cover Dataset (USGS 2006). Some consolidation of similar land use descriptions was done in the compilation provided. The spatial distribution of these land uses is shown on Figure A.2 (located in Appendix A) and land use percentages by subsegment are shown in Table 2.1. The subsegments addressed in this report are primarily undeveloped areas with significant amounts of wetlands, forest, and grass/shrub in every subsegment.

Table 2.1. Land use percentages for subsegments addressed in this report.

Land Use Type	Percent Coverage by Subsegment						
	090101	090104	090301	090401	090502	090505	090506
Open Water	2.3%	0.3%	0.0%	0.1%	0.1%	0.2%	1.6%
Developed	8.6%	11.5%	5.5%	7.9%	4.4%	6.3%	4.3%
Barren Land	0.4%	0.2%	0.1%	0.3%	0.0%	0.1%	2.5%
Forest	13.5%	37.6%	32.1%	44.4%	20.0%	37.8%	33.4%
Grass/Shrub	12.3%	23.9%	13.6%	18.7%	20.3%	16.7%	15.8%
Pasture/Hay	10.2%	2.4%	15.4%	6.2%	19.2%	12.8%	7.3%
Cultivated Crops	2.6%	0.4%	3.9%	0.5%	13.6%	7.0%	1.2%
Wetlands	50.1%	23.7%	29.4%	21.9%	22.4%	19.1%	33.9%
TOTAL	100%	100%	100%	100%	100%	100%	100%

2.3 Stream Flow Data

Flow data from four USGS flow gages were used for the TMDLs in this report. The locations of these flow gages are shown on Figure A.3 (located in Appendix A). These flow gages were located either within or in close proximity to the subsegments addressed in this report. These flow gages provide the most accurate and representative flow data that are available for these subsegments.

USGS flow gage 02489500 (Pearl River near Bogalusa) is located near the southern end of subsegment 090101. The flows recorded at this station were used in the development of the flow duration curve and to compute the flow per unit area values for the TMDL specific to subsegment 090101 (Pearl River). The development of the flow duration curves is discussed in greater detail in Section 4.3.

USGS flow gage 07375000 (Tchefuncta River near Folsom) is located approximately 20 miles from subsegment 090502 (Big Silver Creek) and approximately 10 miles from subsegment 090505 (Bonner Creek). This gage provided a better representation of the drainage areas of Big Silver Creek and its close proximity and completeness in available data made it preferable for use for Bonner Creek as well. The flows recorded at this gage were used in the

flow duration curve and the TMDL calculations specific to these two subsegments. No adjustments were required in the flow per unit area values computed for these subsegments.

A third USGS gaging station (02490105 - Bogue Lusa Creek at Bogalusa) was used in the development of the TMDLs for subsegments 090401 (Bogue Lusa Creek), 090104 (Peters Creek), 090301 (Pushpatapa Creek), and 090506 (Thigpen Creek). Because the flow data at this gage were not available during the time the LDEQ water quality data were being collected, an additional USGS flow gage (02492000 - Bogue Chitto River near Bush) was used in combination with the Bogue Lusa Creek gage. The daily flows per unit area from the Bogue Chitto River gage during the period when LDEQ water quality data were being collected were multiplied by the ratio of the average flow per unit area in Bogue Lusa Creek to the average flow per unit area in Bogue Chitto River during the period when both gages were active (1963-85). These computed flows were used for the TMDLs in subsegments 090401, 090104, 090301, and 090506.

A summary of the use of the USGS flow gages for each subsegment is provided in Table 2.2.

2.4 Water Quality Standards

Water quality standards for Louisiana are included in the Title 33 Environmental Regulatory Code (LDEQ 2007). Designated uses for all seven subsegments in this report are primary and secondary contact recreation, and fish and wildlife propagation. Subsegment 090301 (Pushpatapa Creek) is also designated as an Outstanding Natural Resource waterbody.

Table 2.2. Use of USGS flow data for the TMDLs in this report.

Subsegments	USGS Flow Gage	Drainage Area (mi ²)	Period of Record	Method for Estimating Flow Per Unit Area for Each Subsegment
090101 Pearl River	02489500 Pearl River near Bogalusa, LA	6,573	1938-2006	Used observed flow per unit area at gage with no adjustments.
090502 Big Silver Creek 090505 Bonner Creek	07375000 Tchefuncta River near Folsom, LA	103	1943-2006	Used observed flow per unit area at gage with no adjustments.
090506 Thigpen Creek 090401 Bogue Lusa Creek 090104 Peters Creek 090301 Pushepatapa Creek	02490105 Bogue Lusa Creek at Bogalusa, LA	72.7	1963-1985	Because the period of record for Bogue Lusa Creek did not extend into the period when LDEQ WQ data were collected, the daily flows per unit area for Bogue Chitto River near Bush (02492000) were multiplied by the ratio of average flow per unit area in Bogue Lusa Creek to the average flow per unit area in Bogue Chitto River during the period when both gages were active (1963-1985).
090506 Thigpen Creek 090401 Bogue Lusa Creek 090104 Peters Creek 090301 Pushepatapa Creek	02492000 Bogue Chitto River near Bush, LA	1,213	1937-2006	Used in combination with 02490105 (see explanation for 02490105).

The Louisiana water quality standards specify the following numeric criteria for fecal coliforms for supporting the designated uses of primary and secondary contact recreation:

- Primary Contact Recreation. No more than 25 percent of the total samples collected on a monthly or near-monthly basis shall exceed a fecal coliform density of 400/100 mL, applicable during the defined recreational period of May 1 through October 31. During the non-recreational period of November 1 through April 30, secondary contact recreation criteria shall apply.
- Secondary Contact Recreation. No more than 25 percent of the total samples collected on a monthly or near-monthly basis shall exceed a fecal coliform density of 2000/100 mL, applicable year-round.

The Louisiana water quality standards also include an antidegradation policy (LAC 33: IX.1109.A). This policy states that waters exhibiting high water quality should be maintained at that high level of water quality. If this is not possible, water quality of a level that supports designated uses of the waterbody should be maintained. Changing the designated uses of a waterbody to allow a lower level of water quality can only be achieved through a use attainability study.

2.5 Nonpoint Sources

The Louisiana 2004 303(d) list indicates the suspected sources of impairments for each of the subsegments addressed in this report specific to their identified impairment. In subsegments 090101, 090104, 090301, and 090401, on-site treatment systems (septic systems and similar decentralized systems) are identified as a suspected source of impairment to the waterbodies. Some on-site treatment systems require discharge permits, but most of them (including home sewage systems) are not permitted because they have little or no discharge to surface waters and are therefore treated as nonpoint sources in these TMDLs. In LDEQ's Watershed Protection Program for the Pearl River basin (LDEQ 1999), home sewage systems are identified as contributing to the impairment of the waterbodies. In subsegments 090101, 090301, and 090401, wildlife other than waterfowl is identified on the 303(d) list of suspected sources of impairment. This is also consistent with the nonpoint source assessment identifying animal holding/management areas and pasturelands as suspected sources for the fecal coliform bacteria

in the Pearl River basin. The impact of dairy farm runoff on the receiving streams water quality is cited as contributing to the elevated values of fecal coliform. More specifically, subsegment 090502, located on the western edge of Washington Parish and partially in Tangipahoa Parish, is an area identified in a previous report as having a large dairy industry. In a 1990 report on the Tangipahoa River, Tangipahoa Parish reportedly had 22,500 head of cattle in 271 dairy farms (Tulane 1990). A portion of subsegment 090502 (Big Silver Creek) is located in Tangipahoa Parish. The large concentration of dairy farms in Tangipahoa Parish extends eastward into Washington Parish and the upper part of the Pearl River basin in Louisiana.

Subsegment 090101 includes the Pearl River, which forms the state boundary between Louisiana and Mississippi. The large drainage area of the Pearl River, and the fact that much of the contributing area is outside the jurisdiction of the State of Louisiana, make it difficult to identify nonpoint sources responsible for contributing to the impairment of the waters. The Louisiana 303(d) list identifies these suspected sources only as sources outside of the state jurisdiction and borders and upstream sources.

In subsegments 090502, 090505, and 090506, no specific sources of impairment have been identified in the 303(d) list.

The magnitude of individual nonpoint sources is not estimated here because these TMDLs focus on total nonpoint source loading. Additional data and analyses would be needed to quantify individual nonpoint sources. This could be done by state or local agencies if they develop an implementation plan.

2.6 Point Sources

An initial list of permitted point source dischargers in the entire Pearl River Basin was generated by LDEQ using their internal databases. This list was refined by searching through LDEQ's Electronic Document Management System (EDMS) to verify facility locations, receiving streams, and permit status (active or terminated). Other relevant information (e.g., flows and permit limits) was also obtained from EDMS. A map of the facilities with discharge permits is included as Figure A.3 in Appendix A. In addition, a tabular listing of all of the permits for the seven subsegments addressed in this report is included in Appendix B.

The only point source discharges that were included in the TMDL calculations were the ones that included sanitary wastewater because there were no other permitted discharges with known sources of fecal coliforms. There are numerous dairy farms throughout the seven subsegments addressed in this report, but the runoff from those farms is classified as a nonpoint source and is not regulated by discharge permits. The last column in the table in Appendix B shows which discharges were included in the TMDL calculations.

It should be noted that the final 2004 303(d) list identified municipal point source discharges as a source of impairment in subsegment 090401 (Bogue Lusa Creek), but the research performed for these TMDLs did not yield any municipal point source permits in that subsegment. In subsegment 090506 (Thigpen Creek), one point source discharge was identified, but it did not have a known source of fecal coliforms and was not included in the TMDL calculations. No point source discharges of any kind were identified in subsegment 090301 (Pushepatapa Creek).

There are no municipalities that are regulated by Municipal Separate Storm Sewer System (MS4) permits within the seven subsegments addressed in this report. The City of Slidell, Louisiana, has an MS4 permit, but that city is located more than 20 miles south of the subsegments addressed in this report.

3.0 EXISTING WATER QUALITY

3.1 General Description of Data

Fecal coliform data have been collected by LDEQ at eight water quality monitoring stations located in the seven subsegments that are addressed in this report. The locations of these LDEQ ambient water quality monitoring stations are shown on Figure A.4 (located in Appendix A). Table 3.1 provides a general summary of all of water quality data collected by LDEQ in the seven subsegments. Table 3.2 provides a summary of exceedances of the primary contact recreation criteria and the secondary contact recreation criteria for each sampling location using data since January 1, 1998 (the beginning date that will be used by LDEQ for assessing waterbodies for their 2006 303(d) list). Only subsegments 090301 (Pushepatapa Creek) and 090401 (Bonner Creek) are identified as impaired on the 2004 303(d) list as not supporting secondary contact recreation. It appears from the data collected at station 1119 that the secondary contact recreation criteria have not been exceeded in subsegment 090301 (the percentage of data exceeding the secondary contact recreation criteria is only 18%).

Appendix C includes time series plots, seasonal plots, and plots of water quality versus stream flow for the fecal coliform data for each of the eight LDEQ water quality monitoring stations.

3.2 Trends and Patterns

LDEQ historical water quality data from the monitoring stations located in the seven subsegments were analyzed for long-term trends, seasonal patterns, and relationships between fecal coliform counts and stream flow.

Long-term data were available for only two of the subsegments: 090101 (Pearl River) and 090401 (Bogue Lusa Creek). A visual review of the data does not indicate any apparent long-term historical trends. The water quality sampling in the other subsegments was performed during only two years; those streams were sampled monthly for approximately 1 year (2001) and then again for approximately 7 months during 2006. Plots of the observed data over time are shown on Figures C.1 – C.8 in Appendix C.

Table 3.1. Summary of LDEQ fecal coliform data (colonies/100 mL) for entire period of record.

Station	Description	Subsegment	Begin	End	Count	Min	Median	Average	Max
0012	Pearl River east of Bogalusa, Louisiana	090101	04/11/1978	05/11/1998	223	20	80	480	16,000
0062	Pearl River at Pools Bluff, Louisiana	090101	04/11/1978	05/31/2006	152	17	110	607	16,000
1117	Peters Creek at Highway 21	090104	01/16/2001	05/31/2006	18	80	290	1,224	16,000
1119	Pushpatapa Creek at Highway 436	090301	01/16/2001	05/31/2006	17	14	130	1,540	16,000
0063	Bogue Lusa Creek at Bogulusa, Louisiana	090401	04/11/1978	05/31/2006	154	20	280	1,619	24,000
1058	Big Silver Creek at Highway 38	090502	02/06/2001	04/25/2006	16	23	700	3,397	16,000
1060	Bonner Creek at Highway 25	090505	02/06/2001	04/25/2006	17	50	140	627	5,000
1056	Thigpen Creek at Mill Creek Road	090506	02/06/2001	04/25/2006	16	27	150	327	800

Table 3.2. Summary of LDEQ fecal coliform data collected since January 1, 1998 (colonies/100 mL).

Station	Description	Subsegment	Period of Record ¹	Summer Count	Percent Exceeding PCR Criteria ²	Total Count	Percent Exceeding SCR Criteria ³
0012	Pearl River east of Bogalusa, Louisiana	090101	Jan 1998 – May 1998	1	0%	5	40%
0062	Pearl River at Pools Bluff, Louisiana	090101	Jan 2001 – May 2006	7	29%	18	6%
1117	Peters Creek at Highway 21	090104	Jan 2001 – May 2006	7	43%	18	6%
1119	Pushpatapa Creek at Highway 436	090301	Jan 2001 – May 2006	7	43%	17	18%
0063	Bogue Lusa Creek at Bogalusa, Louisiana	090401	Jan 2001 – May 2006	7	100%	18	39%
1058	Big Silver Creek at Highway 38	090502	Feb 2001 – May 2006	7	43%	16	19%
1060	Bonner Creek at Highway 25	090505	Feb 2001 – Jun 2006	8	38%	17	12%
1056	Thigpen Creek at Mill Creek Road	090506	Feb 2001 – Apr 2006	7	43%	16	0%

1. The Period of Record considered is from January 1998 to present; additional data outside of this period of record is available for stations 0012, 0062, and 0063.

2. Primary Contact Recreation (PCR) Criteria: 400 colonies/100mL (applicable May-October only).

3. Secondary Contact Recreation (SCR) Criteria: 2000 colonies/100 mL (applicable all months).

These data were also plotted seasonally to determine if trends exist by season. There were some stations with the highest fecal coliform counts in the summer months, while other stations had the highest fecal coliform counts in the winter months. For most stations, there were insufficient data to confirm any seasonal trends. The three stations with long-term data (0012, 0062, and 0063) did not show any seasonal trends either. Plots of the observed data by season are shown on Figures C.9 – C.16 in Appendix C.

Fecal coliform counts from these sampling stations were plotted against stream flows on the sampling days to determine if there was a relationship between the fecal coliform counts and stream flow. The three long term stations (0012, 0062, and 0063) offered a fairly large record of data but no relationship between the observed water quality data and the flow was revealed. For the remaining five stations, there were a limited number of samples collected and the corresponding flows were typically low-flow events. There was insufficient data at these stations to confirm any relationship between fecal coliform counts and stream flow. Plots of the observed fecal coliform data versus flow are shown on Figures C.17 – C.24 in Appendix C.

4.0 TMDL DEVELOPMENT

4.1 Seasonality and Critical Conditions

EPA's regulations at 40 CFR 130.7 require the determination of TMDLs to take into account critical conditions for stream flow, loading, and water quality parameters. Also, both Section 303(d) of the Clean Water Act and regulations at 40 CFR 130.7 require TMDLs to consider seasonal variations for meeting water quality standards. The TMDLs in this report were developed for May-October and for November-April because the water quality standards specify different criteria for fecal coliforms for each of those two seasons. The analysis of historical water quality data in Section 3.2 did not indicate that either season is more critical than the other. The analysis of historical water quality data did not indicate a critical flow condition either. However, the methodology used to develop these TMDLs (load duration curve) addresses a wide range of flow conditions.

4.2 Methodology for TMDL Calculations

The methodology used for all of the TMDLs in the report is the load duration curve. Because loading capacity varies as a function of the flow present in the stream, these TMDLs represent a continuum of desired loads over all flow conditions, rather than fixed at a single value. The basic elements of this procedure are documented on the Kansas Department of Health and Environment web site (KDHE 2005). This method was used to illustrate allowable loading at a wide range of flows. The steps for how this methodology was applied for the TMDLs in this report can be summarized as follows:

1. Develop a flow duration curve (Section 4.3).
2. Convert the flow duration curve to load duration curves (Section 4.4).
3. Plot observed loads with load duration curves (Section 4.5).
4. Calculate TMDL, MOS, FG, WLA, and LA (Section 4.6 – 4.8).
5. Calculate percent reductions required to meet water quality standards (Section 4.9).

4.3 Flow Duration Curves

For each of the seven subsegments, a single flow per unit area duration curve was developed. The load duration methodology requires that the flow data used for developing the flow duration curves is the same as the flow used for calculating observed loads from the sampling data. The flow data was obtained from the daily streamflow measurements of four USGS flow gages. Please refer to Section 2.3 and Table 2.2 for a discussion on the reasoning and application of the specific gages for the respective subsegments. The following is a summary of the USGS flow gages and the subsegments where they were applied:

- USGS flow gage 02489500 (Pearl River near Bogalusa) was used to compute the flow per unit area values for subsegment 090101 (Pearl River).
- USGS flow gage 07375000 (Tchefuncta River near Folsom) was used to compute the flow per unit area values for subsegments 090502 (Big Silver Creek) and 090505 (Bonner Creek).
- USGS flow gages 02490105 (Bogue Lusa Creek at Bogalusa) and 02492000 (Bogue Chitto River near Bush) were used together to compute the flow per unit area values for subsegments 090401 (Bogue Lusa Creek), 090104 (Peters Creek), 090301 (Pushepatapa Creek), and 090506 (Thigpen Creek).

Because the fecal coliform bacteria criteria are seasonal, the flow data were separated by season (May through October and November through April). Separate flow durations were developed using the flow data for each season. Each set of flow data was sorted in increasing order and the percent exceedance of each daily flow was calculated. Flow values were converted to flow per unit of drainage area so that they could be applied to different subsegments with different drainage areas. Plots of the seasonal flow duration curves are shown on Figures D.1 through D.6 in Appendix D.

4.4 Load Duration Curves

The flows per unit area from the summer and winter flow duration curves were multiplied by the applicable fecal coliform criteria to calculate an allowable load per unit area duration curve. Each load duration curve is a plot of fecal coliform bacteria colonies per day per square mile of drainage area versus the percent exceedances from the flow. The drainage area is the

total upstream contributing drainage area at the downstream most point of the subsegment. For the seven subsegments addressed in this report, only subsegment 090101 (Pearl River) is not a headwater subsegment. Therefore, the drainage area for subsegment 090101 includes the area upstream of the subsegment. The publication “Drainage Areas of Louisiana” (USGS 1971) provides a cumulative drainage area for the Pearl River at Bogue Chitto, which is near the downstream end of subsegment 090101, of approximately 6,719 square miles. Each of the other subsegments addressed in this report have a total contributing drainage area equal to their subsegment area. Table 4.1 is a summary of the drainage areas applicable in the load duration curves for each subsegment.

Table 4.1. Cumulative drainage area for each subsegment.

Subsegment	Subsegment Name	Cumulative Drainage Area at Subsegment End (mi²)
090101	Pearl River	6,719
090104	Peters Creek	41.4
090301	Pushepatapa Creek	183.8
090401	Bogue Lusa Creek	76.3
090502	Big Silver Creek	96.5
090505	Bonner Creek	183.8
090506	Thigpen Creek	16.8

The summer and winter load duration curves and percent reductions computed for each of the seven subsegments are presented in the following appendices:

- Appendix E: Subsegment 090101 (Pearl River).
- Appendix F: Subsegment 090104 (Peters Creek).
- Appendix G: Subsegment 090301 (Pushepatapha Creek).
- Appendix H: Subsegment 090401 (Bonner Creek).
- Appendix I: Subsegment 090502 (Big Silver Creek).
- Appendix J: Subsegment 090505 (Bonner Creek).
- Appendix K: Subsegment 090506 (Thigpen Creek).

The load duration calculations for subsegment 090101 used water quality data from LDEQ monitoring station 0062 only. LDEQ station 0012 is also located in subsegment 090101,

but those data were not used for the TMDL calculations because station 0062 is farther downstream and includes inputs from a larger portion of subsegment 090101.

The load duration curve is beneficial when analyzing monitoring data with its corresponding flow information plotted as a load. This allows the monitoring data to be plotted in relation to its place in the flow continuum. Assumptions of the probable source or sources of the impairment can often be made from the plotted data if there is a relationship between flow and water quality. If there is no relationship between flow and water quality, the load duration curve may provide less insight concerning probable sources, but it is still a valid technique for calculating TMDLs. The load duration curve methodology is applicable regardless of the source of pollutant loading (e.g., watershed runoff, pumped storm flows, point sources).

The load duration curves show the calculation of the TMDL at any flow rather than at a single critical flow. The official TMDL is calculated and reported as a single number, but the curve is provided to demonstrate the value of the acceptable load at any flow. This allows analysis of load cases for different flow regimes as needed in the future.

4.5 Observed Loads

For each subsegment, observed “loads” were calculated by multiplying each observed fecal coliform count by the flow per unit area on the sampling day. The result of this calculation is a number of fecal coliform colonies per day, which is referred to in this report as a load even though it does not represent mass per unit time. These observed loads were plotted versus the percent exceedance of the flow per unit area on the sampling day and placed on the same plot as the load duration curve for the season in which the sample occurred. These plots are shown in Appendices E – K of this report.

These plots provide visual comparisons between observed and allowable loads under different flow conditions. Observed loads that are plotted above the load duration curve (identified as “TMDL – MOS – FG”) represent conditions where observed fecal coliform counts exceed the criteria in the water quality standards. Observed loads below the load duration curve represent conditions where observed fecal coliform counts are less than criteria in the water quality standards (i.e., not violating water quality standards).

4.6 TMDL, MOS, and FG

Each TMDL was calculated as the area under the load duration curve (colonies/day/mi²) multiplied by the appropriate drainage area (mi²) in Table 4.1.

Both Section 303(d) of the Clean Water Act and regulations at 40 CFR 130.7 require TMDLs to include a MOS to account for uncertainty in available data or in the actual effect that load reductions will have on receiving water quality. The MOS may be expressed explicitly as unallocated assimilative capacity or implicitly through conservative assumptions used in establishing the TMDL. For the TMDLs in this report, 10% of each TMDL was set aside as an explicit MOS.

Each TMDL in this report also includes an FG allocation to allow for future growth in loads to the waterbody. Ten percent of each TMDL was set aside as an FG allocation. The allocation of 20% for MOS and FG combined is consistent with LDEQ's typical procedure of setting aside 20% of the allowable loading in TMDLs to account for "modeling uncertainty, data inadequacies, and future growth and safety" (LDEQ 2006).

4.7 Point Source Loads

The WLA portion of each TMDL is the loading that is allocated to point sources. There are various point sources in the Pearl River Basin but not all are contributors of fecal coliforms. The only permitted discharges that were considered contributors of fecal coliforms were those with sanitary wastewater (i.e., domestic wastewater). For treated sanitary wastewater, LDEQ's policy is to set permit limits for fecal coliforms no higher than water quality criteria for the receiving stream (i.e., criteria are met at "end-of-pipe"). This means that treated sanitary wastewater permits will include limits of 200 colonies/100 mL as a monthly average and/or 400 colonies/100 mL as a weekly average or daily maximum. As long as point source discharges of treated sanitary wastewater contain fecal coliform levels at or below these permit limits, they should not cause any exceedances of water quality criteria in the receiving streams. Therefore, the WLAs for these TMDLs were based on monthly average permit limits of 200 colonies/100 mL with no further load reductions required below these current limits. A complete list of permitted facilities, their fecal coliform permit limits, permitted flow and other

permit information, including the facilities with permitted discharges that are not a source of fecal coliform, is presented in Appendix B. Tables 4.2 – 4.6 provide summaries of the permitted discharges that likely contribute fecal coliforms and are included in the WLA for each subsegment. No point sources with fecal coliform contributions were found in subsegments 090301 (Pushepatapa Creek) and 090506 (Thigpen Creek). The WLAs were set to zero for these two subsegments. The WLAs for the other five subsegments were computed based on the sum of the permitted design flows in the subsegment multiplied by the fecal coliform count of 200 colonies/100 mL.

4.8 Nonpoint Source Loads

For each of the TMDLs in this report, the LA for nonpoint sources was set equal to the TMDL minus the MOS, FG, and WLA. Calculations for the LAs and other TMDLs components are shown in Appendices E – K of this report.

4.9 Percent Reductions

In addition to calculating allowable loads, estimates were made for percent reductions of nonpoint source loads that would be needed for the observed loads to be at levels that are consistent with criteria in the water quality standards. The observed loads at each sampling station were reduced by certain percentages until no more than 25% of the loads for that station were on or below the load duration curve for each season. Using 25% as an allowable percentage of exceedances is consistent with the numeric criteria for fecal coliforms in the water quality standards. The percent reduction calculations are shown in Appendices E – K and are summarized in Table 4.7.

Table 4.2. List of point sources included in the TMDL for subsegment 090101 (Pearl River).

Subsegment	Permit Number	Facility Name	Outfall	Outfall Type	Flowrate (GPD)	Flow Type
090101	LA0046515	City of Bogalusa W/TP	001	Treated Sanitary Wastewater	6,000,000	Average
090101	LA0060275	Washington Correctional Institute	001	Treated Sanitary Wastewater	201,000	Design
090101	LAG470101	Lott & Sons, Inc.	NA	Treated Sanitary Wastewater	2,500	Maximum
090101	LAG470151	Mack Grubbs Motor, Inc.	005	Treated Sanitary Wastewater	2,500	Maximum
			006	Washrack/Treated Sanitary Wastewater	2,500	Maximum
090101	LAG470163	John Furey Motors, Inc.	005	Treated Sanitary Wastewater	2,500	Maximum
			006	Commingle Washrack and Treated Sanitary Wastewater	2,500	Maximum
090101	LAG530376	Milley Ltd.	001A	Treated Sanitary Wastewater	500	Maximum
090101	LAG531287	Wesley Ray Elementary School	001	Treated Sanitary Wastewater	3,495	Average
090101	LAG531554	First Pentecostal Church of Bogalusa, Inc.	001	Treated Sanitary Wastewater	3,250	Expected
090101	LAG541101	K & T Spur #3	001	Treated Sanitary Wastewater	2,500	Maximum
090101	LAG541127	Willa Villa Mobile Home Park	002	Treated Sanitary Wastewater	2,500	Maximum
			001	Treated Sanitary Wastewater	2,500	Maximum
			002	Treated Sanitary Wastewater	1,440	Maximum
090101	LAG750440	Mr. Quik of Bogalusa, Inc.	003	Treated Sanitary Wastewater	200	Average
			004	Vehicle Wash Wastewater/ Sanitary Wastewater	2,500	Maximum
SUM OF PERMITTED FLOWS (GPD)					6,232,385	

Table 4.3. List of point sources included in the TMDL for subsegment 090104 (Peters Creek).

Subsegment	Permit Number	Facility Name	Outfall	Outfall Type	Flowrate (GPD)	Flow Type
090104	LA0098973	Joe N. Miles and Sons	001	Sanitary Wastewater	1,000	Average
			002	Sanitary Wastewater	500	Average
090104	LAG530056	Baywood Apartments	001	Treated Sanitary Wastewater	5,000	Maximum
090104	LAG530616	Countryside Animal Hospital	001	Treated Sanitary Wastewater	2,620	Average
				SUM OF PERMITTED FLOWS (GPD)	9,120	

Table 4.4. List of point sources included in the TMDL for subsegment 090401 (Bogue Lusa Creek).

Subsegment	Permit Number	Facility Name	Outfall	Outfall Type	Flowrate (GPD)	Flow Type
090401	LA0068101	Washington Parish Police Jury – Choctaw Road Landfill	002	Treated Leachate, Treated Sanitary Wastewater	13,000	Average
090401	LAG530968	Nash's Trailer Park ¹	001	Treated Sanitary Wastewater	3,500 ¹	Average
090401	LAG531387	Statham's Mobile Home Park	001	Treated Sanitary Wastewater	2,400	Average
090401	LAG541204	Pine School	001	Treated Sanitary Wastewater	10,795	Expected
				SUM OF PERMITTED FLOWS (GPD)	29,695	

Table 4.5. List of point sources included in the TMDL for subsegment 090502 (Big Silver Creek).

Subsegment	Permit Number	Facility Name	Outfall	Outfall Type	Flowrate (GPD)	Flow Type
090502	LAG541177	Mt. Hermon School	001	Treated Sanitary Wastewater	10,960	Expected
				SUM OF PERMITTED FLOWS (GPD)	10,960	

Table 4.6. List of point sources included in the TMDL for subsegment 090505 (Bonner Creek).

Subsegment	Permit Number	Facility Name	Outfall	Outfall Type	Flowrate (GPD)	Flow Type
090505	LAG531950	Happy Acres Mobile Home Park-WWTP	001	Treated Sanitary Wastewater	3,900	Average
				SUM OF PERMITTED FLOWS (GPD)	3,900	

Table 4.7. Summary of fecal coliform TMDLs.

Subsegment	Season	Loads (colonies/day)					Percent Reduction Needed
		WLA	LA	MOS	FG	TMDL	
090101 Pearl River	Summer	4.72E+10	4.31E+15	5.39E+14	5.39E+14	5.39E+15	55%
	Winter	4.72E+10	5.04E+16	6.31E+15	6.31E+15	6.31E+16	0%
090104 Peters Creek	Summer	6.91E+7	3.75E+13	4.68E+12	4.68E+12	4.68E+13	60%
	Winter	6.91E+7	3.52E+14	4.40E+13	4.40E+13	4.40E+14	0%
090301 Pushpatapa Creek	Summer	0	1.66E+14	2.08E+13	2.08E+13	2.08E+14	86%
	Winter	0	2.92E+16	3.65E+15	3.65E+15	3.65E+16	0%
090401 Bogue Lusa Creek	Summer	2.25E+8	6.91E+13	8.63E+12	8.63E+12	8.63E+13	98%
	Winter	2.25E+8	1.21E+16	1.52E+15	1.52E+15	1.52E+16	90%
090502 Big Silver Creek	Summer	8.33E+7	8.14E+13	1.02E+13	1.02E+13	1.02E+14	60%
	Winter	8.33E+7	8.26E+14	1.03E+14	1.03E+14	1.03E+15	90%
090505 Bonner Creek	Summer	2.95E+7	1.55E+14	1.94E+13	1.94E+13	1.94E+14	36%
	Winter	2.95E+7	1.57E+15	1.97E+13	1.97E+13	1.97E+14	0%
090506 Thigpen Creek	Summer	0	1.52E+13	1.90E+12	1.90E+12	1.90E+13	55%
	Winter	0	1.43E+14	1.78E+13	1.78E+13	1.78E+14	0%

Notes: WLA = Wasteload Allocation, LA = Load Allocation, MOS = Margin of Safety, FG = Future Growth, TMDL = Total Maximum Daily Load

All seven of the subsegments require reductions of fecal coliforms during summer. This result is consistent with the final 2004 303(d) list, which specifies all seven subsegments as not supporting the designated use of primary contact recreation.

For winter, the only two subsegments that need reductions of fecal coliforms are 090401 and 090502. This result is not completely consistent with the final 2004 303(d) list, which specifies subsegments 090301 and 090401 as not supporting the secondary contact recreation

criterion. The inconsistency is due partly to the fact that the percent reductions for the winter TMDLs were based on data only during the winter months, while the assessment for the 303(d) list uses data for all months when determining support or non-support for secondary contact recreation. Another reason for the inconsistency is that the TMDLs included more recent data that were not available when the 2004 303(d) list was developed.

The percent reductions specified in Table ES.2 represent reductions that are needed from nonpoint sources. No point source reductions were specified for these TMDLs because LDEQ's policy is to require point source discharges with fecal coliforms in their effluent to meet water quality standards at the "end of pipe" (i.e., permit limits equal to water quality standards.) Percent reductions were not calculated for individual nonpoint sources (e.g., runoff from pasture, septic systems, etc.) because insufficient data were available to calculate loads from individual nonpoint sources.

5.0 OTHER RELEVANT INFORMATION

These TMDLs have been developed 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 nonpoint source 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 Surveillance Section 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. This information is also utilized in establishing priorities for the LDEQ nonpoint source program.

The LDEQ has implemented a watershed approach to surface water quality monitoring. Through this approach, the entire state is sampled over a 4-year cycle. Long-term trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the 4-year cycle. Sampling is conducted on a monthly basis to yield approximately 12 samples per site each year the site is monitored. Sampling sites are located where they are considered to be representative of the waterbody. Under the current monitoring schedule, approximately one half of the State's waters are newly assessed for each 305(b) and 303(d) listing biennial cycle, with sampling occurring statewide each year. The 4-year cycle follows an initial 5-year rotation that covered all basins in the state according to the TMDL priorities. 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.

Hurricane Katrina made landfall on Monday, August 29, 2005 as a category 4 hurricane with the center of the storm passing through the Pearl River basin. The storm brought heavy winds and rain to southeast Louisiana, causing much flooding and washing large amounts of debris into waterbodies throughout the Pearl River basin in Louisiana (not just along the coast). Some of the coastal areas that were flooded in Hurricane Katrina were re-flooded by the storm surge from Hurricane Rita. Both Hurricanes Katrina and Rita have caused a significant amount of change in water quality in south Louisiana. Many wastewater treatment facilities were temporarily or permanently damaged. Some wastewater treatment facilities will rebuild while others will relocate. Observations and field data collection by LDEQ and other organizations have shown that the wildlife and fisheries in the Pearl River basin were significantly impacted by the hurricanes. The hurricanes expedited the loss of coastal land and modified the hydrology of some of the coastal water bodies. Several federal and state agencies including the EPA and LDEQ are engaged in collecting environmental data and assessing the recovery of the Gulf of Mexico waters. Most of the data used to develop the TMDLs in this report were collected prior to these hurricanes. Therefore, the post-hurricane conditions and other factors may require modifications of these TMDLs prior to their implementation. Any deviation from implementation of these TMDLs should be justified based on site-specific data and/or information.

6.0 PUBLIC PARTICIPATION

Federal regulations require USEPA to notify the public and seek comment concerning TMDLs it prepares. The TMDLs in this report were developed under contract to USEPA, and USEPA held a public review period seeking comments, information, and data from the public and any other interested parties. The notice for the public review period was published in the Federal Register on February 1, 2008, and the review period closed on March 3, 2008.

General and specific comments were received from LDEQ during the public review period. None of the specific comments addressed the TMDLs in this report. The general comments and USEPA's responses are included in Appendix L of this report.

USEPA will submit the final version of these TMDLs to LDEQ for implementation and incorporation into LDEQ's current water quality management plan.

7.0 REFERENCES

- KDHE. 2005. "Kansas TMDL Curve Methodology." Web site maintained by Kansas Department of Health and Environment. www.kdheks.gov/tmdl/basic.htm#data
- LDEQ. 1999. Watershed Protection Programs – Pearl River Basin. Developed by Louisiana Department of Environmental Quality Nonpoint Source Pollution Unit. Downloaded from LDEQ web site (<http://nps.ldeq.org/99manplan/99pearl.pdf>).
- LDEQ. 2005. 2004 303(d) List of Impaired Water Bodies: Including EPA's Additions. Downloaded from Louisiana Department of Environmental Quality web site ([www.deq.louisiana.gov/portal/Portals/0/planning/04 IR1-FINAL-Appendix H-Cat 5 303d List with EPA - August 17 2005.xls](http://www.deq.louisiana.gov/portal/Portals/0/planning/04_IR1-FINAL-Appendix_H-Cat_5_303d_List_with_EPA_-_August_17_2005.xls))
- LDEQ. 2006. Louisiana Total Maximum Daily Load Technical Procedures. Revision 10. Prepared by Office of Environmental Assessment, Louisiana Department of Environmental Quality. Dated August 10, 2006. Downloaded from LDEQ web site (www.deq.louisiana.gov/portal/Portals/0/planning/LTP_sop_1727_r10-081006.pdf).
- LDEQ. 2007. Title 33 Environmental Quality, Part IX Water Quality, Subpart 1 Water Pollution Control, Chapter 11 Surface Water Quality Standards. Including amendments through 11/20/07. Downloaded from Louisiana Department of Environmental Quality web site (www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v09.pdf)
- Tulane. 1990. Bacteriological Criteria for Recreational Waters along the Tangipahoa River. Prepared by A.C. Anderson, A. Abdelghani, J. Stumpf, and J. Rice. Tulane University School of Public Health and Tropical Medicine, New Orleans, LA. November 30, 1990.
- USGS. 1971. Drainage Area of Louisiana Streams. Basic Records Report No. 6. Prepared by R. Sloss, United States Geological Survey, Baton Rouge, LA: 1971 (Reprinted 1991).
- USGS. 2006. National Land Cover Database 2001 (NLCD 2001). Downloaded from United States Geological Survey web site (www.mrlc.gov/mrlc2k_nlcd.asp).

APPENDIX A

Maps

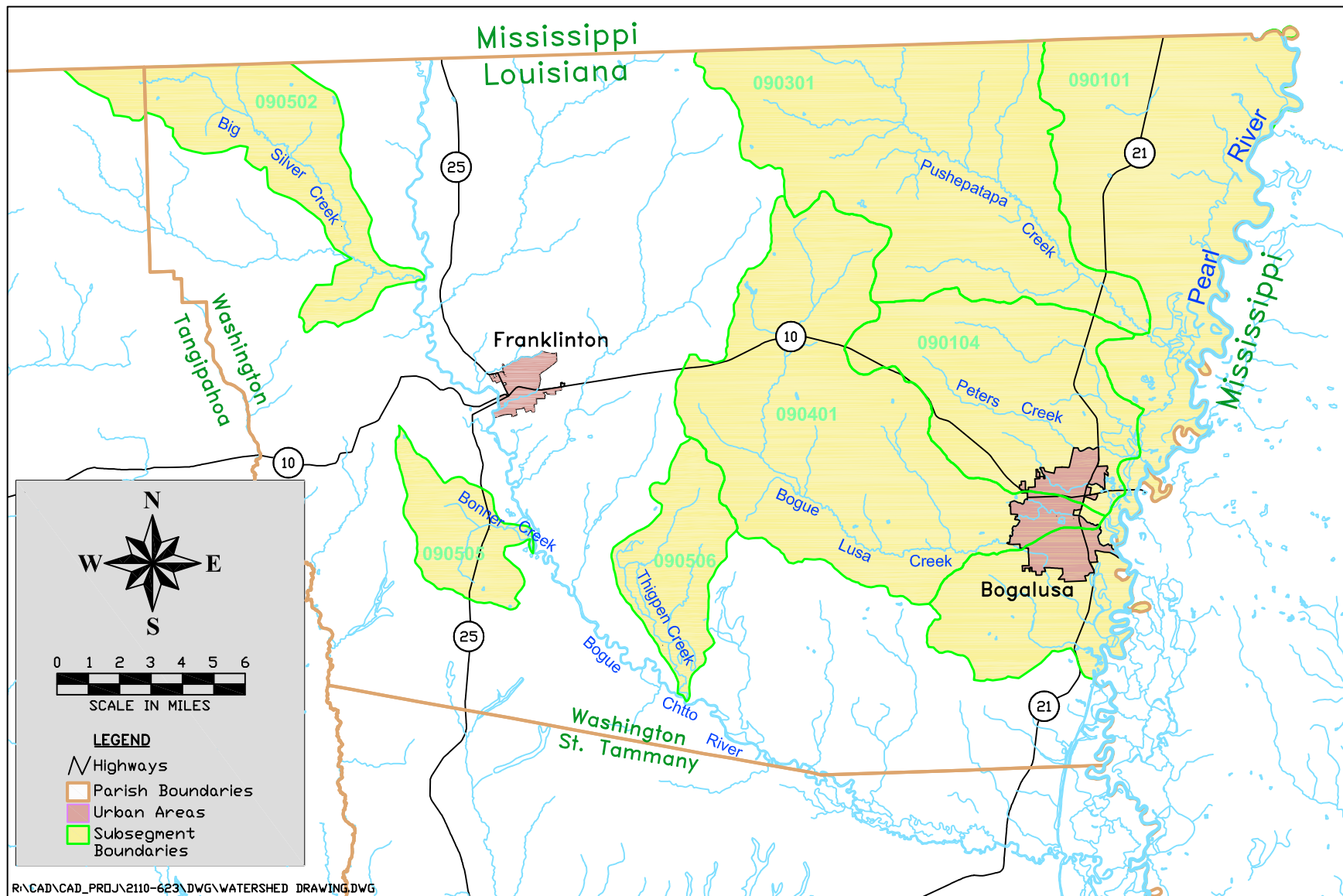


Figure A.1. Map of subsegments impaired for fecal coliforms.

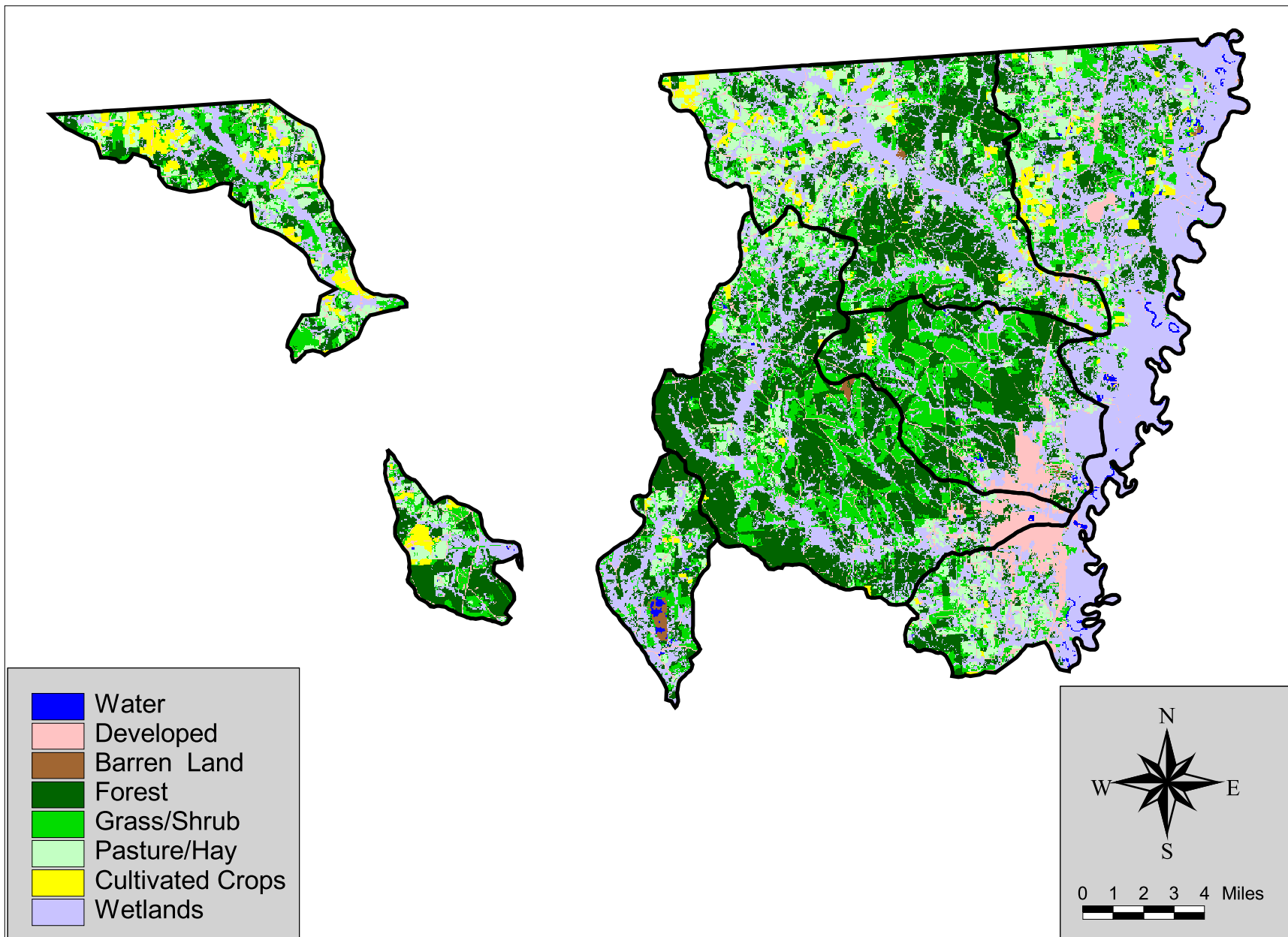


Figure A.2 Land use for Fecal Coliform impaired subsegments in Pearl River basin.

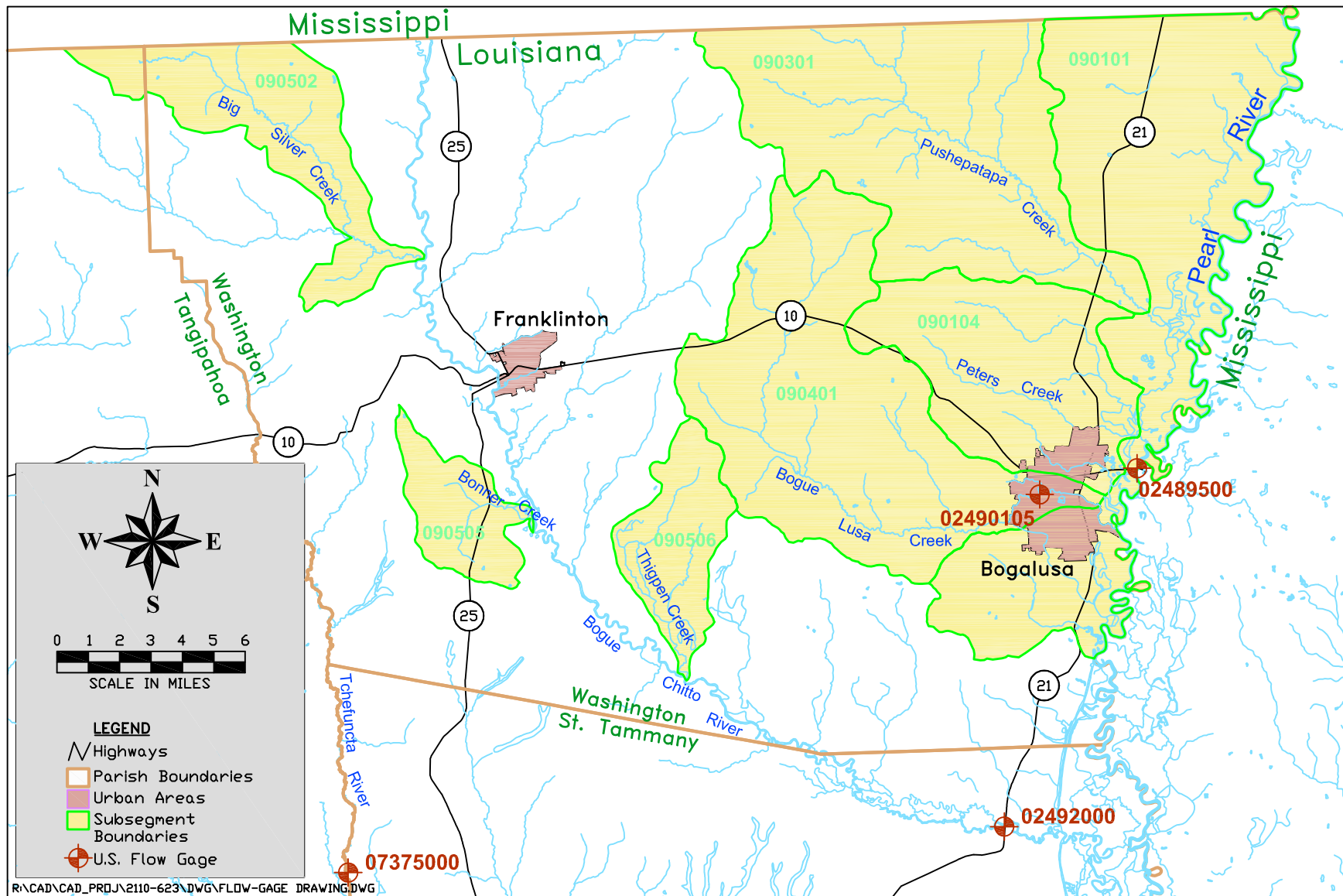


Figure A.3. Map of USGS flow gages used for TMDLs in this report.

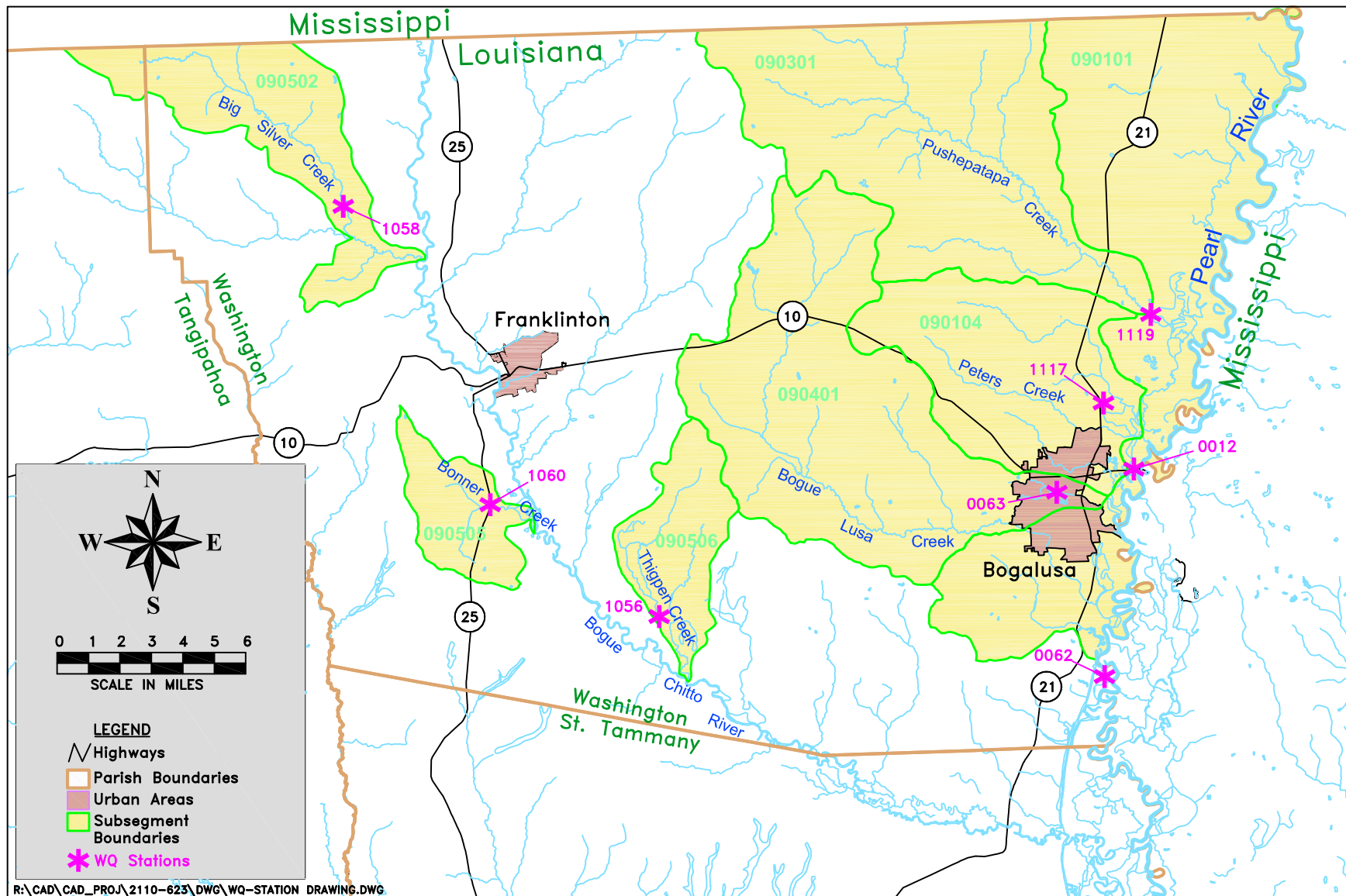


Figure A.4. Map of LDEQ water quality stations.

APPENDIX B

Point Sources/Permitted Facilities

Appendix B: Point Sources/Permitted Facilities in the Pearl River Basin, Subsegments: 090101, 090104, 090301, 090401, 090502, 090505, 090506

Subsegment	Facility Name	AI#	Permit #	Receiving Water Body	Outfall	Type of Discharge	Flow	Flow type and units	Fecal Coliform (FC) limit	FC limit type	Included in TMDL?
90101	Temple Inland-Bogalusa Mill	38936	LA0007901	Pearl River	001	Primarily unbleached Kraft Paper mill effluent, plus a small sanitary wastewater flow	22.4	avg (MGD)	none	--	No
			LAR05M243								No
90101	City of Bogalusa-WWTP	19934	LA0046515	Pearl River Basin	001	Treated Sanitary Wastewater	6	avg (MGD)	200 / 400	monthly avg / weekly avg	Yes
				Pearl River Basin	002	Stormwater Runoff					No
90101	Washington Correctional Institute	18974	LA0060275	Mayfield Creek	001	Treated Sanitary Wastewater	0.201	exp (MGD)	200 / 300	30 day geo mean / weekly avg	Yes
90101	Varnado Water Works District	130597	LAG380083	Scarboroughs Creek	001	Filter Backwash	0.03	avg (MGD)			No
90101	Lott & Sons, Inc.	88333	LAG470101	Coburn Creek		Treated Sanitary Wastewater	2,500	max (GPD)	400	max	Yes
90101	Mack Grubbs Motor, Inc.	23362	LAG470151	Pearl River	001	Washrack Wastewater	2,500	max (GPD)			No
				Pearl River	002	Maintenance Washwater	2,500	max (GPD)			No
				Pearl River	003	Paint Booth Washdown	2,500	max (GPD)			No
				Pearl River	004	Paint Booth Washdown	2,500	max (GPD)			No
				Pearl River	005	Treated Sanitary Wastewater	2,500	max (GPD)	400	max	Yes
				Pearl River	006	Washrack/Treated Sanitary Wastewater	2,500	max (GPD)	400	max	Yes
90101	John Furey Motors, Inc.	27207	LAG470159	Pearl River	001	Washrack Wastewater	2,500	max (GPD)			No
				Pearl River	002	Maintenance/Repair Shop Washwater	2,500	max (GPD)			No
				Pearl River	003	Paint booth/Wet Sanding Wastewater	2,500	max (GPD)			No
				Pearl River	004	Potentially Contaminated Stormwater	2,500	max (GPD)			No
				Pearl River	005	Treated Sanitary Washwater	2,500	max (GPD)	400	max	Yes
				Pearl River	006	Commingle Washrack and Treated Sanitary Wastewater	2,500	max (GPD)	400	max	Yes
90101	Canadian National-Illinois Central Railroad	41884	LAG480012	Pearl River	001		0.001	avg (MGD)			No
90101	Miley Ltd.	42509	LAG530376	Pearl River	001A	Treated Sanitary Wastewater	500	max (GPD)	400	max	Yes
90101	Wesley Ray Elementary School	94396	LAG531287	Foster Creek	001	Treated Sanitary Wastewater	3,495	avg (GPD)	400	max	Yes
90101	First Pentecostal Church of Bogalusa, Inc.	102968	LAG531554	Pearl River	001	Treated Sanitary Wastewater	3,250	exp (GPD)	400	max	Yes
90101	K & T Spur #3	51514	LAG541101	Pearl River	001	Treated Sanitary Wastewater	2,500	max (GPD)	200 / 400	monthly avg / weekly avg	Yes
				Pearl River	002	Treated Sanitary Wastewater	2,500	max (GPD)	200 / 400	monthly avg / weekly avg	Yes
90101	Willa Villa Mobile Home Park	97698	LAG541127	Pearl River	001	Treated Sanitary Wastewater	2,500	max (GPD)	200 / 400	monthly avg / weekly avg	Yes

Subsegment	Facility Name	AI#	Permit #	Receiving Water Body	Outfall	Type of Discharge	Flow	Flow type and units	Fecal Coliform (FC) limit	FC limit type	Included in TMDL?
90101	Mr. Quik of Bogalusa, Inc.	97698	LAG750440	Pearl River	001	Exterior Vehicle and Equipment Wash Wastewater					No
				Pearl River	002	Treated Sanitary Wastewater	1,440	max (GPD)	400	max	Yes
				Pearl River	003	Treated Sanitary Wastewater	200	avg (GPD)	400	max	Yes
				Pearl River	004	Vehicle Wash Wastewater/Sanitary Wastewater	2,500	max (GPD)	400	max	Yes
				Pearl River	005	Portable Washing Wastewater					No
90101	JAMES EZELL DBA JIMS EXXON		LAU003465	Jones Creek		Unpermitted discharge, compliance orders issued					No
90101	ILLINOIS CENTRAL GULF RR	41884	LA0008028	Yellow Branch	001	Maintenance Washwater					No
90104	Joe N Miles and Sons	17316	LA0098973	Adams Creek	001	Sanitary Wastewater	1,000	avg (GPD)	400	max	Yes
				Adams Creek	002	Sanitary Wastewater	500	avg (GPD)	400	max	Yes
				Adams Creek	003	Stormwater	54,021	avg (GPD)			No
				Adams Creek	004	Stormwater	27,430	avg (GPD)			No
				Adams Creek	005	Cooling Water	14,384	avg (GPD)			No
				Adams Creek	006	Stormwater	25,254	avg (GPD)			No
				Adams Creek	007	Stormwater Runoff	29,346	avg (GPD)			No
90104	Baywood Apartments	40742	LAG530056	Peters Creek	001	Treated Sanitary Wastewater	5,000	max (GPD)	400	max	Yes
90104	Countryside Animal Hospital	36856	LAG530616	Peters Creek	001	Treated Sanitary Wastewater	2,620	avg (GPD)	400	max	Yes
90104	Bogalusa Airport	77047	LAR10D208	Peter's Creek							No
90104	WEYERHAEUSER		LAR05N561	DITCH-BOG		Stormwater discharge only covered under multi-sector; no sanitary discharge					No
90104	MITCH ROAD SALVAGE	34046	LAR05M682			Stormwater discharge only covered under multi-sector; no sanitary discharge					No
90401	Nash's Trailer Park	42596	LAG530968	Bogue Lusa Creek	001	Treated Sanitary Wastewater			400	weekly average	Yes
90401	Washington Parish Police Jury-Choctaw Road Landf	20076	LA0068101	Pearl River	001	Non-contact stormwater runoff	0.068	avg (MGD)			No
				Pearl River	002	Treated leachate, treated sanitary wastewater	0.013	avg (MGD)	200 / 400	30 day geo mean / daily max	Yes
90401	Calpine Corp.-Washington Parish Energy Center	83619	LA0112771	Bogue Lusa Creek	001	Cooling Tower Blowdown Wastewater	1.79	avg (MGD)			No
				Bogue Lusa Creek	101	Wastewater	0.2	avg (MGD)			No
				Bogue Lusa Creek	201	Wastewater	0.03	avg (MGD)			No
				Bogue Lusa Creek	002	stormwater runoff and miscellaneous wastewater					No
				Bogue Lusa Creek	003	stormwater runoff and miscellaneous wastewater					No
				Bogue Lusa Creek	004	stormwater runoff and miscellaneous wastewater					No
				Bogue Lusa Creek	005	stormwater runoff and miscellaneous wastewater					No
				Bogue Lusa Creek	102	Hydrostatic Test Water					No
90401	LADOTD-Bogalusa Maintenance Unit	85757	LAR05N425	Bogue Lusa Creek							No
90401	Statham's Mobile Home Park	98541	LAG531387	Pearl River	001	Treated Sanitary Wastewater	2,400	avg (GPD)	none		Yes
90401	Pine School	94403	LAG541204	Bogue Lusa Creek	001	Treated Sanitary Wastewater	10,795	exp (GPD)	200 / 400	monthly avg / weekly avg	Yes
90401	MAPCO INC #7392		LAG830102	Bogue Lusa Creek		no sanitary discharge from this facility					No
90401	STEVEN B SIMMONS		LAR05B282	Bogue Lusa Creek							No
90502	Mt. Hermon School	94405	LAG541177	Bogue Chitto River	001	Treated Sanitary Wastewater	10,960	exp (GPD)	200 / 400	monthly avg / weekly avg	Yes

Subsegment	Facility Name	AI#	Permit #	Receiving Water Body	Outfall	Type of Discharge	Flow	Flow type and units	Fecal Coliform (FC) limit	FC limit type	Included in TMDL?
90505	Happy Acres Mobile Home Park - WWTP	118109	LAG531950	Bonner Creek	001	Treated Sanitary Wastewater	3,900	avg (GPD)	400	max	Yes
90505	Industrial Aggregates LLC	130059	LAR05N679								No
90506	Florida Gas Transmission Co-Franklinton Compress	17216	LA0104906			no sanitary discharge from this facility					No

FILE: R:\PROJECTS\2110-623\TECH\NPDES\APPENDIXB_PEARLR_FC TMDL_PERMITS-REVISED.XLS

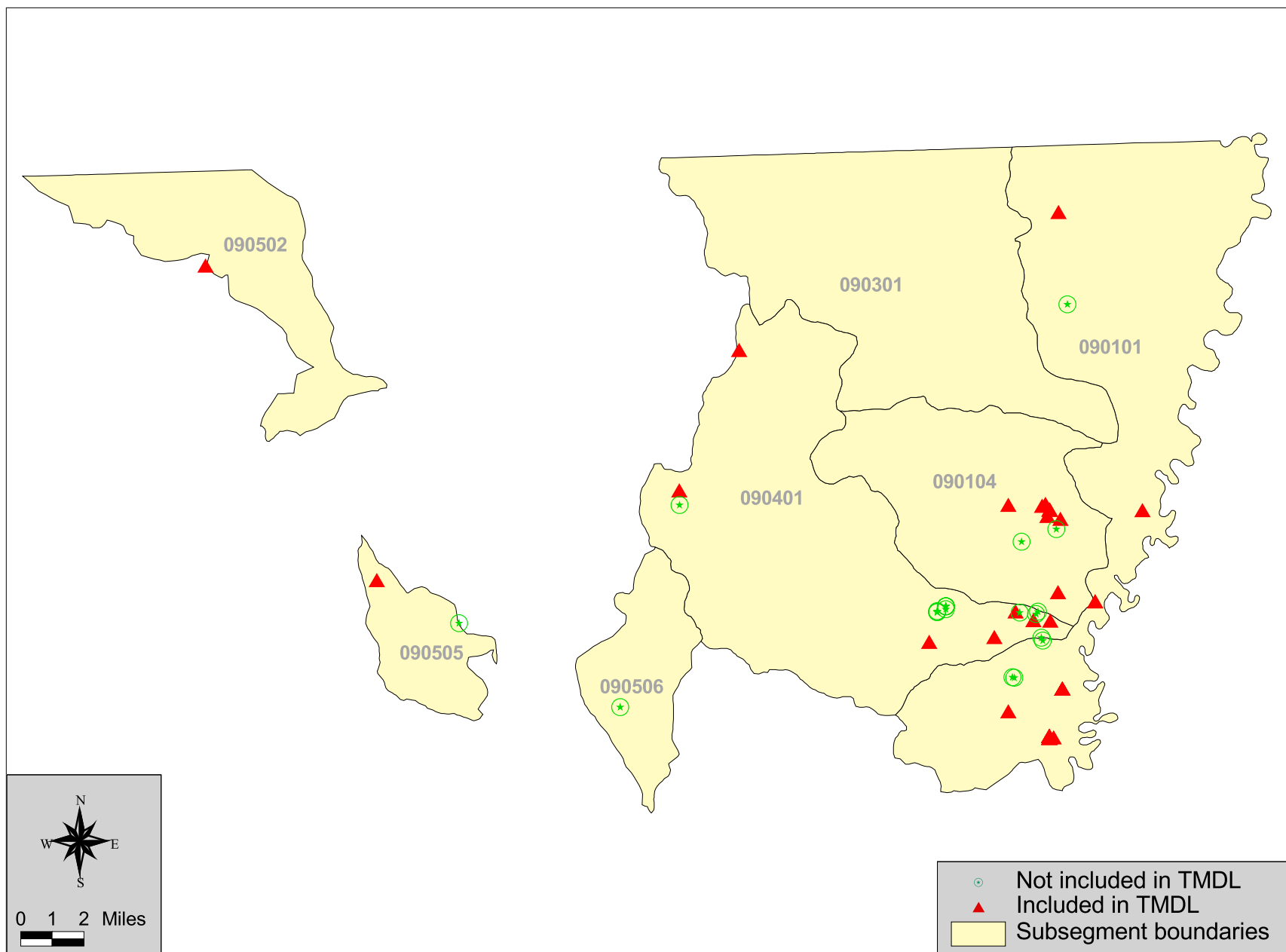


Figure B.1. Point sources in subsegments impaired for fecal coliforms in the Pearl River basin.

APPENDIX C

Water Quality Data Plots

Pearl River Subsegment 090101

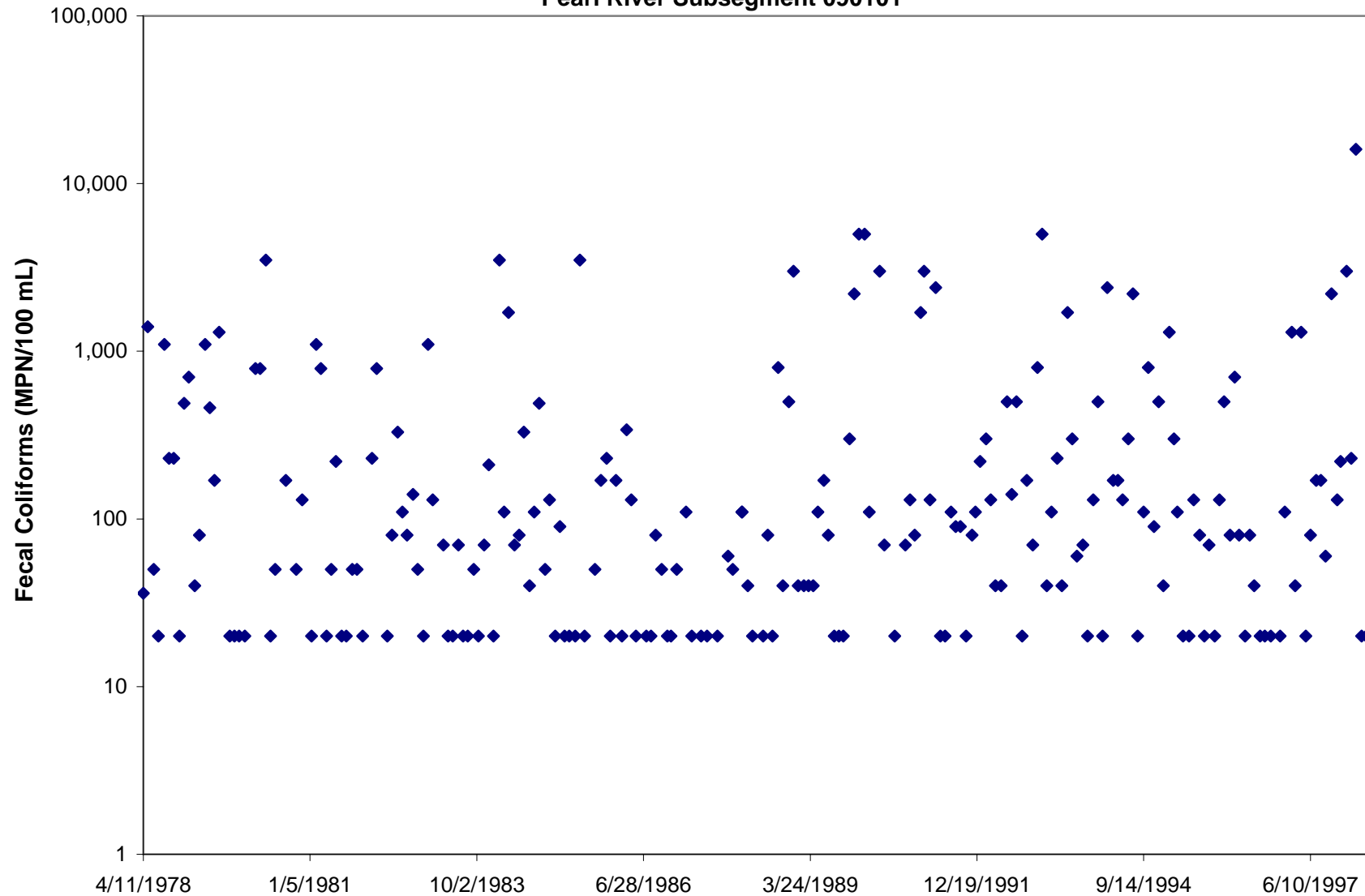


Figure C.2. Observed long term fecal coliforms for Pearl River at Pools Bluff, LA (LDEQ 0062)
Pearl River Subsegment 090101

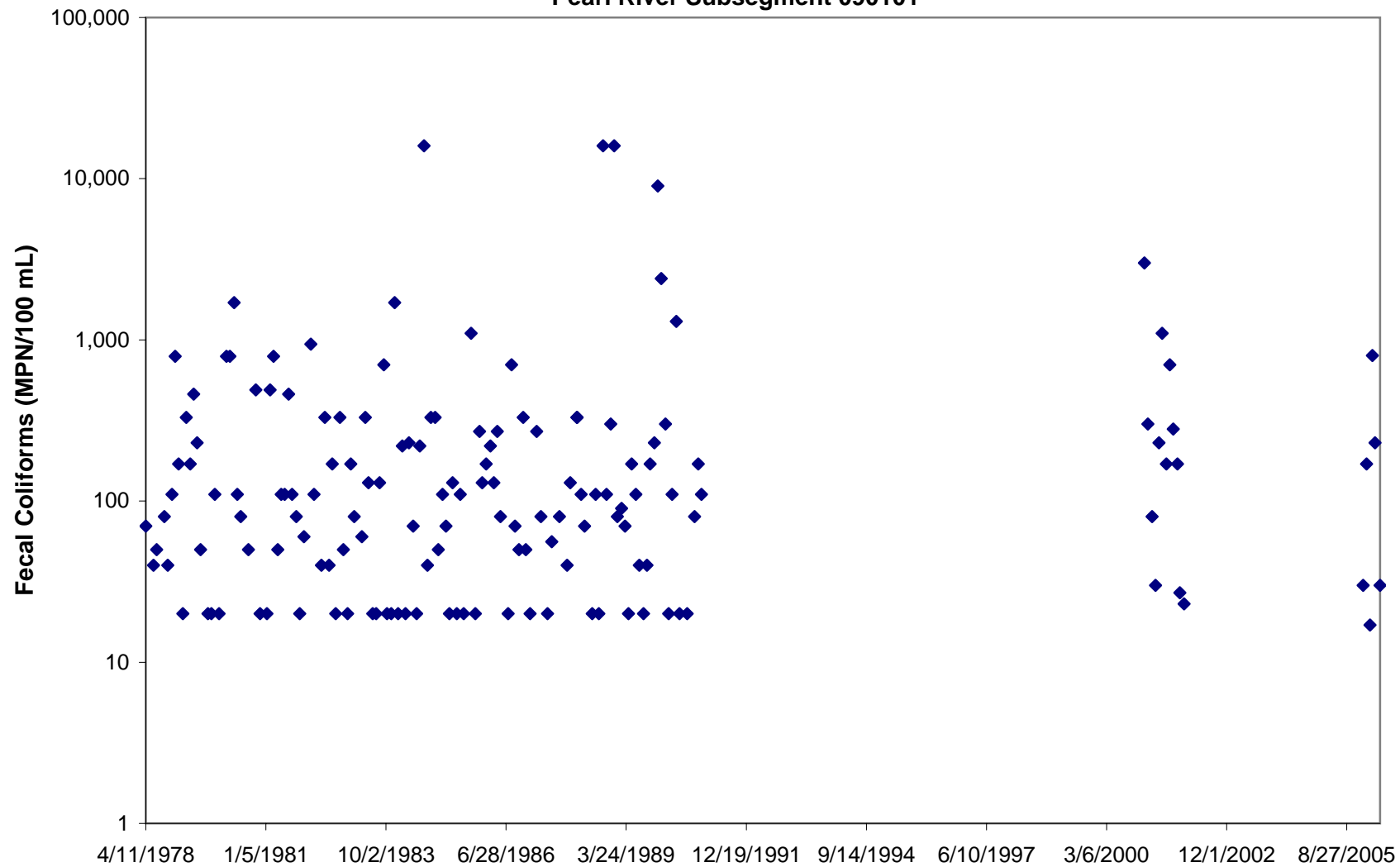


Figure C.3. Observed long term fecal coliforms for Peters Creek at Highway 21 (LDEQ 1117)
Peters Creek Subsegment 090104

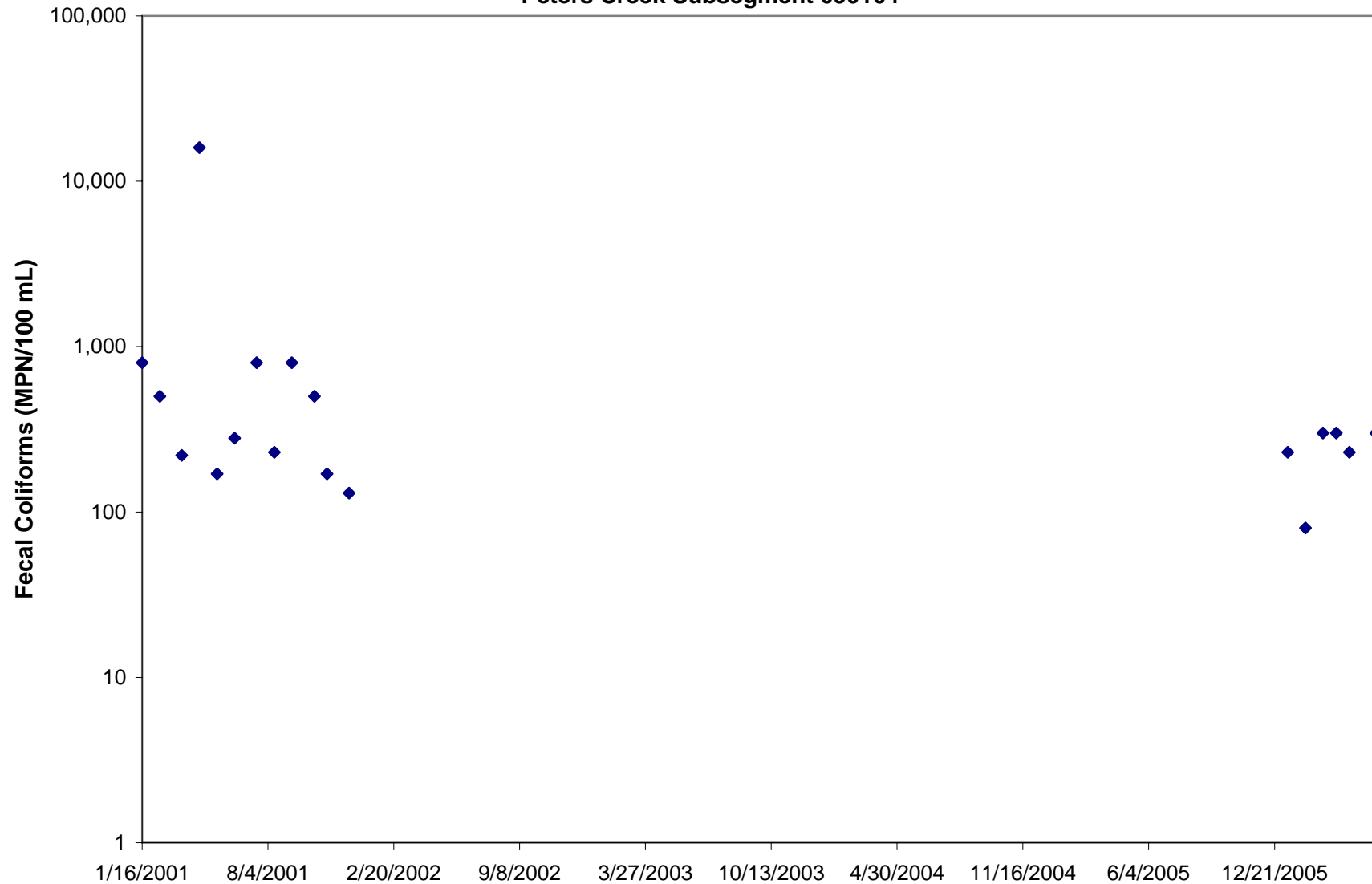
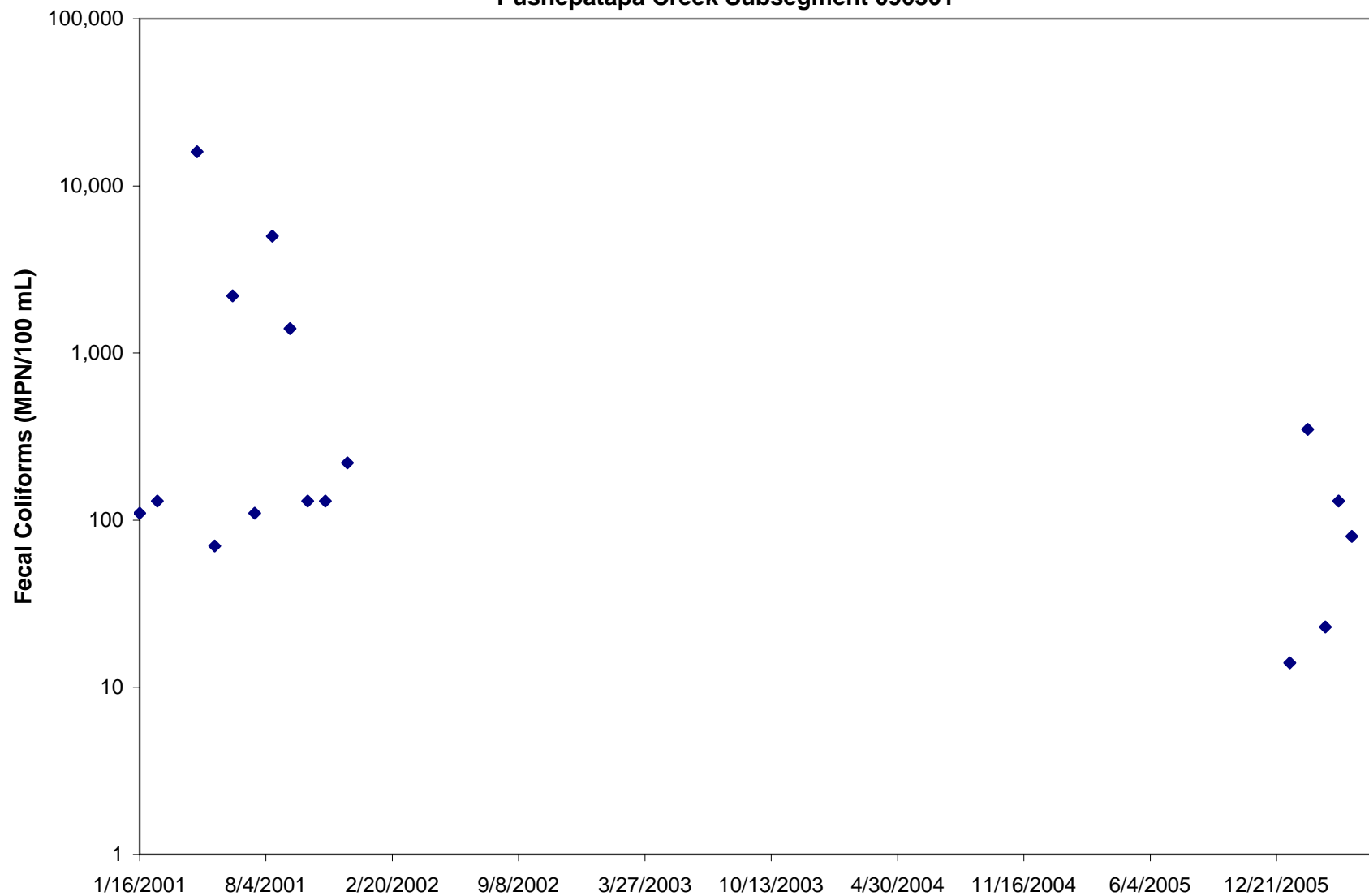


Figure C.4 Observed long term fecal coliforms for Pushepatapa Creek at Highway 436 (LDEQ 1119)
Pushepatapa Creek Subsegment 090301



Bogue Lusa Creek Subsegment 090401

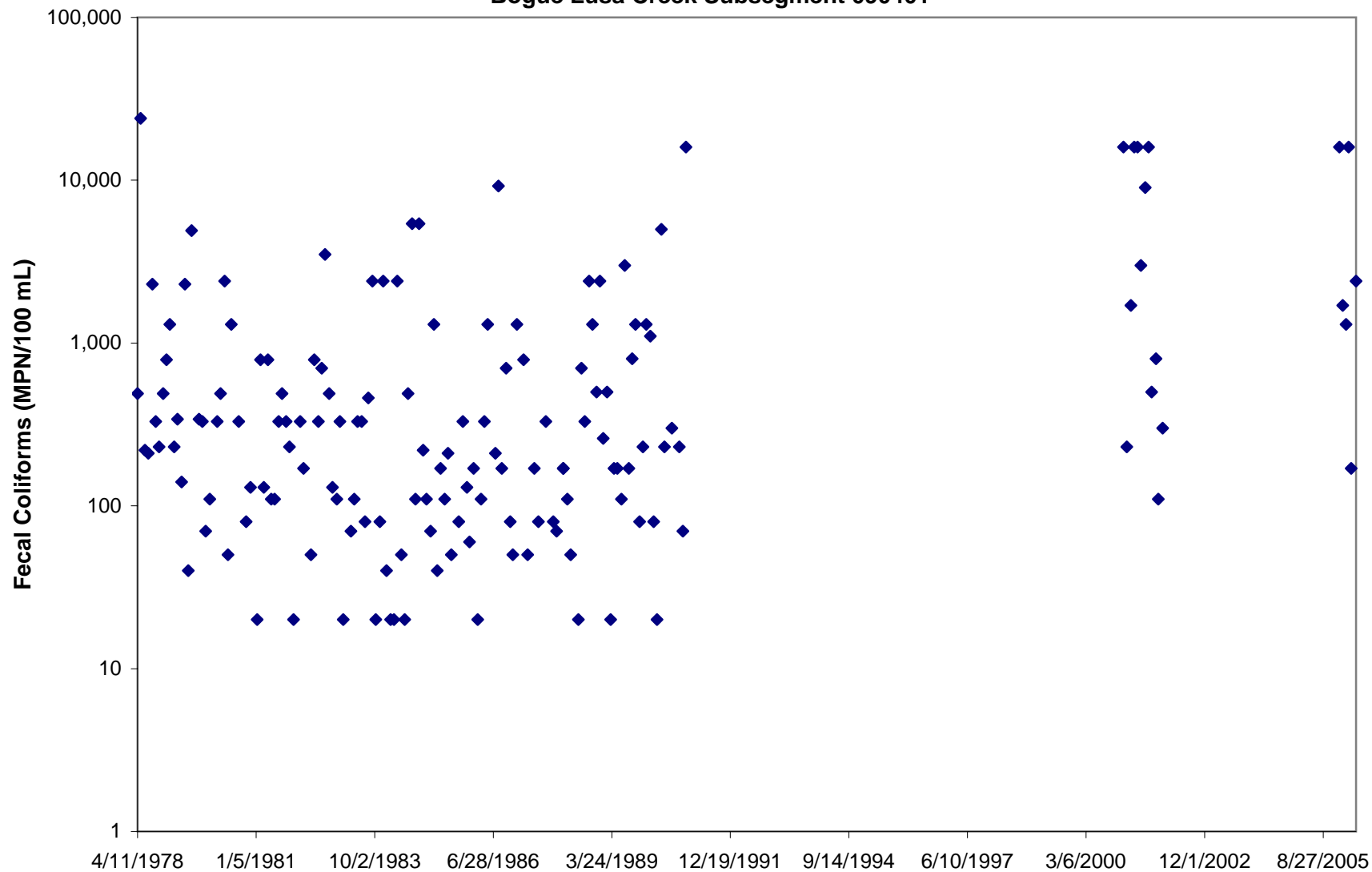


Figure C.6 Observed long term fecal coliforms for Big Silver Creek at Highway 38 (LDEQ 1058)
Big Silver Creek Subsegment 090502

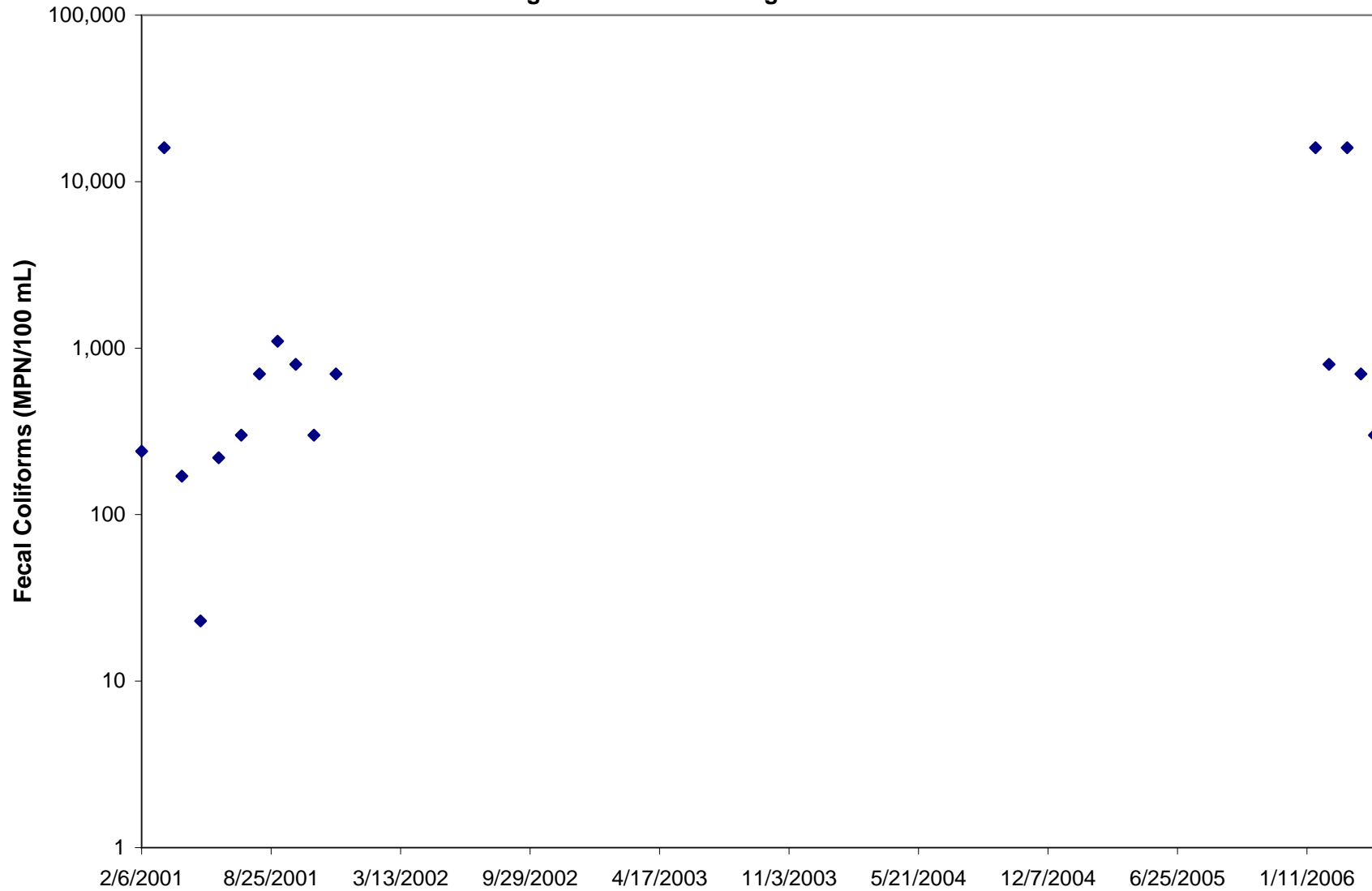


Figure C.7 Observed long term fecal coliforms for Bonner Creek at Highway 25 (LDEQ 1060)
Bonner Creek Subsegment 090505

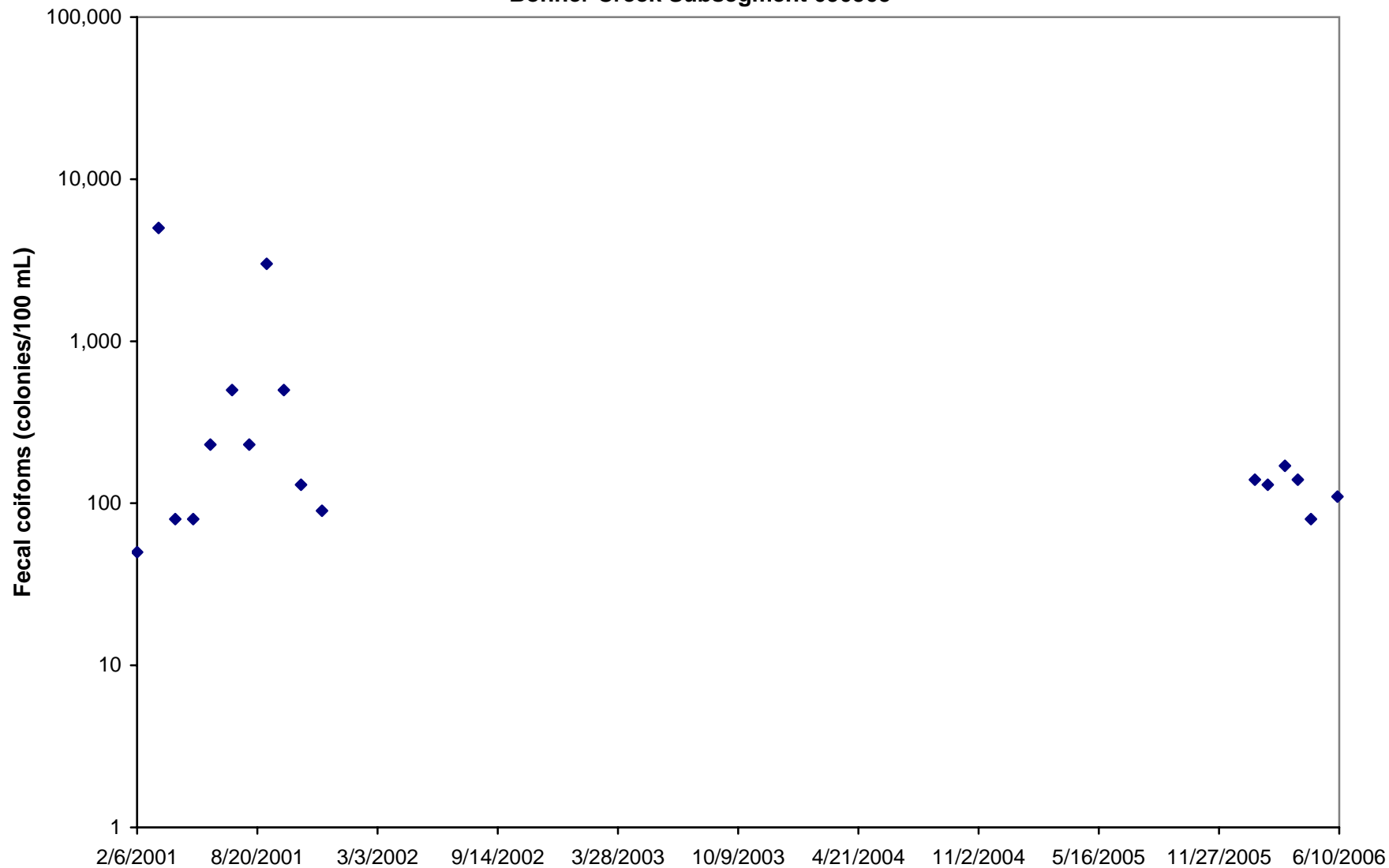


Figure C.8 Observed long term fecal coliforms for Thigpen Creek at Mill Creak Road (LDEQ 1056)
Thigpen Creek Subsegment 090506

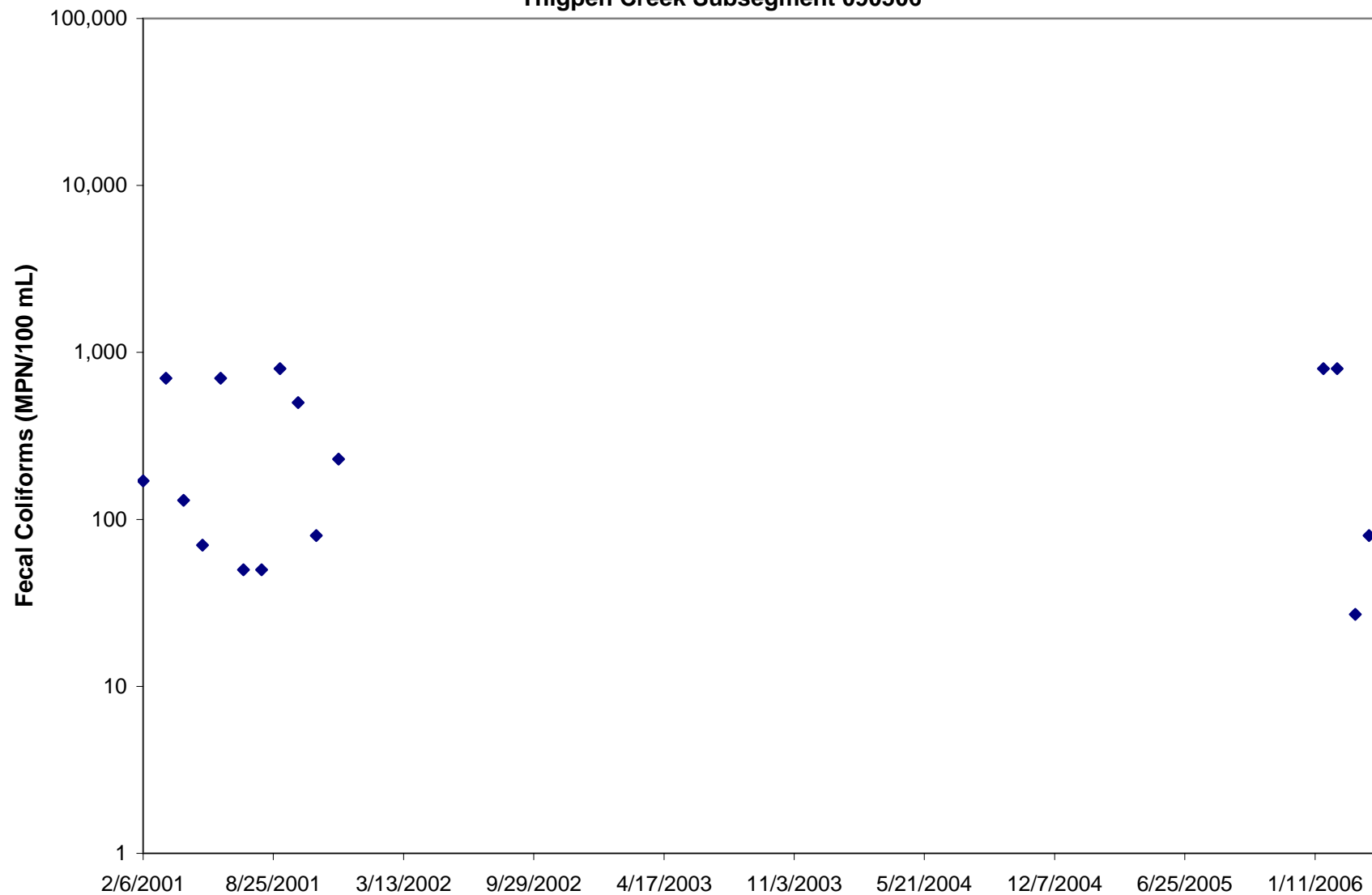


Figure C.9 Seasonal observed fecal coliforms for Pearl River east of Bogalusa (LDEQ 0012)
Pearl River Subsegment 090101

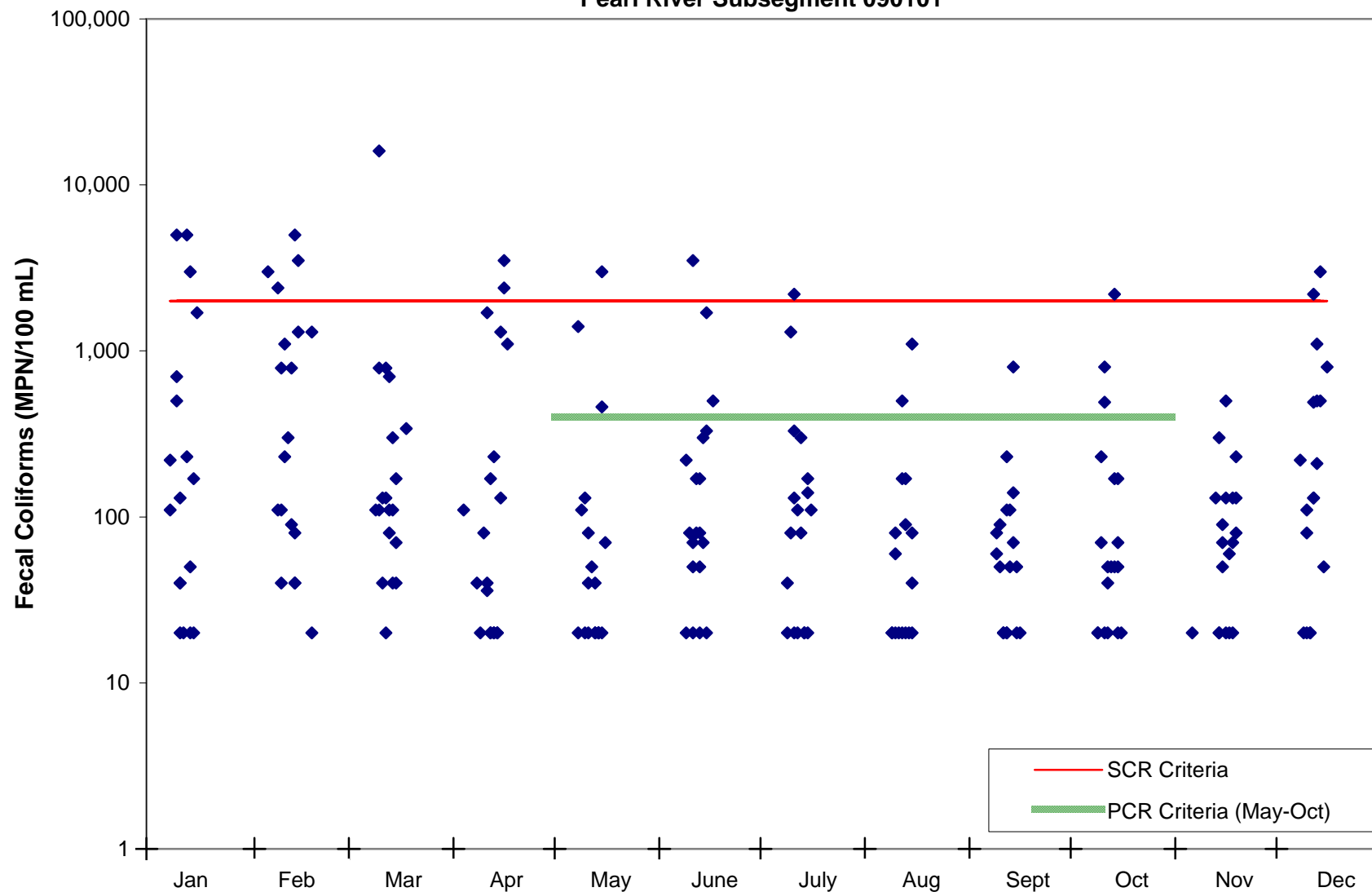


Figure C.10 Seasonal observed fecal coliforms for Pearl River at Pools Bluff (LDEQ 0062)
Pearl River Subsegment 090101

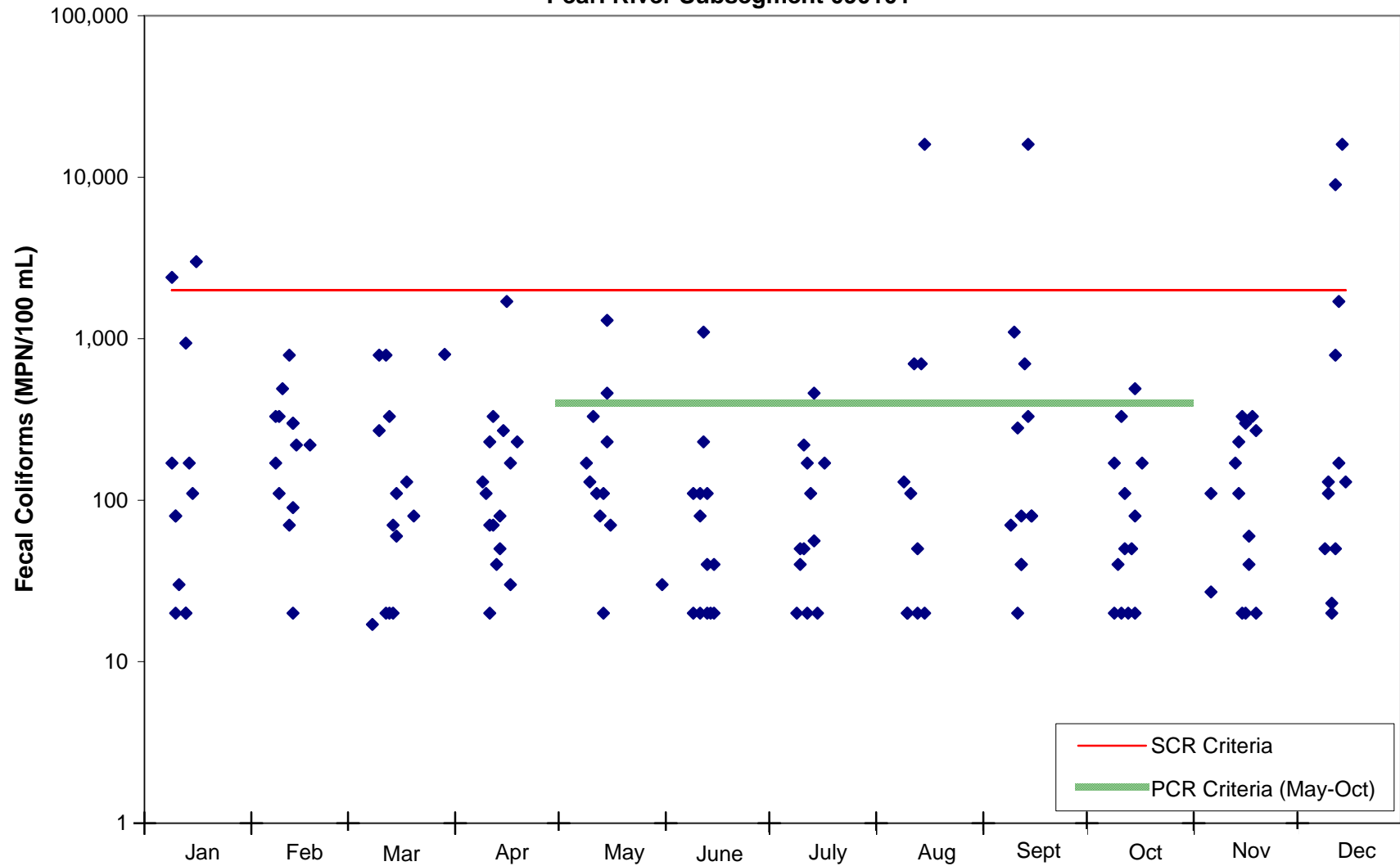


Figure C.11 Seasonal observed fecal coliforms for Peters Creek at Highway 21 (LDEQ 1117)
Peters Creek Subsegment 090104

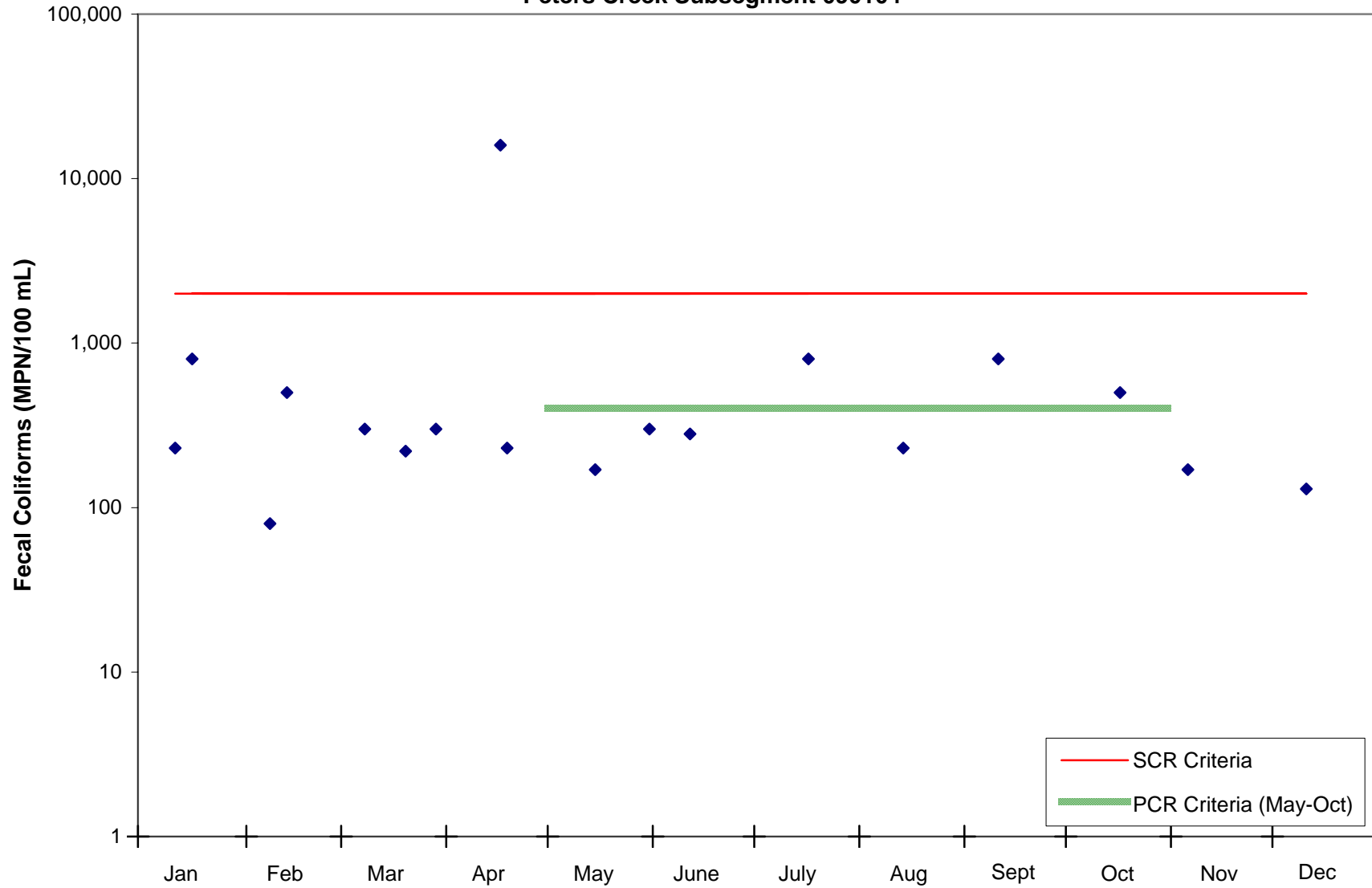


Figure C.12 Seasonal observed fecal coliforms for Pushepatapa Creek at Highway 436 (LDEQ 1119)
Pushepatapa Creek Subsegment 090301

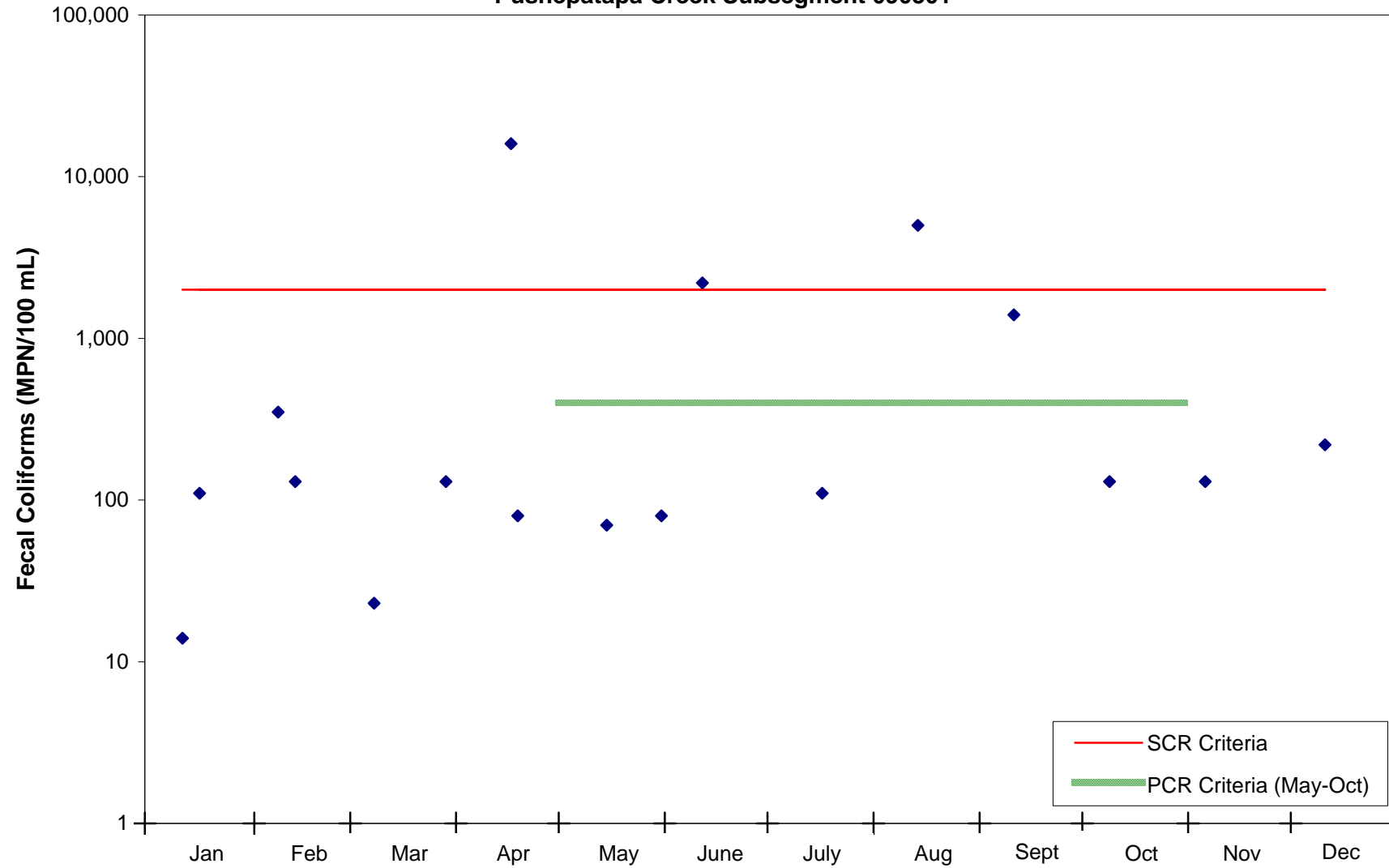


Figure C.13 Seasonal observed fecal coliforms for Bogue Lusa Creek at Bogalusa (LDEQ 0063)
Bogue Lusa Creek Subsegment 090401

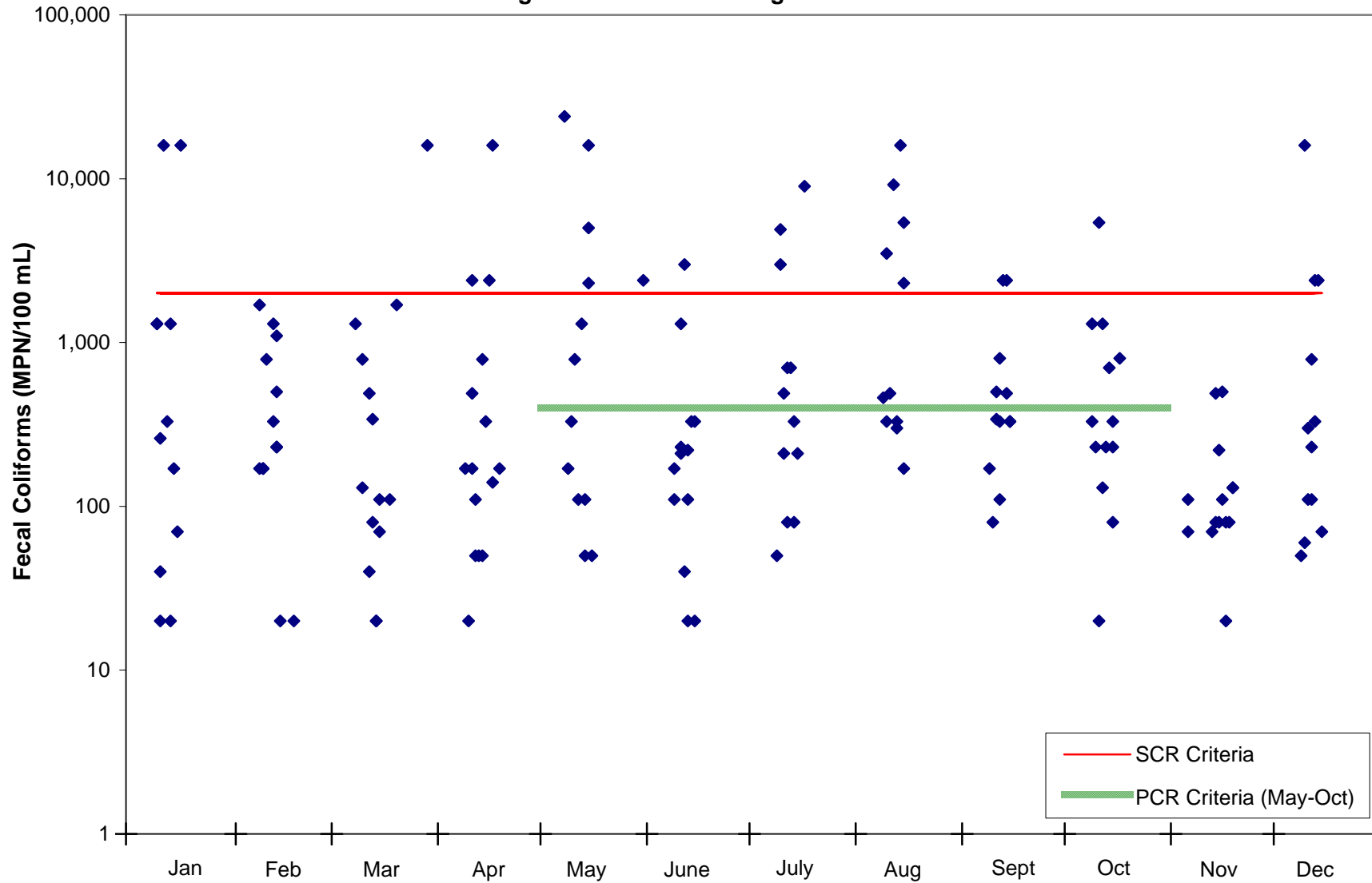


Figure C.14 Seasonal observed fecal coliforms for Big Silver Creek at Highway 38 (LDEQ 1058)
Big Silver Creek Subsegment 090502

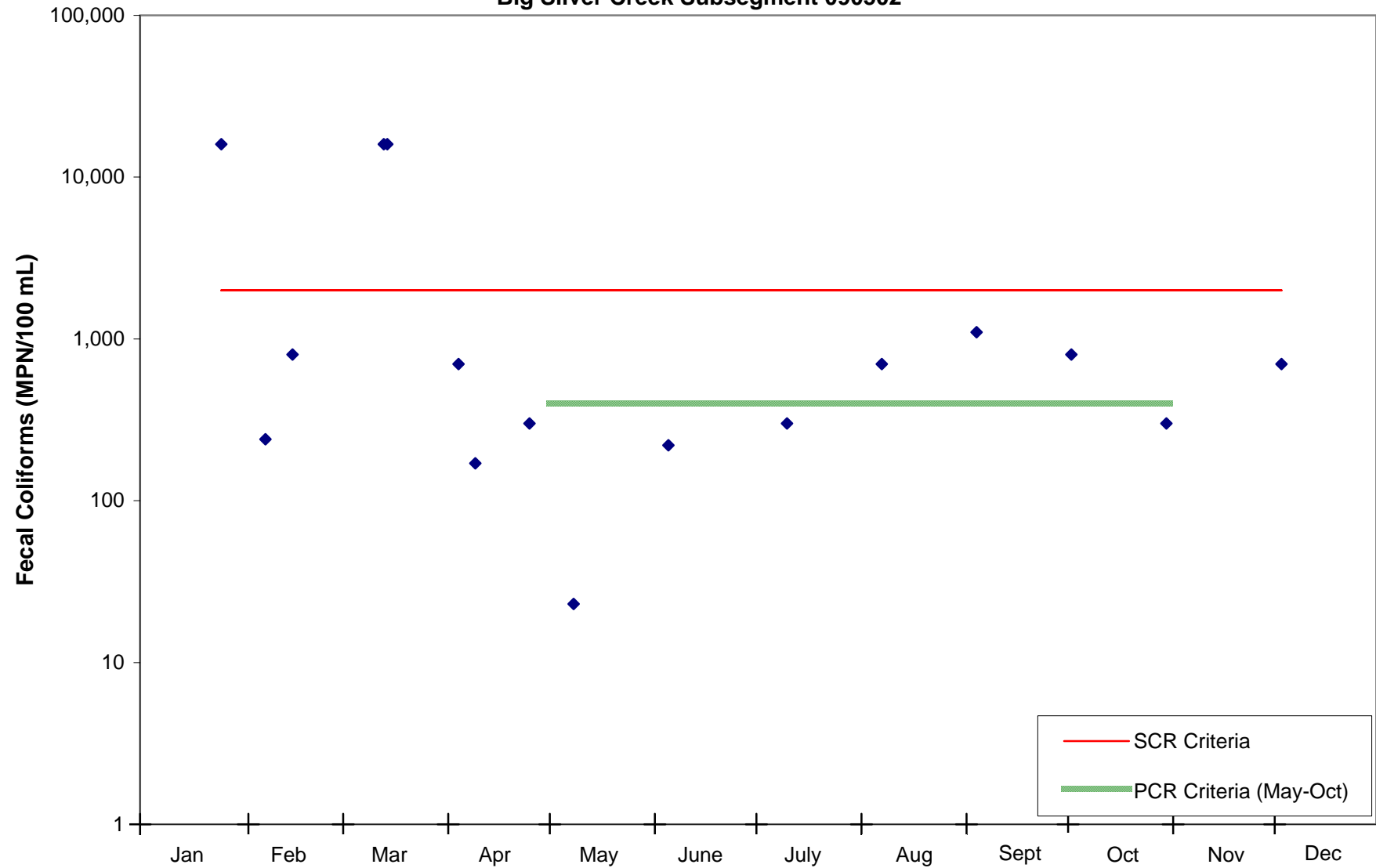


Figure C.15 Seasonal observed fecal coliforms for Bonner Creek at Highway 25 (LDEQ 1060)
Bonner Creek Subsegment 090505

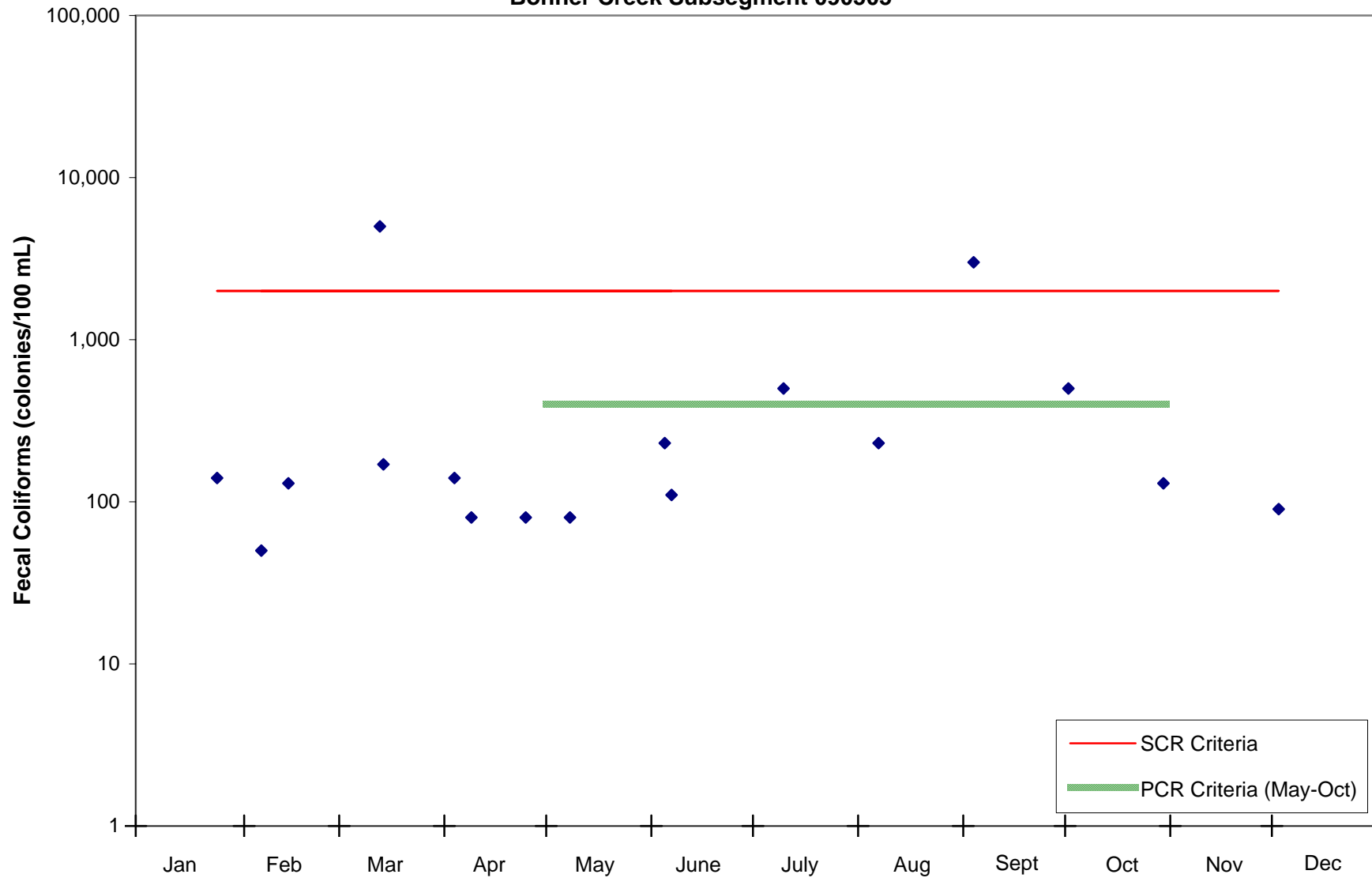


Figure C.16 Seasonal observed fecal coliforms for Thigpen Creek at Mill Creek Road (LDEQ 1056)
Thigpen Creek Subsegment 090506

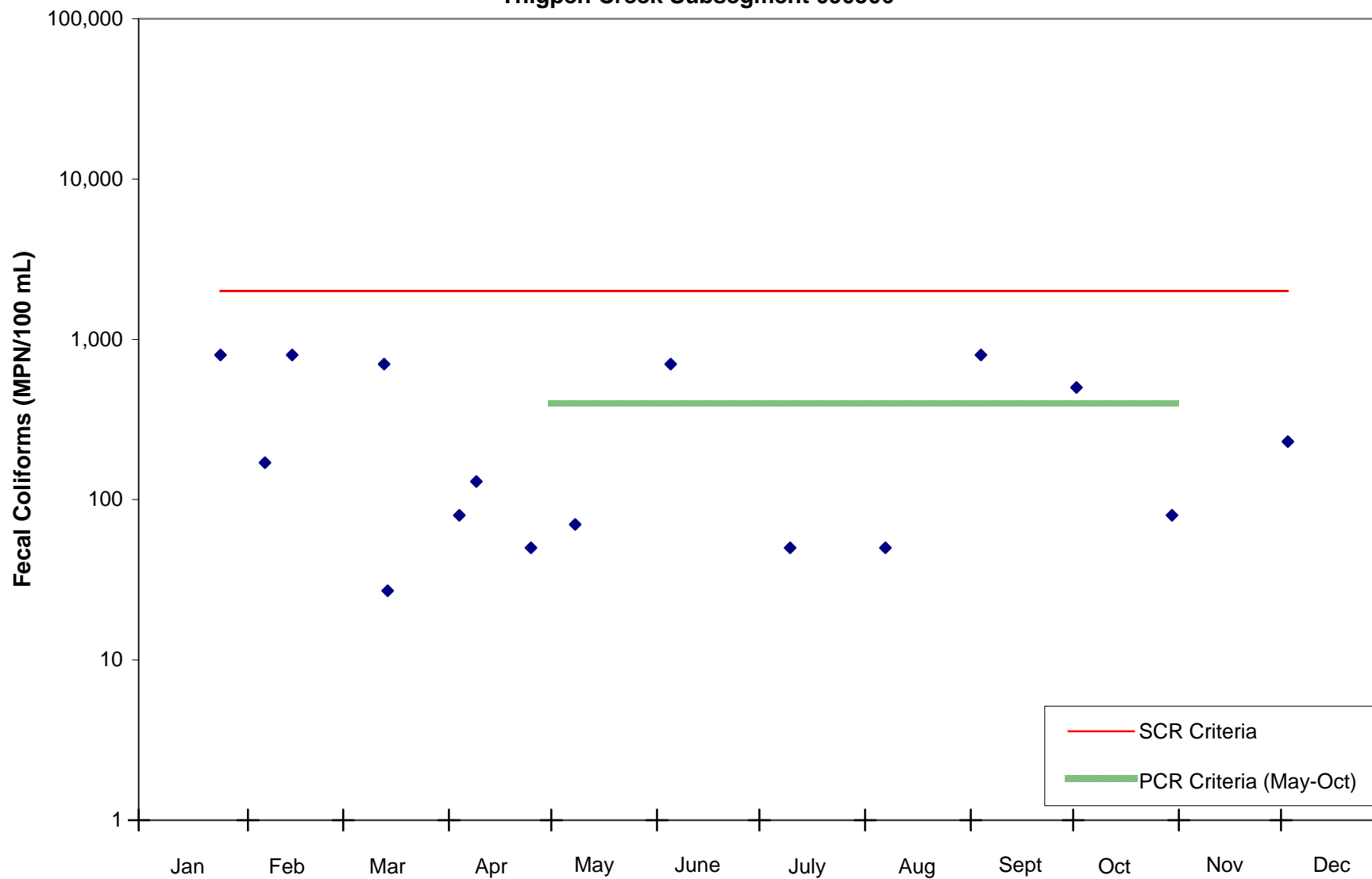


Figure C.17 Fecal coliforms versus flow for Pearl River east of Bogalusa (LDEQ 0012)
Pearl River Subsegment 090101

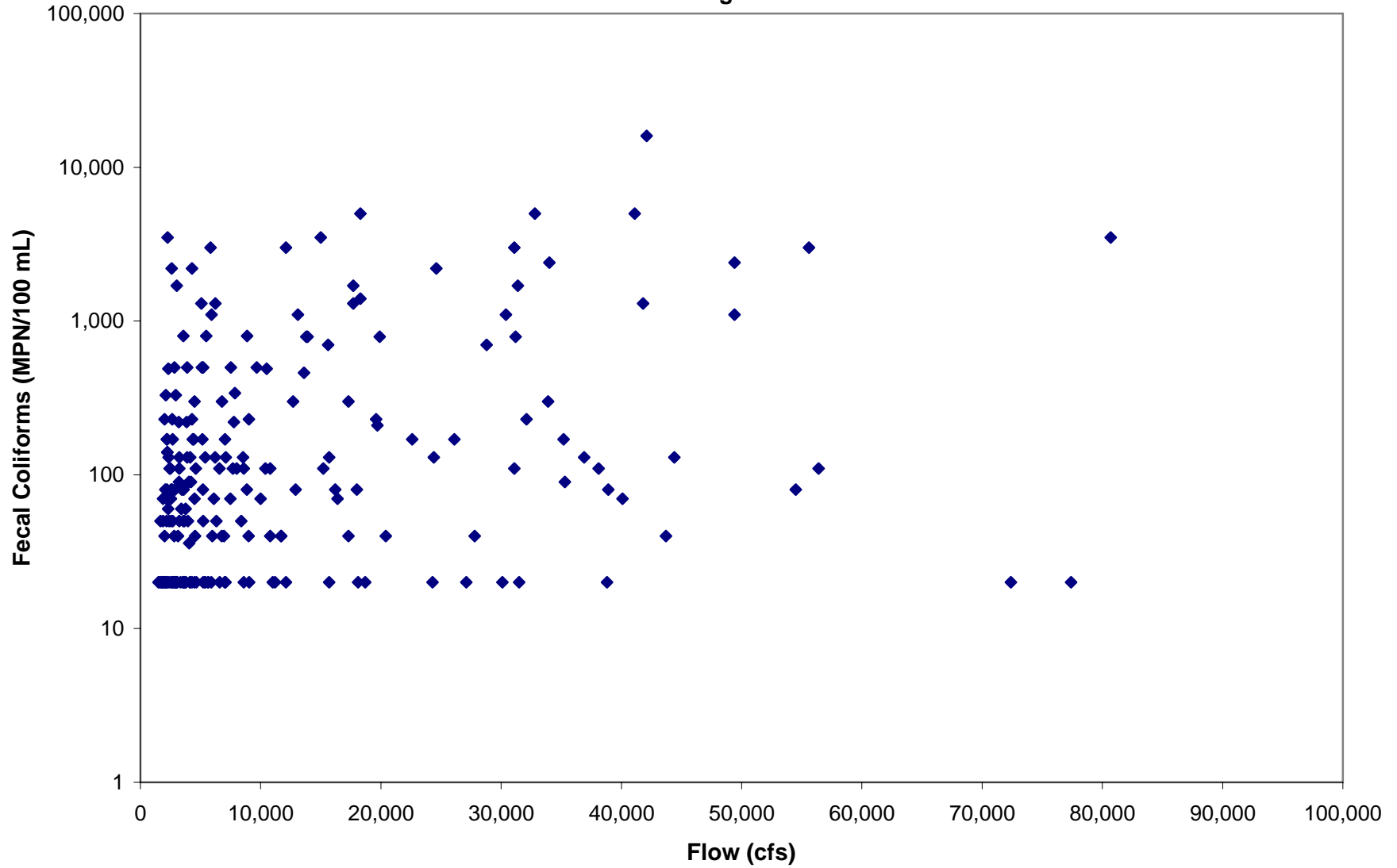


Figure C.18 Fecal coliforms versus flow for Pearl River at Pools Bluff (LDEQ 0062)
Pearl River Subsegment 090101

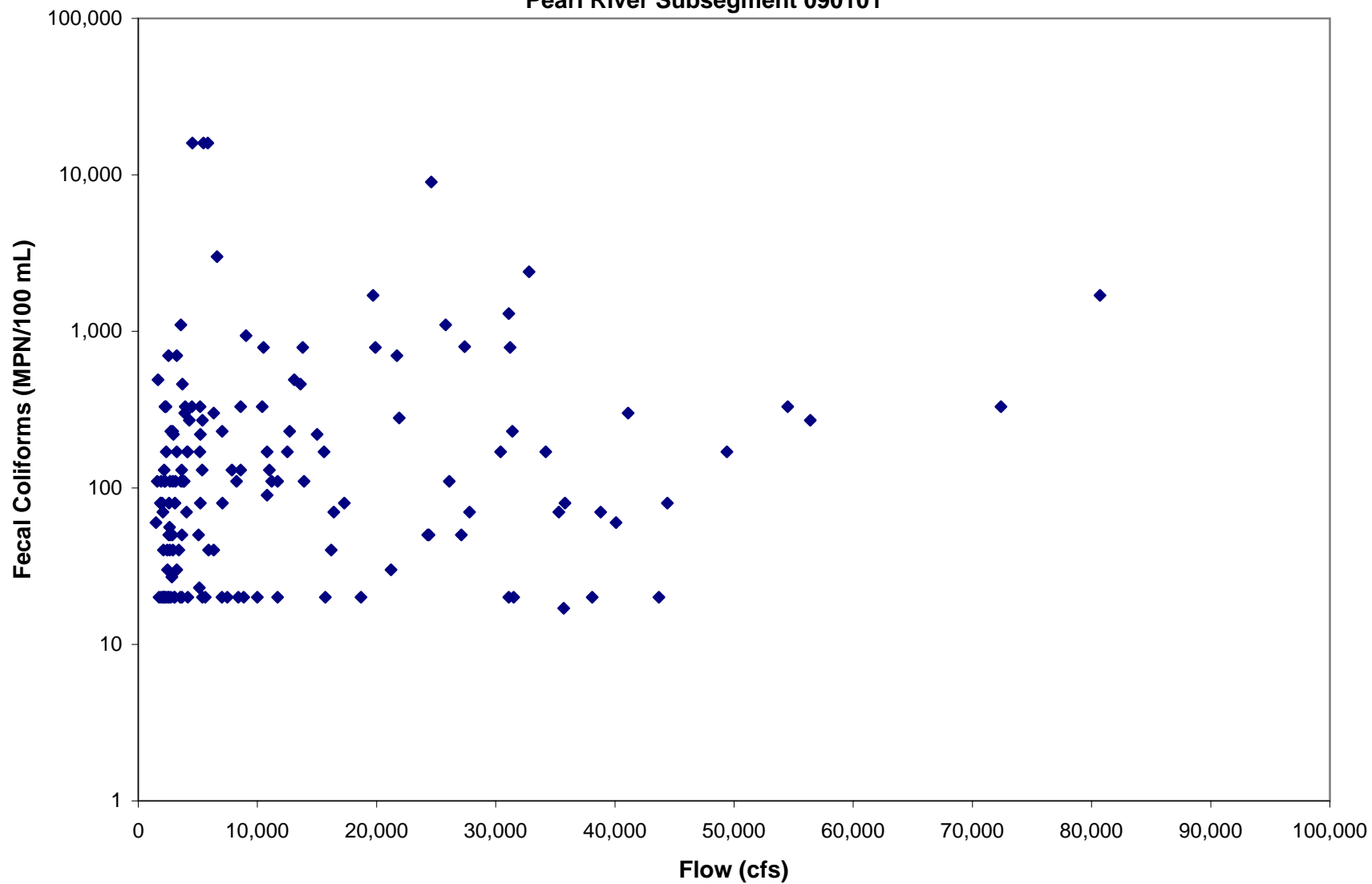


Figure C.19 Fecal Coliform versus Flow for Peters Creek at Highway 21 (LDEQ 1117)
Peters Creek Subsegment 090104

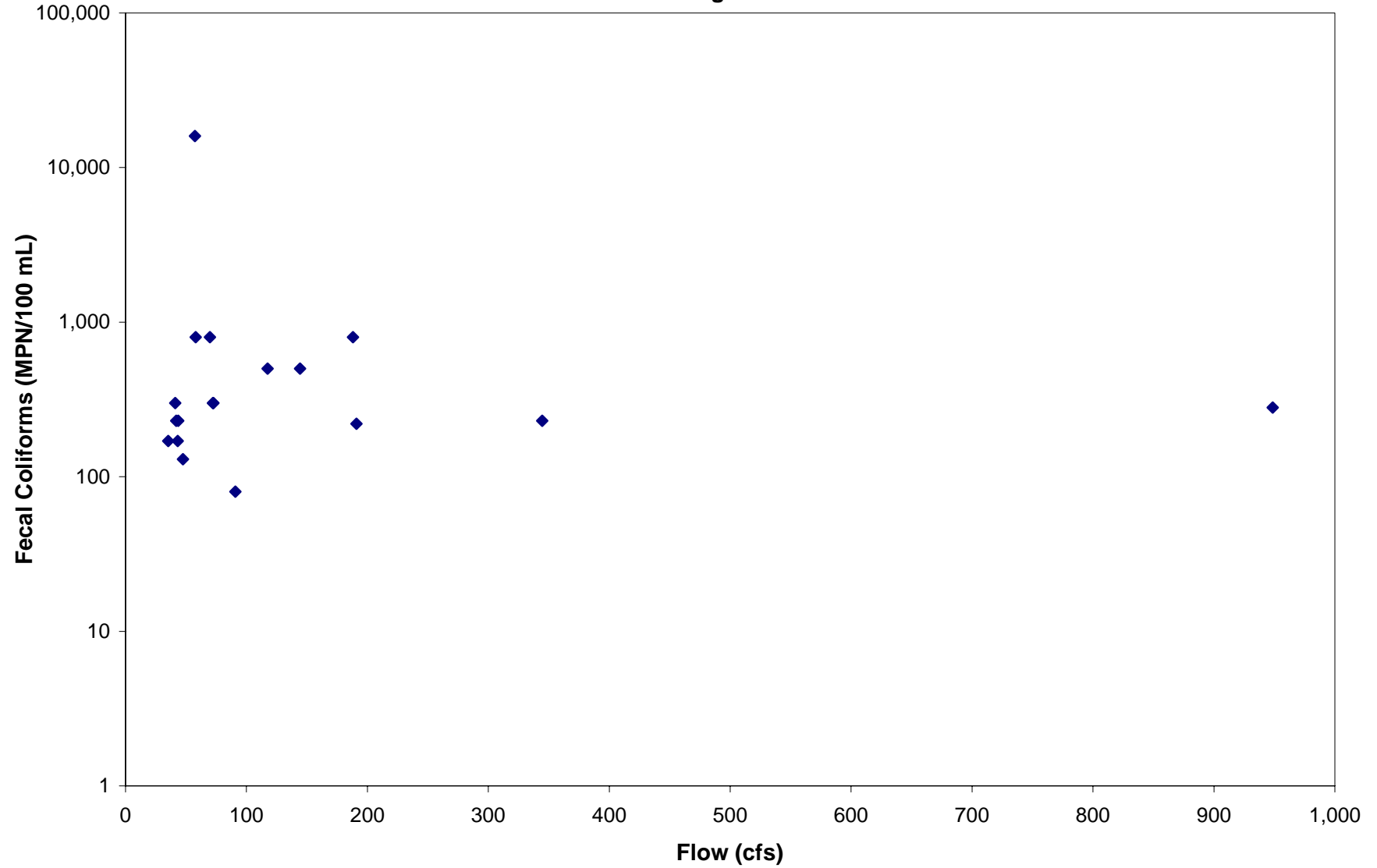


Figure C.20 Fecal Coliform versus Flow for Pushepatapa Creek at Highway 436 (LDEQ 1119)
Pushepatapa Creek Subsegment 090301

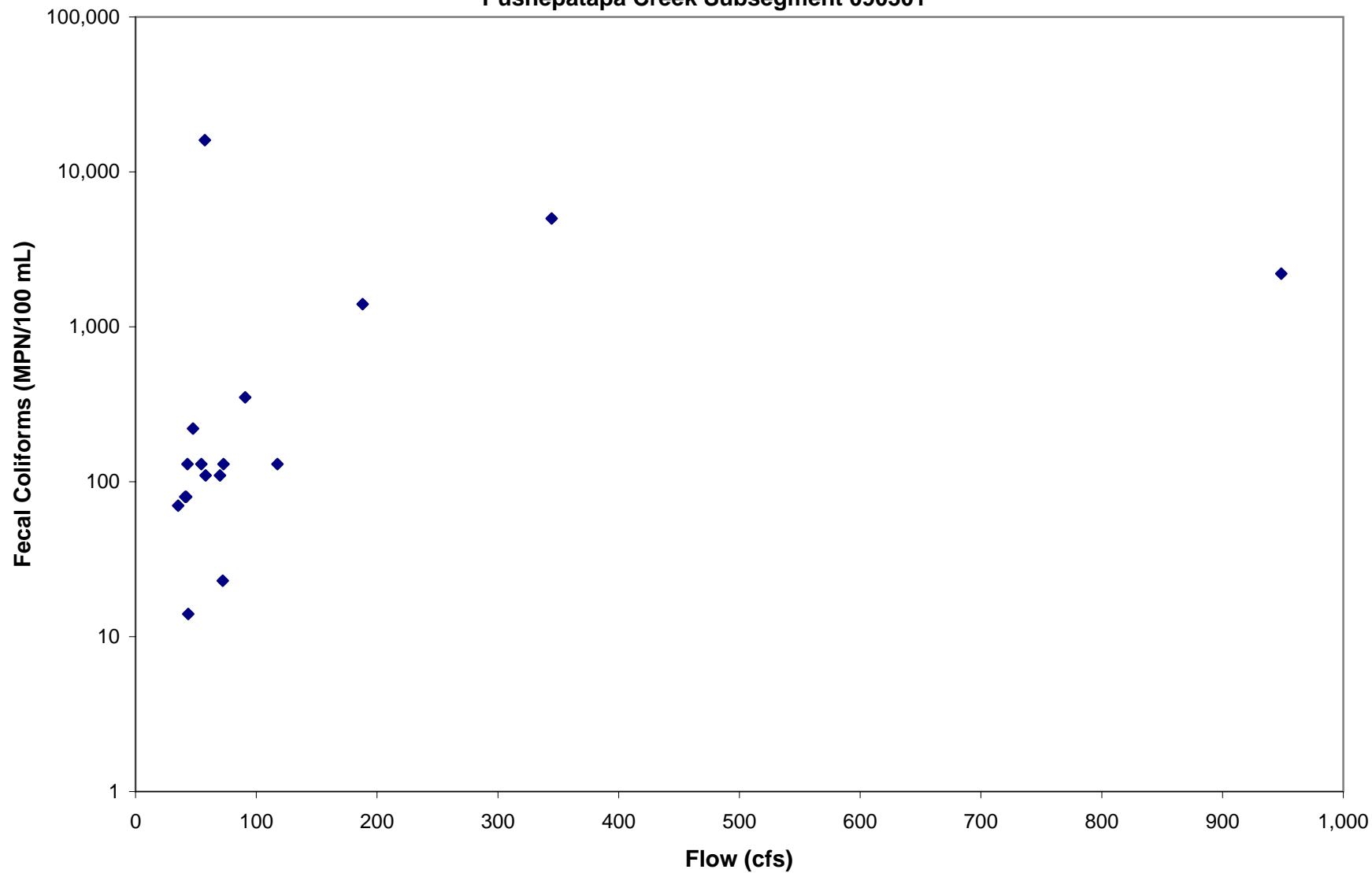


Figure C.21 Fecal Coliform versus Flow for Bogue Lusa Creek at Bogalusa (LDEQ 0063)
Bogue Lusa Creek Subsegment 090401

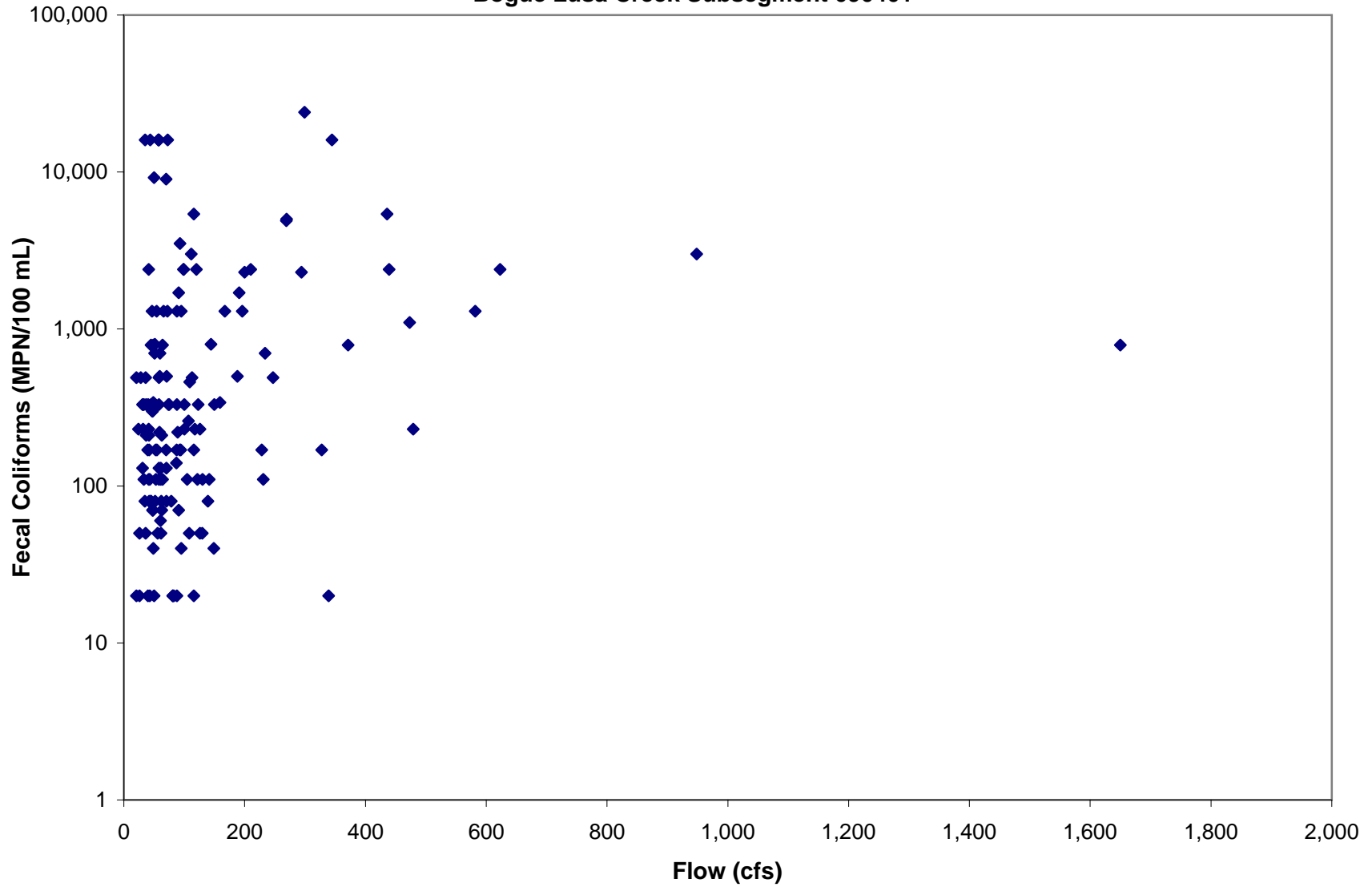


Figure C.22 Fecal coliform versus Flow for Big Silver Creek at Highway 38 (LDEQ 1058)
Big Silver Creek Subsegment 090502

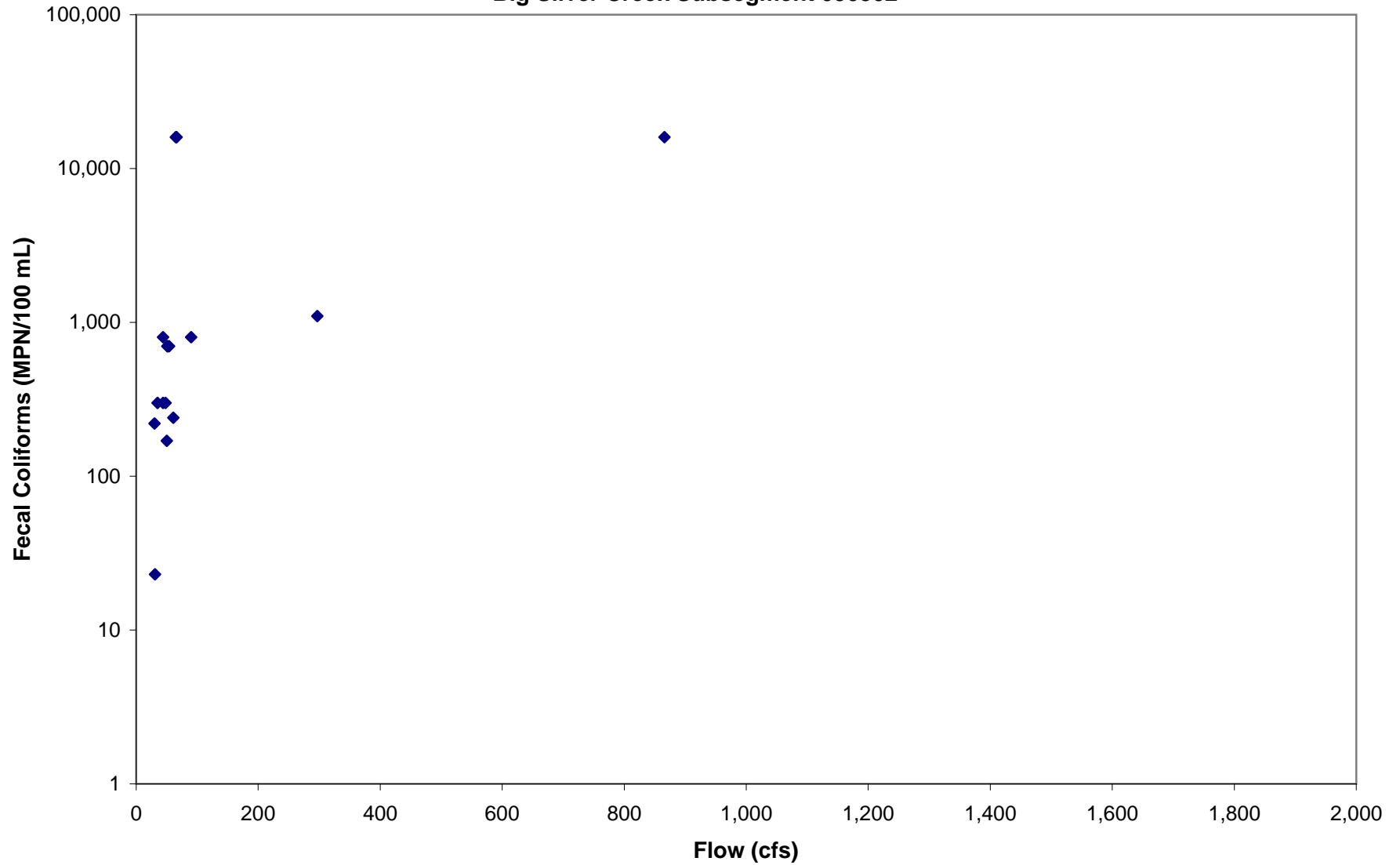


Figure C.23 Fecal Coliform versus Flow for Bonner Creek at Highway 25 (LDEQ 1060)
Bonner Creek Subsegment 090505

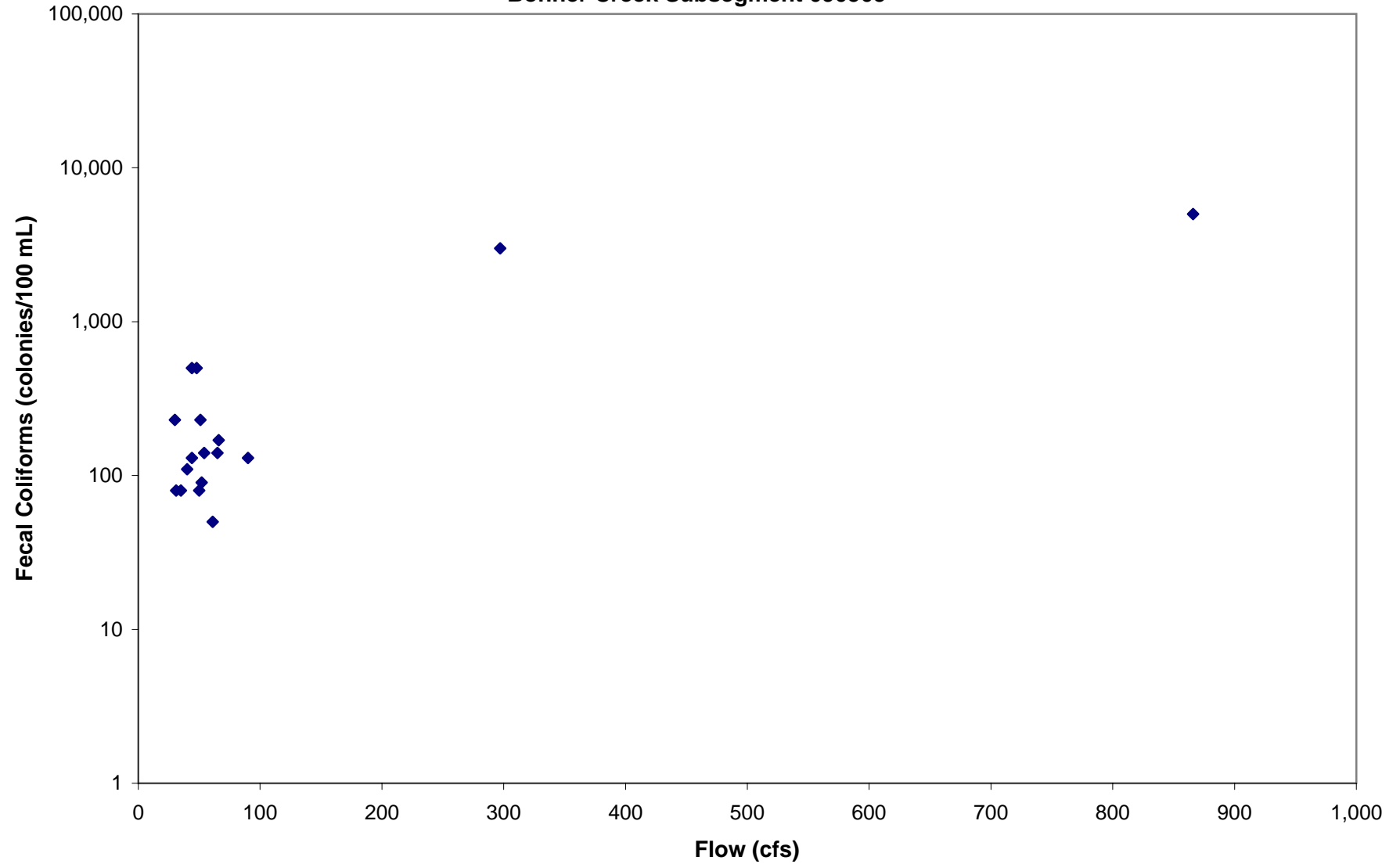
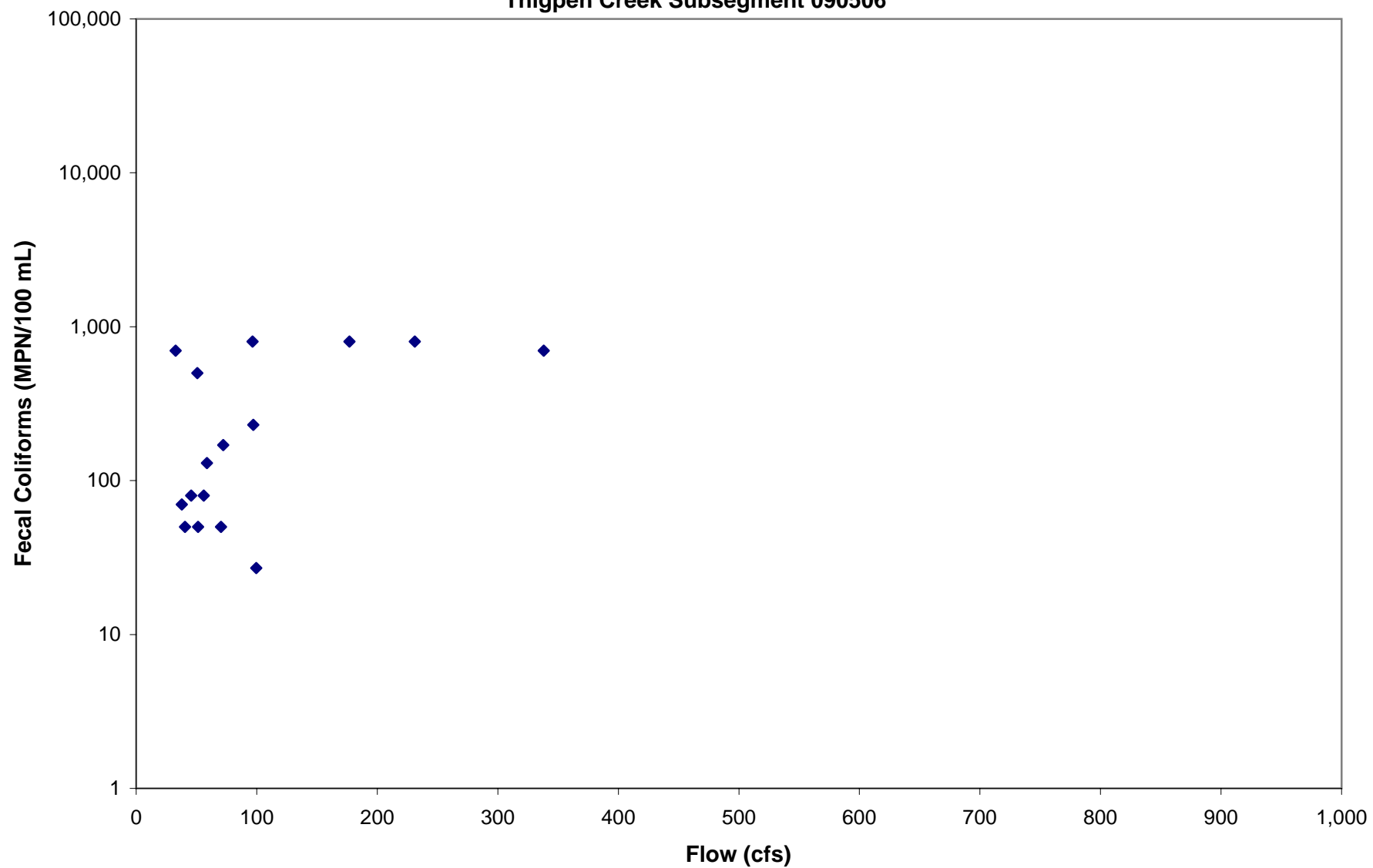


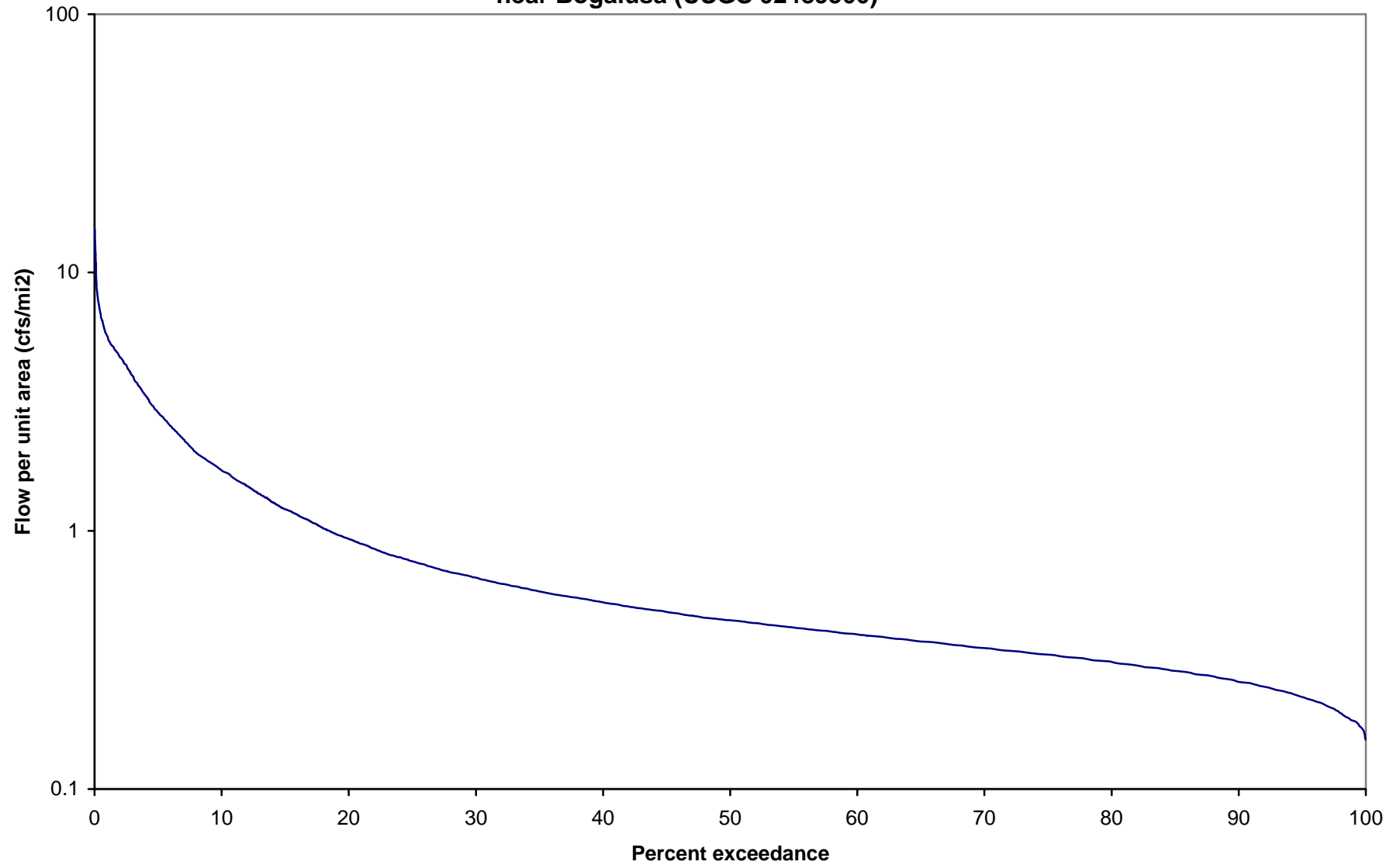
Figure C.24 Fecal Coliform versus Flow for Thigpen Creek at Mill Creek Road (LDEQ 1056)
Thigpen Creek Subsegment 090506



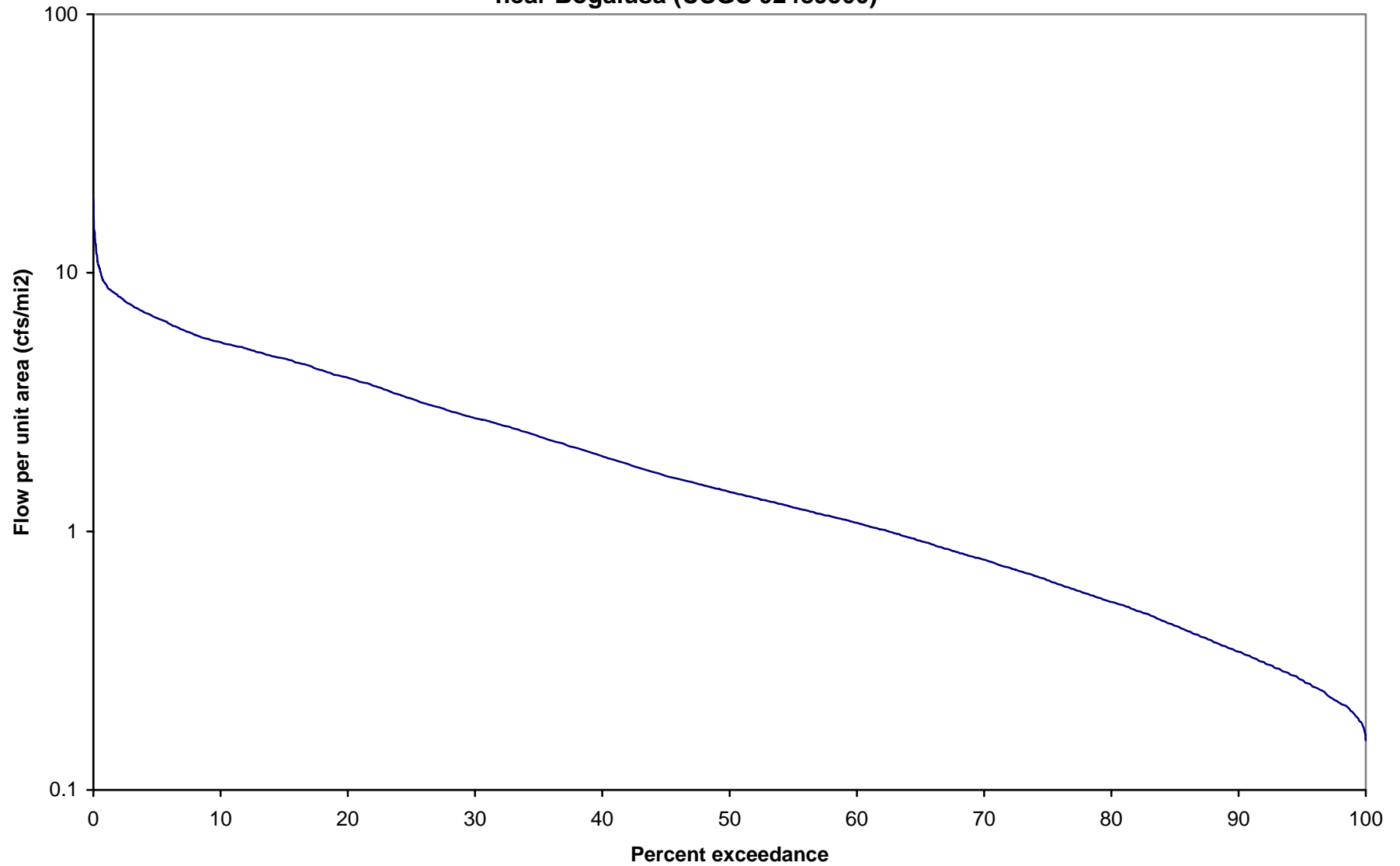
APPENDIX D

Flow Duration Calculations and Plots

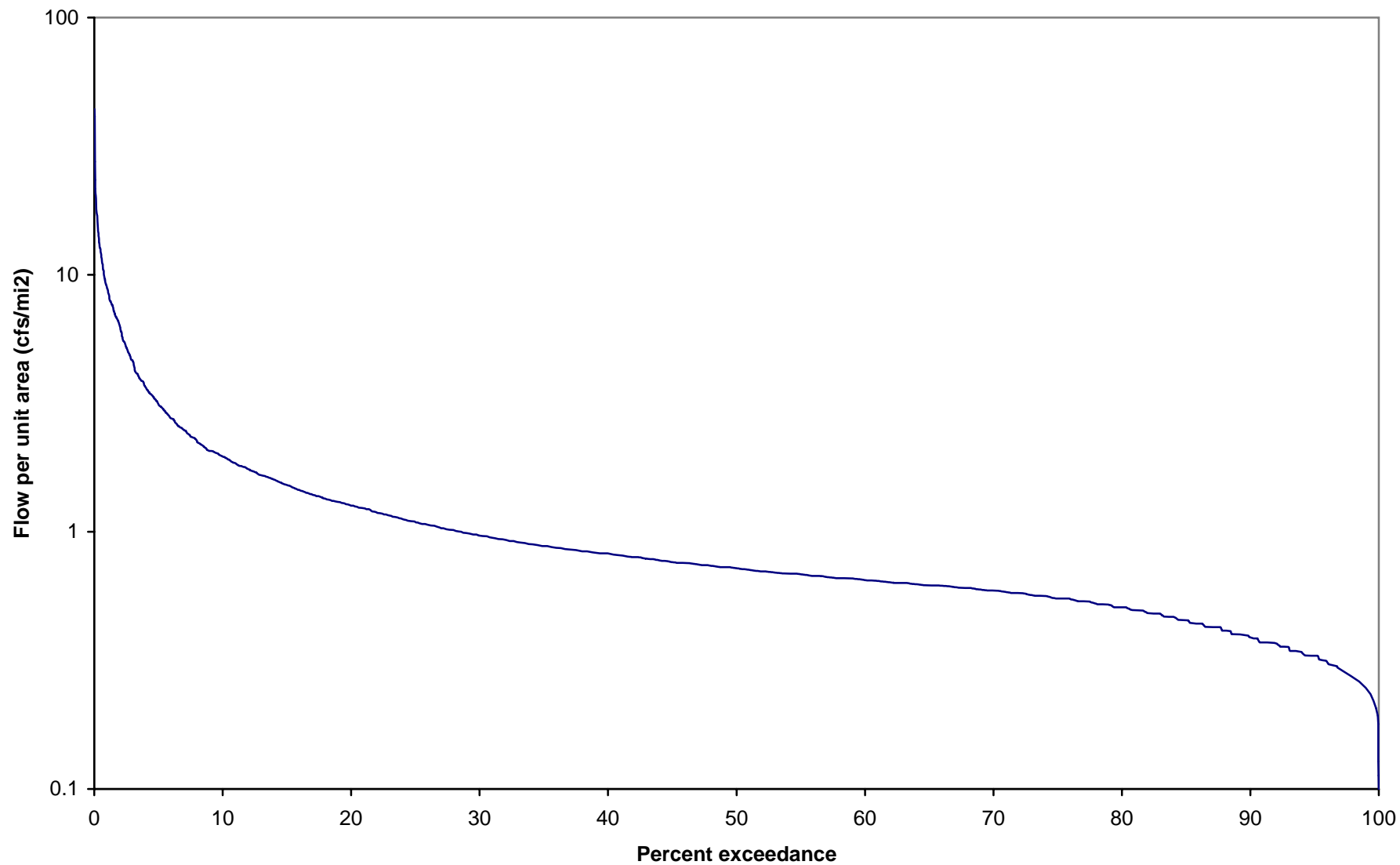
**Figure D.1 Summer flow duration curve for Pearl River (090101)
near Bogalusa (USGS 02489500)**



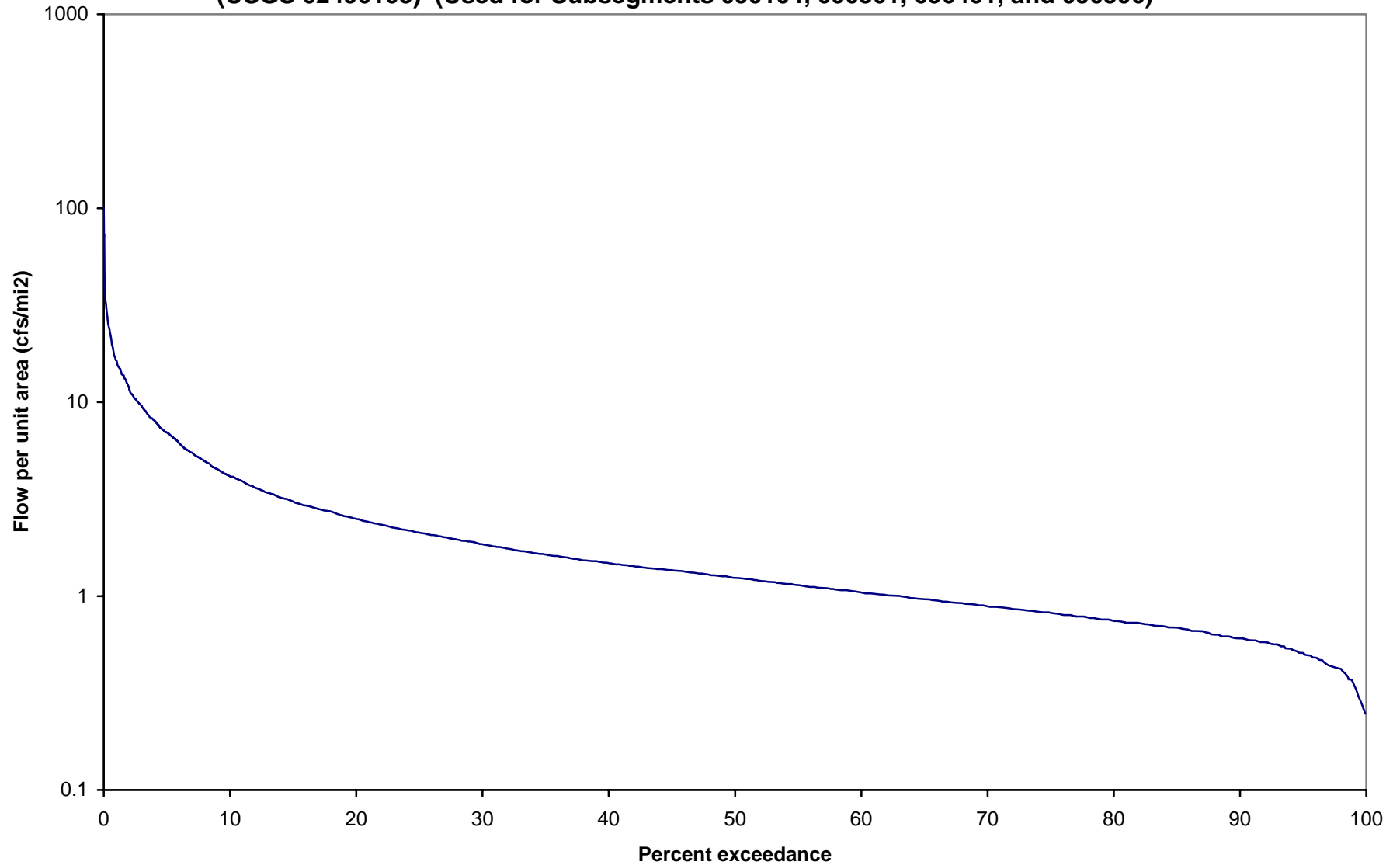
**Figure D.2 Winter flow duration curve for Pearl River (090101)
near Bogalusa (USGS 02489500)**



**Figure D.3 Summer flow duration curve for Bogue Lusa Creek at Bogalusa (090401)
(USGS 02490105) (Used for Subsegments 090104, 090301, 090401, and 090506)**



**Figure D.4 Winter flow duration curve for Bogue Lusa Creek at Bogalusa (090401)
(USGS 02490105) (Used for Subsegments 090104, 090301, 090401, and 090506)**



**Figure D.5 Summer flow duration curve for Tchefuncta River near Folsom
(USGS 07375000) (Used for Subsegments 090502 and 090505)**

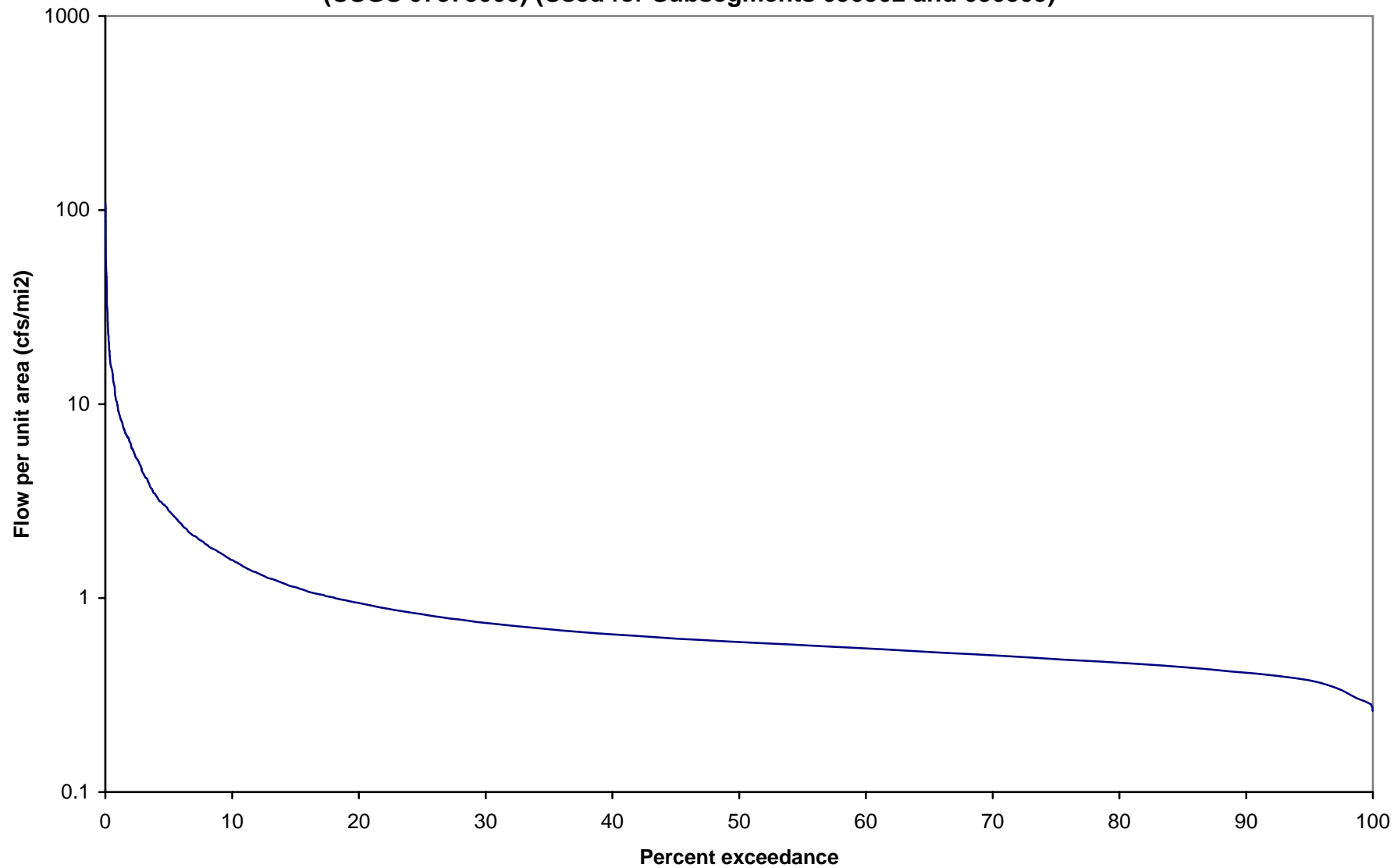
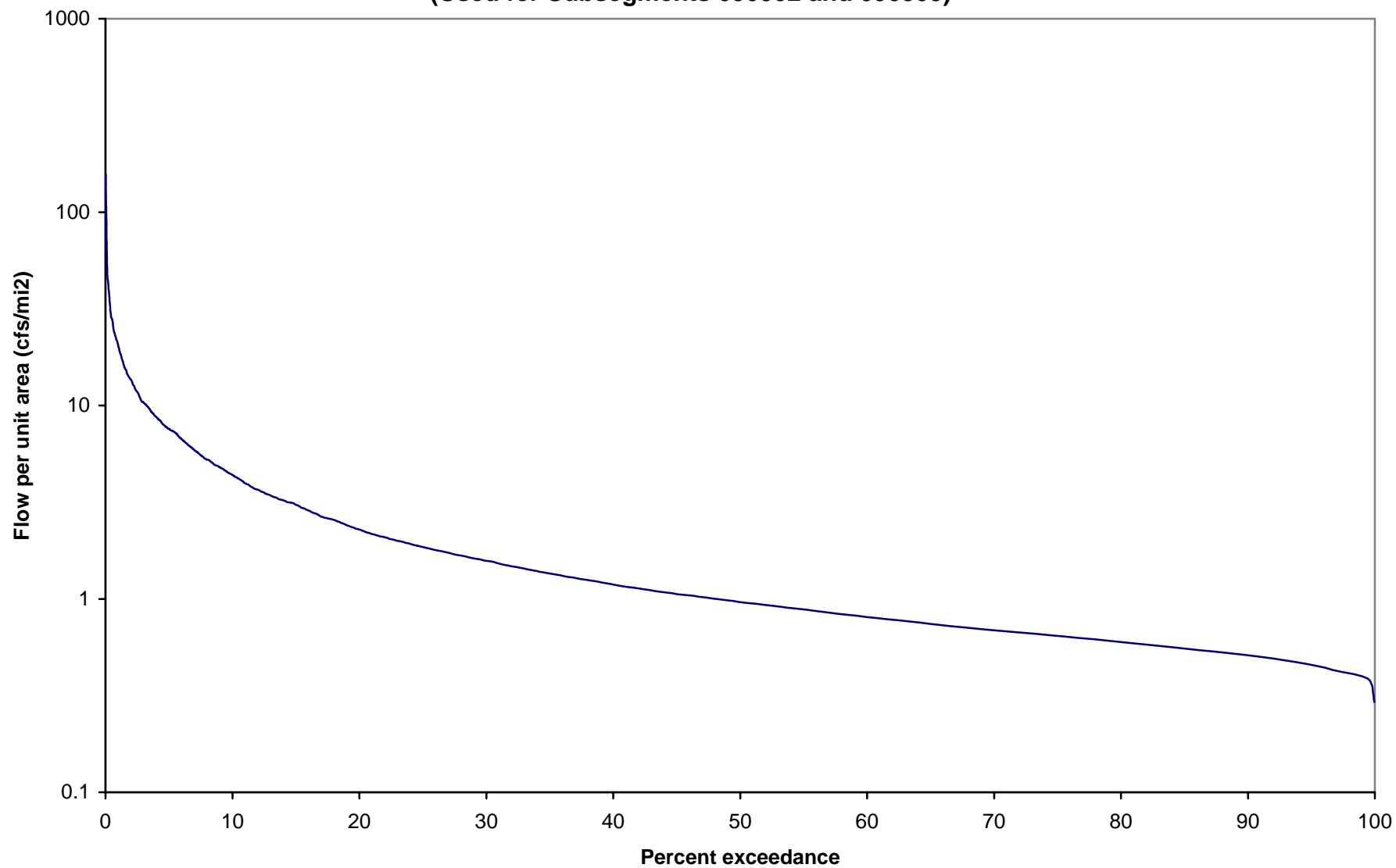


Figure D.6 Winter flow duration curve for Tchefuncta River near Folsom (USGS 07375000)
(Used for Subsegments 090502 and 090505)



APPENDIX E

TMDL Calculations for Subsegment 090101-Pearl River

TABLE E.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR PEARL RIVER
NEAR BOGALUSA (USED FOR SUBSEGMENT 090101)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)

Drainage area at flow gage = 6573 mi²

Target load = 8.02E+11 colonies/day/mi²

Pearl River near Bogalusa, LA (02489500)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
Flow, (cfs)						
1,020	0.155	99.99%	0.026	1.52E+09	1.21E+09	3.97E+07
1,040	0.158	99.95%	0.036	1.55E+09	1.24E+09	5.61E+07
1,070	0.163	99.92%	0.030	1.59E+09	1.27E+09	4.81E+07
1,080	0.164	99.89%	0.028	1.61E+09	1.29E+09	4.53E+07
1,090	0.166	99.86%	0.026	1.62E+09	1.30E+09	4.24E+07
1,100	0.167	99.84%	0.028	1.64E+09	1.31E+09	4.61E+07
1,110	0.169	99.80%	0.048	1.65E+09	1.32E+09	7.98E+07
1,120	0.170	99.74%	0.062	1.67E+09	1.33E+09	1.04E+08
1,130	0.172	99.68%	0.060	1.68E+09	1.35E+09	1.02E+08
1,140	0.173	99.62%	0.080	1.70E+09	1.36E+09	1.37E+08

For brevity most of the rows have been hidden (between the 99.62% and 0.08% percent exceedances).

77,000	11.715	0.08%	0.008	1.15E+11	9.17E+10	9.22E+08
77,400	11.775	0.07%	0.008	1.15E+11	9.22E+10	9.27E+08
81,200	12.354	0.06%	0.008	1.21E+11	9.67E+10	9.73E+08
83,800	12.749	0.05%	0.008	1.25E+11	9.98E+10	1.00E+09
83,900	12.764	0.04%	0.008	1.25E+11	9.99E+10	1.00E+09
86,900	13.221	0.04%	0.008	1.29E+11	1.04E+11	1.04E+09
90,600	13.784	0.03%	0.008	1.35E+11	1.08E+11	1.09E+09
92,200	14.027	0.02%	0.008	1.37E+11	1.10E+11	1.10E+09
95,200	14.483	0.01%	0.008	1.42E+11	1.13E+11	1.14E+09
97,400	14.818	0.00%	0.006	1.45E+11	1.16E+11	8.75E+08

Sum = Target load = 8.02E+11

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 0062 PEARL RIVER TMDL SUMMER.XLS

TABLE E.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR PEARL RIVER (090101)
AT POOLS BLUFF, LA (LDEQ 0062)

Percent Reduction = 55 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

Date ^A	Observed FC at Station 0062 (colonies/100 mL)	Flow per unit area on sampling day (cfs/mi ²)	Percent exceedance for flow on sampling day	Observed FC load (colonies/day/mi ²) ^B	Reduced FC load (colonies/day/mi ²) ^C	Allowable FC load (colonies/day/mi ²) ^D	Reduced load less than or equal to allow load
5/15/2001	230	0.42	55.96%	2.35E+09	1.06E+09	3.26E+09	Yes
6/12/2001	1,100	3.93	3.07%	1.06E+11	4.75E+10	3.07E+10	No
7/17/2001	170	0.63	31.61%	2.62E+09	1.18E+09	4.93E+09	Yes
8/14/2001	700	3.30	4.08%	5.65E+10	2.54E+10	2.58E+10	Yes
9/11/2001	280	3.33	4.04%	2.28E+10	1.03E+10	2.61E+10	Yes
10/17/2001	170	1.90	8.68%	7.91E+09	3.56E+09	1.49E+10	Yes
5/31/2006	30	0.37	64.69%	2.75E+08	1.24E+08	2.93E+09	Yes

Allowable Percent of Exceedances = 25.0%
Percent of Exceedances before Reductions = 28.6%
Percent of Exceedances after Reductions = 14.3%

Total allowable loading per unit area to meet stds (from Table E.1) = 8.02E+11 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090101 = 8.02E+11 * 6719 mi² = 5.39E+15 colonies/day

Explicit MOS for FC for Subsegment 090101 (10% * 5.39E+15) = 5.39E+14 colonies/day
Explicit FG for FC for Subsegment 090101 (10% * 5.39E+15) = 5.39E+14 colonies/day

Sum of design flows for point sources of FC for Subsegment 090101^E = 6.232 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090101 = 4.72E+10 colonies/day

WLA for FC for Subsegment 090101 (same as existing point source load) = 4.72E+10 colonies/day

LA for FC for Subsegment 090101 = TMDL - MOS - WLA - FG = 4.31E+15 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 55% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure E.1.

D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 0062 PEARL RIVER TMDL SUMMER.XLS

TABLE E.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR PEARL RIVER
NEAR BOGALUSA (USED FOR SUBSEGMENT 090101)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Secondary Contact Recreation)
Drainage area at flow gage = 6573 mi²

Target load = 9.38E+12 colonies/day/mi²

Pearl River near Bogalusa, LA (02489500)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
Flow, (cfs)						
1,020	0.155	100.00%	0.006	7.59E+09	6.07E+09	4.62E+07
1,040	0.158	99.99%	0.010	7.74E+09	6.19E+09	7.85E+07
1,070	0.163	99.98%	0.016	7.97E+09	6.37E+09	1.29E+08
1,080	0.164	99.96%	0.030	8.04E+09	6.43E+09	2.45E+08
1,100	0.167	99.91%	0.041	8.19E+09	6.55E+09	3.32E+08
1,120	0.170	99.87%	0.032	8.34E+09	6.67E+09	2.71E+08
1,140	0.173	99.85%	0.034	8.49E+09	6.79E+09	2.93E+08
1,150	0.175	99.81%	0.041	8.56E+09	6.85E+09	3.47E+08
1,160	0.176	99.77%	0.037	8.64E+09	6.91E+09	3.15E+08
1,180	0.180	99.73%	0.039	8.78E+09	7.03E+09	3.39E+08
1,190	0.181	99.69%	0.047	8.86E+09	7.09E+09	4.13E+08
1,200	0.183	99.64%	0.079	8.93E+09	7.15E+09	7.07E+08
1,210	0.184	99.53%	0.089	9.01E+09	7.21E+09	8.04E+08
1,220	0.186	99.46%	0.045	9.08E+09	7.27E+09	4.05E+08
1,230	0.187	99.44%	0.024	9.16E+09	7.33E+09	2.23E+08
1,240	0.189	99.41%	0.045	9.23E+09	7.38E+09	4.12E+08
1,250	0.190	99.35%	0.071	9.31E+09	7.44E+09	6.61E+08
1,260	0.192	99.27%	0.081	9.38E+09	7.50E+09	7.61E+08
1,270	0.193	99.19%	0.051	9.45E+09	7.56E+09	4.79E+08
1,280	0.195	99.17%	0.047	9.53E+09	7.62E+09	4.45E+08

For brevity most of the rows have been hidden (between the 99.17% and 0.17% percent exceedances).

85,200	12.962	0.17%	0.008	6.34E+11	5.07E+11	5.15E+09
85,300	12.977	0.17%	0.010	6.35E+11	5.08E+11	6.44E+09
85,700	13.038	0.15%	0.012	6.38E+11	5.10E+11	7.76E+09
88,000	13.388	0.14%	0.010	6.55E+11	5.24E+11	6.64E+09
88,900	13.525	0.13%	0.008	6.62E+11	5.29E+11	5.37E+09
89,200	13.571	0.13%	0.008	6.64E+11	5.31E+11	5.39E+09
89,700	13.647	0.12%	0.008	6.68E+11	5.34E+11	5.42E+09
93,900	14.286	0.11%	0.008	6.99E+11	5.59E+11	5.67E+09
94,000	14.301	0.10%	0.008	7.00E+11	5.60E+11	5.68E+09
94,400	14.362	0.09%	0.008	7.03E+11	5.62E+11	5.70E+09
94,900	14.438	0.09%	0.008	7.06E+11	5.65E+11	5.73E+09
95,400	14.514	0.08%	0.010	7.10E+11	5.68E+11	7.20E+09
95,700	14.560	0.06%	0.012	7.12E+11	5.70E+11	8.67E+09
96,100	14.620	0.05%	0.010	7.15E+11	5.72E+11	7.26E+09
99,000	15.062	0.04%	0.008	7.37E+11	5.90E+11	5.98E+09
104,000	15.822	0.04%	0.008	7.74E+11	6.19E+11	6.28E+09
109,000	16.583	0.03%	0.008	8.11E+11	6.49E+11	6.58E+09
115,000	17.496	0.02%	0.008	8.56E+11	6.85E+11	6.95E+09
122,000	18.561	0.01%	0.008	9.08E+11	7.27E+11	7.37E+09
127,000	19.321	0.00%	0.006	9.45E+11	7.56E+11	5.75E+09

Sum = Target load = 9.38E+12

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 0062 PEARL RIVER TMDL WINTER.XLS

TABLE E.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR PEARL RIVER (090101)
AT POOLS BLUFF, LA (LDEQ 0062)

Percent Reduction = 0 %

Error check for reduction is/is not needed: OK

Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 0062 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
1/16/01	3,000	1.00	62.37%	7.37E+10	7.37E+10	3.93E+10	No
2/13/01	300	0.96	63.56%	7.07E+09	7.07E+09	3.77E+10	Yes
3/20/01	80	5.45	9.53%	1.07E+10	1.07E+10	2.13E+11	Yes
4/17/01	30	3.23	25.29%	2.37E+09	2.37E+09	1.26E+11	Yes
11/6/01	27	0.43	85.07%	2.84E+08	2.84E+08	1.69E+10	Yes
12/11/01	23	0.78	69.87%	4.39E+08	4.39E+08	3.06E+10	Yes
1/11/06	30	0.49	81.97%	3.62E+08	3.62E+08	1.93E+10	Yes
2/8/06	170	5.20	11.20%	2.16E+10	2.16E+10	2.04E+11	Yes
3/8/06	17	5.43	9.68%	2.26E+09	2.26E+09	2.13E+11	Yes
3/29/06	800	4.17	18.14%	8.16E+10	8.16E+10	1.63E+11	Yes
4/19/06	230	0.44	84.59%	2.47E+09	2.47E+09	1.72E+10	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							9.1%
Percent of Exceedances after Reductions =							9.1%

Total allowable loading per unit area to meet stds (from Table E.3) = 9.38E+12 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090101 = 9.38E+12 * 6719 mi² = 6.31E+16 colonies/day

Explicit MOS for FC for Subsegment 090101 (10% * 6.31E+16) = 6.31E+15 colonies/day
Explicit FG for FC for Subsegment 090101 (10% * 6.31E+16) = 6.31E+15 colonies/day

Sum of design flows for point sources of FC for Subsegment 090101^E = 6.232 MGD
Assumed effluent FC concentration for point sources = standard 200 colonies/100 mL
Existing point source FC load for Subsegment 090101 = 4.72E+10 colonies/day

WLA for FC for Subsegment 090101 (same as existing point source load) = 4.72E+10 colonies/day

LA for FC for Subsegment 090101 = TMDL - MOS - WLA - FG = 5.04E+16 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

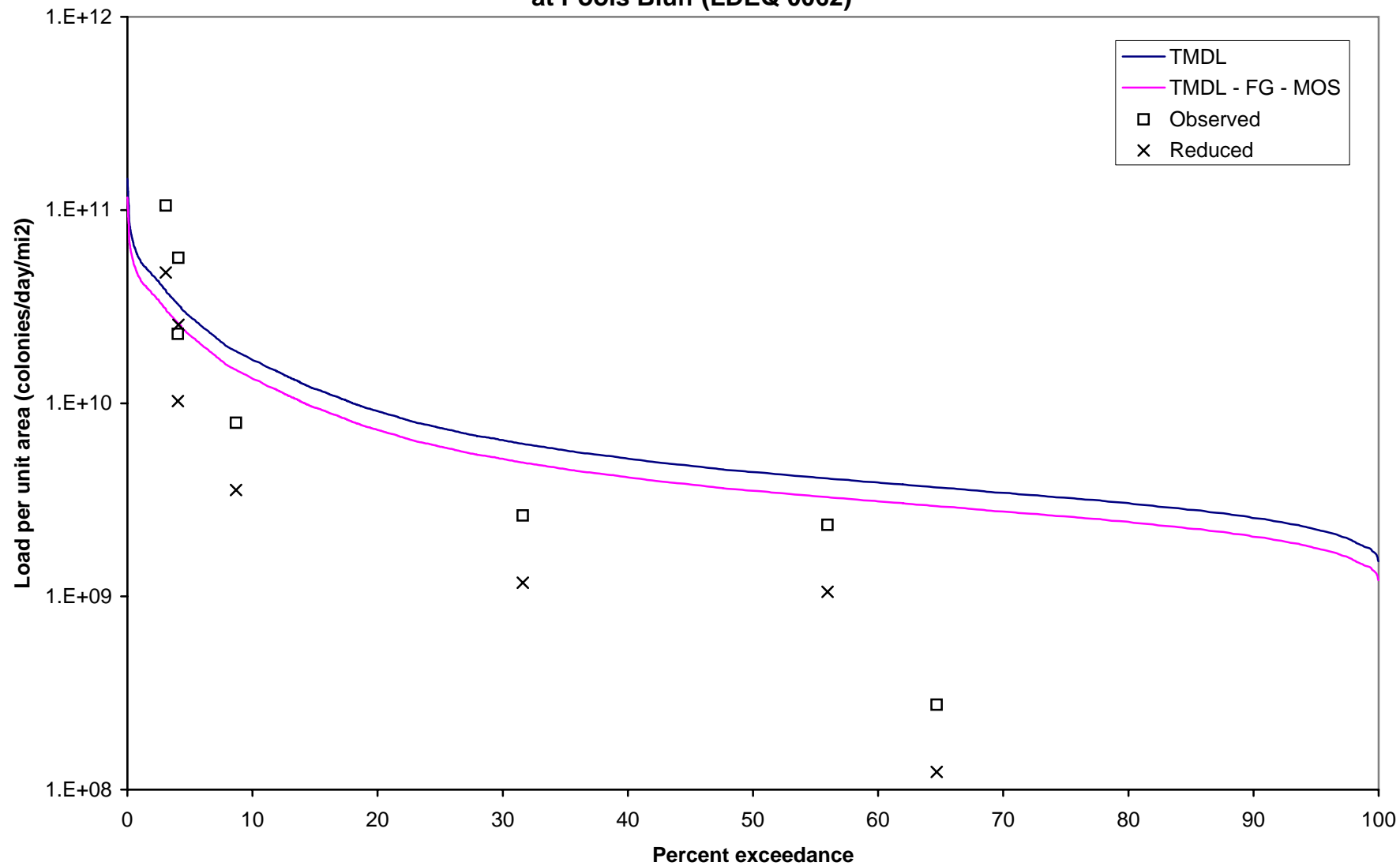
C. This is the load calculated as described in note B and reduced by 0% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure E.2.

D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

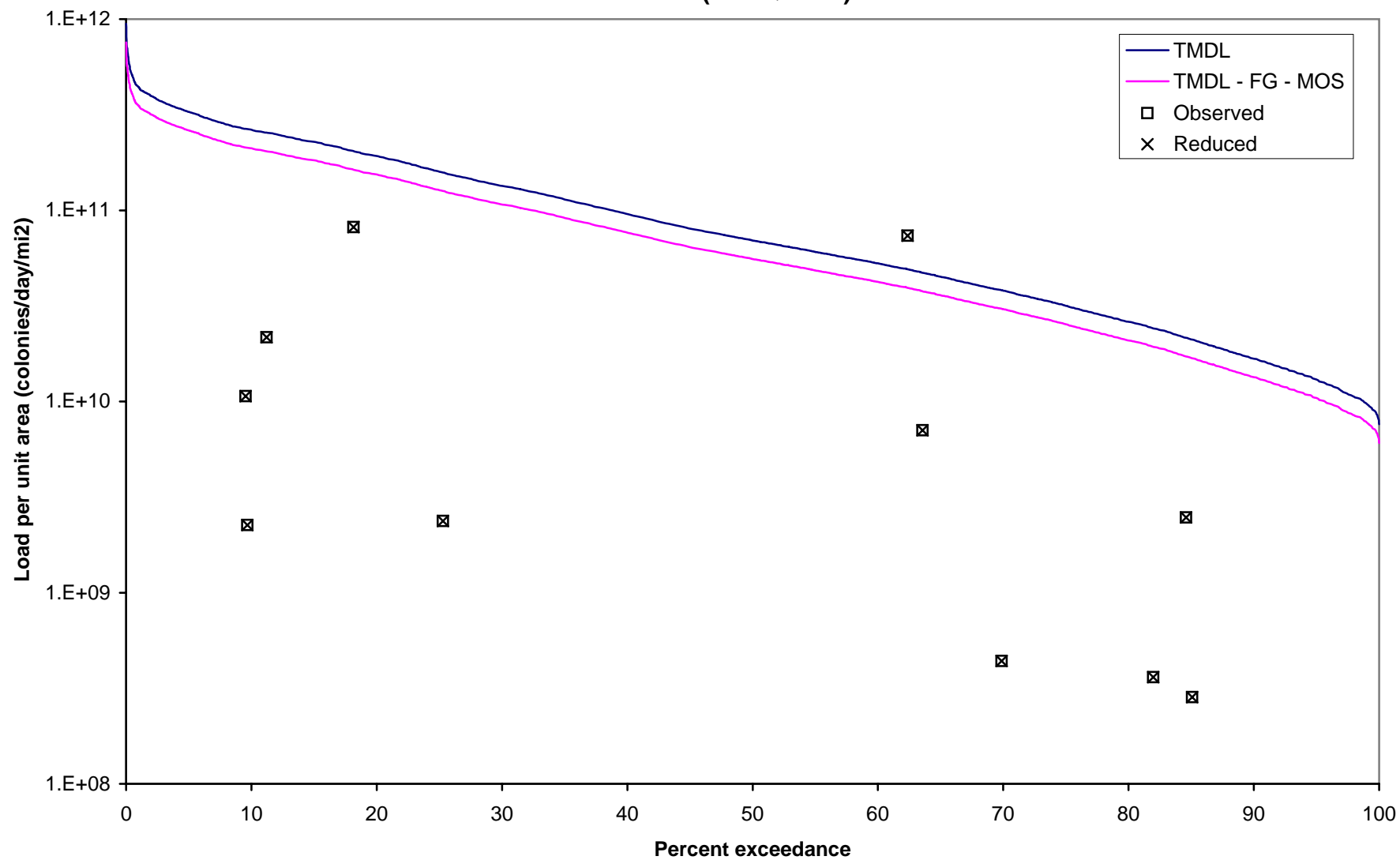
E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 0062 PEARL RIVER TMDL WINTER.XLS

**Figure E.1 Summer load duration curve for Pearl River (090101)
at Pools Bluff (LDEQ 0062)**



**Figure E.2 Winter load duration curve for Pearl River (090101)
at Pools Bluff (LDEQ 0062)**



APPENDIX F

TMDL Calculations for Subsegment 090104-Peters Creek

TABLE F.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)

Drainage area at flow gauge = 72.7 mi²

Target load = 1.13E+12 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) Flow, (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
7	0.098	99.99%	0.010	9.56E+08	7.65E+08	9.15E+06
8	0.113	99.98%	0.013	1.10E+09	8.83E+08	1.41E+07
9	0.128	99.97%	0.013	1.25E+09	1.00E+09	1.60E+07
13	0.179	99.96%	0.022	1.75E+09	1.40E+09	3.91E+07
14	0.193	99.92%	0.083	1.88E+09	1.51E+09	1.56E+08
15	0.206	99.79%	0.166	2.02E+09	1.62E+09	3.35E+08
16	0.220	99.59%	0.214	2.15E+09	1.72E+09	4.61E+08
17	0.234	99.36%	0.300	2.29E+09	1.83E+09	6.87E+08
18	0.248	98.99%	0.447	2.42E+09	1.94E+09	1.08E+09
19	0.261	98.47%	0.575	2.56E+09	2.05E+09	1.47E+09
20	0.275	97.84%	0.661	2.69E+09	2.15E+09	1.78E+09
21	0.289	97.15%	0.533	2.83E+09	2.26E+09	1.51E+09
22	0.297	96.78%	0.192	2.91E+09	2.33E+09	5.57E+08
22	0.300	96.76%	0.172	2.94E+09	2.35E+09	5.06E+08
22	0.303	96.43%	0.338	2.96E+09	2.37E+09	1.00E+09
22	0.306	96.09%	0.185	2.99E+09	2.39E+09	5.54E+08
22	0.307	96.06%	0.019	3.00E+09	2.40E+09	5.75E+07

For brevity most of the rows have been hidden (between the 96.06% and 0.27% percent exceedances).

1,129	15.529	0.27%	0.016	1.52E+11	1.22E+11	2.43E+09
1,170	16.090	0.26%	0.019	1.57E+11	1.26E+11	3.02E+09
1,234	16.970	0.24%	0.016	1.66E+11	1.33E+11	2.65E+09
1,240	17.050	0.22%	0.013	1.67E+11	1.33E+11	2.13E+09
1,245	17.130	0.21%	0.013	1.68E+11	1.34E+11	2.14E+09
1,257	17.290	0.20%	0.016	1.69E+11	1.35E+11	2.70E+09
1,280	17.607	0.18%	0.019	1.72E+11	1.38E+11	3.30E+09
1,310	18.019	0.16%	0.016	1.76E+11	1.41E+11	2.81E+09
1,315	18.091	0.15%	0.013	1.77E+11	1.42E+11	2.26E+09
1,437	19.772	0.13%	0.013	1.93E+11	1.55E+11	2.47E+09
1,480	20.358	0.12%	0.016	1.99E+11	1.59E+11	3.18E+09
1,500	20.633	0.10%	0.019	2.02E+11	1.62E+11	3.87E+09
1,571	21.613	0.08%	0.016	2.12E+11	1.69E+11	3.38E+09
1,700	23.384	0.07%	0.016	2.29E+11	1.83E+11	3.65E+09
2,000	27.510	0.05%	0.019	2.69E+11	2.15E+11	5.16E+09
3,000	41.265	0.03%	0.019	4.04E+11	3.23E+11	7.73E+09
3,200	44.017	0.01%	0.016	4.31E+11	3.45E+11	6.87E+09

Sum = Target load = 1.13E+12

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1117 PETERS CREEK TMDL SUMMER.XLS

TABLE F.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR PETERS CREEK (090104)
AT HIGHWAY 21, LA (LDEQ 1117)

Percent Reduction =

60 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 1117 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
5/15/2001	170	0.49	81.95%	2.02E+09	8.07E+08	3.80E+09	Yes
6/12/2001	280	13.05	0.40%	8.94E+10	3.58E+10	1.02E+11	Yes
7/17/2001	800	0.96	30.58%	1.88E+10	7.52E+09	7.52E+09	Yes
8/14/2001	230	4.74	2.84%	2.67E+10	1.07E+10	3.71E+10	Yes
9/11/2001	800	2.59	6.52%	5.06E+10	2.02E+10	2.02E+10	Yes
10/17/2001	500	1.99	9.79%	2.43E+10	9.71E+09	1.55E+10	Yes
5/31/2006	300	0.57	73.16%	4.15E+09	1.66E+09	4.42E+09	Yes

Allowable Percent of Exceedances = 25.0%
Percent of Exceedances before Reductions = 42.9%
Percent of Exceedances after Reductions = 0.0%

Total allowable loading per unit area to meet stds (from Table F.1) =

1.13E+12 colonies/day/mi²

Total allowable loading at downstream end of Subsegment 090104 = 1.13E+12 * 41 mi² =

4.68E+13 colonies/day

Explicit MOS for FC for Subsegment 090104 (10% * 4.68E+13) =

4.68E+12 colonies/day

Explicit FG for FC for Subsegment 090104 (10% * 4.68E+13) =

4.68E+12 colonies/day

Sum of design flows for point sources of FC for Subsegment 090104^E =

0.00912 MGD

Assumed effluent FC concentration for point sources =

200 colonies/100 mL

Existing point source FC load for Subsegment 090104 =

6.91E+07 colonies/day

WLA for FC for Subsegment 090104 (same as existing point source load) =

6.91E+07 colonies/day

LA for FC for Subsegment 090104 = TMDL - MOS - WLA - FG =

3.75E+13 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 60% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 1117 PETERS CREEK TMDL SUMMER.XLS

TABLE F.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Secondary Contact Recreation)
Drainage area at flow gage = 72.7 mi²

Target load = 1.06E+13 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
18	0.248	99.92%	0.112	1.21E+10	9.69E+09	1.36E+09
19	0.261	99.78%	0.122	1.28E+10	1.02E+10	1.56E+09
20	0.275	99.67%	0.122	1.35E+10	1.08E+10	1.64E+09
21	0.289	99.53%	0.141	1.41E+10	1.13E+10	1.99E+09
22	0.303	99.39%	0.115	1.48E+10	1.18E+10	1.71E+09
23	0.316	99.30%	0.103	1.55E+10	1.24E+10	1.59E+09
24	0.330	99.19%	0.119	1.62E+10	1.29E+10	1.92E+09
25	0.344	99.06%	0.119	1.68E+10	1.35E+10	2.00E+09
26	0.358	98.95%	0.093	1.75E+10	1.40E+10	1.63E+09
27	0.365	98.88%	0.042	1.79E+10	1.43E+10	7.45E+08
27	0.368	98.86%	0.013	1.80E+10	1.44E+10	2.31E+08
27	0.370	98.85%	0.074	1.81E+10	1.45E+10	1.34E+09
27	0.371	98.72%	0.135	1.82E+10	1.45E+10	2.45E+09
27	0.371	98.58%	0.074	1.82E+10	1.45E+10	1.34E+09
27	0.378	98.57%	0.026	1.85E+10	1.48E+10	4.74E+08
28	0.385	98.53%	0.122	1.88E+10	1.51E+10	2.30E+09
29	0.399	98.33%	0.225	1.95E+10	1.56E+10	4.38E+09
30	0.413	98.08%	0.160	2.02E+10	1.62E+10	3.24E+09
31	0.421	98.00%	0.241	2.06E+10	1.65E+10	4.96E+09
31	0.426	97.60%	0.504	2.09E+10	1.67E+10	1.05E+10

For brevity most of the rows have been hidden (between the 97.60% and 0.25% percent exceedance).

2,083	28.657	0.25%	0.013	1.40E+12	1.12E+12	1.80E+10
2,107	28.978	0.24%	0.013	1.42E+12	1.13E+12	1.82E+10
2,170	29.849	0.22%	0.013	1.46E+12	1.17E+12	1.87E+10
2,200	30.261	0.21%	0.013	1.48E+12	1.18E+12	1.90E+10
2,211	30.418	0.20%	0.013	1.49E+12	1.19E+12	1.91E+10
2,322	31.939	0.19%	0.013	1.56E+12	1.25E+12	2.01E+10
2,330	32.050	0.17%	0.013	1.57E+12	1.25E+12	2.01E+10
2,370	32.600	0.16%	0.013	1.60E+12	1.28E+12	2.05E+10
2,392	32.900	0.15%	0.013	1.61E+12	1.29E+12	2.07E+10
2,398	32.980	0.13%	0.013	1.61E+12	1.29E+12	2.07E+10
2,520	34.661	0.12%	0.013	1.70E+12	1.36E+12	2.18E+10
2,572	35.381	0.11%	0.013	1.73E+12	1.39E+12	2.22E+10
2,729	37.543	0.10%	0.013	1.84E+12	1.47E+12	2.36E+10
2,790	38.377	0.08%	0.013	1.88E+12	1.50E+12	2.41E+10
2,800	38.514	0.07%	0.013	1.88E+12	1.51E+12	2.42E+10
3,329	45.788	0.06%	0.013	2.24E+12	1.79E+12	2.87E+10
5,210	71.664	0.04%	0.013	3.51E+12	2.81E+12	4.50E+10
5,300	72.902	0.03%	0.013	3.57E+12	2.85E+12	4.58E+10
5,330	73.315	0.02%	0.013	3.59E+12	2.87E+12	4.60E+10
7,320	100.688	0.01%	0.010	4.93E+12	3.94E+12	4.74E+10

Sum = Target load = 1.06E+13

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1117 PETERS CREEK TMDL WINTER.XLS

TABLE F.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR PETERS CREEK (090104)
AT HIGHWAY 21, LA (LDEQ 1119)

Percent Reduction = 0 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 1119 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
1/11/2006	230	0.60	90.40%	3.37E+09	3.37E+09	2.35E+10	Yes
11/6/2001	170	0.59	90.70%	2.46E+09	2.46E+09	2.32E+10	Yes
12/11/2001	130	0.65	87.20%	2.08E+09	2.08E+09	2.56E+10	Yes
2/8/2006	80	1.25	49.67%	2.44E+09	2.44E+09	4.89E+10	Yes
3/8/2006	300	0.99	63.32%	7.29E+09	7.29E+09	3.89E+10	Yes
3/29/2006	300	1.00	63.04%	7.34E+09	7.34E+09	3.92E+10	Yes
2/13/2001	500	1.62	35.46%	1.98E+10	1.98E+10	6.33E+10	Yes
4/19/2006	230	0.58	92.14%	3.24E+09	3.24E+09	2.26E+10	Yes
3/20/2001	220	2.63	18.68%	1.41E+10	1.41E+10	1.03E+11	Yes
1/16/2001	800	0.80	76.05%	1.56E+10	1.56E+10	3.12E+10	Yes
4/17/2001	16,000	0.79	76.83%	3.09E+11	3.09E+11	3.09E+10	No
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							9.1%
Percent of Exceedances after Reductions =							9.1%

Total allowable loading per unit area to meet stds (from Table F.3) = 1.06E+13 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090104 = 1.06E+13 * 41 mi² = 4.40E+14 colonies/day

Explicit MOS for FC for Subsegment 090104 (10% * 4.40E+14) = 4.40E+13 colonies/day
Explicit FG for FC for Subsegment 090104 (10% * 4.40E+14) = 4.40E+13 colonies/day

Sum of design flows for point sources of FC for Subsegment 090104^E = 0.00912 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090104 = 6.91E+07 colonies/day

WLA for FC for Subsegment 090104 (same as existing point source load) = 6.91E+07 colonies/day

LA for FC for Subsegment 090104 = TMDL - MOS - WLA - FG = 3.52E+14 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.
B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".
C. This is the load calculated as described in note B and reduced by 0% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.
D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.
E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 1117 PETERS CREEK TMDL WINTER.XLS

Figure F.1 Summer load duration curve for Peters Creek (090104) (LDEQ 1117)

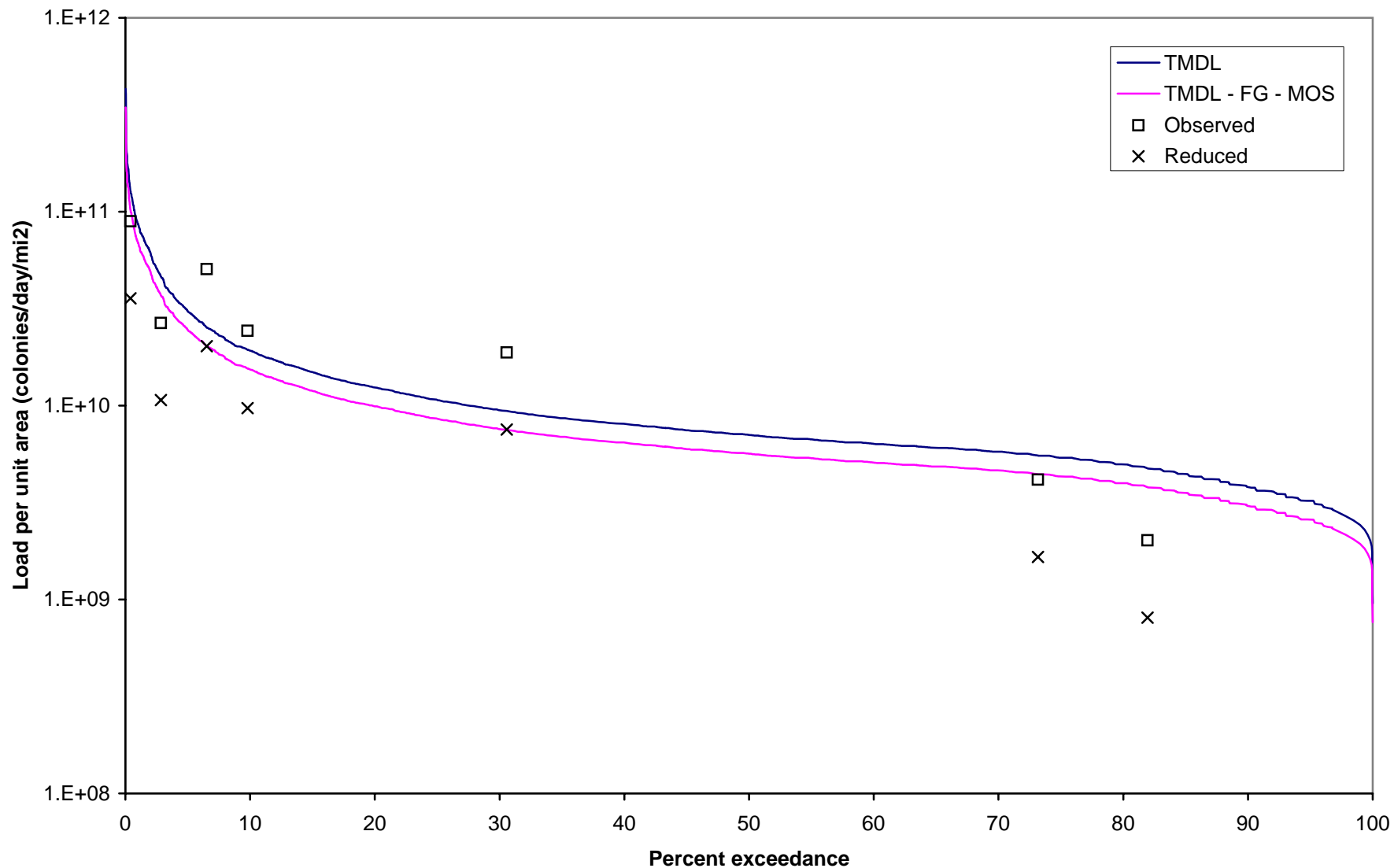
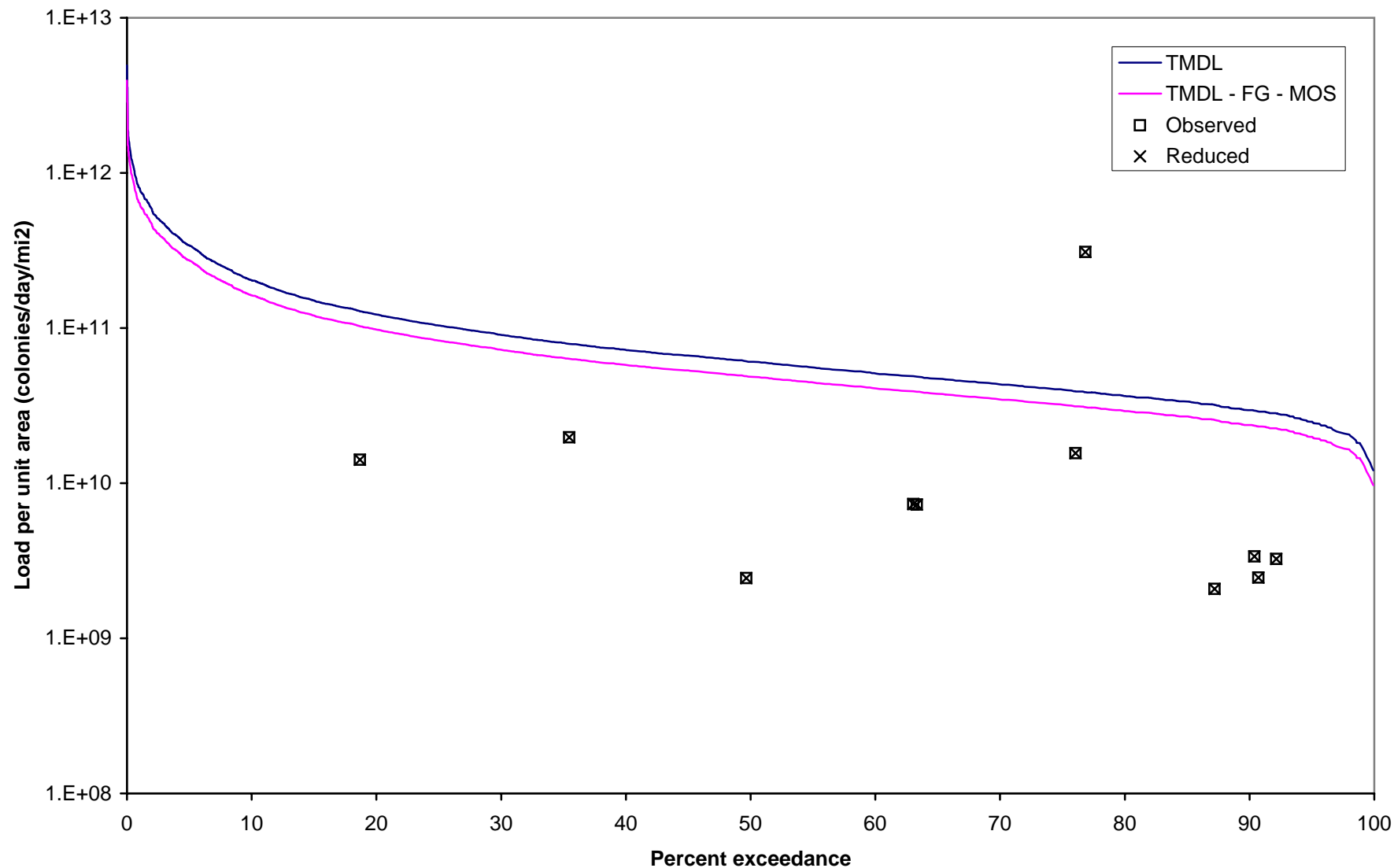


Figure F.2 Winter load duration curve for Peters Creek (090104) (LDEQ 1117)



APPENDIX G

TMDL Calculations for Subsegment 090301-Pushepatapa Creek

TABLE G.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)

Drainage area at flow gage = 72.7 mi²

Target load = 1.13E+12 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) <u>Flow</u>	<u>Flow per unit area, (cfs/mi²)</u>	<u>Percent exceedance</u>	<u>Width on plot between data points (unitless)</u>	<u>Fecal Coliform TMDL load (colonies/day/mi²)^A</u>	<u>Fecal Coliform TMDL - FG - MOS load (colonies/day/mi²)^B</u>	<u>Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi²)^C</u>
7	0.098	99.99%	0.010	9.56E+08	7.65E+08	9.15E+06
8	0.113	99.98%	0.013	1.10E+09	8.83E+08	1.41E+07
9	0.128	99.97%	0.013	1.25E+09	1.00E+09	1.60E+07
13	0.179	99.96%	0.022	1.75E+09	1.40E+09	3.91E+07
14	0.193	99.92%	0.083	1.88E+09	1.51E+09	1.56E+08
15	0.206	99.79%	0.166	2.02E+09	1.62E+09	3.35E+08
16	0.220	99.59%	0.214	2.15E+09	1.72E+09	4.61E+08
17	0.234	99.36%	0.300	2.29E+09	1.83E+09	6.87E+08
18	0.248	98.99%	0.447	2.42E+09	1.94E+09	1.08E+09
19	0.261	98.47%	0.575	2.56E+09	2.05E+09	1.47E+09
20	0.275	97.84%	0.661	2.69E+09	2.15E+09	1.78E+09
21	0.289	97.15%	0.533	2.83E+09	2.26E+09	1.51E+09
22	0.297	96.78%	0.192	2.91E+09	2.33E+09	5.57E+08
22	0.300	96.76%	0.172	2.94E+09	2.35E+09	5.06E+08
22	0.303	96.43%	0.338	2.96E+09	2.37E+09	1.00E+09
22	0.306	96.09%	0.185	2.99E+09	2.39E+09	5.54E+08
22	0.307	96.06%	0.019	3.00E+09	2.40E+09	5.75E+07

For brevity most of the rows have been hidden (between the 96.06% and 0.27% percent exceedances).

1,129	15.529	0.27%	0.016	1.52E+11	1.22E+11	2.43E+09
1,170	16.090	0.26%	0.019	1.57E+11	1.26E+11	3.02E+09
1,234	16.970	0.24%	0.016	1.66E+11	1.33E+11	2.65E+09
1,240	17.050	0.22%	0.013	1.67E+11	1.33E+11	2.13E+09
1,245	17.130	0.21%	0.013	1.68E+11	1.34E+11	2.14E+09
1,257	17.290	0.20%	0.016	1.69E+11	1.35E+11	2.70E+09
1,280	17.607	0.18%	0.019	1.72E+11	1.38E+11	3.30E+09
1,310	18.019	0.16%	0.016	1.76E+11	1.41E+11	2.81E+09
1,315	18.091	0.15%	0.013	1.77E+11	1.42E+11	2.26E+09
1,437	19.772	0.13%	0.013	1.93E+11	1.55E+11	2.47E+09
1,480	20.358	0.12%	0.016	1.99E+11	1.59E+11	3.18E+09
1,500	20.633	0.10%	0.019	2.02E+11	1.62E+11	3.87E+09
1,571	21.613	0.08%	0.016	2.12E+11	1.69E+11	3.38E+09
1,700	23.384	0.07%	0.016	2.29E+11	1.83E+11	3.65E+09
2,000	27.510	0.05%	0.019	2.69E+11	2.15E+11	5.16E+09
3,000	41.265	0.03%	0.019	4.04E+11	3.23E+11	7.73E+09
3,200	44.017	0.01%	0.016	4.31E+11	3.45E+11	6.87E+09

Sum = Target load = 1.13E+12

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1119 PUSHEPATAPA CREEK TMDL SUMMER.XLS

TABLE G.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR PUSHEPATAPA CREEK (090301)
AT HIGHWAY 436, LA (LDEQ 1119)

Percent Reduction = 86 %

Error check for reduction is/is not needed: OK

Error check more reduction needed/not needed: OK

Date ^A	Observed FC at Station 1119 (colonies/100 mL)	Flow per unit area on sampling day (cfs/mi ²)	Percent exceedance for flow on sampling day	Observed FC load (colonies/day/mi ²) ^B	Reduced FC load (colonies/day/mi ²) ^C	Allowable FC load (colonies/day/mi ²) ^D	Reduced load less than or equal to allow load
5/15/2001	70	0.49	81.95	8.31E+08	1.16E+08	3.80E+09	Yes
6/12/2001	2,200	13.05	0.40	7.02E+11	9.83E+10	1.02E+11	Yes
7/17/2001	110	0.96	30.58	2.59E+09	3.62E+08	7.52E+09	Yes
8/14/2001	5,000	4.74	2.84	5.80E+11	8.12E+10	3.71E+10	No
9/11/2001	1,400	2.59	6.52	8.86E+10	1.24E+10	2.02E+10	Yes
10/9/2001	130	0.75	46.81	2.38E+09	3.34E+08	5.87E+09	Yes
5/31/2006	80	0.57	73.16	1.11E+09	1.55E+08	4.42E+09	Yes

Allowable Percent of Exceedances = 25.0%
Percent of Exceedances before Reductions = 42.9%
Percent of Exceedances after Reductions = 14.3%

Total allowable loading per unit area to meet stds (from Table G.1) = 1.13E+12 colonies/day/mi²

Total allowable loading at downstream end of Subsegment 090301 = 1.13E+12 * 184 mi² = 2.08E+14 colonies/day

Explicit MOS for FC for Subsegment 090301 (10% * 2.08E+14) = 2.08E+13 colonies/day

Explicit FG for FC for Subsegment 090301 (10% * 2.08E+14) = 2.08E+13 colonies/day

Sum of design flows for point sources of FC for Subsegment 090301^E = 0 MGD

Assumed effluent FC concentration for point sources = 400 colonies/100 mL

Existing point source FC load for Subsegment 090301 = 0.00E+00 colonies/day

WLA for FC for Subsegment 090301 (same as existing point source load) = 0.00E+00 colonies/day

LA for FC for Subsegment 090301 = TMDL - MOS - WLA - FG = 1.66E+14 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 86% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. No point source permits for fecal coliform on record.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1119 PUSHEPATAPA CREEK TMDL SUMMER.XLS

TABLE G.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Secondary Contact Recreation)
Drainage area at flow gage = 72.7 mi²

Target load = 1.99E+14 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
18	0.248	99.92%	0.112	1.21E+10	9.69E+09	1.36E+09
19	0.261	99.78%	0.122	1.28E+10	1.02E+10	1.56E+09
20	0.275	99.67%	0.122	1.35E+10	1.08E+10	1.64E+09
21	0.289	99.53%	0.141	1.41E+10	1.13E+10	1.99E+09
22	0.303	99.39%	0.115	1.48E+10	1.18E+10	1.71E+09
23	0.316	99.30%	0.103	1.55E+10	1.24E+10	1.59E+09
24	0.330	99.19%	0.119	1.62E+10	1.29E+10	1.92E+09
25	0.344	99.06%	0.119	1.68E+10	1.35E+10	2.00E+09
26	0.358	98.95%	0.093	1.75E+10	1.40E+10	1.63E+09
27	0.365	98.88%	0.042	1.79E+10	1.43E+10	7.45E+08
27	0.368	98.86%	0.013	1.80E+10	1.44E+10	2.31E+08
27	0.370	98.85%	0.074	1.81E+10	1.45E+10	1.34E+09
27	0.371	98.72%	0.135	1.82E+10	1.45E+10	2.45E+09
27	0.371	98.58%	0.074	1.82E+10	1.45E+10	1.34E+09
27	0.378	98.57%	0.026	1.85E+10	1.48E+10	4.74E+08
28	0.385	98.53%	0.122	1.88E+10	1.51E+10	2.30E+09
29	0.399	98.33%	0.225	1.95E+10	1.56E+10	4.38E+09
30	0.413	98.08%	9.719	2.02E+10	1.62E+10	1.96E+11
31	0.421	98.00%	9.623	2.06E+10	1.65E+10	1.98E+11
31	0.426	97.60%	9.604	2.09E+10	1.67E+10	2.00E+11

For brevity most of the rows have been hidden (between the 96.70% and 0.25% percent exceedances).

2,083	28.657	0.25%	0.013	1.40E+12	1.12E+12	1.80E+10
2,107	28.978	0.24%	0.013	1.42E+12	1.13E+12	1.82E+10
2,170	29.849	0.22%	0.013	1.46E+12	1.17E+12	1.87E+10
2,200	30.261	0.21%	0.013	1.48E+12	1.18E+12	1.90E+10
2,211	30.418	0.20%	0.013	1.49E+12	1.19E+12	1.91E+10
2,322	31.939	0.19%	0.013	1.56E+12	1.25E+12	2.01E+10
2,330	32.050	0.17%	0.013	1.57E+12	1.25E+12	2.01E+10
2,370	32.600	0.16%	0.013	1.60E+12	1.28E+12	2.05E+10
2,392	32.900	0.15%	0.013	1.61E+12	1.29E+12	2.07E+10
2,398	32.980	0.13%	0.013	1.61E+12	1.29E+12	2.07E+10
2,520	34.661	0.12%	0.013	1.70E+12	1.36E+12	2.18E+10
2,572	35.381	0.11%	0.013	1.73E+12	1.39E+12	2.22E+10
2,729	37.543	0.10%	0.013	1.84E+12	1.47E+12	2.36E+10
2,790	38.377	0.08%	0.013	1.88E+12	1.50E+12	2.41E+10
2,800	38.514	0.07%	0.013	1.88E+12	1.51E+12	2.42E+10
3,329	45.788	0.06%	0.013	2.24E+12	1.79E+12	2.87E+10
5,210	71.664	0.04%	0.013	3.51E+12	2.81E+12	4.50E+10
5,300	72.902	0.03%	0.013	3.57E+12	2.85E+12	4.58E+10
5,330	73.315	0.02%	0.013	3.59E+12	2.87E+12	4.60E+10
7,320	100.688	0.01%	0.010	4.93E+12	3.94E+12	4.74E+10

Sum = Target load = 1.99E+14

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".
B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.
C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1119 PUSHEPATAPA CREEK TMDL WINTER.XLS

TABLE G.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR PUSHEPATAPA CREEK (090301)
AT HIGHWAY 436, LA (LDEQ 1119)

Percent Reduction = 0 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 1119 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
1/16/2001	110	0.798	76.05%	2.15E+09	2.15E+09	3.12E+10	Yes
2/13/2001	130	1.617	35.46%	5.14E+09	5.14E+09	6.33E+10	Yes
4/17/2001	16,000	0.788	76.83%	3.09E+11	3.09E+11	3.09E+10	No
11/6/2001	130	0.592	90.70%	1.88E+09	1.88E+09	2.32E+10	Yes
12/11/2001	220	0.653	87.20%	3.52E+09	3.52E+09	2.56E+10	Yes
1/11/2006	14	0.600	90.40%	2.05E+08	2.05E+08	2.35E+10	Yes
2/8/2006	350	1.249	49.67%	1.07E+10	1.07E+10	4.89E+10	Yes
3/8/2006	23	0.993	63.32%	5.59E+08	5.59E+08	3.89E+10	Yes
3/29/2006	130	1.001	63.04%	3.18E+09	3.18E+09	3.92E+10	Yes
4/19/2006	80	0.576	92.14%	1.13E+09	1.13E+09	2.26E+10	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							10.0%
Percent of Exceedances after Reductions =							10.0%

Total allowable loading per unit area to meet stds (from Table G.3) = 1.99E+14 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090301 = 1.99E+14 * 184 mi² = 3.65E+16 colonies/day

Explicit MOS for FC for Subsegment 090301 (10% * 3.65E+16) = 3.65E+15 colonies/day
Explicit FG for FC for Subsegment 090301 (10% * 3.65E+16) = 3.65E+15 colonies/day

Sum of design flows for point sources of FC for Subsegment 090301^E = 0 MGD
Assumed effluent FC concentration for point sources = 0 colonies/100 mL
Existing point source FC load for Subsegment 090301 = 0.00E+00 colonies/day

WLA for FC for Subsegment 090301 (same as existing point source load) = 0.00E+00 colonies/day

LA for FC for Subsegment 090301 = TMDL - MOS - WLA - FG = 2.92E+16 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 0% to allow no more than 25%
of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. No point source permits for fecal coliform on record.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1119 PUSHEPATAPA CREEK TMDL WINTER.XLS

Figure G.1 Summer load duration curve for Pushepatapa Creek (090301) (LDEQ 1119)

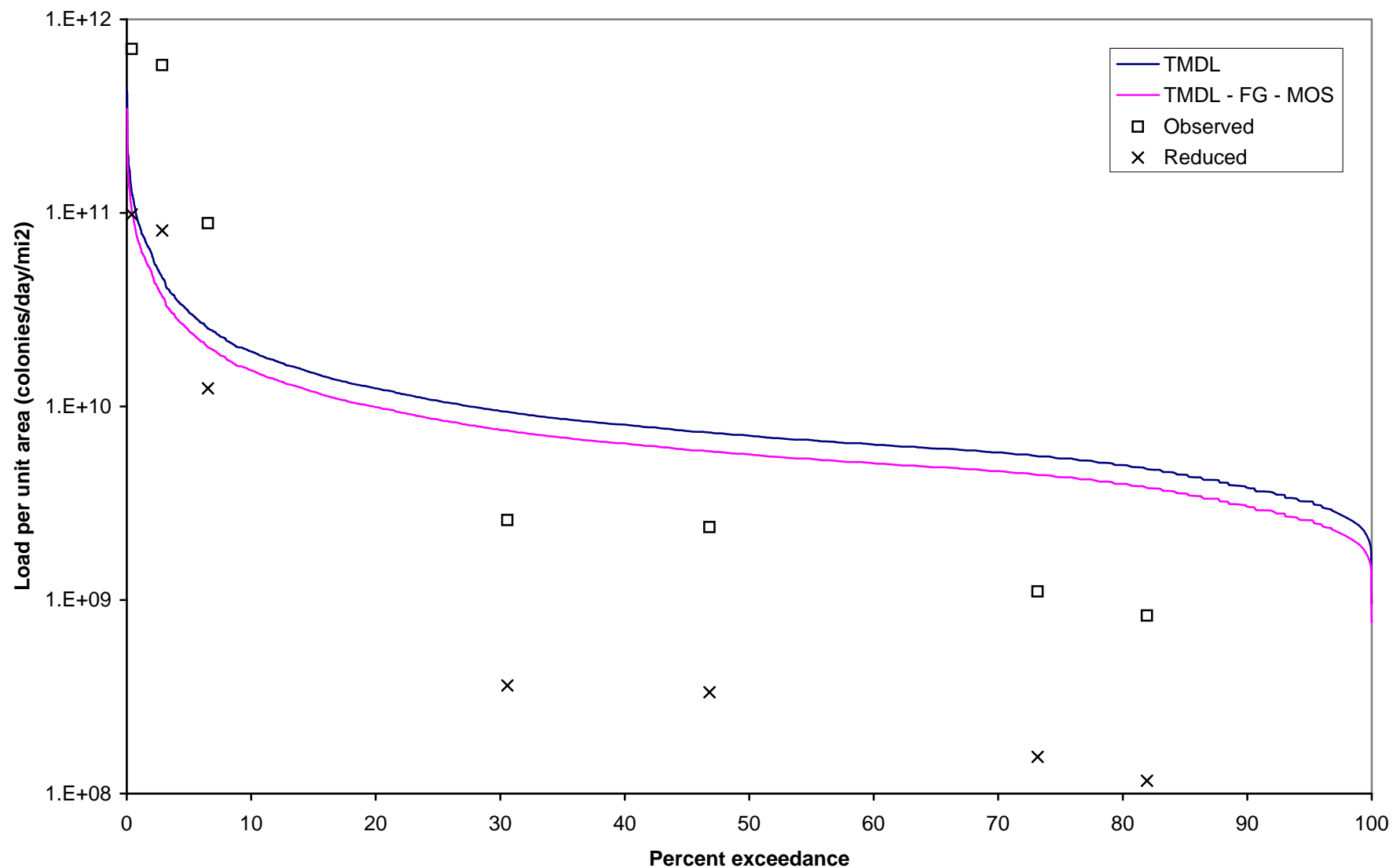
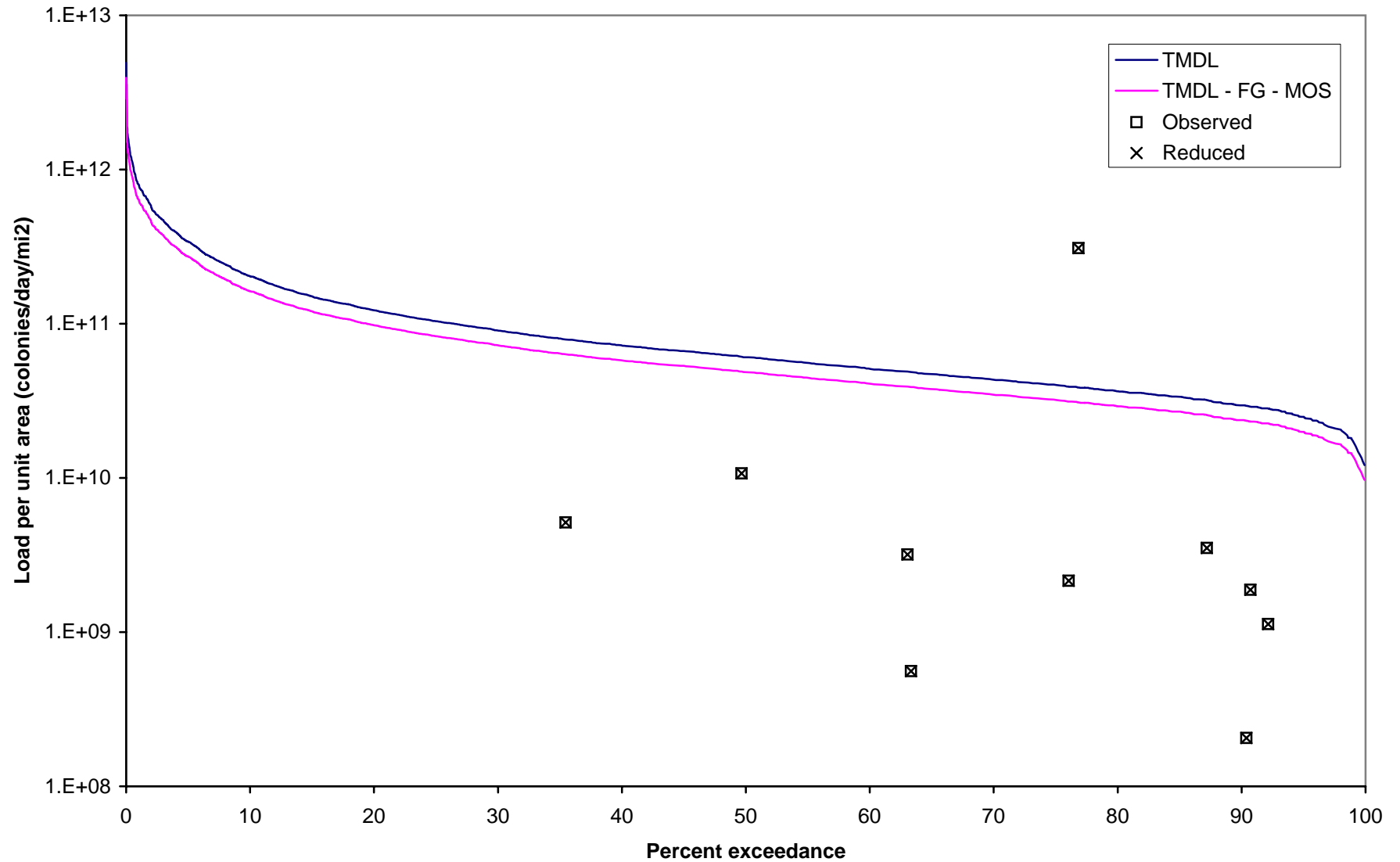


Figure G.2 Winter load duration curve for Pushepatapa Creek (090301) (LDEQ 1119)



APPENDIX H

TMDL Calculations for Subsegment 090401-Bogue Lusa Creek

TABLE H.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)

Drainage area at flow gage = 72.7 mi²

Target load = 1.13E+12 colonies/day/mi²

Bogue Lusa Creek at Bogalusa, LA (02490105) Flow, (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
7	0.098	99.99%	0.010	9.56E+08	7.65E+08	9.15E+06
8	0.113	99.98%	0.013	1.10E+09	8.83E+08	1.41E+07
9	0.128	99.97%	0.013	1.25E+09	1.00E+09	1.60E+07
13	0.179	99.96%	0.022	1.75E+09	1.40E+09	3.91E+07
14	0.193	99.92%	0.083	1.88E+09	1.51E+09	1.56E+08
15	0.206	99.79%	0.166	2.02E+09	1.62E+09	3.35E+08
16	0.220	99.59%	0.214	2.15E+09	1.72E+09	4.61E+08
17	0.234	99.36%	0.300	2.29E+09	1.83E+09	6.87E+08
18	0.248	98.99%	0.447	2.42E+09	1.94E+09	1.08E+09
19	0.261	98.47%	0.575	2.56E+09	2.05E+09	1.47E+09
20	0.275	97.84%	0.661	2.69E+09	2.15E+09	1.78E+09
21	0.289	97.15%	0.533	2.83E+09	2.26E+09	1.51E+09
22	0.297	96.78%	0.192	2.91E+09	2.33E+09	5.57E+08
22	0.300	96.76%	0.172	2.94E+09	2.35E+09	5.06E+08
22	0.303	96.43%	0.338	2.96E+09	2.37E+09	1.00E+09
22	0.306	96.09%	0.185	2.99E+09	2.39E+09	5.54E+08
22	0.307	96.06%	0.019	3.00E+09	2.40E+09	5.75E+07

For brevity most of the rows have been hidden (between the 96.06% and 0.27% percent exceedances).

1129	15.529	0.27%	0.016	1.52E+11	1.22E+11	2.43E+09
1170	16.090	0.26%	0.019	1.57E+11	1.26E+11	3.02E+09
1234	16.970	0.24%	0.016	1.66E+11	1.33E+11	2.65E+09
1240	17.050	0.22%	0.013	1.67E+11	1.33E+11	2.13E+09
1245	17.130	0.21%	0.013	1.68E+11	1.34E+11	2.14E+09
1257	17.290	0.20%	0.016	1.69E+11	1.35E+11	2.70E+09
1280	17.607	0.18%	0.019	1.72E+11	1.38E+11	3.30E+09
1310	18.019	0.16%	0.016	1.76E+11	1.41E+11	2.81E+09
1315	18.091	0.15%	0.013	1.77E+11	1.42E+11	2.26E+09
1437	19.772	0.13%	0.013	1.93E+11	1.55E+11	2.47E+09
1480	20.358	0.12%	0.016	1.99E+11	1.59E+11	3.18E+09
1500	20.633	0.10%	0.019	2.02E+11	1.62E+11	3.87E+09
1571	21.613	0.08%	0.016	2.12E+11	1.69E+11	3.38E+09
1700	23.384	0.07%	0.016	2.29E+11	1.83E+11	3.65E+09
2000	27.510	0.05%	0.019	2.69E+11	2.15E+11	5.16E+09
3000	41.265	0.03%	0.019	4.04E+11	3.23E+11	7.73E+09
3200	44.017	0.01%	0.016	4.31E+11	3.45E+11	6.87E+09

Sum = Target load = 1.13E+12

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 0063 BOGUE LUSA CREEK TMDL SUMMER.XLS

TABLE H.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS BOGUE LUSA CREEK (090401)
NEAR BOGALUSA, LA (LDEQ 0063)

Percent Reduction = 98 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 0063 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
5/15/01	16,000	0.49	81.95%	1.90E+11	3.80E+09	3.80E+09	Yes
6/12/01	3,000	13.05	0.40%	9.58E+11	1.92E+10	1.02E+11	Yes
7/17/01	9,000	0.96	30.58%	2.12E+11	4.23E+09	7.52E+09	Yes
8/14/01	16,000	4.74	2.84%	1.86E+12	3.71E+10	3.71E+10	Yes
9/11/01	500	2.59	6.52%	3.16E+10	6.33E+08	2.02E+10	Yes
10/17/01	800	1.99	9.79%	3.89E+10	7.77E+08	1.55E+10	Yes
5/31/06	2,400	0.57	73.16%	3.32E+10	6.64E+08	4.42E+09	Yes

Allowable Percent of Exceedances = 25.0%
Percent of Exceedances before Reductions = 100.0%
Percent of Exceedances after Reductions = 0.0%

Total allowable loading per unit area to meet stds (from Table H.1) = 1.13E+12 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090401 = 1.13E+12 * 76 mi² = 8.63E+13 colonies/day

Explicit MOS for FC for Subsegment 090401 (10% * 8.63E+13) = 8.63E+12 colonies/day
Explicit FG for FC for Subsegment 090401 (10% * 8.63E+13) = 8.63E+12 colonies/day

Sum of design flows for point sources of FC for Subsegment 090401^E = 0.0297 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090401 = 2.25E+08 colonies/day

WLA for FC for Subsegment 090401 (same as existing point source load) = 2.25E+08 colonies/day

LA for FC for Subsegment 090401 = TMDL - MOS - WLA - FG = 6.91E+13 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 98% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 0063 BOGUE LUSA CREEK TMDL SUMMER.XLS

TABLE H.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Secondary Contact Recreation)
Drainage area at flow gage = 72.7 mi²

Target load = 1.99E+14 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
18	0.248	99.92%	0.112	1.21E+10	9.69E+09	1.36E+09
19	0.261	99.78%	0.122	1.28E+10	1.02E+10	1.56E+09
20	0.275	99.67%	0.122	1.35E+10	1.08E+10	1.64E+09
21	0.289	99.53%	0.141	1.41E+10	1.13E+10	1.99E+09
22	0.303	99.39%	0.115	1.48E+10	1.18E+10	1.71E+09
23	0.316	99.30%	0.103	1.55E+10	1.24E+10	1.59E+09
24	0.330	99.19%	0.119	1.62E+10	1.29E+10	1.92E+09
25	0.344	99.06%	0.119	1.68E+10	1.35E+10	2.00E+09
26	0.358	98.95%	0.093	1.75E+10	1.40E+10	1.63E+09
27	0.365	98.88%	0.042	1.79E+10	1.43E+10	7.45E+08
27	0.368	98.86%	0.013	1.80E+10	1.44E+10	2.31E+08
27	0.370	98.85%	0.074	1.81E+10	1.45E+10	1.34E+09
27	0.371	98.72%	0.135	1.82E+10	1.45E+10	2.45E+09
27	0.371	98.58%	0.074	1.82E+10	1.45E+10	1.34E+09
27	0.378	98.57%	0.026	1.85E+10	1.48E+10	4.74E+08
28	0.385	98.53%	0.122	1.88E+10	1.51E+10	2.30E+09
29	0.399	98.33%	0.225	1.95E+10	1.56E+10	4.38E+09
30	0.413	98.08%	9.719	2.02E+10	1.62E+10	1.96E+11
31	0.421	98.00%	9.623	2.06E+10	1.65E+10	1.98E+11
31	0.426	97.60%	9.604	2.09E+10	1.67E+10	2.00E+11

For brevity most of the rows have been hidden (between the 97.60% and 0.25% percent exceedances).

2083	28.657	0.25%	0.013	1.40E+12	1.12E+12	1.80E+10
2107	28.978	0.24%	0.013	1.42E+12	1.13E+12	1.82E+10
2170	29.849	0.22%	0.013	1.46E+12	1.17E+12	1.87E+10
2200	30.261	0.21%	0.013	1.48E+12	1.18E+12	1.90E+10
2211	30.418	0.20%	0.013	1.49E+12	1.19E+12	1.91E+10
2322	31.939	0.19%	0.013	1.56E+12	1.25E+12	2.01E+10
2330	32.050	0.17%	0.013	1.57E+12	1.25E+12	2.01E+10
2370	32.600	0.16%	0.013	1.60E+12	1.28E+12	2.05E+10
2392	32.900	0.15%	0.013	1.61E+12	1.29E+12	2.07E+10
2398	32.980	0.13%	0.013	1.61E+12	1.29E+12	2.07E+10
2520	34.661	0.12%	0.013	1.70E+12	1.36E+12	2.18E+10
2572	35.381	0.11%	0.013	1.73E+12	1.39E+12	2.22E+10
2729	37.543	0.10%	0.013	1.84E+12	1.47E+12	2.36E+10
2790	38.377	0.08%	0.013	1.88E+12	1.50E+12	2.41E+10
2800	38.514	0.07%	0.013	1.88E+12	1.51E+12	2.42E+10
3329	45.788	0.06%	0.013	2.24E+12	1.79E+12	2.87E+10
5210	71.664	0.04%	0.013	3.51E+12	2.81E+12	4.50E+10
5300	72.902	0.03%	0.013	3.57E+12	2.85E+12	4.58E+10
5330	73.315	0.02%	0.013	3.59E+12	2.87E+12	4.60E+10
7320	100.688	0.01%	0.010	4.93E+12	3.94E+12	4.74E+10

Sum = Target load = 1.99E+14

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 0063 BOGUE LUSA CREEK TMDL WINTER.XLS

TABLE H.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR BOGUE LUSA CREEK (090401)
AT HIGHWAY 436, LA (LDEQ 0063)

Percent Reduction =

90 %

Error check for reduction is/is not needed: OK

Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 0063 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
1/16/2001	16,000	0.80	76.05%	3.12E+11	3.12E+10	3.12E+10	Yes
2/13/2001	230	1.62	35.46%	9.10E+09	9.10E+08	6.33E+10	Yes
3/20/2001	1,700	2.63	18.68%	1.09E+11	1.09E+10	1.03E+11	Yes
4/17/2001	16,000	0.79	76.83%	3.09E+11	3.09E+10	3.09E+10	Yes
11/6/2001	110	0.59	90.70%	1.59E+09	1.59E+08	2.32E+10	Yes
12/11/2001	300	0.65	87.20%	4.79E+09	4.79E+08	2.56E+10	Yes
1/11/2006	16,000	0.60	90.40%	2.35E+11	2.35E+10	2.35E+10	Yes
2/8/2006	1,700	1.25	49.67%	5.19E+10	5.19E+09	4.89E+10	Yes
3/8/2006	1,300	0.99	63.32%	3.16E+10	3.16E+09	3.89E+10	Yes
3/29/2006	16,000	1.00	63.04%	3.92E+11	3.92E+10	3.92E+10	Yes
4/19/2006	170	0.58	92.14%	2.40E+09	2.40E+08	2.26E+10	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							36.4%
Percent of Exceedances after Reductions =							0.0%

Total allowable loading per unit area to meet stds (from Table H.3) = 1.99E+14 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090401 = 1.99E+14 * 76 mi² = 1.52E+16 colonies/day

Explicit MOS for FC for Subsegment 090401 (10% * 1.52E+16) = 1.52E+15 colonies/day
Explicit FG for FC for Subsegment 090401 (10% * 1.52E+16) = 1.52E+15 colonies/day

Sum of design flows for point sources of FC for Subsegment 090401^E = 0.0297 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090401 = 2.25E+08 colonies/day

WLA for FC for Subsegment 090401 (same as existing point source load) = 2.25E+08 colonies/day

LA for FC for Subsegment 090401 = TMDL - MOS - WLA - FG = 1.21E+16 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 90% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 0063 BOGUE LUSA CREEK TMDL WINTER.XLS

Figure H.1 Summer load duration curve for Bogue Lusa Creek (090401) (LDEQ 0063)

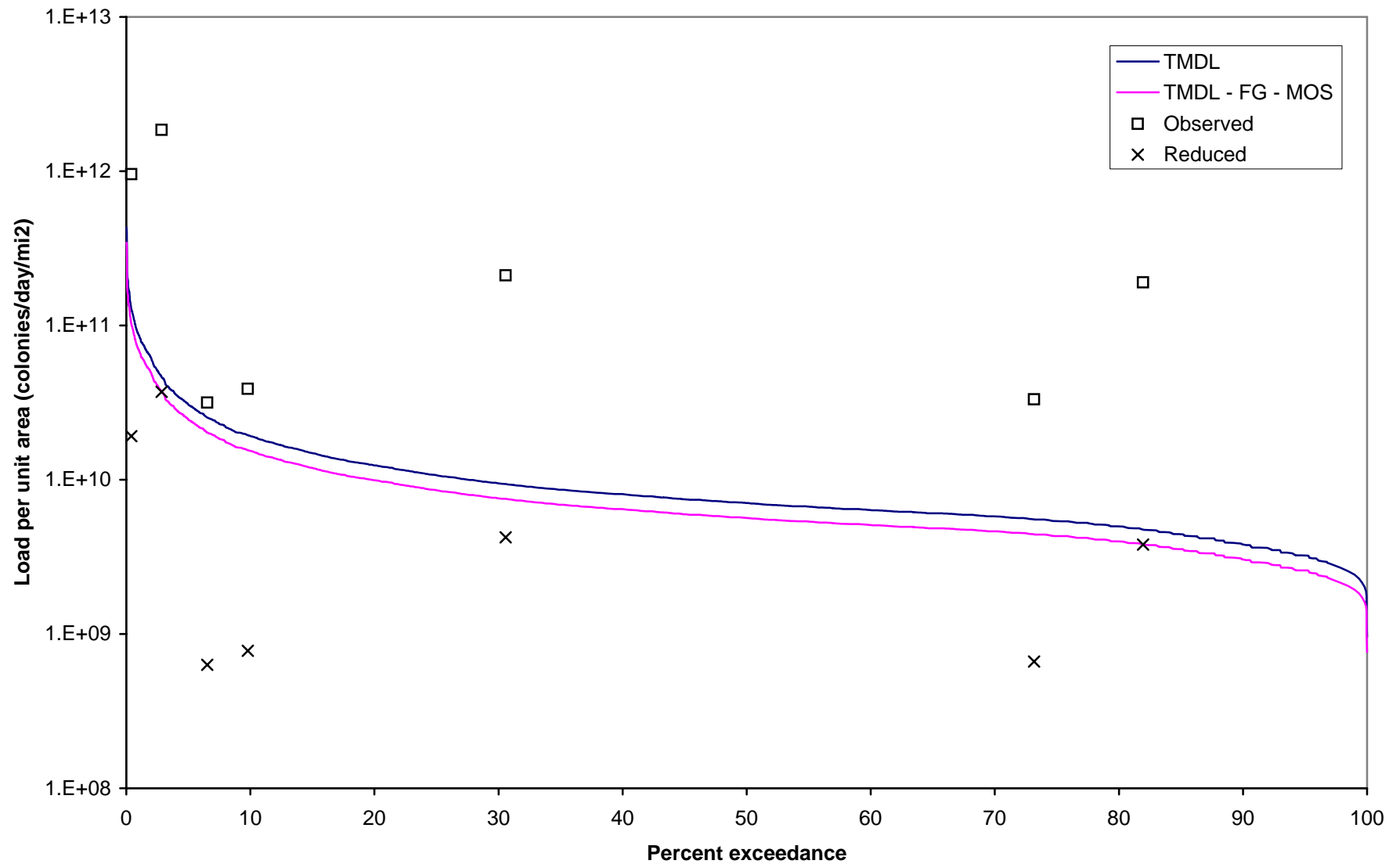
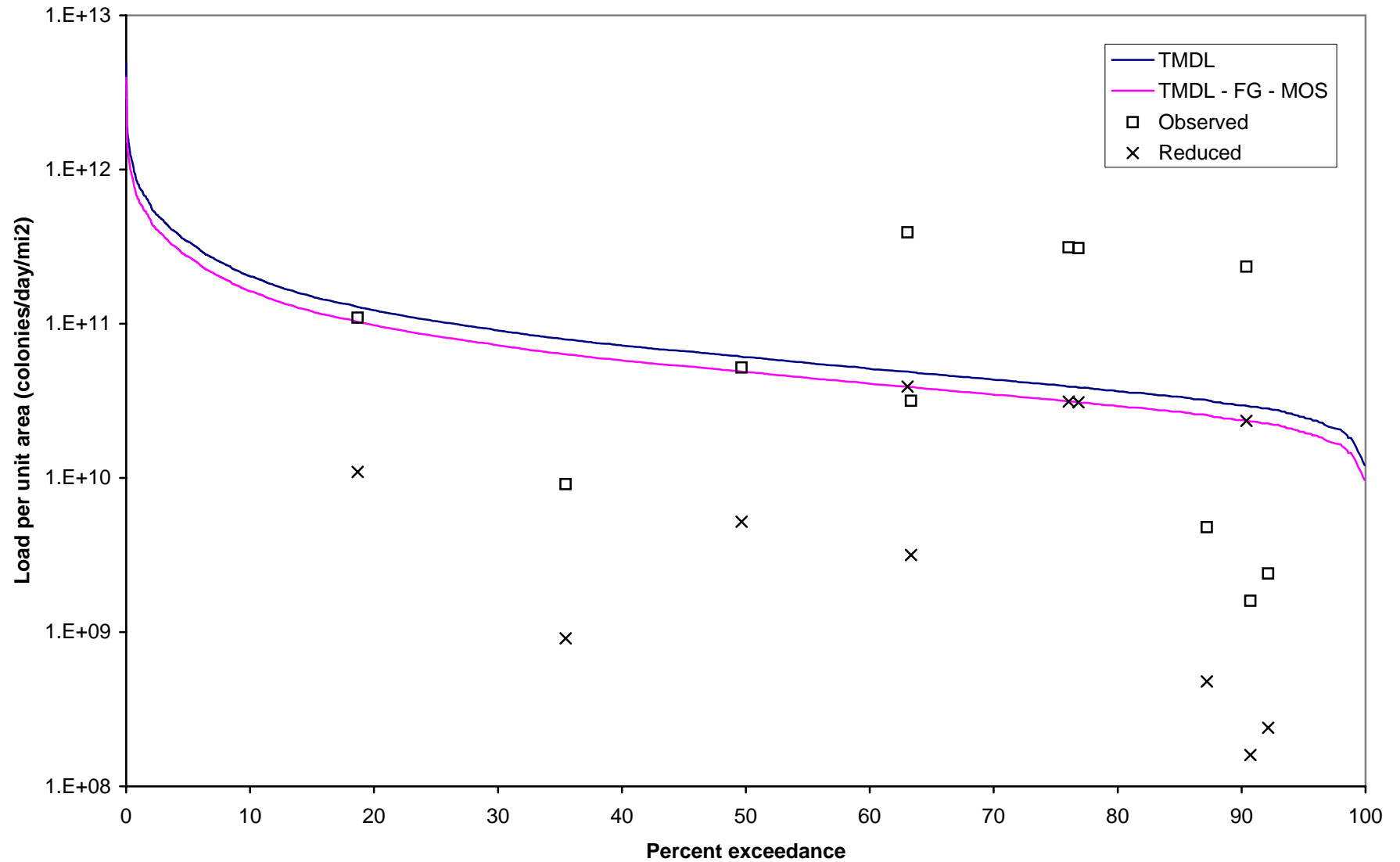


Figure H.2 Winter load duration curve for Bogue Lusa Creek (090401) (LDEQ 0063)



APPENDIX I

TMDL Calculations for Subsegment 090502-Big Silver Creek

TABLE I.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR TCHEFUNCTA RIVER
NEAR FOLSOM, LA (USED FOR SUBSEGMENTS 090502 AND 090505)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)
Drainage area at flow gage = 95.5 mi²

Target load = 1.05E+12 colonies/day/mi²

Tchefuncta near Folsom, LA (07375000) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
25	0.262	99.98%	0.024	2.56E+09	2.05E+09	6.13E+07
26	0.272	99.95%	0.055	2.66E+09	2.13E+09	1.47E+08
27	0.283	99.87%	0.285	2.77E+09	2.21E+09	7.88E+08
28	0.293	99.38%	0.555	2.87E+09	2.30E+09	1.59E+09
29	0.304	98.76%	0.519	2.97E+09	2.38E+09	1.54E+09
30	0.314	98.34%	0.402	3.07E+09	2.46E+09	1.24E+09
31	0.325	97.96%	0.402	3.18E+09	2.54E+09	1.28E+09
32	0.335	97.54%	0.457	3.28E+09	2.62E+09	1.50E+09
33	0.346	97.04%	0.531	3.38E+09	2.71E+09	1.80E+09
34	0.356	96.48%	0.610	3.48E+09	2.79E+09	2.13E+09
35	0.366	95.82%	0.771	3.59E+09	2.87E+09	2.76E+09
36	0.377	94.94%	1.034	3.69E+09	2.95E+09	3.81E+09
37	0.387	93.75%	1.302	3.79E+09	3.03E+09	4.94E+09
38	0.398	92.33%	1.539	3.89E+09	3.12E+09	5.99E+09
39	0.408	90.67%	1.783	4.00E+09	3.20E+09	7.13E+09
40	0.419	88.76%	1.838	4.10E+09	3.28E+09	7.53E+09
41	0.429	87.00%	1.829	4.20E+09	3.36E+09	7.68E+09
42	0.440	85.11%	1.972	4.30E+09	3.44E+09	8.49E+09
43	0.450	83.05%	2.109	4.41E+09	3.53E+09	9.29E+09
44	0.461	80.89%	2.341	4.51E+09	3.61E+09	1.06E+10

For brevity most of the rows have been hidden (between the 80.89% and 0.21% percent exceedances).

2,380	24.921	0.21%	0.010	2.44E+11	1.95E+11	2.33E+09
2,520	26.387	0.20%	0.010	2.58E+11	2.07E+11	2.47E+09
2,590	27.120	0.19%	0.010	2.65E+11	2.12E+11	2.54E+09
2,780	29.110	0.18%	0.012	2.85E+11	2.28E+11	3.41E+09
2,900	30.366	0.16%	0.014	2.97E+11	2.38E+11	4.27E+09
2,970	31.099	0.15%	0.014	3.04E+11	2.43E+11	4.37E+09
3,000	31.414	0.13%	0.014	3.07E+11	2.46E+11	4.41E+09
3,150	32.984	0.12%	0.012	3.23E+11	2.58E+11	3.86E+09
3,870	40.524	0.11%	0.010	3.97E+11	3.17E+11	3.80E+09
4,190	43.874	0.10%	0.010	4.29E+11	3.43E+11	4.11E+09
4,330	45.340	0.09%	0.010	4.44E+11	3.55E+11	4.25E+09
4,360	45.654	0.08%	0.010	4.47E+11	3.57E+11	4.28E+09
4,500	47.120	0.07%	0.010	4.61E+11	3.69E+11	4.41E+09
4,770	49.948	0.06%	0.010	4.89E+11	3.91E+11	4.68E+09
4,790	50.157	0.05%	0.010	4.91E+11	3.93E+11	4.70E+09
5,000	52.356	0.04%	0.010	5.12E+11	4.10E+11	4.91E+09
5,100	53.403	0.03%	0.010	5.23E+11	4.18E+11	5.00E+09
8,340	87.330	0.02%	0.010	8.55E+11	6.84E+11	8.18E+09
9,760	102.199	0.01%	0.010	1.00E+12	8.00E+11	9.58E+09
10,400	108.901	0.00%	0.007	1.07E+12	8.53E+11	7.65E+09

Sum = Target load = 1.05E+12

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1058 BIG SILVER CREEK TMDL SUMMER.XLS

TABLE I.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR BIG SILVER CREEK (090502)
AT HIGHWAY 38, LA (LDEQ 1058)

Percent Reduction =

60 %

Error check for reduction is/is not needed: OK

Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 1058 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
5/8/01	23	0.32	97.96%	1.83E+08	7.31E+07	2.54E+09	Yes
6/5/01	220	0.31	98.34%	1.69E+09	6.76E+08	2.46E+09	Yes
7/10/01	300	0.50	70.90%	3.69E+09	1.48E+09	3.94E+09	Yes
8/7/01	700	0.53	63.62%	9.15E+09	3.66E+09	4.18E+09	Yes
9/4/01	1,100	3.11	4.46%	8.37E+10	3.35E+10	2.43E+10	No
10/2/01	800	0.46	80.89%	9.02E+09	3.61E+09	3.61E+09	Yes
10/30/01	300	0.46	80.89%	3.38E+09	1.35E+09	3.61E+09	Yes

Allowable Percent of Exceedances = 25.0%
Percent of Exceedances before Reductions = 42.9%
Percent of Exceedances after Reductions = 14.3%

Total allowable loading per unit area to meet stds (from Table I.1) =

1.05E+12 colonies/day/mi²

Total allowable loading at downstream end of Subsegment 090502 = 1.05E+12 * 97 mi² =

1.02E+14 colonies/day

Explicit MOS for FC for Subsegment 090502 (10% * 1.02E+14) =

1.02E+13 colonies/day

Explicit FG for FC for Subsegment 090502 (10% * 1.02E+14) =

1.02E+13 colonies/day

Sum of design flows for point sources of FC for Subsegment 090502^E =

0.011 MGD

Assumed effluent FC concentration for point sources =

200 colonies/100 mL

Existing point source FC load for Subsegment 090502 =

8.33E+07 colonies/day

WLA for FC for Subsegment 090502 (same as existing point source load) =

8.33E+07 colonies/day

LA for FC for Subsegment 090502 = TMDL - MOS - WLA - FG =

8.14E+13 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 60% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 1058 BIG SILVER CREEK TMDL SUMMER.XLS

TABLE I.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR TCHEFUNCTA RIVER
NEAR FOLSOM, LA (USED FOR SUBSEGMENTS 090502 AND 090505)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Primary Contact Recreation)
Drainage area at flow gage = 95.5 mi²

Target load = 1.07E+13 colonies/day/mi²

Tchefuncta near Folsom, LA (07375000) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
28	0.293	99.96%	0.041	1.43E+10	1.15E+10	5.86E+08
29	0.304	99.92%	0.034	1.49E+10	1.19E+10	4.99E+08
30	0.314	99.89%	0.026	1.54E+10	1.23E+10	4.06E+08
31	0.325	99.87%	0.024	1.59E+10	1.27E+10	3.81E+08
32	0.335	99.85%	0.022	1.64E+10	1.31E+10	3.54E+08
33	0.346	99.82%	0.036	1.69E+10	1.35E+10	6.09E+08
34	0.356	99.77%	0.060	1.74E+10	1.39E+10	1.05E+09
35	0.366	99.70%	0.079	1.79E+10	1.43E+10	1.42E+09
36	0.377	99.62%	0.134	1.84E+10	1.48E+10	2.48E+09
37	0.387	99.43%	0.312	1.90E+10	1.52E+10	5.92E+09
38	0.398	98.99%	0.567	1.95E+10	1.56E+10	1.10E+10
39	0.408	98.30%	0.778	2.00E+10	1.60E+10	1.55E+10
40	0.419	97.44%	0.802	2.05E+10	1.64E+10	1.64E+10
41	0.429	96.70%	0.672	2.10E+10	1.68E+10	1.41E+10
42	0.440	96.09%	0.627	2.15E+10	1.72E+10	1.35E+10
43	0.450	95.44%	0.720	2.20E+10	1.76E+10	1.59E+10
44	0.461	94.65%	0.840	2.25E+10	1.80E+10	1.89E+10
45	0.471	93.76%	0.896	2.31E+10	1.84E+10	2.06E+10
46	0.482	92.86%	0.876	2.36E+10	1.89E+10	2.07E+10
47	0.492	92.01%	0.948	2.41E+10	1.93E+10	2.28E+10

For brevity most of the rows have been hidden (between the 92.01% and 0.20% percent exceedances).

4,240	44.398	0.20%	0.012	2.17E+12	1.74E+12	2.61E+10
4,260	44.607	0.18%	0.014	2.18E+12	1.75E+12	3.14E+10
4,310	45.131	0.17%	0.012	2.21E+12	1.77E+12	2.65E+10
4,320	45.236	0.16%	0.010	2.21E+12	1.77E+12	2.13E+10
4,400	46.073	0.15%	0.010	2.25E+12	1.80E+12	2.17E+10
4,580	47.958	0.14%	0.010	2.35E+12	1.88E+12	2.25E+10
4,880	51.099	0.13%	0.010	2.50E+12	2.00E+12	2.40E+10
5,090	53.298	0.12%	0.010	2.61E+12	2.09E+12	2.50E+10
5,460	57.173	0.11%	0.010	2.80E+12	2.24E+12	2.69E+10
6,310	66.073	0.10%	0.010	3.23E+12	2.59E+12	3.11E+10
6,600	69.110	0.09%	0.010	3.38E+12	2.71E+12	3.25E+10
6,930	72.565	0.08%	0.010	3.55E+12	2.84E+12	3.41E+10
8,390	87.853	0.07%	0.010	4.30E+12	3.44E+12	4.13E+10
9,460	99.058	0.06%	0.010	4.85E+12	3.88E+12	4.66E+10
10,200	106.806	0.05%	0.010	5.23E+12	4.18E+12	5.02E+10
10,300	107.853	0.04%	0.010	5.28E+12	4.22E+12	5.07E+10
10,800	113.089	0.03%	0.010	5.53E+12	4.43E+12	5.31E+10
13,300	139.267	0.02%	0.010	6.81E+12	5.45E+12	6.54E+10
14,800	154.974	0.01%	0.010	7.58E+12	6.07E+12	7.28E+10
15,100	158.115	0.00%	0.007	7.74E+12	6.19E+12	5.57E+10

Sum = Target load = 1.07E+13

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1058 BIG SILVER CREEK TMDL WINTER.XLS

TABLE I.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR BIG SILVER CREEK (090502)
AT HIGHWAY 38, LA (LDEQ 1058)

Percent Reduction =

90 %

Error check for reduction is/is not needed: OK

Error check more reduction needed/not needed: OK

Date ^A	Observed FC at Station 1058 (colonies/100 mL)	Flow per unit area on sampling day (cfs/mi ²)	Percent exceedance for flow on sampling day	Observed FC load (colonies/day/mi ²) ^B	Reduced FC load (colonies/day/mi ²) ^C	Allowable FC load (colonies/day/mi ²) ^D	Reduced load less than or equal to allow load
2/6/01	240	0.64	75.55%	3.75E+09	3.75E+08	2.50E+10	Yes
3/13/01	16,000	9.07	3.78%	3.55E+12	3.55E+11	3.55E+11	Yes
4/9/01	170	0.52	88.59%	2.18E+09	2.18E+08	2.05E+10	Yes
12/3/01	700	0.54	86.04%	9.33E+09	9.33E+08	2.13E+10	Yes
1/24/06	16,000	0.68	70.90%	2.66E+11	2.66E+10	2.66E+10	Yes
2/14/06	800	0.94	51.25%	1.84E+10	1.84E+09	3.69E+10	Yes
3/14/06	16,000	0.69	69.73%	2.71E+11	2.71E+10	2.71E+10	Yes
4/4/06	700	0.57	83.69%	9.68E+09	9.68E+08	2.21E+10	Yes
4/25/06	300	0.37	99.70%	2.69E+09	2.69E+08	1.43E+10	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							33.3%
Percent of Exceedances after Reductions =							0.0%

Total allowable loading per unit area to meet stds (from Table I.3) =

1.07E+13 colonies/day/mi²

Total allowable loading at downstream end of Subsegment 090502 = 1.07E+13 * 97 mi² =

1.03E+15 colonies/day

Explicit MOS for FC for Subsegment 090502 (10% * 1.03E+15) =

1.03E+14 colonies/day

Explicit FG for FC for Subsegment 090502 (10% * 1.03E+15) =

1.03E+14 colonies/day

Sum of design flows for point sources of FC for Subsegment 090502^E =

0.011 MGD

Assumed effluent FC concentration for point sources =

200 colonies/100 mL

Existing point source FC load for Subsegment 090502 =

8.33E+07 colonies/day

WLA for FC for Subsegment 090502 (same as existing point source load) =

8.33E+07 colonies/day

LA for FC for Subsegment 090502 = TMDL - MOS - WLA - FG =

8.26E+14 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 90% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJECTS\2110-623\TECH\TMDL\PEARL\FECAL\UPDATED\LDEQ 1058 BIG SILVER CREEK TMDL WINTER.XLS

Figure I.1 Summer load duration curve for Big Silver Creek (090502) (LDEQ 1058)

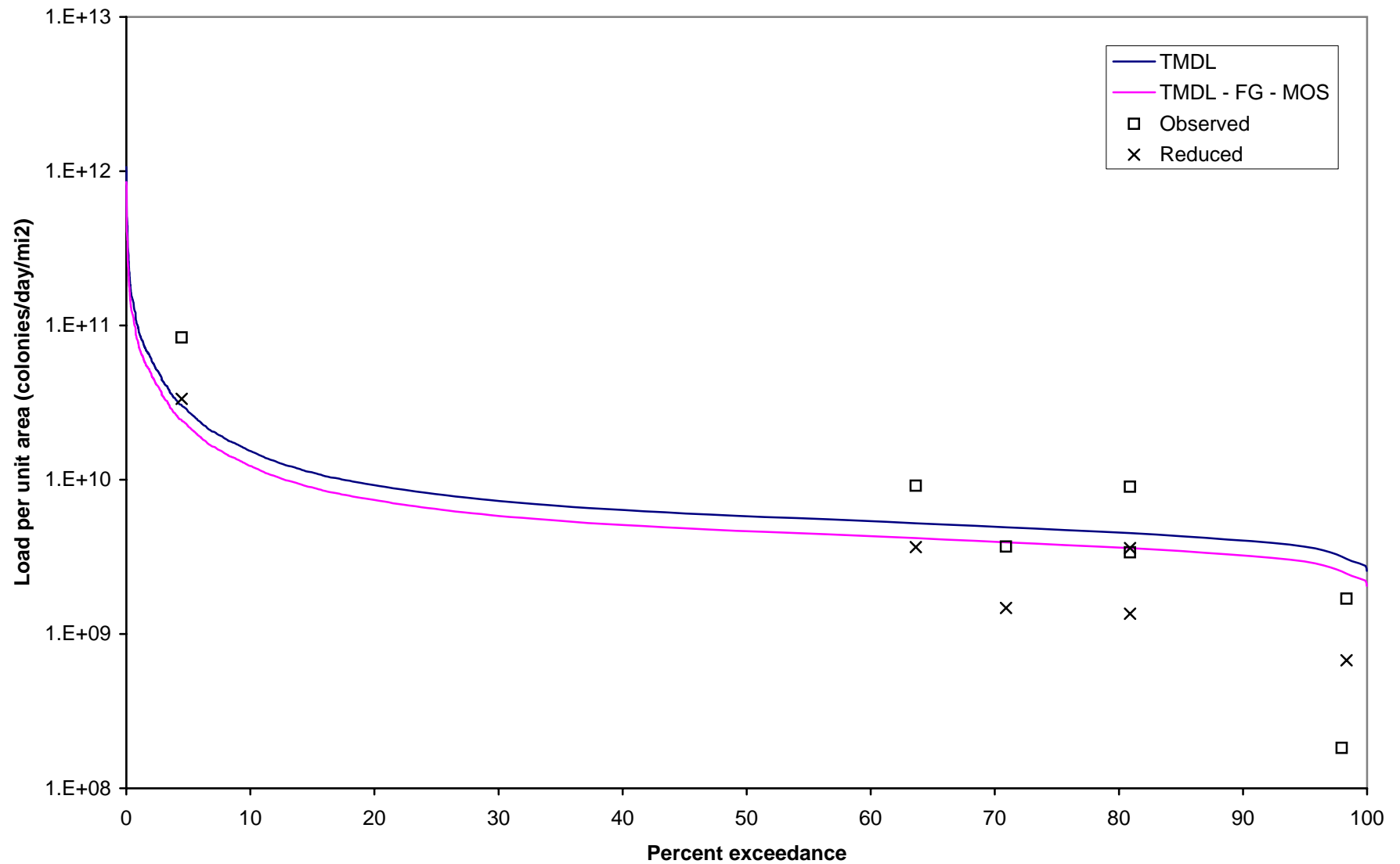
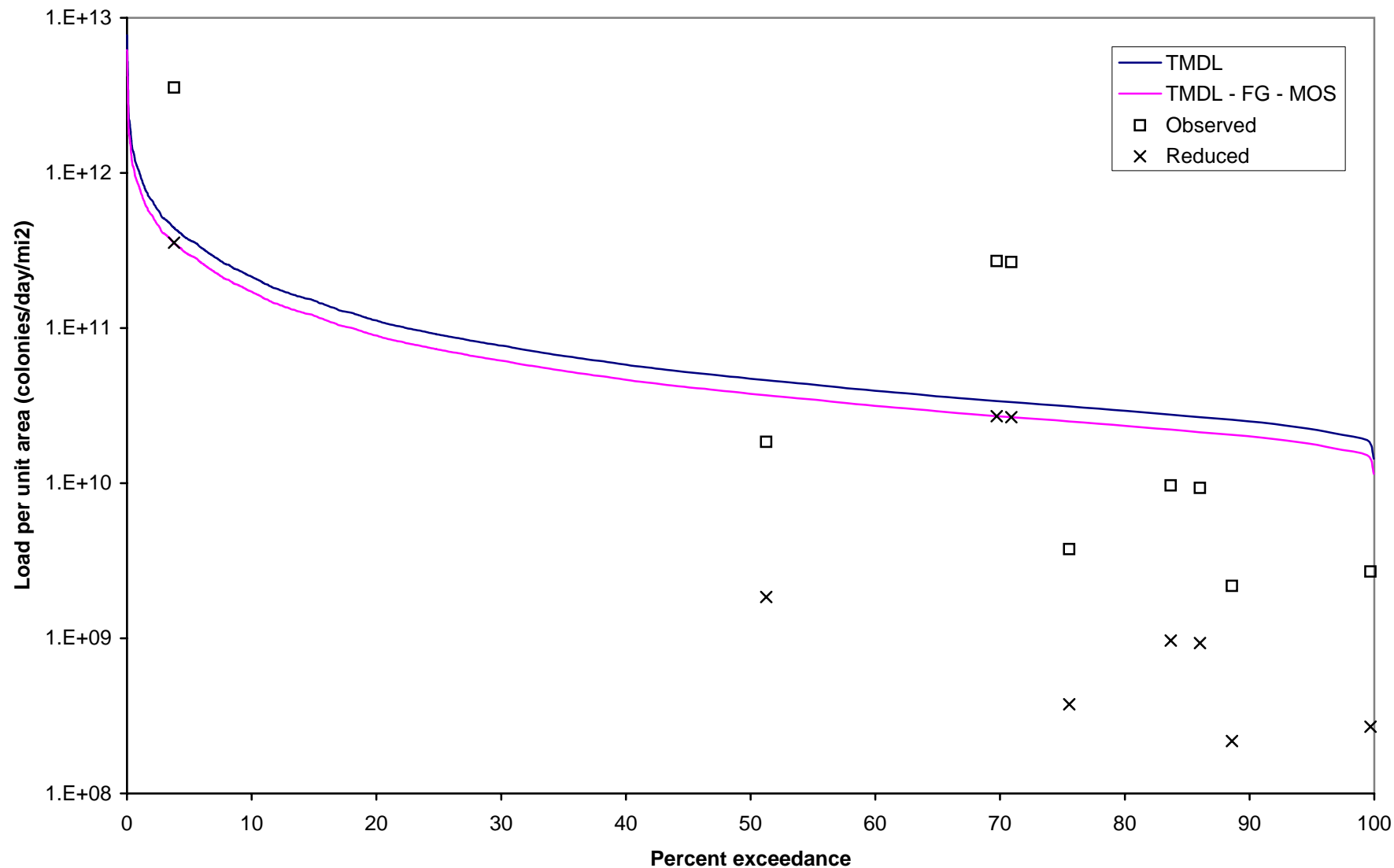


Figure I.2 Winter load duration curve for Big Silver Creek (090502) (LDEQ 1058)



APPENDIX J

TMDL Calculations for Subsegment 090505-Bonner Creek

TABLE J.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR TCHEFUNCTA RIVER
NEAR FOLSOM, LA (USED FOR SUBSEGMENTS 090502 AND 090505)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)
Drainage area at flow gage = 95.5 mi²

Target load = 1.05E+12 colonies/day/mi²

Tchefuncta near Folsom, LA (07375000) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
25	0.262	99.98%	0.024	2.56E+09	2.05E+09	6.13E+07
26	0.272	99.95%	0.055	2.66E+09	2.13E+09	1.47E+08
27	0.283	99.87%	0.285	2.77E+09	2.21E+09	7.88E+08
28	0.293	99.38%	0.555	2.87E+09	2.30E+09	1.59E+09
29	0.304	98.76%	0.519	2.97E+09	2.38E+09	1.54E+09
30	0.314	98.34%	0.402	3.07E+09	2.46E+09	1.24E+09
31	0.325	97.96%	0.402	3.18E+09	2.54E+09	1.28E+09
32	0.335	97.54%	0.457	3.28E+09	2.62E+09	1.50E+09
33	0.346	97.04%	0.531	3.38E+09	2.71E+09	1.80E+09
34	0.356	96.48%	0.610	3.48E+09	2.79E+09	2.13E+09
35	0.366	95.82%	0.771	3.59E+09	2.87E+09	2.76E+09
36	0.377	94.94%	1.034	3.69E+09	2.95E+09	3.81E+09
37	0.387	93.75%	1.302	3.79E+09	3.03E+09	4.94E+09
38	0.398	92.33%	1.539	3.89E+09	3.12E+09	5.99E+09
39	0.408	90.67%	1.783	4.00E+09	3.20E+09	7.13E+09
40	0.419	88.76%	1.838	4.10E+09	3.28E+09	7.53E+09
41	0.429	87.00%	1.829	4.20E+09	3.36E+09	7.68E+09
42	0.440	85.11%	1.972	4.30E+09	3.44E+09	8.49E+09
43	0.450	83.05%	2.109	4.41E+09	3.53E+09	9.29E+09
44	0.461	80.89%	2.341	4.51E+09	3.61E+09	1.06E+10

For brevity most of the rows have been hidden (between the 80.89% and 0.21% percent exceedances).

2,380	24.921	0.21%	0.010	2.44E+11	1.95E+11	2.33E+09
2,520	26.387	0.20%	0.010	2.58E+11	2.07E+11	2.47E+09
2,590	27.120	0.19%	0.010	2.65E+11	2.12E+11	2.54E+09
2,780	29.110	0.18%	0.012	2.85E+11	2.28E+11	3.41E+09
2,900	30.366	0.16%	0.014	2.97E+11	2.38E+11	4.27E+09
2,970	31.099	0.15%	0.014	3.04E+11	2.43E+11	4.37E+09
3,000	31.414	0.13%	0.014	3.07E+11	2.46E+11	4.41E+09
3,150	32.984	0.12%	0.012	3.23E+11	2.58E+11	3.86E+09
3,870	40.524	0.11%	0.010	3.97E+11	3.17E+11	3.80E+09
4,190	43.874	0.10%	0.010	4.29E+11	3.43E+11	4.11E+09
4,330	45.340	0.09%	0.010	4.44E+11	3.55E+11	4.25E+09
4,360	45.654	0.08%	0.010	4.47E+11	3.57E+11	4.28E+09
4,500	47.120	0.07%	0.010	4.61E+11	3.69E+11	4.41E+09
4,770	49.948	0.06%	0.010	4.89E+11	3.91E+11	4.68E+09
4,790	50.157	0.05%	0.010	4.91E+11	3.93E+11	4.70E+09
5,000	52.356	0.04%	0.010	5.12E+11	4.10E+11	4.91E+09
5,100	53.403	0.03%	0.010	5.23E+11	4.18E+11	5.00E+09
8,340	87.330	0.02%	0.010	8.55E+11	6.84E+11	8.18E+09
9,760	102.199	0.01%	0.010	1.00E+12	8.00E+11	9.58E+09
10,400	108.901	0.00%	0.007	1.07E+12	8.53E+11	7.65E+09

Sum = Target load = 1.05E+12

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1060 BONNER CREEK TMDL SUMMER.XLS

TABLE J.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR BONNER CREEK (090505)
AT HIGHWAY 25, LA (LDEQ 1060)

Percent Reduction = 36 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

Date ^A	Observed FC at Station 1060 (colonies/100 mL)	Flow per unit area on sampling day (cfs/mi ²)	Percent exceedance for flow on sampling day	Observed FC load (colonies/day/mi ²) ^B	Reduced FC load (colonies/day/mi ²) ^C	Allowable FC load (colonies/day/mi ²) ^D	Reduced load less than or equal to allow load
5/8/2001	80	0.32	97.96%	6.35E+08	4.07E+08	2.54E+09	Yes
6/5/2001	230	0.31	98.34%	1.77E+09	1.13E+09	2.46E+09	Yes
7/10/2001	500	0.50	70.90%	6.15E+09	3.94E+09	3.94E+09	Yes
8/7/2001	230	0.53	63.62%	3.01E+09	1.92E+09	4.18E+09	Yes
9/4/2001	3,000	3.11	4.46%	2.28E+11	1.46E+11	2.43E+10	No
10/2/2001	500	0.46	80.89%	5.64E+09	3.61E+09	3.61E+09	Yes
10/30/2001	130	0.46	80.89%	1.47E+09	9.38E+08	3.61E+09	Yes
6/7/2006	110	0.42	88.76%	1.13E+09	7.21E+08	3.28E+09	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							37.5%
Percent of Exceedances after Reductions =							12.5%

Total allowable loading per unit area to meet stds (from Table J.1) = 1.05E+12 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090502 = 1.05E+12 * 184 mi² = 1.94E+14 colonies/day

Explicit MOS for FC for Subsegment 090502 (10% * 1.94E+14) = 1.94E+13 colonies/day
Explicit FG for FC for Subsegment 090502 (10% * 1.94E+14) = 1.94E+13 colonies/day

Sum of design flows for point sources of FC for Subsegment 090502 = 0.0039 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090502 = 2.95E+07 colonies/day

WLA for FC for Subsegment 090502 (same as existing point source load) = 2.95E+07 colonies/day

LA for FC for Subsegment 090502 = TMDL - MOS - WLA - FG = 1.55E+14 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.
B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".
C. This is the load calculated as described in note B and reduced by 36% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.
D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.
E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1060 BONNER CREEK TMDL SUMMER.XLS

TABLE J.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR TCHEFUNCTA RIVER
NEAR FOLSOM,LA (USED FOR SUBSEGMENTS 090502 AND 090505)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Secondary Contact Recreation)

Drainage area at flow gage = 95.5 mi²

Target load = 1.07E+13 colonies/day/mi²

Tchefuncta near Folsom, LA (07375000) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
28	0.293	99.96%	0.041	1.43E+10	1.15E+10	5.86E+08
29	0.304	99.92%	0.034	1.49E+10	1.19E+10	4.99E+08
30	0.314	99.89%	0.026	1.54E+10	1.23E+10	4.06E+08
31	0.325	99.87%	0.024	1.59E+10	1.27E+10	3.81E+08
32	0.335	99.85%	0.022	1.64E+10	1.31E+10	3.54E+08
33	0.346	99.82%	0.036	1.69E+10	1.35E+10	6.09E+08
34	0.356	99.77%	0.060	1.74E+10	1.39E+10	1.05E+09
35	0.366	99.70%	0.079	1.79E+10	1.43E+10	1.42E+09
36	0.377	99.62%	0.134	1.84E+10	1.48E+10	2.48E+09
37	0.387	99.43%	0.312	1.90E+10	1.52E+10	5.92E+09
38	0.398	98.99%	0.567	1.95E+10	1.56E+10	1.10E+10
39	0.408	98.30%	0.778	2.00E+10	1.60E+10	1.55E+10
40	0.419	97.44%	0.802	2.05E+10	1.64E+10	1.64E+10
41	0.429	96.70%	0.672	2.10E+10	1.68E+10	1.41E+10
42	0.440	96.09%	0.627	2.15E+10	1.72E+10	1.35E+10
43	0.450	95.44%	0.720	2.20E+10	1.76E+10	1.59E+10
44	0.461	94.65%	0.840	2.25E+10	1.80E+10	1.89E+10
45	0.471	93.76%	0.896	2.31E+10	1.84E+10	2.06E+10
46	0.482	92.86%	0.876	2.36E+10	1.89E+10	2.07E+10
47	0.492	92.01%	0.948	2.41E+10	1.93E+10	2.28E+10

For brevity most of the rows have been hidden (between the 92.01% and 0.20% percent exceedances).

4,240	44.398	0.20%	0.012	2.17E+12	1.74E+12	2.61E+10
4,260	44.607	0.18%	0.014	2.18E+12	1.75E+12	3.14E+10
4,310	45.131	0.17%	0.012	2.21E+12	1.77E+12	2.65E+10
4,320	45.236	0.16%	0.010	2.21E+12	1.77E+12	2.13E+10
4,400	46.073	0.15%	0.010	2.25E+12	1.80E+12	2.17E+10
4,580	47.958	0.14%	0.010	2.35E+12	1.88E+12	2.25E+10
4,880	51.099	0.13%	0.010	2.50E+12	2.00E+12	2.40E+10
5,090	53.298	0.12%	0.010	2.61E+12	2.09E+12	2.50E+10
5,460	57.173	0.11%	0.010	2.80E+12	2.24E+12	2.69E+10
6,310	66.073	0.10%	0.010	3.23E+12	2.59E+12	3.11E+10
6,600	69.110	0.09%	0.010	3.38E+12	2.71E+12	3.25E+10
6,930	72.565	0.08%	0.010	3.55E+12	2.84E+12	3.41E+10
8,390	87.853	0.07%	0.010	4.30E+12	3.44E+12	4.13E+10
9,460	99.058	0.06%	0.010	4.85E+12	3.88E+12	4.66E+10
10,200	106.806	0.05%	0.010	5.23E+12	4.18E+12	5.02E+10
10,300	107.853	0.04%	0.010	5.28E+12	4.22E+12	5.07E+10
10,800	113.089	0.03%	0.010	5.53E+12	4.43E+12	5.31E+10
13,300	139.267	0.02%	0.010	6.81E+12	5.45E+12	6.54E+10
14,800	154.974	0.01%	0.010	7.58E+12	6.07E+12	7.28E+10
15,100	158.115	0.00%	0.007	7.74E+12	6.19E+12	5.57E+10

Sum = Target load = 1.07E+13

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1060 BONNER CREEK TMDL WINTER.XLS

TABLE J.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR BONNER CREEK (090505)
AT HIGHWAY 25, LA (LDEQ 1060)

Percent Reduction = 0 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

Date ^A	Observed FC at Station 1060 (colonies/100 mL)	Flow per unit area on sampling day (cfs/mi ²)	Percent exceedance for flow on sampling day	Observed FC load (colonies/day/mi ²) ^B	Reduced FC load (colonies/day/mi ²) ^C	Allowable FC load (colonies/day/mi ²) ^D	Reduced load less than or equal to allow load
2/6/01	50	0.64	75.55%	7.81E+08	7.81E+08	2.50E+10	Yes
3/13/01	5,000	9.07	3.78%	1.11E+12	1.11E+12	3.55E+11	No
4/9/01	80	0.52	88.59%	1.02E+09	1.02E+09	2.05E+10	Yes
12/3/01	90	0.54	86.04%	1.20E+09	1.20E+09	2.13E+10	Yes
1/24/06	140	0.68	70.90%	2.33E+09	2.33E+09	2.66E+10	Yes
2/14/06	130	0.94	51.25%	3.00E+09	3.00E+09	3.69E+10	Yes
3/14/06	170	0.69	69.73%	2.87E+09	2.87E+09	2.71E+10	Yes
4/4/06	140	0.57	83.69%	1.94E+09	1.94E+09	2.21E+10	Yes
4/25/06	80	0.37	99.70%	7.17E+08	7.17E+08	1.43E+10	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							11.1%
Percent of Exceedances after Reductions =							11.1%

Total allowable loading per unit area to meet stds (from Table J.3) = 1.07E+13 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090502 = 1.07E+13 * 184 mi² = 1.97E+15 colonies/day

Explicit MOS for FC for Subsegment 090502 (10% * 1.97E+15) = 1.97E+14 colonies/day
Explicit FG for FC for Subsegment 090502 (10% * 1.97E+15) = 1.97E+14 colonies/day

Sum of design flows for point sources of FC for Subsegment 090502^E = 0.0039 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090502 = 2.95E+07 colonies/day

WLA for FC for Subsegment 090502 (same as existing point source load) = 2.95E+07 colonies/day

LA for FC for Subsegment 090502 = TMDL - MOS - WLA - FG = 1.57E+15 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 0% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. Sum of design flows from available LDEQ permit information.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1060 BONNER CREEK TMDL WINTER.XLS

Figure J.1 Summer load duration curve for Bonner Creek (090505) (LDEQ 1060)

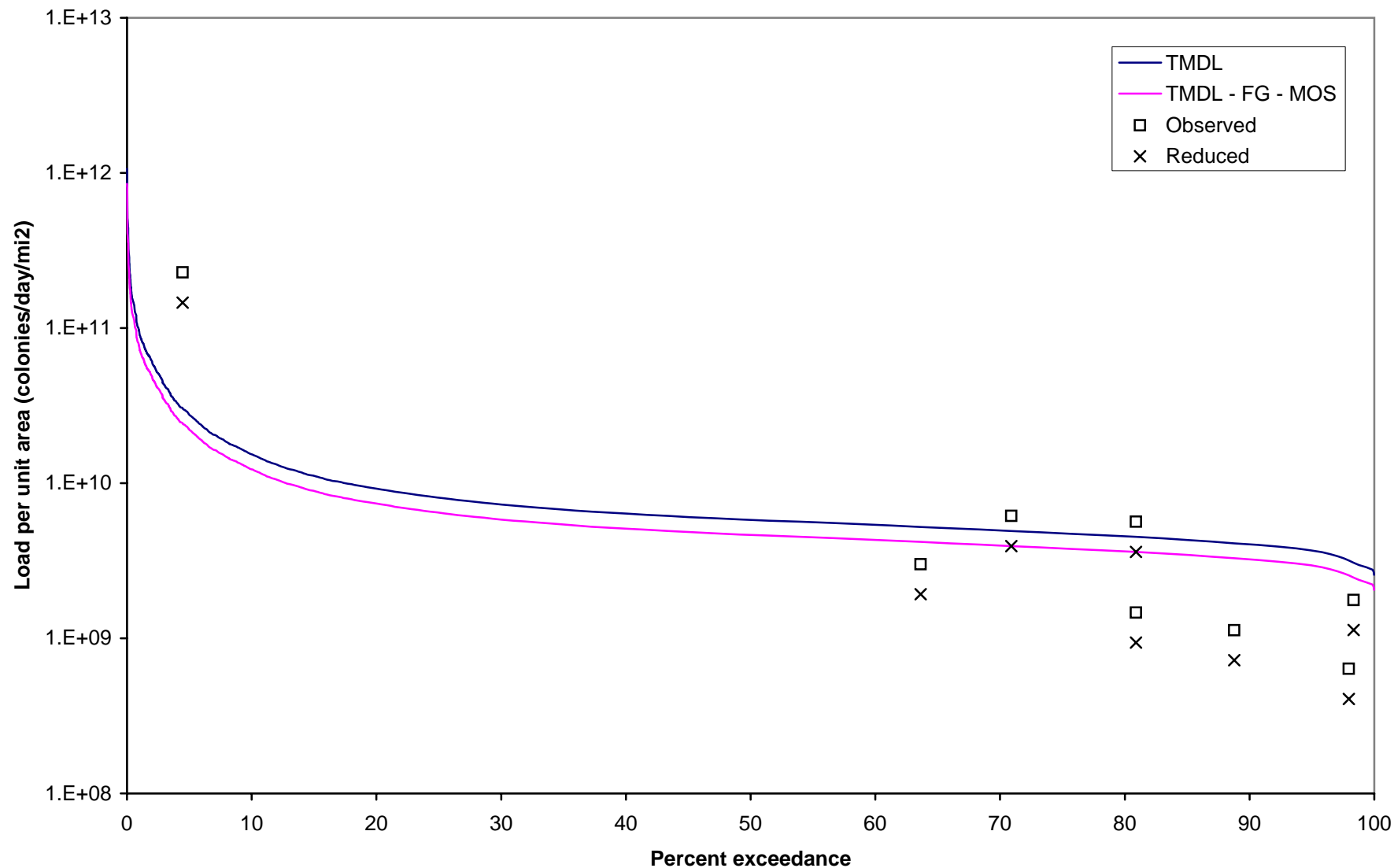
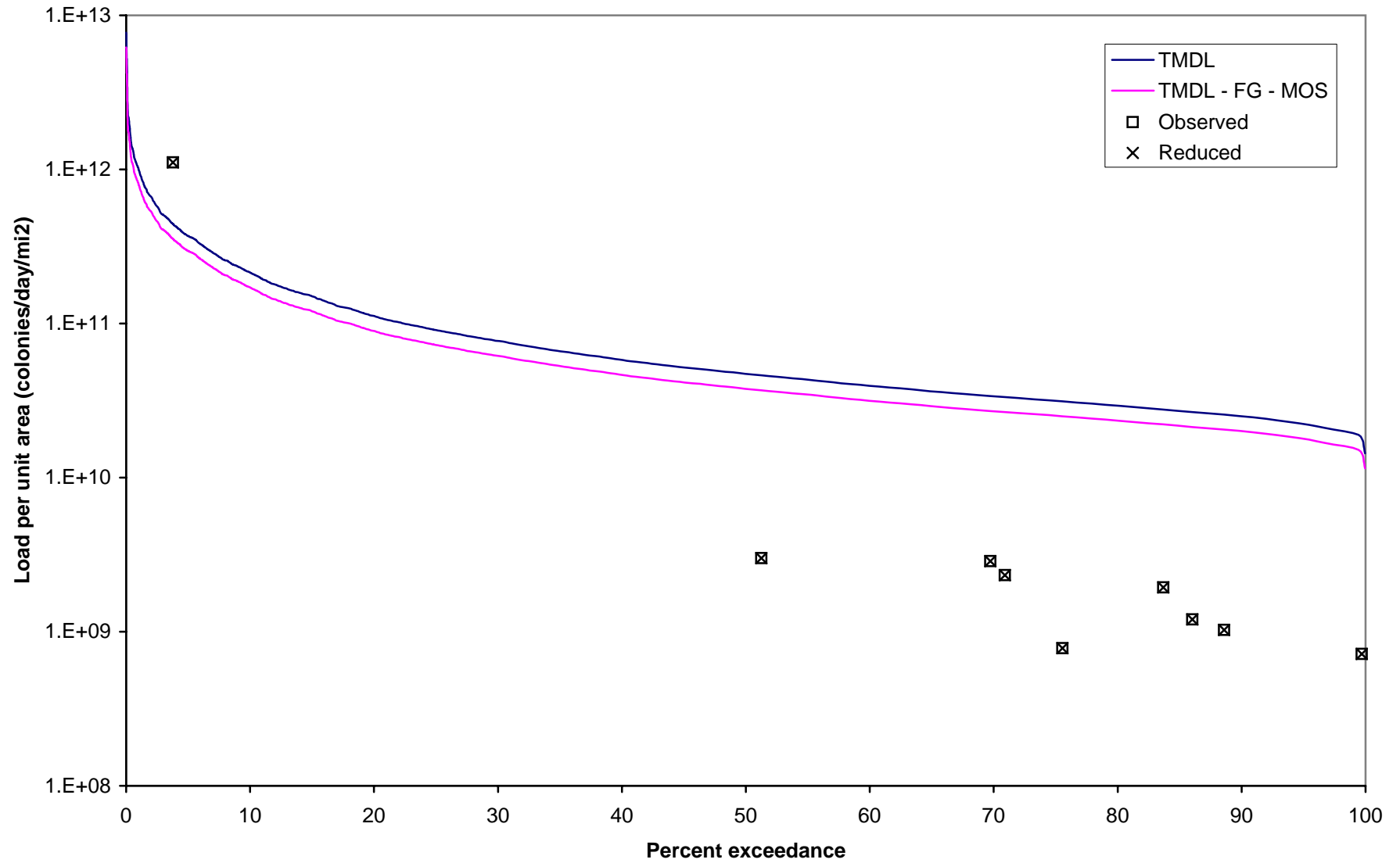


Figure J.2 Winter load duration curve for Bonner Creek (090505) (LDEQ 1060)



APPENDIX K

TMDL Calculations for Subsegment 090506-Thigpen Creek

TABLE K.1 SUMMER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 400 colonies/100 mL (Primary Contact Recreation)

Drainage area at flow gage = 72.7 mi²

Target load = 1.13E+12 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) Flow, (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
7	0.098	99.99%	0.010	9.56E+08	7.65E+08	9.15E+06
8	0.113	99.98%	0.013	1.10E+09	8.83E+08	1.41E+07
9	0.128	99.97%	0.013	1.25E+09	1.00E+09	1.60E+07
13	0.179	99.96%	0.022	1.75E+09	1.40E+09	3.91E+07
14	0.193	99.92%	0.083	1.88E+09	1.51E+09	1.56E+08
15	0.206	99.79%	0.166	2.02E+09	1.62E+09	3.35E+08
16	0.220	99.59%	0.214	2.15E+09	1.72E+09	4.61E+08
17	0.234	99.36%	0.300	2.29E+09	1.83E+09	6.87E+08
18	0.248	98.99%	0.447	2.42E+09	1.94E+09	1.08E+09
19	0.261	98.47%	0.575	2.56E+09	2.05E+09	1.47E+09
20	0.275	97.84%	0.661	2.69E+09	2.15E+09	1.78E+09
21	0.289	97.15%	0.533	2.83E+09	2.26E+09	1.51E+09
22	0.297	96.78%	0.192	2.91E+09	2.33E+09	5.57E+08
22	0.300	96.76%	0.172	2.94E+09	2.35E+09	5.06E+08
22	0.303	96.43%	0.338	2.96E+09	2.37E+09	1.00E+09
22	0.306	96.09%	0.185	2.99E+09	2.39E+09	5.54E+08
22	0.307	96.06%	0.019	3.00E+09	2.40E+09	5.75E+07

For brevity most of the rows have been hidden (between the 96.06% and 0.27% percent exceedances).

1129	15.529	0.27%	0.016	1.52E+11	1.22E+11	2.43E+09
1170	16.090	0.26%	0.019	1.57E+11	1.26E+11	3.02E+09
1234	16.970	0.24%	0.016	1.66E+11	1.33E+11	2.65E+09
1240	17.050	0.22%	0.013	1.67E+11	1.33E+11	2.13E+09
1245	17.130	0.21%	0.013	1.68E+11	1.34E+11	2.14E+09
1257	17.290	0.20%	0.016	1.69E+11	1.35E+11	2.70E+09
1280	17.607	0.18%	0.019	1.72E+11	1.38E+11	3.30E+09
1310	18.019	0.16%	0.016	1.76E+11	1.41E+11	2.81E+09
1315	18.091	0.15%	0.013	1.77E+11	1.42E+11	2.26E+09
1437	19.772	0.13%	0.013	1.93E+11	1.55E+11	2.47E+09
1480	20.358	0.12%	0.016	1.99E+11	1.59E+11	3.18E+09
1500	20.633	0.10%	0.019	2.02E+11	1.62E+11	3.87E+09
1571	21.613	0.08%	0.016	2.12E+11	1.69E+11	3.38E+09
1700	23.384	0.07%	0.016	2.29E+11	1.83E+11	3.65E+09
2000	27.510	0.05%	0.019	2.69E+11	2.15E+11	5.16E+09
3000	41.265	0.03%	0.019	4.04E+11	3.23E+11	7.73E+09
3200	44.017	0.01%	0.016	4.31E+11	3.45E+11	6.87E+09

Sum = Target load = 1.13E+12

NOTES: A. This is the criterion for fecal coliforms (400 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1056 THIGPEN CREEK TMDL SUMMER.XLS

TABLE K.2 SUMMER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR THIGPEN CREEK (090506)
AT MILL CREEK RD (LDEQ 1056)

Percent Reduction = 55 %

Error check for reduction is/is not needed: OK

Error check more reduction needed/not needed: OK

<u>Date^A</u>	<u>Observed FC at Station 1056 (colonies/100 mL)</u>	<u>Flow per unit area on sampling day (cfs/mi²)</u>	<u>Percent exceedance for flow on sampling day</u>	<u>Observed FC load (colonies/day/mi²)^B</u>	<u>Reduced FC load (colonies/day/mi²)^C</u>	<u>Allowable FC load (colonies/day/mi²)^D</u>	<u>Reduced load less than or equal to allow load</u>
5/8/2001	70	0.52	79.07%	8.90E+08	4.00E+08	4.07E+09	Yes
6/5/2001	700	0.45	85.18%	7.70E+09	3.47E+09	3.52E+09	Yes
7/10/2001	50	0.71	51.42%	8.64E+08	3.89E+08	5.53E+09	Yes
8/7/2001	50	0.97	29.93%	1.18E+09	5.33E+08	7.58E+09	Yes
9/4/2001	800	3.18	4.93%	6.22E+10	2.80E+10	2.49E+10	No
10/2/2001	500	0.70	52.71%	8.53E+09	3.84E+09	5.46E+09	Yes
10/30/2001	80	0.63	63.59%	1.23E+09	5.53E+08	4.92E+09	Yes

Allowable Percent of Exceedances = 25.0%
Percent of Exceedances before Reductions = 42.9%
Percent of Exceedances after Reductions = 14.3%

Total allowable loading per unit area to meet stds (from Table K.1) = 1.13E+12 colonies/day/mi²

Total allowable loading at downstream end of Subsegment 090506 = 1.13E+12 * 17 mi² = 1.90E+13 colonies/day

Explicit MOS for FC for Subsegment 090506 (10% * 1.90E+13) = 1.90E+12 colonies/day

Explicit FG for FC for Subsegment 090506 (10% * 1.90E+13) = 1.90E+12 colonies/day

Sum of design flows for point sources of FC for Subsegment 090506^E = 0 MGD

Assumed effluent FC concentration for point sources = 200 colonies/100 mL

Existing point source FC load for Subsegment 090506 = 0.00E+00 colonies/day

WLA for FC for Subsegment 090506 (same as existing point source load) = 0.00E+00 colonies/day

LA for FC for Subsegment 090506 = TMDL - MOS - WLA - FG = 1.52E+13 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 55% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (400 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. No applicable permits from available LDEQ permit information.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1056 THIGPEN CREEK TMDL SUMMER.XLS

TABLE K.3 WINTER ALLOWABLE FECAL COLIFORM LOAD CALCULATIONS FOR BOGUE LUSA CREEK
NEAR BOGALUSA (USED FOR SUBSEGMENTS 090104, 090301, 090401, AND 090506)

Fecal Coliform Criterion = 2,000 colonies/100 mL (Secondary Contact Recreation)
Drainage area at flow gage = 72.7 mi²

Target load = 1.06E+13 colonies/day/mi²

Bogue Lusa Creek near Bogalusa, LA (02490105) <u>Flow</u> (cfs)	Flow per unit area, (cfs/mi ²)	Percent exceedance	Width on plot between data points (unitless)	Fecal Coliform TMDL load (colonies/day/mi ²) ^A	Fecal Coliform TMDL - FG - MOS load (colonies/day/mi ²) ^B	Area under TMDL Curve (TMDL width times TMDL load) (colonies/day/mi ²) ^C
18	0.248	99.92%	0.112	1.21E+10	9.69E+09	1.36E+09
19	0.261	99.78%	0.122	1.28E+10	1.02E+10	1.56E+09
20	0.275	99.67%	0.122	1.35E+10	1.08E+10	1.64E+09
21	0.289	99.53%	0.141	1.41E+10	1.13E+10	1.99E+09
22	0.303	99.39%	0.115	1.48E+10	1.18E+10	1.71E+09
23	0.316	99.30%	0.103	1.55E+10	1.24E+10	1.59E+09
24	0.330	99.19%	0.119	1.62E+10	1.29E+10	1.92E+09
25	0.344	99.06%	0.119	1.68E+10	1.35E+10	2.00E+09
26	0.358	98.95%	0.093	1.75E+10	1.40E+10	1.63E+09
27	0.365	98.88%	0.042	1.79E+10	1.43E+10	7.45E+08
27	0.368	98.86%	0.013	1.80E+10	1.44E+10	2.31E+08
27	0.370	98.85%	0.074	1.81E+10	1.45E+10	1.34E+09
27	0.371	98.72%	0.135	1.82E+10	1.45E+10	2.45E+09
27	0.371	98.58%	0.074	1.82E+10	1.45E+10	1.34E+09
27	0.378	98.57%	0.026	1.85E+10	1.48E+10	4.74E+08
28	0.385	98.53%	0.122	1.88E+10	1.51E+10	2.30E+09
29	0.399	98.33%	0.225	1.95E+10	1.56E+10	4.38E+09
30	0.413	98.08%	0.160	2.02E+10	1.62E+10	3.24E+09
31	0.421	98.00%	0.241	2.06E+10	1.65E+10	4.96E+09
31	0.426	97.60%	0.504	2.09E+10	1.67E+10	1.05E+10

For brevity most of the rows have been hidden (between the 97.60% and 0.25% percent exceedances).

2083	28.657	0.25%	0.013	1.40E+12	1.12E+12	1.80E+10
2107	28.978	0.24%	0.013	1.42E+12	1.13E+12	1.82E+10
2170	29.849	0.22%	0.013	1.46E+12	1.17E+12	1.87E+10
2200	30.261	0.21%	0.013	1.48E+12	1.18E+12	1.90E+10
2211	30.418	0.20%	0.013	1.49E+12	1.19E+12	1.91E+10
2322	31.939	0.19%	0.013	1.56E+12	1.25E+12	2.01E+10
2330	32.050	0.17%	0.013	1.57E+12	1.25E+12	2.01E+10
2370	32.600	0.16%	0.013	1.60E+12	1.28E+12	2.05E+10
2392	32.900	0.15%	0.013	1.61E+12	1.29E+12	2.07E+10
2398	32.980	0.13%	0.013	1.61E+12	1.29E+12	2.07E+10
2520	34.661	0.12%	0.013	1.70E+12	1.36E+12	2.18E+10
2572	35.381	0.11%	0.013	1.73E+12	1.39E+12	2.22E+10
2729	37.543	0.10%	0.013	1.84E+12	1.47E+12	2.36E+10
2790	38.377	0.08%	0.013	1.88E+12	1.50E+12	2.41E+10
2800	38.514	0.07%	0.013	1.88E+12	1.51E+12	2.42E+10
3329	45.788	0.06%	0.013	2.24E+12	1.79E+12	2.87E+10
5210	71.664	0.04%	0.013	3.51E+12	2.81E+12	4.50E+10
5300	72.902	0.03%	0.013	3.57E+12	2.85E+12	4.58E+10
5330	73.315	0.02%	0.013	3.59E+12	2.87E+12	4.60E+10
7320	100.688	0.01%	0.010	4.93E+12	3.94E+12	4.74E+10

Sum = Target load = 1.06E+13

NOTES: A. This is the criterion for fecal coliforms (2,000 colonies/100 mL) times the flow per unit area to yield a "load".

B. This is the load calculated as described in note A and reduced by 20% due to a FG of 10% and a MOS of 10%.

C. This is the instantaneous load described in note A times a width to get an area that will be summed to determine a total load.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1056 THIGPEN CREEK TMDL WINTER.XLS

TABLE K.4 WINTER PERCENT REDUCTION CALCULATIONS FOR FECAL COLIFORMS FOR THIGPEN CREEK (090506)
AT MILL CREEK RD (LDEQ 1056)

Percent Reduction = 0 %

Error check for reduction is/is not needed: OK
Error check more reduction needed/not needed: OK

Date ^A	Observed FC at Station 1056 (colonies/100 mL)	Flow per unit area on sampling day (cfs/mi ²)	Percent exceedance for flow on sampling day	Observed FC load (colonies/day/mi ²) ^B	Reduced FC load (colonies/day/mi ²) ^C	Allowable FC load (colonies/day/mi ²) ^D	Reduced load less than or equal to allow load
2/6/01	170	0.99	63.32%	4.13E+09	4.13E+09	3.89E+10	Yes
3/13/01	700	4.65	8.57%	7.97E+10	7.97E+10	1.82E+11	Yes
4/9/01	130	0.81	75.71%	2.57E+09	2.57E+09	3.16E+10	Yes
12/3/01	230	1.34	45.99%	7.52E+09	7.52E+09	5.23E+10	Yes
1/24/06	800	1.33	46.27%	2.60E+10	2.60E+10	5.20E+10	Yes
2/14/06	800	2.43	20.70%	4.76E+10	4.76E+10	9.53E+10	Yes
3/14/06	27	1.37	44.48%	9.04E+08	9.04E+08	5.36E+10	Yes
4/4/06	80	0.77	78.09%	1.51E+09	1.51E+09	3.02E+10	Yes
4/25/06	50	0.56	93.08%	6.82E+08	6.82E+08	2.18E+10	Yes
Allowable Percent of Exceedances =							25.0%
Percent of Exceedances before Reductions =							0.0%
Percent of Exceedances after Reductions =							0.0%

Total allowable loading per unit area to meet stds (from Table K.3) = 1.06E+13 colonies/day/mi²
Total allowable loading at downstream end of Subsegment 090506 = 1.06E+13 * 17 mi² = 1.78E+14 colonies/day

Explicit MOS for FC for Subsegment 090506 (10% * 1.78E+14) = 1.78E+13 colonies/day
Explicit FG for FC for Subsegment 090506 (10% * 1.78E+14) = 1.78E+13 colonies/day

Sum of design flows for point sources of FC for Subsegment 090506^E = 0 MGD
Assumed effluent FC concentration for point sources = 200 colonies/100 mL
Existing point source FC load for Subsegment 090506 = 0.00E+00 colonies/day

WLA for FC for Subsegment 090506 (same as existing point source load) = 0.00E+00 colonies/day

LA for FC for Subsegment 090506 = TMDL - MOS - WLA - FG = 1.43E+14 colonies/day

NOTES: A. The LDEQ assessment period is Jan. 1, 1998 - Aug 23, 2005, additional recent observed data is included when available.

B. This is the observed fecal coliform count (colonies/100 mL) times the flow per unit area to yield a "load".

C. This is the load calculated as described in note B and reduced by 0% to allow no more than 25% of the points below "TMDL - MOS - FG" line found in Figure X.1.

D. This is the criterion (2,000 colonies/100 mL) times the flow per unit area minus the 10% MOS and the 10% FG.

E. No applicable permits from available LDEQ permit information.

FILE: R:\PROJ_LR\2110-623\FROM LR 20061219\2110-623\TECH\TMDL\PEARL\FECAL\LDEQ 1056 THIGPEN CREEK TMDL WINTER.XLS

Figure K.1 Summer load duration curve for Thigpen Creek (090506) (LDEQ 1056)

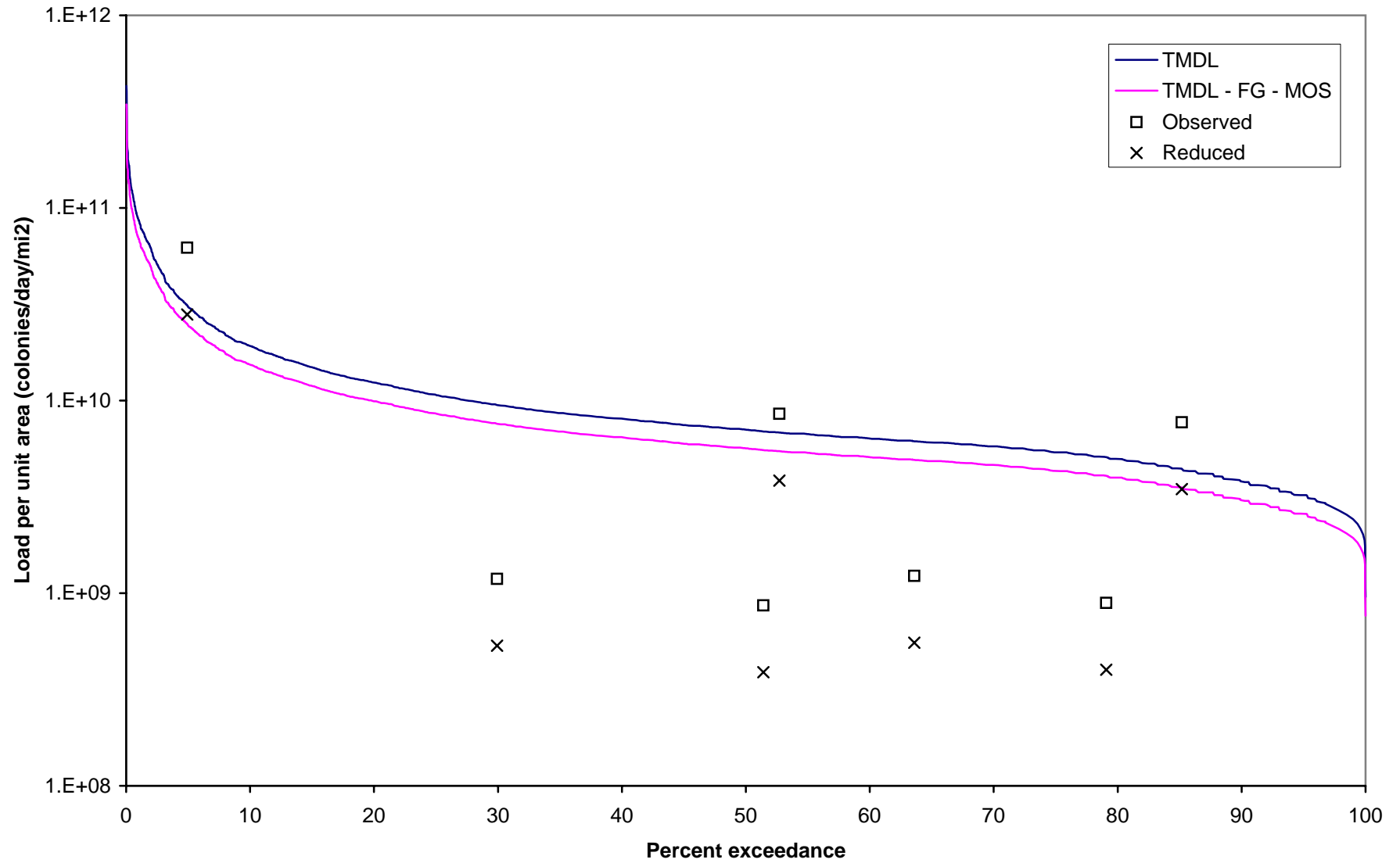
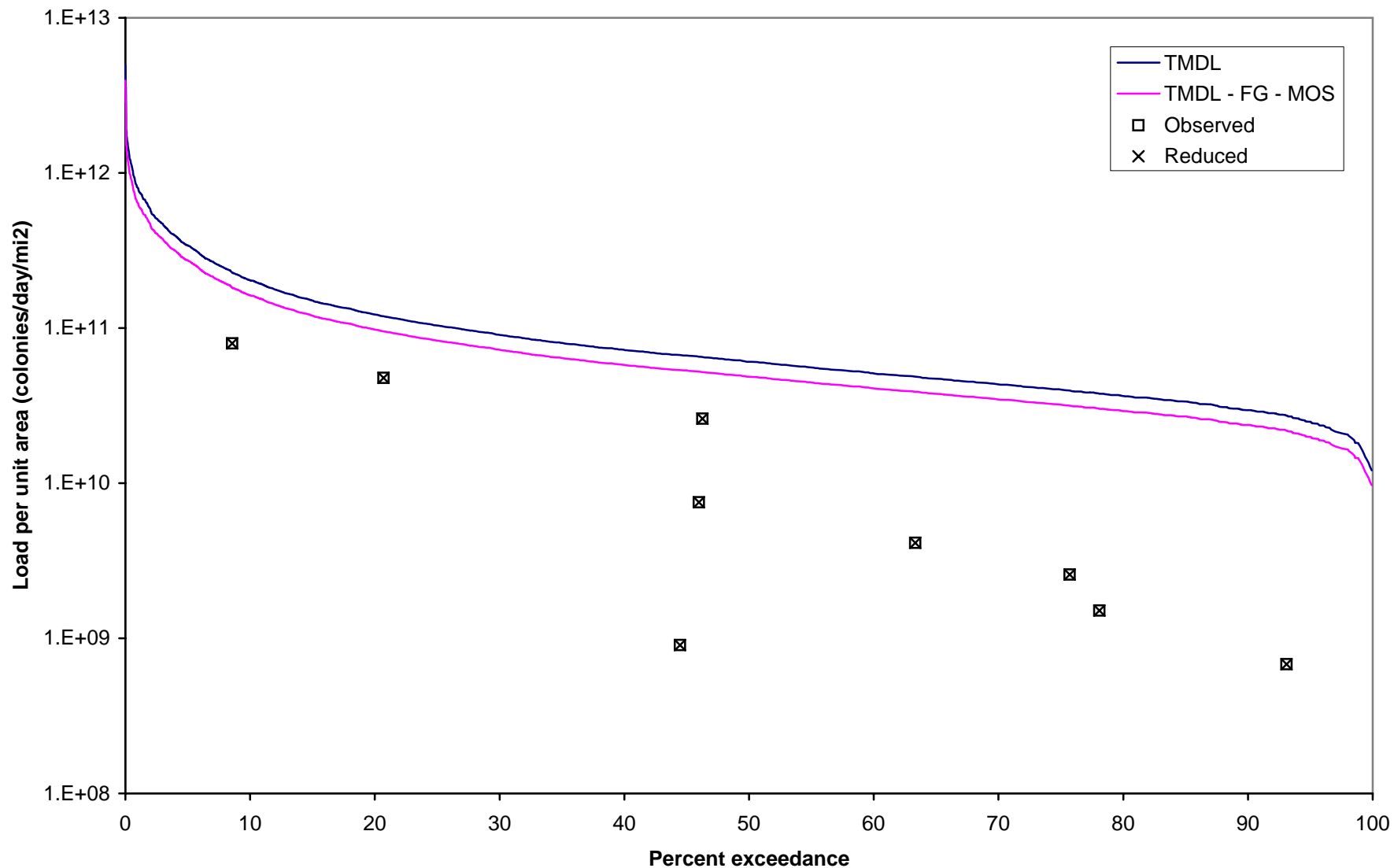


Figure K.2 Winter load duration curve for Thigpen Creek (090506) (LDEQ 1056)



APPENDIX L

Public Comments and EPA Responses

LDEQ Comments 3/3/2008

March 3, 2008

Diane Smith, Environmental Protection Specialist
Mail Code: 6WQNP
Water Quality Protection Division
U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

RE:Comments on Federal Register: February 1, 2008 (Volume 73, Number 22)
[FRL-8523-6] Clean Water Act Section 303(d): Availability of 16 Total Maximum Daily Loads (TMDLs) in Louisiana

Dear Ms. Smith:

The Louisiana Department of Environmental Quality appreciates the opportunity to review the above referenced Notice and hereby submits the enclosed comments on the TMDLs prepared by EPA Region 6 for waters listed in the Pearl River and the Terrebonne Basins in Louisiana.

If you have any questions, please contact me at 225-219-3554.

Sincerely,

David M. Hughes
Environmental Scientist
Water Quality Assessment Division

Enclosure(s)

c: (w/enclosure)
Linda Levy, LDEQ
Barbara Romanowsky, LDEQ

General Comments

1. If any unresolved LDEQ comments to these TMDLs become the basis for an EPA Region 6 objection of an LDEQ drafted permit or permittee objection/appeal of an LDEQ drafted permit, LDEQ shall relinquish permitting authority to EPA Region 6.

EPA Response: In accordance with Section 1.C of the NPDES MOA (Revision 1, April 28, 2004) between LDEQ and EPA, EPA has the responsibility of providing technical and other assistance on a continuing basis, including interpretation and implementation of Federal regulations, policies, and guidelines on permitting and enforcement matters. The MOA further states that LDEQ has primary responsibilities for implementing the LPDES program in Louisiana, including applicable sections of the Federal Clean Water Act, applicable state legal authority, the applicable requirements of 40 CFR Parts 122-125 and any other applicable federal regulations, establishing LPDES program priorities with consideration of EPA Region 6 and national NPDES goals and objectives.

In developing the TMDLs, EPA strives to use the most accurate available information for the point sources. Also, during the public comment period if any entity including LDEQ, permittee, or public has provided any significant data or information that is relevant to the calculations of the TMDLs, EPA has reviewed those data or information and revised the TMDLs as appropriate.

Specific Comments¹

All comments under this heading were specifically addressing other TMDL reports that were available for public review at the same time as this report.

¹ The March 3, 2008 letter and TMDL responses from LDEQ address three TMDL reports, including this document. Specific comments to other TMDL reports have been omitted from this document and are addressed in their respective documents.

LDEQ Summary of Persistent Problems with TMDLs Developed by EPA Region 6 for Louisiana Waters

For Parameters Other Than Dissolved Oxygen and Nutrients

1. Inadequate or erroneous science

- a. Application of in-stream criteria at “end-of-pipe” without allowing for mixing with upstream flow (resulting in unnecessarily stringent wasteload allocations).

EPA Response: Allowable point source loads in these TMDLs were based on LDEQ policy, which does not allow mixing zones for bacteria.

- b. The use of inappropriate sites for flow data when more appropriate sites are available and/or faulty calculations of flow from available data (resulting in inaccurate TMDL calculations).

EPA Response: Flow data used for these TMDLs was appropriate because the data was taken from nearby gages for similar watersheds.

- c. The use of monthly water yield for flow data instead of measured flows is inappropriate and can result in inaccurate TMDL calculations.

EPA Response: No monthly water yields were used in this TMDL report.

- d. Water quality data supposedly copied from our web site often does not agree with the web site data (resulting in errors in the statistical analysis and causing inaccurate TMDL calculations).

EPA Response: During the development of these TMDLs, ambient water quality data were not available on LDEQ’s web site. All ambient water quality data were obtained directly from LDEQ staff.

- e. The EPA uses average flow for TMDLs of chlorides, sulfates, and TDS rather than harmonic mean flow as called for by our regulations (resulting in inaccurate TMDL calculations).

EPA Response: This comment applies only to dissolved minerals TMDLs, not the fecal coliform TMDLs in this report.

- f. The EPA has treated non-conservative parameters such as temperature and TSS as conservatives (resulting in unnecessarily stringent wasteload allocations and nonpoint percentage reductions).

EPA Response: Fecal coliforms were treated as conservative parameters in this report because resources and information were not available to estimate die-off in the environment. This is a common assumption for bacteria TMDLs across the United States. Because point sources are required to meet bacteria criteria at the “end of the pipe”, the assumption of no die-off does not affect the bacteria wasteload allocations.

- g. In a TMDL for temperature, the EPA calculated the heat content of a lake from 0°C rather than 0°K and failed to address evaporation from the lake.

EPA Response: This comment applies only to temperature TMDLs, not the fecal coliform TMDLs in this report.

2. A significant portion of the flow/watershed was not taken into consideration while calculating the TMDL (resulting in inaccurate TMDL calculations).

EPA Response: These TMDLs were calculated to include contributions from all parts of each watershed.

3. Combined point source wasteload allocations for an entire basin/segment/ subsegment that do not accommodate all existing dischargers and do not include a margin of safety/growth for existing facilities or addition of new facilities (possibly resulting in unnecessarily stringent wasteload allocations which could cause major restrictions to the number and size of future permit renewals and new permits).

LDEQ TMDLs give facilities within the watershed, that are not a part of the model, allocations based on state policy. Thus all of the facilities that we are aware of within a subsegment are accounted for in the TMDL. LDEQ wasteload allocations contain a margin of growth to allow for facility expansions and new facilities. In those cases where the wasteload is increased or the discharge point is relocated, the Louisiana Technical Procedures provide that an increase in the total wasteload of 10 percent or more or a change in discharge location of 15 percent or more (of the wasteload) will trigger a recalculation of the TMDL and allocations.

EPA Response: The TMDLs in this report show allowable loads for each individual point source that discharges bacteria. The allowable loads also include an explicit margin of safety.

4. The EPA used weak correlations between TSS and turbidity to develop linear regression equations. From turbidity's numeric criteria, these equations were used to determine numeric criteria for TSS (resulting in EPA assigning numeric criteria for TSS to

Louisiana streams, which conflicts with LDEQ's regulatory intentions). LDEQ takes exception to EPA's continued use of a TMDL "endpoint" in the absence of promulgated water quality criteria. TMDL's seriously impact both point and nonpoint sources and as such should not be capriciously developed for substances for which no numerical water quality criteria exists. While the methodology used for developing the endpoint is the methodology LDEQ uses for establishing water quality criteria, use of this number as the basis for a TMDL without promulgation is unacceptable.

EPA Response: This comment applies only to turbidity TMDLs, not the fecal coliform TMDLs in this report.

5. By definition, load-duration curves describe the contribution of each constituent as a function of overland flow. Most of the data trend shows an inverse relationship between flows and constituent concentrations (i.e., constituent concentrations decrease with increasing flow). This trend indicates that impairments are contributed by a constant background source. Because of these factors, the proposed BMPs, which seek to reduce constituent concentrations by mitigating overland inflows, could fail to yield even the slightest reduction in the targeted impairments.

EPA Response: The load duration approach includes flow and pollutant loadings from all sources (e.g., overland flow, subsurface seepage, pumped inflows, etc.). The portion of the comment about an inverse relationship between flows and constituent concentrations is not true for this report (as shown in the plots in Appendix C). No BMPs have been proposed in this report; selection of BMPs would be done during the implementation process.

6. Many of the load-duration curves are based on the relationship between flow and drainage area. This relationship is not valid for most of the targeted waterbodies. Most of these waterbodies are tidally influenced or they are controlled by man-made control structures.

EPA Response: EPA believes that the relationship between average flow and drainage area is good for the watersheds in these TMDLs. None of the waterbodies in this TMDL report is tidally influenced or significantly controlled by man-made structures.

7. The landuse data used in many of these reports appears to be 10-15 years old. Much of the landuse has changed within that time due to new agricultural practices/and crop-type changes, subsidence, and urban expansion.

EPA Response: The land use data in this report are from the USGS National Land Cover Dataset, which is based on aerial imagery during 2001. These are the most recent land use data that are available for the study area.

8. The EPA has, in several cases, added small point source dischargers to a LDEQ TMDL and subtracted that loading from the non-point “load allocation”. We do not agree with this practice. The LDEQ TMDLs are specific to the 303(d) listed stream and are not calculated to apply to the entire watershed.

To the extent that these small/distant dischargers impact the 303(d) stream, they were already accounted for in the LDEQ TMDL as part of the distributed non-point loading, and the EPA is therefore accounting for them twice. The LDEQ has recently started listing the known small/distant dischargers separately and giving them state policy limitations. EPA needs to do that as well in their TMDLs developed for Louisiana.

EPA Response: This comment does not apply to this TMDL report.

9. Discharges were estimated for the facilities with no justification as to how the estimates were calculated (which could result in inaccurately calculated WLA loads).

EPA Response: The point source information in this TMDL report was obtained from permits, applications, and other documents on LDEQ’s Electronic Document Management System (EDMS). Assumptions used to estimate loads were documented in the report.

10. TMDL Load Calculations - Louisiana regulations state: “For chlorides, sulfates and total dissolved solids, criteria are to be met below the point of discharge after complete mixing. Because criteria are developed over a long-term period, harmonic mean flow will be applied for mixing.” (33:IX.1115.C.8) The flow which should have been used to calculate both the current and TMDL loadings should have been the harmonic mean flow.

EPA Response: This comment applies only to dissolved minerals TMDLs, not the fecal coliform TMDLs in this report.

11. LDEQ strongly objects to establishing a TMDL for a constituent which does not have a numerical water quality criteria especially when a valid constituent which does have a criteria is available for use in protecting the water from the same type of pollution. The sources of input data for this TMDL are not adequately documented. An adequate margin of safety was not used in the establishment of the TMDL. Numerous point source and nonpoint sources were not identified and received no allocations in the TMDL. LDEQ expects the same high standard of data documentation, presentation and justification from EPA which is required in the TMDLs prepared by LDEQ. EPA has not met this standard.

EPA Response: These TMDLs were developed for fecal coliforms, for which there are numeric criteria in the Louisiana water quality standards.

12. The EPA has developed TMDLs for parameters that are not on the court ordered list or that should, by their own stated justification, have been delisted (resulting in unnecessary load restrictions as well as increased workload for EPA and LDEQ staff).

EPA Response: All of the TMDLs in this report addressed impairments on the 2004 approved 303(d) list. These impairments were put on the 303(d) list by LDEQ.

13. Cocodrie Lake is not on the court ordered list for these parameters. EPA claims that it is mentioned in a consent order, but the LDEQ has no documentation of that order.

EPA Response: This comment does not apply to this TMDL report.

For Dissolved Oxygen and Nutrients

EPA Response: The remaining comments below do not apply to this TMDL report.

1. Inadequate or erroneous science
 - a. The use of inappropriate sites for flow data when more appropriate sites are available and/or faulty calculations of flow from available data (resulting in inaccurate TMDL calculations).
 - b. Incorrect calculations/determinations of critical flows.
 - c. Inappropriate use of LDEQ's defaults for calibration and projection modeling.
 - d. Omission of hydrologic data which was used as the basis for the TMDL is unacceptable.
 - e. Omission of field notes, measurements, and lab reports which were used as the basis for the TMDL is unacceptable.
 - f. The amount of data actually collected is inadequate to support the TMDL model and conclusions.
 - g. The calibration is not calibrated acceptably or adequately.
 - h. Inappropriate interpretation and use of Chlorophyll a data.
 - i. Inadequate data to appropriately analyze the tributaries.
 - j. Omission of key tributaries.
2. Incomplete and/or inaccurate discharger inventory
 - a. Some known facilities are missing.
 - b. Apparently the DMRs were not reviewed.
 - c. Discharges were estimated for the facilities with no justification as to how the estimates were calculated (which could result in inaccurately calculated WLA loads).
 - d. Loads were estimated for the facilities with no justification as to how the estimates were calculated.
 - e. Overly conservative handling of dischargers:

The EPA has, in several cases, added small point source dischargers to a LDEQ TMDL and subtracted that loading from the non-point “load allocation”. We do not agree with this practice. The LDEQ TMDLs are specific to the 303(d) listed stream and are not calculated to apply to the entire watershed.

To the extent that these small/distant dischargers impact the 303(d) stream, they were already accounted for in the LDEQ TMDL as part of the distributed non-point loading, and the EPA is therefore accounting for them twice. The LDEQ has recently started listing the known small/distant dischargers separately and giving them state policy limitations. EPA needs to do that as well in their TMDLs developed for Louisiana.

3. Water quality data supposedly copied/downloaded from our web site often does not agree with the web site data (resulting in errors in the statistical analysis and causing inaccurate TMDL calculations).
4. The presence of a year-round criterion for DO does not relieve EPA of the responsibility to perform winter season projection modeling.
5. Inconsistencies between the Tabular information presented in the report and the same information presented in the Appendices. Inadequacies in the information presented (missing overlay files for example).
6. Inappropriate determinations/use of the MOS.
7. The Consultants confuse information from one TMDL with information from another. Remnant tables and sentences from some previous TMDL appear in the report. Before delivering reports to Region 6, EPA’s paid consultants should be responsible for carefully proofing final submittals and checking for errors made when cutting and pasting language among multiple TMDL reports.
8. The poor quality of all EPA TMDLs is a direct result of inadequate funding. The Consultants do not gather enough field data, measurements or samples to support the development of technically sound and complete TMDLs.
9. The EPA has developed TMDLs for parameters that are not on the court ordered list or that should, by their own stated justification, have been delisted (resulting in unnecessary load restrictions assigned to sources as well as increased workload for EPA and LDEQ staff).