



# Post-Hurricane Water Quality Assessments: Katrina Monitoring (Report #10)

Louisiana Department of  
Environmental Quality  
Water Quality Assessment Division

February 21, 2006



All information presented here is based on laboratory results and field observations available through January 13, 2006. As additional data is collected water quality assessments may change over time.



# A partnership for water quality assessment

- Louisiana Department of Environmental Quality
- U.S. Geological Survey
- Lake Pontchartrain Basin Foundation
- Louisiana Department of Agriculture and Forestry



# Parameter categories analyzed

- Field parameters (DO, pH, conductivity, etc.)
- Conventionals (Turbidity, TSS, etc.)
- Nutrients
- Dissolved Metals and Mercury
- TOC, BOD5, COD (COD discontinued)
- Volatile Organics (VOCs)
- Acid Base Neutrals (ABNs) (discontinued)
- PCBs and Pesticides (discontinued)
- Cyanide (discontinued)
- Fecal Coliform



# Sampling frequency

- Sampling in/around the lake was initiated September 6, 2005 at 12 sites
- Sampling at 24 sites twice per week was initiated September 11, 2005
- Began to expand sampling, October 11, 2005
- Discontinued sites with no problems at end of October
- Currently sampling 19 sites in and around Lake Pontchartrain; will continue doing so for the foreseeable future
- Analytical parameters reduced to those of most concern for ongoing monitoring of the region

# Hurricane Katrina Surface Water Quality Monitoring Sites (Updated Jan. 26, 2006)

-  Perennial Stream
-  Interstate Highway

## Sample Site by Region

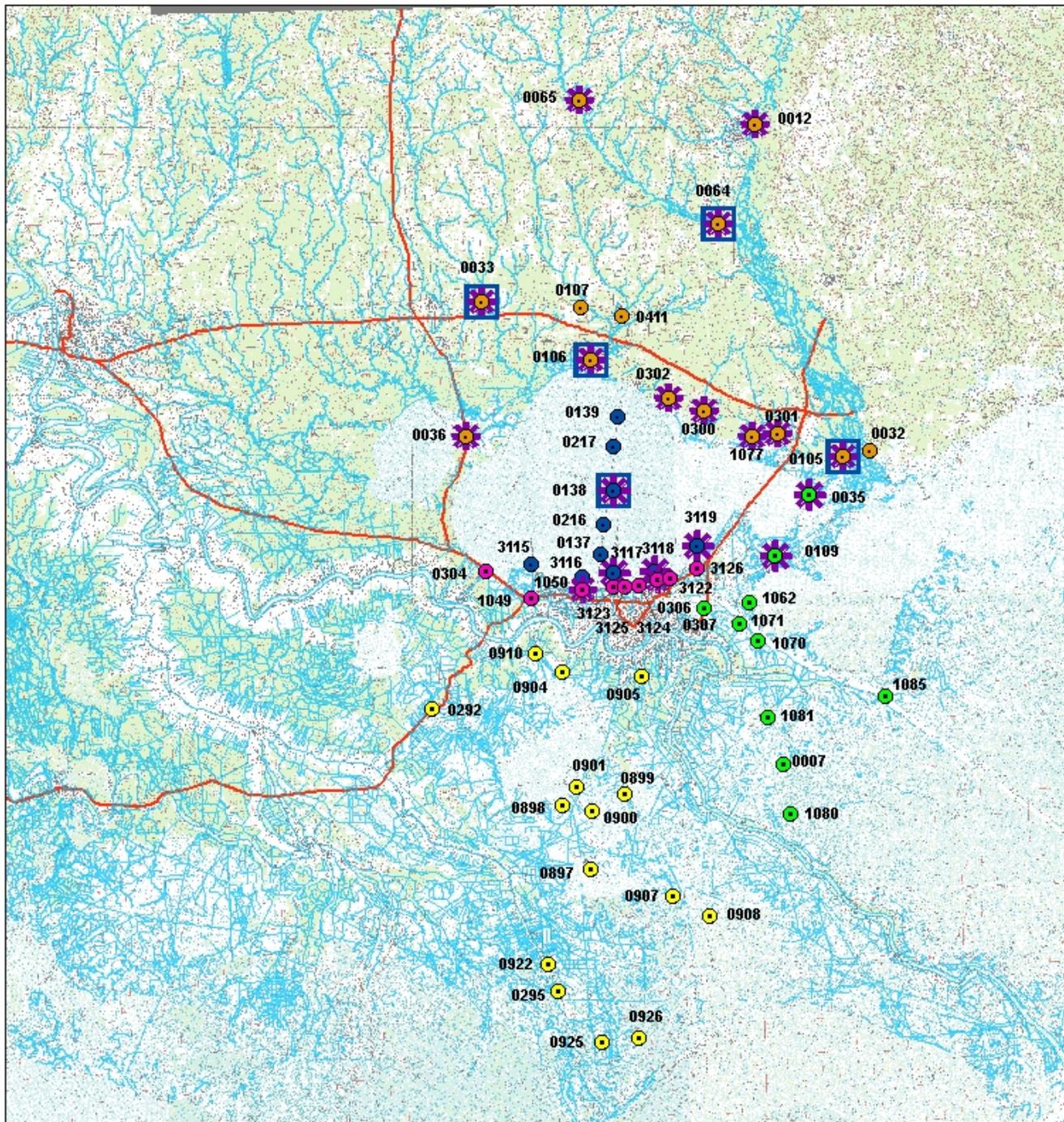
-  Lake Pontchartrain
-  Barataria
-  MRGO/Breton Sound
-  Northshore/Florida Parishes
-  Southshore Canals and Bayous
-  Active site
-  Long term station



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Projection: UTM Zone 15, NAD 83





# Magnitude of Laboratory Analyses: Water only as of January 3, 2006

- o Sampling “Events” by LDEQ
  - 330 between September 6 and December 13 (based on dissolved oxygen values in database)
- o LDEQ Lab
  - Organic compounds – 595 samples (34,359 analyses)
  - Conventional parameters – 1,798 samples (6,178 analyses)
  - Metals – 337 samples (643 analyses)
  - Total samples – 2,730 samples (41,180 analyses)
- o Contract Labs
  - Organic compounds – 391 samples (13,569 analyses)
  - Conventional parameters – 505 samples (687 analyses)
  - Metals – 282 samples (2,256 analyses)
  - Total samples – 1,178 samples (16,512 analyses)



# Organic Compound Analysis

# Post-Katrina Organic Compound Analysis in Southeast Louisiana

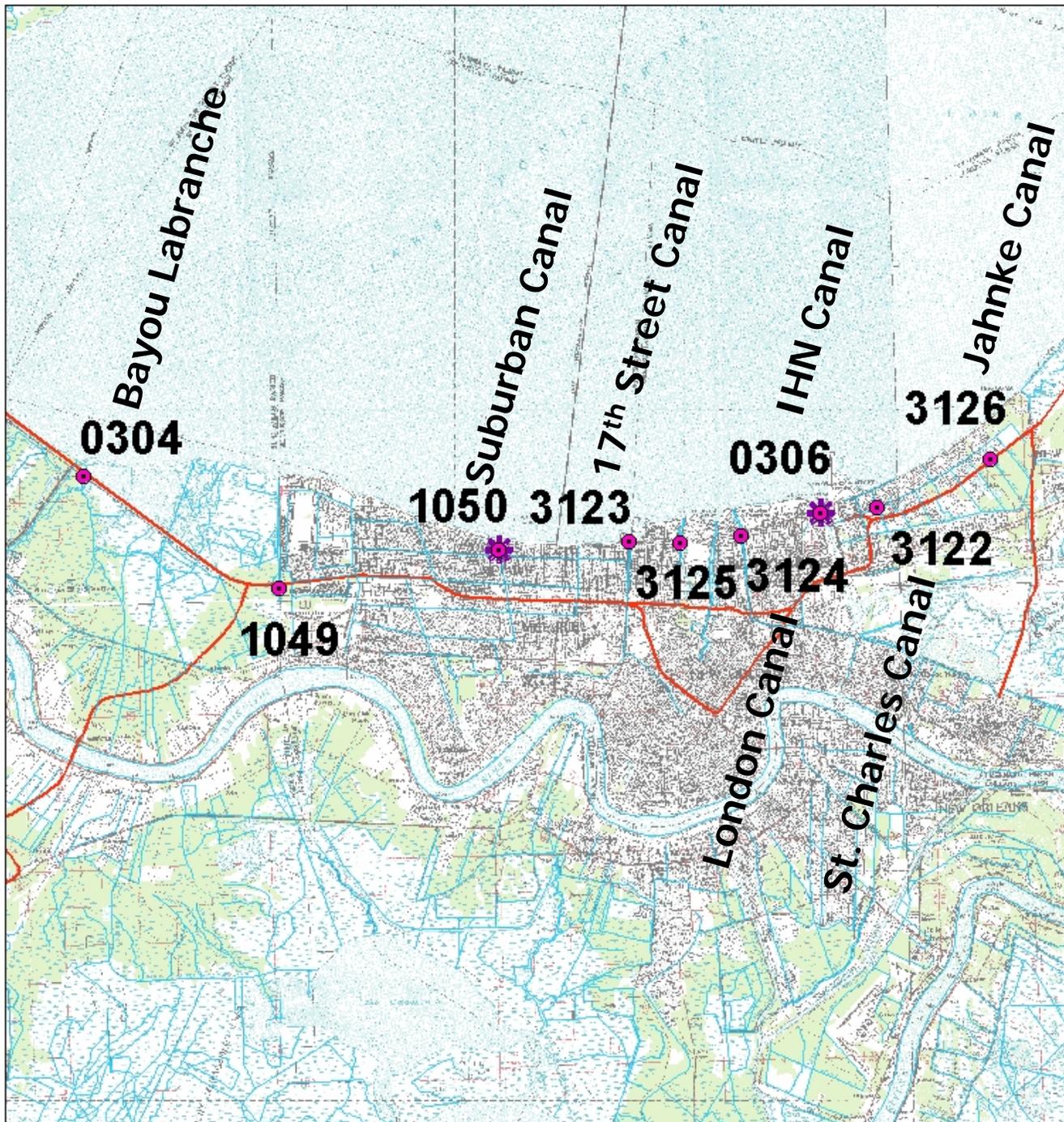
- Of the approximately 40,420 analytical results (nearly 1,000 samples) for organic compounds in ambient water, 108 (0.27%) were above detection levels
  - No detections since November 9, 2005
- Hexachlorobenzene exceeded non-drinking water human health standard in one sample from a canal on September 19, 2005
- Bromodichloromethane exceeded non-drinking water human health standard in one sample from a canal on October 3, 2005
- All other detections for organic compounds have been below Louisiana water quality standards



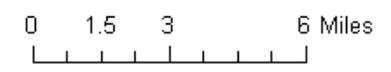


# Biotoxicity Testing

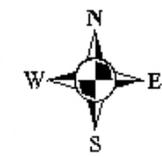
# Hurricane Katrina Surface Water Quality Monitoring Sites: Southshore Canals and Bayous (Updated Jan. 26, 2006)



-  Perennial Stream
-  Interstate Highway
-  Sample Site
-  Active site



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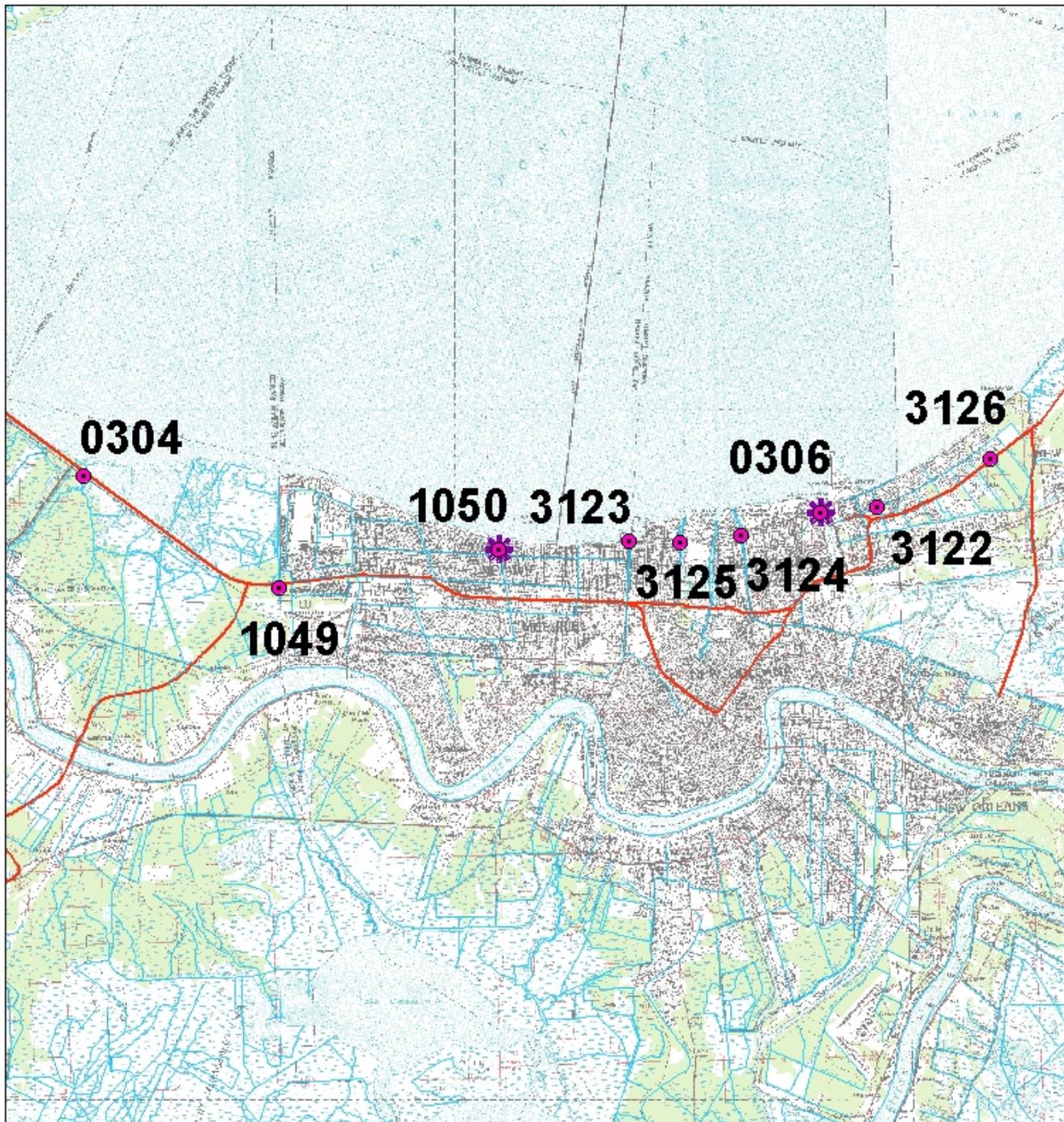
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Map No. 200502050, October 25, 2005  
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Projection: UTM Zone 15, NAD 83



# Biotoxicity test results

- Biotoxicity sampling and analysis was done through October 6, 2005
- No toxicity was observed in 100 test results for fish
- 7 early results out of 100 test results for invertebrates indicated toxicity (3 canal sites)
- Retesting at the 3 canal sites showed no further toxicity

# Hurricane Katrina Surface Water Quality Monitoring Sites: Southshore Canals and Bayous (Updated Jan. 26, 2006)



-  Perennial Stream
-  Interstate Highway
-  Sample Site
-  Active site



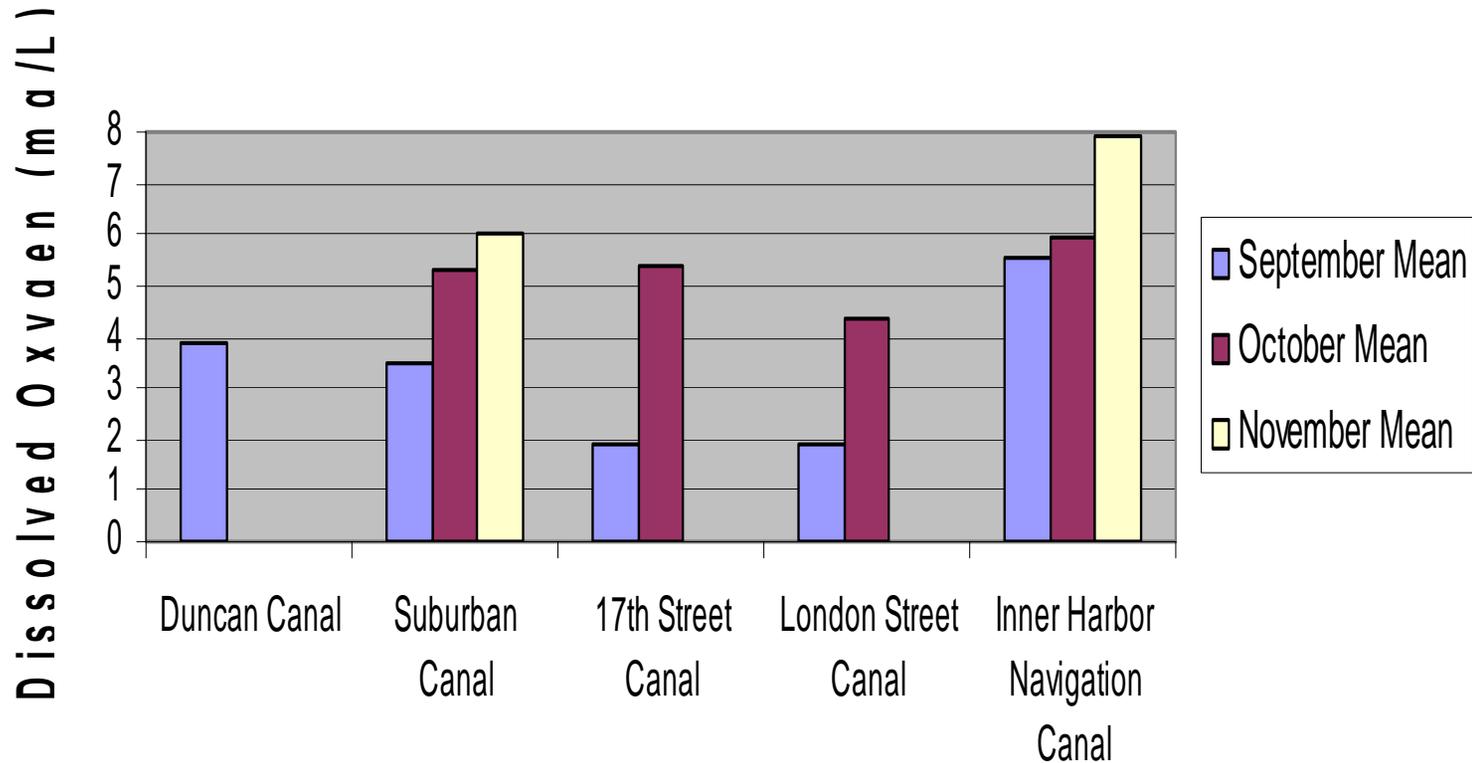
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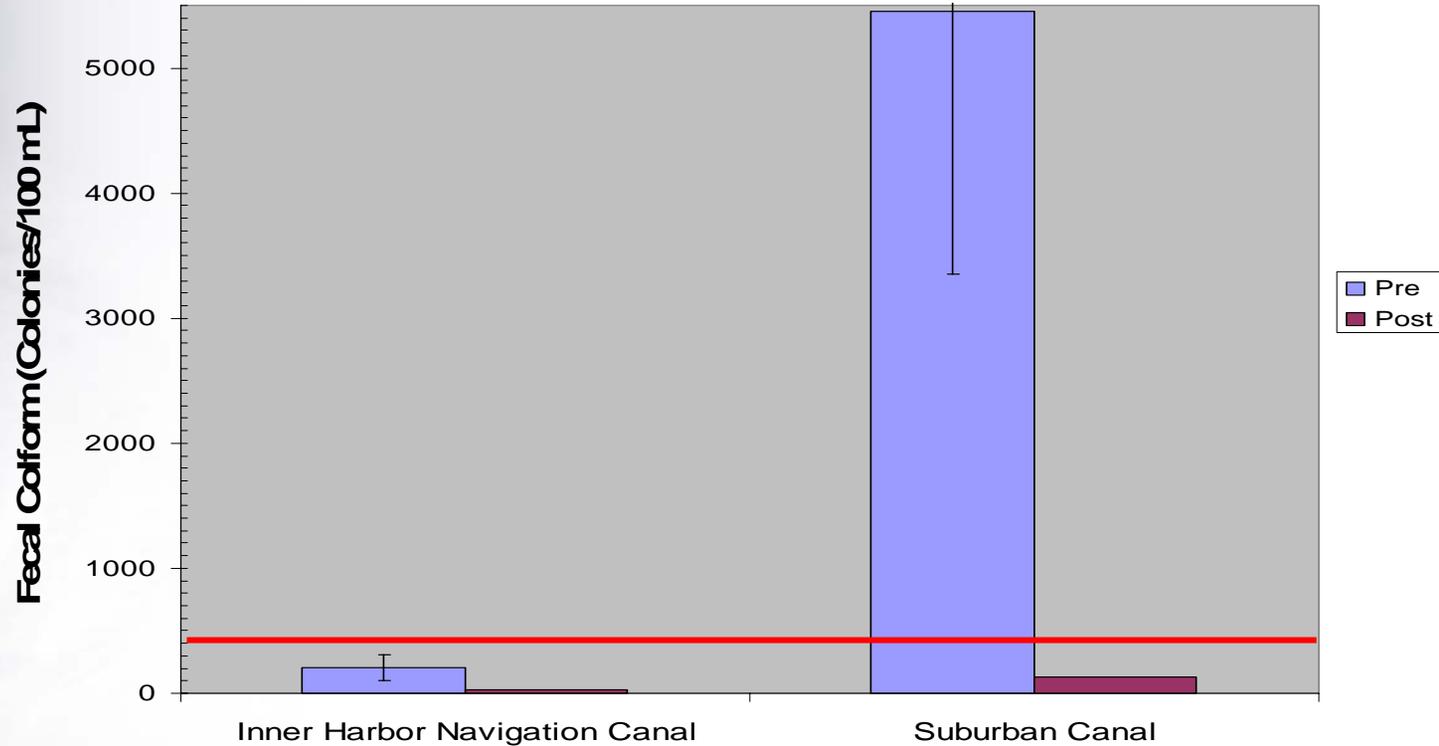
## Mean Dissolved Oxygen by Month for New Orleans Drainage Canals



There has been no new data for these sites since November 15, 2005.



## Comparison of Mean Fecal Coliform Concentrations at Southshore Sites



Latest data for these sites is from January 4, 2006. No sample exceeded the swimming standard of 400 colonies/100 mL.



# Summation of water quality assessments for impacted area: Southshore Canals

- Dissolved oxygen was initially slightly depressed due to high organic loading but has recovered to normal concentrations
- There were early reports of oil sheen at the 17<sup>th</sup> Street Canal (3 times) and London Canal (2 times)
- Fecal coliform results were somewhat elevated initially but are currently at or below swimming standards at the sites being tested
- Bromodichloromethane slightly exceeded the human health non-drinking water criteria for one sample from the London Street Canal
- Hexachlorobenzene exceeded the same criteria for one sample from the 17<sup>th</sup> Street Canal
- All other organic compound results have been below Louisiana water quality standards

# Hurricane Katrina Surface Water Quality Monitoring Sites: Pontchartrain Basin (Updated Jan. 26, 2006)

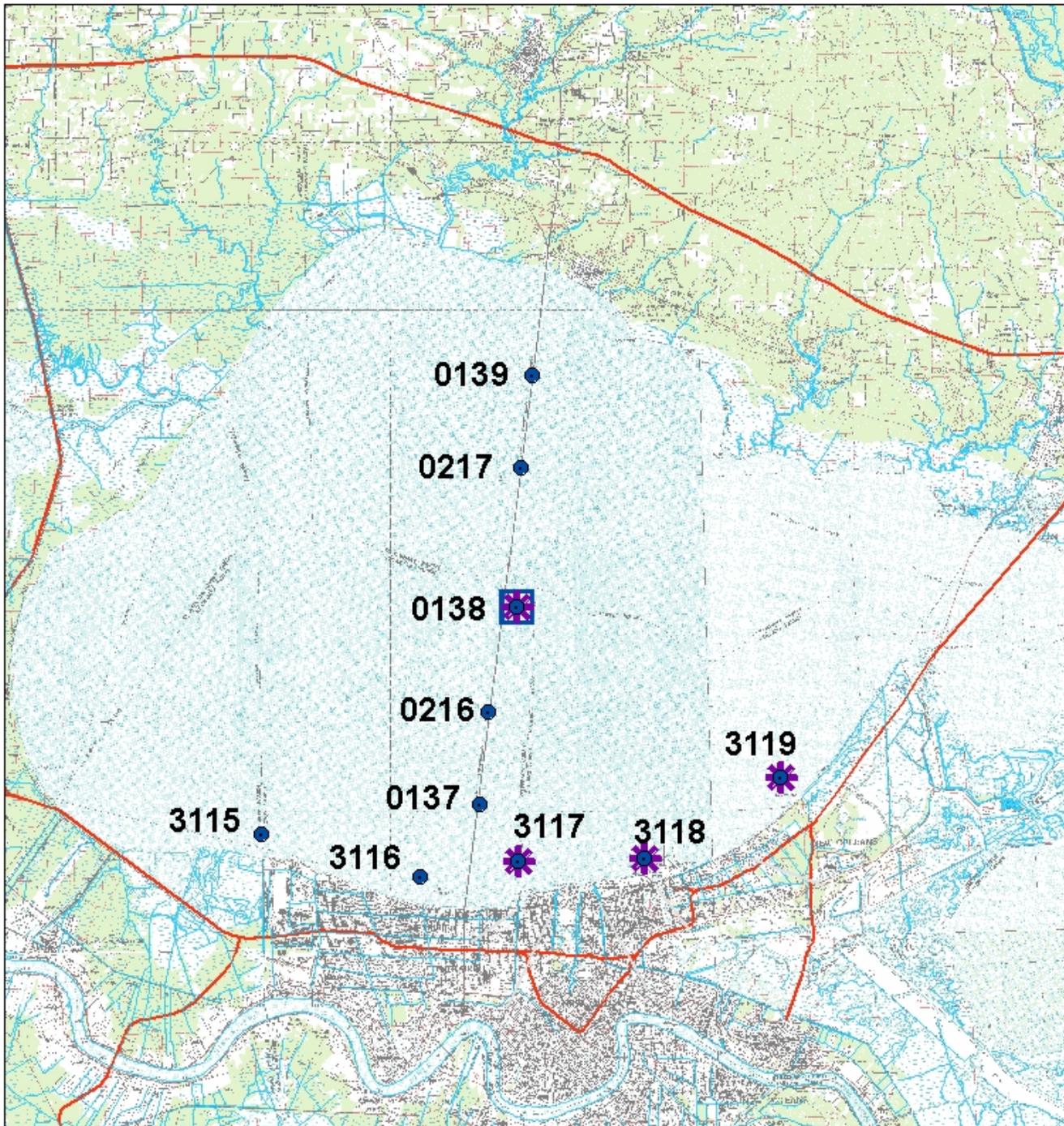
-  Perennial Stream
-  Interstate Highway
-  Sample Site
-  Active site
-  Long term station



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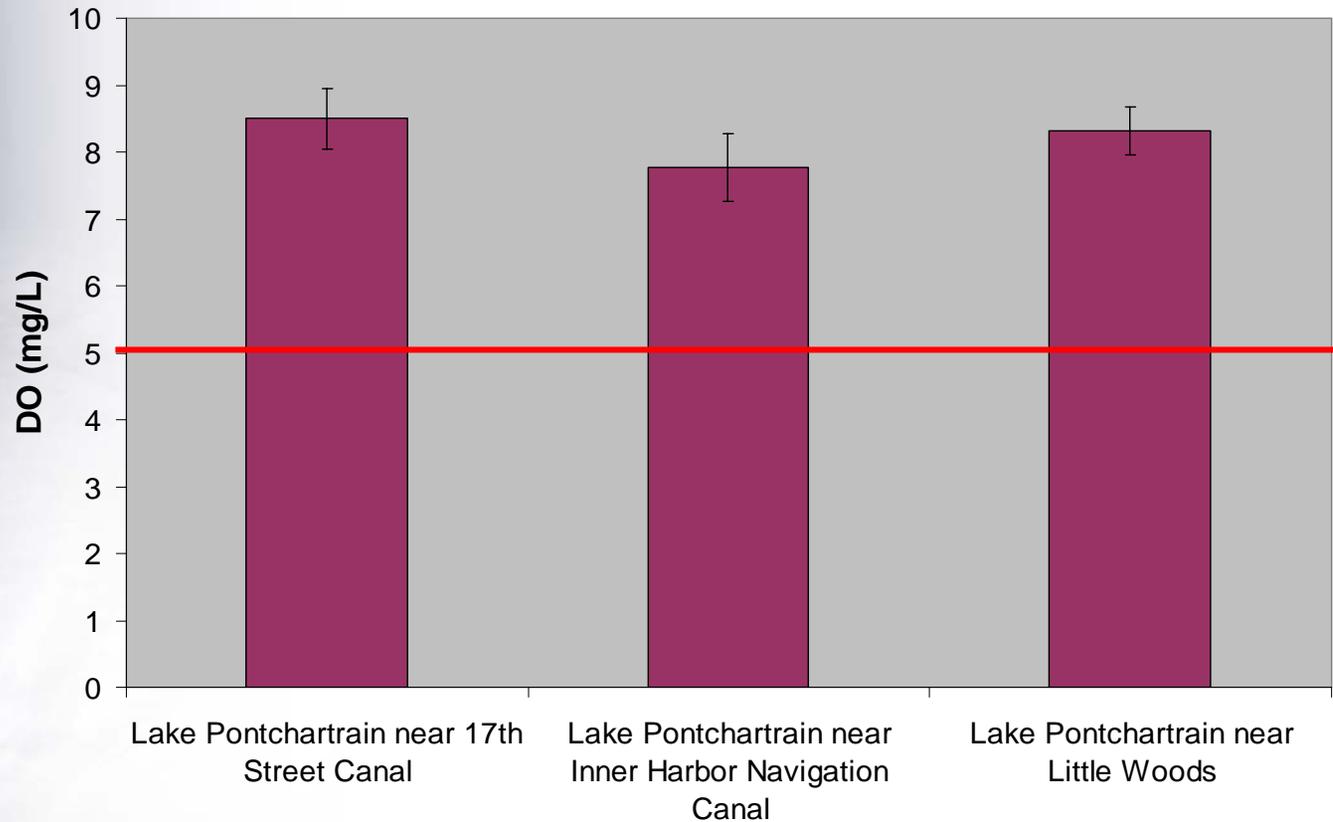


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Base Map 1:100k DLG  
Projection: UTM Zone 15, NAD 83





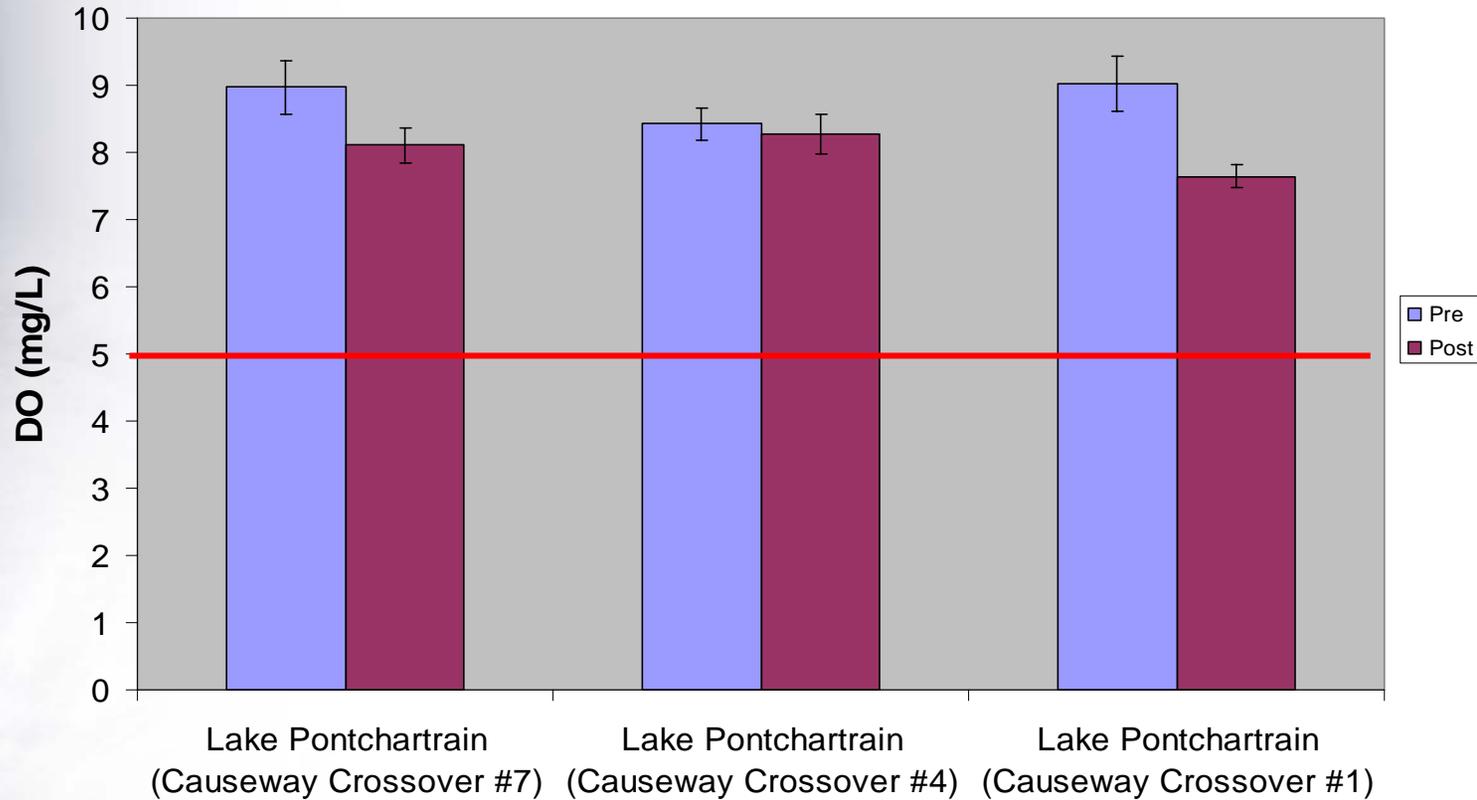
## Mean Dissolved Oxygen Concentrations at Sites 1/2 Mile off Southshore



Latest data for these sites is from November 8, 2005 (Crossover 4 only). No sample fell below 5.0 mg/L at any Lake Pontchartrain site.



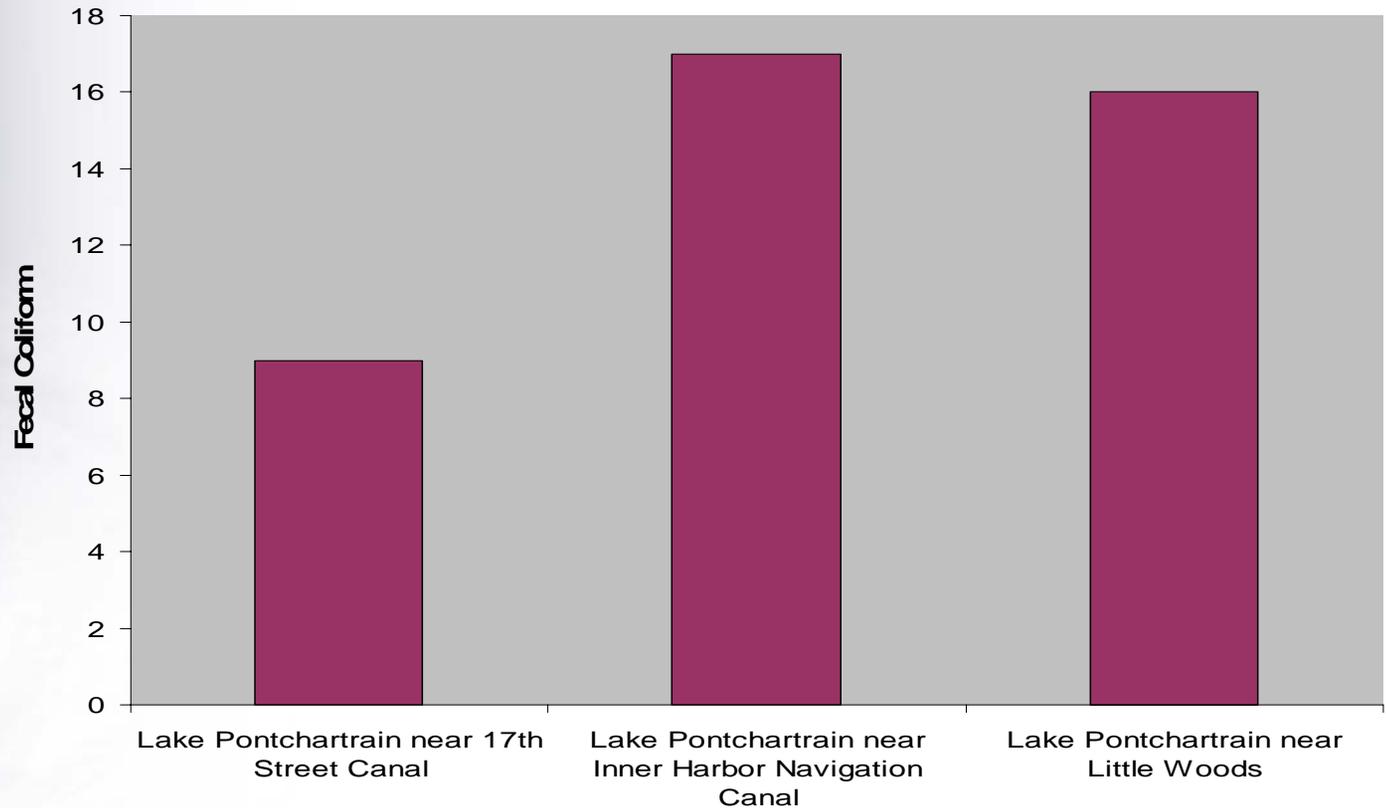
## Comparison of Mean Dissolved Oxygen Concentrations at Lake Pontchartrain Causeway Sites



Latest data for these sites is from December 13, 2005 (Crossover 4 only). No sample fell below 5.0 mg/L at any Lake Pontchartrain site.



## Geometric Mean Fecal Coliform Concentrations at Sites 1/2 Mile off Southshore

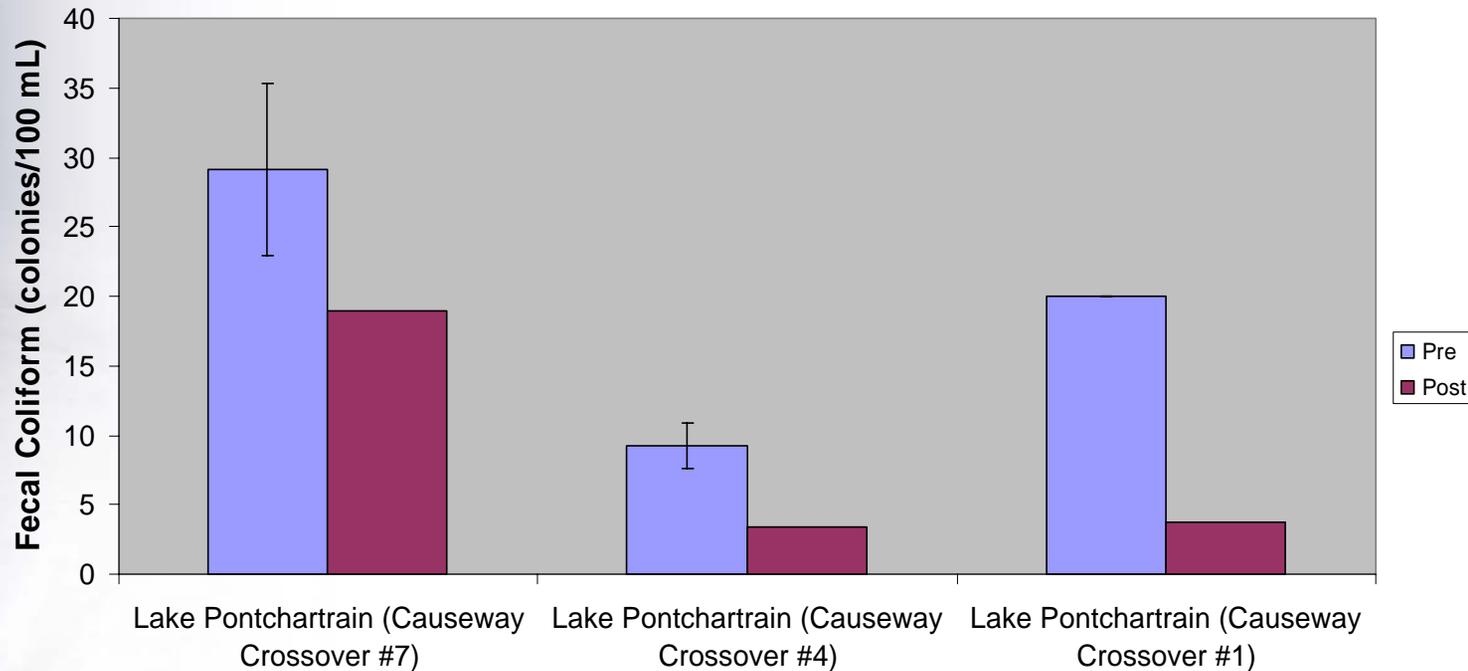


**Note: Standard = 400 col/100 mL**

Latest data for these sites is from January 4, 2006. No sample exceeded the swimming standard of 400 colonies/100 mL.



## Comparison of Mean Fecal Coliform Concentrations at Lake Pontchartrain Causeway Sites



**Note: Standard = 400 col/100 mL**

Latest data for these sites is from December 13, 2006. No sample exceeded the swimming standard of 400 colonies/100 mL.



# Lake Pontchartrain Field Observations

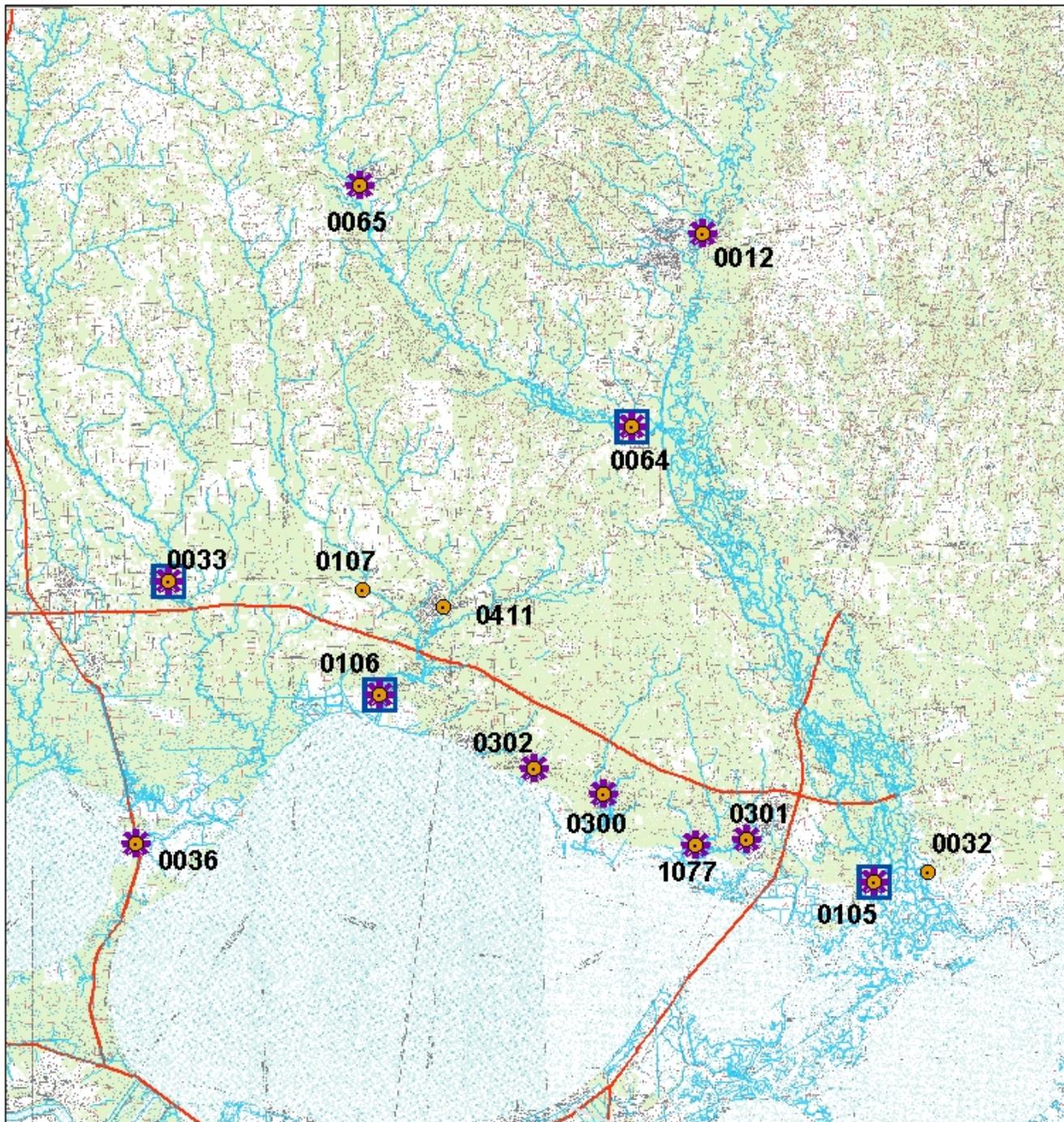
- There have been no reports of excessive algae blooms
- Numerous bait fish and mullet observed
- Large fish, possibly tarpon, observed striking at surface fish
- Large schools of other fish have been observed striking bait fish
- Live crabs and shrimp observed in traps along the southshore
- Good visibility in water column
- High shrimp productivity and catch during December



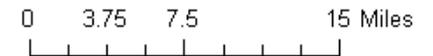
# Summation of water quality assessments for impacted area: Lake Pontchartrain

- Dissolved oxygen, fecal coliforms, and turbidity all meet water quality standards
- Water quality parameters have remained at or near values expected for this time of year
- There have been no exceedences of organic compound standards and very few samples with detectable concentrations
- There have been no reports of oil sheen on the water
- Very low levels of Atrazine were detected at two causeway sites in one sample from each site; however, the concentrations were below standards

# Hurricane Katrina Surface Water Quality Monitoring Sites: Northshore/ Florida Parishes (Updated Jan. 26, 2006)



-  Perennial Stream
-  Interstate Highway
-  Sample Site
-  Active site
-  Long term station



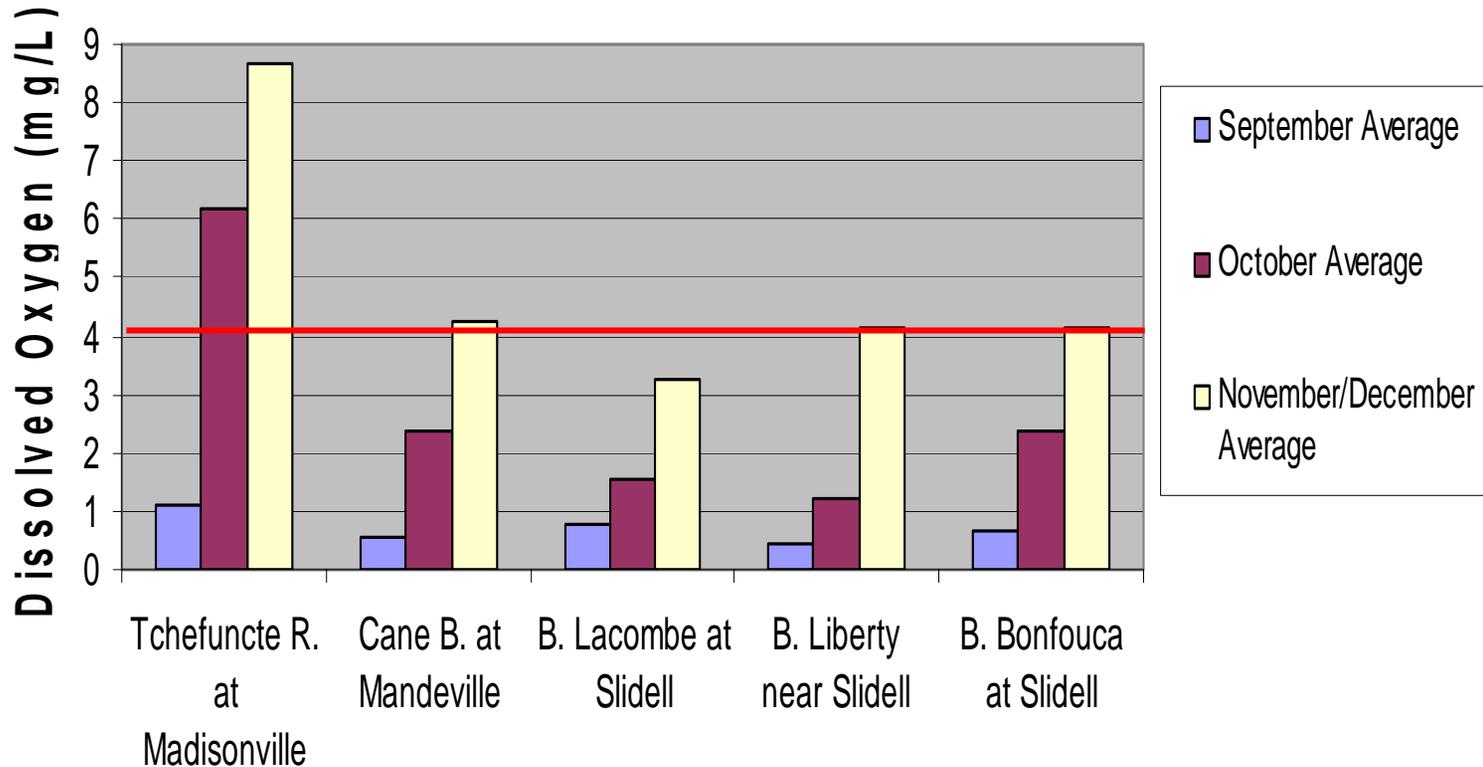
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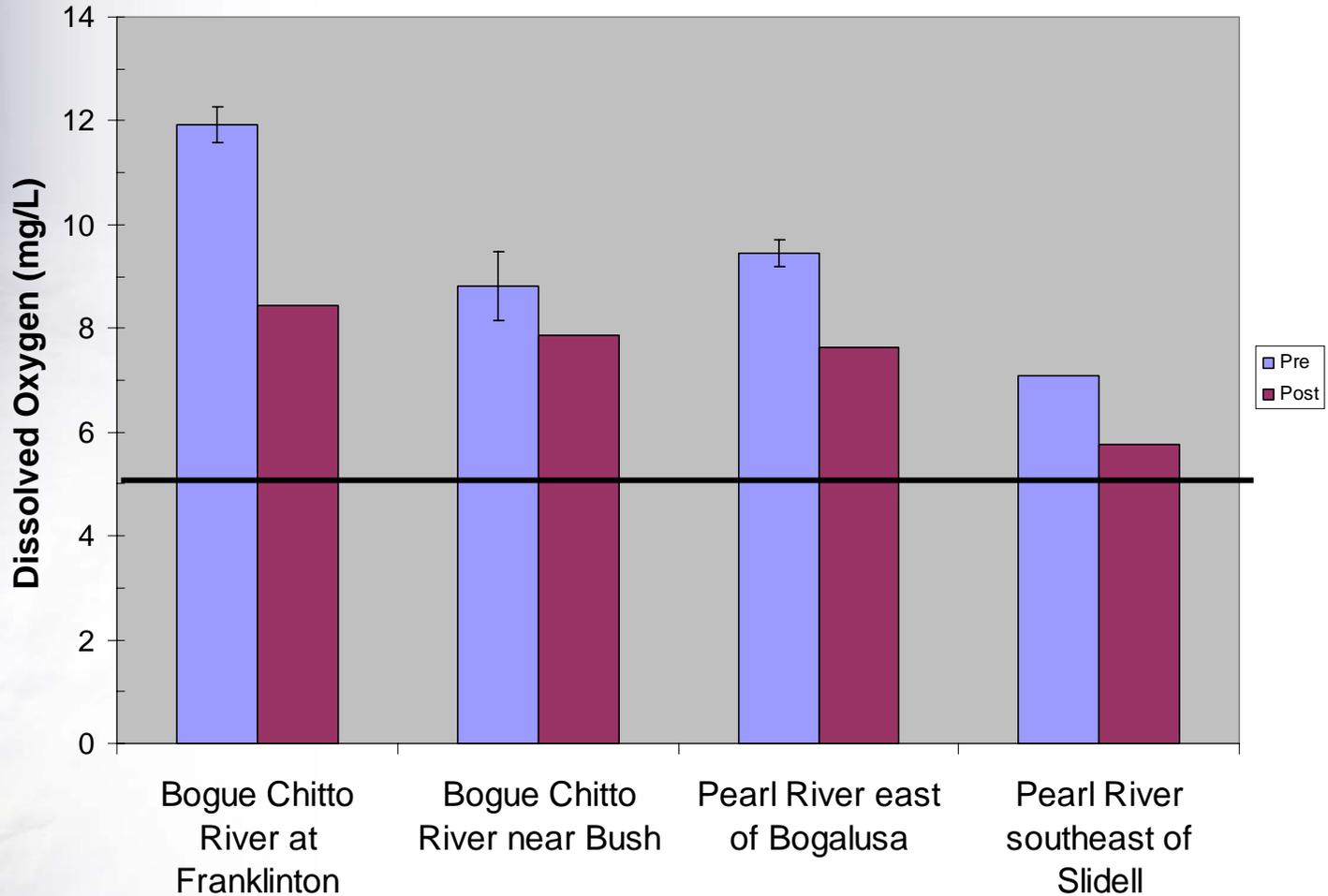


## Mean Dissolved Oxygen by Month for Northshore Streams



Last sample date varies with site between November and December.

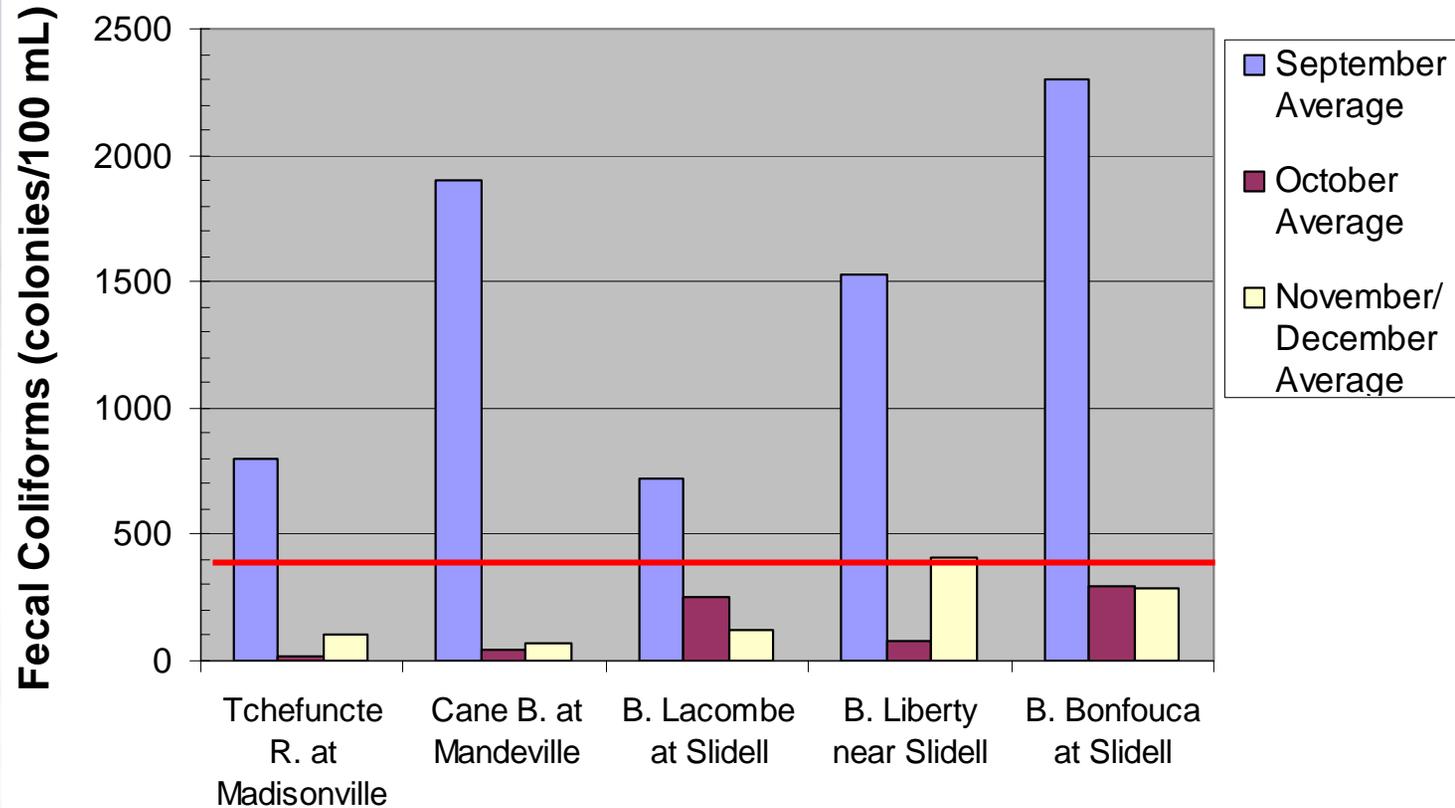
# Comparison of Mean Dissolved Oxygen Concentrations at Northshore Sites



Last sample date varies with site between October and December.



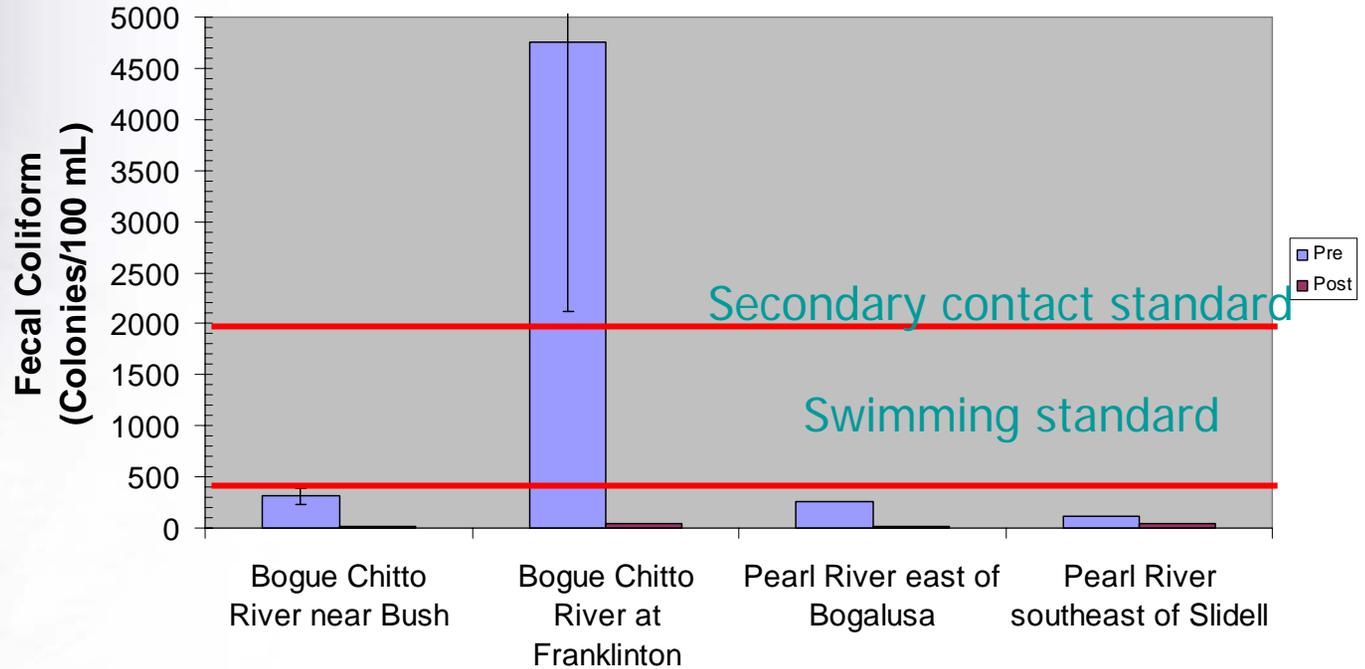
## Geometric Mean of Fecal Coliforms by Month for Northshore Streams



Last sample date for these sites was December 13, 2005.



## Comparison of Mean Fecal Coliform Concentrations at Northshore Sites



Latest data for these sites is from December 12 or 14, 2006. No sample exceeded the swimming standard of 400 colonies/100 mL.



# Summation of water quality assessments for impacted area: Northshore/Florida Parishes

- Except for Tangipahoa River, West Pearl River, and upstream sites, Northshore streams continue to be impacted by low but improving dissolved oxygen
- Early reports of fish kills in the Northshore area were the result of low DO
- Slightly elevated levels of fecal coliforms are being detected but this is not unusual for the area
- No exceedences of Louisiana water quality standards for organic compounds
- Oil sheens were seen at five of seven sites but not in recent months



# Summation of water quality assessments for impacted area: Northshore/Florida Parishes

- Bayou Lacombe had one sample exceed chronic aquatic life criteria for lead and mercury. Bayou Liberty had one sample exceed the chronic criteria for mercury.
- Bayou Cane has had three exceedences of the chronic aquatic life criteria for mercury
- West Pearl River had one sample exceed the chronic aquatic life criteria for chromium VI
  - Cannot determine what proportion of sample was Cr III or Cr VI

# Hurricane Katrina Surface Water Quality Monitoring Sites: MRGO/Breton Sound (Updated Jan. 26, 2006)

-  Perennial Stream
-  Interstate Highway
-  Sample Site
-  Active site



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# Summation of water quality assessments for impacted area: MRGO/Breton Sound



- Dissolved oxygen remained above water quality standards for all sites tested
- Fecal coliform concentrations remained below water quality standards for swimming
- There were no detectable concentrations of organic compounds
- Sampling has been discontinued at these sites

# Hurricane Katrina Surface Water Quality Monitoring Sites: Barataria

- Sample Site
- Perennial Stream
- Interstate Highway



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# Summation of water quality assessments for impacted area: Barataria Basin

- Dissolved oxygen remained near or above water quality standards for all sites tested
- Only one sample exceeded swimming standards for fecal coliforms
- No organic compounds were been detected
- Sampling has been discontinued at these sites

# Early Warning Organic Compound Detection System (EWOCDS) Sampling Sites Hurricane Katrina

▲ EWOCDS site

0 1.25 2.5 5 Miles

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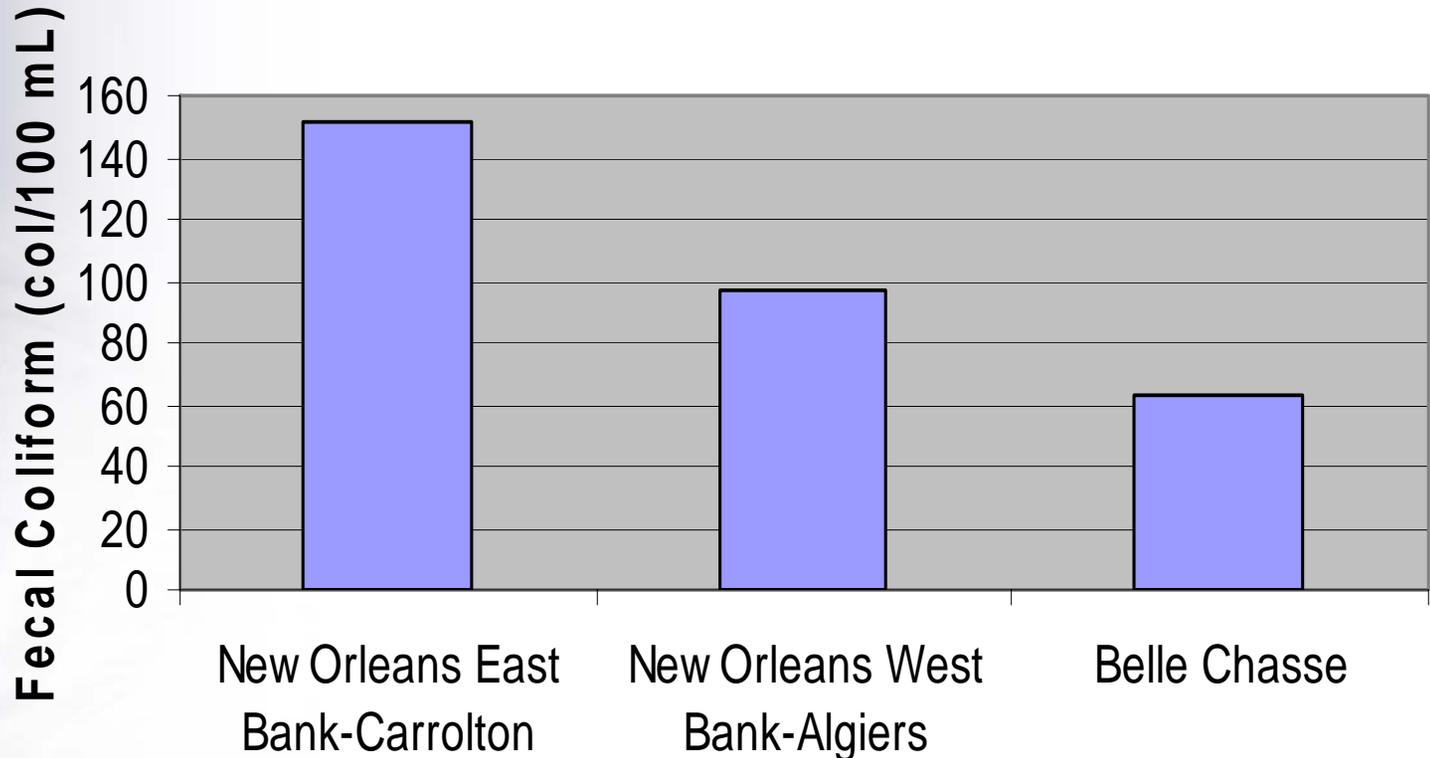


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 Base Map: 1:24k DLG  
 UTM Zone 15, NAD 83





## Average Density of Fecal Coliforms at Mississippi River Water Intakes Near New Orleans



Includes only those sites still being sampled. Data for Carrolton and Algiers through October 31. Belle Chasse data through November 28, 2005.

**Note: Standard = 400 col/100 mL**



# Summation of water quality assessments for impacted area: Mississippi River water intakes

- One test result for fecal coliform from the Mississippi River at Carrolton was above the swimming standard but well below the drinking water standard
- Recent test results for three sites on the Mississippi River have been below standards



# Summary



# Water quality summary throughout affected area: Through January 18, 2005

- Northshore Lake Pontchartrain – most impacted
  - Low but recovering dissolved oxygen in rivers and bayous
  - Slightly elevated bacteria counts (i.e., fecal coliform)
- Water quality of coastal marshes south and east of New Orleans generally unimpacted



# Water quality summary throughout affected area: Through January 18, 2005

- Organic compounds and metals
  - Results mostly non-detect
  - Only two exceedences of non-drinking water human health standards in approximately 40,420 analytical results for organic compounds
  - Only 7 exceedences of chronic aquatic life standards in approximately 2,900 analytical results for metals



# Water quality summary throughout affected area: Through January 18, 2005

- Most impacts seen thus far were a result of the hurricane and not a result of the pump down of floodwaters
- The quantity of floodwaters pumped from New Orleans area into Lake Pontchartrain was estimated to be less than 5.0% of the lake's volume
- Lake Pontchartrain remains normal for this time of year and has been largely unaffected by the pumping of floodwaters from New Orleans



Where do we go  
from here?



# Where do we go from here?

- LDEQ has resumed statewide ambient water quality monitoring under it's four-year rotating subsegments approach (2006 sites shown in green on following map)
  - Data will be analyzed prior to Clean Water Act assessments to determine if any hurricane effects remain
- 6 ambient long-term trend sites in the region continue to be sampled
- In addition, 13 more monitoring sites remain active specific to post-Katrina monitoring





# References

- <http://www.deq.louisiana.gov/>
- <http://www.deq.louisiana.gov/deqgallery/>
- [http://lagic.lsu.edu/images/hurricanes/2005\\_LAGIC\\_HURRICANE\\_ATLAS.pdf](http://lagic.lsu.edu/images/hurricanes/2005_LAGIC_HURRICANE_ATLAS.pdf)
- <http://www.louisiana.gov/wps/portal/>
- <http://katrina.louisiana.gov/>
- <http://lra.louisiana.gov/>



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