NONPOINT SOURCE SUCCESS STORY

Texas

Low Impact Development, Outreach and Sewer System Infrastructure Contribute to Improved Water Quality in the Brownsville Ship Channel

Waterbody Improved

The Brownsville Ship Channel Assessment Unit (AU) 2494_01 was first listed for failing to meet water quality standards for bacteria in the 2010 Texas Integrated Report of Surface Water Quality and Texas 303(d) List (Integrated Report). Since that time, efforts to improve water quality by local partners and several state and federal agencies have been focused on outreach and education, implementation of best management practices (BMPs), stakeholder participation and construction of a sewer collection system. These efforts have led to documented water quality improvements in the Brownsville Ship Channel. As a result, the Texas Commission on Environmental Quality (TCEQ) delisted Brownsville Ship Channel AU 2494_01 from the 2020 Texas 303(d) list for bacteria.

Problem

The Brownsville Ship Channel (Segment 2494) is a 42-foot-deep dredged channel in Cameron County at the southernmost tip of Texas (Figure 1). It is part of the Lower Laguna Madre/Brownsville Ship Channel (LLMBSC) Watershed and contributes about 25% of the freshwater flow into the Lower Laguna Madre. It originates at the Port of Brownsville and flows downstream to the confluence with the Laguna Madre. Segment 2494 has a designated noncontact recreation use and an Enterococci criterion of 35 colony-forming units (cfu) per 100 milliliters (100 mL). TCEQ originally listed AU 2494_01 on the 2010 Texas 303(d) List due to elevated bacteria. In 2010, the Enterococci geometric mean was 47.07 cfu/100 mL, exceeding the criterion of 35 cfu/100 mL. In 2018, the Texas Water Resources Institute collaborated with the University of Texas Rio Grande Valley to complete a watershed characterization with Clean Water Act (CWA) section 319(h) funds before developing a watershed protection plan. Elevated levels of bacteria are suspected to have originated from nonpoint source pollution associated with urban stormwater and failing on-site wastewater disposal systems.

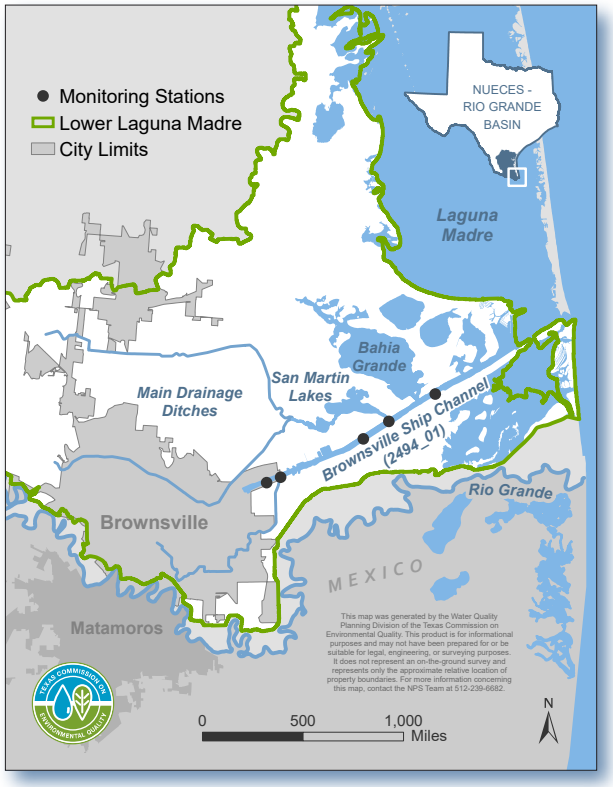

Figure 1. The Brownsville Ship Channel is in south Texas.

Story Highlights

Between 2011 and 2017, several state and federal parties collaborated to implement BMPs, conduct education and outreach, and participate in water quality improvement projects in the LLMBSC Watershed.

CWA section 319(h) funds were used by Texas A&M University at Kingsville (TAMUK) to improve LLMBSC Watershed conditions by implementing low impact development (LID) BMPs at Cascade Park in

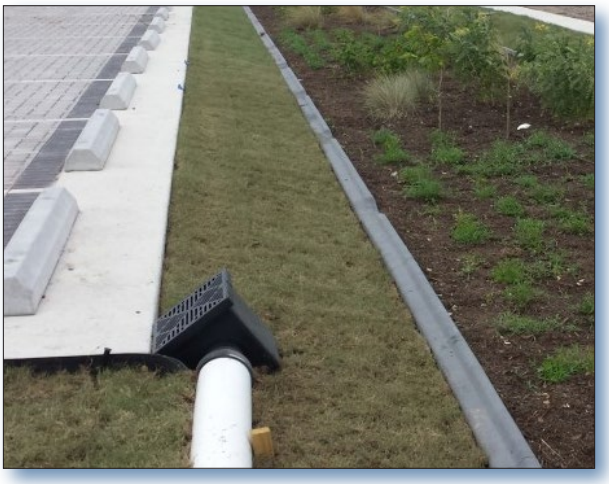

Figure 2. Finished bioswale at Cascade Park.

Brownsville, Texas, and conducting several nonpoint source education and outreach events. The main LID elements of Cascade Park were a retention constructed wetland, a pervious parking lot bordered by bioretention areas and pervious channels, a bioswale, and cisterns for rainwater collection (Figure 2).

TAMUK also performed several outreach campaigns to promote the importance of LID BMPs in the watershed. Highlights from this campaign include the creation of factsheets explaining the BMP design process, LID public service announcements, delivery of an annual LID workshop, and educational activities conducted with local elementary and middle school students. The importance of managing nonpoint source pollution and LID practices in the watershed was highlighted in a media campaign. The campaign promoted public participation in clean-up events, tree plantings near waterways, and a watershed-wide classroom competition for the design of a nonpoint source pollution awareness mascot. Using CWA section 319(h) funds, TCEQ continues to fund implementation projects and the development of other watershed protection plans in the LLMBSC Watershed.

In 2013, Brownsville Public Utility Board began construction on the Colonias Improvement Project. The project focused on the lack of a proper sewer collection system for residents of the Colonia areas southeast of Brownsville. Many of the on-site wastewater disposal systems in use were installed prior to Cameron County's adoption of septic system design and installation standards. These systems contributed bacteria and nutrients to the waterways, particularly during wet weather. Brownsville Public Utility Board was awarded grants by the Texas Water Development Board to create sewer system infrastructure and connect homes in the Colonia areas to the city sewer system. By the end of 2016, approximately 2,200 residents were connected for the first time to the public sewer collection system, and 474 septic tanks were decommissioned. These efforts reduced health risks to residents and eliminated a source of bacteria caused by failing septic systems. The project resulted in an estimated 175,720 gallons per day of wastewater collected and properly treated.

Results

In the 2010–2016 Integrated Reports, the geometric mean concentration of Enterococci samples from the Brownsville Ship Channel was above the criterion of 35 cfu/100 mL. During 2011–2017, targeted implementation activities in the watershed helped to reduce polluted runoff to the Brownsville Ship Channel. Data collected in 2017 and 2018 allowed the AU to be reassessed in the 2020 Integrated Report. New data were collected after implementation actions were in place. In the 2020 Integrated Report, the geometric mean concentration of Enterococci samples from the Brownsville Ship Channel was 7.68 cfu/100 mL; as a result, it was delisted from the Texas 303(d) List. As more BMPs in the watershed protection plan are implemented, a continued improvement of bacteria levels in the waterbody is expected.

Partners and Funding

Watershed partners have spent approximately $1,563,920 on watershed characterization, education and outreach efforts, and implementing BMPs, which included combining $938,353 in federal CWA section 319(h) funds with $625,567 matched by local entities. Watershed partners included TAMUK, the Lower Rio Grande Valley Stormwater Task Force, Cameron County Drainage District No. 1, the Valley Proud Environmental Council, the Institute for Sustainable Energy and the Environment, and the Arroyo Colorado Watershed Partnership. Brownsville Public Utility Board received approximately $29,174,560 from various grant and loan programs to complete the Colonias Improvement Project.

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