



## Improving Water Quality in Nueces Bay A TMDL Project for Zinc in Oysters

The Department of State Health Services (DSHS) has banned harvesting of oysters throughout Nueces Bay (Segment 2482) because of high concentrations of zinc in oyster tissues.

Zinc is a trace element naturally present in living tissue, and essential to the healthy function of the body. Zinc plays an important role in metabolism, tissue repair, cell replication, and growth. However, like all trace elements, zinc is toxic if consumed in excess over an extended period. Excessive intake of zinc may result in the reduced absorption and utilization of copper and iron by the body.

The TCEQ initiated a total maximum daily load project to determine the measures necessary to restore water quality in the bay. 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 the categories of sources within the watershed, and stakeholders work with the state to develop measures that reduce pollutant loads.

Learn more about water quality standards, monitoring, and TMDLs by reading *Preserving and Improving Water Quality*, available on our website at [www.tceq.texas.gov/goto/tmdl/](http://www.tceq.texas.gov/goto/tmdl/).

### Description of the Nueces Bay Watershed

Nueces Bay has an area of 28.9 square miles and drains the Nueces River Basin (16,950 square miles), along with portions of the San Antonio-Nueces and Nueces-Rio Grande Coastal Basins. Nueces Bay is a shallow, secondary bay that receives freshwater from the Nueces River and exchanges saline water with Corpus Christi Bay. The climate in this region is arid most of the time, except when influenced by freshets and tropical storms, which often result in flooding.

The headwaters of the Nueces River originate in the central Texas hill country. Principal tributaries of the Nueces River include the Atascosa and Frio rivers. The western part of the Edwards Aquifer lies within the river basin, along with two major reservoirs—Choke Canyon Reservoir and Lake Corpus Christi. The western part of Corpus Christi is the only major metropolitan area within the river's watershed.

Nueces Bay has economic and ecologic importance to the surrounding region. Economic activities in and



around the bay include petrochemical refining and production, agriculture, manufacturing, recreation, maritime commerce, and tourism. Ecologically, Nueces Bay is home to many plants and animals, and plays a role in water purification and storm protection.

### Project Development

The historical data set for zinc in oysters was limited and indicated excessively high levels of zinc in oyster tissue. The DSHS collected new samples of oyster, fish, and crab tissue beginning in February 2002. A new risk assessment in January 2003 confirmed high levels of zinc in oyster tissue. The TCEQ compiled its data sets and those of the Coastal Bend Bays and Estuaries Program (CBBEP) for zinc in water and sediment, then drainage areas were spatially delineated. The Center for Research in Water Resources (CRWR) updated a total loadings model for the bay in June 2003. The TCEQ developed a draft TMDL using the updated model along with historical and recently collected data.

The TCEQ adopted the TMDL on November 1, 2006; the EPA approved it December 15, 2006. The TCEQ approved the implementation plan October 24, 2007. The plan recommended continued sampling to track attenuating zinc levels in Nueces Bay.

## Technical Reports

The effectiveness of the I-Plan is described in the document "Historical Review of Nueces Bay (Segment 2482) Zinc Total Maximum Daily Load Effectiveness Monitoring." This and other technical reports are available on the project website.

## Public Participation

In all its projects, the TCEQ seeks to gather opinion and information from people who represent government, permitted facilities, agriculture, business, environmental, and community and private interests in the watershed. The stakeholder committees of the Coastal Bend Bays and Estuary Program (CBBEP) are the forum for local public participation in the Nueces Bay project.

The CBBEP hosted the first stakeholder meeting on September 27, 2002, in Corpus Christi. A second meeting was held on October 22, 2003. Stakeholders and project staff discussed the results of the loadings model and the allocation of the allowable load to the sources in the watershed.

## For More Information

Contact the project manager listed below, or visit the project website at:

<[www.tceq.texas.gov/implementation/water/tmdl/21-nuecesbay.html](http://www.tceq.texas.gov/implementation/water/tmdl/21-nuecesbay.html)>

### TCEQ TMDL Program:

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## TMDL Development Status

**Start Date:** December 2000

**TCEQ Adoption:** November 1, 2006

**Submitted to EPA Region 6:** November 8, 2006

**EPA Region 6 Approval:** December 15, 2006

## Implementation Plan Status

**Start Date:** December 2006

**TCEQ Approval:** October 24, 2007

## Project Highlights

- Implementation monitoring began in 2006.
- The commission approved the Implementation Plan on October 24, 2007.
- During 2007-9, extreme fluctuations in salinity from flooding and drought prevented harvest of any viable (living or marketable size) oysters for analysis.
- Implementation monitoring restarted in 2010 and continued through 2013.
- Extensive discussion is available in the "Technical Support Document: Historical Review of Nueces Bay Zinc TMDL Effectiveness Monitoring" on the project website.

Visit our website at: <[www.tceq.texas.gov/goto/tmdl/](http://www.tceq.texas.gov/goto/tmdl/)>