

**Water Quality Impact of Proposed Diversion of Water from Lake Verret
to Bayou Lafourche**

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INTRODUCTION

Bayou Lafourche was historically a distributary of the Mississippi River, and before this century was also known as the West Fork of the Mississippi River. Early in this century the Bayou was completely isolated from the River by Mississippi River flood control levees. Today, a small part of the Mississippi River flow is diverted into the Bayou via a pump station at Donaldsonville. Bayou Lafourche provides a freshwater supply for numerous communities and industries along its path. Bayou Lafourche is the source of drinking water for a quarter of a million people in five Parishes in southwest Louisiana. The Bayou is also the major artery through this region. Highways, cities and industry line its banks from Donaldsonville in the north, to Golden Meadow near the Gulf of Mexico. Locations of landmarks along the Bayou are conveniently identified by their distance along the stream channel from the diversion pump station. Prominent landmark locations (e.g. bridge crossings) are listed in Table 1. Freshwater intakes and their rivermile locations are listed in Table 2. Additionally, the City of Houma produces a part of its drinking water from Bayou Lafourche (Hebel and Waldon, 1995).

RIVERMILE	BANK	DESCRIPTION	COMMUNITY	PARISH
0.6		Tenth St	Donaldsonville	Ascension
0.7		Texas & Pacific RR	Donaldsonville	Ascension
3.3		Hwy 943		Ascension
4.1	W	Ascension-Assumption		parish line
4.2	E	Ascension-Assumption		parish line
6.2	W		Belle Rose	Assumption
8.7	W		Klotzville	Assumption
10.0		Hwy. 70		Assumption
10.7	W	Hwy. 402		Assumption
12.5	E		Plattenville	Assumption
15.9		Texas & Pacific RR		Assumption
16.2	W		Napoleanville	Assumption
20.2	W	Cancienne Canal		Assumption
20.3		Hwy 1008 bridge	Ingleside	Assumption
25.1			Labadieville	Assumption
27.1		Assumption-Lafourche		parish line
29.4		St John Church bridge		Lafourche
33.8		Jackson St.	Thibodaux	Lafourche
38.1		Southern Pacific RR		Lafourche
41.0		St Charles Bridge		Lafourche
48.4	W	Hwy 3198-Hwy 1	Raceland	Lafourche
49.0	E	Hwy 3199-Hwy 308	Raceland	Lafourche
51.0		Hwy. 90		Lafourche
52.8		Pontoon Bridge	Mathews	Lafourche
56.1		Company Canal	Lockport	Lafourche
56.2		Drawbridge	Lockport	Lafourche
62.4			Valentine	Lafourche
67.7		Intracoastal Waterway	Larose	Lafourche
71.0			Cut Off	Lafourche
79.0			Galliano	Lafourche
84.0			Golden Meadow	Lafourche
86.5		Storm Surge Structure	below Golden Meadow	Lafourche

Table 1. Major landmarks along Bayou Lafourche.

WATER DISTRICTS AND COMPANIES	BANK	Place name	Rivermile
Peoples Water Service	E	Donaldsonville	0
Assumption Parish Water Dist. No. 1	W	Napoleanville	16.9
Thibodaux Municipal Water Plant	E	Thibodaux	34.0
Lafourche Parish Water Dist. #1 North Plant	W	Lafourche	37.4
Consolidated Water Works Dist. #1 (Houma)	W	Lafourche (Shriever)	38.7
Lafourche Parish Water Dist. #1 South Plant	E	Clotilda	54.7
Lockport Filtration Plant	W	Lockport	56.4
PRIVATE USERS			
	BANK	Place name	Rivermile
Savoie Sugar Industries	W	Lula	8.0
Glenwood Sugar Cooperative	W	Glenwood	15.4
Supreme Sugars	W	Supreme	23.0
Caldwell Sugars Co-op Inc.	E	Laurel Grove	29.8
Lafourche Sugars	W	Leighton	31.9
Raceland Sugars	E	south of Raceland	49.7
Valentine Sugars	E	Valentine	62.3
Nicolaus Paper Inc.	E	Valentine	62.4

Table 2. Bayou Lafourche water intake locations.

It has been proposed to divert water from Lake Verret into Bayou Lafourche via the Canceled Canal. Diversion flow is proposed to be between 500 to 1000 cubic feet per second (cfs). The study reported here provides a preliminary examination of the water quality implications of such a diversion. This study was based on data collected by the Louisiana Department of Environmental Quality (LDEQ) at periodic (primarily monthly) monitoring sites in Bayou Lafourche and Lake Verret (Table 3).

SITE NO	BasinSeq	DESCRIPTION
23	20401	Bayou Lafourche near Donaldsonville
112	20401	Bayou Lafourche at Raceland
144	120204	Lake Verret at Attakapas Landing near Georgia
293	20401	Bayou Lafourche at Thibodaux
294	20401	Bayou Lafourche at Lockport

Table 3. LDEQ monitoring stations used in this study.

MISSISSIPPI RIVER DIVERSION DISCHARGE

Under present conditions water is diverted from the Mississippi river into the headwater of Bayou Lafourche using a pump/siphon station located at Donaldsonville. Typically, under present conditions, Mississippi River diversion flow into Bayou Lafourche is roughly 200 cfs. This diversion provides a base flow for the Bayou. Travel time in Bayou Lafourche may be estimated using the R-TOT time-of-travel model (Waldon, 1997). The R-TOT time-of-travel model for Bayou Lafourche was calibrated using dye-tracer studies which were performed by LDEQ and USGS prior to removal of vegetation from the Bayou. Travel times under present conditions of reduced vegetation may be slightly reduced, however, the R-TOT projections should be adequate for the purposes of the analysis reported here. Travel time estimates are important in water quality assessments because transformation and loss processes are dynamic and frequently represented as first-order decay or reaction processes. R-TOT estimated travel times at this 200 cfs base discharge from the Mississippi River are presented in Table 4 and Figure 1. Locations on Bayou Lafourche are conveniently identified as rivermiles below the headwaters at the Mississippi River in Donaldsonville.

Description	River mile	Time-of-travel	
		Hours	Days
Donaldsonville Pump Station (DV)	0	0	0
Cancienne Canal (CC)	20.2	48	2.0
Thibodaux (TB)	34.2	87	3.6
Raceland (RL)	49.0	134	5.6
Lockport (LP)	56.5	154	6.4

Table 4. Bayou Lafourche rivermile locations and time-of-travel (200 cfs).

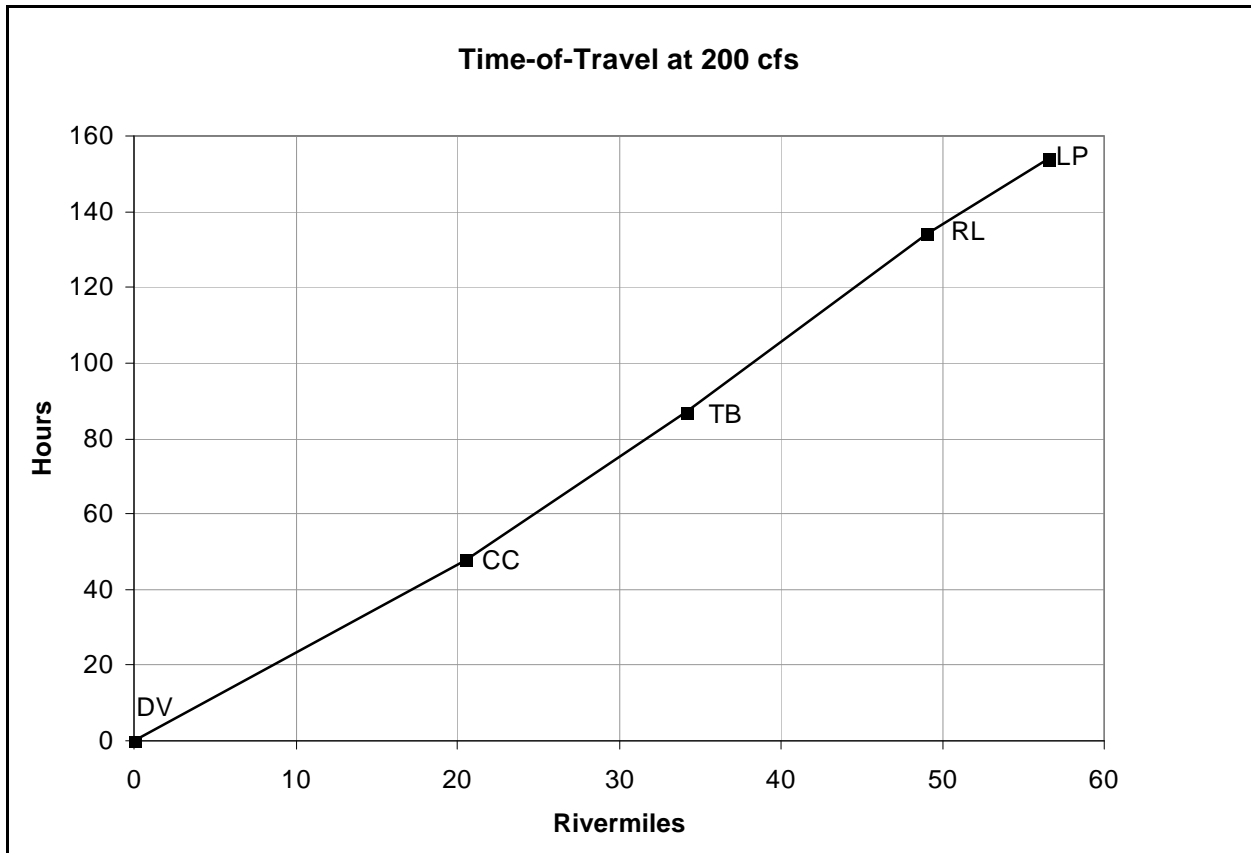


Figure 1. Bayou Lafourche time-of-travel. Location abbreviations are listed in Table 4.

LDEQ WATER QUALITY INVENTORY

The LDEQ (1992) has defined basins and segments of basins covering all watersheds in Louisiana. Bayou Lafourche from Donaldsonville to the Intracoastal Waterway is designated as segment 0401 of basin 02 (the Barataria Basin). Lake Verret and Grassy Lake are designated segment 0204 of basin 12 (the Terrebonne Basin). Table 5 summarizes LDEQ water quality assessments of these segments. The suspected sources and causes listed by LDEQ are of special interest here because they provide insight into factors impacting water quality in these waterbodies.

BASIN - SEGMENT NUMBER	020401	120204
Type	River	Lake
Size	68.0 miles	14,080 acres
Overall degree of use support	NOT	FULL
Primary contact recreation	NOT	THREATENED
Secondary contact recreation	NOT	FULL
Fish and wildlife propagation	NOT	NOT
Suspected sources		
Minor industrial point sources	✓	✓
Minor municipal point sources	✓	✓
Package plants (small flows)	✓	✓
Nonirrigated crop production	✓	✓
Pastureland	✓	
Highway/road/bridge construction	✓	
Other urban runoff	✓	✓
Petroleum activities		✓
Septic tanks	✓	✓
Flow regulation/modification	✓	
Highway maintenance & runoff	✓	
Spills	✓	
Natural sources	✓	
Recreational activities		✓
Upstream sources		✓
Suspected causes		
Pesticides	✓	✓
Nutrients	✓	✓
Siltation	✓	
pH		✓
Organic enrichment/low DO	✓	✓
Salinity/TDS/chlorides	✓	
Pathogen indicators	✓	✓
Suspended solids	✓	
Noxious aquatic plants	✓	✓
Turbidity	✓	

Table 5. LDEQ water quality assessment.

MONITORING DATA SUMMARIES

For the purposes of data management and analysis, LDEQ classifies parameters into classes of field, nutrient, metals, other laboratory, and coliform. In this study only selected parameters were examined: ph from the field data class; nitrate plus nitrite, total phosphorus, and total organic carbon from the nutrient class, total suspended solids and chloride from the other laboratory class; and fecal coliform from the coliform class. Because the LDEQ Water Quality Inventory does not indicate metals levels of concern in these waters, in this study none of the metals parameters were examined. General areas of water quality concern considered here are nutrients and eutrophication, fecal coliform bacteria levels, color, and the potential for trihalomethane (THM) production during drinking water disinfection.

Monitoring statistics from the selected LDEQ monitoring sites and selected parameters are listed on the following pages. Parameters were selected that are relevant to the issues considered in this study. Statistics include the earliest and most recent dates in the period-of-record, number of observations, average, median, and percentile values. The percentile values are the values which are not exceeded at exactly the frequency specified. For example, the 10% percentile is not exceeded in 10% of the observations, and is exceeded in 90% of the observations. The median is the 50% percentile value. Percentile statistics provide information on the variability and frequency of extreme values for the parameter under consideration.

Examination of these summaries can provide insight into current water quality status and the potential impacts of the proposed diversion. Each summary table lists statistics for the available period-of-record for four sites on Bayou Lafourche and one site in Lake Verret. The four Bayou Lafourche sites are listed in downstream order. Site number 23 is near the headwater of the Bayou at Donaldsonville. Thus, this site is most characteristic of the Mississippi River diversion water as it enters the Bayou. Although some runoff does enter the Bayou as it flows downstream, the median values at downstream sites should provide an indication of how the quality of the diverted River water changes as it travels downstream under typical conditions with little gain in discharge and dilution from runoff flows.

	Bavou Lafourche				L. Verret
Site No.	23	293	112	294	144
Abbreviation	DV	TB	RL	LP	LV
Rivermile	1.0	34.2	49.0	56.5	
Period-of-Record					
Begin	5/1/72	2/4/91	5/1/72	2/4/91	1/13/87
End	12/8/97	12/8/97	12/8/97	12/8/97	11/18/97
Field pH					
# of Obs	255	41	254	42	86
Average	7.6	7.6	7.5	7.3	8.3
Median	7.6	7.6	7.4	7.1	8.2
10%	7.3	7.1	7.0	6.6	7.4
25%	7.4	7.3	7.3	6.9	7.8
75%	7.8	7.8	7.7	7.6	8.8
90%	8.1	8.0	7.9	7.9	9.2

Table 6. Field pH monitoring statistics.

	Bavou Lafourche				L. Verret
Site No.	23	293	112	294	144
Abbreviation	DV	TB	RL	LP	LV
Rivermile	1.0	34.2	49.0	56.5	
Period-of-Record					
Begin	5/1/72	2/4/91	5/1/72	2/4/91	1/13/87
End	12/8/97	12/8/97	12/8/97	12/8/97	11/18/97
Total suspended solids (mg/L)					
# of Obs	249	41	235	42	85
Average	117	52	59	34	30
Median	102	25	40	29	24
10%	27	6	15	12	11
25%	56	11	24	21	16
75%	160	62	70	42	30
90%	231	110	127	61	46

Table 7. Total suspended solids statistics.

	Bavou Lafourche				L. Verret
Site No.	23	293	112	294	144
Abbreviation	DV	TB	RL	LP	LV
Rivermile	1.0	34.2	49.0	56.5	
Period-of-Record					
Begin	5/1/72	2/4/91	5/1/72	2/4/91	1/13/87
End	12/8/97	12/8/97	12/8/97	12/8/97	11/18/97
# of Obs	257	42	259	42	88
NOx (mg-N/L)					
# of Obs	193	41	195	42	86
Average	1.29	1.07	0.77	0.55	0.10
Median	1.25	1.06	0.77	0.49	0.04
10%	0.69	0.63	0.15	0.08	0.01
25%	0.99	0.88	0.41	0.29	0.01
75%	1.56	1.21	1.07	0.80	0.10
90%	1.97	1.50	1.32	1.07	0.19
TKN (mg-N/L)					
# of Obs	182	41	185	42	79
Average	0.83	0.75	0.86	0.93	1.29
Median	0.76	0.60	0.81	0.93	1.13
10%	0.51	0.34	0.50	0.43	0.67
25%	0.62	0.47	0.63	0.61	0.87
75%	0.96	0.88	1.00	1.17	1.60
90%	1.23	1.27	1.23	1.36	1.80
TN (mg-N/L)					
# of Obs	182	41	185	42	79
Average	2.13	1.82	1.65	1.48	1.38
Median	2.08	1.69	1.59	1.49	1.22
10%	1.24	1.21	1.01	1.06	0.75
25%	1.72	1.51	1.31	1.25	0.93
75%	2.48	1.98	1.92	1.71	1.65
90%	2.87	2.61	2.45	1.88	1.86

Table 8. Nitrogen concentration statistics.

	Bavou Lafourche				L. Verret
Site No.	23	293	112	294	144
Abbreviation	DV	TB	RL	LP	LV
Rivermile	1.0	34.2	49.0	56.5	
TP (mg-P/L)					
# of Obs	182	41	185	42	79
Average	0.26	0.27	0.20	0.20	0.20
Median	0.23	0.18	0.16	0.15	0.16
10%	0.13	0.08	0.10	0.07	0.10
25%	0.17	0.12	0.13	0.11	0.12
75%	0.32	0.30	0.22	0.20	0.23
90%	0.39	0.41	0.34	0.32	0.37
TN:TP					
# of Obs	182	41	185	42	79
Average	9.9	14.4	10.5	18.2	8.1
Median	8.8	8.9	9.5	9.2	7.0
10%	5.6	4.1	4.2	4.6	4.1
25%	6.8	5.4	6.5	7.1	5.6
75%	11.3	15.4	12.5	12.3	10.0
90%	13.4	22.0	16.7	20.9	13.7

Table 9. Total phosphorus (mg-P/L), and total nitrogen to total phosphorus mass ratio.

	Bavou Lafourche				L. Verret
Site No.	23	293	112	294	144
Abbreviation	DV	TB	RL	LP	LV
Rivermile	1.0	34.2	49.0	56.5	
TOC (mg-C/L)					
# of Obs	178	41	172	42	85
Average	4.95	5.52	5.76	7.39	9.77
Median	4.50	5.40	4.80	7.50	9.00
10%	3.00	3.80	3.50	4.13	7.34
25%	3.80	4.60	4.10	5.45	7.90
75%	5.50	6.10	6.13	9.28	10.60
90%	6.86	6.80	7.68	10.49	12.24
Color					
# of Obs	253	41	252	42	86
Average	25	30	29	39	55
Median	20	30	20	40	50
10%	10	10	16	20	30
25%	20	20	20	23	40
75%	30	40	40	50	70
90%	40	50	50	60	90
Chloride (mg/L)					
# of Obs	252	41	242	42	86
Average	25.92	24.80	24.48	59.18	20.73
Median	24.00	19.60	22.20	21.35	19.40
10%	16.00	9.80	14.91	15.72	11.05
25%	19.90	16.00	17.58	18.53	14.63
75%	29.63	25.10	29.00	28.75	24.28
90%	36.72	39.60	36.60	59.12	32.05

Table 10. Total organic carbon (TOC) and true color statistics.

	Bavou Lafourche				L. Verret
Site No.	23	293	112	294	144
Abbreviation	DV	TB	RL	LP	LV
Rivermile	1.0	34.2	49.0	56.5	
Period-of-Record					
Begin	4/12/78	2/4/91	4/11/78	2/4/91	1/13/87
End	12/8/97	12/8/97	12/8/97	12/8/97	11/18/97
Fecal coliforms (MPN/100 mL)					
# of Obs	176	39	169	39	71
Geom Avg.	785	740	442	191	22
Median	790	700	330	170	10
10%	170	162	104	40	10
25%	330	265	210	95	10
75%	1700	2350	1300	500	40
90%	3500	5800	2400	1100	80

Table 11. Fecal coliform statistics.

NUTRIENTS AND EUTROPHICATION

Nutrient concentrations are of concern because excessive growth of microscopic algae and other plants can have a negative impact on ecosystems. Two elemental nutrients, nitrogen and phosphorus, are most commonly of concern and are subject to management controls. Although it is generally accepted that excessive nutrient concentrations are undesirable, no agreement exists on numerical levels which define excessive concentration. In Louisiana numerical nutrient criteria have not been determined by the LDEQ. At a minimum, development of such criteria would require extensive site-specific studies and may, in fact, be beyond the current state of scientific understanding of the diverse sub-tropical ecosystems of Louisiana. Much of the national and international work to-date on nutrient criteria has focused on northern temperate lakes in North America and Europe.

In general, there is a scientific consensus that lakes are most sensitive to excessive nutrient enrichment. Rivers and streams are least sensitive. Wetlands including marshes and swamps are often characterized as requiring nutrient enrichment to promote their exceptionally high levels of productivity.

Nitrogen

Nitrogen levels are considered here using the LDEQ monitoring data for nitrate plus nitrite nitrogen (NO_x) concentrations and total Kjeldahl nitrogen (TKN) concentrations. NO_x is an inorganic nitrogen form which is highly soluble. TKN includes both ammonia nitrogen which is soluble and inorganic, and organically bound nitrogen which may be biochemically associated with plankton as well as with dissolved organic compounds. Total nitrogen (TN) is the sum of NO_x and TKN. TN represents all nitrogen available to support algal growth including dissolved compounds, nitrogen which has already been used in plankton production, and nitrogen sequestered in plankton through "luxury uptake." Total nitrogen, TN, is most commonly used as a measure of nitrogen enrichment.

Median total nitrogen (TN) level at Donaldsonville is 2.08 mg-N/L. This value reduces to 1.49 at Lockport. This is a 28% reduction in TN over the 56 miles and 6.4 day typical travel time. Although the NO_x component of TN is highly soluble, this loss likely results from sedimentation of particulates and algae, followed by permanent loss to the sediments.

Under the condition of a 2000 cfs diversion from Lake Verret, travel time from the Lake to Lockport will be short and sedimentation reduced. Little change in nutrient should occur during transport from Lake Verret to Lockport under the 2000 cfs proposed diversion. Average TN concentration in Lake Verret (1.38 mg/L) is only slightly lower than the present average concentration at Lockport (1.48 mg/L). Thus, TN concentration should not be greatly impacted by the proposed Lake Verret diversion.

Phosphorus

Median total phosphorus (TP) level at Donaldsonville is 0.23 mg-P/L. This value reduces to 0.15 at Lockport. This is a 35% reduction in TP. Most forms of phosphorus are not highly soluble and are associated with particulates. The reduction in phosphorus concentration along the Bayou therefore likely results from sedimentation and permanent burial in the Bayou. Loss due to sedimentation is supported by the reduction in total suspended solids (TSS) from Donaldsonville to Lockport of 102 to 29 mg/L. Median phosphorus in Lake Verret is 0.16 mg-P/L. Thus, diversion of Lake Verret water should have little impact on the phosphorus levels in Bayou Lafourche.

The total nitrogen to total phosphorus ratio (Table 9) is often cited as an indication of the limiting nutrient in a waterbody and the propensity of a waterbody to favor growth of blue-green algae. A mass ratio of seven is considered nearly balanced, with neither nutrient being present in limiting or excess quantities. Ratios well below seven indicate a nitrogen limiting condition which favors undesirable nitrogen fixing blue-green algae. Ratios vary widely in natural waters from near unity to greater than thirty. Lake Verret is commonly near a balanced nutrient condition (N:P=7); Bayou Lafourche is commonly in a condition of slight nitrogen excess (N:P>7).

Median total nutrient concentrations decrease over the reach from Donaldsonville to Lockport (Figure 2). This is likely caused by permanent loss through sedimentation. A similar loss is less likely to occur for nutrients diverted from Lake Verret because these nutrients are not associated with the high suspended solids of Mississippi River water, and because travel times will be greatly reduced at the 2000 cfs diversion flow.

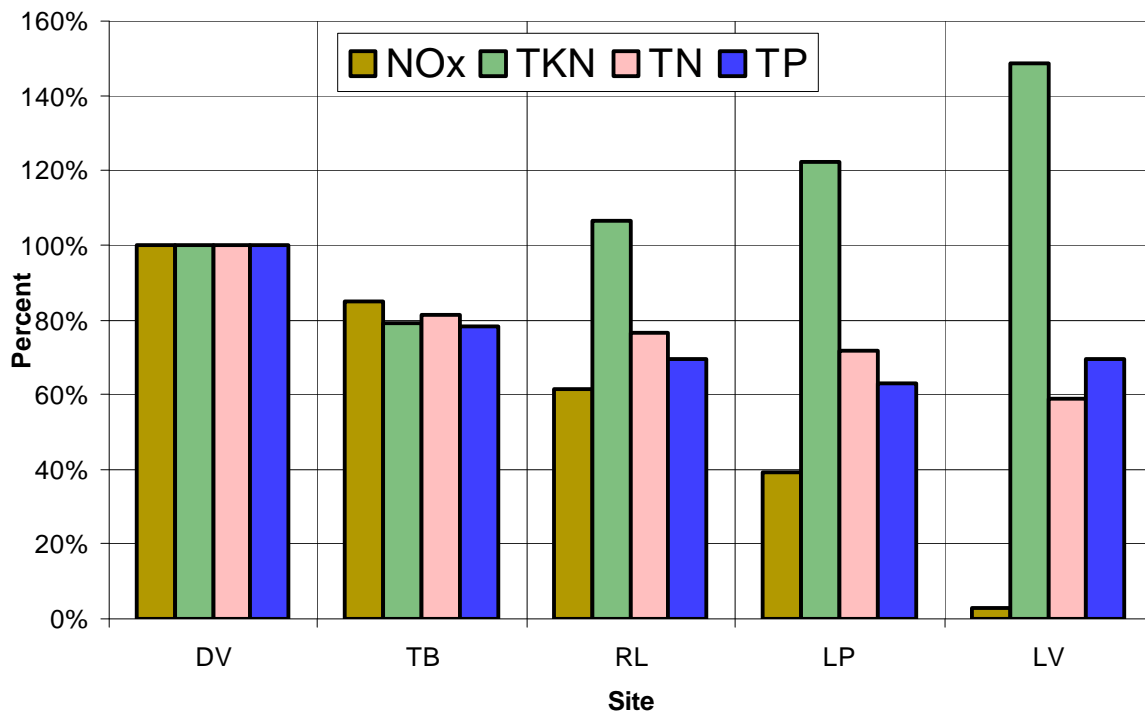


Figure 2. Median nutrient concentration as a percent of the value at Donaldsonville.

WATER SUPPLY

A major use of Bayou Lafourche is as a drinking water supply. Water quality issues associated with drinking water treatment include potential presence of pathogenic organisms, treatability of water color, and production of potential carcinogens during disinfection. Chloride concentrations (Table 10) at all sites examined here indicate that the sites are sufficiently low in chloride for drinking water use.

Coliform bacteria and pathogens

Fecal coliform bacteria are used as an indicator (termed a surrogate) for possible pathogenic organism contamination from human sewage or animal sources. Coliform bacteria monitoring by LDEQ uses a most probable number (MPN) technique. Assessment of MPN data often utilizes the geometric average of observed values rather than the arithmetic average because errors in the MPN technique are statistically biased (skewed) toward higher values. Louisiana numerical criteria for fecal coliform bacteria are also based on a geometric average. For these reasons, the geometric average statistic is presented in Table 11.

Median fecal coliform (FC) level at Donaldsonville is 790 colonies-MPN/100mL. This value reduces to 170 at Lockport. This is a 78% reduction in FC. Median total suspended solids (TSS) level at Donaldsonville is 102 mg/L. This value reduces to 29 at Lockport. This is a 72% reduction in TSS. Because fecal coliform bacteria are often associated with particulate materials in the water column, the similar loss percentages are not surprising.

Median and geometric average fecal coliform levels at Donaldsonville are high, and remain high between Donaldsonville and Thibodaux. Below Thibodaux (Station number 293) however, median values do fall sharply (Figure 3). This indicates that significant local sources are present at and above Thibodaux, but are less prevalent below Thibodaux. In general, fecal coliform bacteria are expected to disappear rapidly in the environment. From 50% to 90% disappearance rate per day is commonly cited for these bacteria. Median values below Thibodaux support such a loss rate over the 2.8 day typical time-of-travel from Thibodaux to Lockport (Table 4). The failure of the median to decrease, and the increase in 90% percentile value, from Donaldsonville to Thibodaux indicates that local sources play a major role in the upper 34 miles of the Bayou. Likely sources of coliform contamination in this reach include septic tanks and minor point source discharges (Table 5).

Fecal coliform levels in Lake Verret are low, with a median value of 10 and a geometric average of 22. In terms of fecal coliform levels, these observations indicate that no additional problems would result from diversion of Lake Verret waters to Bayou Lafourche.

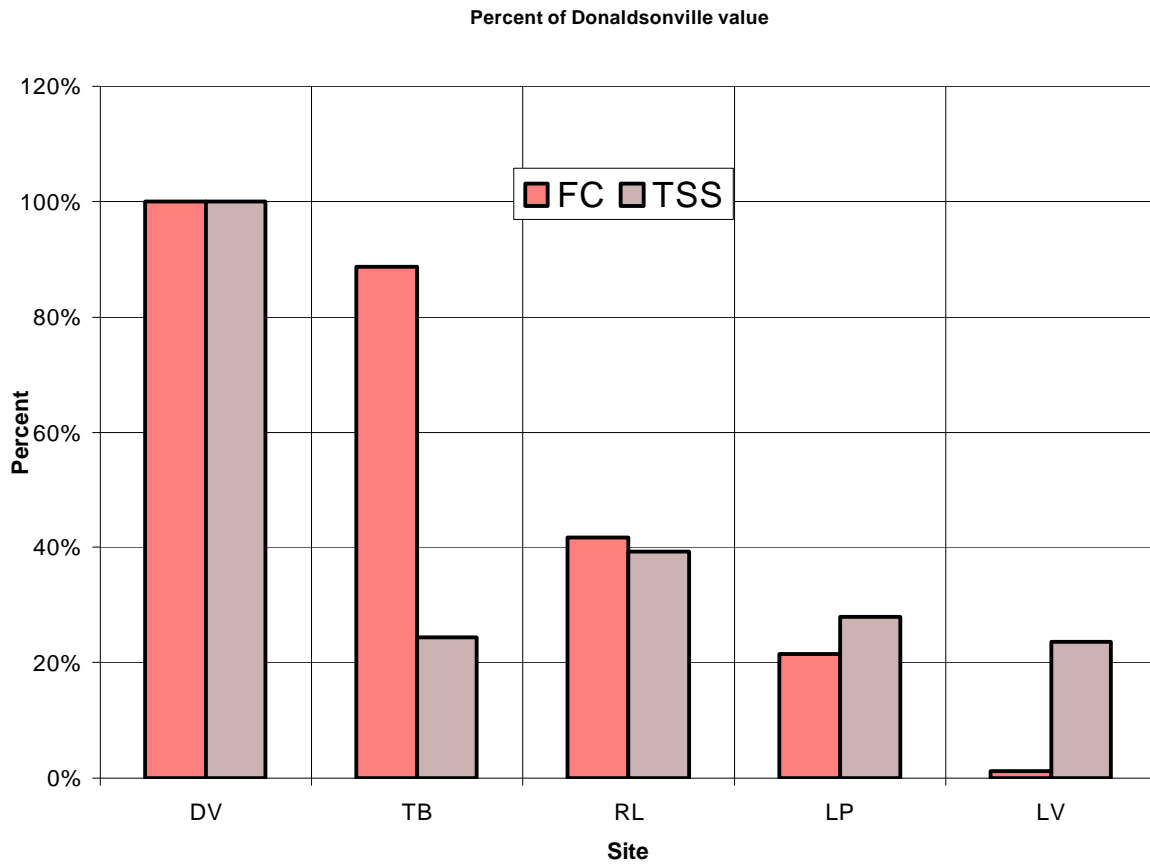


Figure 3. Median coliform and TSS as a percent of the value at Donaldsonville.

Color

Water color (also termed true color) is a semi-quantitative measurement of the appearance of color in a water sample after the removal of suspended particulate material. Color is often associated with the presence of organic materials such as humic and fluvic acids. These materials are difficult to remove in water treatment, and may lead to an unaesthetic residual color in drinking water. High color levels in Bayou Lafourche waters would also present significant water treatment problems for the paper plant at Valentine.

Median color in Bayou Lafourche at Donaldsonville is 20, 90% percentile is 40, and the difference between the 10% and 90% percentiles is 30. Color levels increase slightly as the Bayou flows downstream. Median color in Lake Verret is 50, 90% percentile is 90, and the difference between the 10% and 90% percentiles is 60. Thus, color is higher and more variable in Lake Verret than in Bayou Lafourche.

Color may be removed during drinking water treatment by flocculation or use of granulated activated carbon (GAC). These treatment processes are expensive and are more difficult to maintain under variable source water color and variable source water pH. The conditions of high color, highly variable color, and highly variable pH make Lake Verret much less suitable as a drinking water source.

Trihalomethanes (THMs)

Disinfection by-products are compounds formed by the reaction of a disinfectant such as chlorine with organic material in the water supply. Trihalomethanes (THMs) are a family of organic compounds named as derivative of methane. THMs are generally by-products of chlorination of drinking water that contains organic material (<http://www.epa.gov/ocepa111/OCEPAterms/>). THMs are carcinogens whose levels in drinking water are regulated by Louisiana and the U.S. Environmental Protection Agency. It is likely that these regulations will become even more stringent in the future. When chlorine and ammonia are both present in water they react to form products collectively known as chloramines. THM formation may be reduced, but not eliminated, by disinfection with chloramine (Montgomery, 1985). In an effort to reduce levels of THMs in finished drinking water, chloramine disinfection has replaced chlorination in many Louisiana water treatment plants in recent years.

Presence of color or TOC in drinking water sources indicates the potential for THM formation. Color may also greatly reduce the aesthetic quality of finished drinking water. The higher levels of color and TOC in Lake Verret leads to the conclusion that Lake Verret is a much less suitable drinking water source in terms of potential THM formation.

CONCLUSIONS

Analysis of LDEQ water quality monitoring data indicates:

- ◆ Because of higher levels of color and TOC, Lake Verret is a less suitable source for drinking water.
- ◆ There is an increased risk of THM formation during disinfection of water diverted from Lake Verret.
- ◆ Levels of total phosphorus in Bayou Lafourche and Lake Verret are comparable.
- ◆ Levels of total nitrogen decrease during travel from Donaldsonville to Lockport, however, median total nitrogen in Lake Verret is 82% of that at Lockport on Bayou Lafourche.
- ◆ Fecal coliform levels in Bayou Lafourche are higher than levels in Lake Verret. Current treatment practices on Bayou Lafourche should be appropriate for the present coliform levels in the Bayou.
- ◆ There is evidence suggesting some fecal coliform contamination is entering Bayou Lafourche in the reach from Donaldsonville to Thibodaux.

The preliminary analysis presented here could be extended and enhanced:

- ◆ Because concentrations are often found to be highly correlated with discharge, further studies should incorporate the available period-of-record of daily discharge measurements on the Bayou and on the Mississippi River.
- ◆ Development of a calibrated water quality model for the reach of Bayou Lafourche examined in this study would provide quantitative projections under proposed conditions.
- ◆ Treatability of Lake Verret water could be more precisely determined through laboratory studies.
- ◆ A survey of water treatment technologies in use along Bayou Lafourche would provide a basis for establishing the adequacy of current treatment following this diversion or other hydraulic alterations.

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