



# Improving Water Quality in the Arroyo Colorado

## One TMDL for Dissolved Oxygen

### Water Quality in the Arroyo Colorado

The state of Texas requires that water quality in the Arroyo Colorado be suitable for swimming, fishing, and a healthy aquatic ecosystem. However, water quality analyses have found that dissolved oxygen levels are sometimes too low downstream of the Port of Harlingen (Segment 2201) to provide optimum conditions for fish and other aquatic life. 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.

In response to this impairment, the TCEQ is developing a Total Maximum Daily Load (TMDL) to improve conditions in the Arroyo Colorado. 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. A local steering committee is working concurrently to develop a watershed protection plan for the Arroyo Colorado.

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Learn more about water quality standards, monitoring, and TMDLs by reading *Clean Water for Texas: Working Together for Water Quality*. 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.tnrcc.state.tx.us/water/quality/tmdl/](http://www.tnrcc.state.tx.us/water/quality/tmdl/).

### Description of the Arroyo Colorado Watershed

The Arroyo Colorado, an ancient distributary channel of the Rio Grande, extends about 90 miles from Mission, Texas to the Laguna Madre in the Rio Grande Valley. Flow in the Arroyo Colorado is sustained by waste water discharges, agricultural irrigation return flows, urban runoff, and base flows from shallow groundwater. Although an integral part of a major floodway system, water is rarely (only during



major flood events), diverted from the Rio Grande into the Arroyo Colorado. The Arroyo is also the major source of fresh water to the lower Laguna Madre, an economically and ecologically important resource to the region.

The Arroyo Colorado watershed (1,810 square kilometers) is a flat coastal plain that slopes gently toward the Gulf of Mexico. The fertile farmland, long growing season, and access to water for irrigation from the Rio Grande make this region one of the most productive agricultural areas in the U.S. The Laguna Atascosa National Wildlife Refuge and several county and city parks are located within the Arroyo watershed. The mild climate, semi-tropical plants and animals, and many recreational opportunities draw large numbers of people to the Arroyo Colorado watershed. One third of the stream is used for shipping from the Gulf Intracoastal Waterway to the Port of Harlingen.

### Project Development

In 1998, the TCEQ and the Texas State Soil and Water Conservation Board (TSSWCB) initiated an effort to develop a TMDL for dissolved oxygen in the tidal segment of the Arroyo Colorado. The first phase of this effort was completed in June of 2002. Phase 1 determined that a combination of nutrient loading from the watershed and

hydraulic effects in the dredged navigational channel result in periodic but severe episodes of hypoxia (low dissolved oxygen) in the upper reach of the tidal segment of the Arroyo. The current TMDL effort (Phase 2) is focused on collecting new data and refining hydrodynamic and water quality models to determine the loading reductions and/or physical modifications necessary to achieve appropriate dissolved oxygen concentrations.

The TCEQ is partnering with the United States Geological Survey (USGS) to continue the research into the causes of low dissolved oxygen in the Arroyo Colorado. The joint study will begin in July 2004 and is expected to be completed in Spring 2007. It will include detailed characterizations of 1) tidal hydrodynamics; 2) short-term fate, transport, and cycling of nutrients and carbon; and 3) biochemical oxygen production rates, community respiration rates, and sediment oxygen demand in the tidal segment of the Arroyo Colorado.

### Public Participation Process

The Arroyo Colorado Watershed Steering Committee advises the TCEQ on this project. The committee has

representatives from permitted wastewater dischargers, agriculture groups, universities, citizen groups, and local, state, regional, and federal government agencies. A specialized work group of the committee has been formed to guide the data collection and modeling efforts.

### For More Information

For information on upcoming meetings and documents available for review, contact one of the following representatives from the Texas Commission on Environmental Quality (TCEQ) or the Texas State Soil and Water Conservation Board (TSSWCB). Or visit our Web site at [www.tnrcc.state.tx.us/water/quality/tmdl/](http://www.tnrcc.state.tx.us/water/quality/tmdl/).

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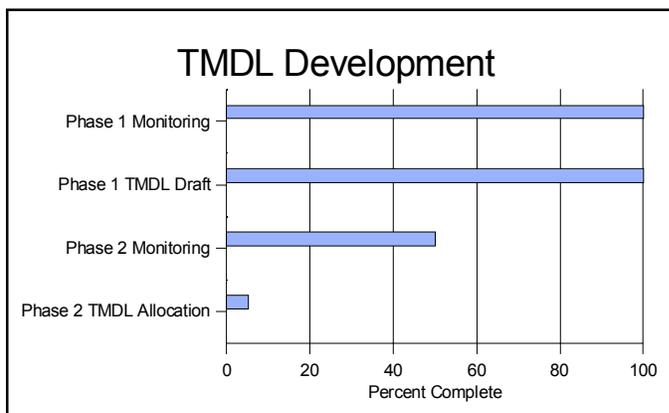
#### TSSWCB Regional Coordinator:

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### TMDL Development Status

**Start:** July 2002

**Projected End:** December 2005



### TMDL Project Highlights

- In June 1998, the Arroyo Colorado TMDL Watershed Steering Committee and Science and Technical Advisory Committee were convened to advise the TCEQ on improving water quality in the Arroyo Colorado.
- In September 2002, all data collection, analysis, and water quality modeling under Phase 1 was completed, including a “zero load” (natural land cover only) scenario.
- Modeling results indicate that the dissolved oxygen problem in the tidal segment is related as much to the physical setting and geomorphology of the Arroyo Colorado as it is to the loading of nutrients and oxygen-demanding substances (BOD) from the non-tidal segment.
- Phase 2 was initiated in July 2002 to refine the TMDL developed under Phase 1.
- A watershed plan is being developed through a related project to address dissolved oxygen and bacteria impairments.