



# Improving Water Quality in Oso Bay and Laguna Madre Assessing Dissolved Oxygen Concentrations

## Water Quality in Oso Bay and Laguna Madre

The state of Texas requires that the water quality in Oso Bay (Segment 2485) and Laguna Madre (Segment 2491) be suitable for swimming, wading, fishing, a healthy aquatic ecosystem, and for growing and harvesting clams, mussels, or oysters. However, water quality testing found that dissolved oxygen levels are sometimes lower than the standard established to assure a healthy aquatic ecosystem.

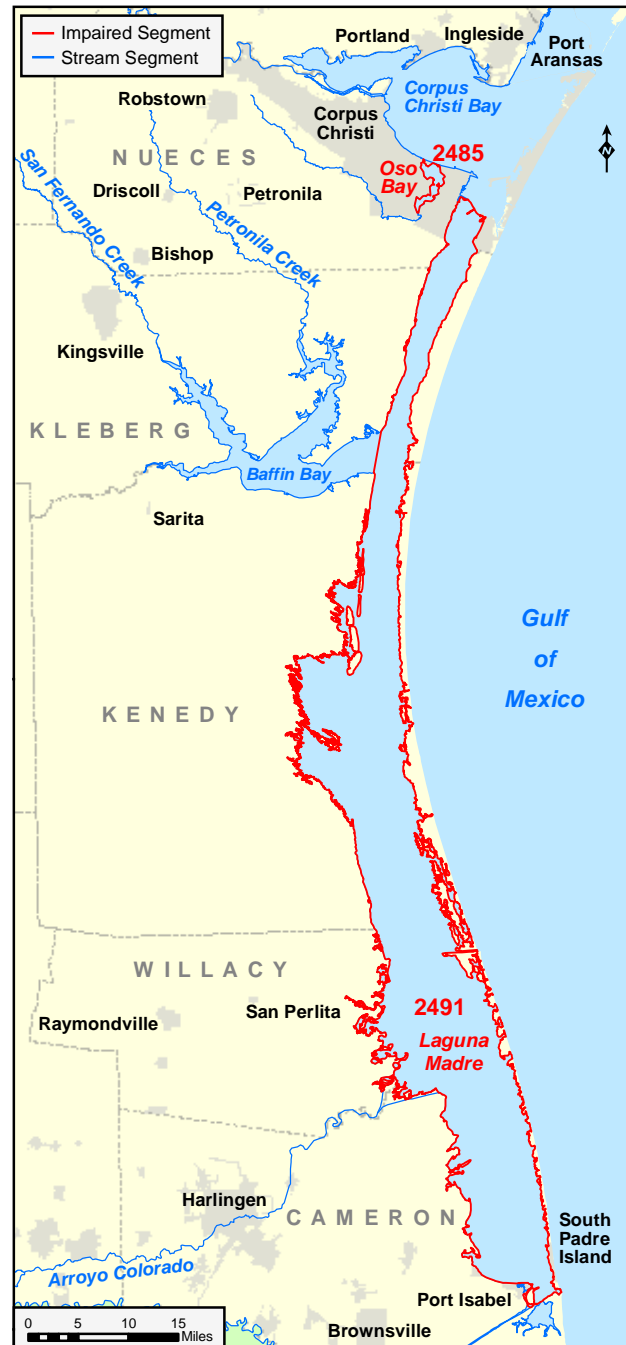
In response to these conditions, the TCEQ conducted a project to assess the two water bodies. The results of this project determined that low dissolved oxygen levels continue to be a problem, but are likely due to natural conditions. The TCEQ determined that it was most appropriate to carry out a use attainability analysis (UAA) rather than develop a total maximum daily load (TMDL).

Many water bodies are evaluated against a general set of standards that are applied to all water bodies, regardless of local conditions. A UAA establishes the standards that are appropriate for a specific water body, taking into account the unique features of the local ecosystem and watershed. A UAA may result in an adjustment to a more appropriate standard; or the TCEQ may develop a TMDL for the affected water body. The goal of a TMDL is to determine the amount (or load) of a pollutant that a body of water can receive and still support its beneficial uses.

### Description of the Watersheds

The Oso Bay watershed drains an area of approximately 255 square miles and is located in the northern-most portion of the Nueces-Rio Grande Coastal Basin. The bay is an enclosed, shallow body of water situated along the southern shore of Corpus Christi Bay, with a surface area of approximately 7 square miles. The bay receives fresh water from Oso Creek, a stream whose flow is dominated by permitted discharges, and exchanges saltwater with Corpus Christi Bay. Ecologically, Oso Bay provides habitat for many plants and animals, and plays an influential role in water purification and storm protection.

Corpus Christi is the only major metropolitan area that lies within the watershed boundaries. The only other large community within the watershed is Robstown. Economic activities in and around the bay include oil



and gas refining and production, agriculture, manufacturing, and tourism.

The Laguna Madre drains most of the Nueces-Rio Grande Coastal Basin (10,442 square miles) and is one of only five hypersaline or negative estuaries in the

world. The Laguna is a shallow, bar-built coastal lagoon with limited freshwater inflow and a surface area at mean high tide of 729 square miles. The Arroyo Colorado is primarily responsible for freshwater inflow to the lower Laguna Madre. Freshwater inflow is primarily attributed to municipal or industrial discharges and to runoff from rainfall events. Tides in the Laguna Madre are minimal. Ecologically, the Laguna is characterized as exhibiting hypersaline conditions, barren shorelines with extensive wind-tidal flats, extensive submerged seagrass meadows, and a highly productive finfishery.

Several cities and towns are located along the shoreline adjacent to the Laguna Madre—Corpus Christi, Port Mansfield, Laguna Vista, Laguna Heights, Port Isabel and South Padre Island. The shorelines of the Laguna Madre are predominantly inaccessible because of the large tracts of privately owned ranch land and the establishment of two federally protected areas—Padre Island National Seashore and Laguna Atascosa National Wildlife Refuge. Economic activities in and around the lagoon include ranching, oil and gas production, agriculture, fishing, recreation and tourism.

### Project Development

Project staff first initiated targeted monitoring to determine if dissolved oxygen measurements collected from Oso Bay and a nearby control site in the upper Laguna Madre exceeded the criteria established by the TCEQ standards. The results verified the low dissolved oxygen levels; however, the data raised many questions about the appropriateness of the criteria for

the bay. TCEQ staff determined that additional monitoring data was necessary before a standards adjustment could be considered. This additional monitoring allowed for the capture of annual seasonal variability in dissolved oxygen concentrations and extended the project area to include the entire Laguna Madre (upper and lower) as well as Oso Bay.

### Public Participation

The Coastal Bend Bays and Estuaries Program (CBBEP) stakeholder committees provide for local participation in this project. These committees include representatives from:

- state and federal agencies
- industries
- citizen groups
- local governments
- universities
- water districts
- agricultural interests
- environmental groups
- other water user groups

### For More Information

For more information, contact the TCEQ Contact listed below.

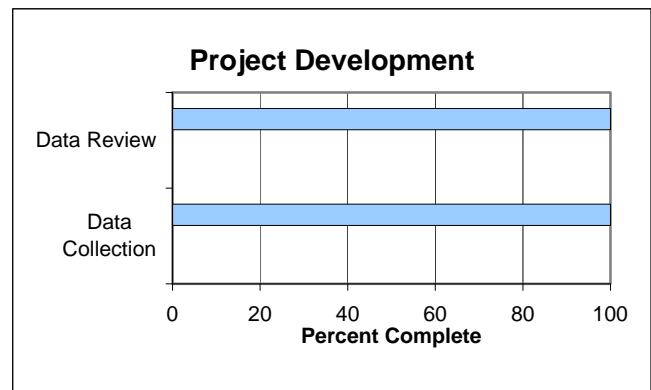
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### TMDL Development Status

**Start Date:** June 2001

**Project End Date:** August 2006



### TMDL Project Highlights

- August 2000-October 2001. A monitoring program to collect 24-hour dissolved oxygen data in accordance with TCEQ guidance was initiated in Oso Bay, with a control site located in the upper Laguna Madre.
- June 2002. The TCEQ determined the need for additional 24-hour dissolved oxygen monitoring to consider whether the oxygen criteria for the bay should be adjusted.
- November 2002. A project to initiate additional monitoring began.
- Contractor recommendation is for TCEQ to consider establishing site-specific standards.
- The Water Quality Standards group has conducted a UAA using historical data and is proposing site-specific DO criteria for both water bodies in the current water quality standards revision.