



Bacterial Monitoring for the Buck Creek Watershed

**Texas State Soil and Water Conservation Board
Texas Commission on Environmental Quality
Childress, Donley, and Collingsworth SWCDs
Texas Agricultural Experiment Station
Texas Cooperative Extension
Texas Water Resources Institute**

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Clean Water Act

1. Established to ensure integrity of surface water in the U.S.
 2. Creates two enforcement tools for the EPA
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National Pollution Discharge Elimination System (NPDES) permits

- Permits control discharges from point sources of contaminants
- EPA can shut down noncompliant operations or change permits through renewal process

Total Maximum Daily Loading (TMDL) limits

- Establishes maximum allowable loading for a particular contaminant in a body of water
- Works with all point and nonpoint-sources to ensure that TMDL is not exceeded



The TMDL Program

- ✱ **Authorized by and created to fulfill the requirements of Section 303(d) of the federal Clean Water Act**
- ✱ **Objective: to restore and maintain beneficial uses of impaired or threatened water bodies in Texas**
- ✱ **Goal: reduce indicator bacteria to acceptable risk levels for recreational exposure**

What is point source and nonpoint source pollution?

- ✦ **Point source pollution is pollution with a clearly definable point of discharge. The outflow of a factory's smokestacks is an example.**
- ✦ **Pollution without an obvious single point of discharge with large areas involved is considered nonpoint source pollution. Surface runoff of a common herbicide is an example.**

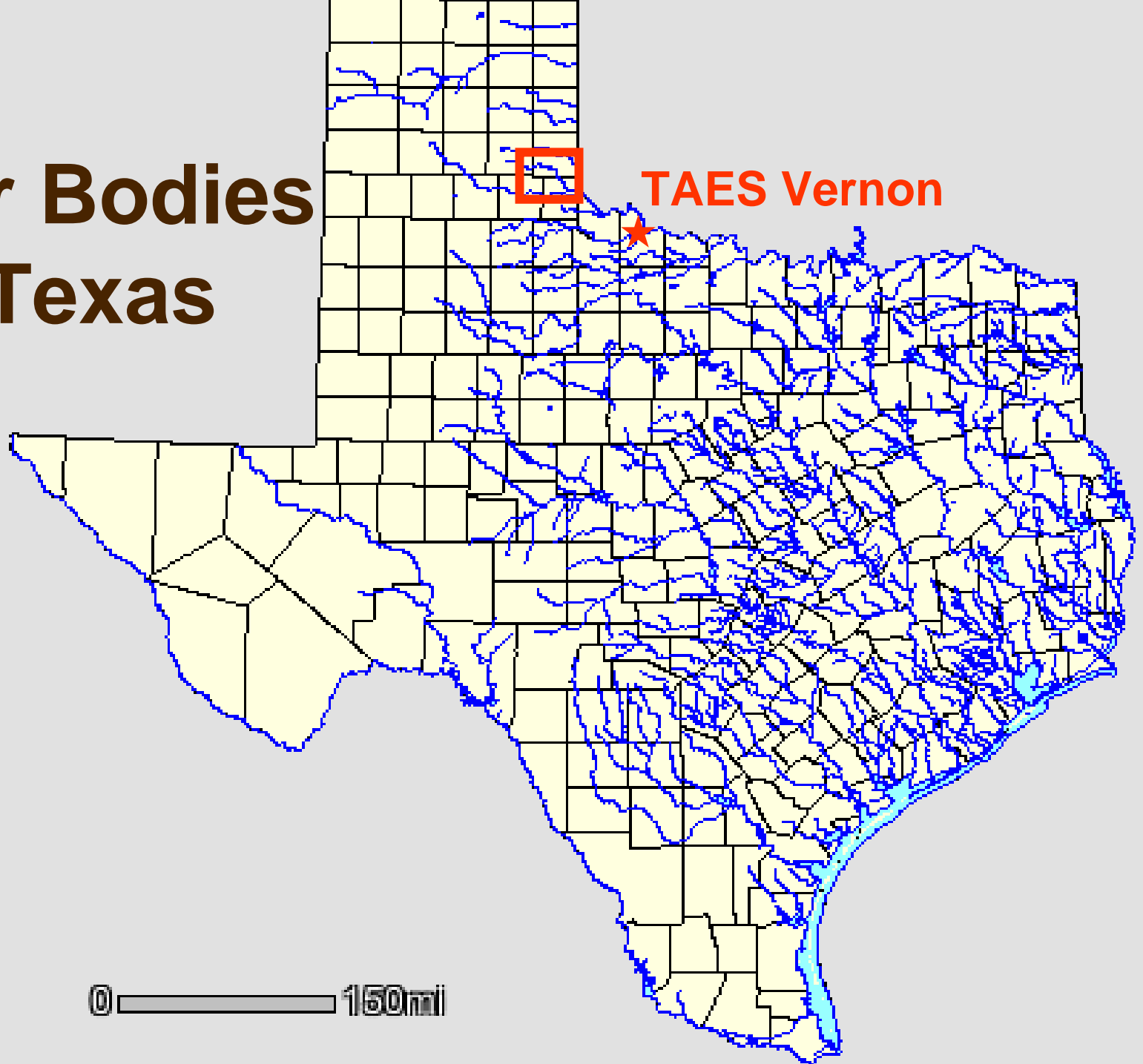
Texas Commission on Environmental Quality (TCEQ) – Clean Rivers Program

-  **In 1991, CRP was implemented to maintain and improve the quality of surface water resources within each river basin in Texas.**
-  **CRP requires that water quality assessments be conducted for each river basin in Texas using an approach that integrates water quality issues within a river basin or watershed.**

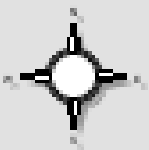
Texas State Soil and Water Conservation Board

- ✦ **Lead agency for the State of Texas in abating agricultural/silvicultural NPS pollution**
- ✦ **Works closely with Soil Water and Conservation Districts and other agencies (Texas Water Resources Institute, Texas Agric. Exp. Station, Texas Cooperative Extension)**

Water Bodies in Texas



TAES Vernon



0 150mi

Description of Buck Creek

Part of the Red River Basin

- ◆ 29 classified segments
- ◆ 11 major reservoirs
- ◆ 145,169 acres

Located within the subwatershed of the Lower Prairie Dog Fork of the Red River

Unclassified Freshwater Stream

289 miles² watershed

- ◆ Extends 50 miles, from OK state line NE of Childress to W of Wellington

Predominantly rural agricultural landscape: no point sources

Used for

- ◆ Aquatic life
- ◆ Contact recreation
- ◆ Fish consumption

Texas Surface Water Standards

- ✱ Single sample for E. coli should not exceed > 394 colonies / 100 ml
- ✱ Geometric mean for E. coli should not exceed > 126 colonies / 100 ml
- ✱ Single sample for fecal coliform should not exceed > 400 colonies / 100 ml
- ✱ Geometric mean for fecal coliform should not exceed > 200 colonies / 100 ml
- ✱ Exceedance levels of > 25% warrant listing as impairments

2002 Assessment Data for Buck Creek

Samples taken from 1 site over a five-year period for TCEQ by Red River Authority, as part of the Clean Rivers Program

<u>Assessment Method</u>	<u># of samples</u>	<u># of exceedances</u>	<u>Geometric mean</u>
E. coli single sample	14	3	
E. coli geometric mean	14		156
Fecal coliform single sample	20	8	
Fecal coliform geometric mean	20		240

2002 Assessment Data for Buck Creek


- ✱ 21% of single E. coli samples have exceeded 394 colonies / 100 ml
- ✱ The geometric mean of E. coli exceeds 126 colonies / 100 ml by 24%
- ✱ 40% of single fecal coliform samples have exceeded 400 colonies / 100 ml
- ✱ The geometric mean of fecal coliform exceeds 200 colonies / 100 ml by 20%

Conclusions made by TCEQ


- ✱ **The state of Texas requires that water quality in Buck Creek be suitable for fishing, swimming, wading, and a healthy aquatic ecosystem.**
- ✱ **Water quality testing found that bacteria levels are sometimes elevated in the creek. Bacteria from human and animal waste may indicate the presence of disease-causing microorganisms that pose a threat to public health.**
- ✱ **People swimming or wading in the creek may be at risk.**

Texas State Soil and Water Conservation Board

- ◆ Felt current data were not sufficient to provide conclusive evidence of a persistent impairment; rather, it suggests a temporal recurring phenomenon
- ◆ Recommended encouragement of public participation, establishment of targeted monitoring, and an educational outreach program

 **In response to these conditions, a TMDL project was being initiated to restore support of recreational uses in the water body.**

- The goal is to determine the load of a pollutant that a body of water can receive and still maintain its beneficial uses.
- The load is then allocated among all the potential sources of pollution within the watershed, and measures to reduce pollutant loads are developed as necessary.

 **Pollution control measures which target agricultural practices would likely reduce ambient levels of bacteria to a point where water quality is compliant with existing standards.**

Proposed Buck Creek Sample Sites



Buck Creek Water Quality Sampling / Assessment Project

Phase 1

- Develop Data Quality Objectives and a Quality Assurance Project Plan
- Monitor water quality as related to bacterial nonpoint source pollution in Buck Creek by in-stream sampling
- Report findings

Phase 2

- If Phase 1 determines need for a TMDL, appropriate follow-up will be planned and implemented
- Bacterial source tracking efforts will be involved and advisory to Phase 1 efforts to facilitate TMDL definitions and guidance if needed

Role of TAES and TCE

TAES

- ◆ Collect samples
- ◆ Compile and analyze data
- ◆ Attend quarterly meetings
- ◆ Prepare electronic quarterly reports
- ◆ Develop final report

TCE

- ◆ Provide leadership for educational programs on water pollution and this study
- ◆ Attend quarterly meetings
- ◆ Disseminate information in quarterly reports
- ◆ Develop final report

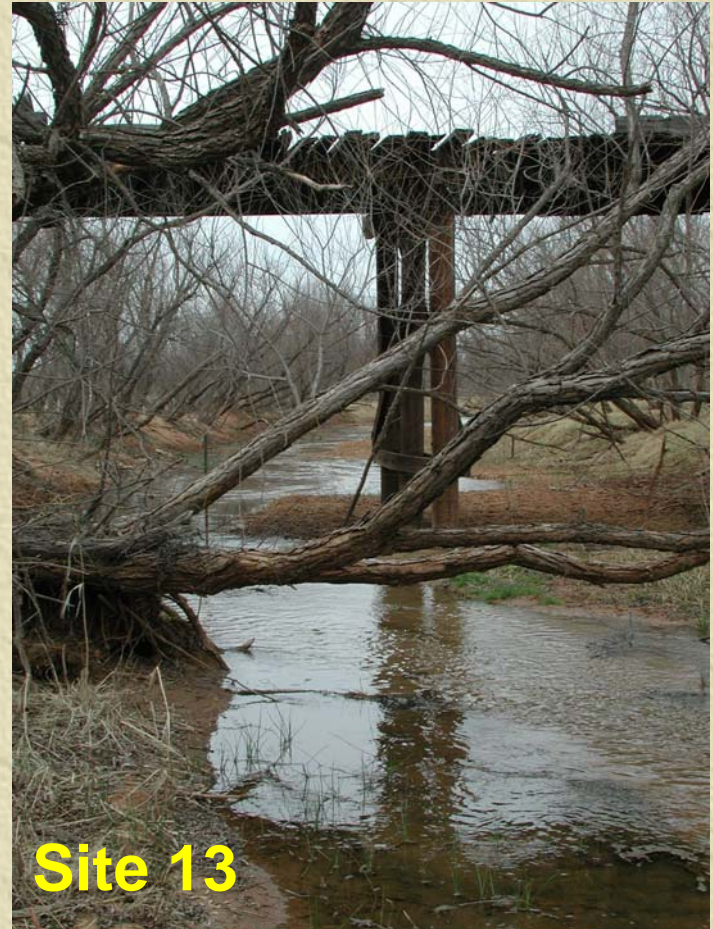
Measures of Success

- ✱ **Water quality monitored throughout Buck Creek Watershed**
- ✱ **Qualify or disqualify the need for further TMDL action within the watershed**
- ✱ **Inform landowners and stakeholders of ongoing assessment activities**

Buck Creek Watershed



Site 1



Site 13

Summary

Federal Clean Water Act – 1977 (EPA)

◆ **State Clean Rivers Act – 1991 (TCEQ)**

- **Texas Surface Water Standards**
 - ◆ **2002 Buck Creek Assessment Data**
 - ◆ **Conclusions made by TCEQ**

◆ **State TMDL Program**

◆ **State Agricultural/Silvicultural NPS Management Program - 2000 (TSSWCB)**

- **Proposed Buck Creek Water Quality
Sampling/Assessment Project (TAES, TCE)**

Significant Federal Environmental Legislation

<u>Federal Regulation</u>	<u>Year</u>	<u>Description</u>
Federal Water Pollution Control Act - Clean Water Act (CWA)	1948 - Amended 1977	Controls discharge into navigable waters; provides NPDES permits and TMDLs; primary authority for water pollution programs
National Environmental Policy Act (NEPA)	1970	Provides national policy to try to prevent or reduce damage to the environment; forces federal agencies to assess potential environmental impacts of major programs, including federally funded local programs and research
Safe Drinking Water Act (SDWA)	1974	Regulates drinking water quality in public water systems; provides MCLs as water quality standards