Post-Hurricane Water Quality Assessments: Rita Monitoring

(Report #4)

Louisiana Department of Environmental Quality
Water Quality Assessment Division

December 20, 2005

Louisiana Department of Environmental Quality

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

A partnership for water quality assessment

- Louisiana Department of Environmental Quality
- Louisiana Department of Agriculture and Forestry

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What we expected following Hurricane Rita

- Hurricane and wind damage
  - Increases in organic loading
  - Decreases in dissolved oxygen
  - Fish kills
  - Increases in fecal coliform
  - Increases in salinity and chlorides

Post-hurricane parameter categories analyzed

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

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Sampling frequency

- Began Hurricane Rita monitoring in SW Louisiana, October 17, 2005
  - Once every two weeks for two sample runs
- Evaluate need for continued sampling based on results of first two sample runs
- Sampling now limited to follow-up investigation of areas found to have possible problems following initial round of sampling

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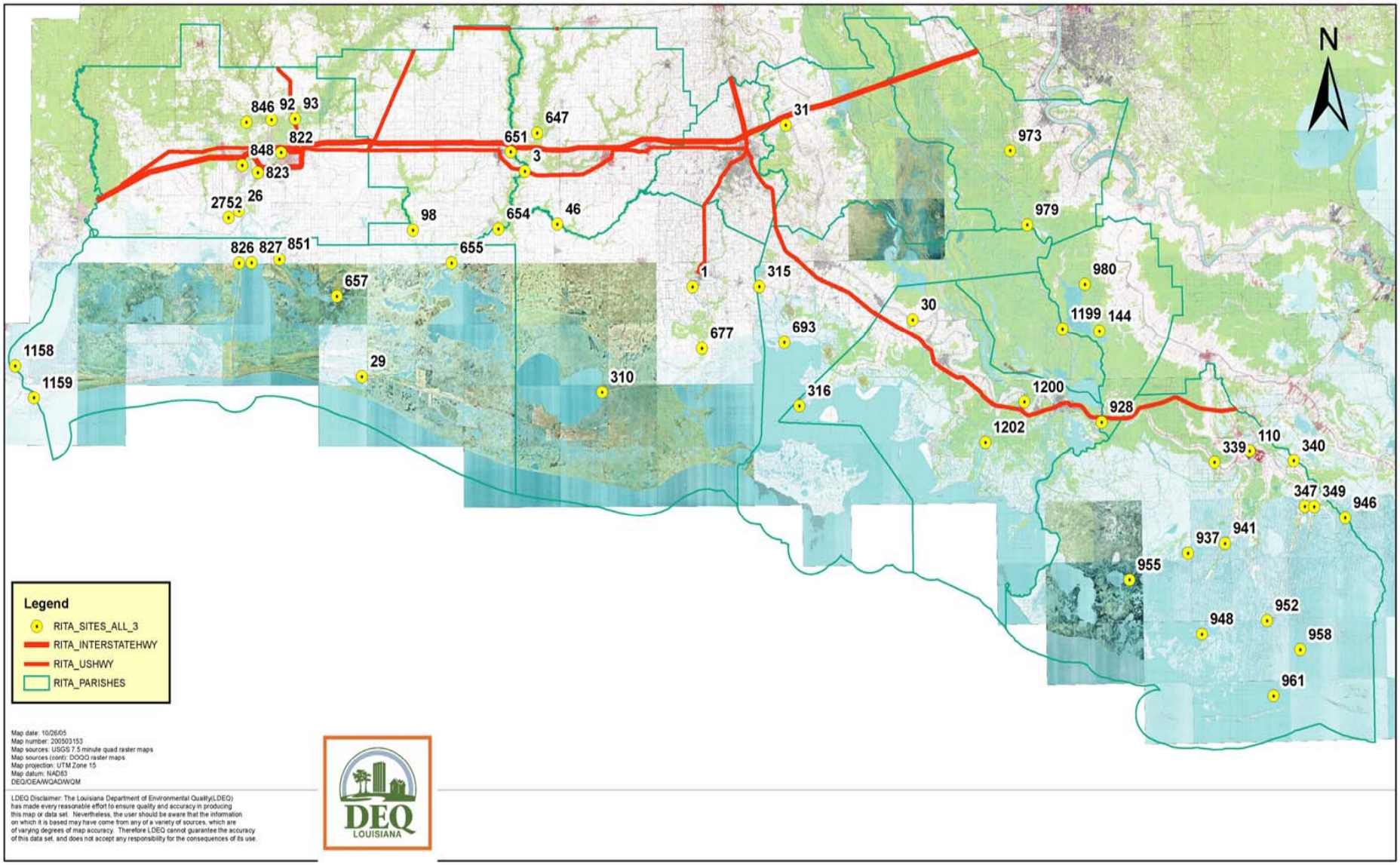
Magnitude of Laboratory Analyses: Water only as of December 12, 2005

- LDEQ Lab
  - Organic compounds – 160 samples (9,880 analyses)
  - Conventional parameters – 543 samples (1,896 analyses)
  - Metals – 108 samples (108 analyses)
  - Total samples – 811 samples (11,884 analyses)
- Contract Labs
  - Organic compounds – 213 samples (9,145 analyses)
  - Conventional parameters – 197 samples (197 analyses)
  - Metals – 138 samples (1,104 analyses)
  - Total samples – 548 samples (10,446 analyses)



Hurricane Rita Surface Water Quality Monitoring Sites

Overview Map of Selected Sites

0 5 10 20 30 40 Miles

Organic Compound Analysis

Post-Rita Organic Compound Analysis in Southwest Louisiana

- Of the over 19,000 analytical results (over 373 samples) for organic compounds in ambient water, less than 0.3% were above detection levels
- 1-2 dichloroethane (EDC) exceeded Louisiana's human health non-drinking water standard once at both Bayou Verdine and the Intracoastal Waterway near Boones Corner
- Malathion exceeded EPA freshwater chronic standards for one sample at Sabine Pass
- All other detections for organic compounds have been below Louisiana water quality standards

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Sabine River Basin

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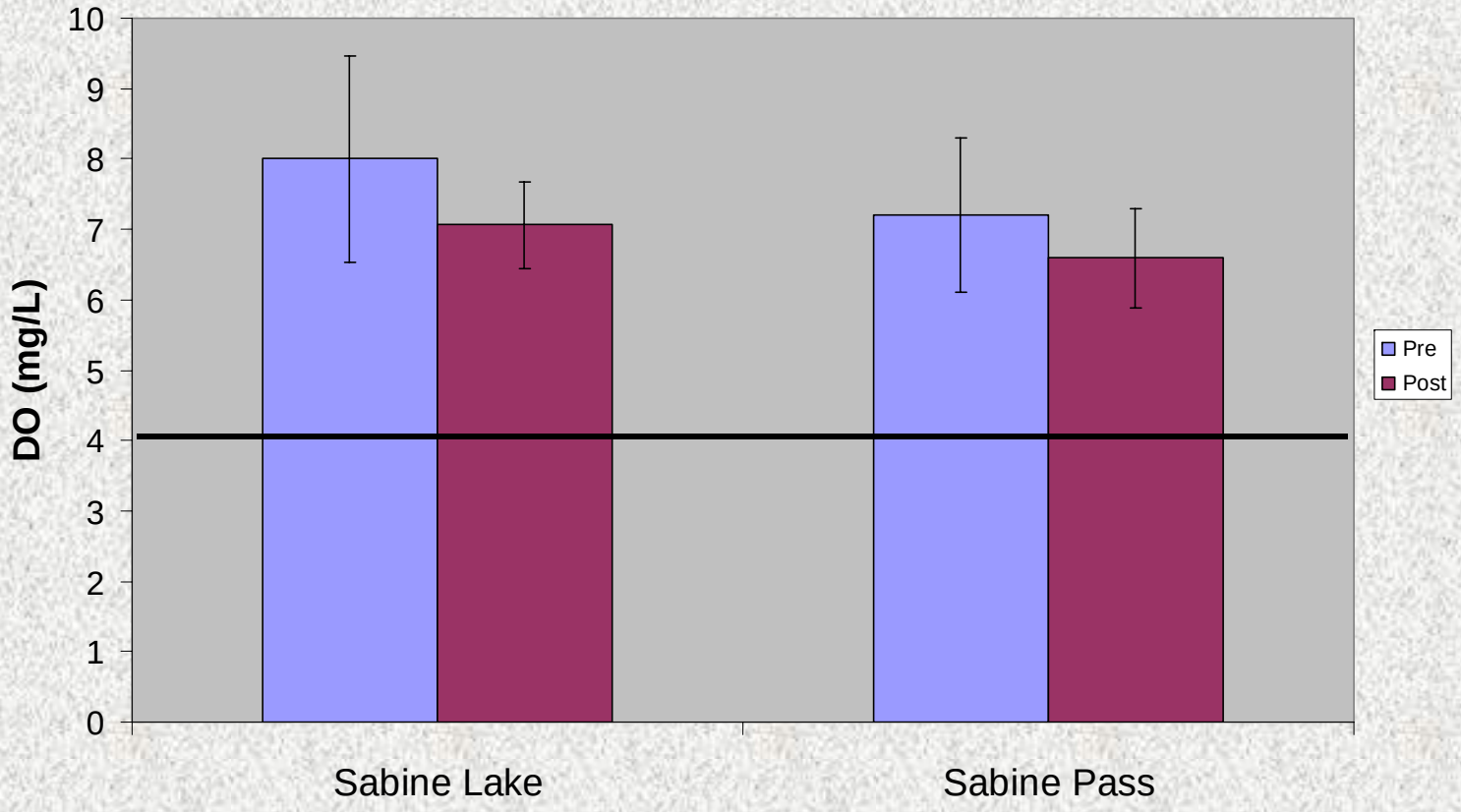
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concetrations at Sabine River Basin Sites



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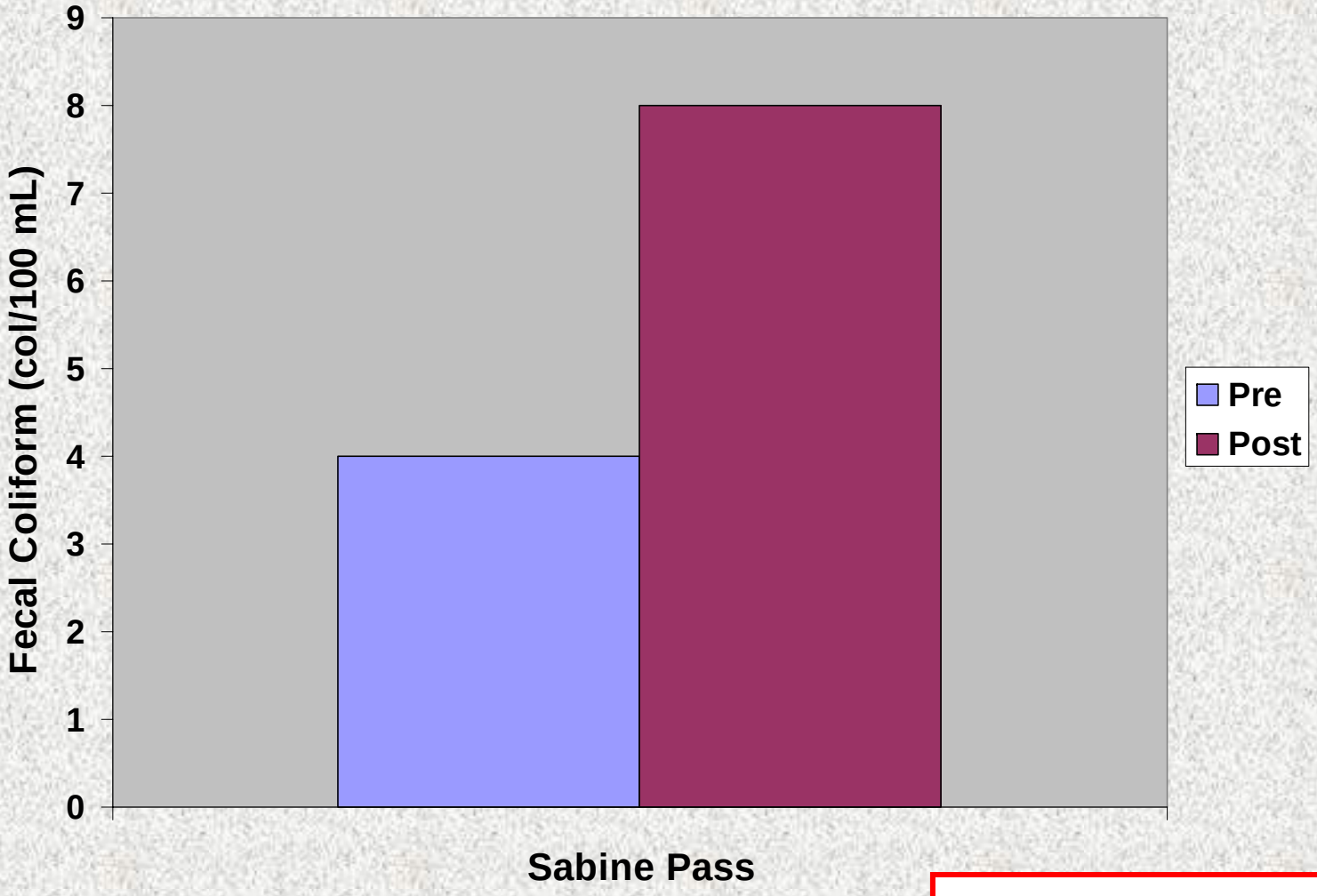
Comparison of Pre- vs. Post-Hurricane Fecal Coliform Densities at Sabine Pass



Note: Standard = 400 col/100 mL

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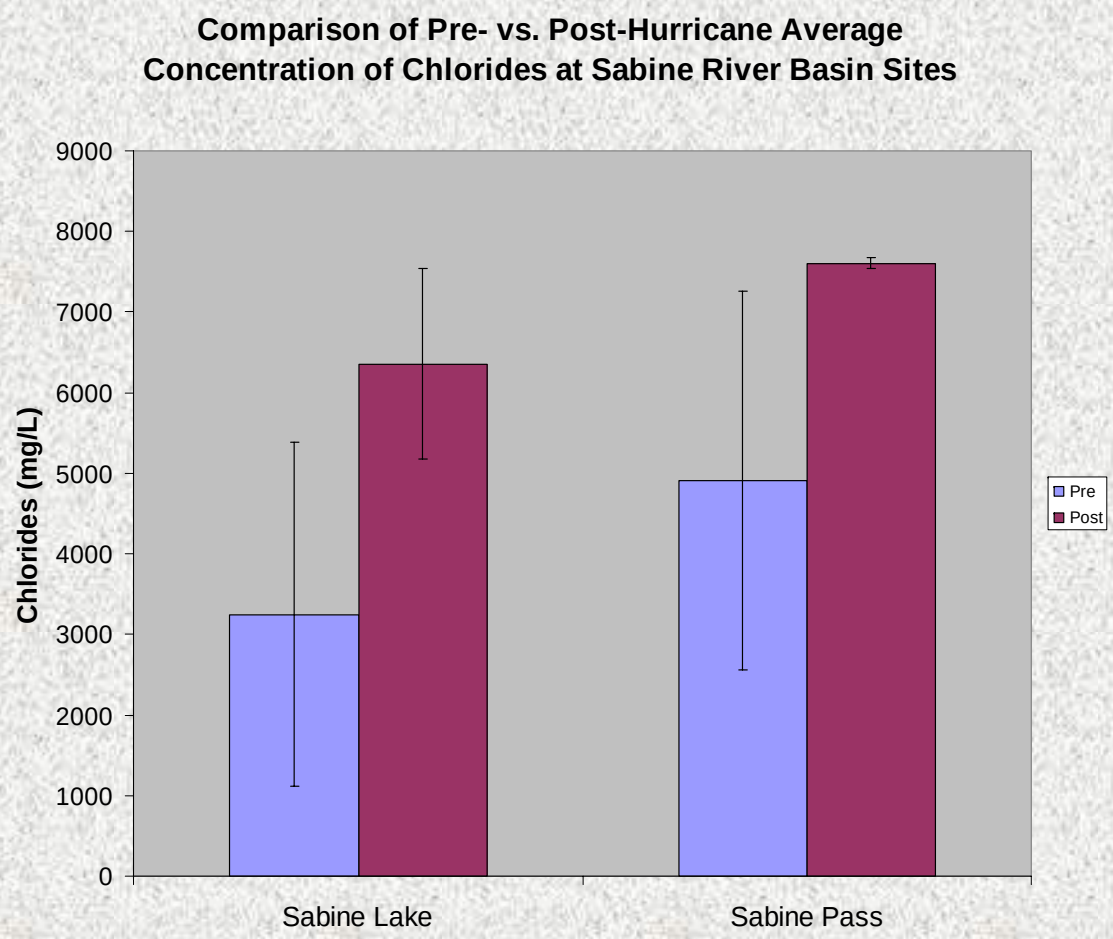

There are no chloride standards for these water bodies due to their estuarine nature.

Summation of water quality assessments for impacted area: Sabine River Basin

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- Dissolved oxygen levels are above their standard
- Fecal coliform densities are below their criterion
- Chloride concentrations were well above pre-hurricane concentrations; however, there are no chloride standards for these water bodies due to their estuarine nature
- Malathion exceeded EPA's chronic freshwater aquatic life standard for one sample from Sabine Pass on October 18, 2005
- All other organic compound and metals results have been below Louisiana water quality standards

Calcasieu River Basin

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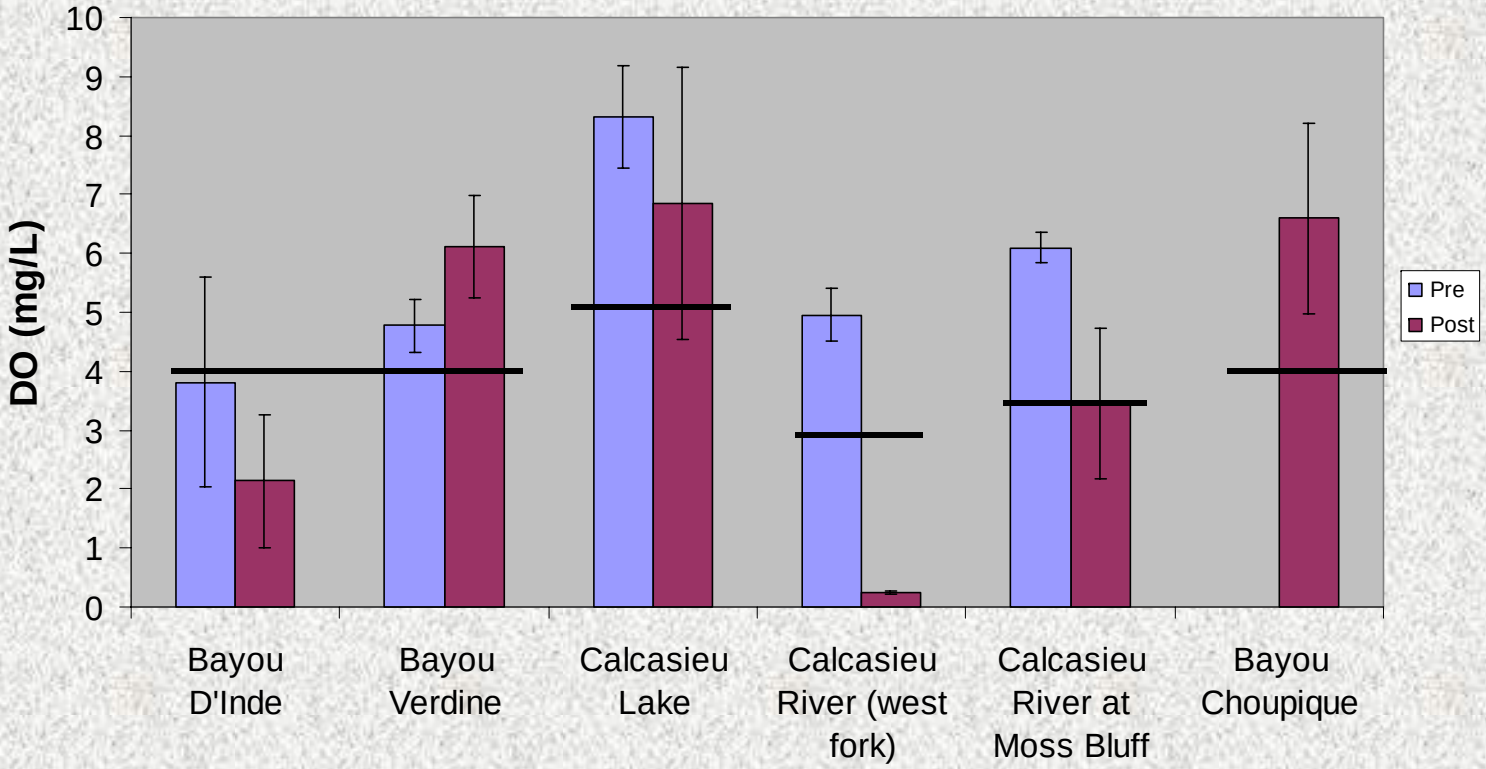
Comparison of Pre- vs. Post-Hurricane Average Dissolved Oxygen Concentrations at Calcasieu River Basin Sites



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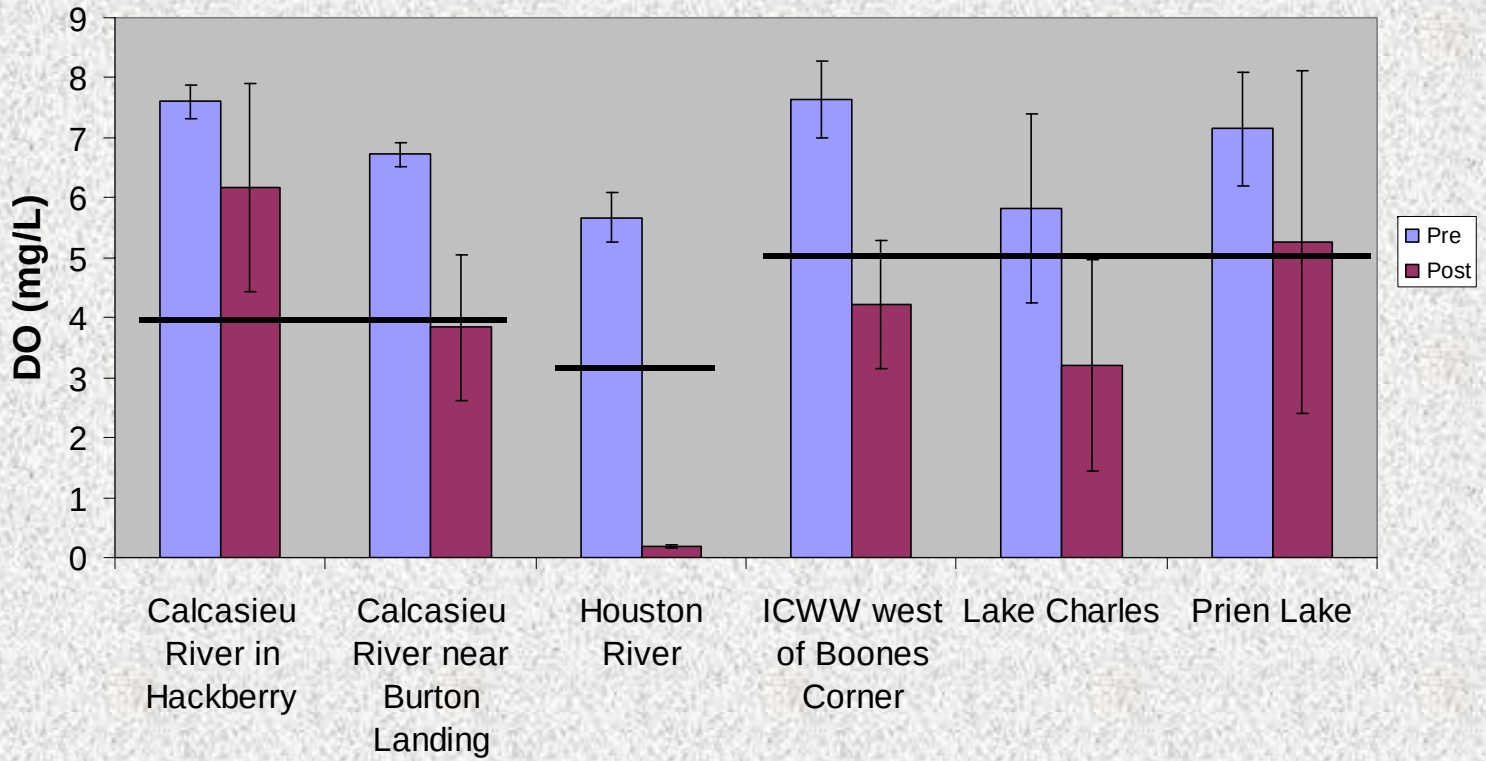
Comparison of Pre- vs. Post-Hurricane Average Dissolved Oxygen Concentrations at Calcasieu River Basin Sites



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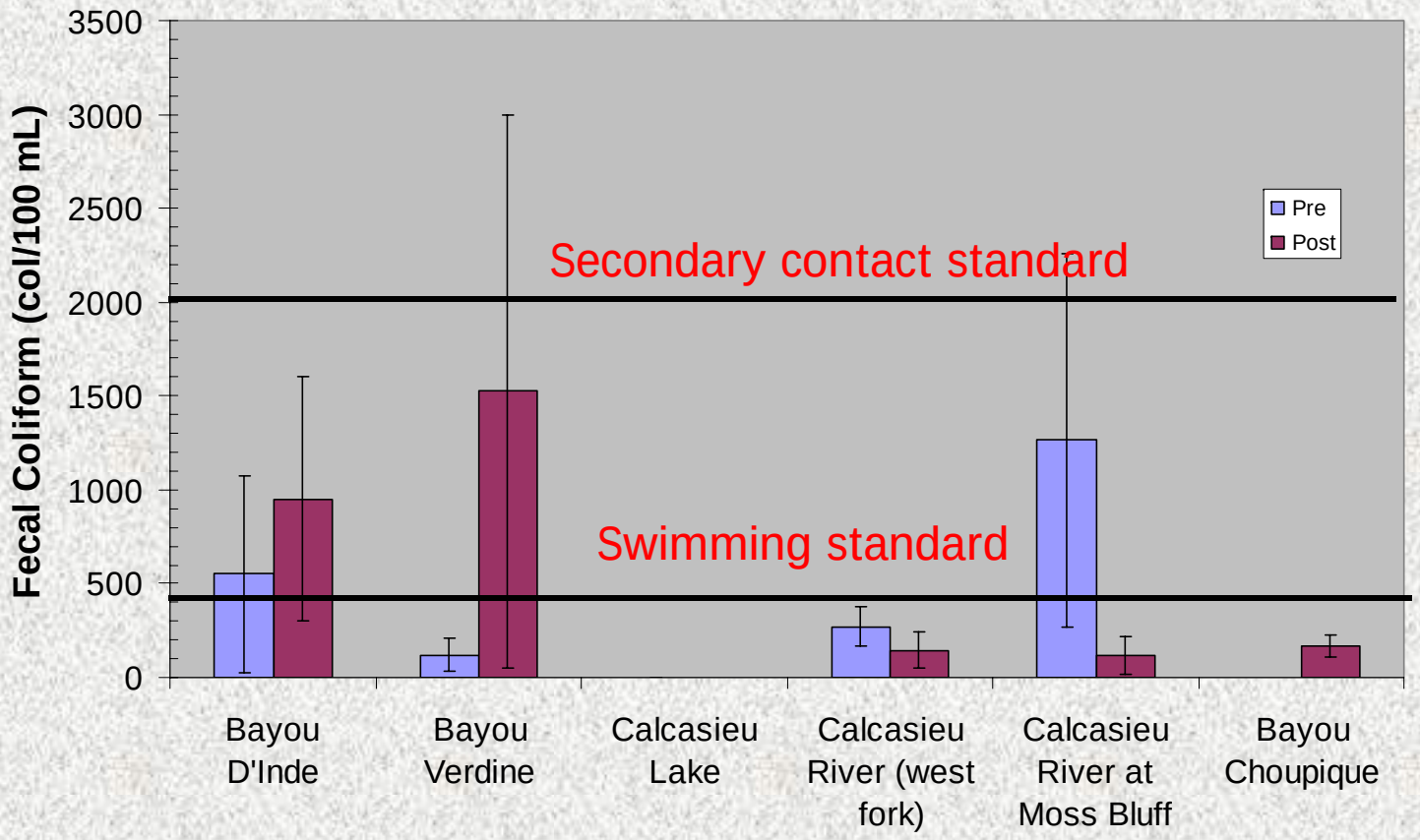

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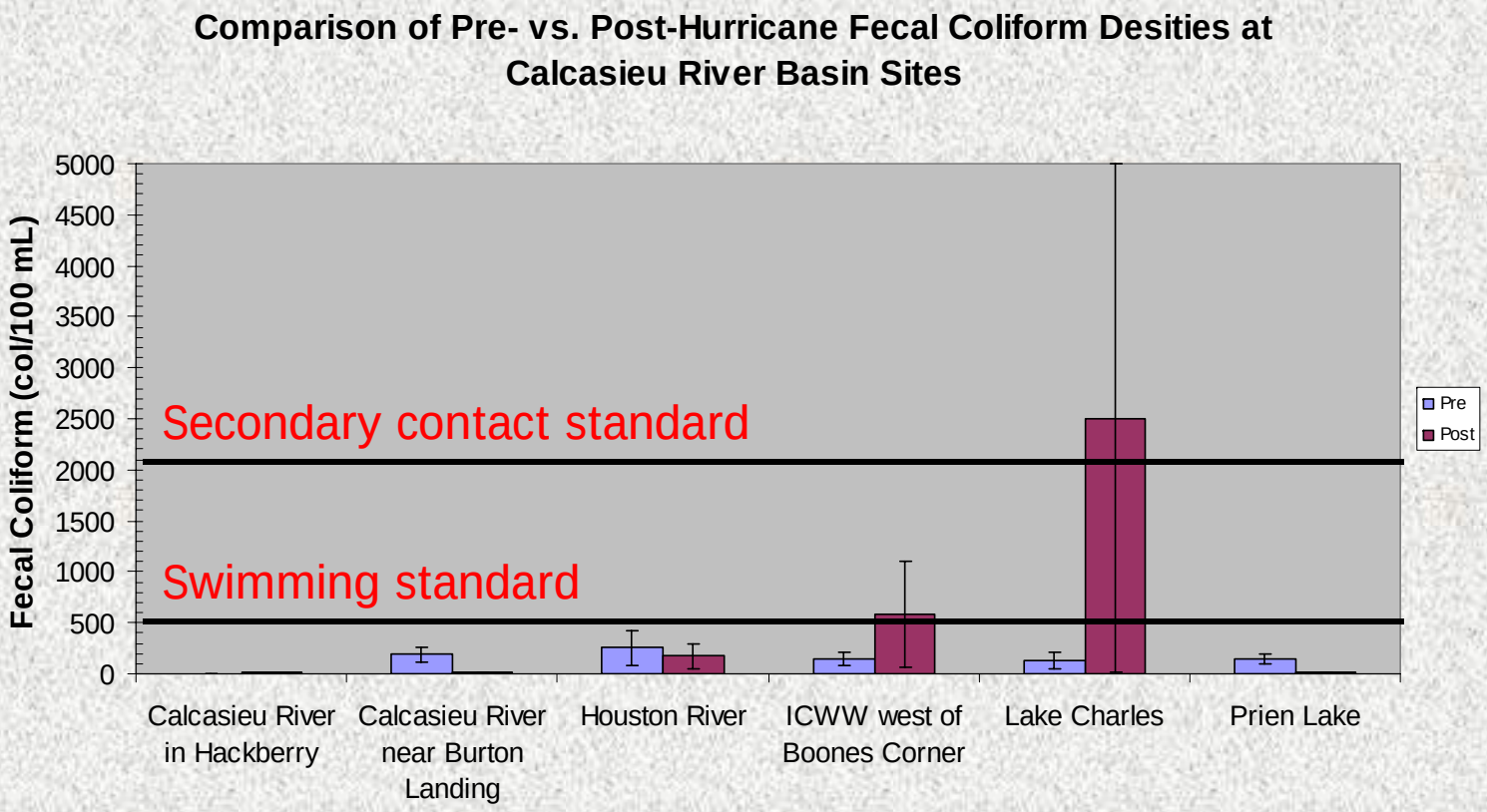

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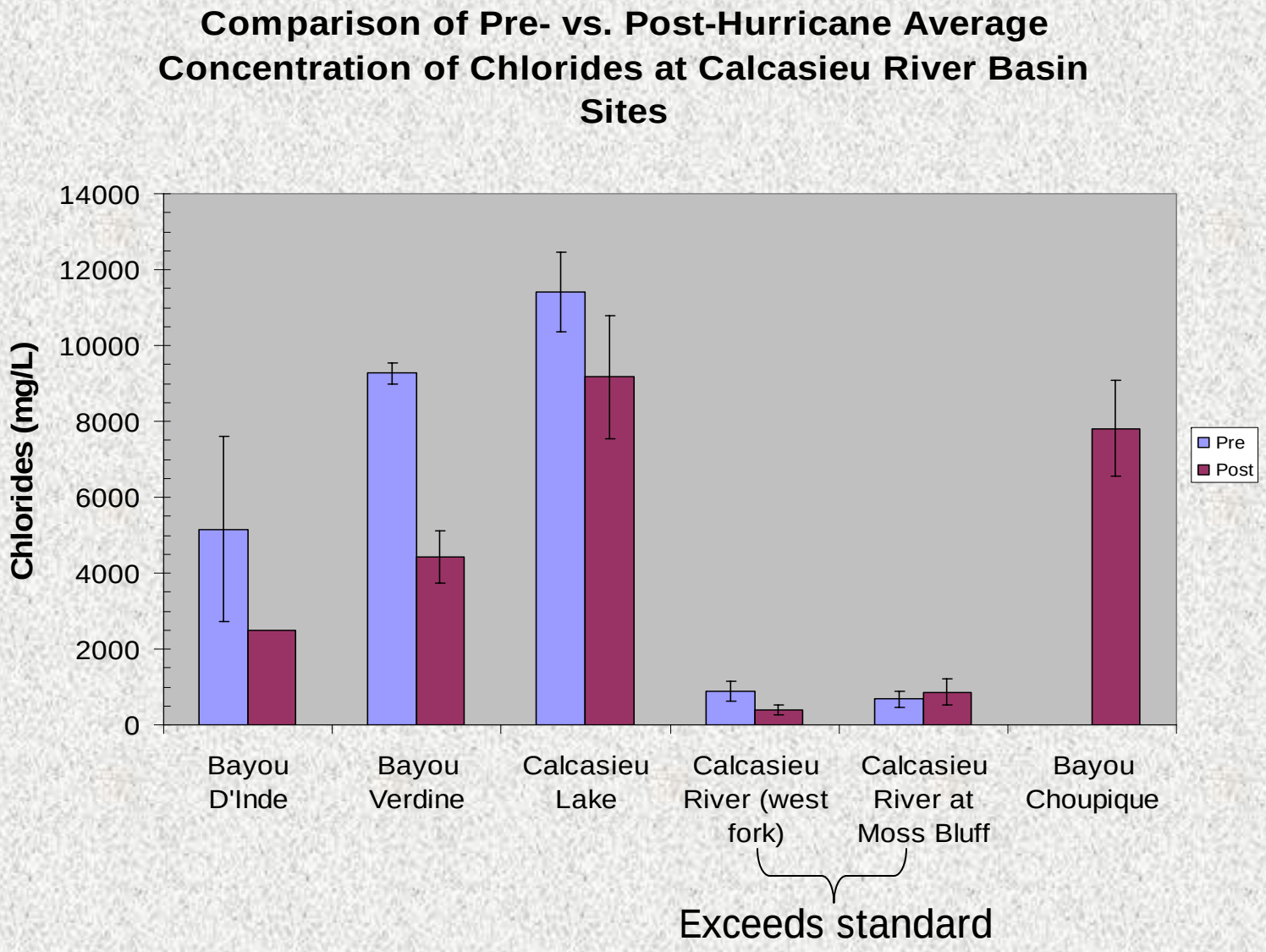

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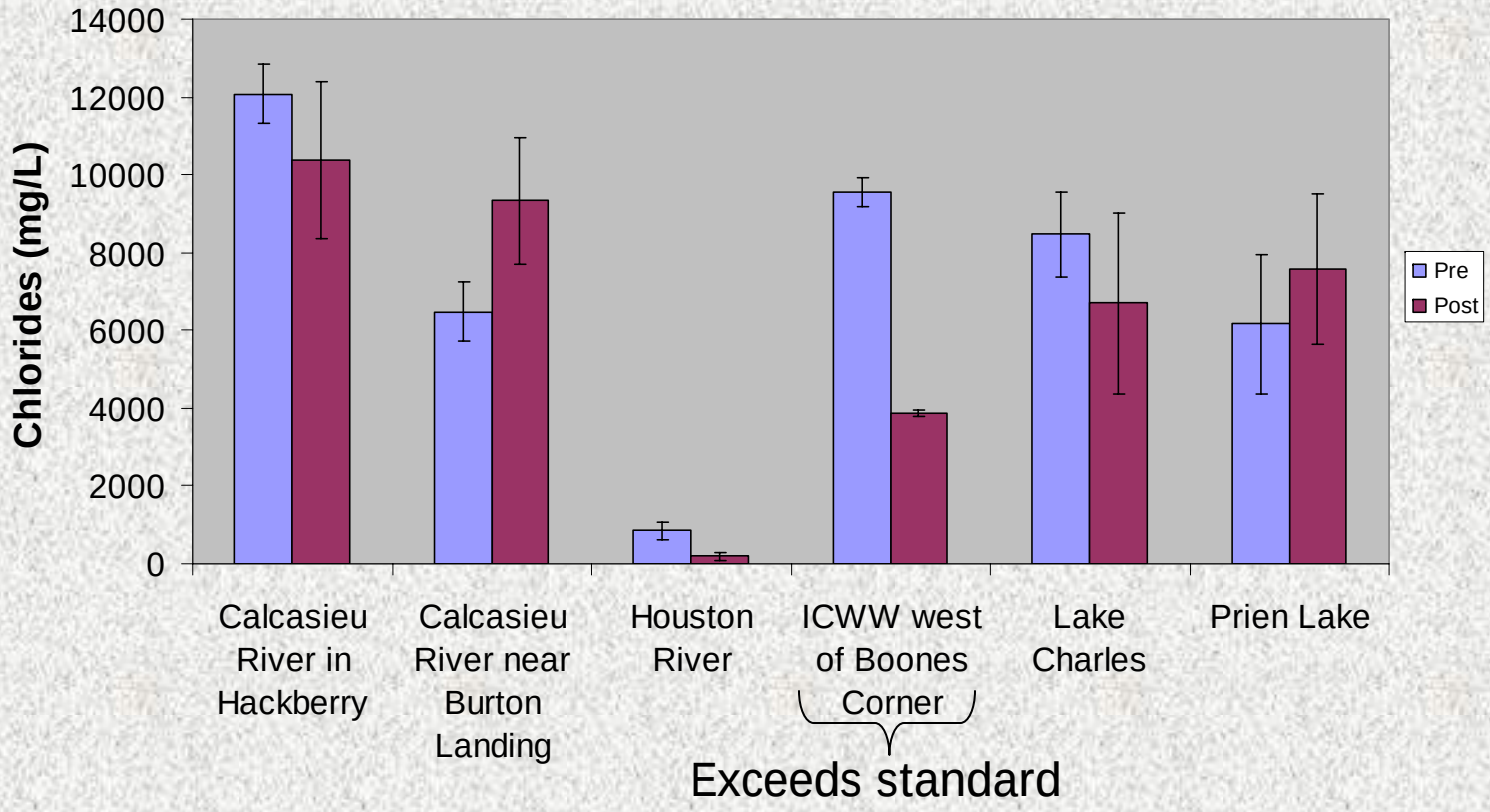

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Summation of water quality assessments for impacted area: Calcasieu River Basin

- Five of twelve sites had dissolved oxygen levels below their standards for this time of year
- One of twelve sites on average exceeded the secondary contact recreation standard for fecal coliforms
- Three sites exceeded chloride standards; remaining nine sites were either below standards or do not have standards due to their estuarine nature
  - Four sites had elevated chloride concentrations relative to pre-hurricane conditions

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Summation of water quality assessments for impacted area: Calcasieu River Basin

- 1-2 dichloroethane was found to be above the standard at Bayou Verdine once in October and at the ICWW west of Boone's Corner once in November
- Mercury slightly exceeded Louisiana's chronic aquatic life standard at Houston River on October 18, 2005
- All other organic compound and metals results have been below Louisiana water quality standards

Mermentau River Basin

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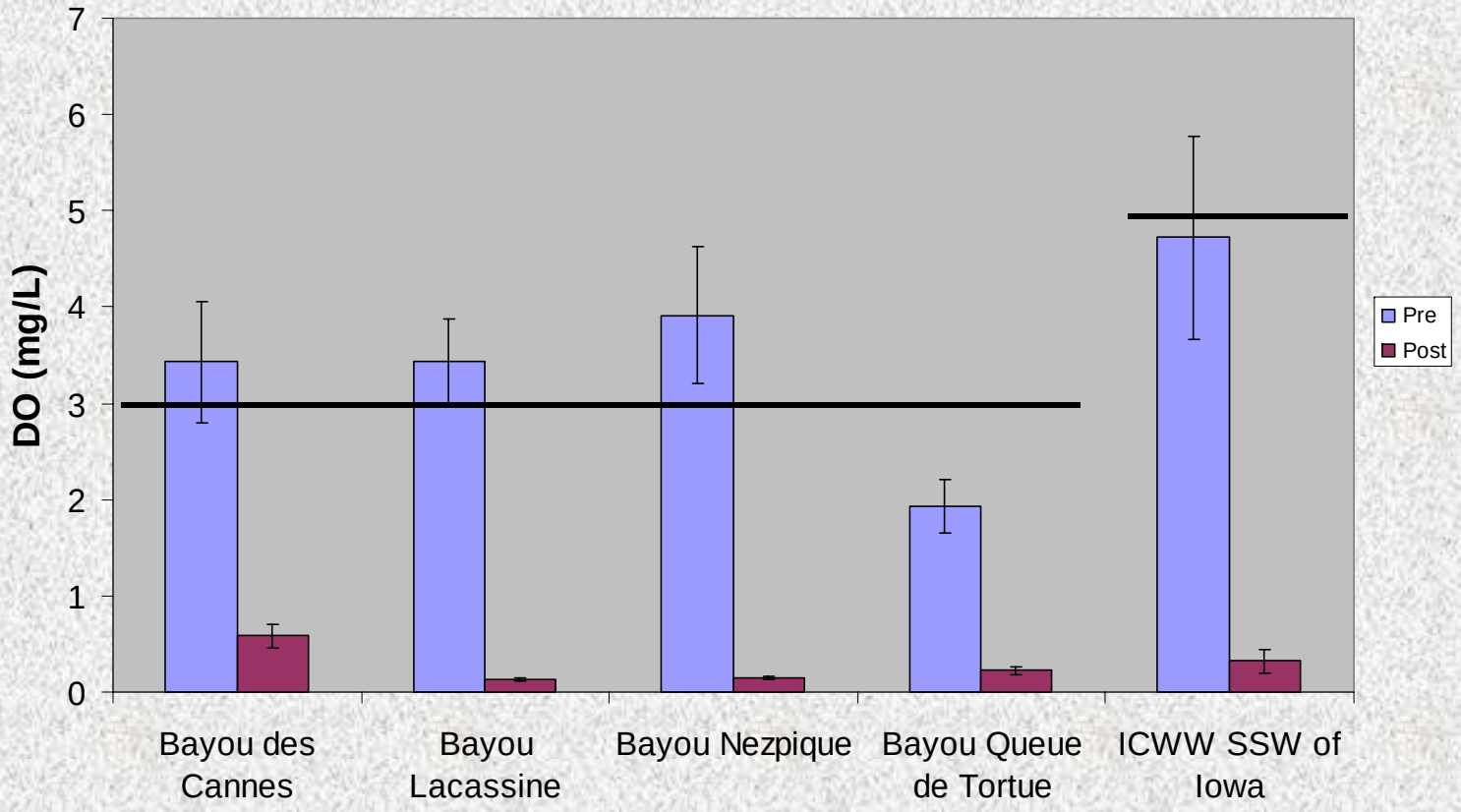
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Mermentau River Basin Sites



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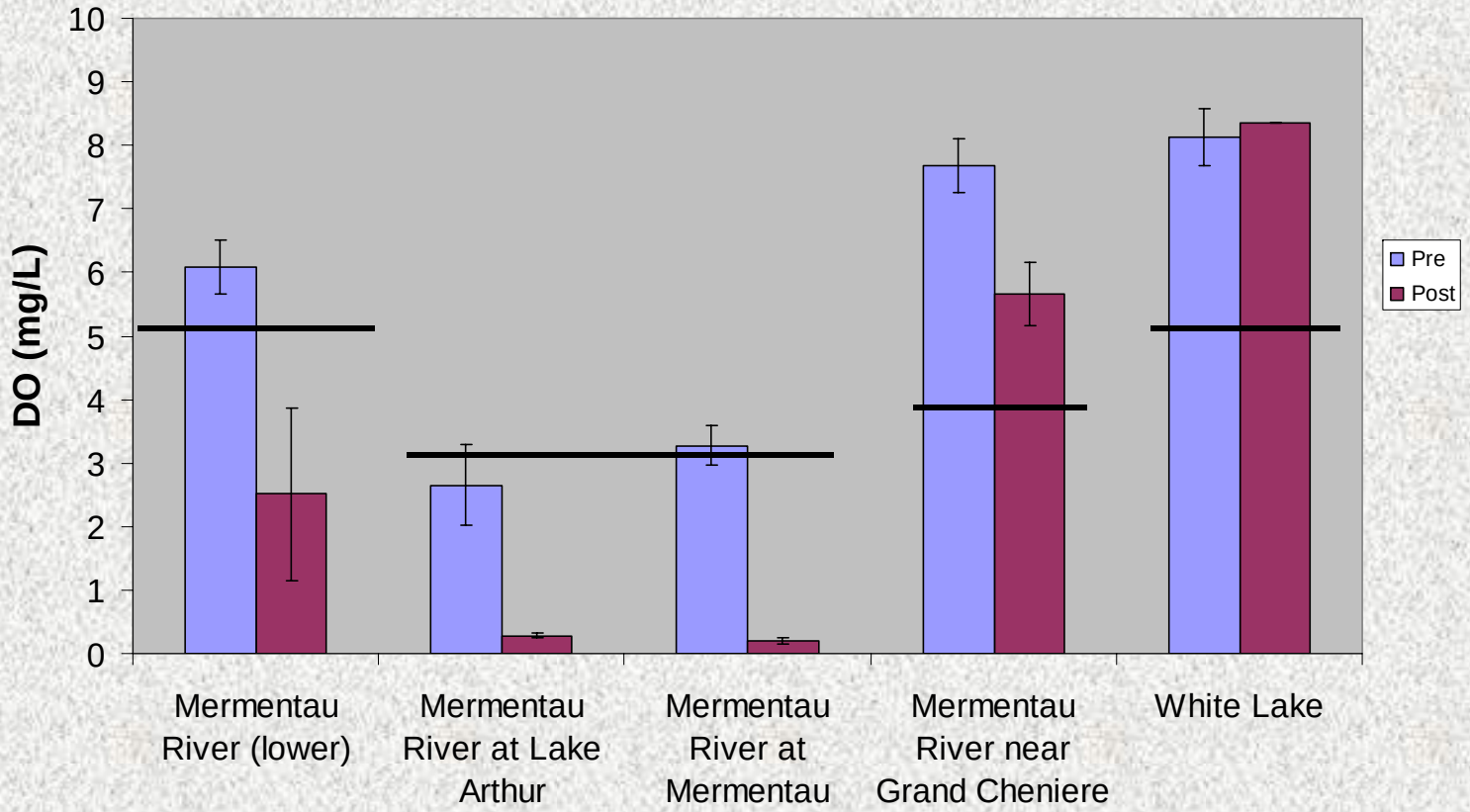
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Mermentau River Basin Sites



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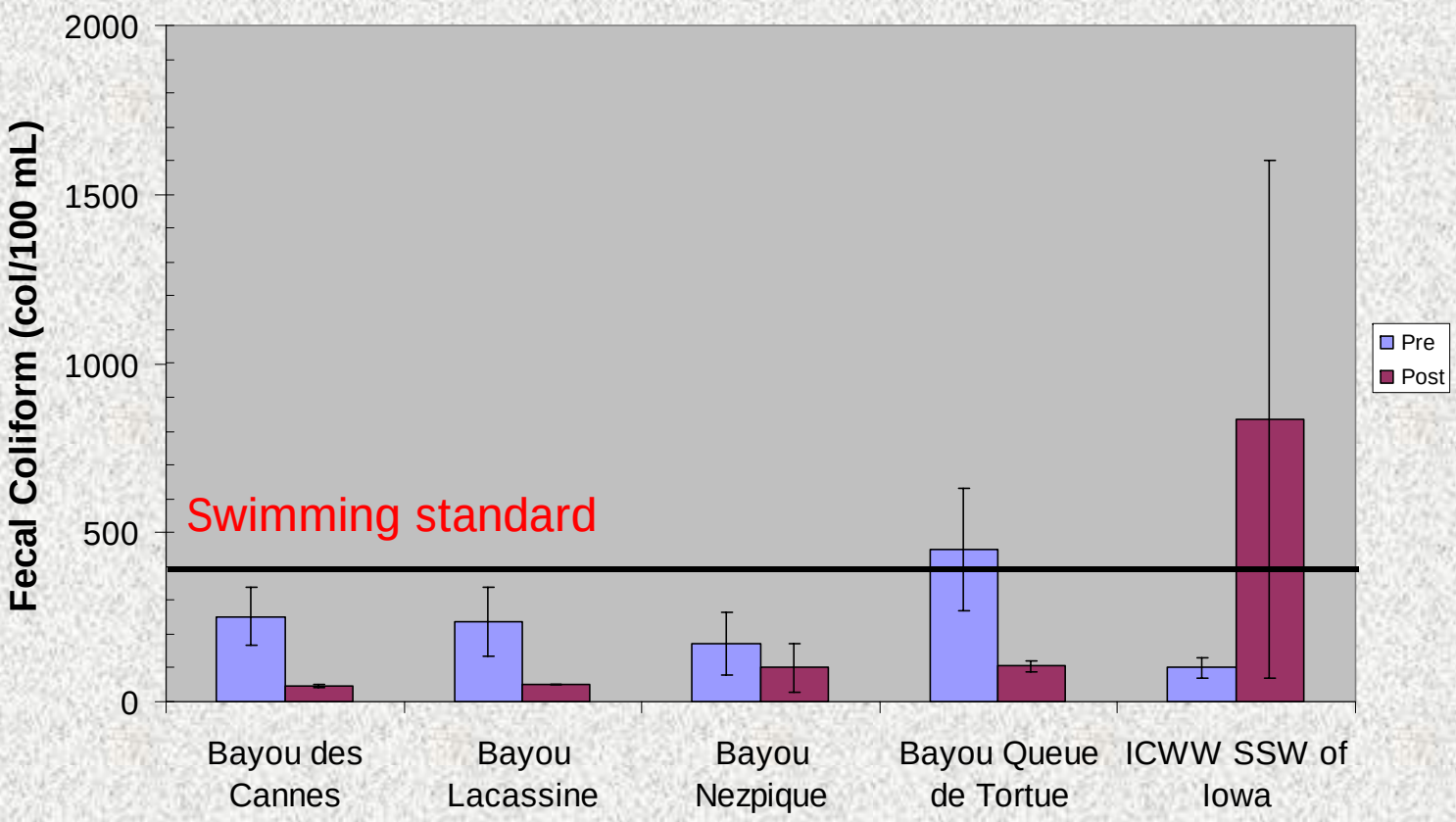

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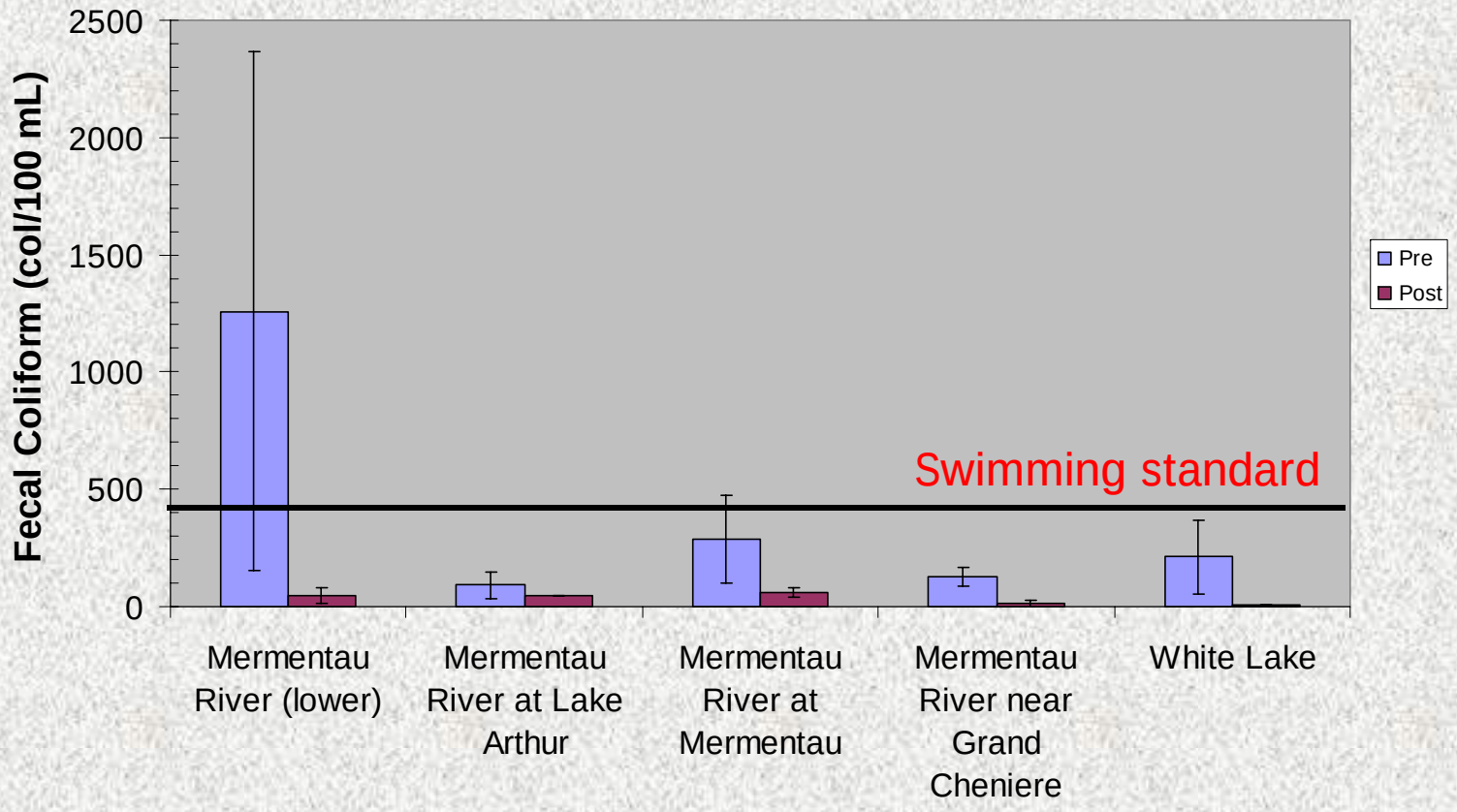

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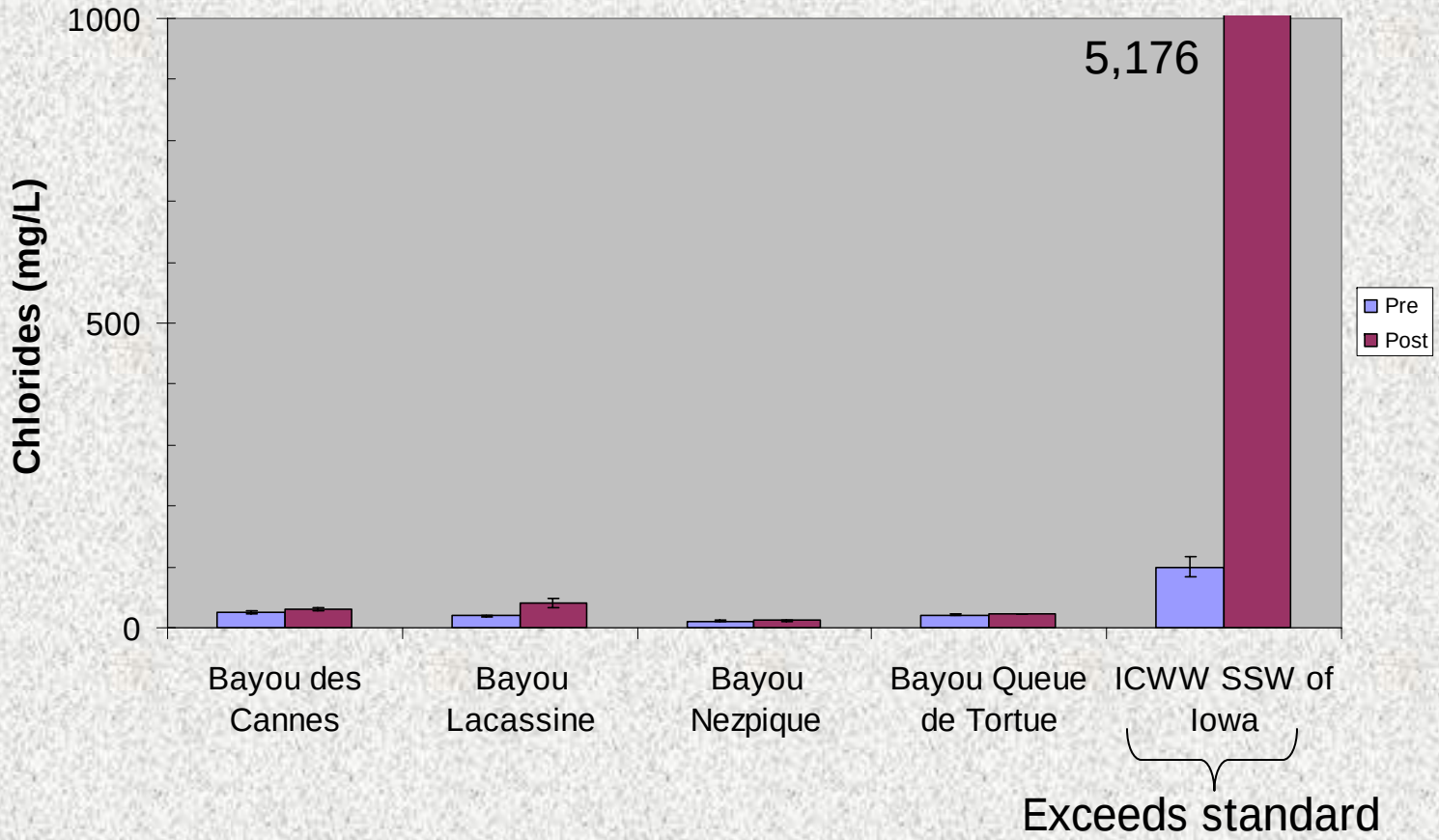

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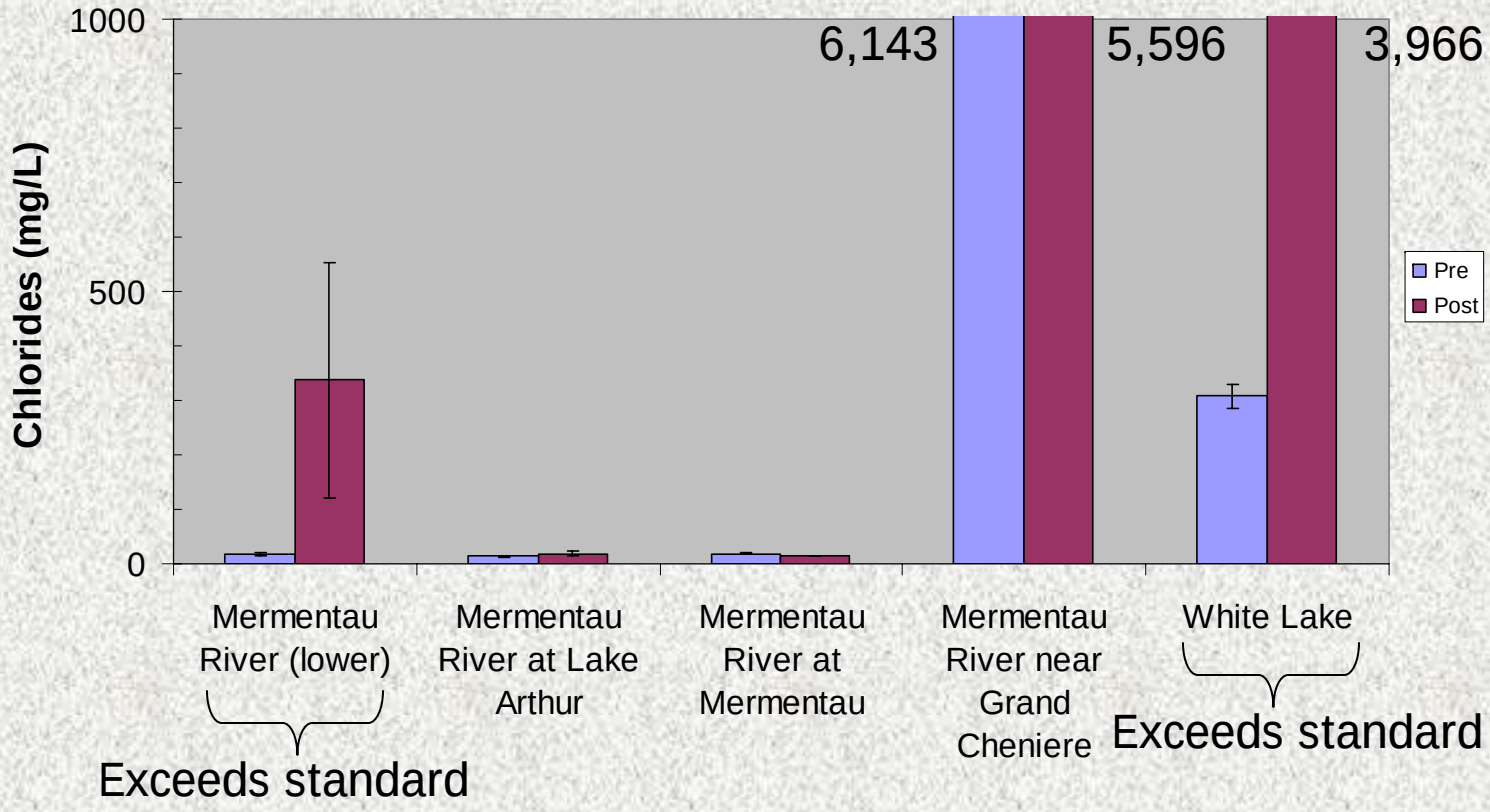
Comparison of Pre- vs. Post-Hurricane Average Concentration of Chlorides at Mermentau River Basin Sites



Summation of water quality assessments for impacted area: Mermentau River Basin

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- Eight of ten sites had average dissolved oxygen levels below standards
- None of the ten sites exceeded fecal coliform standards for secondary contact recreation, which is the appropriate standard for this time of year
- Three sites exceeded chloride standards; remaining seven sites were either below standards or do not have standards due to their estuarine nature
- One oil sheen was seen at Bayou Nezpique in October
- All organic compound results have been below Louisiana water quality standards

Vermilion/Teche Basin

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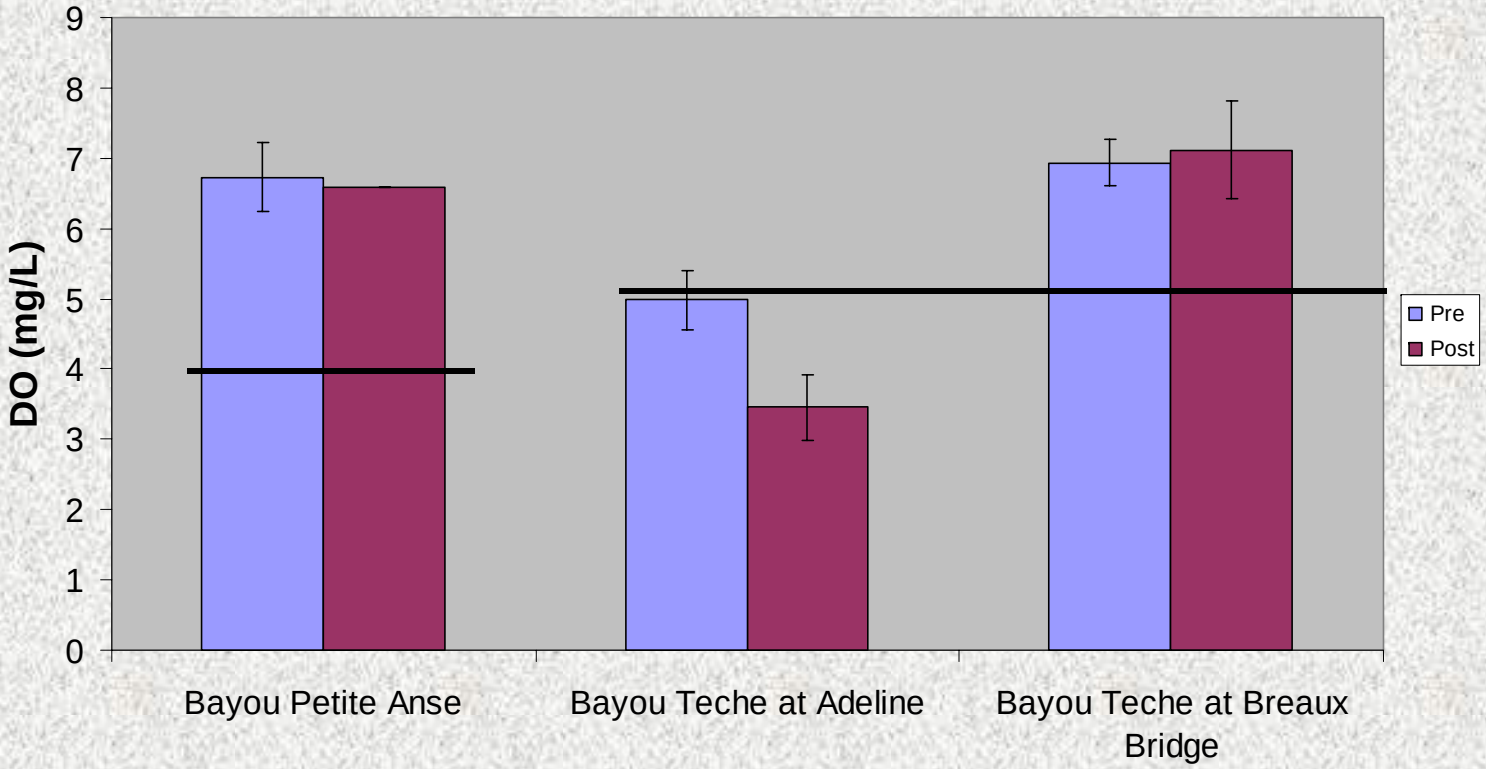
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Vermilion-Teche River Basin Sites



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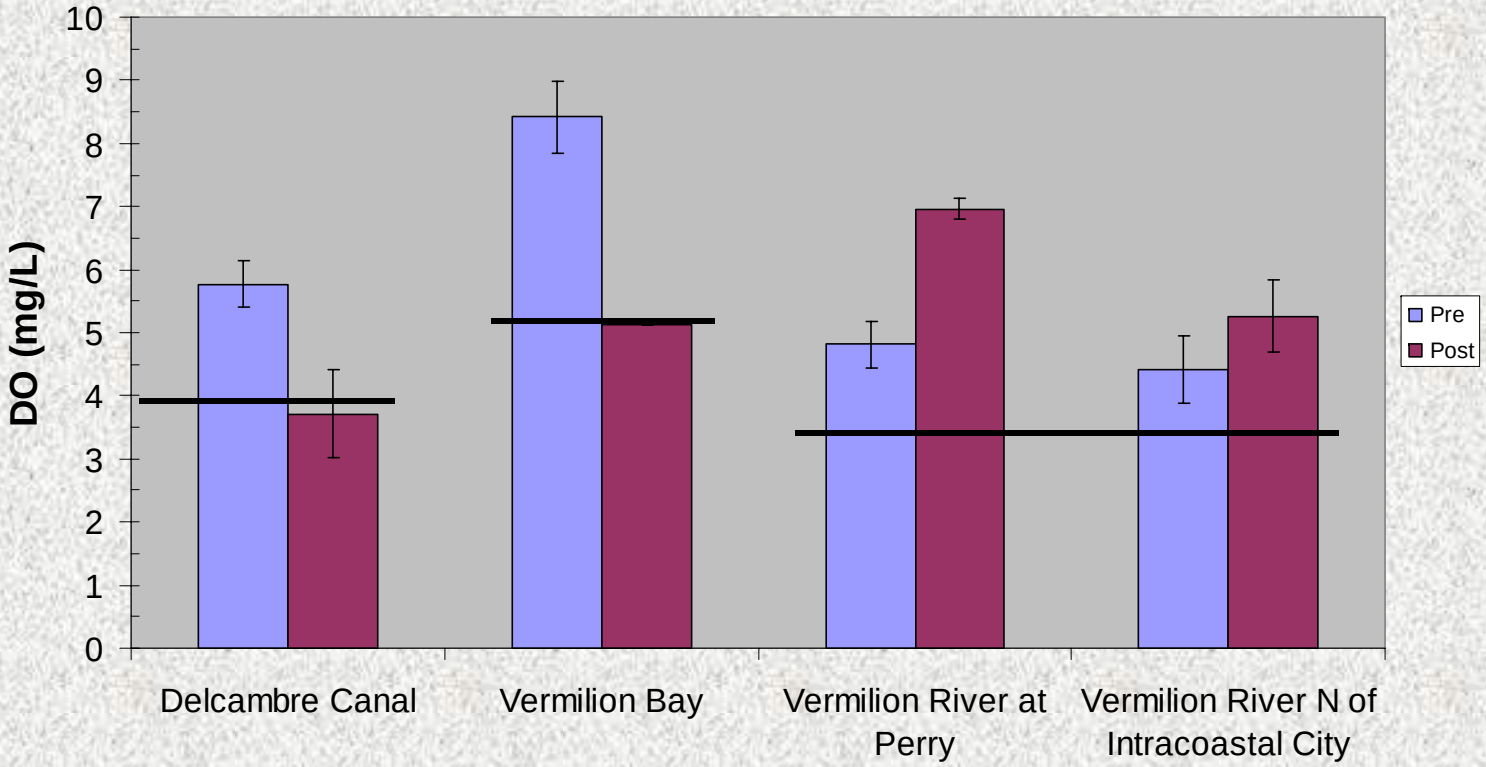
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Vermilion-Teche River Basin Sites



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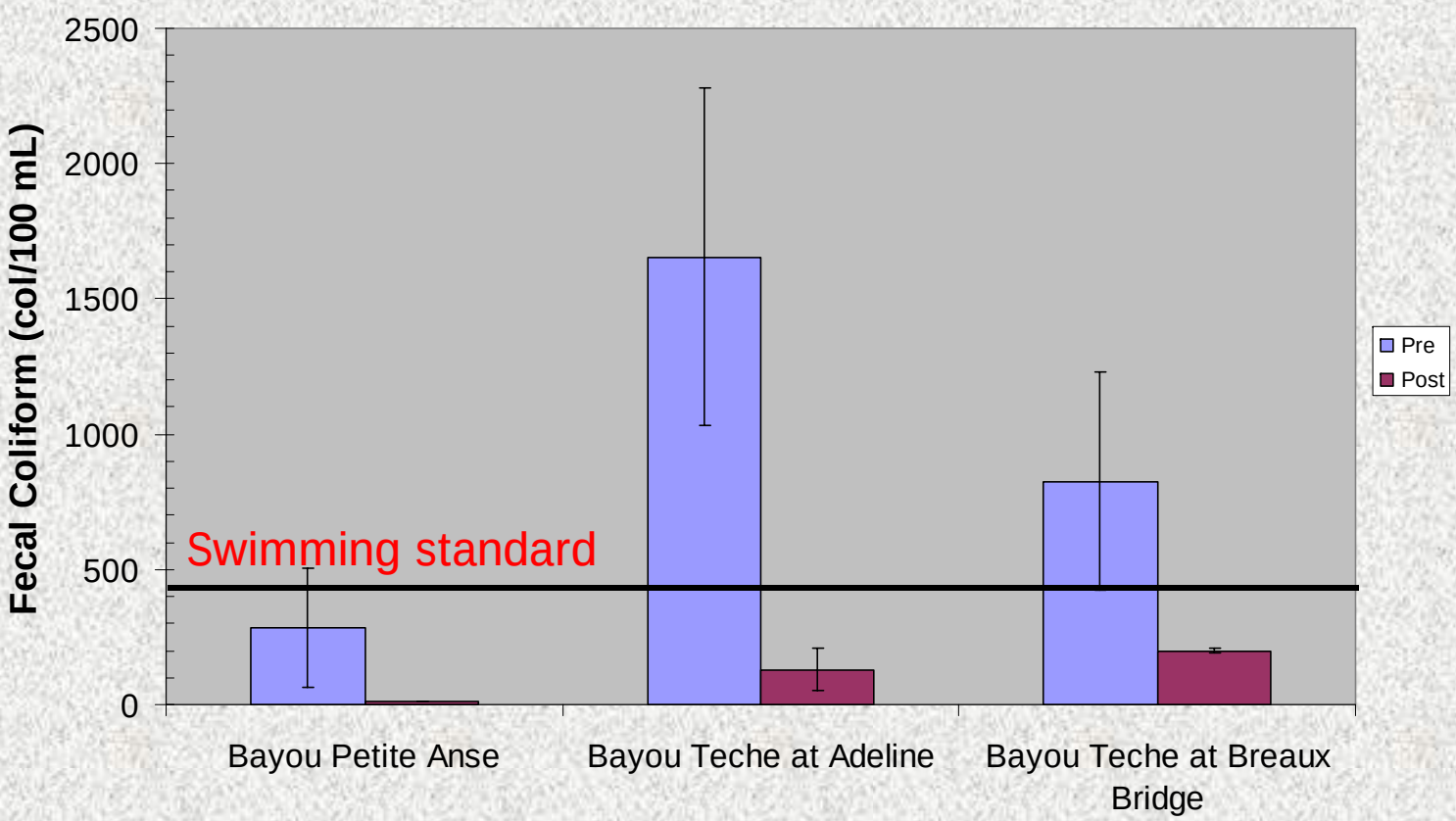

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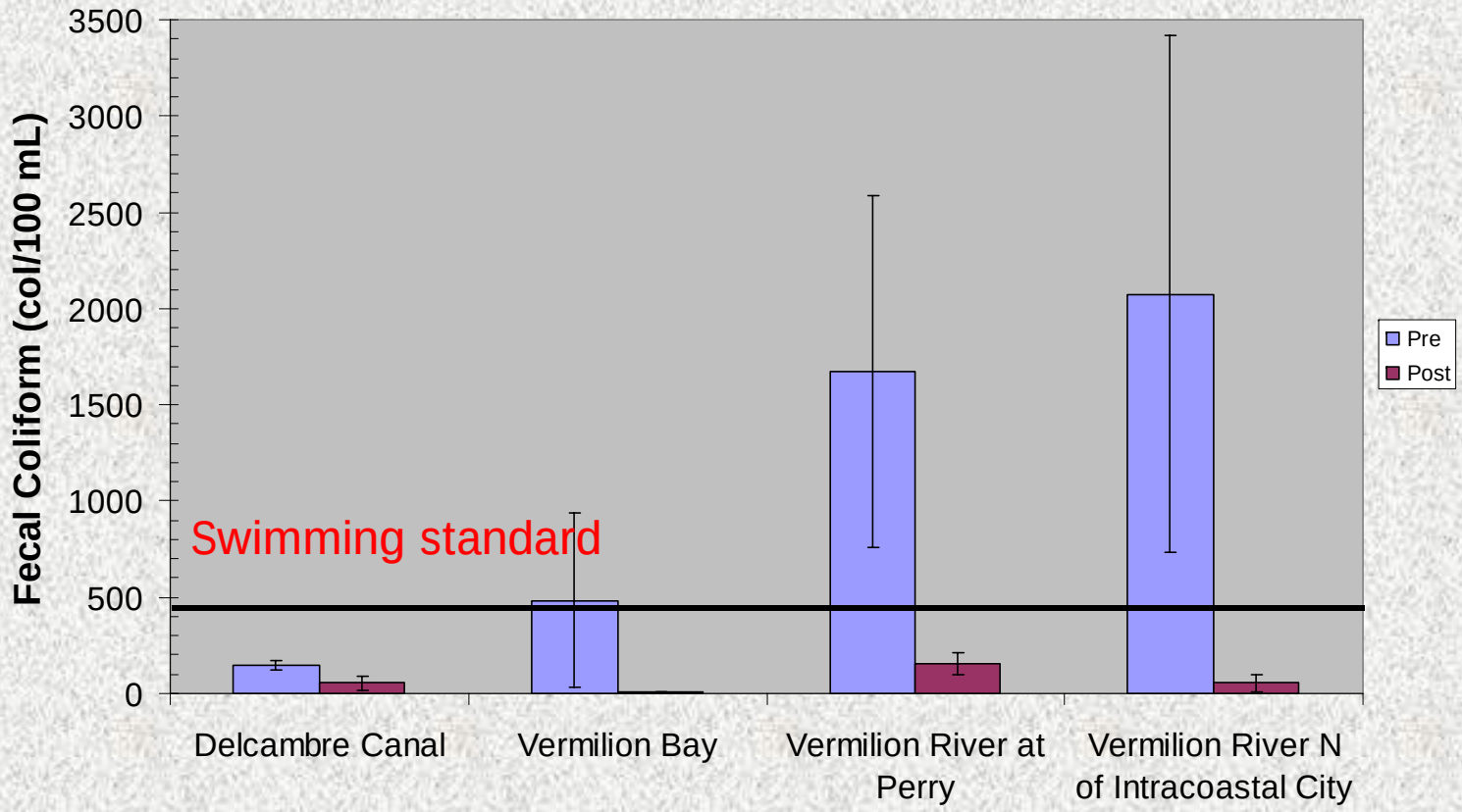

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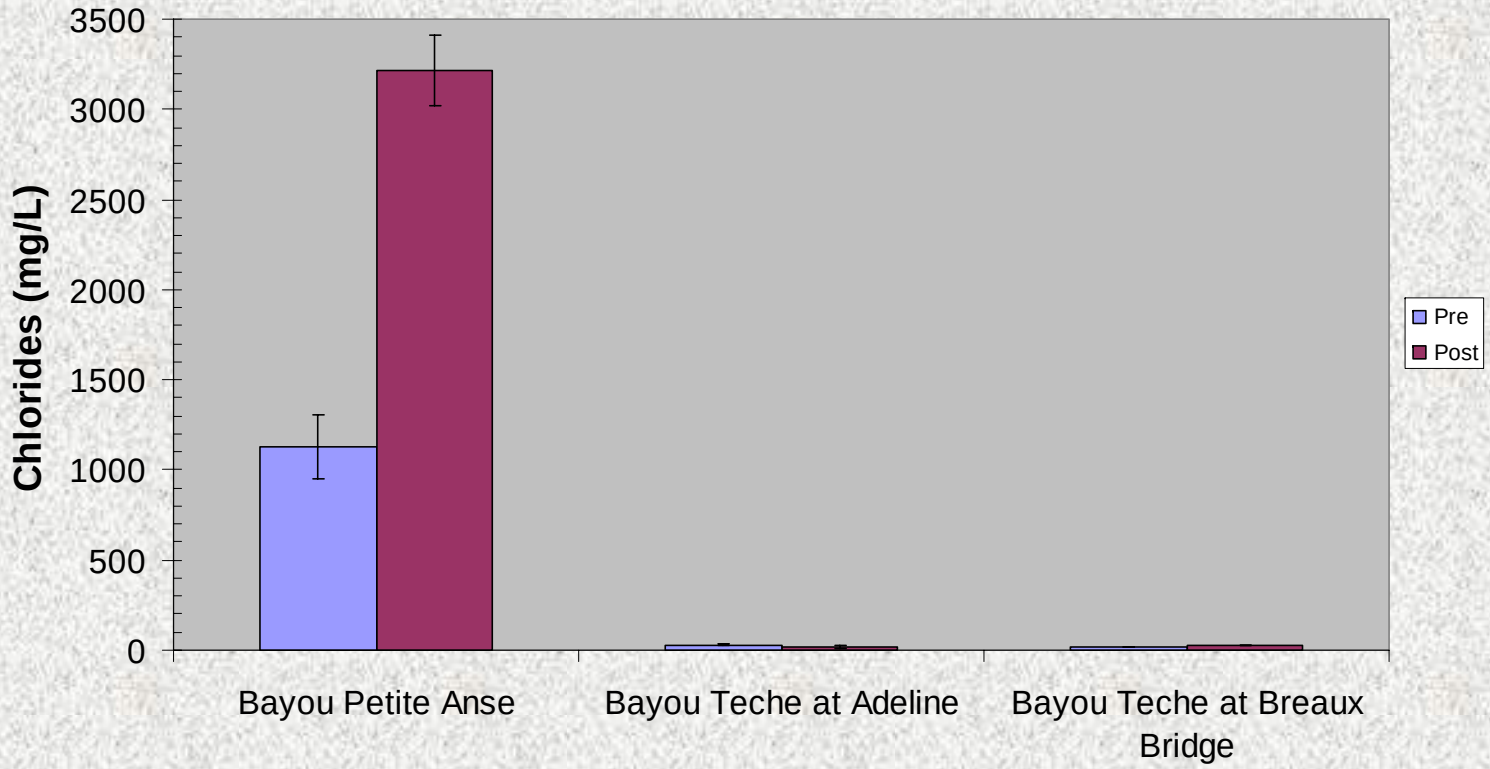

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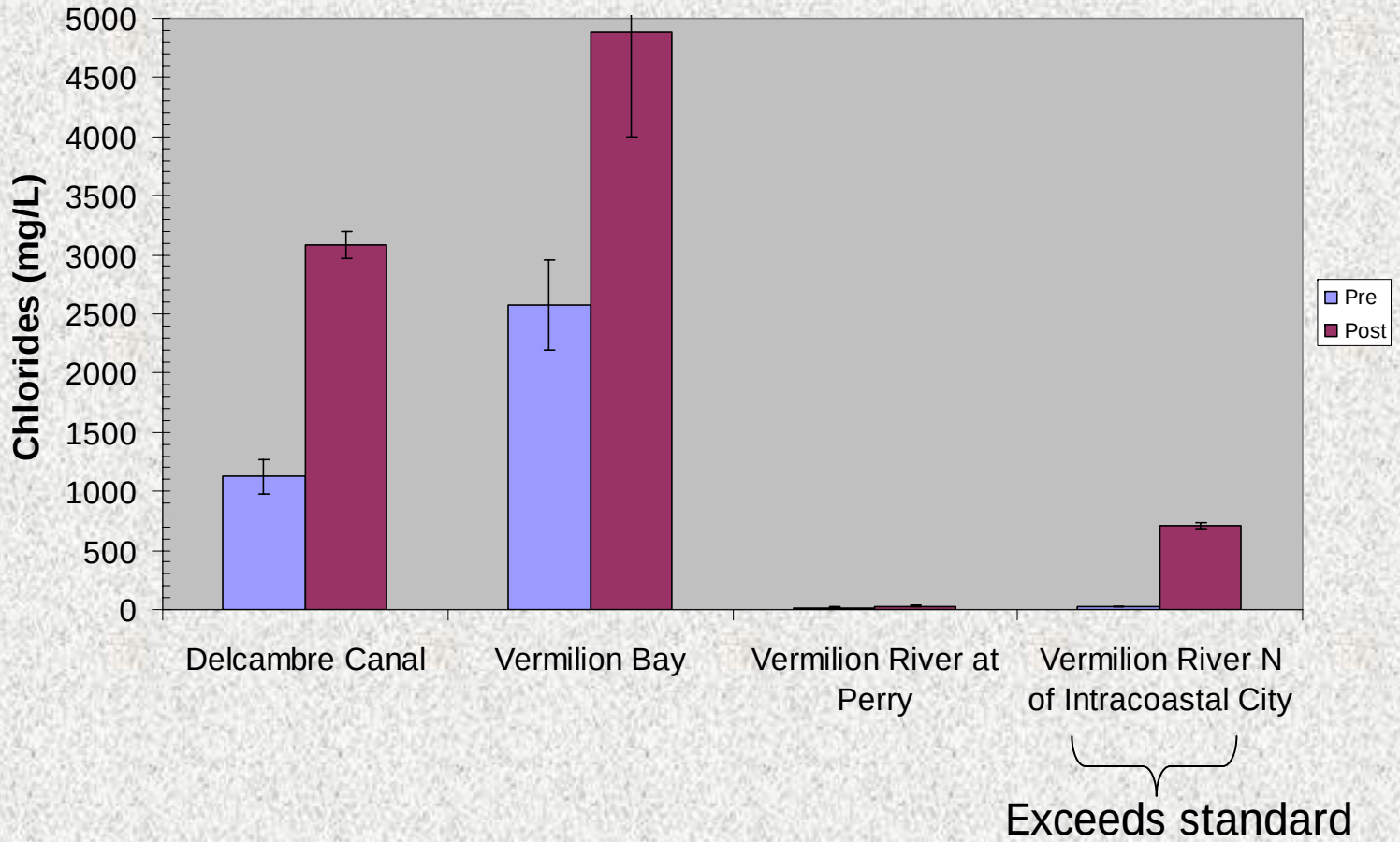
Comparison of Pre- vs. Post-Hurricane Average Concentration of Chlorides at Vermilion-Teche River Basin Sites



Summation of water quality assessments for impacted area: Vermilion/Teche Basin

- Two of seven sites had average dissolved oxygen concentrations below standards for this time of year
  - One was only 0.3 mg/L below the standard of 4.0 mg/L
- All sites met fecal coliform standards for swimming
- Average chloride concentration at one of seven sites exceeded standards; remaining sites either met standards or did not have chloride standards due to their estuarine nature
  - While no standard existed, chloride concentrations at three additional sites were elevated relative to pre-hurricane conditions
- All organic compound results have been below Louisiana water quality standards

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Atchafalaya River Basin

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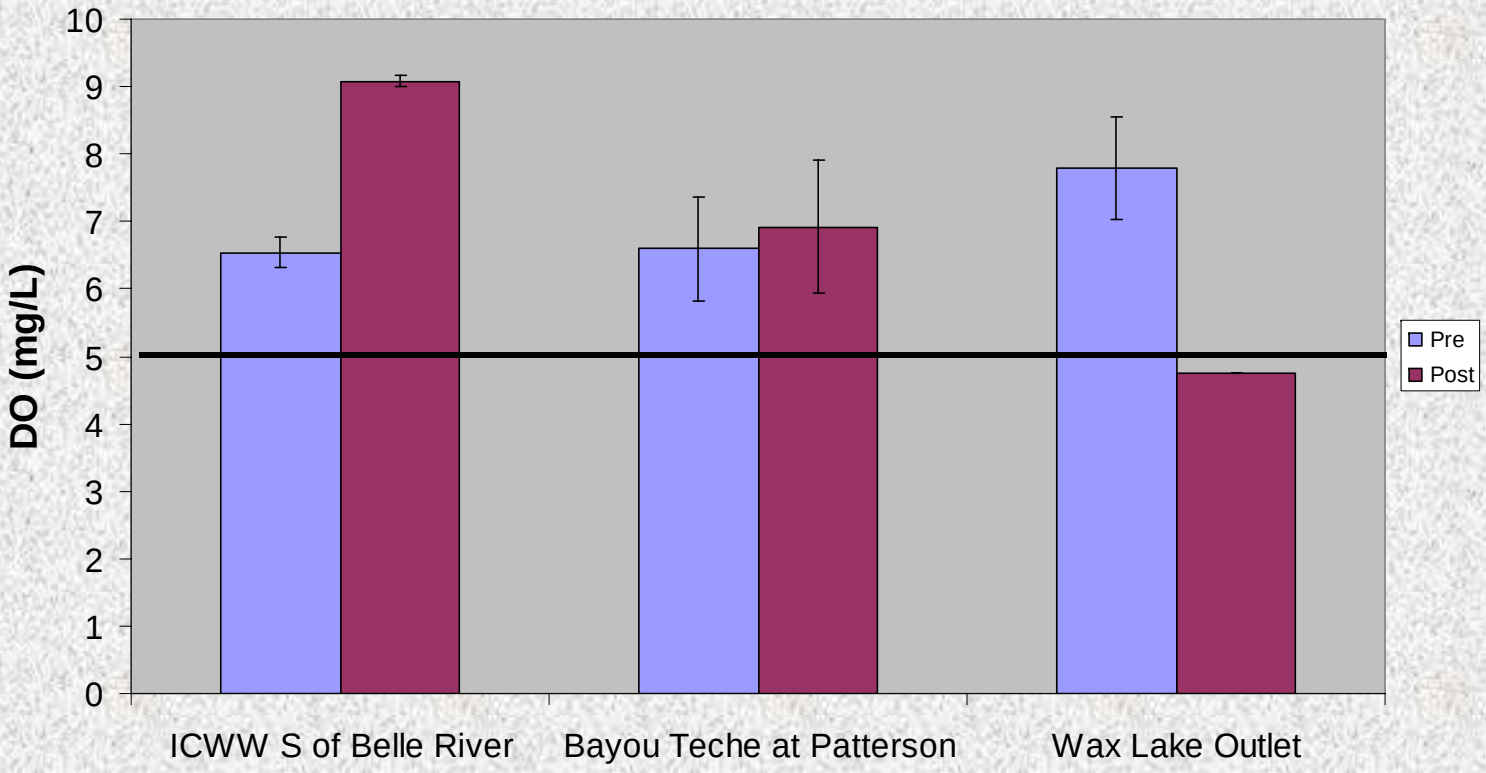
Comparison of Pre- vs. Post-Hurricane Average Dissolved Oxygen Concentrations at Atchafalaya River Basin Sites



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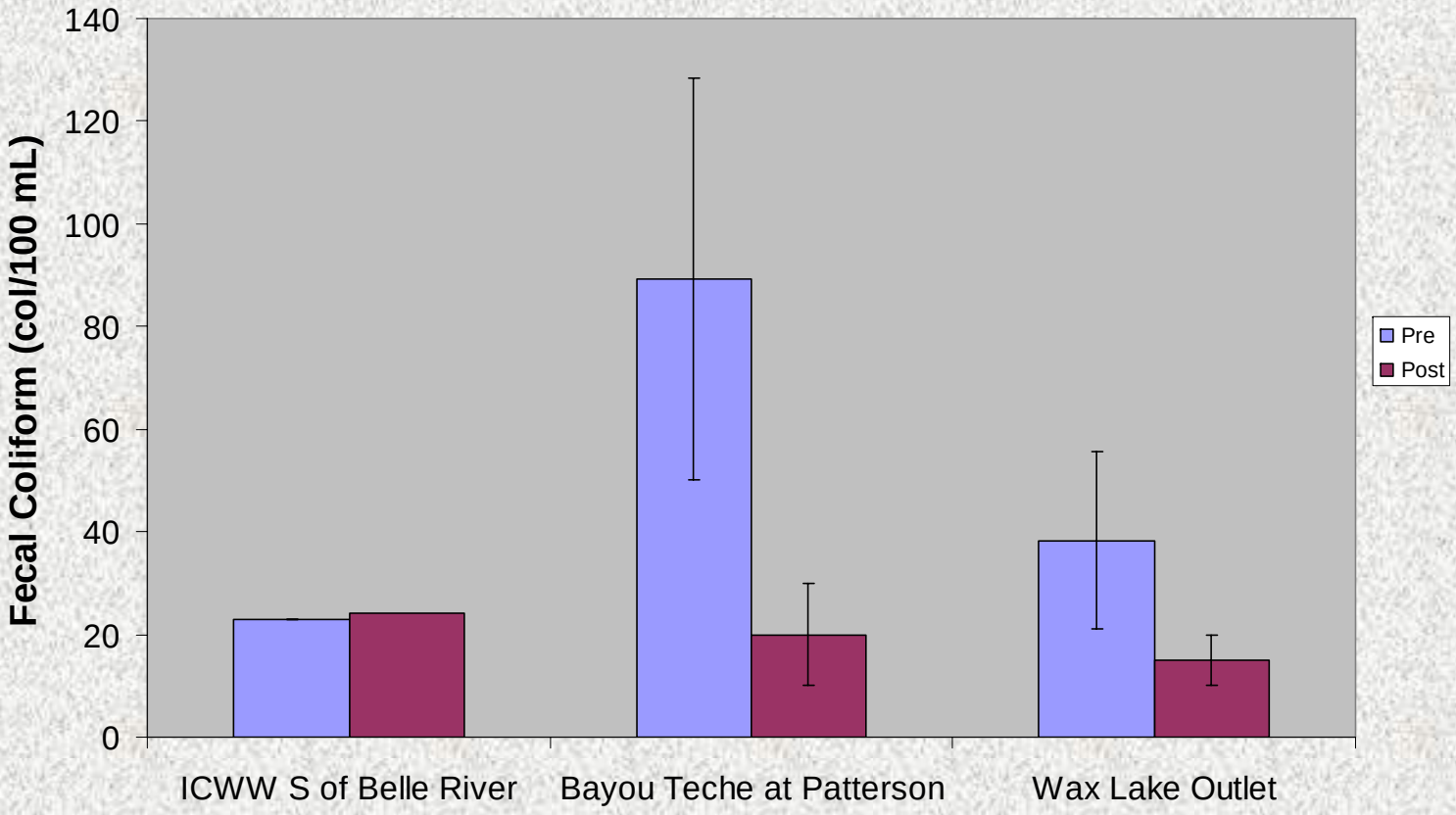
Comparison of Pre- vs. Post-Hurricane Fecal Coliform Desities at Atchafalaya River Basin Sites



Note: Standard = 400 col/100 mL

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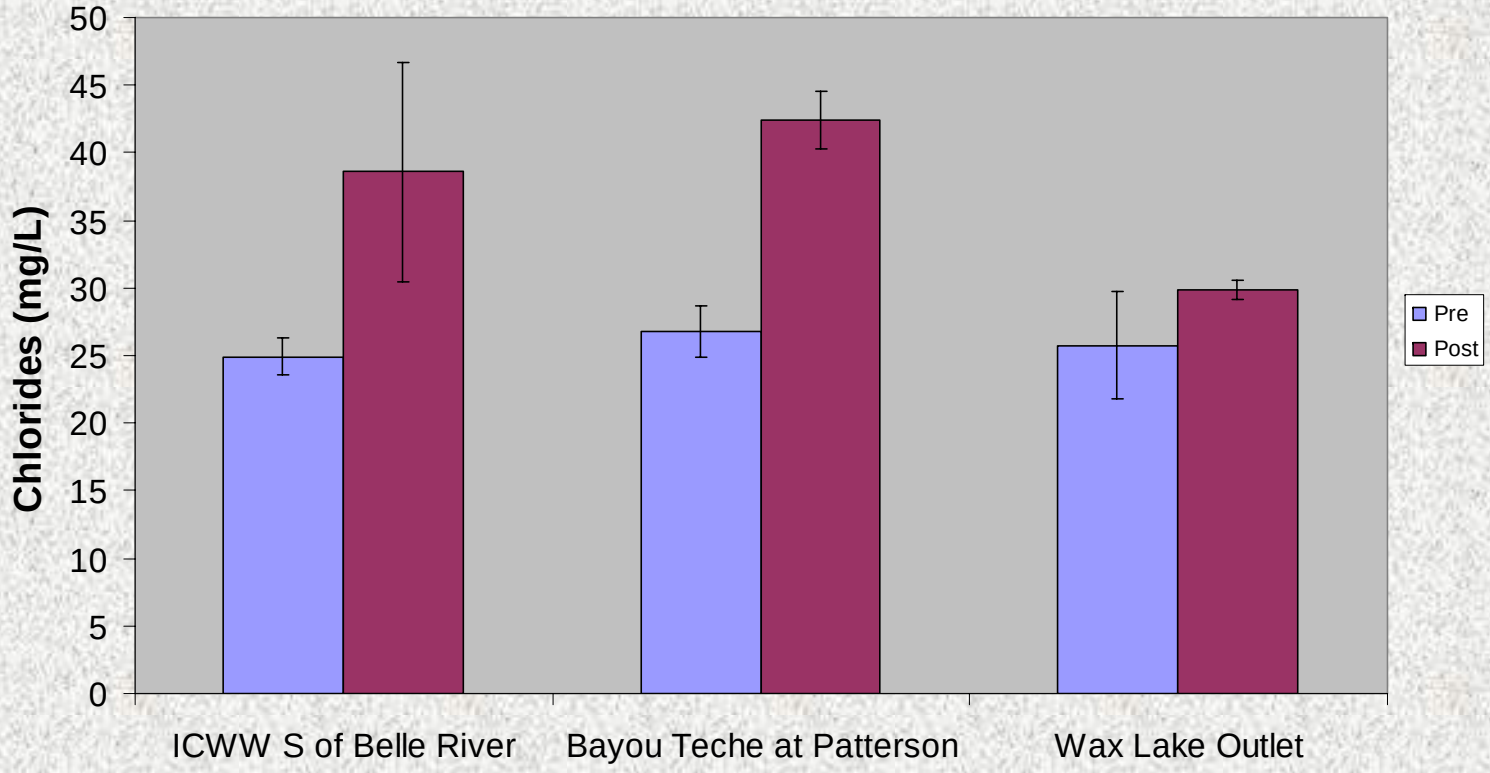
Comparison of Pre- vs. Post-Hurricane Average Concentration of Chlorides at Atchafalaya River Basin Sites



Summation of water quality assessments for impacted area: Atchafalaya River Basin

- Two of three sites had average dissolved oxygen levels above their standards
  - One site was only 0.25 mg/L below the standard of 5.0 mg/L
- Fecal coliform standards for swimming were met for all sites
- Chloride standards for all sites were met
- All organic compound results have been below Louisiana water quality standards

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Terrebonne Basin

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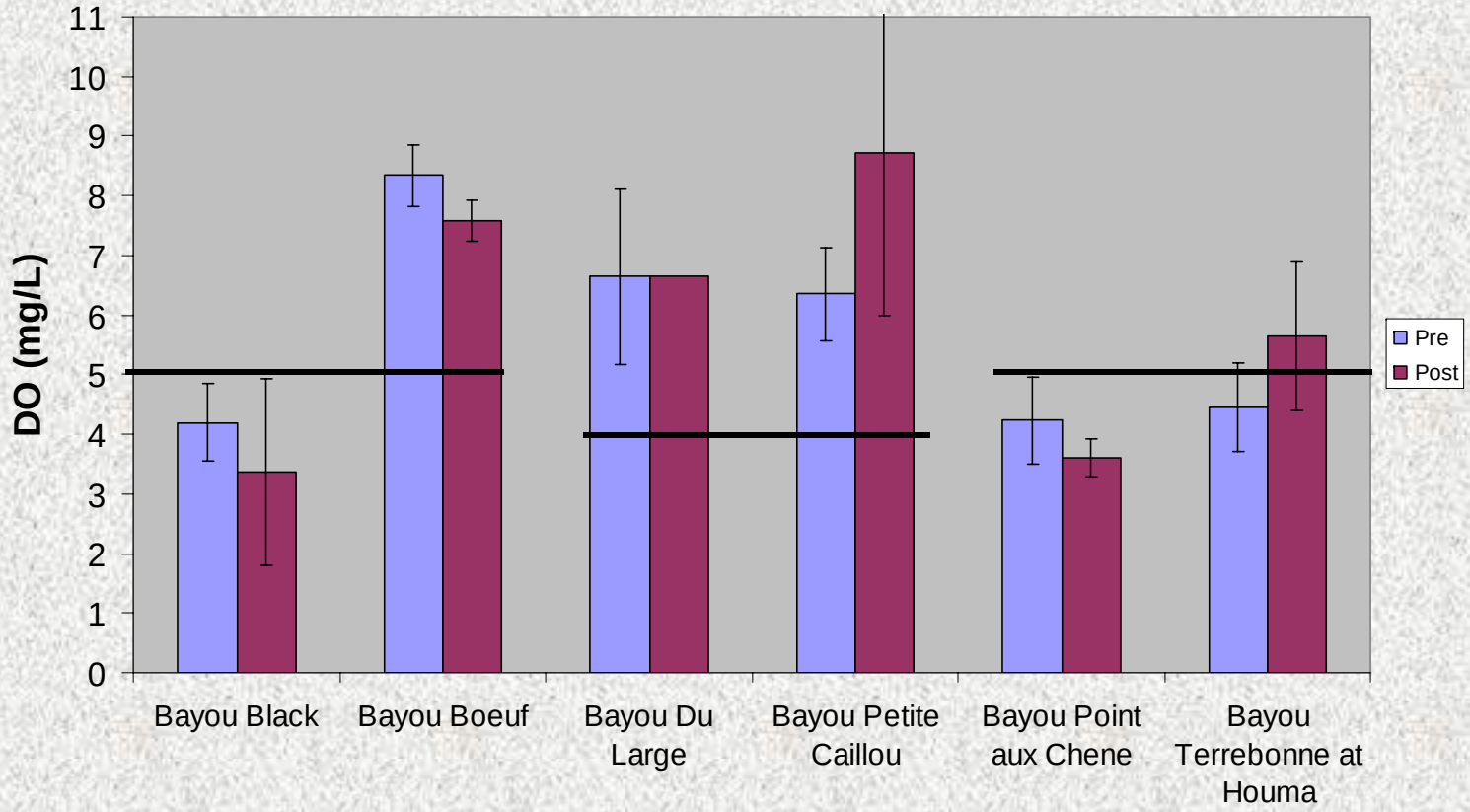
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Terrebonne Basin Sites



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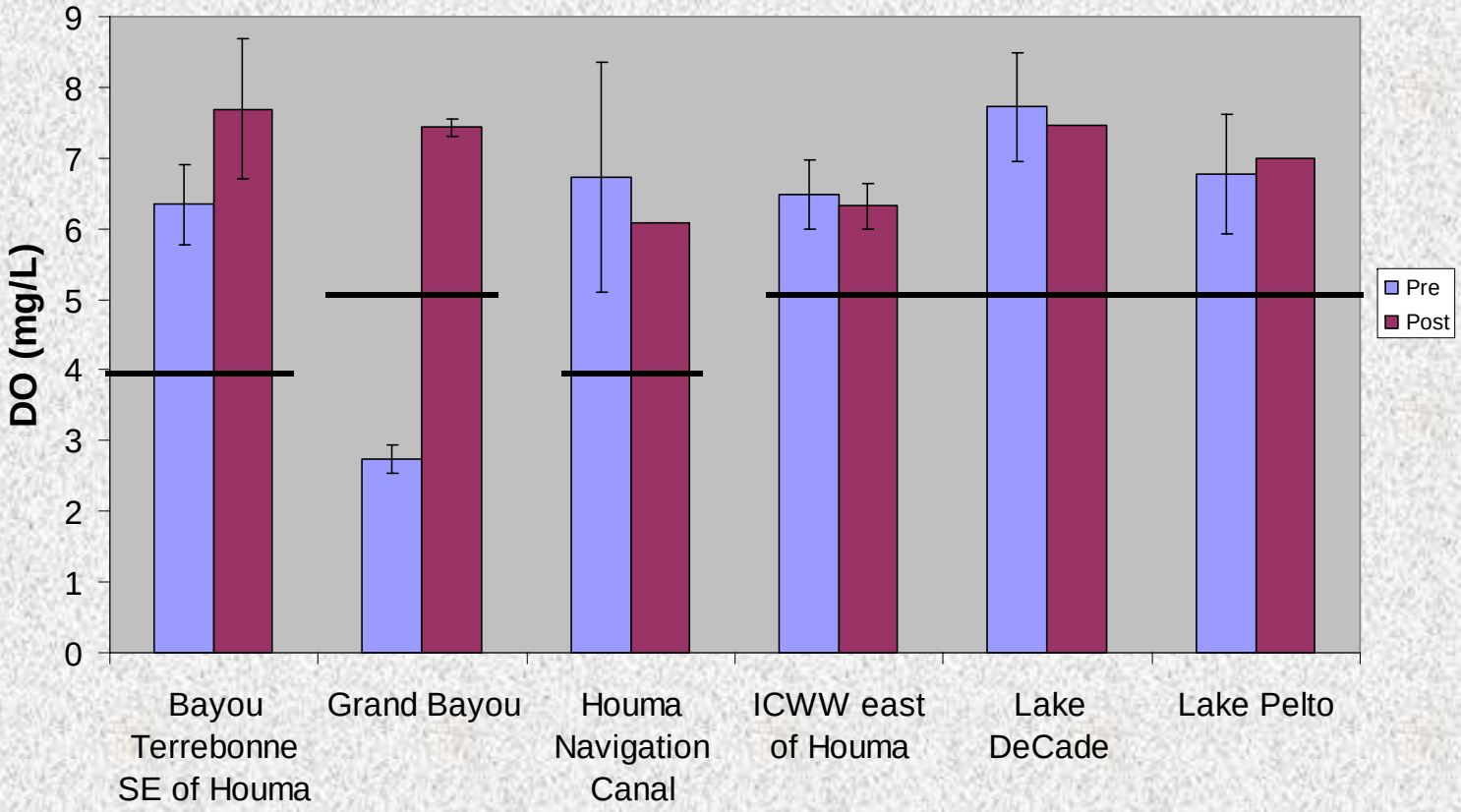
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Terrebonne Basin Sites



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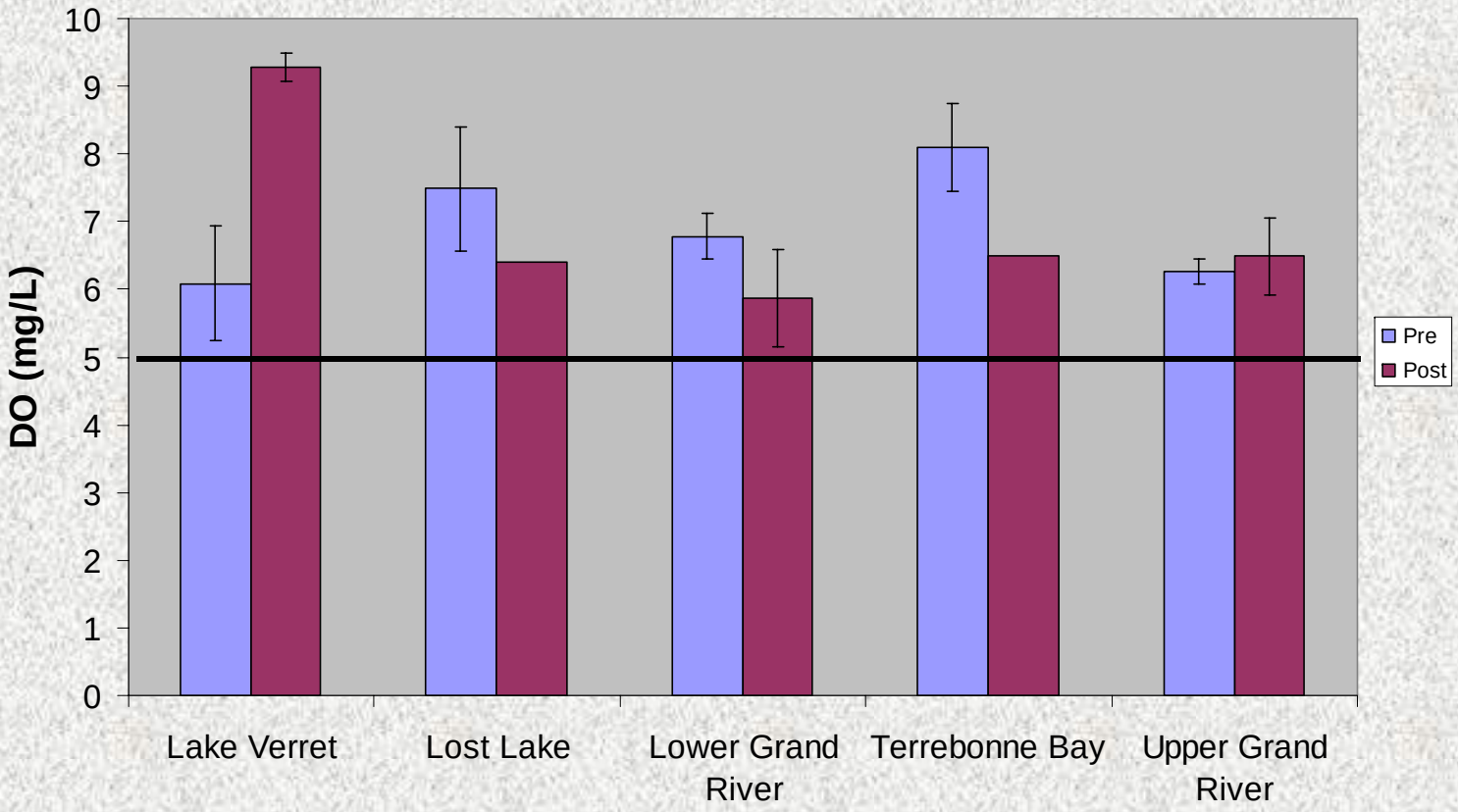
Comparison of Pre- vs. Post-Hurricane Dissolved Oxygen Concentrations at Terrebonne Basin Sites



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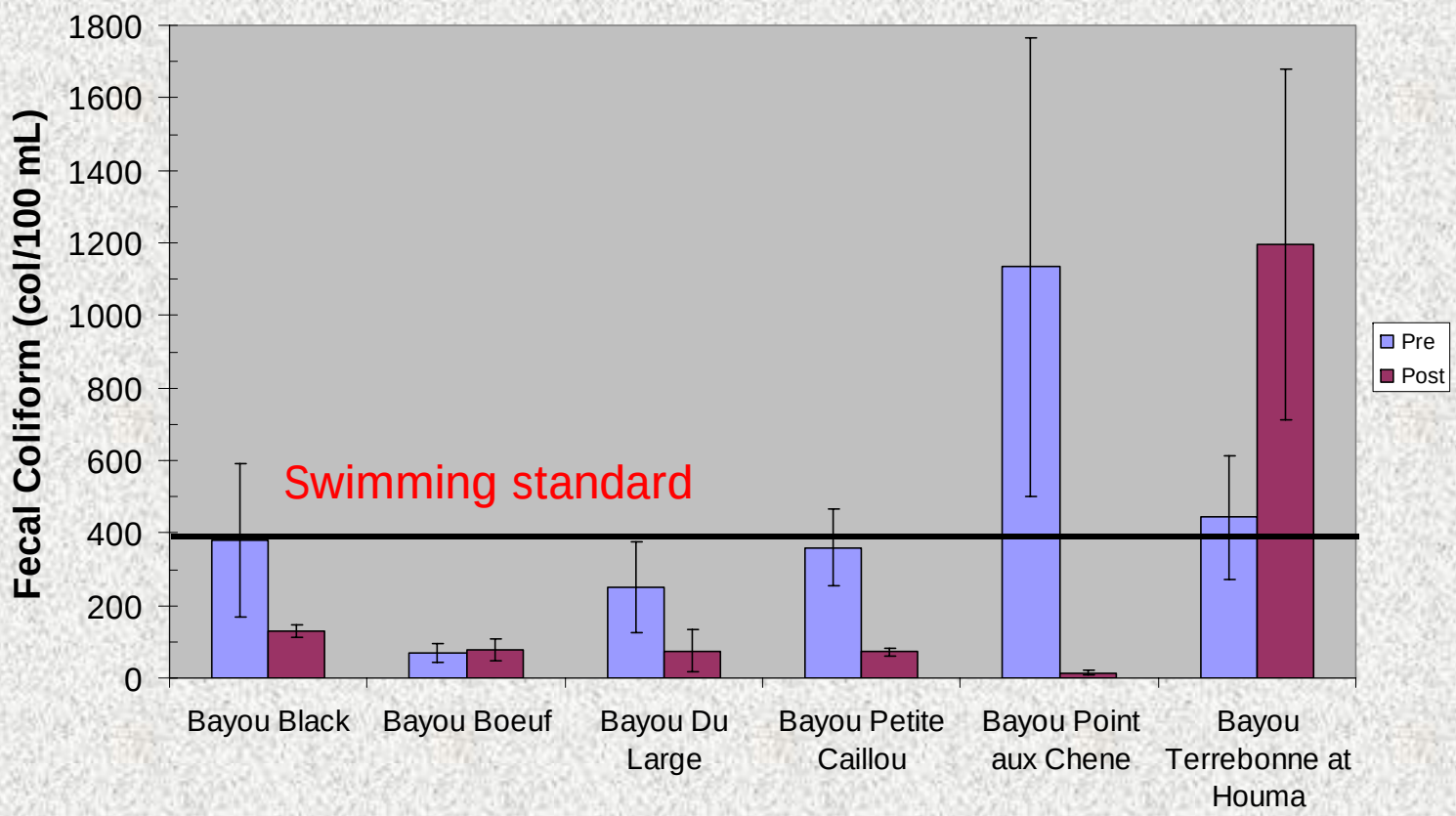

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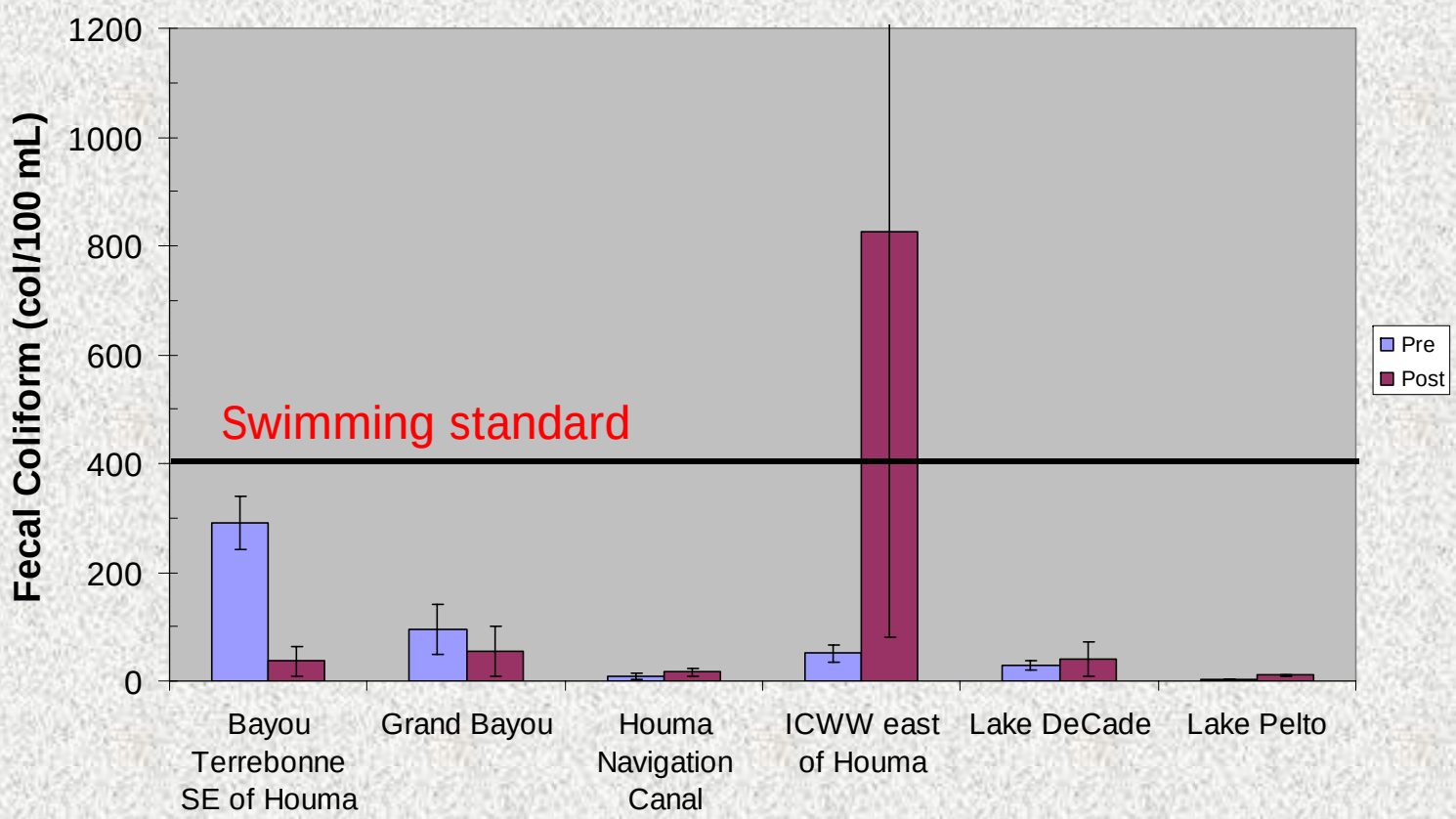

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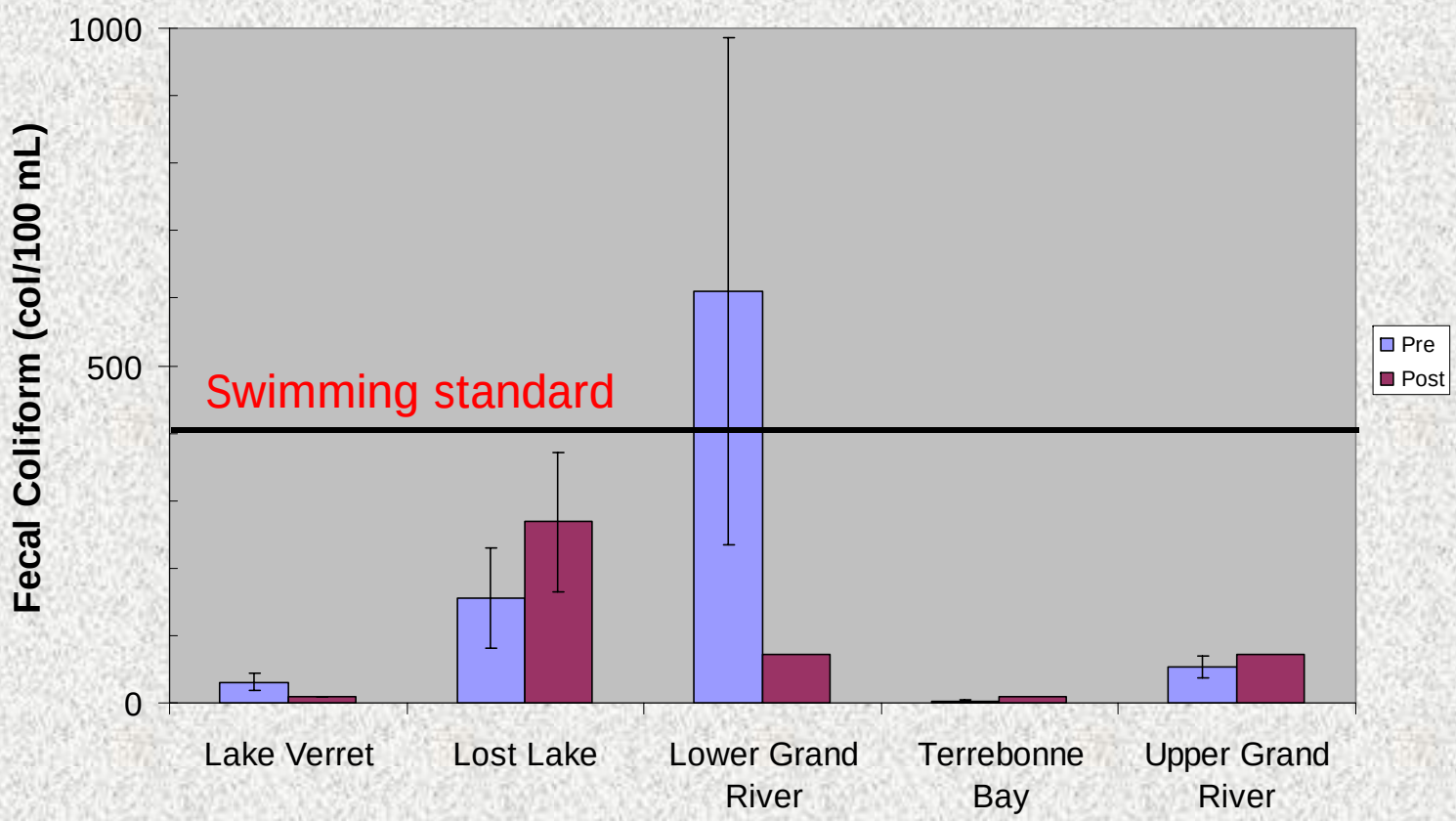

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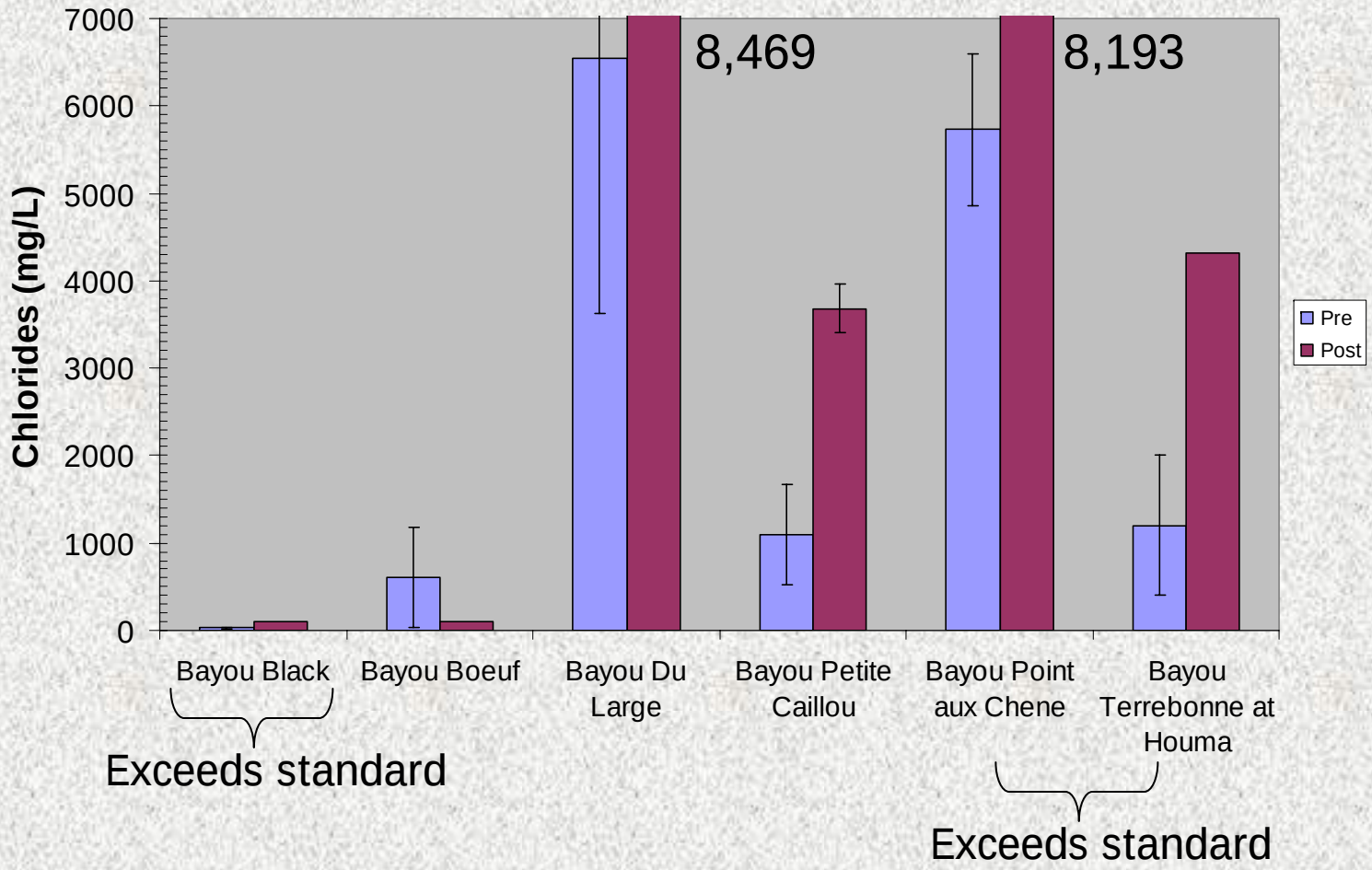
Comparison of Pre- vs. Post-Hurricane Average Concentration of Chlorides at Terrebonne Basin Sites



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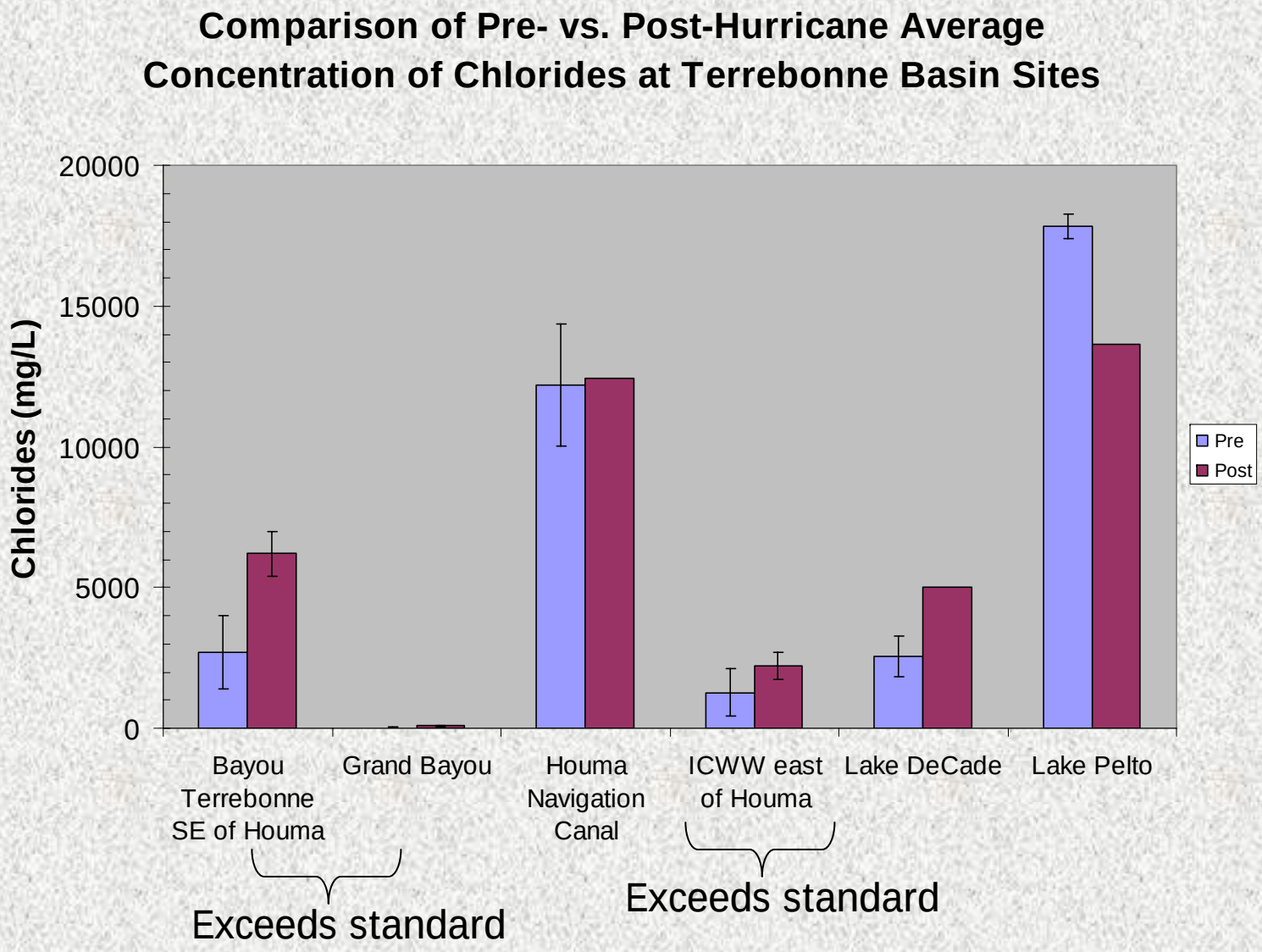

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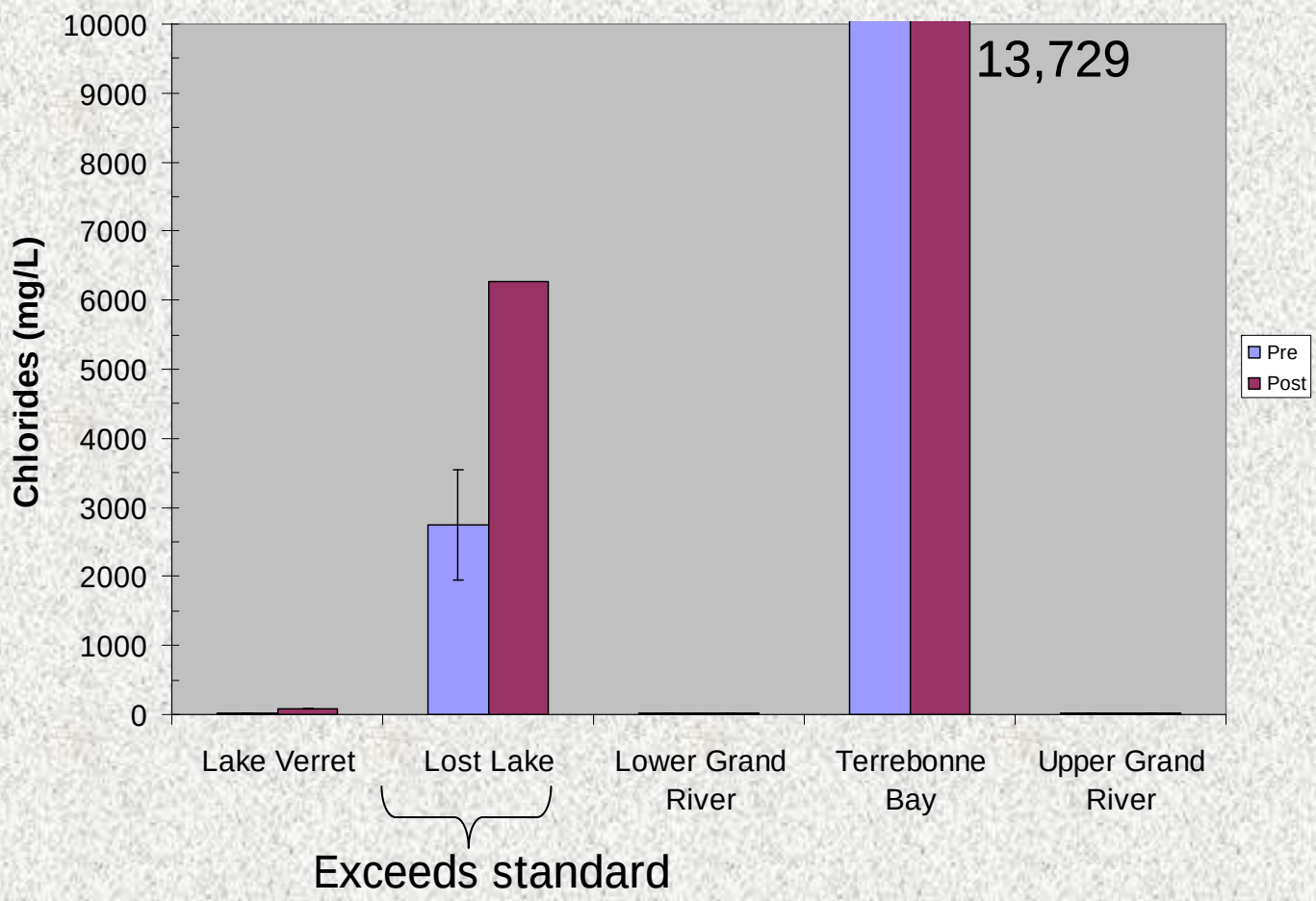

Summation of water quality assessments for impacted area: Terrebonne Basin

- Two of seventeen sites had average dissolved oxygen concentrations below their standards
- None of the seventeen sites had average fecal coliform densities exceeding the secondary contact recreation standard suitable for this time of year
- Average chloride concentration at six of seventeen sites exceeded standards; remaining sites either met standards or did not have chloride standards due to their estuarine nature

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Summary

Water quality summary throughout affected area:

Through December 20, 2005

- Water quality impacts have been largely limited to natural impacts resulting in low dissolved oxygen or increases in chloride levels
- Fecal coliform concentrations have generally remained below Louisiana standards for secondary contact recreation, which is the appropriate standard for this time of year

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Water quality summary throughout affected area:

Through December 20, 2005

- Organic compounds and metals
  - Results mostly non-detect (<0.3% of samples resulted in detectable concentrations)
  - Only two exceedences of non-drinking water human health standards in approximately 19,000 analytical results for organic compounds
  - Only 1 exceedence of chronic aquatic life standards in nearly 250 analytical results for metals

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References

- http://www.deq.louisiana.gov/
- http://www.deq.louisiana.gov/deqgallery/
- 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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