Texas Commission on Environmental Quality
Total Maximum Daily Load Program
GI-500

Improving Water Quality in Petronila Creek

A Project to Protect General Uses

In 2000, water quality testing found elevated levels of chloride, sulfate, and total dissolved solids (TDS) in Petronila Creek. High concentrations of chloride can cause a bad taste in drinking water, harm plumbing, and increase the risk of hypertension in humans. High concentrations of sulfate can cause drinking water to smell or taste bad. Large amounts of dissolved solids can be toxic to species that live in fresh water.

In response to these conditions, TCEQ developed total maximum daily loads (TMDLs) to restore water quality in the creek. A TMDL determines 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 categories of sources within the watershed. Stakeholders developed an Implementation Plan (I-Plan) to implement TMDLs with measures that reduce pollution.

A variety of man-made and natural sources can result in elevated levels of chloride, sulfate, and TDS. For example, a common man-made source of dissolved solids is brine, a by-product of oil production.

Learn more about water quality standards, monitoring, and TMDLs by reading Preserving and Improving Water Quality[1], available on our website or in print.

Petronila Creek Watershed

Petronila Creek, Segment 2204, is a 44-mile freshwater stream. Located southwest of Corpus Christi, Segment 2204 flows from a point near the Laureles Ranch in Kleberg County to its confluence with Agua Dulce and Banquete creeks in Nueces County. This segment is a part of the Baffin Bay watershed.

The surrounding terrain varies from flat with local shallow depressions to some locally dissected rolling areas.

Project Development

TCEQ signed a contract with EA Engineering, Science, and Technology to study the creek, coordinate public involvement, and to develop TMDLs. EA Engineering collected additional data under a range of stream flow conditions, including wet weather, and accounted for direct discharges from point sources (such as wastewater treatment plants) and runoff from nonpoint sources (such as agricultural operations, land-clearing activities, abandoned oil and gas wells, and carbonate dissolution).

In June 2004, the Bureau of Economic Geology (BEG) surveyed electromagnetic conductivity in and around the creek. Their survey supported the groundwater component of models used to develop the TMDLs.

The Railroad Commission of Texas investigated oil field-related salinity contamination and prepared a Soil Feasibility Study. This study recommended excavation of contaminated soils from two of the highest priority areas and the placement of a surface cap in a third area.

The Railroad Commission also eliminated potential sources of salinity by plugging orphaned or abandoned unplugged wells. This work will continue as funding becomes available.

The Nueces River Authority (NRA) is monitoring the main stem of the creek and several tributaries to aid with I-Plan efforts by identifying localized sources and tracking trends in concentrations of chloride, sulfate, and TDS.

[1] https://www.tceq.texas.gov/publications/gi/gi-351

Public Participation

Stakeholder participation is crucial to developing workable TMDLs and implementation plans. It is also critical to sustaining planned activities over several years.

Stakeholders from a variety of sectors—including local governments, oil and gas operations, agriculture, public interest groups, and landowners—were invited to participate. A named-member stakeholder group advised TCEQ on development of the TMDLs.

NRA worked with stakeholders in 2013 and 2014 to evaluate to complete a revised I-Plan to continue their efforts in improving local water quality.

For More Information

Contact the project manager, or visit our webpage at:

www.tceq.texas.gov/waterquality/tmdl/nav/32-petronila

TCEQ Project Manager
Jazmyn Milford, TMDL Program
512-239-1524
Jazmyn.Milford@tceq.texas.gov

TMDL Status

TCEQ Adoption: January 10, 2007
EPA Region 6 Approval: March 14, 2007

I-Plan Status

TCEQ Approval: October 10, 2007
Revised: 2014

Highlights

- Implementation activities performed in the Petronila Creek watershed include investigating solutions to contaminated soils and plugging abandoned oil wells.
- In addition to quarterly routine monitoring, NRA conducts targeted monitoring on tributaries of Petronila Creek.
- In 2014, the stakeholders completed a revised I-Plan.
- Beginning in 2016, NRA has been producing annual trend analyses of chloride, sulfate, and TDS concentrations. The most recent trend report is available on the project webpage.