Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY

Texas

Adopting Conservation Tillage and Repairing Septic Systems Improves Water Quality in Oso Bay

Waterbodies Improved

Low levels of dissolved oxygen (DO) in Texas' Oso Bay caused by high nutrient and organic loading prompted the Texas Commission on Environmental Quality (TCEQ) to add the bay to the Clean Water Act (CWA) section 303(d) list of impaired waters for failure to support its aquatic life designated use. Extensive implementation of cropland best management practices (BMPs), repair and replacement of failing septic systems, trash cleanups, and education and outreach took place in the watershed and around the bay, leading to decreased nutrient and organic loading and higher DO levels in the bay. As a result, in 2010 TCEQ removed Upper and Lower Oso Bay (segments 2485_01 and 2485_03, respectively) from the CWA section 303(d) list.

Problem

The combined watersheds of Oso Creek and Oso Bay drain an area of approximately 235 square miles in Nueces County, Texas (Figure 1). Oso Bay is a shallow tertiary bay of about 2,963 acres that empties into Corpus Christi Bay. The watershed is dominated by cropland in the western portion and developed residential areas in the eastern portion. Other activities in the watershed include petroleum exploration and refining, manufacturing, and tourism.

Oso Bay is classified as having an *exceptional aquatic life* designated use. To meet state water quality standards, the bay must maintain a 24-hour average for DO above 5.0 milligrams per liter (mg/L), and the daily minimum grab sample may not be below 4.0 mg/L. Portions of Oso Bay were first placed on the CWA section 303(d) list in 1996 for failing to meet the state's DO criteria. Water quality sampling conducted by Texas A&M University–Corpus Christi in 2001 indicated that the lowest recorded DO values in the bay were 1.9 mg/L (in segment 2485_01) and 0.45 mg/L (in segment 2485_03). On the basis of these and other similar data, TCEQ added the entire bay to the CWA section 303(d) list for low DO in 2004.

Low DO levels can be caused by elevated nutrient levels, which result in algal blooms and other oxygen-demanding materials decomposing in water. Litter, failing septic systems, and runoff from cropland and urban areas were identified as potential sources of nonpoint source pollution contributing to Oso Bay's impairment.

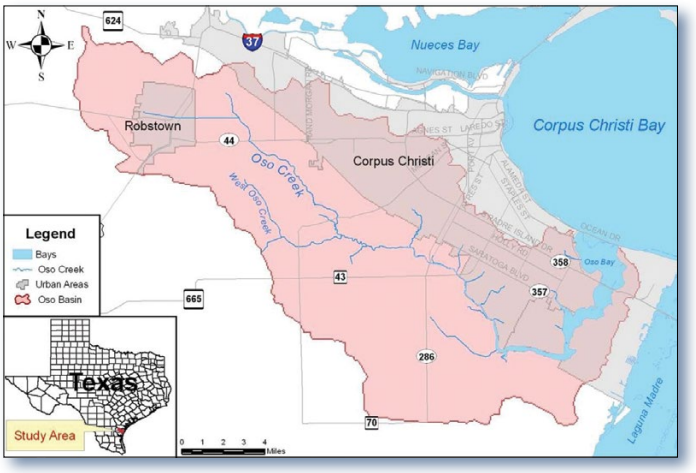

Figure 1. Oso Creek and Oso Bay are in southeast Texas.

Project Highlights

In September 2002 the Texas State Soil and Water Conservation Board (TSSWCB) partnered with the Nueces Soil and Water Conservation District (SWCD) and local landowners to voluntarily implement BMPs on agricultural land in the Oso Bay watershed. Conservation tillage (Figure 2) was one of the main practices used to reduce soil erosion. Through this effort, 56 water quality management plans were developed and implemented on 14,501 acres. The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) also developed conservation plans on more than 35,000 acres of agricultural land in the watershed. Education and outreach were provided by the SWCD, TSSWCB, and NRCS through technical assistance to the landowners.

Figure 2. Landowners adopted conservation tillage in the Oso Bay watershed.

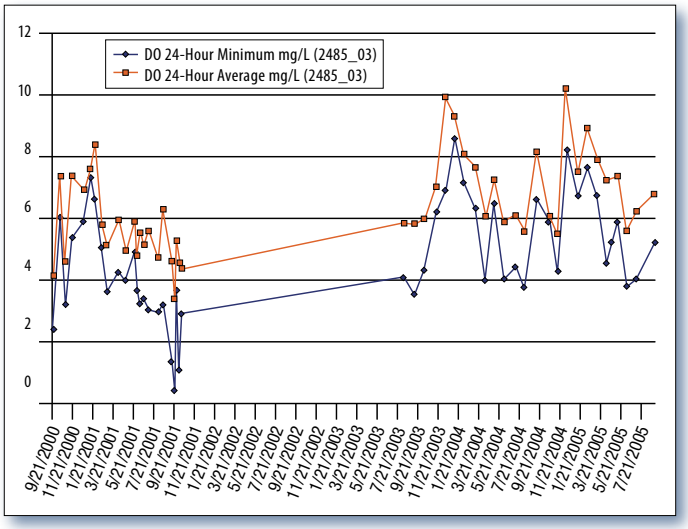

Figure 3. Twenty-four-hour DO monitoring data showed improved DO levels in Lower Oso Bay.

TSSWCB also partnered with Texas A&M AgriLife Research and the U.S. Geological Survey to collect and analyze water quality data in the watershed's agricultural areas. These data were collected pre-and post-implementation to determine the effectiveness of BMPs. The Coastal Bend Bays and Estuaries Program, Nueces County, and TCEQ partnered to repair, replace, or install septic systems in the watershed from 2007 to 2009. The primary area of focus was Tierra Grande colonia (an unincorporated subdivision) and nearby households. Partners helped to install 21 new septic systems on properties with no existing systems or with failed systems. Additionally, 10 systems that were not functioning at optimal capacity were repaired.

The Coastal Bend Council of Governments partnered with Nueces County, Texas A&M–Corpus Christi, and TCEQ Region 14 to address illegal dumping. As part of an education campaign about illegal dumping, the partners conducted 97 presentations at local schools and community events from 2006 through 2010. In addition, three public service announcements were aired over a six-month period in 2006. The partners also performed litter cleanups, including two events (November 6, 2009, and July 23, 2010) at the State Highway 348 bridge over Oso Bay. The cleanup efforts removed more than four tons of trash and debris. The partners installed four trash cans along the bridge to encourage proper trash disposal. An additional cleanup was conducted in the Tierra Grande colonia on November 3, 2007.

Results

Water quality monitoring data that were assessed for the 2010 Texas Integrated Report and CWA section 303(d) list showed that the daily minimum grab sample and 24-hour average for DO levels in Upper and Lower Oso Bay (Figure 3) complied with the state's water quality standards. As a result, TCEQ removed the Upper and Lower Oso Bay segments from the state's CWA section 303(d) list of impaired waters for DO. The success of this effort is attributed to the voluntary implementation of BMPs by landowners and the use of education and outreach through technical assistance. Landowners continued to implement agricultural BMPs with assistance from TSSWCB, Nueces SWCD, and NRCS after the assessment period, along with continued septic system implementation, trash cleanup, and outreach.

Partners and Funding

Over $761,100 in CWA section 319 funds and over $27,700 in state funds from TSSWCB, paired with over $385,600 in non-federal matching funds from Texas A&M AgriLife Research and local landowners, supported efforts to collect and analyze water samples and provide technical and financial assistance for voluntary BMP implementation by agricultural producers in the Oso Bay watershed. Additionally, NRCS provided over $90,900 in Farm Bill funding for technical and financial assistance to develop watershed conservation plans.

More than $180,000 in CWA section 319 funds from TCEQ, combined with $120,000 in non-federal matching funds from the Coastal Bend Bays and Estuaries Program, the Coastal Bend Council of Governments, and Nueces County, was used to install, replace, or repair septic systems, perform litter cleanups, and provide outreach and education in the Oso Bay watershed.

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