



# Water Quality Improvement Through Implementation of a Watershed Protection Plan in the Leon River Watershed

HGAC Clean Waters Initiative  
Houston, Texas  
September 26, 2017



# Agency Role

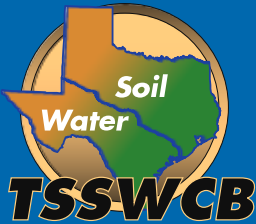
## **Water Quality Mandate - Texas Agriculture Code §201.026**

Texas State Soil and Water Conservation Board (TSSWCB) is the lead agency in Texas responsible for planning, implementing and managing programs and practices for abating agricultural and silvicultural nonpoint source water pollution.



# Agency Role

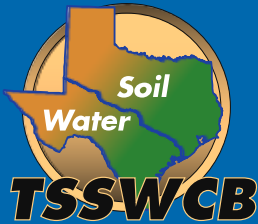
- Provide technical and financial assistance to local soil and water conservation districts
  - *Local districts encourage landowners and agricultural producers to voluntarily conserve natural resources on their private lands through the implementation of best management practices*
- Results in a positive impact on state water resources, and protects soil quality which supports the strength of Texas' agricultural economy



# How this gets done

TSSWCB administers several programs to achieve conservation goals across the state, they include:

- **Water Quality Management Plan Program**
- **Texas Nonpoint Source Management Program**
- Water Supply Enhancement Program (Brush control)
- Carrizo Cane
- Flood Control Program



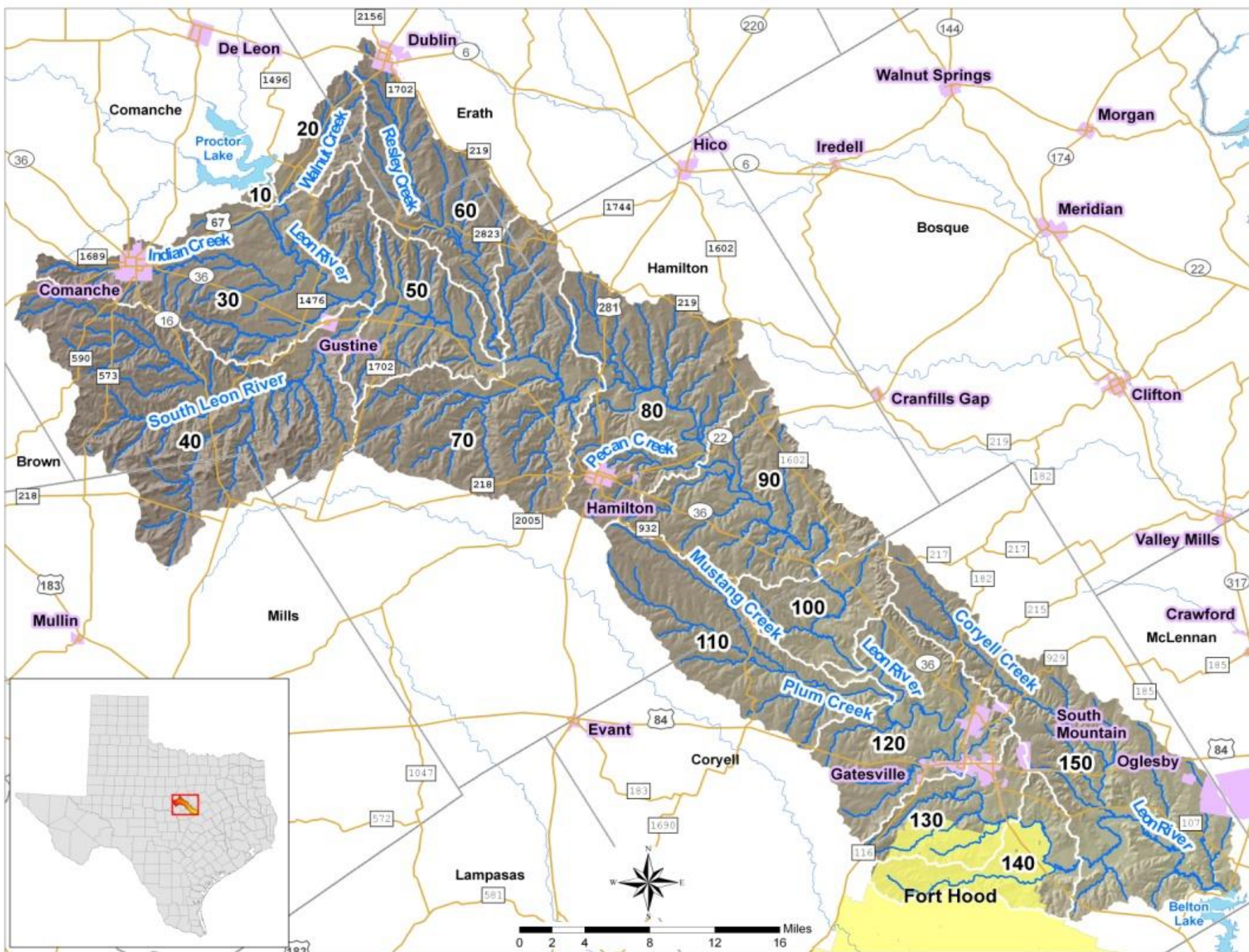
# How this gets done

## Texas Nonpoint Source Management Program

- Nonpoint Source Grants
- Watershed Protection Plan Program
- Planning and Implementation

## Water Quality Management Plan Program

- Implementation (State or Federal Funding)
- Regional Offices
- SWCDs
- NRCS





# Problem

The 1,375-square-mile Leon River watershed in central Texas is bounded by Proctor Lake upstream and Belton Lake downstream. The Leon River is 190 miles long, and drains portions of Comanche, Erath, Hamilton, and Coryell counties. The watershed is largely rural, with most of the land suited for grazing by cattle and goats; a few animal feeding operations are also present.



# Problem

Water quality data collected in the Leon River from 1990 to 1995 showed that fecal coliform levels exceeded the bacteria water quality standard for contact recreation. As a result, TCEQ added the river to the 1996 CWA section 303(d) list of impaired waters for not supporting its primary contact recreation use.





# Problem

In 2000, the bacteria water quality standard changed to an *Escherichia coli*-based bacteria standard. The new standard requires that *E. coli* levels not exceed a geometric mean of 126 colony-forming units (cfu) per 100 milliliters (100 mL) of water. Data collected from 1998 to 2005 showed that the geometric mean for *E. coli* exceeded the contact recreation standard in Pecan Creek, a tributary of the Leon River. As a result, TCEQ added Pecan Creek to the 2006 CWA section 303(d) list of impaired waters for not supporting its primary contact recreation use.



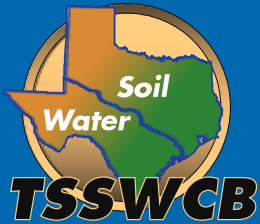
# Developing the WPP

- Leon River Stakeholders expressed interest in taking an active role in addressing the bacteria impairment, so decided on developing a WPP
- TSSWCB provided a CWA Section 319 funding to Brazos River Authority to develop a WPP for the Leon River
- The stakeholder group was made up of County and City representatives, Agriculture producers, wildlife interests, SWCDs, and the dairy industry



# **Watershed Protection Plan for the Leon River Below Proctor Lake and Above Belton Lake**

**January 2015**



# Implementing the WPP

## Management Measures in the WPP

- Wastewater Strategies (WWTFs, OSSFs, SSOs)
- Direct Deposition (Alternative Water for Livestock, Feral Hog Management, Deer Management)
- Grazing Land (WQMPs, USDA Farm Bill Programs)
- There were more measures, but these were the measures implemented once the planning process was completed



# WQMPs

- Site specific plans with a combination of BMPs for the treatment of identified resource concerns
  
- Based on:
  - Soil types
  - Planned land use/production goals
  - Known/potential water quality/natural resource problems
  - Other site specific factors (topo, etc.)



# WQMPs

- Cover the entire farm or ranch
- Specifically designed to achieve pollution prevention/abatement
- Texas Water Code §26.121

UNAUTHORIZED DISCHARGES PROHIBITED. (a) Except as authorized by the commission, no person may:

- (1) discharge sewage, municipal waste, recreational waste, **agricultural waste**, or industrial waste into or adjacent to any water in the state;
- (2) discharge other waste into or adjacent to any water in the state which in itself or in conjunction with any other discharge or activity causes, continues to cause, or will cause pollution of any of the water in the state, **unless the discharge complies with a person's:**
  - (A) **certified water quality management plan approved by the State Soil and Water Conservation Board**



# Results

- 26 WQMPs on 7,012 acres were written and implemented in Hamilton, Coryell, and Comanche Counties from 2008-12
- Additional Conservation Practices were implemented on 440,040 acres in the watershed, using USDA Farm Bill funding (EQIP and AWEPP)
- Prescribed grazing, alternative water sources, and grass and range planting were the top conservation practices



# Results

- The TSSWCB also partnered with Hamilton County and Texas A&M AgriLife Extension, beginning in 2011, and ten OSSFs were repaired or replaced on or near the Leon River in Hamilton County. Implementation continued after 2012, and additional counties in the watershed have received funding to address failing OSSFs.
- Cities and Counties throughout the watershed provided stormwater, feral hog and wildlife management outreach and education to stakeholders, from the start of the WPP process.





# Results

- Through these efforts, water quality is improving in the Leon River and its tributaries, and as a result, several assessment units have been removed from the 303(d) list in 2010, 2012, and 2014
- Leon River 121.83 cfu/100 mL for assessment data collected from 2003–2010; 101.82 cfu/100 mL in AU 1221\_01; 67.82 cfu/100mL in AU 1221\_04; 99.23 cfu/100mL in AU 1221\_05 for assessment data collected from 2005–2012



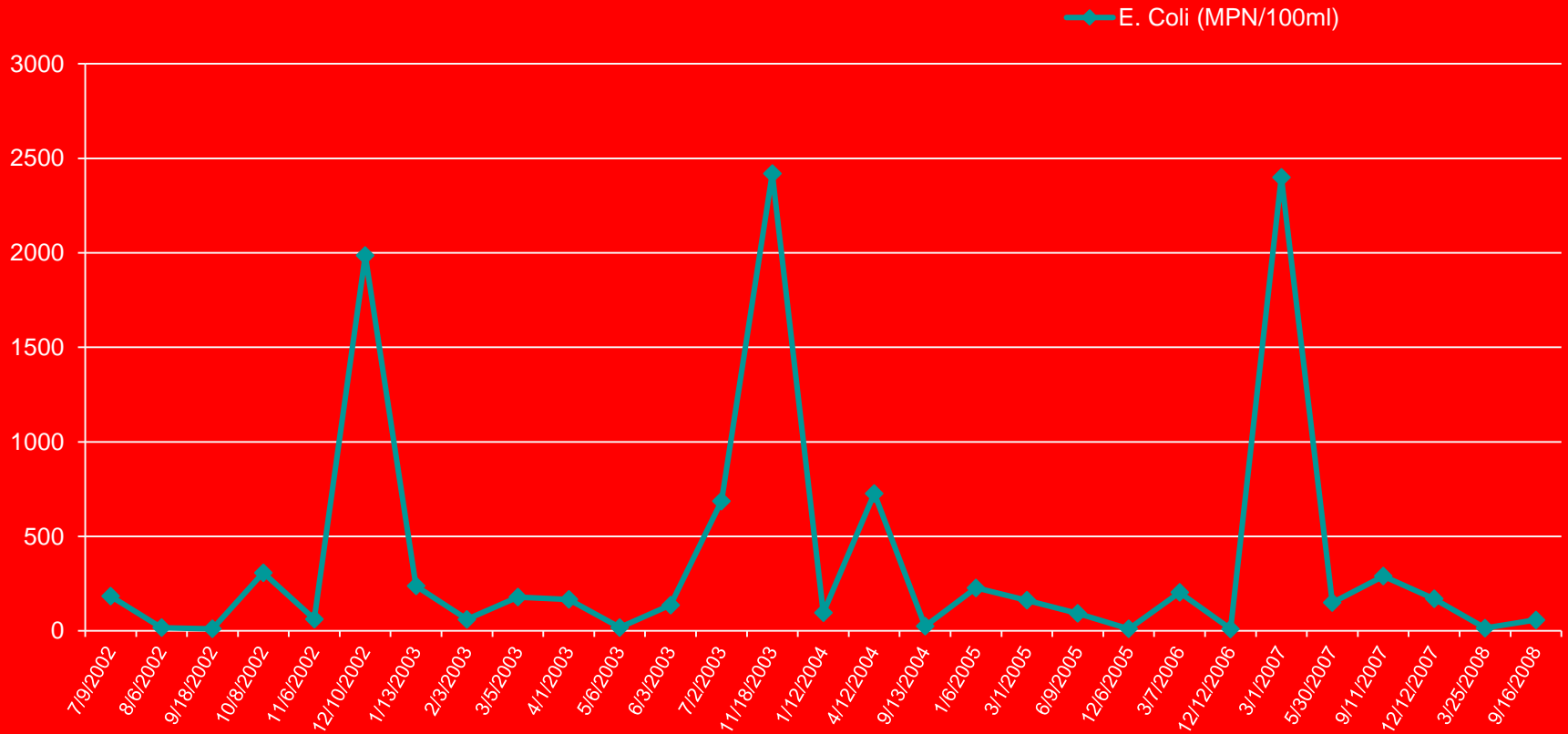
# Results

- Pecan Creek-123.81 cfu/100 mL for assessment data collected from 2001–2008
- South Leon River-116.93 cfu/100 mL for assessment data collected from 2005–2012
- Implementation continues in
- Review of assessment data collected from 2007-2014 suggests more river AUs and tributaries are now meeting the standard, and could be removed from the 2016 303(d) list



# Pecan Creek *E. coli* levels

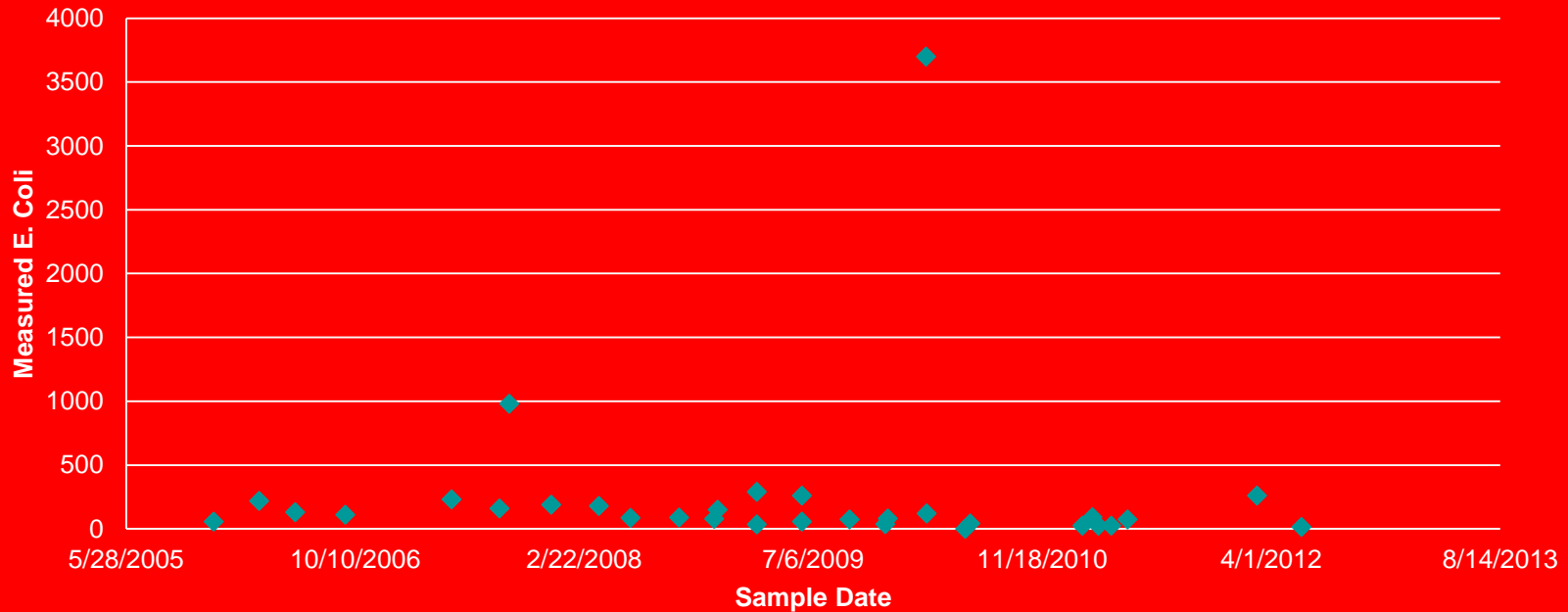
Pecan Creek *E. Coli* Levels

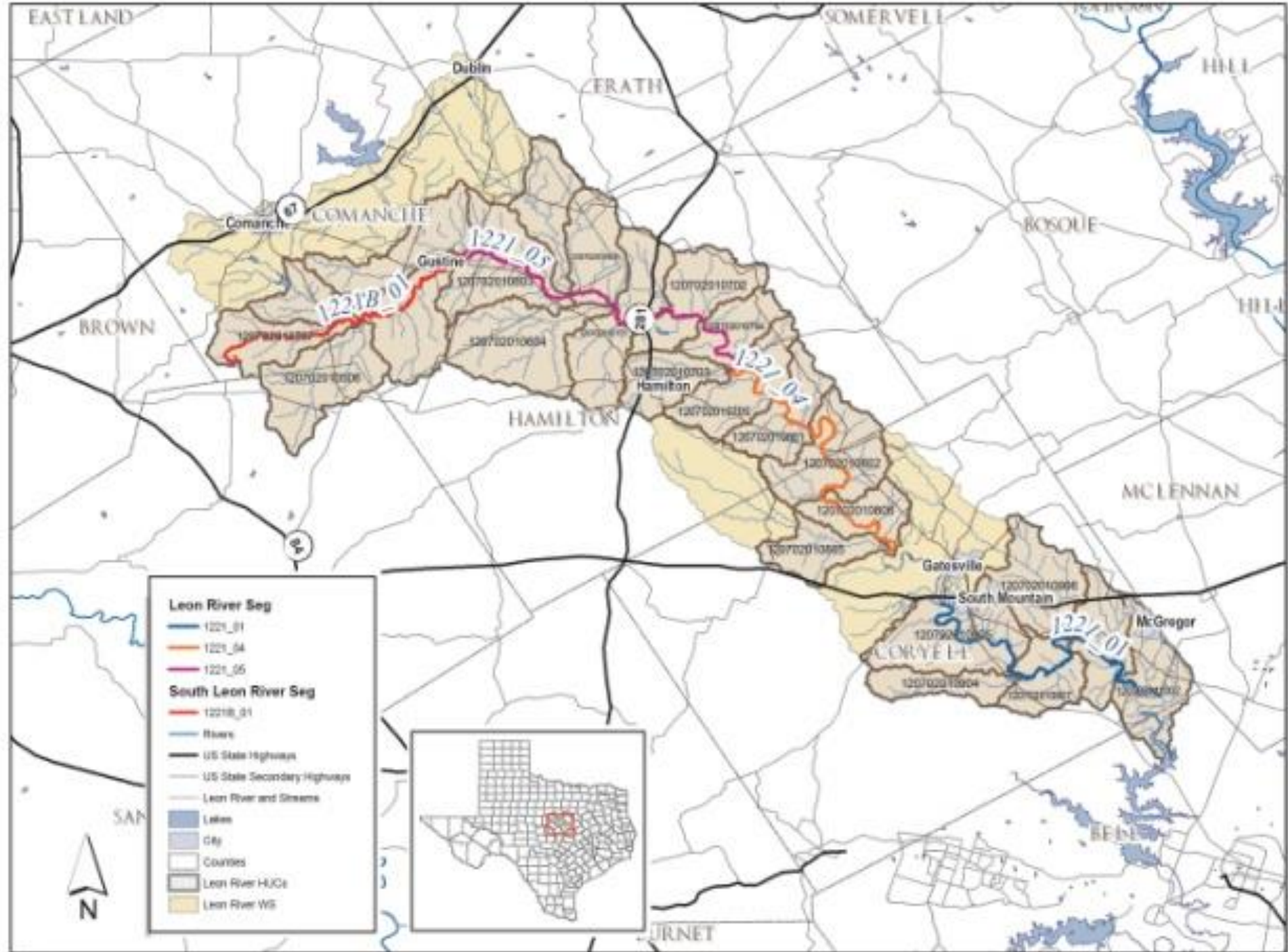




# South Leon River *E. coli* levels

## South Leon River E. Coli Levels





**Leon River Seg**

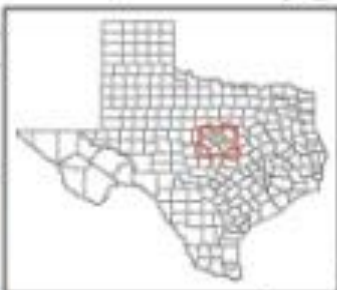
- 1221\_01
- 1221\_04
- 1221\_05

**South Leon River Seg**

- 1221B\_01

**Legend:**

- Rivers
- US State Highways
- US State Secondary Highways
- Leon River and Streams
- Lakes
- City
- Counties
- Leon River HUCs
- Leon River WS





# Partners and Funding

- Developing the WPP
  - \$433,550 in CWA 319 funding through TSSWCB, matched with \$353,680 from Brazos River Authority
- WQMPs and Conservation Practices
  - TSSWCB WQMP Program \$107,900
  - CWA 319 \$14,900
  - NRCS/Farm Bill through EQIP and AWEPP \$2,067,245



# Partners and Funding

## ➤ OSSFs

- \$60,000 CWA 319 through TSSWCB, matched with \$8,500 from Hamilton County and homeowners on OSSF repair and replacement

➤ Cities and Counties participated in outreach and education for stormwater, wastewater, feral hogs and other water quality issues



# Summary

The success can be attributed to increased stakeholder awareness due to the watershed planning process, repaired or replaced OSSFs, and conservation practices being implemented in the watershed. Water quality monitoring continues to track and measure interim progress to implement the Leon River WPP and ensure this restoration effort remains a success.





# Success Stories



## Section 319 NONPOINT SOURCE PROGRAM SUCCESS STORY

### Texas

### Implementing Conservation Practices and Conducting Watershed Outreach Improves Water Quality in the Upper Leon River and Pecan Creek

#### Waterbodies Improved

High levels of bacteria prompted the Texas Commission on Environmental Quality (TCEQ) to add the Leon River (in 1996) and Pecan Creek (in 2006) to the Clean Water Act (CWA) section 303(d) list of impaired waters for not supporting the primary contact recreation use. The Texas State Soil and Water Conservation Board (TSSWCB) provided CWA section 319 grant funding to develop a watershed protection plan (WPP) to address the bacteria impairments in the Leon River watershed. Stakeholders within the watershed voluntarily implemented best management practices (BMPs) and conducted public outreach and education. Through these efforts water quality was improved and Pecan Creek and a portion of the Leon River (below Proctor Lake) were removed from the state's list of impaired waters in 2010 and 2012, respectively.

#### Problem

The 1,375-square-mile Leon River watershed in central Texas is bounded by Proctor Lake upstream and Belton Lake downstream (Figure 1). The Leon River is 190 miles long, and drains portions of Comanche, Erath, Hamilton, and Coryell counties. The watershed is largely rural, with most of the land suited for grazing by cattle and goats; a few animal feeding operations are also present. Pecan Creek, a tributary of the Leon River, shares the land use features of the larger watershed.

Water quality data collected in the Leon River from 1990 to 1995 showed that fecal coliform levels exceeded the bacteria water quality standard for contact recreation. As a result, TCEQ added the river to the 1996 CWA section 303(d) list of impaired waters for not supporting its primary contact recreation use.

In 2000, the bacteria water quality standard changed to an *Escherichia coli*-based bacteria standard. The new standard requires that *E. coli* levels not exceed a geometric mean of 126 colony-forming units (cfu) per 100 milliliters (100 mL) of water.

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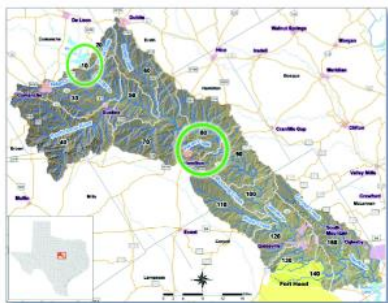


Figure 1. The Leon River watershed is in central Texas. Numbers represent subwatersheds within the Leon River watershed. Restored waters are within subwatersheds 10 and 80 (indicated by green circles).

#### Project Highlights

In September 2002, the TCEQ initiated a total maximum daily load (TMDL) study for the Leon River. Local stakeholders expressed interest in taking an active role in developing management strategies to reduce bacteria loadings in the watershed and sought to initiate the development of a WPP. The TSSWCB provided CWA section 319 funding to the Brazos River Authority (BRA) to facilitate the development of a WPP for the Leon River.



## NONPOINT SOURCE SUCCESS STORY

### Texas

### Addressing Agricultural and Residential Bacteria Sources Improves Water Quality in the Leon and South Leon Rivers

#### Waterbodies Improved

High levels of bacteria prompted the Texas Commission on Environmental Quality (TCEQ) to add the Leon River (in 1996) and South Leon River (in 2006) to the Clean Water Act (CWA) section 303(d) list of impaired waters for not supporting the primary contact recreation use. The Texas State Soil and Water Conservation Board (TSSWCB) provided CWA section 319(h) grant funding to develop a watershed protection plan (WPP) to address the bacteria impairments in the Leon River watershed. Watershed stakeholders voluntarily implemented best management practices (BMPs) and conducted public outreach and education. Through these efforts, water quality improved and the South Leon River (assessment unit [AU] 1221B\_01) and three assessment units of the Leon River below Proctor Lake (AU 1221\_01, 1221\_04, and 1221\_05) were removed from the state's list of impaired waters in 2014.

#### Problem

The 1,375-square-mile Leon River watershed in central Texas is bounded by Proctor Lake upstream and Belton Lake downstream (Figure 1). The Leon River is 190 miles long, and drains portions of Comanche, Erath, Hamilton, and Coryell counties. The watershed is largely rural, with most of the land suited for grazing by cattle and goats; a few animal feeding operations, wildlife, feral hogs and on-site sewage facilities (OSSFs) have the potential to be sources of bacteria loadings. South Leon River, a tributary of the Leon River, shares the land use features of the larger watershed.

Data collected in the Leon River (1990–1995) showed that fecal coliform levels exceeded the bacteria water quality standard (WQS) for contact recreation. As a result, TCEQ added the river to the 1996 CWA section 303(d) list for not supporting its primary contact recreation use. In 2000 the bacteria WQS changed to an *Escherichia coli*-based standard requiring that *E. coli* levels not exceed a geometric mean of 126 colony-forming units (cfu) per 100 milliliters (mL) of water. Data collected from 1998 to 2005 showed that the geometric mean for *E. coli* exceeded the standard in South Leon River. As a result, TCEQ added South Leon River to the 2006 CWA section 303(d) list for not supporting its primary contact recreation use.

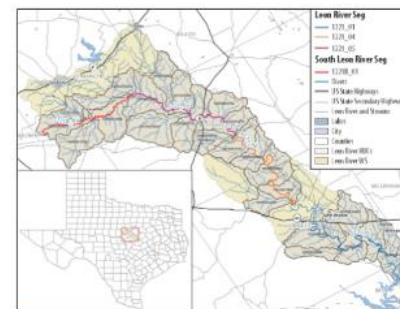


Figure 1. The Leon River watershed is in central Texas.

#### Project Highlights

Water quality impairments in the Leon River and some of its tributaries prompted TCEQ to begin developing a bacteria total maximum daily load in 2002. Local stakeholders, wanting to take an active role in developing management strategies to reduce bacteria loadings, sought to initiate the development of a WPP. The TSSWCB provided CWA section 319(h) funding to



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