NONPOINT SOURCE SUCCESS STORY

Texas

Urban and Rural Nonpoint Source Best Management Practices Improve Water Quality in the Upper San Antonio River

Waterbody Improved

The Upper San Antonio River was listed as not meeting the contact recreation use in the 1992 Texas Water Quality Inventory and Clean Water Act (CWA) section 303(d) list (1992 Integrated Report [IR]). Multiple state and federal agencies have worked with local stakeholders to improve water quality in the Upper San Antonio River, including the Texas Commission on Environmental Quality (TCEQ), the Texas State Soil and Water Conservation Board (TSSWCB), and the U.S. Department of Agriculture Natural Resources Conservation Service. The development and implementation of a watershed protection plan (WPP), urban and agricultural best management practices (BMPs), and local stakeholder engagement has helped reduce the concentration of bacteria in the Upper San Antonio River. Based on instream water quality data, AU 1911_02 now meets the bacterial water quality standard and was delisted in the 2016 IR.

Problem

The Upper San Antonio River (Segment 1911) is divided into nine assessment units. AU 1911_02 is southeast of the city of San Antonio in Wilson County (Figure 1). While this AU is downstream of a major city, the surrounding land is primarily pasture and cultivated crops.

The Upper San Antonio River was listed as impaired for elevated fecal coliform in the 1992 IR. Beginning with the 2002 IR, the TCEQ transitioned from performing water body assessments using fecal coliform to using the indicator bacteria *Escherichia coli (E. coli)*. The water quality standard for primary contact recreation in surface waters states that the geometric mean concentration of bacteria should not exceed 126 colony-forming units (cfu)/100 milliliters (mL) of water. When first listed for *E. coli* in the 2006 IR, AU 1911_02 had a geometric mean of 184 cfu/100 mL.

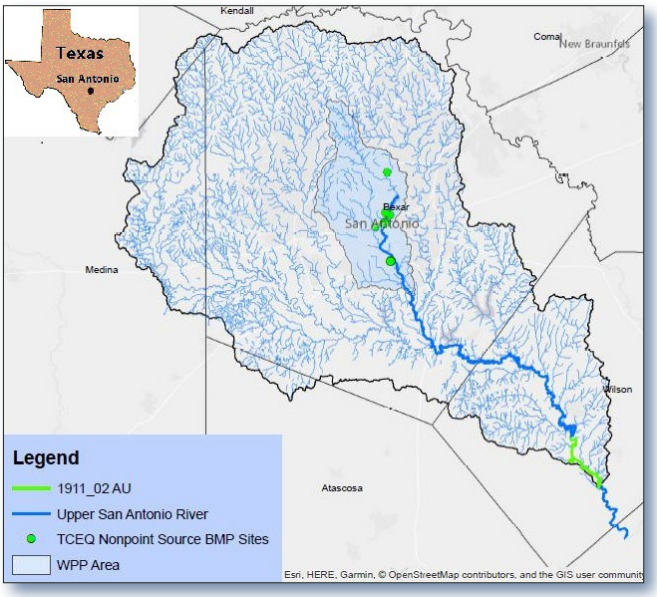

Figure 1. The Upper San Antonio River watershed is in south-central Texas.

Story Highlights

With funding from the U.S. Environmental Protection Agency (EPA) and the TCEQ, the San Antonio River Authority completed a WPP in 2006, updated the WPP (accepted by EPA in 2015), and implemented two projects from 2006 through 2018. The WPP analyses indicated that a 30 percent reduction in bacteria loading from stormwater sources was needed across the watershed. As a result, subsequent implementation projects targeted urban and rural nonpoint sources, prioritizing low impact development (LID) and education and outreach to citizens for implementation.

The TCEQ also partnered with the Texas A&M Agrilife Research outreach program "Healthy Lawns Healthy Waters" to educate homeowners about rainwater management and lawn and landscaping practices through presentations, education materials, and providing free soil analysis.

An early example of WPP implementation dates to 2008 when CWA section 319(h) funds paid for power washers to be used on the San Antonio River Walk. This practice diverts runoff that would otherwise run directly into the San Antonio River through sanitary sewers.

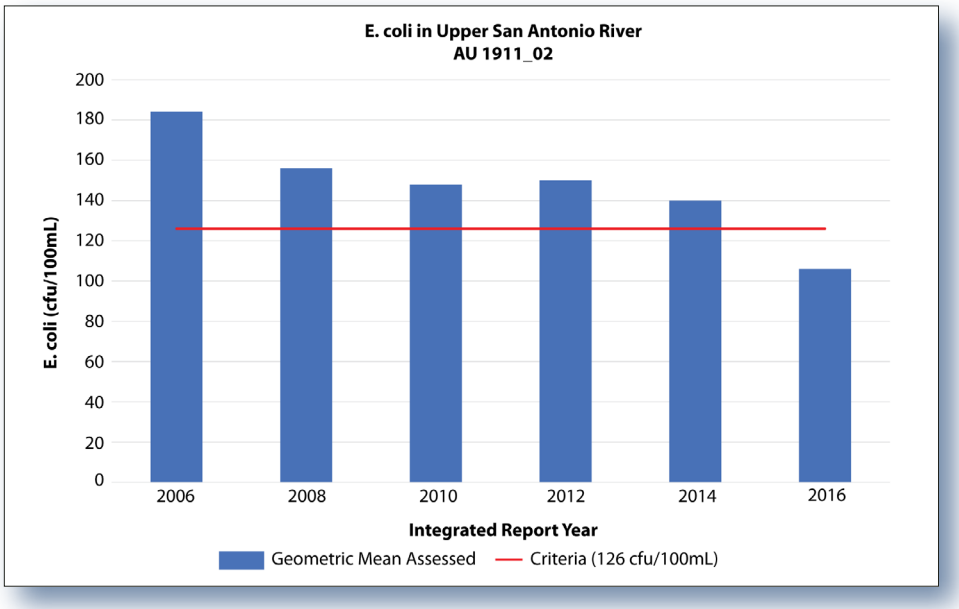

Figure 2. *E. coli* levels have declined in the Upper San Antonio River.

An example of education and outreach to citizens can be found in the highly visible BMP implementation at the San Antonio Mission Public Library. The library's proximity to the San Antonio River made it an ideal location to demonstrate LID features to the public and educate developers. The constructed features include surface retention and infiltration structures, bioswales, stormwater roof collection systems and rain gardens. Construction was completed in spring 2012; monitoring results before and after installation demonstrate a reduction in the amount of stormwater runoff and pollutants leaving the site and entering the Upper San Antonio River.

Since 2007, the TSSWCB has partnered with the Karnes County and Wilson County soil and water conservation districts (SWCDs) and local landowners to implement BMPs on grazing land. Twelve water quality management plans (WQMPs) have been developed and certified in the watershed, covering 1,706 acres of grazing land. Implemented management practices include prescribed grazing, range planting, alternative watering facilities, and forage and biomass planting. The TSSWCB and SWCDs provide technical assistance to landowners in the watershed.

Results

Texas assesses bacteria in freshwaters for the IR by comparing the geometric mean concentration of *E. coli* samples collected during the assessment period (typically a 7-year period of record) against the water quality standard. The geometric mean concentration of *E. coli* in the Upper San Antonio River AU 1911_02 decreased from 184 cfu/100mL to 106 cfu/100mL in the 10 years between the 2006 IR and the 2016 IR. A net decrease in bacteria concentrations in the Upper San Antonio River have been observed since implementation activities began (Figure 2). As BMPs recommended in the WPP continue to be implemented and have more time to become established, a greater decrease in bacteria throughout the waterbody is expected.

Partners and Funding

Since 2007, watershed partners have spent approximately $1,854,913 on water quality improvements and education and outreach efforts, combining $1,112,948 in federal CWA section 319(h) funds with $741,965 matched by local entities such as the City of San Antonio, the San Antonio River Authority, and Karnes County and Wilson County SWCDs. TCEQ and TSSWCB continue to fund implementation projects in the Upper San Antonio River watershed.

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