



Maxent Canal (New Orleans East) Water Quality Monitoring October 2013 – September 2014

Background

The Lake Pontchartrain Basin Foundation (LPBF) conducted water monitoring for five sites in New Orleans East. Canal sampling sites were located in the Village de l'est community which is bounded on the north by Lake Pontchartrain, on the south by Chef Menteur Blvd, on the west by Paris Rd. and I-510, and on the east by Bayou Sauvage National Wildlife Refuge. According to the 2010 census, Village de l'est has a population of 8,008, is 43% black and 45% Asian, with 40% living in poverty. Land use is urban development.

Methodology

Sampling Locations

Eight sites were initially chosen to be sampled (Figure 1). Sites 3 & 4 were the same site - Peltier Farm Well, known as site 4. This site was sampled twice (10/30/13 & 12/6/13) and is not included in the data analysis. Site 6, LeMans Well, was never available and is not included in the data analysis.

Figure 1. Maxent Canal Sampling Sites

<u>Site</u>	<u>Location</u>
MXC1	Bayou Sauvage near landfill
MXC2	Alcee Fortier Bridge
MXC3	N/A
MXC4	Well @ Peltier - (sampled twice)
MXC5	Dwyer Bridge
MXC6	Well @ E. Lemans – (unavailable)
MXC7	End of Canal
MXC8	Michoud Bridge



Methodology

Water quality parameters measured included water temperature, dissolved oxygen (DO), specific conductance, salinity, fecal coliform, nitrate-nitrite (as N), total phosphorous, and RCRA metals (arsenic, barium, cadmium, chromium, lead, selenium, and silver).

The samples were collected by the LPBF. Physiochemical parameters of water temperature, dissolved oxygen, specific conductance, and salinity were sampled *in situ*. Grab samples of fecal coliform, nitrate-nitrite (as N), total phosphorous, and RCRA 7 ICP metals (arsenic, barium, cadmium, chromium, lead, selenium, and silver) were collected and preserved by protocol. An EPA/LELAP approved lab conducted the analysis for the enteric pathogen indicator fecal coliform, nutrients, and metals.

Designated Uses and Water Quality Criteria

An important goal of the Clean Water Act is to protect and restore waters for their intended uses, including Primary Contact Recreation- any recreational or other water contact involving full-body exposure to water and a considerable probability of ingesting water (EPA, 2012). When criteria are met, water quality will generally protect the designated use.

Water quality criteria for fecal coliform bacteria are 400 col/100ml (May 1-Oct. 31) and 2000 col/100ml (Nov. 1-April 30). LDEQ specifies that for primary contact recreation, no more than 25 percent of the total samples collected on a monthly basis shall exceed a fecal coliform bacteria density of 400 colonies/100 ml (2000 col/100ml in winter months) (LDEQ, 2014).

Another important criterion to establish the health of a waterway is Dissolved Oxygen (DO). The DO criterion is 4 mg/ml year-round (LDEQ, 2014). LDEQ specifies that no more than 25 percent of the total samples collected on a monthly basis shall exceed this criteria (LDEQ, 2014).

Results and Discussion

Ten sampling events (roughly monthly) took place from October 30, 2013 to September 24, 2014. Data was analyzed for 5 sites: MXC1, MXC2, MXC 5, MXC 7, and MXC 8. All sites were sampled for water temperature, DO, specific conductance, salinity, turbidity, and fecal coliform all dates. The sites were sampled eight times for nutrients and three times for metals.

Dissolved Oxygen (DO)

Table 1 summarizes the dissolved oxygen data at each site, including the number sampled; the minimum, maximum, and median observations; and the percentage of samples that passed the state criteria of 4 mg/l.

Table 1. Dissolved Oxygen Summary Statistics

Dissolved Oxygen					
Site	# sampled	% passed	Min	Max	Median
MXC1	10	60%	1.9	11.26	5.7
MXC2	9	33%	2.2	7.56	3.4
MXC5	9	44%	0.2	6.74	3.1
MXC7	10	60%	2.03	8.7	5.5
MXC8	9	44%	0.06	9.2	2.3

- All sites had DO observations below the water quality criterion of 4 mg/L and all sites failed to pass overall (> 25% exceeded criteria).
- Site 2 had the lowest DO readings overall, with a total passing score of 33%. The lowest observed level at this site was 2.2 mg/L (8/20/14, hot with scattered storms), median 3.4.
- Site 8 had the lowest overall DO level (Figure 2) and the lowest single observed DO at 0.06 mg/L (12/6/13, overcast, light rain).

Figure 2. Dissolved Oxygen Distribution, compared to state standard 4 mg/l.

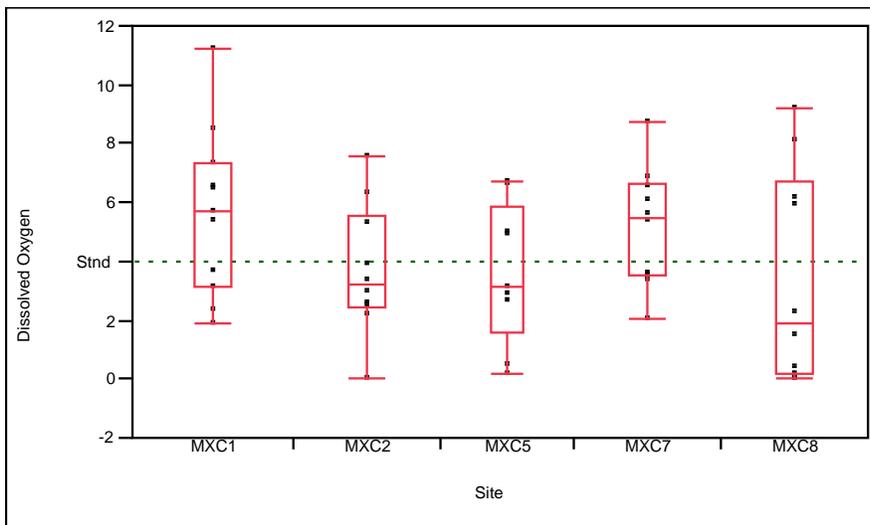
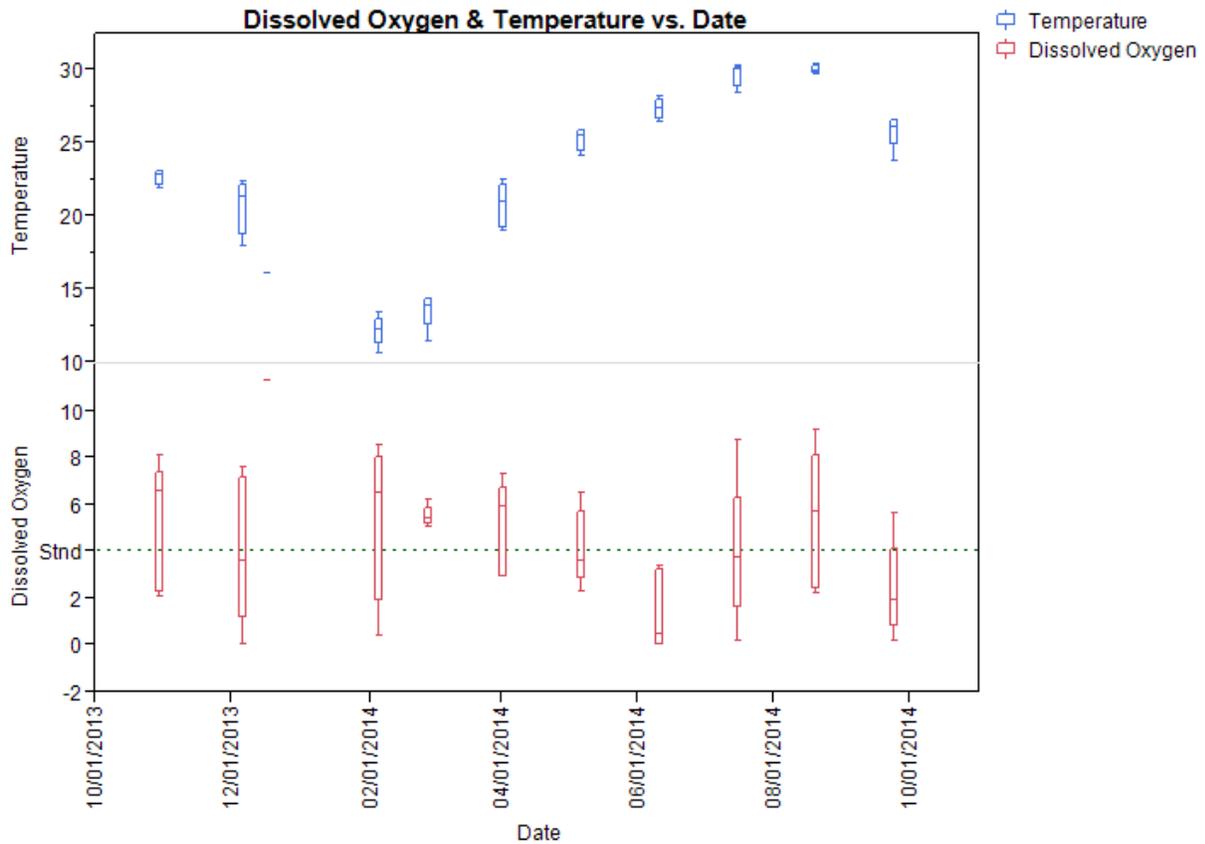


Figure 3 shows the relationship between DO and temperature by date. There was an inverse relationship between dissolved oxygen & temperature. This is an expected relationship—generally, the warmer the water, the less oxygen that is available.

Figure 3.



Fecal Coliform

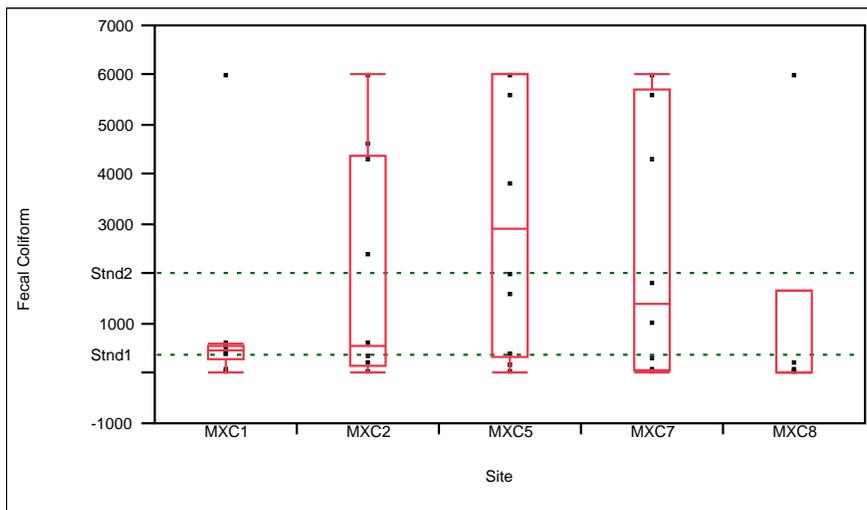
Table 2 summarizes the fecal coliform data at each site, including the number sampled; the minimum, maximum, and median observations; and the percentage of samples passed.

Table 2. Fecal Coliform Summary Statistics, including passing percentages for PCR.

Fecal Coliform							
Site	# sampled	%Passed Summer	% Passed Winter	% Total Passed	Min	Max	Median
MXC1	10	40%	100%	66%	20	6000	462.5
MXC2	10	20%	80%	50%	10	6000	575
MXC5	10	0%	60%	30%	35	6000	2900
MXC7	10	0%	80%	40%	25	6000	1400
MXC8	10	60%	100%	80%	0	6000	25.5

- All sites had fecal coliform observations > 6,000 col/100m.
- All sites exceeded the summer PCR criterion of 400 col/100 ml from May 1 through October 31 (> 25% exceeded criteria).
- Sites MXC2, MXC5, and MXC7 (all on Maxent Canal) also exceeded the SCR criterion of 2000 col/100 ml.
- Figure 4 shows fecal coliform distribution (box and whisker plots) by site. Included on the graph are the PCR standard (Stnd 1) and SCR standard (Stnd 2).

Figure 4. Fecal Coliform Distribution By Site

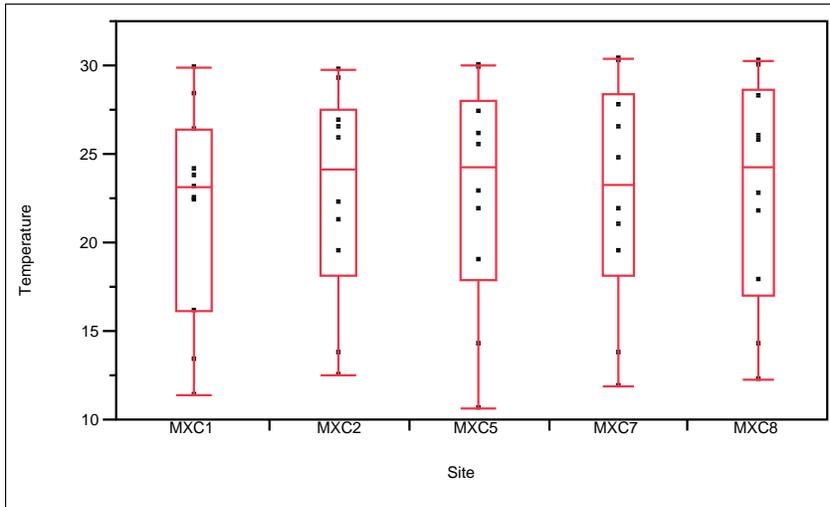


- Site MXC 5 showed the greatest fecal impairment, with only 30% total passing and the highest observed counts.
- The lowest levels of fecal coliform were noted at Site 8, which had an 80% total passing.

Temperature

Temperature remained consistent among sites. There was no statistical difference between sites. Figure 5 shows the distribution (box and whisker plots) of temperature by site.

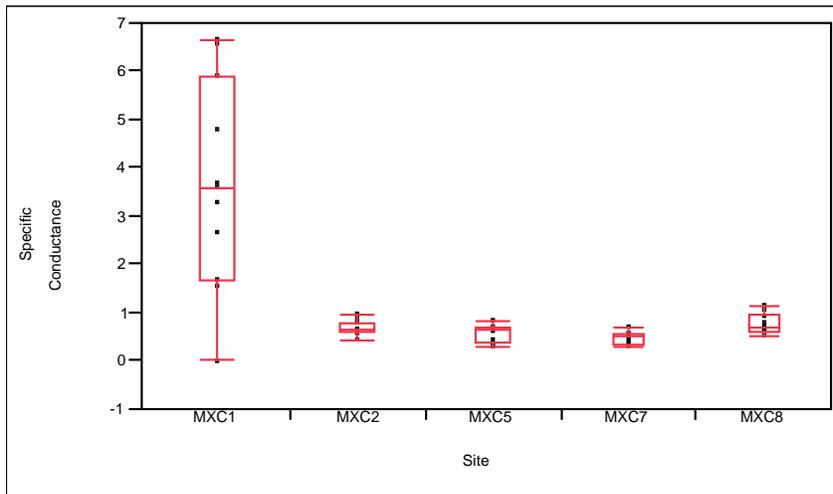
Figure 5. Distribution of Temperature Among Sites



Specific Conductance

Site MXC1 showed the greatest specific conductance due to its location in a wetland area. In this case specific conductance is synonymous with salinity (Figure 6). All canal sites showed fairly consistent specific conductance indicating no large discharges.

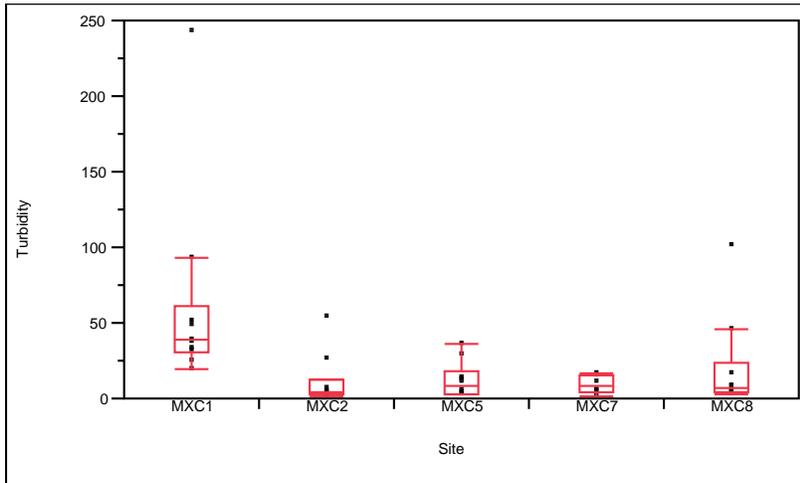
Figure 6. Specific Conductance Distribution By Site



Turbidity

The state standard for turbidity is 50 NTU. Most sites (all canal sites) met the state standard (Figure 7). Only MXC1, in the wetland environment went slightly above the standard.

Figure 7. Distribution of turbidity among sites- box and whisker plots



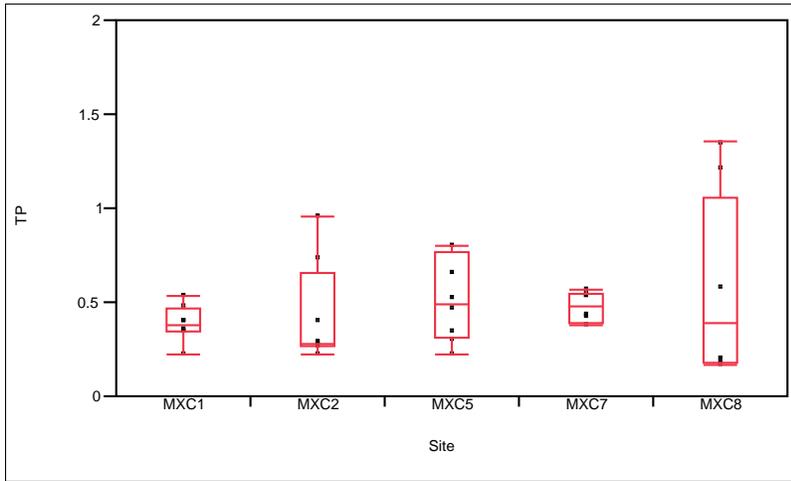
Total Phosphorous

- Table 3 summarizes phosphorous data at each site, including the number sampled; the minimum, maximum, median, and average observations.
- Figure 8 shows that site MXC 1, the wetland site had the highest TP levels. Within the canals, TP was highly variable with sites MXC 2 and 5 showing higher counts. This could be localized impacts of fertilizer being used in gardens.
- Site MXC 5 had by far the highest TP level – 6.81 on 12/16/13. Conditions were overcast with light rain.

Table 3. Summary Statistics for Total Phosphorus

Total Phosphorous					
Site	# sampled	Min	Max	Average	Median
MXC1	8	0.226	0.532	0.387	0.38
MXC2	8	0.221	0.957	0.426	0.278
MXC5	7	0.226	6.81	1.372	0.464
MXC7	7	0.378	0.564	0.48	0.528
MXC8	8	0.162	1.35	0.555	0.389

Figure 8. Distribution of total phosphorus among sites- box and whisker plots



Nitrate/Nitrite

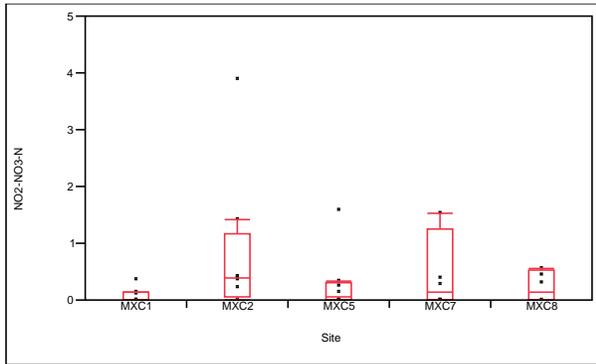
- Table 4 summarizes nitrate/nitrite data at each site, including the number sampled; the minimum, maximum, median, and average observations.
- On 8/20/14, nitrate/nitrite levels were higher than normal at all sites, with all max readings at MXC7 and MXC8 falling on this date. Conditions were hot with scattered storms.
- While averages in MXC 7 & 8 were driven up by the max values, the median values for all sites ranged 0.08-0.39.
- When data is graphed, Figure 9, MXC 2 and 7 show the highest overall data. (The highs seen on MXC 7 and 8 were treated as outliers for this graph)

Table 4. Summary statistics for Nitrate-Nitrite-Nitrogen

Nitrate/Nitrite

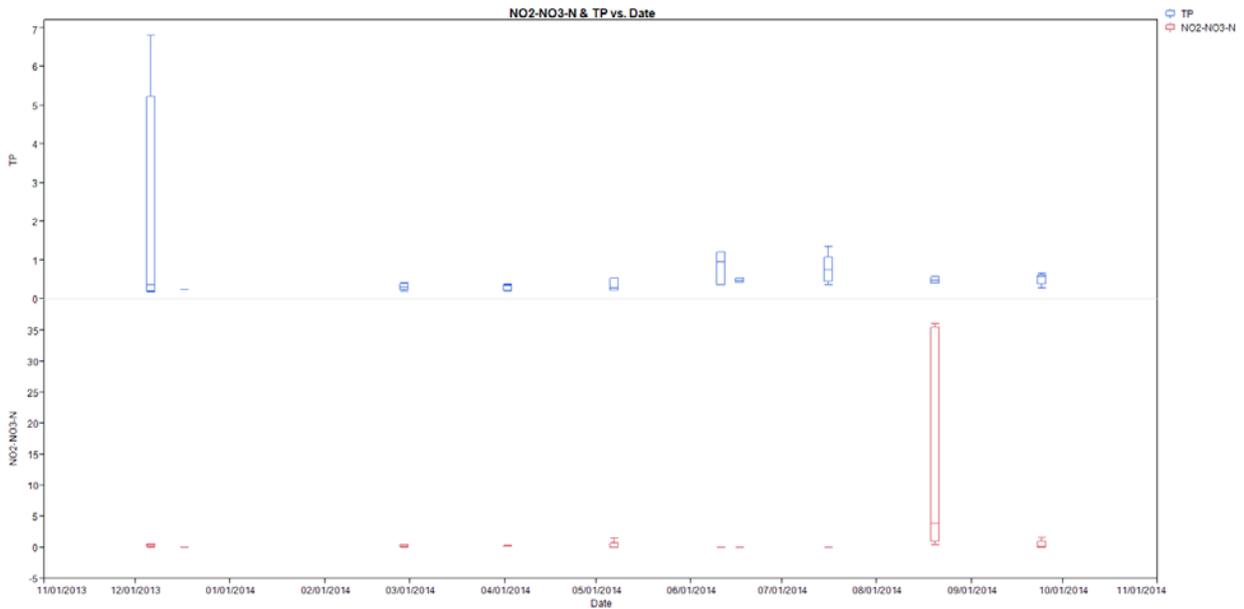
Site	# sampled	Min	Max	Average	Median
MXC1	8	0	0.37	0.08	0.08
MXC2	8	0	3.88	0.84	0.39
MXC5	7	0	1.58	0.33	0.13
MXC7	7	0	35	5.31	0.28
MXC8	8	0	36	4.66	0.15

Figure 9. Distribution of nitrate-nitrite-nitrogen among sites- box and whisker plots



When nitrate-nitrite nitrogen values and plotted by date and compared to total phosphorus (Figure 10), no pattern is apparent.

Figure 10. Nitrite-nitrate-nitrogen plotted with TP by date to assess trends



Metals

During the sampling period, no sites tested positive for arsenic, cadmium, chromium, selenium, or silver.

Lead

- Site 5 was the only site to test positive for lead with an observation of 5.77 ug/L on 12/6/13.

- The current RCRA action level for lead is 15ug/L. Lead does not seem to be an issue as seen in the water.

Barium

- Barium was detected in trace amounts at all sites during summer months only. The highest observation occurred at site 1 with a level of 0.128 ug/L.
- The current MCL is 2 ug/L
- Possible sources of contaminant include motor vehicle parts manufacturing

Summary of Data Analysis

- MXC2 (Alcee Fortier Bridge) - This sites samples out of Michoud Bayou. It is bordered by residential properties to the north and shopping centers to the south.
 - Lowest DO readings overall
- MXC5 (Dwyer Bridge) – This site samples out of Michoud Bayou. It is surrounded by residential properties and a large empty lot. This canal flows into larger part of Michoud Bayou.
 - Worst fecal impairment overall
 - Highest phosphorous level (12/16/13 -conditions were overcast with light rain)
 - Only site to test positive for lead (12/16/13)
- MXC8 (Michoud Bridge) – This site samples out of Michoud Bayou. It is bordered by residential properties to the north and 2 shopping centers to the south (dry cleaners, convenience store, Chevron, Brand Car Care).
 - Lowest observed DO at 0.06 mg/L (12/6/13, overcast, light rain)
 - Lowest fecal coliform overall
 - Highest N level (8/20/14, hot with scattered rain)

Summary of Suspected Sources of Impairment of Water Quality

Low DO impairments may be due in part to natural conditions but may also be related to high loadings of material that lead to the reduction of oxygen levels in the water. These materials come from a variety of sources including sewage, fertilizers, some sediments, and naturally high levels of plant material in swampy areas.

Suspected sources of impairment by fecal coliform in this area include: sanitary sewage overflows, wildlife, waterfowl, natural sources, point source discharges, and unknown sources.

Possible sources of barium include the manufacture of motor vehicle parts and accessories. Sources of lead may include urban stormwater runoff, paint, or automobiles.

References

The Data Center. (2014). Village de l'est statistical area. The Data Center analysis of Local Employment Dynamics, U.S. Census Bureau. Retrieved from <http://www.datacenterresearch.org/data-resources/neighborhood-data/district-10/Village-de-lest/>

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