



## Improving Water Quality in Armand Bayou

# A TMDL Project for Dissolved Oxygen

### Water Quality in Armand Bayou

The state of Texas requires water quality in Armand Bayou (Segments 1113 and 1113A) to be suitable for swimming, wading, fishing, and aquatic life. However, water quality samples evaluated in 1998 found that (1) bacteria levels were occasionally elevated, indicating a potential health risk to people who swim or wade in the bayou and (2) low dissolved oxygen levels in the water may occasionally stress the fish community and other aquatic life. In response to these conditions, a project was initiated to determine the extent and severity of the low dissolved oxygen levels and the appropriateness of the water quality standard. The results of the project were used to decide whether it would be appropriate to develop a total maximum daily load (TMDL).

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 designated uses. This allowable load is then allocated among all the potential sources of pollution within the watershed, and measures to reduce pollutant loads are developed as necessary.

Oxygen gas, which dissolves in water, is essential for the survival of aquatic life. While the amount of dissolved oxygen in water fluctuates naturally, various human activities can cause unusually or chronically low dissolved oxygen levels, which may harm fish and other aquatic organisms. However, oxygen is not the only factor which influences the health of aquatic organisms; many other factors are important, especially in complex ecosystems like the bayou.

Learn more about water quality standards and monitoring by reading *Clean Water for Texas: Solving Water Quality Problems*. For general information about how TMDL projects are structured, read *The TMDL Process in Texas: What You Need to Know*. Both documents are available on the Web at [www.tceq.org/goto/tmdl/](http://www.tceq.org/goto/tmdl/).

### Armand Bayou Watershed

Armand Bayou is located in the San Jacinto-Brazos Coastal Basin. It originates in Pasadena, a suburb of Houston, and flows southeast through Pasadena, running parallel to and south of Red Bluff Road. Armand Bayou is tidal for approximately 8 miles above its confluence with Clear Lake. Horsepen Bayou, a significant tributary of Armand Bayou, flows through



Clear Lake City and joins Armand Bayou in the tidal reach. The watershed lies entirely within Harris County.

Armand Bayou is rich in plant and animal life and attracts canoeists, kayakers, fishermen, and birdwatchers daily. There are several parks and other recreational areas along Armand Bayou, including Bay Area Park and Armand Bayou Nature Center. The Armand Bayou Nature Center is a private, 2,500-acre wildlife refuge and wilderness preserve located along the lower reaches of the bayou in the center of a highly urbanized area between NASA/Johnson Space Center and the Bayport Industrial District. The Nature Center protects remnants of the region's original wetland, bottomland forest, and tall grass prairie ecosystems. This area has been designated as one of only four Texas State Coastal Preserves and is one of the last bayous in the Houston area that is not channelized in the tidal reaches. The Nature Center is also the recipient of the Lone Star Land Steward Award sponsored by the Texas Parks & Wildlife Department due to its excellent wildlife habitat management and private lands conservation.

## Public Participation

Public meetings were held in the Clear Lake City area. Meetings were attended by representatives of the following groups.

- 5 Local Governments
- 4 State Agencies
- 4 Cities
- 1 Water District
- 1 Citizen Group
- 2 Universities
- 1 Agriculture Group
- 2 Other Water User Groups
- Several Industries

An ad hoc stakeholder group was formed during the project under the auspices of the Texas Sea Grant of Texas A&M University. This group continues to meet intermittently to identify ways to protect Armand Bayou. For more information about this group, contact Michi Vojta at Texas Sea Grant, (281) 335-3170, [mvojta@tamu.edu](mailto:mvojta@tamu.edu). Or visit the Web site for the Coastal Watershed Program of the Texas Sea Grant at [www.urban-nature.org/](http://www.urban-nature.org/).

## For More Information

For more information about this project, contact one of the project team members listed on this page.

### TCEQ Contact:

Larry Koenig, TMDL Program,  
(512) 239-4533, [lkoenig@tceq.state.tx.us](mailto:lkoenig@tceq.state.tx.us)

### TCEQ Regional Office:

Linda Broach, Region 12 - Houston  
(713) 767-3579

### TSSWCB Contact:

Stephen Deiss, (979) 532-9496

### Regional Coordinator:

Carl Masterson, Houston-Galveston Area Council,  
(713) 993-4561, [cmasters@hgac.cog.tx.us](mailto:cmasters@hgac.cog.tx.us)

## TMDL Development Status

**Start:** September 1997

**End:** Inactive pending further data

**TCEQ Adoption:**

**Submitted to EPA Region 6:**

**EPA Region 6 Approval:**

## TMDL Project Highlights

- An intensive data set representing hot weather conditions at various points in the Armand Bayou system was delivered to the TCEQ. The data was collected during May through September of 1999. The report can be reviewed on the H-GAC's Web site at [www.hgac.cog.tx.us/intro/introtmdl.html](http://www.hgac.cog.tx.us/intro/introtmdl.html).
- Initial analyses of the data set revealed that dissolved oxygen concentrations are often relatively low during hot weather, but also found no indication of aquatic life impairment or limitation related to the dissolved oxygen regime. The data set has several unconventional aspects that are related to unique hydraulic characteristics of the Armand Bayou system.
- A TMDL allocation related to dissolved oxygen is not deemed appropriate at this time, since available data do not indicate impairment of the aquatic life community, nor identify a pollutant that needs to be controlled. Additional data are needed to provide satisfactory understanding of the causes and effects of the Armand Bayou dissolved oxygen regime. The TCEQ will continue working to gather more data, and to develop protocols suitable for evaluating dissolved oxygen and aquatic life conditions in tidal streams, in conjunction with Texas Parks and Wildlife.