Protecting Tres Palacios Bay

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Tres Palacios Bay is an ecologically important part of the Matagorda Bay system and the Texas Gulf Coast. The area around the bay is home to many kinds of plants and animals, and includes freshwater and saltwater marshes, estuaries, and open bay. The coastal marshes and estuaries of Tres Palacios Bay serve as nurseries for a large number of coastal aquatic species, including many types of commercial fish, shrimp, crabs, and oysters. Tres Palacios Bay itself is among the most productive coastal areas of the state.

Prices Slough and Tres Palacios Bay

A Valuable Natural Resource

Tres Palacios Bay, along with the entire Matagorda Bay system, is an important commercial and recreational fishing resource. In 2004, the value of all commercially caught finfish, shrimp, oysters, and crabs within the Matagorda Bay system exceeded $3.3 million, according to the Texas Parks and Wildlife Department. Additionally, anglers from across the state and nation come to the area to catch speckled trout, redfish, flounder, and many other types of fish. These anglers often rent lodging in the area, rent or buy boats and equipment, and eat at local restaurants.

The Port of Palacios is one of the busiest fishing ports in the country. In 2004, fishing operations brought ashore and processed $27.6 million worth of seafood caught in area bays and the Gulf of Mexico. Shrimp is the port's main catch. In fact, shrimp are so valuable to the local economy that they are the major food produced in Matagorda County, exceeding both rice and cattle. Consequently, the Port of Palacios has adopted the title "Shrimp Capital of Texas."

Water Quality in Tres Palacios Bay

The quality of water in Tres Palacios Bay is an important component of the bay's ecosystem and plays a vital role in the productivity of the entire Matagorda Bay coastal area. Water quality testing conducted by the TCEQ prior to 2004 showed that, in several of the bays in the Matagorda Bay system, concentrations of dissolved oxygen were sometimes outside the range required to support a healthy aquatic community. The bay systems identified as having low dissolved oxygen were Matagorda Bay–Powderhorn Lake (Segment 2451), Tres Palacios–Turtle Bay (Segment 2452), and Carancahua Bay (Segment 2456).

Oxygen, which dissolves in water, is essential for the survival of aquatic life. The amount of dissolved oxygen in water fluctuates naturally, but various human activities can cause unusually low dissolved-oxygen conditions that may harm fish and other aquatic organisms. The State of Texas requires that

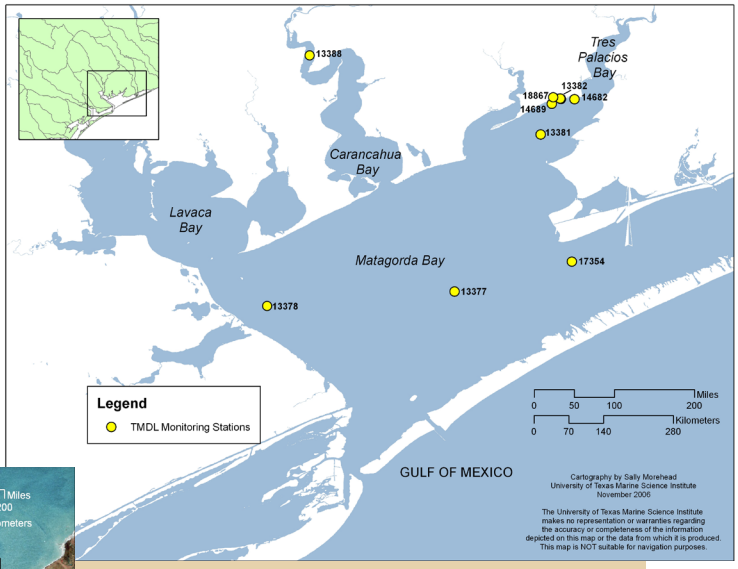
The Port of Palacios

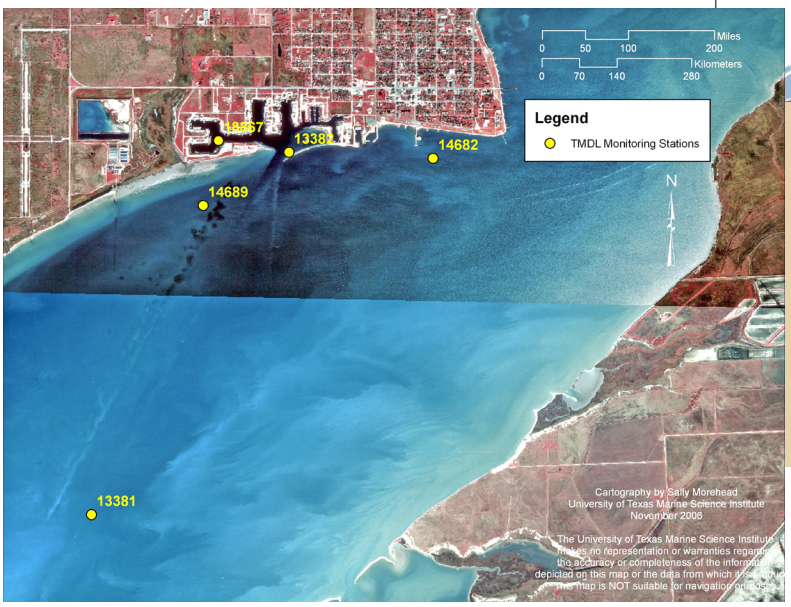
water quality in these coastal water bodies support the exceptional aquatic life that normally thrives in them. In response to the water quality conditions in the Matagorda Bay area, the TCEQ began a project to determine the extent, severity, and possible causes of the low dissolved oxygen.

According to data collected between 2004 and 2006 by the University of Texas Marine Science Institute, two areas of Tres Palacios Bay showed persistently low dissolved oxygen—an area near the city of Palacios (Station 14689) and Palacios Harbor (Stations 13382 and 18867).

Location of Monitoring Stations for the Project

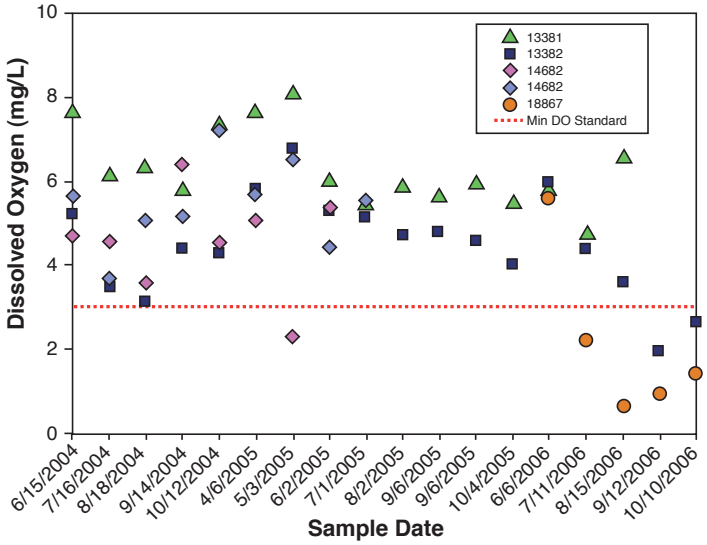
Segment	Stations
2452 Tres Palacios–Turtle Bay	13382, 13381, 14682, 14689, 18867
2451 Matagorda Bay–Powderhorn Lake	17354, 13377, 13378
2456 Carancahua Bay	13388





Credit: Figures courtesy of the University of Texas Marine Science Institute.

Lowest Dissolved Oxygen Concentrations Recorded Over a 24-Hour Period in Tres Palacios Bay, Segment 2452



The minimum level of dissolved oxygen required to support the aquatic life use of the bay is 3 milligrams per liter (mg/L). In Palacios Harbor (Stations 13382 and 18867), 6 of 23 measurements—26 percent of the total—were below the minimum level required.

What Is Causing the Low Oxygen Levels?

There are several possible causes of low dissolved oxygen in Palacios Harbor and Tres Palacios Bay. Among these are:

- Oxygen-consuming pollutants in rainfall runoff that can wash into the harbor during storms.
- Onboard trash or organic wastes such as fish by-catch and shrimp heads thrown directly into the water.
- The physical shape of the port itself, which keeps wave action low and makes it difficult for tides to flush and renew harbor waters.

The balance between dissolved oxygen and organic matter affects the overall level of dissolved oxygen in the bay. Dissolved oxygen is increased by processes called aeration and photosynthesis. It is decreased by bacteria that feed on organic waste like dead fish, fish parts, or shrimp heads.

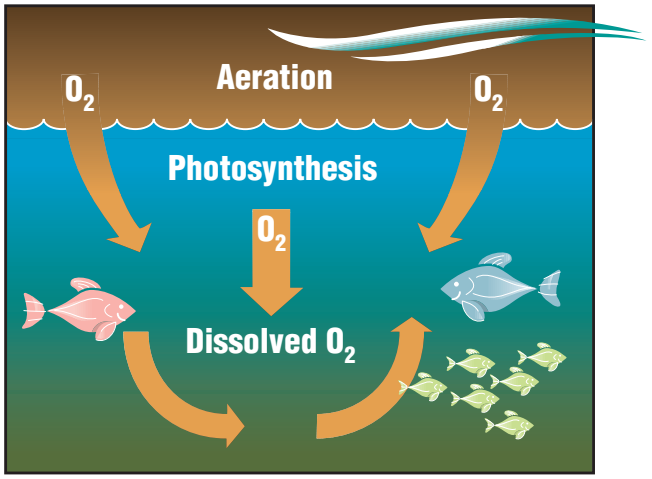
Dissolved Oxygen

The oxygen in the air we breathe dissolves into water through natural processes. Waves or even a strong surface current can add significant quantities of oxygen to a body of water. This process is called *aeration*.

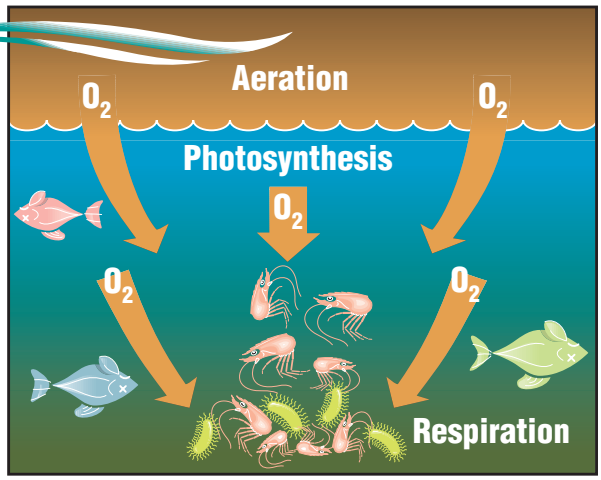
Aquatic plants also add oxygen to the water. During the day, plants use nutrients, water, and sunlight to produce their own food. This process is called *photosynthesis* and produces oxygen as a by-product. Photosynthesis by floating algae is a common source of dissolved oxygen in the bay.

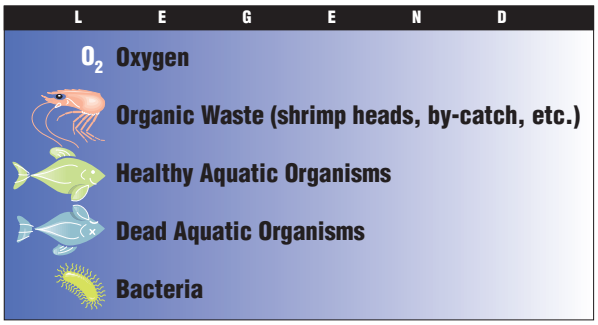
In addition, oxygen dissolves better in water at low temperatures. Cool, rapidly flowing waters often

Dissolved Oxygen Mixes and Circulates



Dissolved Oxygen Is Depleted





contain significantly more oxygen than warm, slow moving ones. Warm, stagnant water bodies that are sheltered from the wind—such as marinas and boat harbors like Palacios Harbor—tend to have lower levels of dissolved oxygen.

Credit: Photograph copyrighted by Pro-Aire Aerial Photography, <www.proaire.com>. Courtesy of Matagorda County Navigation District Number One.

Organic Matter

Nearly **every living creature needs oxygen to survive.** Whether they get it from air or in water, organisms use oxygen to convert food into energy for life. This process is called *respiration* and it occurs in even the smallest of creatures such as bacteria.

Some kinds of bacteria thrive on organic waste like shrimp heads and by-catch discarded into the water. In doing so, the bacteria consume dissolved oxygen in the surrounding water.

Getting Involved in the Solution

Tres Palacios Bay is a valuable natural resource worthy of the highest level of environmental protection. The State of Texas is obligated under federal law to preserve and protect Tres Palacios Bay. However, comprehensive resource protection can only be accomplished through the care and the commitment of local stakeholders and the public.

The State of Texas regulates discharges of wastewater and some storm water into waters of the state, including Tres Palacios Bay, through the Texas Pollutant Discharge Elimination System. The state also enforces laws against unauthorized releases of pollutants into its waters through various other programs. However, while environmental regulation can help protect Tres Palacios Bay, ultimately the well-being of the bay ecosystem is directly dependent on the stewardship of the local population. Stakeholders and other citizens can ensure the protection of the natural resources in Tres Palacios Bay by:

- Properly disposing of fishing and boating wastes generated in the bay and harbor.
- Supporting propositions to pay for adequate wastewater and storm water infrastructure in the Palacios area that will keep urban pollutants from contaminating the bay.
- Encouraging local governments to adopt ordinances that incorporate "Smart Growth" concepts into building and development requirements.

For More Information

To find out more about water quality in the Tres Palacios area, call the TCEQs Total Maximum Daily Load Program at 512-239-4900 or send an e-mail to <tmdl@tceq.state.tx.us>. Visit the TMDL Program on the web at <www.tceq.state.tx.us/goto/tmdl>.

GI-363 2/07

Texas Commission on Environmental Quality

The TCEQ is an equal opportunity/affirmative action employer. The agency does not allow discrimination on the basis of race, color, religion, national origin, sex, disability, age, sexual orientation or veteran status. In compliance with the Americans with Disabilities Act, this document may be requested in alternate formats by contacting the TCEQ at 512-239-0028, Fax 512-239-4488, or 1-800-RELAY-TX (TDD), or by writing P.O. Box 13087, Austin, TX 78711-3087.