



Post-Hurricane Water Quality Assessments: Katrina Monitoring (Report #9)

*Louisiana Department of Environmental Quality
Water Quality Assessment Division*

December 16, 2005



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All information presented here is based on preliminary laboratory results and field observations available through December 15, 2005. As additional data is collected water quality assessments may change over time.



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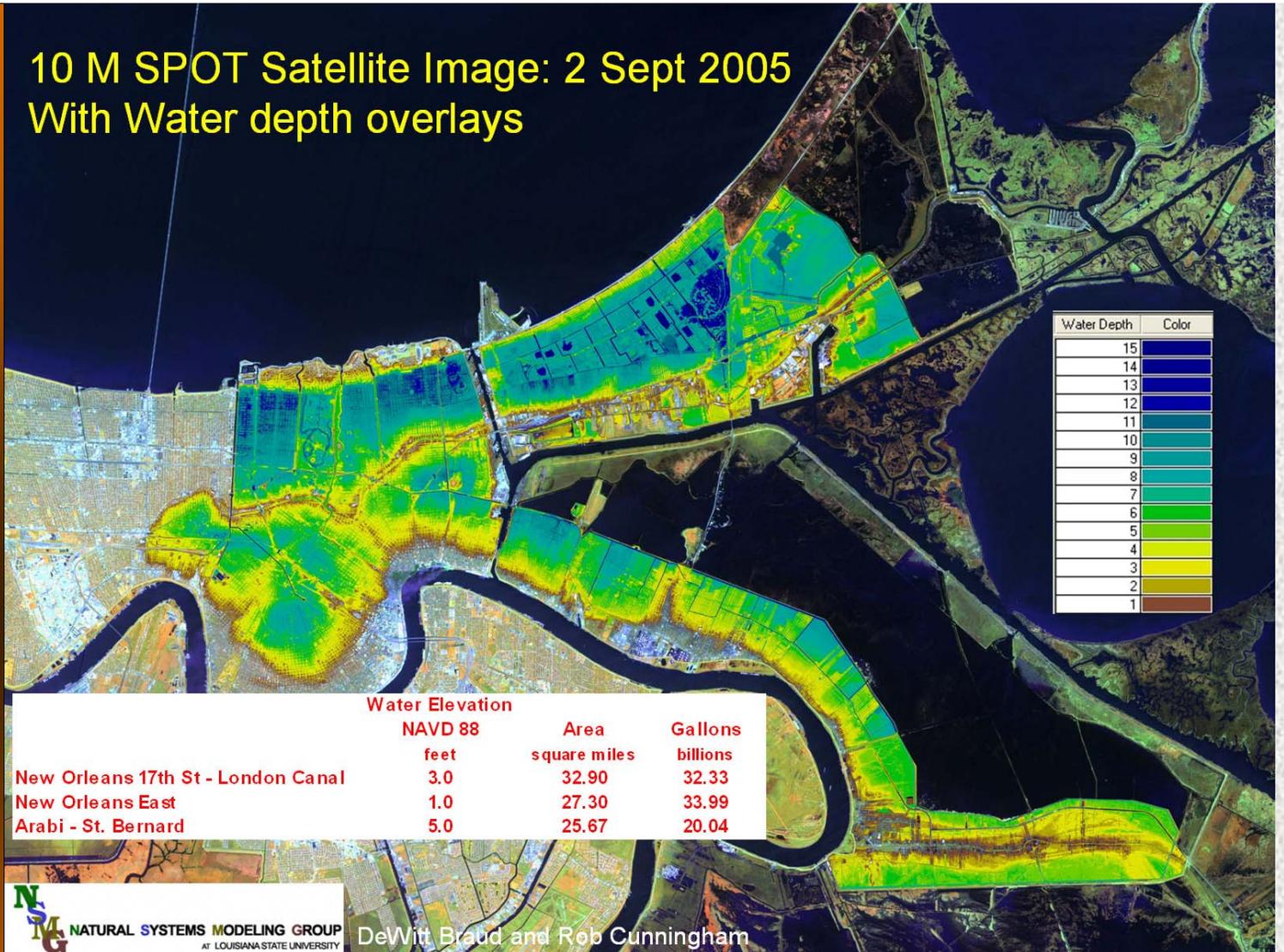
A partnership for water quality assessment

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



10 M SPOT Satellite Image: 2 Sept 2005 With Water depth overlays

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Based on GIS hydrologic analysis by LSU and LDEQ, floodwaters pumped into Lake Pontchartrain was estimated to be 8.87 billion cubic feet or 4.5% of the volume of Lake Pontchartrain.



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What we expected following Hurricane Katrina

- Hurricane and wind damage
 - Increases in organic loading
 - Decreases in dissolved oxygen
 - Fish kills
 - Increases in fecal coliform
- Impact of floodwater discharges
 - Decreases in dissolved oxygen
 - Fish kills
 - Increases in fecal coliform and other urban nonpoint source pollutants (metals, pesticides, oil and grease)



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Parameter categories analyzed

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



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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

Sampling Site

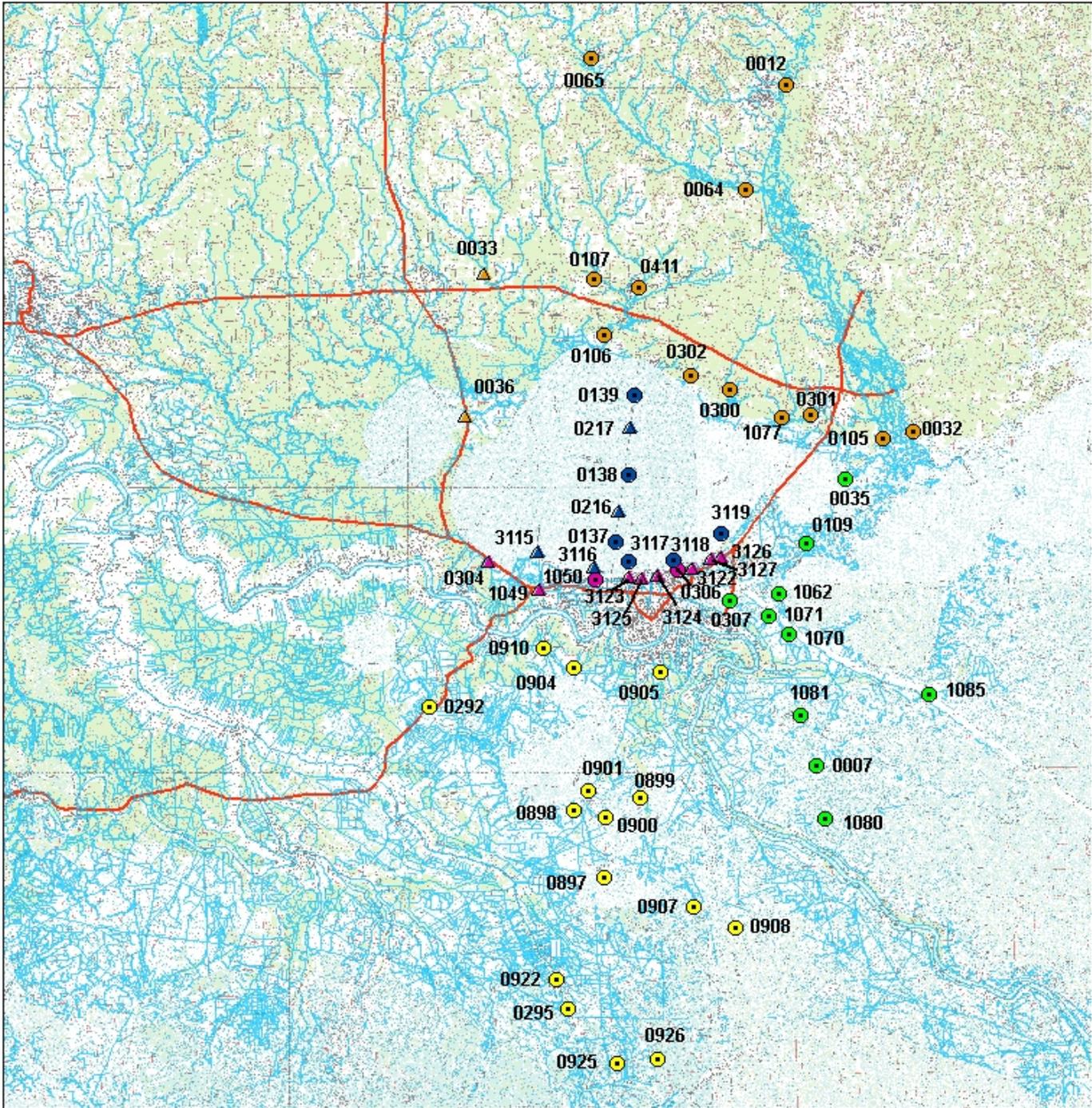
- Lake Pontchartrain Active
- ▲ Lake Pontchartrain Dropped
- Barataria Active
- MRGO/Breton Sound Active
- Northshore/Florida Parishes, Active
- ▲ Northshore/Florida Parishes, Dropped
- Southshore Canals and Bayous, Active
- ▲ Southshore Canals and Bayous, Dropped
- Interstate Highway
- Perennial Stream



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 Map No. 200502047, October 25, 2005
 Base Map 1:100k DLG
 Projection: UTM Zone 15, NAD 83





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Magnitude of Laboratory Analyses: Water only as of December 12, 2005

- o LDEQ Lab
 - Organic compounds – 595 samples (34,359 analyses)
 - Conventional parameters – 1,720 samples (5,842 analyses)
 - Metals – 337 samples (643 analyses)
 - Total samples – 2,652 samples (40,844 analyses)
- o Contract Labs
 - Organic compounds – 391 samples (13,569 analyses)
 - Conventional parameters – 485 samples (667 analyses)
 - Metals – 282 samples (2,256 analyses)
 - Total samples – 1,158 samples (16,492 analyses)



Organic Compound Analysis



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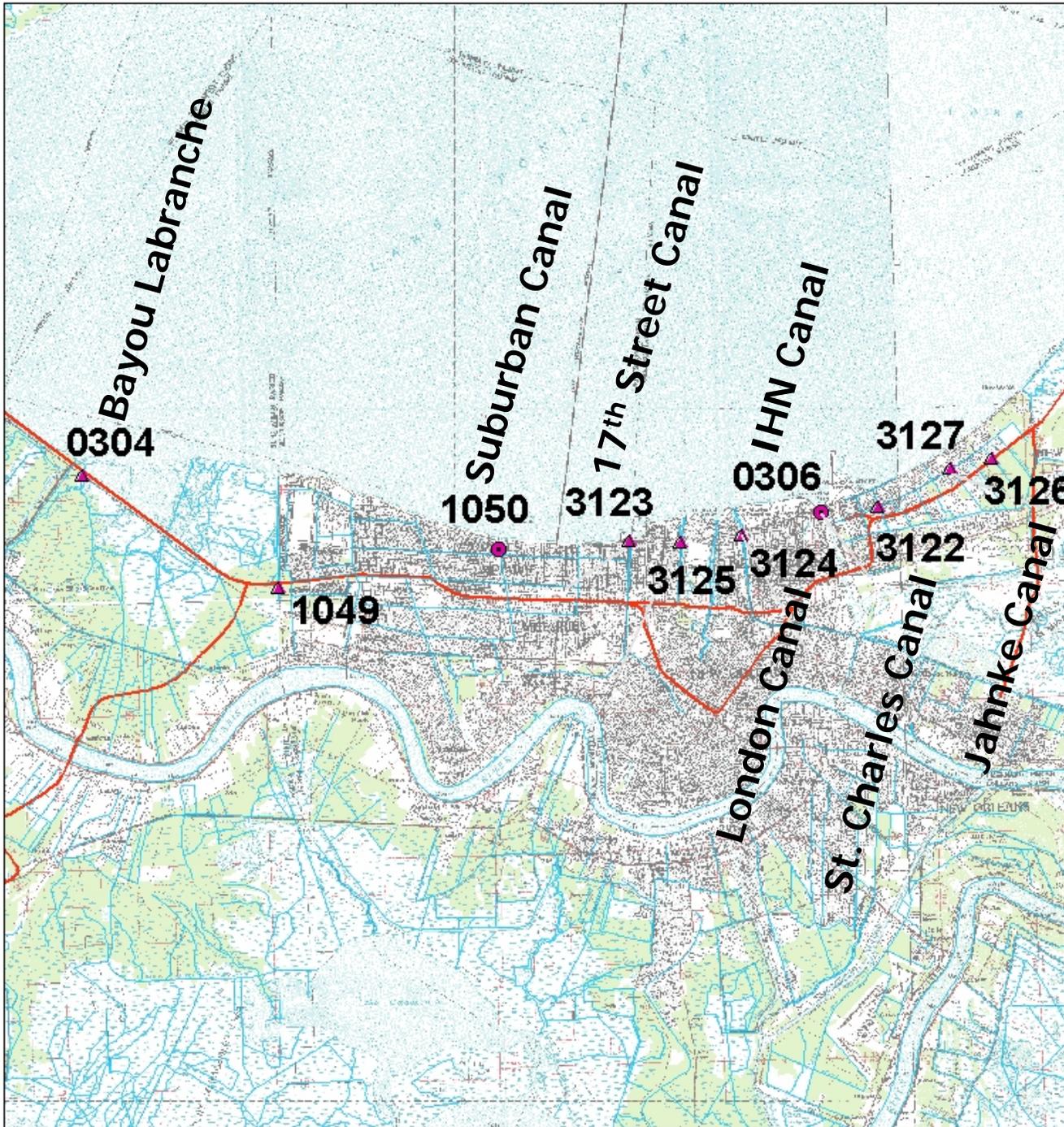
Post-Katrina Organic Compound Analysis in Southeast Louisiana

- Of the approximately 48,000 analytical results (nearly 1,000 samples) for organic compounds in ambient water, less than 0.2% were above detection levels
- 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



- Active Sample Site
- ▲ Dropped Sample Site
- Perennial Stream
- Interstate Highway



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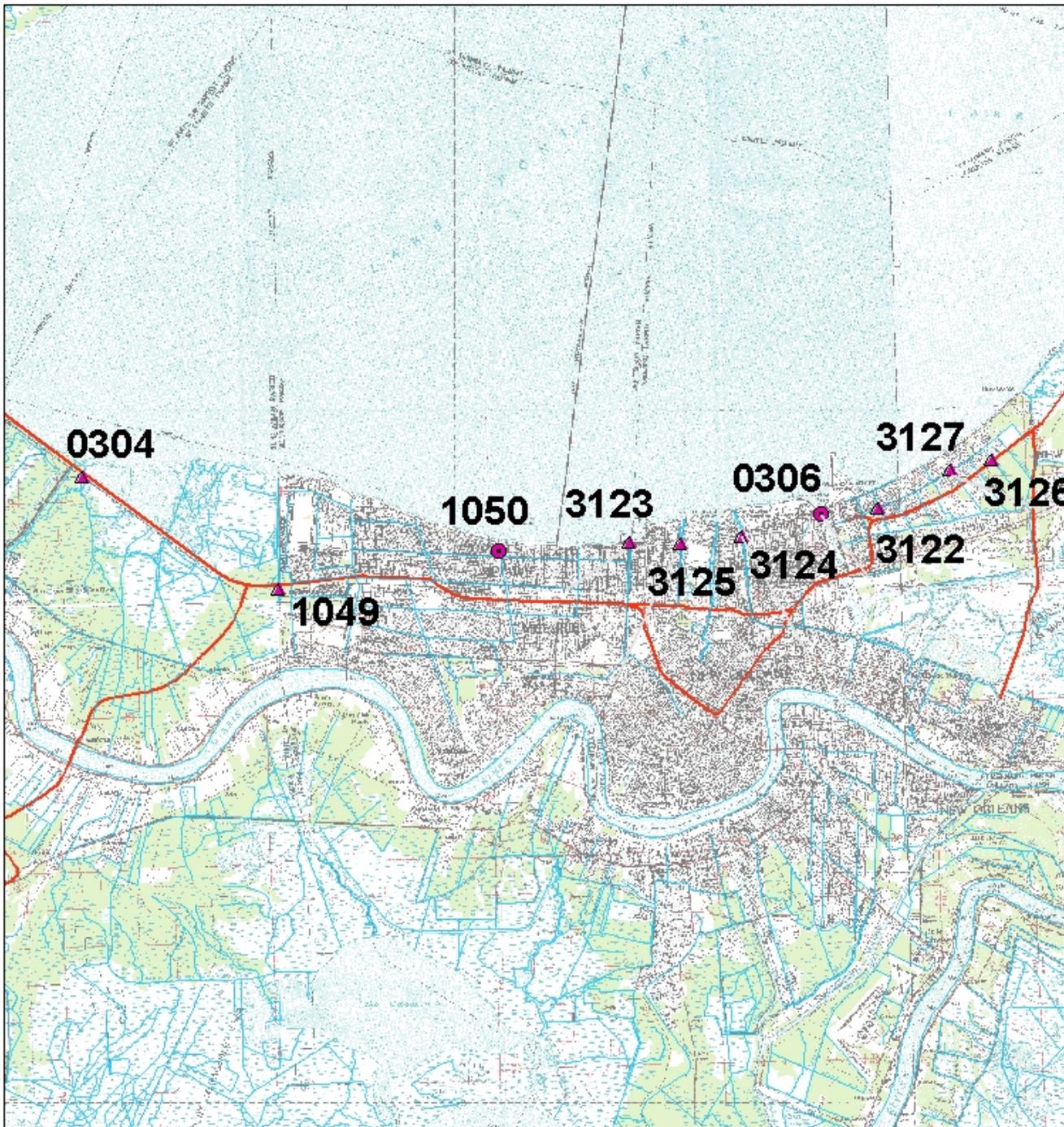
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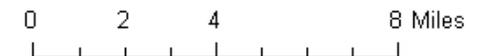
Biotoxicity test results

- 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



- Active Sample Site
- ▲ Dropped Sample Site
- Perennial Stream
- Interstate Highway



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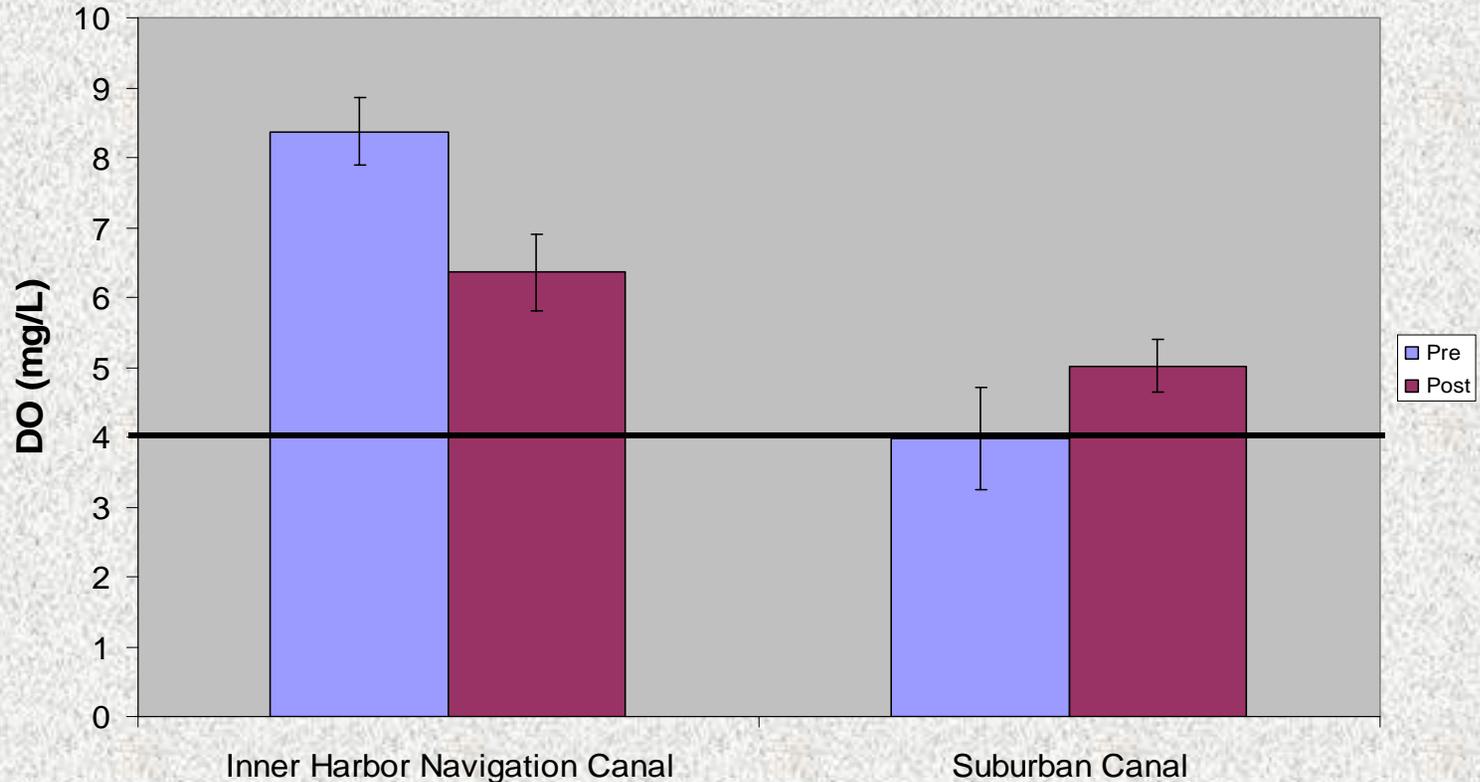
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Comparison of Average Dissolved Oxygen Concentrations at Southshore Sites



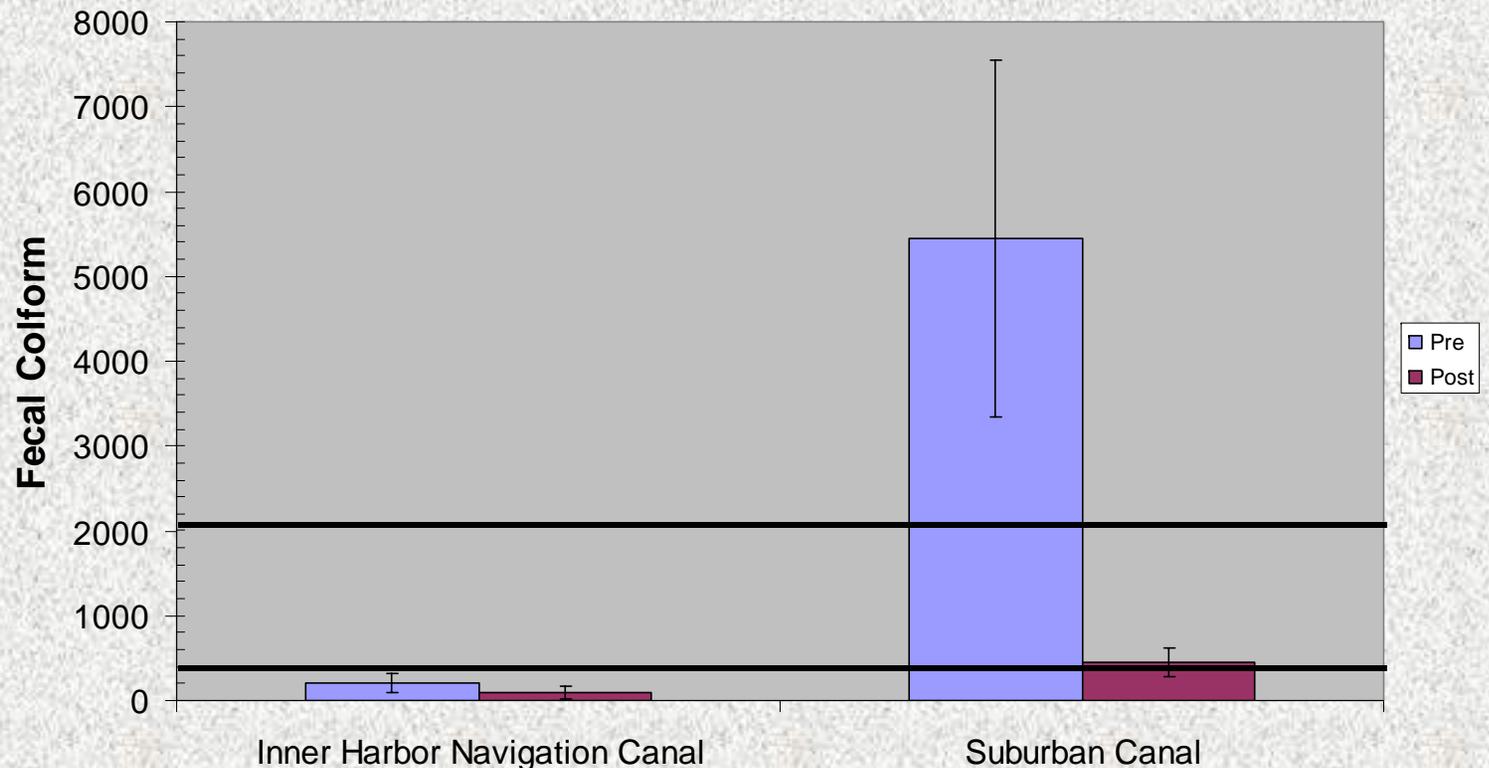
Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems. There has been no new data for these sites since November 15, 2005. Additional samples are being collected and will be reported as they become available.



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Comparison of Average Fecal Coliform Concentrations at Southshore Sites



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

There has been no new data for these sites since November 15, 2005. Additional samples are being collected and will be reported as they become available.



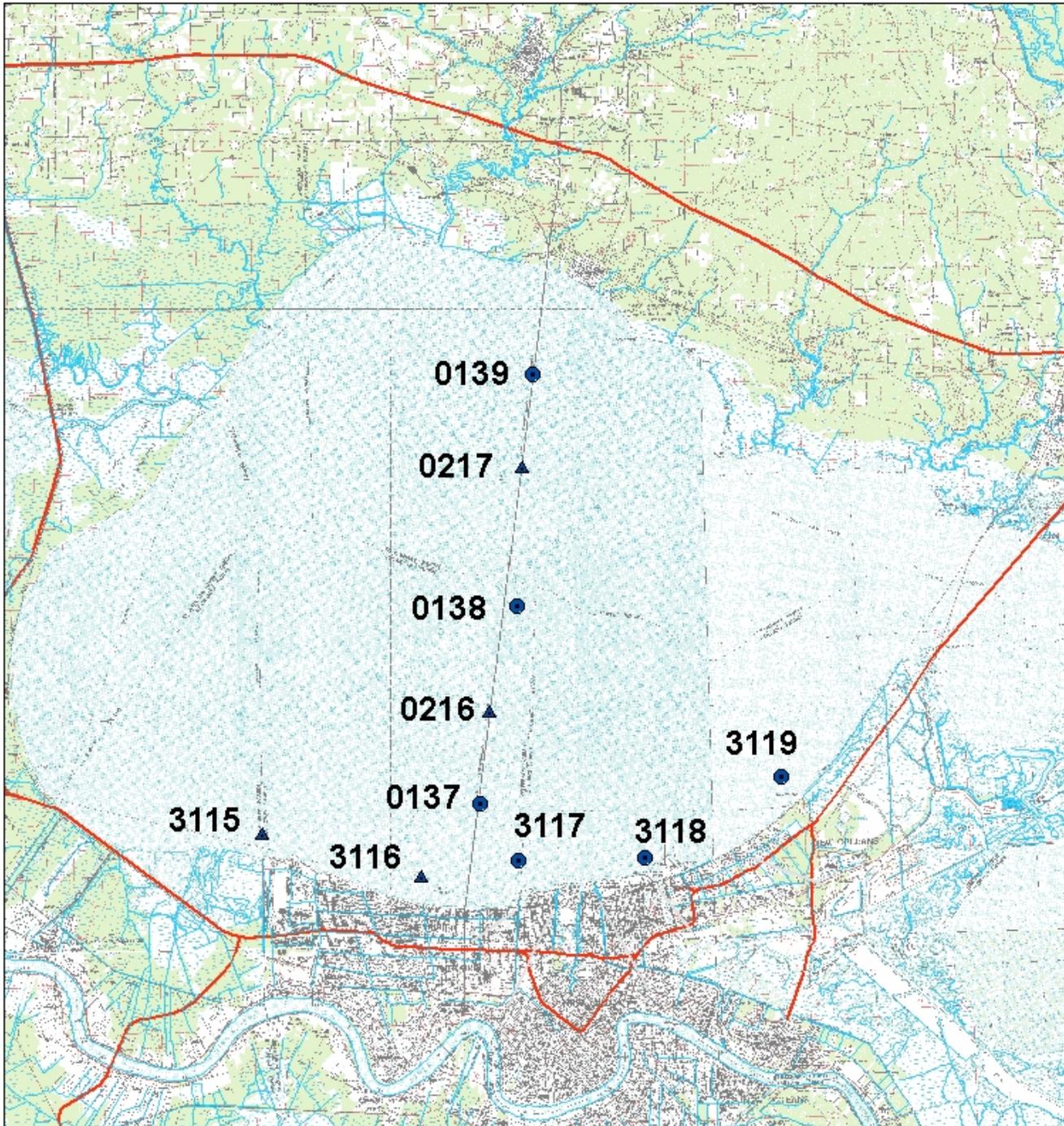
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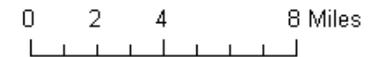
Summation of water quality assessments for impacted area: Southshore Canals

- 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 17th 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 17th Street Canal
- All other organic compound results have been below Louisiana water quality standards

Hurricane Katrina Surface Water Quality Monitoring Sites: Lake Pontchartrain



- Active Sample Site
- ▲ Dropped Sample Site
- Perennial Stream
- Interstate Highway



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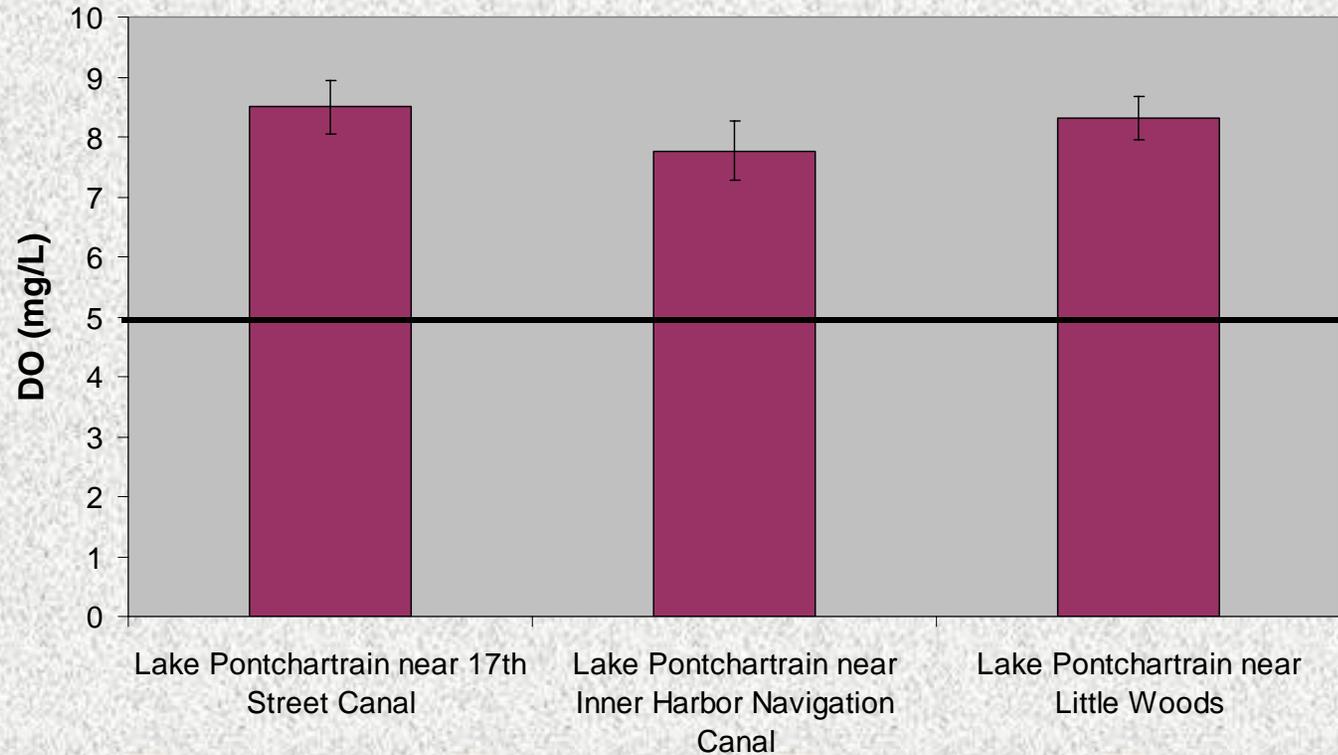
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Comparison of Average Dissolved Oxygen Concentrations at Sites 1/2 Mile off Southshore



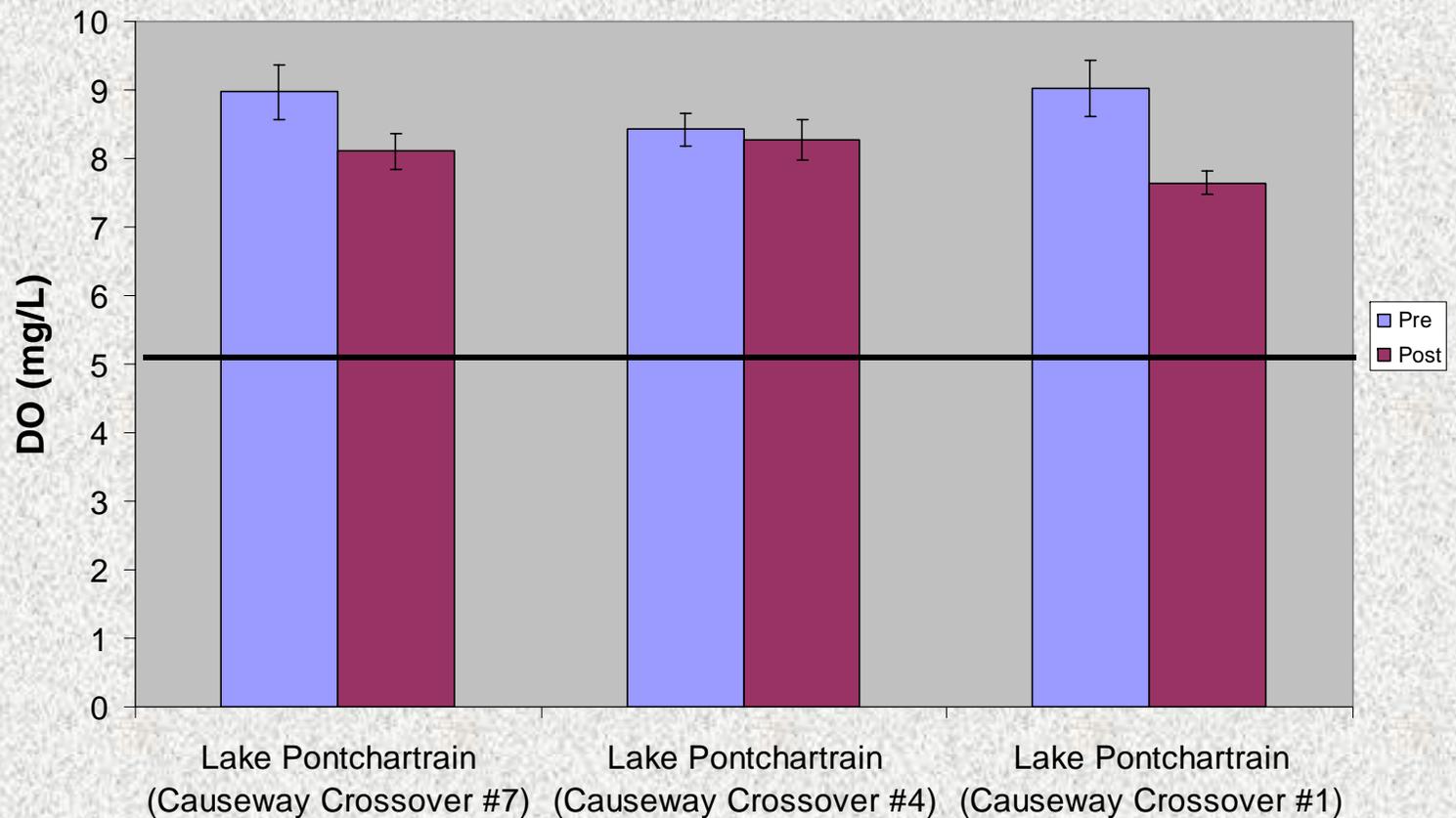
Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems. There has been no new data for these sites since November 8, 2005. Additional samples are being collected and will be reported as they become available.



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Comparison of Average Dissolved Oxygen Concentrations at Lake Pontchartrain Causeway Sites



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

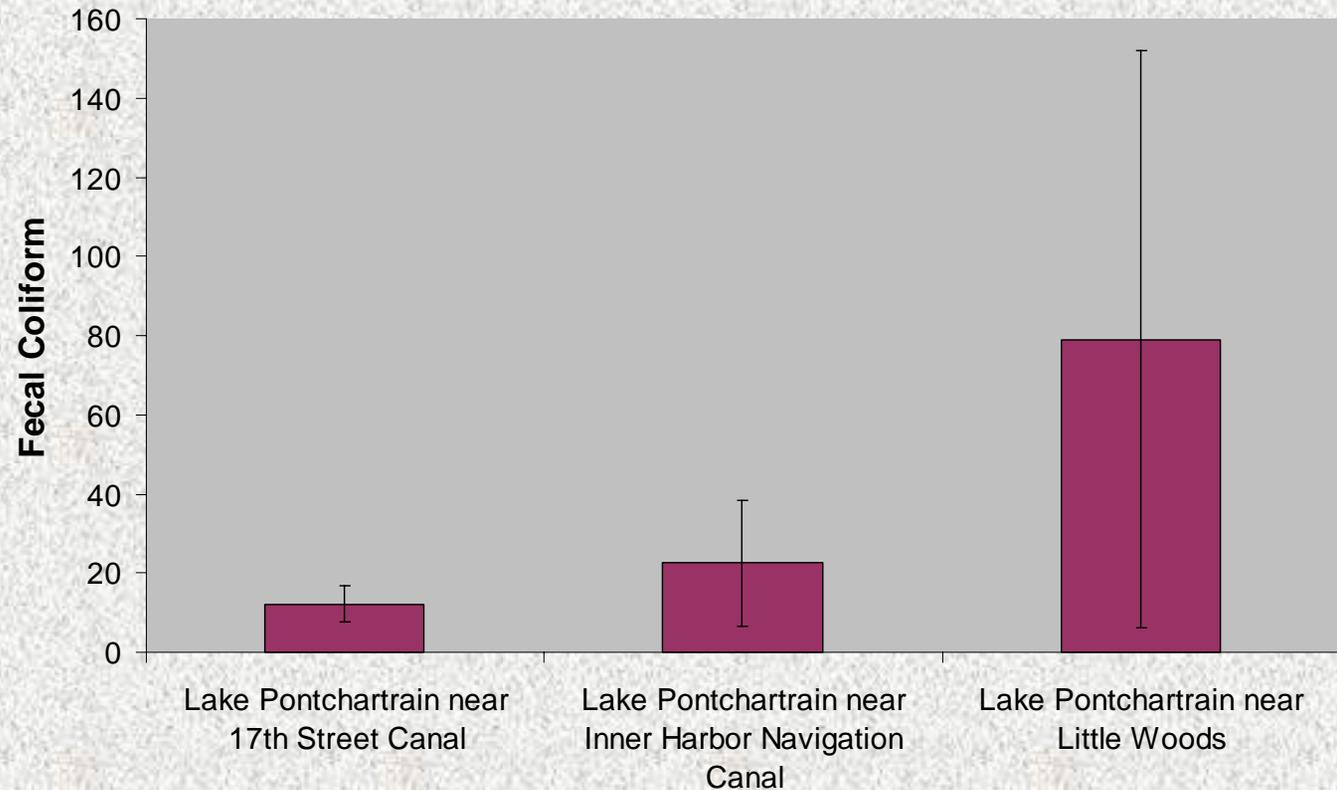
There has been no new data for these sites since December 13, 2005 (Crossover 4 only). Additional samples are being collected and will be reported as they become available.



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Comparison of Average Fecal Coliform Concentrations at Sites 1/2 Mile off Southshore



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

There has been no new data for these sites since November 8, 2005. Additional samples are being collected and will be reported as they become available.

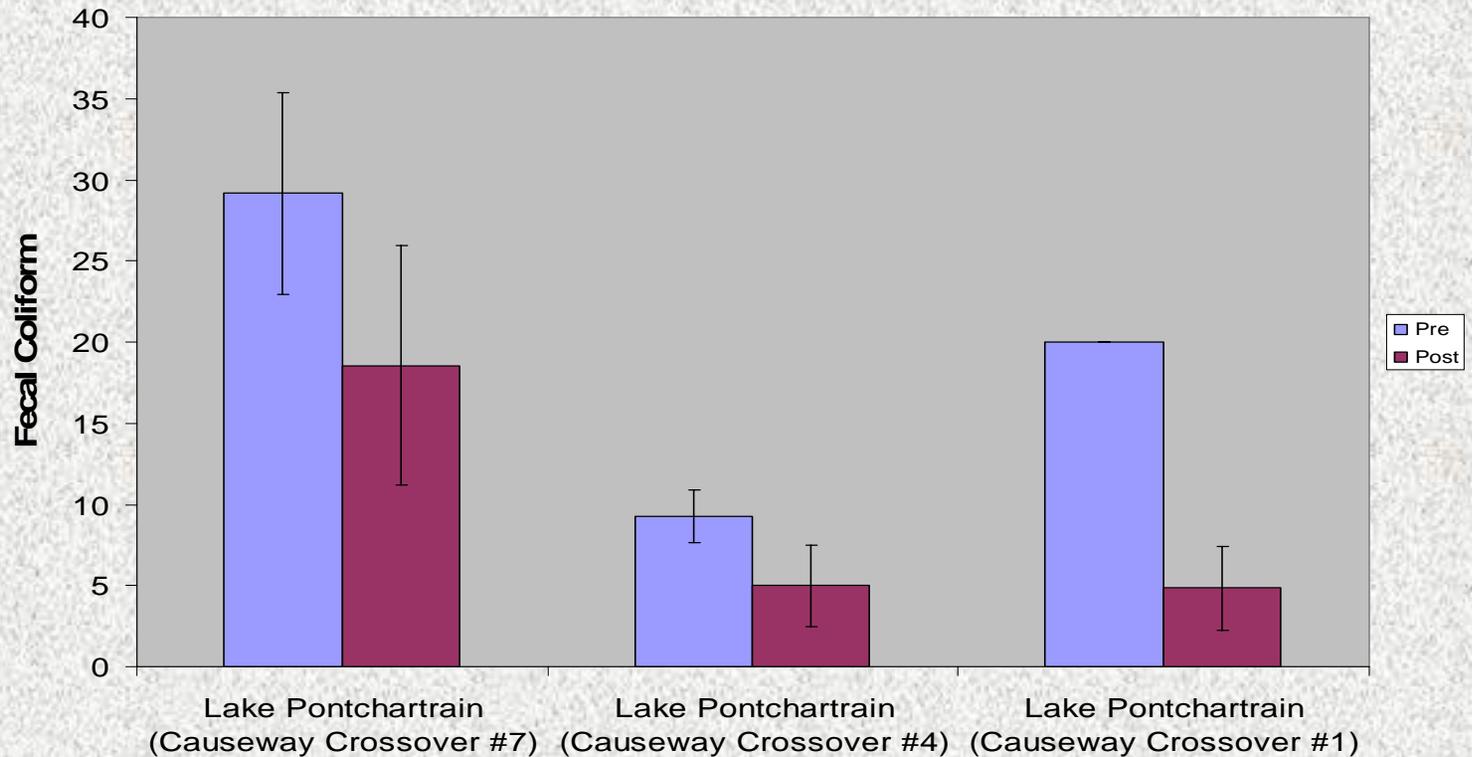
**Note: Standard =
400 col/100 mL**



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Comparison of Average Fecal Coliform Concentrations at Lake Pontchartrain Causeway Sites



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

There has been no new data for these sites since December 13, 2005 (Crossover 4 only). Additional samples are being collected and will be reported as they become available.

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



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Lake Pontchartrain field observations

- As of November 28, 2005 there have been no excessive algae blooms observed (High dissolved oxygen levels indicate algal activity)
- Numerous bait fish and mullet observed
- Large fish, possibly tarpon, were 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



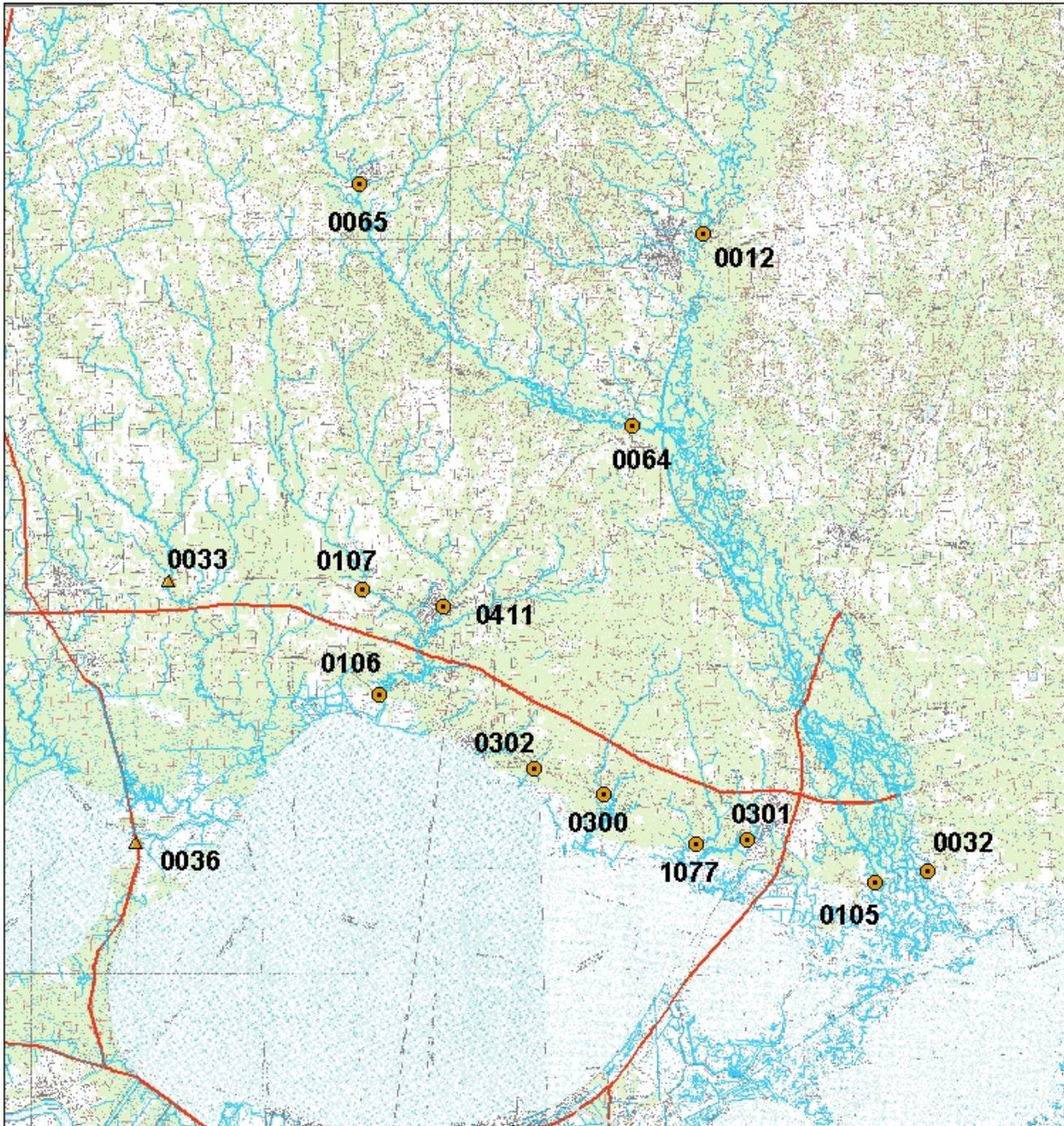
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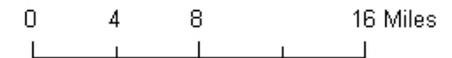
Summation of water quality assessments for impacted area: Lake Pontchartrain

- 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



- Active Site
- ▲ Dropped Site
- Perennial Stream
- Interstate Highway



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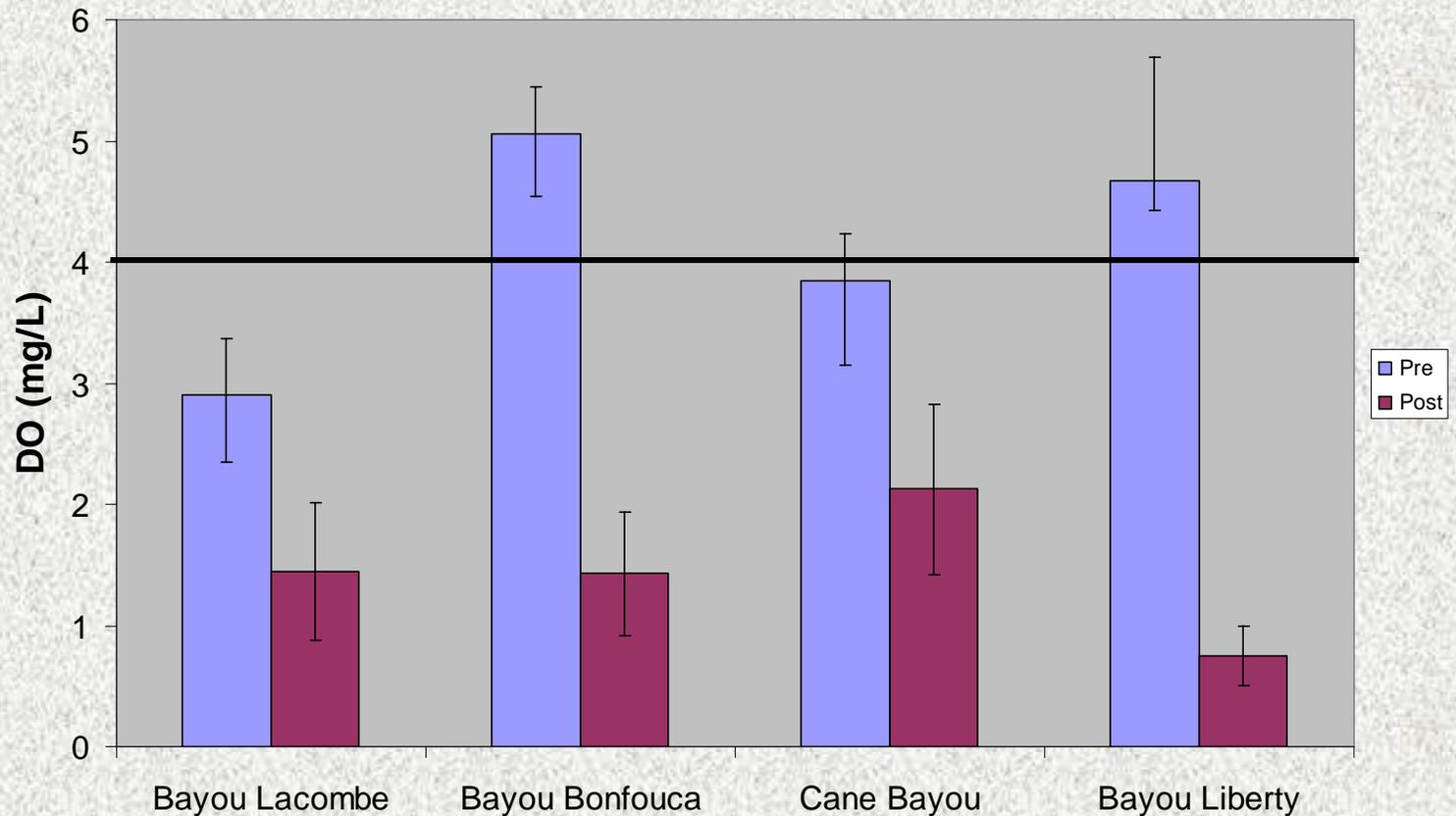
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Map No. 200502048, October 25, 2005
Base Map 1:100k DLG
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Comparison of Average Dissolved Oxygen Concentrations at Northshore Sites



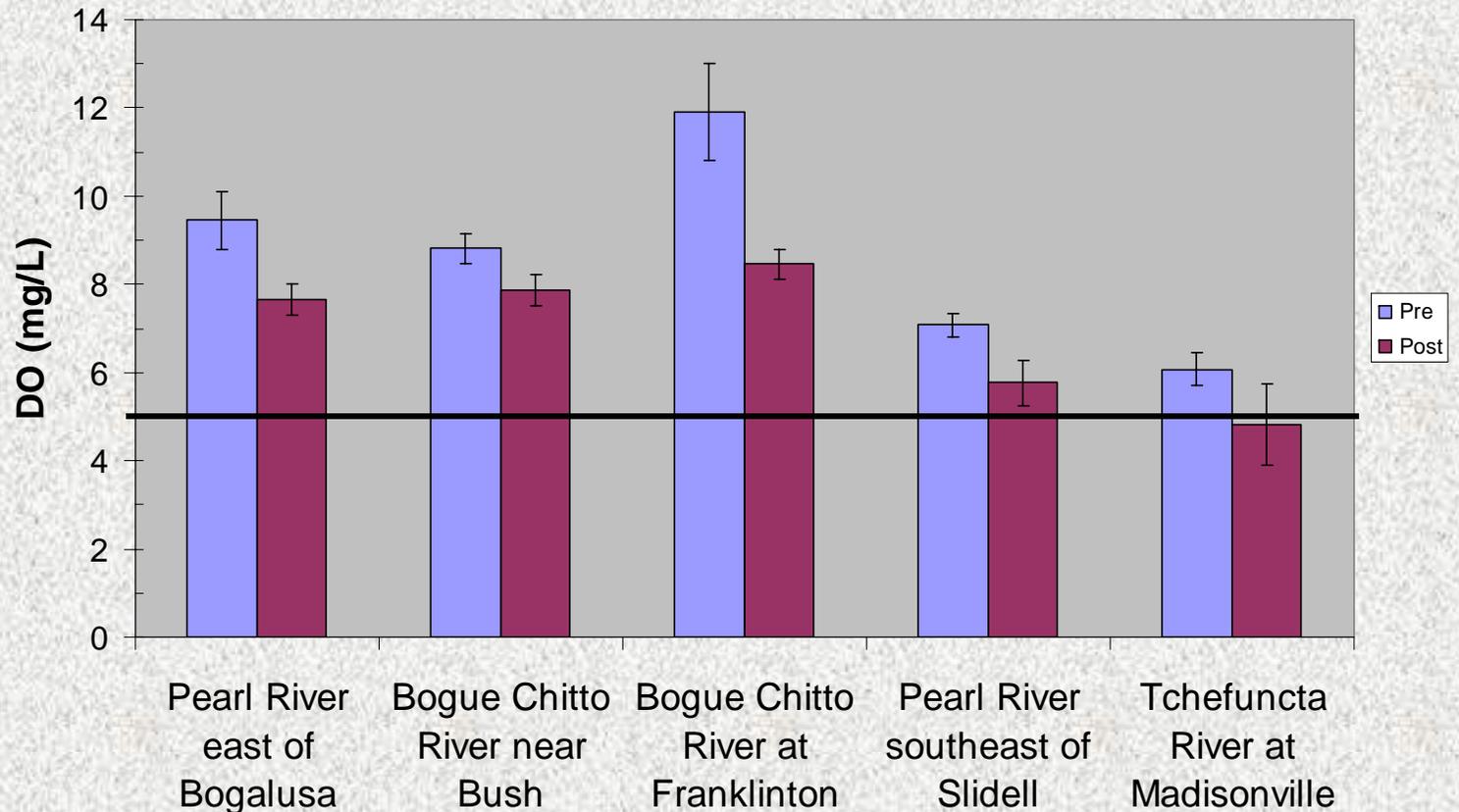
Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.
Last sample dates vary with site between November and December. Additional data will be reported as it becomes available.



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Comparison of Average Dissolved Oxygen Concentrations at Northshore Sites



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

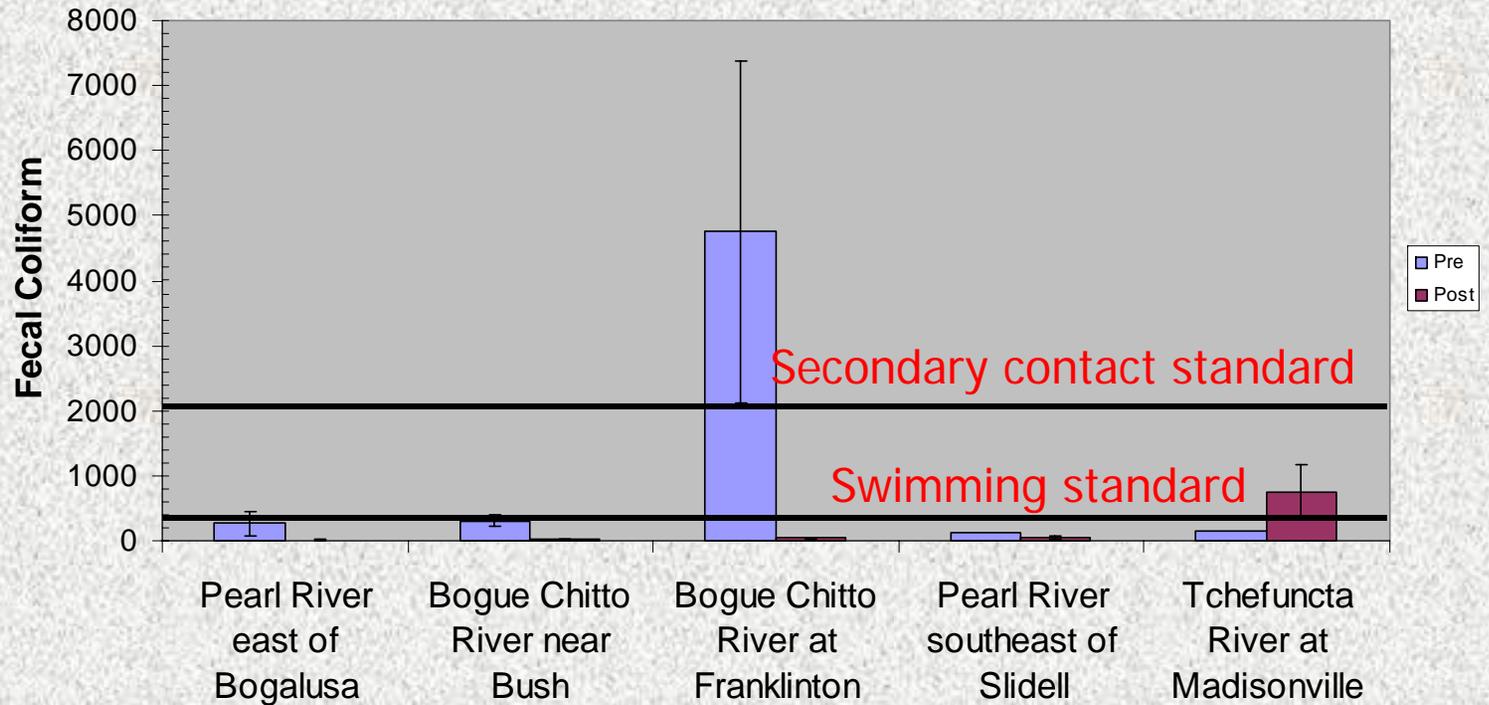
Last sample dates vary with site between October and December. Additional data will be reported as it becomes available.



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Comparison of Average Fecal Coliform Concentrations at Northshore Sites



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

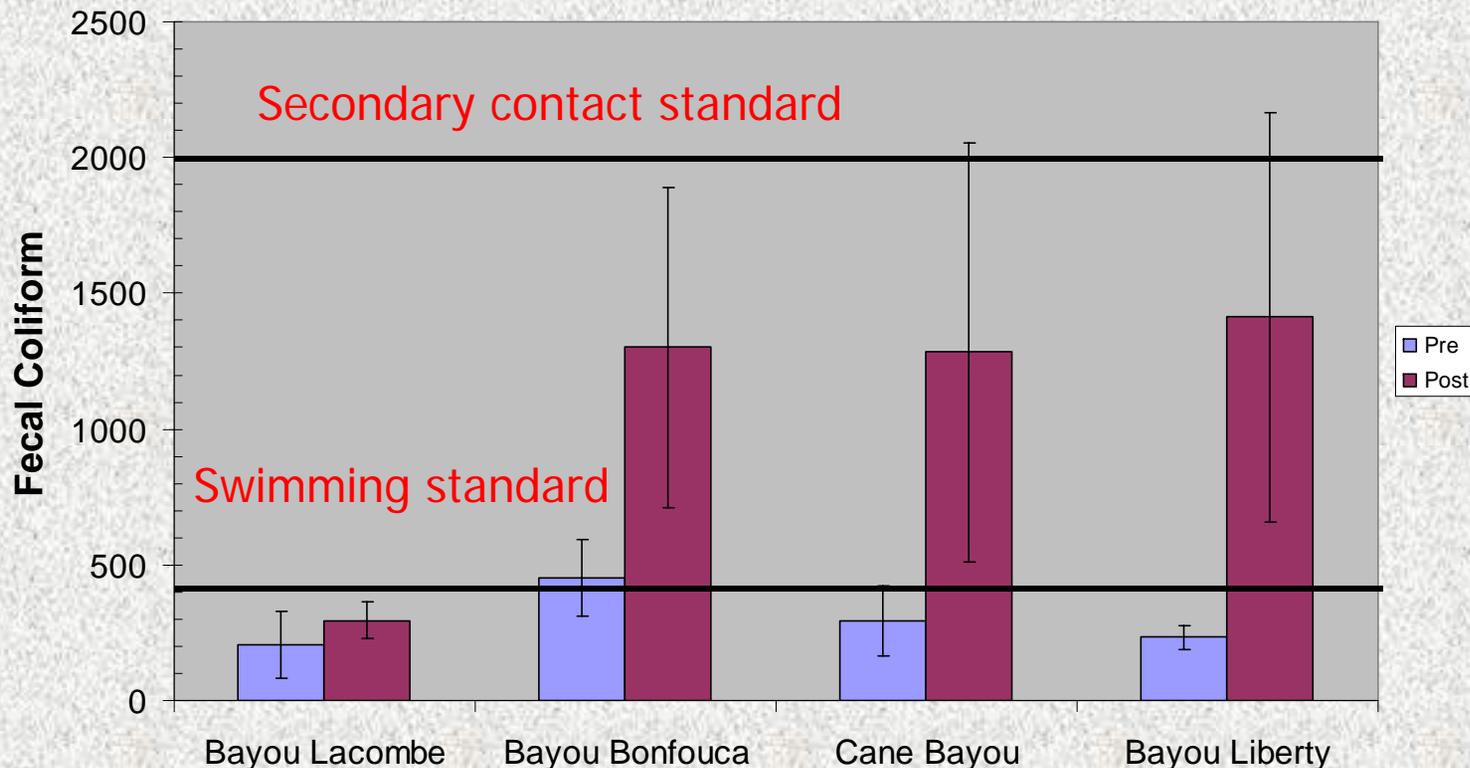
Last sample dates vary with site between October and late-November. Additional data will be reported as it becomes available.



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Comparison of Average Fecal Coliform at Northshore Sites



Includes only those sites still being sampled. Discontinued sites were dropped because results to date have shown no water quality problems.

Last sample date for these sites was November 29, 2005. Additional data will be reported as it becomes available.



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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 dissolved oxygen
 - There are signs DO concentrations are recovering
- 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 sheen was seen at five of seven sites but not in recent weeks



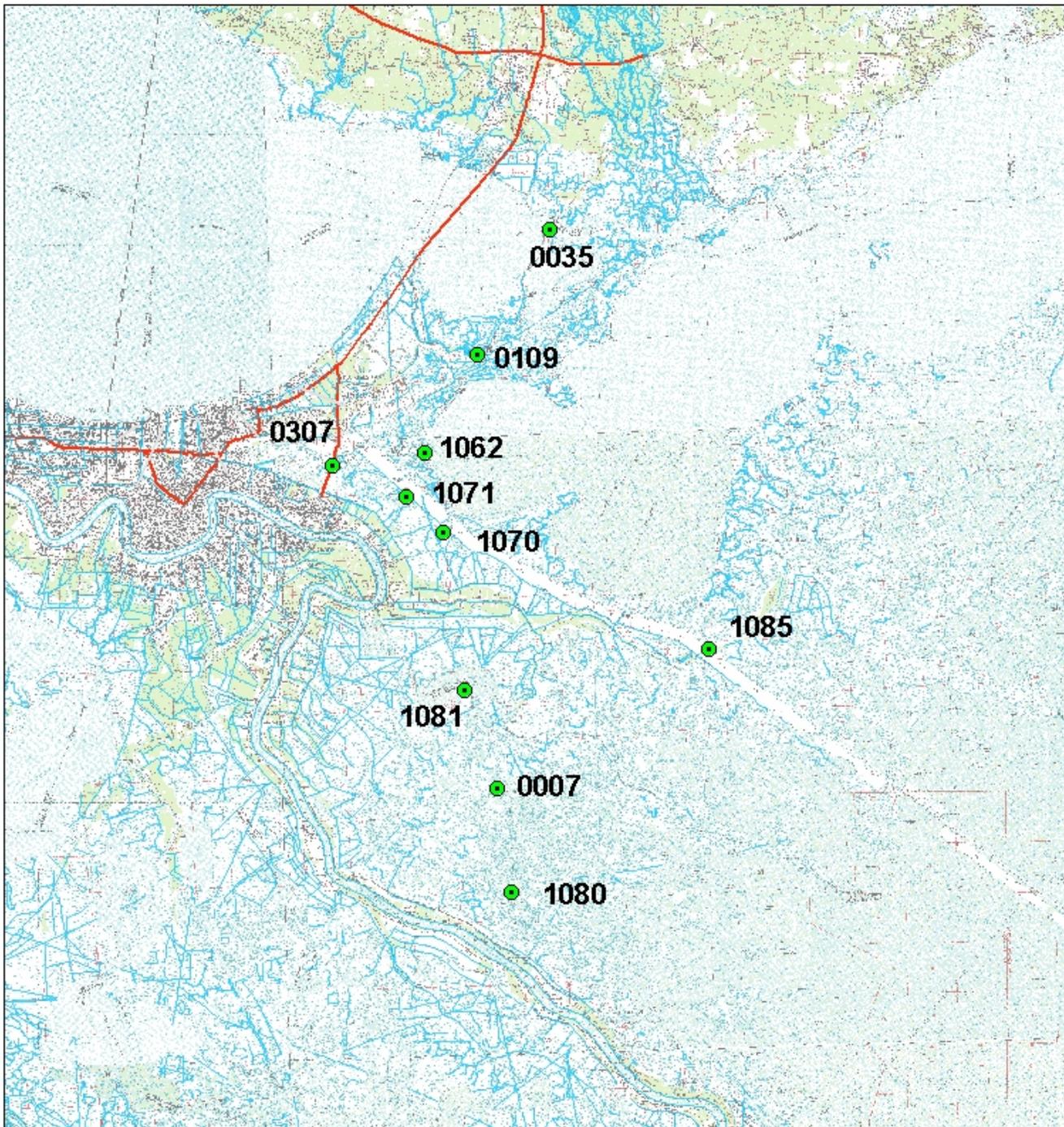
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Summation of water quality assessments for impacted area: Northshore/Florida Parishes

- 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

Hurricane Katrina Surface Water Quality Monitoring Sites: MRGO/Breton Sound



- Sample Site
- Perennial Stream
- Interstate Highway



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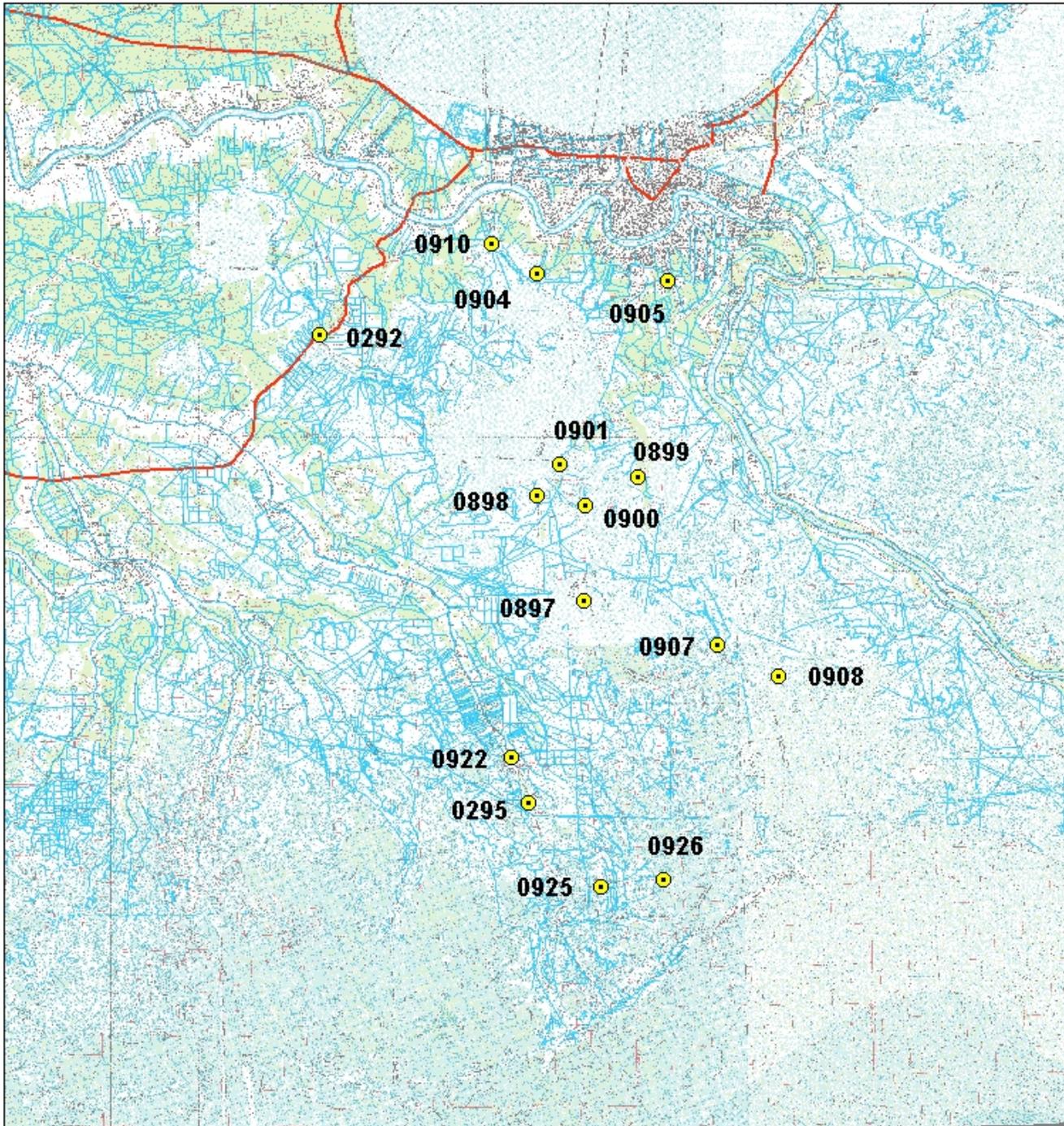
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Summation of water quality assessments for impacted area: MRGO/Breton Sound

- o Dissolved oxygen remained above water quality standards for all sites tested
- o Fecal coliform concentrations remained below water quality standards for swimming
- o There were no detectable concentrations of organic compounds
- o 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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Base Map 1:100k DLG
Projection: UTM Zone 15, NAD 83



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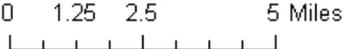


Summation of water quality assessments for impacted area: Barataria Basin

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

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

▲ EWOCDS site



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Base Map: 1:24k DLG
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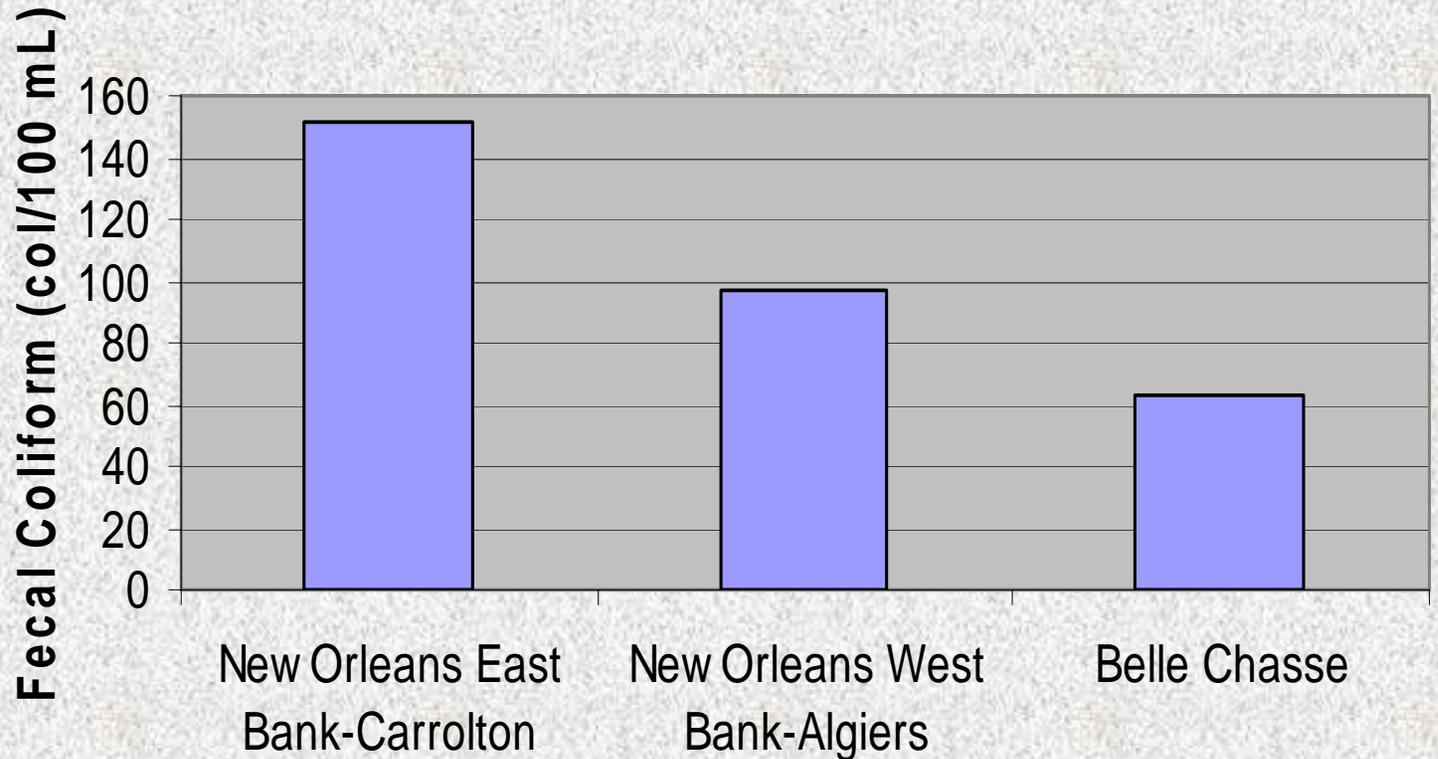




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Average Density of Fecal Coliforms at Mississippi River Water Intakes Near New Orleans



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



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

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



Summary



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Water quality summary throughout affected area: Through December 16, 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
- Organic compounds and metals
 - Results mostly non-detect
 - Only two exceedences of non-drinking water human health standards in approximately 48,000 analytical results for organic compounds
 - Only 6 exceedences of chronic aquatic life standards in nearly 2,900 analytical results for metals



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Water quality summary throughout affected area: Through December 16, 2005

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



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References

- o <http://www.deq.louisiana.gov/>
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- o http://logic.lsu.edu/images/hurricanes/2005_LAGIC_HURRICANE_ATLAS.pdf
- o <http://www.louisiana.gov/wps/portal/>
- o <http://katrina.louisiana.gov/>
- o <http://lra.louisiana.gov/>



For further information please contact:

Albert Hindrichs

Louisiana Department of Environmental
Quality

Water Quality Assessment Division

al.hindrichs@LA.GOV

(225) 219-3590