



NONPOINT SOURCE SUCCESS STORY

Texas

Slowing, Detaining and Filtering Stormwater Reduces Bacteria Loads in the North Concho River

Waterbody Improved

High levels of bacteria, nutrients and low dissolved oxygen prompted the Texas Commission on Environmental Quality (TCEQ) to add the North Concho River to the state's list of impairments and concerns in 2008. As early as 1994, the city of San Angelo (the city) and the Upper Colorado River Authority (UCRA) began implementing best management practices (BMPs) to slow, detain and filter stormwater entering the river. The city also conducted nonpoint source (NPS) education and outreach efforts. Beginning in 2007 to comply with new permit requirements, the city partnered with UCRA to develop a stormwater management plan (SWMP). A watershed protection plan (WPP) was also developed in 2008. As a result, water quality in the North Concho River (assessment unit [AU] 1421_08) has improved, and TCEQ proposed in 2016 to remove the bacteria impairment from the list of impaired waters.

Problem

The North Concho River is 88 miles long, with a northwest-to-southeast flow. It flows from Glasscock County into O.C. Fisher Lake and then through the city to the confluence of the South Concho River near Bell Street. AU 1421_08 of the North Concho River is about 6.5 miles long and flows through the city (Figure 1).

Land use in the North Concho River watershed includes rangeland for livestock grazing, farming and crop irrigation, concentrated animal feeding operations, extensive rural subdivision development, and residential, commercial, and industrial development in and around the city. In 2017, the estimated population of San Angelo was 100,000.

The designated beneficial use for AU 1421_08 is primary contact recreation (PCR). To meet the Texas PCR water quality standard, *Escherichia coli* levels cannot exceed a geometric mean of 126 colony-forming units per 100 milliliters (cfu/100 mL) of water. AU 1421_08 was found to have geometric means that exceeded the standard for PCR. As a result, the TCEQ included AU 1421_08 on the 2008 list of impaired waters. This segment was listed as impaired for macrobenthos, and concerns were noted for low dissolved oxygen, elevated nutrients, total dissolved solids, and excessive algal growth on the 2002 list of impaired waters.

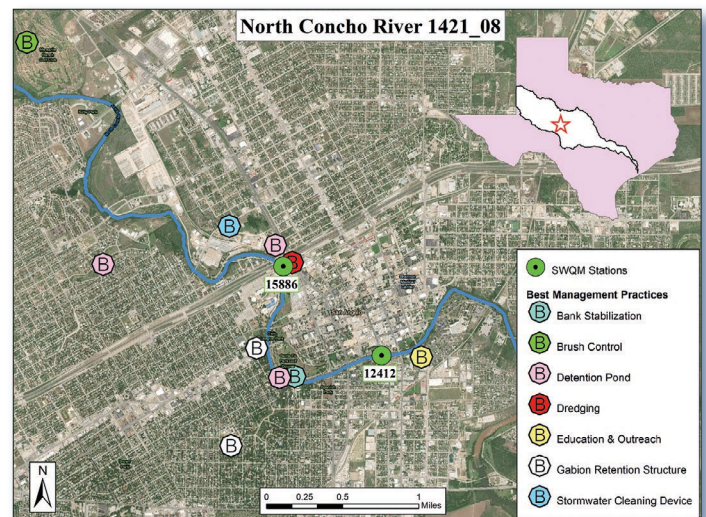


Figure 1. Map of BMP locations in San Angelo, Texas

Story Highlights

Many parties collaborated to implement BMPs and conduct watershed planning and education and outreach in the North Concho River watershed. Much of the work was completed either before the city's municipal separate storm sewer system (MS4) permit was issued in 2008 or was above and beyond permit requirements after 2008. A Clean Water Act (CWA) section 319(h)-funded project was initiated in 1994 between the city, UCRA, and TCEQ to restore

the North Concho River by constructing BMPs that slowed and filtered stormwater before it discharged to the North Concho River. In 1998, gabion retention structures designed to reduce stormwater runoff were constructed at San Angelo's Civic League Park and Santa Rita Park. These were the first of many structural BMPs built using CWA section 319(h) funding to reduce urban runoff and pollutant loading to the North Concho River.

A wet retention pond at Brentwood Park and a dry detention pond near 11th Street were constructed in 2001 and 2003, respectively. Monitoring has demonstrated that the Brentwood Park retention pond can remove 99 percent of total suspended solids, 85 percent of the biochemical oxygen demand and 98 percent of fecal coliform from stormwater. A gravity-based stormwater cleaning device was also installed downtown in 2007. After stormwater is gravity-separated and filtered by this device, effluent from the system is discharged into the river or pumped into nearby "living laboratory" demonstration ponds that are part of the expanded public education effort.

The city encourages homeowners to adopt rainwater harvesting (RWH) practices to conserve water and reduce stormwater runoff that contributes bacteria to waterbodies. The watershed has four RWH systems on city buildings and at least four RWH systems on various private commercial buildings. The city does not track the number of residential RWH systems, but a conservative estimate is in the hundreds.

The city conducts weekly trash pick-ups at many of their parks. The city started an Adopt-A-Spot-Program in 1998. Groups, clubs, families or individuals can choose to maintain different property locations. In 2017, the program had 51 spots adopted by 78 volunteers. The city maintains pet waste stations at parks along the river to encourage the public to dispose of pet waste properly.

In 2008 the North Concho River WPP was developed by the UCRA, with funding from the Texas State Soil and Water Conservation Board (TSSWCB) via the U.S. Environmental Protection Agency. The WPP evaluated and assessed potential sources of NPS pollution and identified control strategies. The city developed a stormwater management plan for its MS4 in 2008 with guidance from the UCRA. This led to an education and outreach campaign to provide the public and private

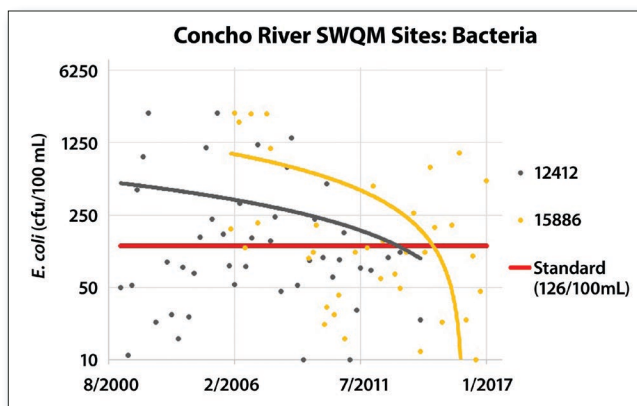


Figure 2. Bacteria levels have dropped in the North Concho River.

sectors with information on reducing NPS pollution from their commercial and residential property in the most vital areas.

Results

The TCEQ originally listed AU 1421_08 on the 2008 list of impaired waters because of high bacteria levels at TCEQ water quality monitoring stations 12412 and 15886. Water quality data indicate that concentrations of *E. coli* have decreased in the North Concho River. The bacteria levels have been improving at stations 12412 and 15886 (Figure 2). During the 2016 assessment, the *E. coli* geomean for AU 1421_08 was below the 126 cfu/100 mL PCR use standard, resulting in the waterbody's proposed removal from the impaired waters list.

Partners and Funding

Watershed partners have spent approximately \$3,928,263 on water quality improvements in the North Concho River, combining \$2,358,958 in CWA section 319(h) funds with \$1,569,305 matched by local efforts. Of these combined funds, the TCEQ granted \$1,983,718 with \$1,322,478 from local match, for a total of \$3,306,196. The TSSWCB provided \$375,240 with \$246,827 from local match, for a total of \$622,067. Private funding for NPS water quality improvements on the North Concho River included a contribution of \$260,000 in 1997 from a private benefactor. The city of San Angelo also collects a half-cent sales tax implemented in 1999, which helped fund this project.



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