

Bacterial Source Tracking Study in Plum Creek Watershed: Implications for Watershed Protection Plans



**North Central Texas
Council of Governments**

Bacterial Source Tracking Webinar
April 1, 2022



Christina Lopez, PhD, Watershed Coordinator
Plum Creek Watershed Partnership | clopez@plumcreekwatershed.org

Overview

Plum Creek Watershed

01

E. coli Sources

02

Adapative Management

03

Outreach and Education

04

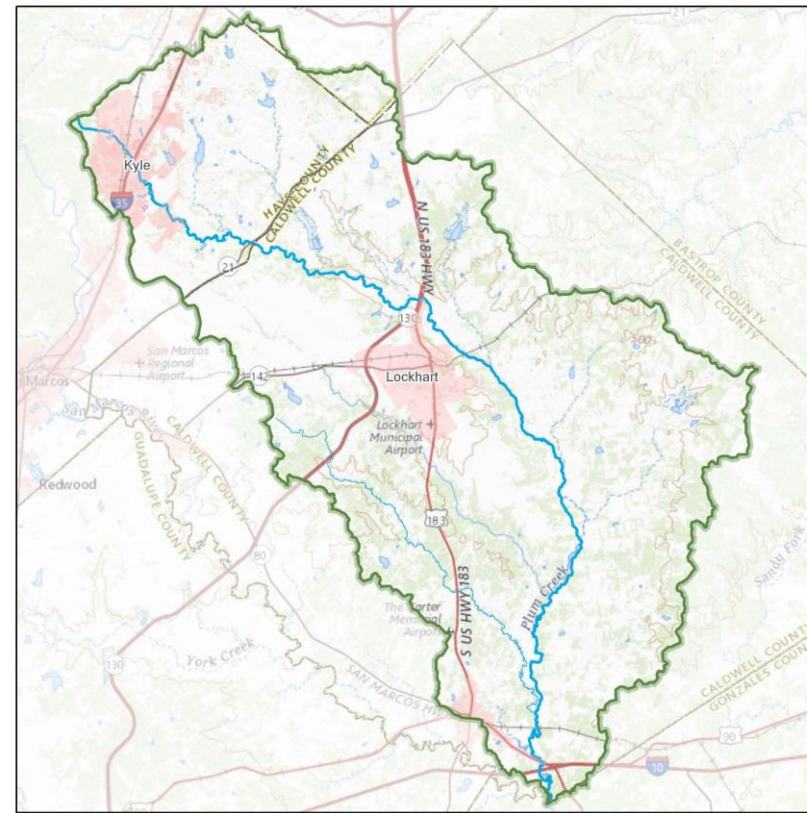
Plum Creek Watershed

The Watershed

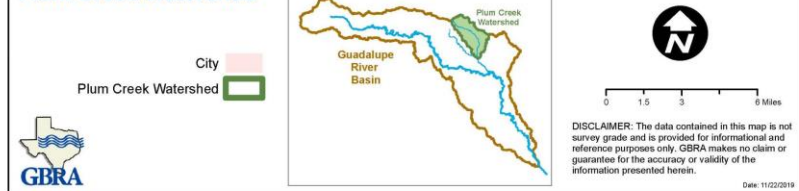
- Kyle-Lockhart-Luling
- 52 miles
- ~400 square miles
- Tributary to the San Marcos River

Problems in Plum Creek

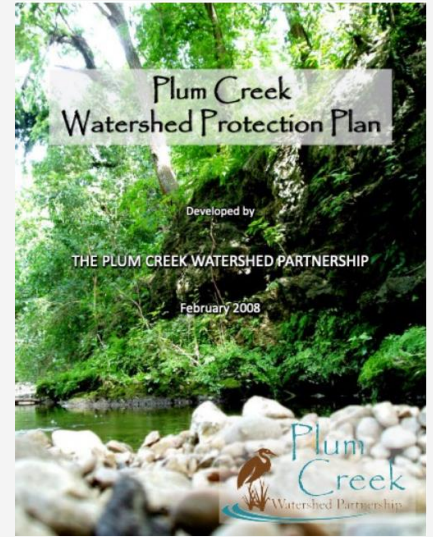
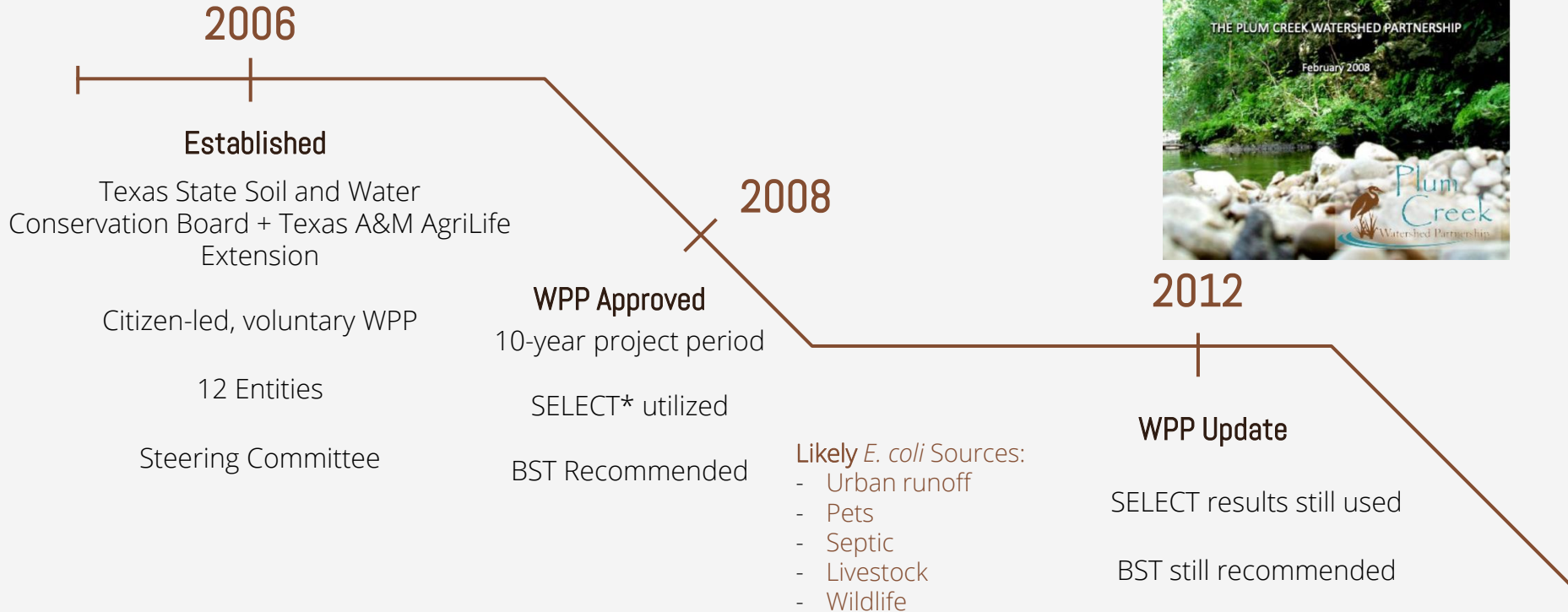
- Impaired for *E. coli* bacteria (since 2004)
- Concerns for nutrients and in-stream habitats



Plum Creek Watershed

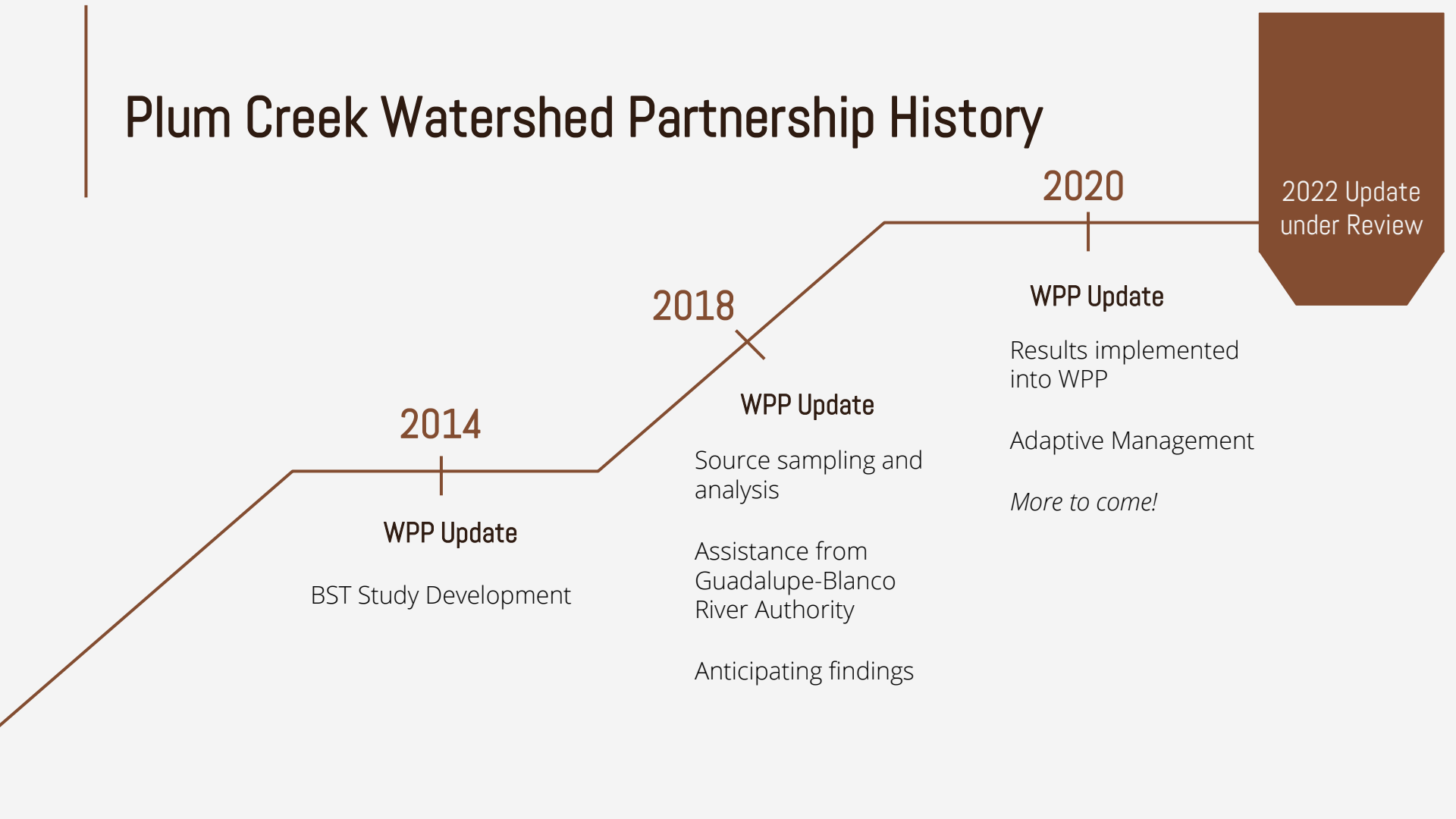


Plum Creek Watershed Partnership History



*Spatially Explicit Load Enrichment Calculation Tool – identifies potential sources based on production rates in spatial boundaries

Plum Creek Watershed Partnership History



2014

WPP Update

BST Study Development

2018

WPP Update

Source sampling and analysis

Assistance from Guadalupe-Blanco River Authority

Anticipating findings

2020

WPP Update

Results implemented into WPP

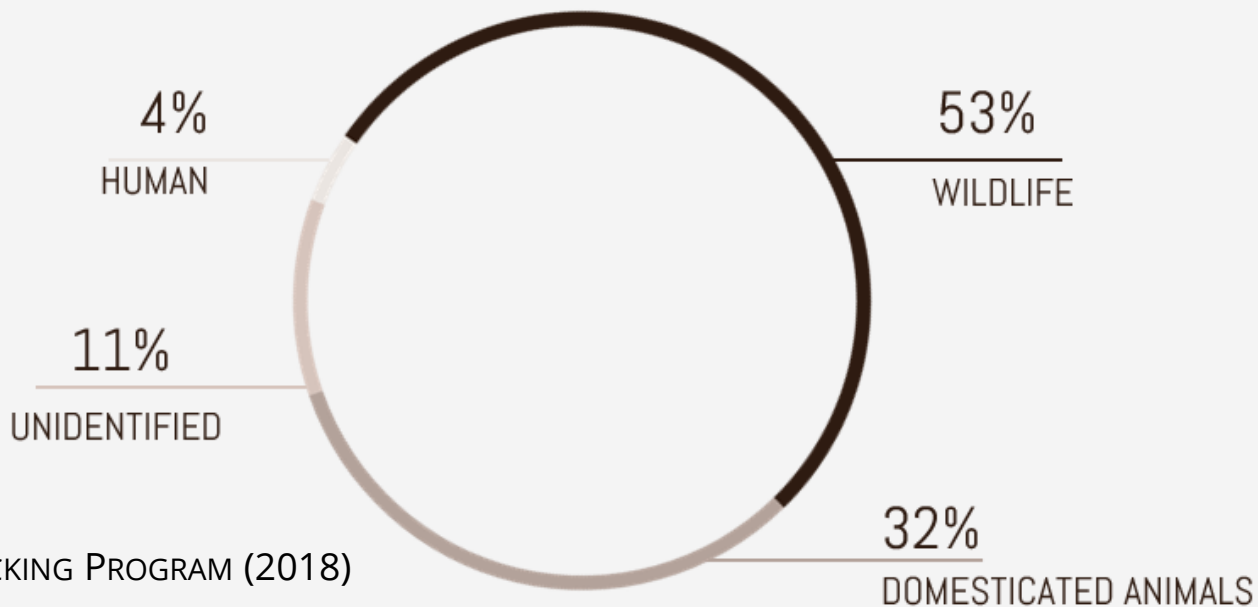
Adaptive Management

More to come!

2022 Update under Review

BST Study in Plum Creek Watershed

- GBRA collected at five locations over 12 months
- 234 *E. coli* isolates / 108 DNA “fingerprinted”
- 89% identified through BST Library



TEXAS BACTERIAL SOURCE TRACKING PROGRAM (2018)

BST Study Results Cont

Upstream



Downstream

Plum Creek at Heidenreich Ln

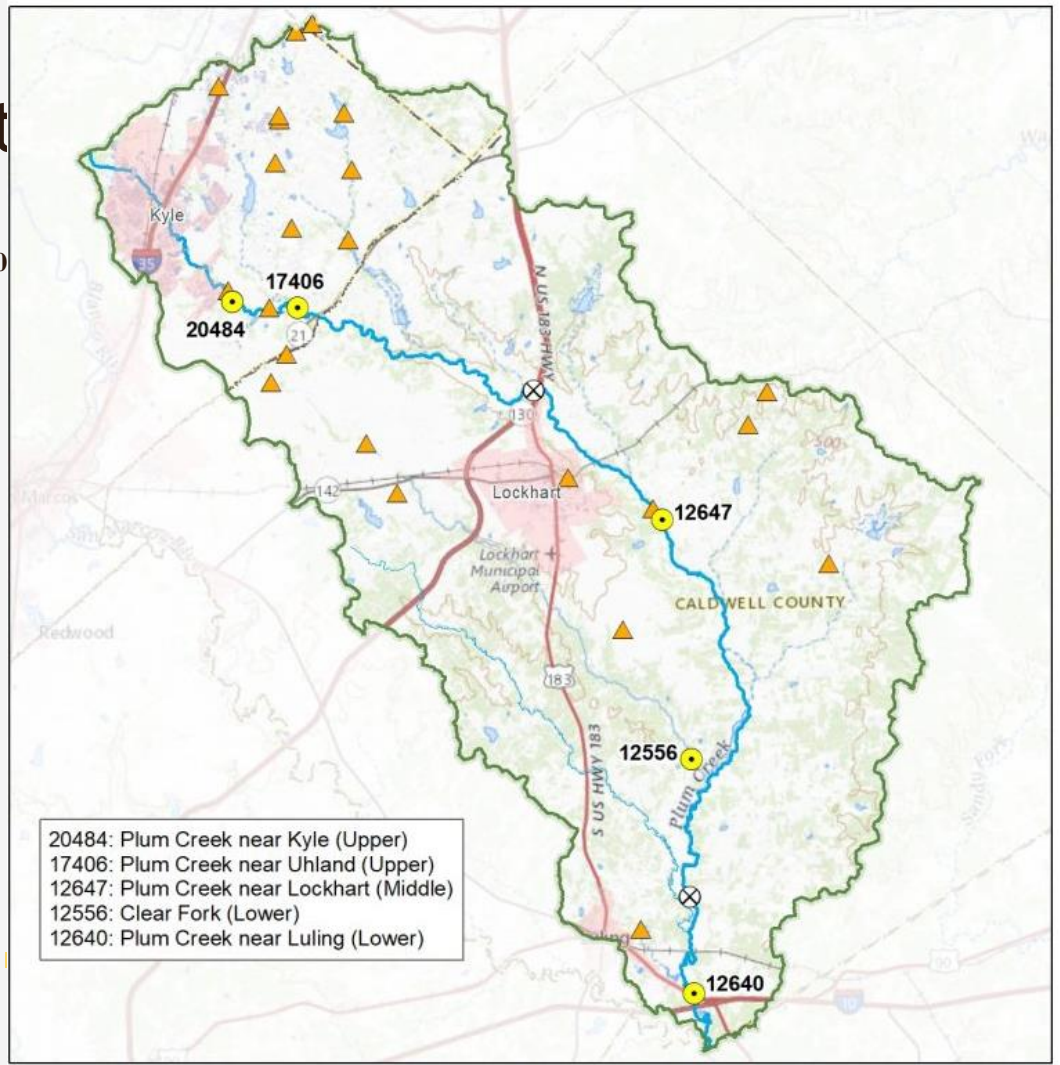
Plum Creek at Plum Creek

Plum Creek at CR 202

Clear Fork at CR 158

Plum Creek at CR 135

■ Wildlife

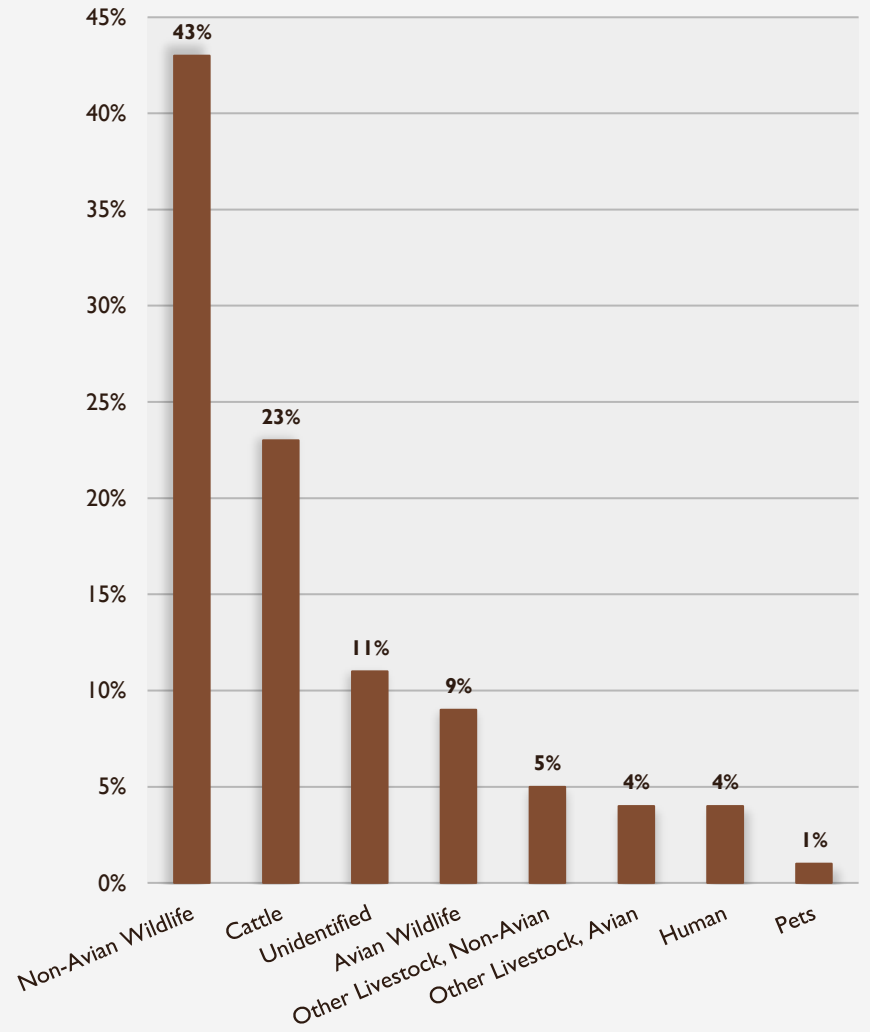


BST Study Results Continued



Wild pigs/feral hogs contribute fecal coliforms directly into water sources

Source: Texas A&M Natural Resource Institute

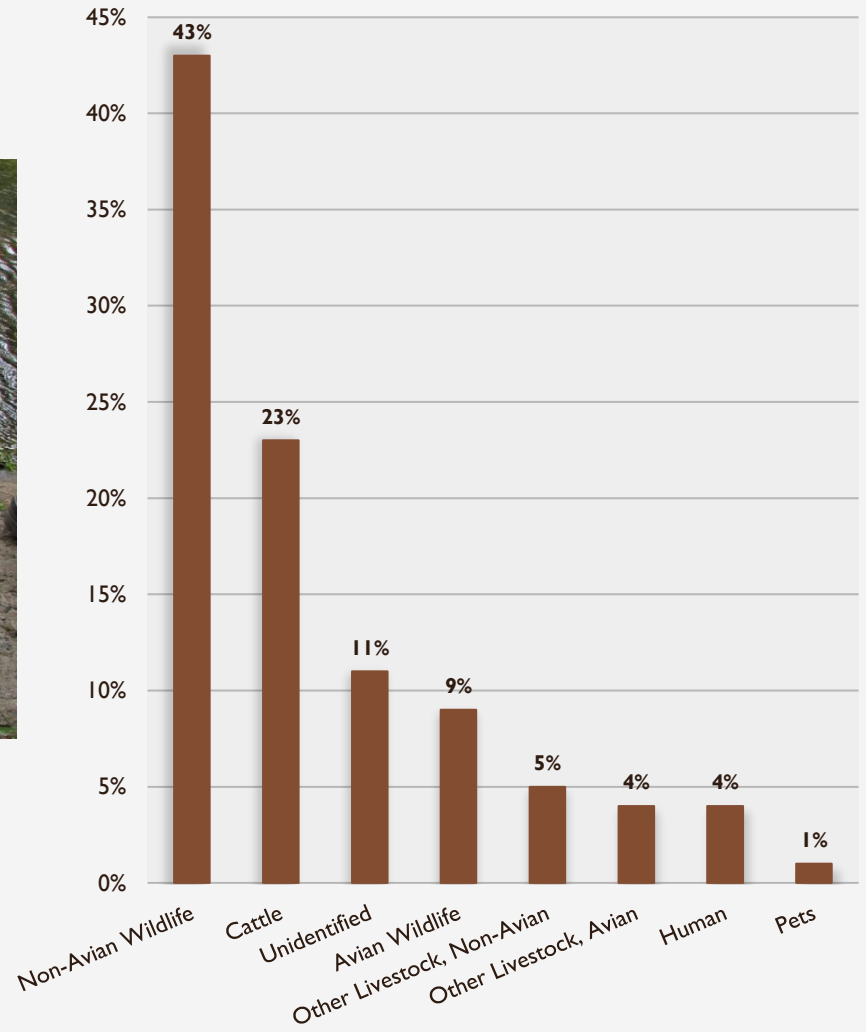


BST Study Results Continued



Cows defecate **more frequently in-stream** than in other types of environments.

Source: Bond *et al.* (2012) / Photo: Stuart Naylor





Adaptive Management

(1) Central Texas Feral Hog Task Force

(2) Focus Areas in WPP

Central Texas Feral Hog Task Force

Est. 2013

- Collaborative regional effort
- Hays, Caldwell, and Guadalupe Counties
- 16,976 hogs removed

BST Study Implications

- Confirmed hogs as significant *E. coli* source
- Supports funding applications for ongoing programs
- 2022 Programs funded by Texas A&M AgriLife Extension Service, Wildlife Services
- \$5 Bounty per tail
- Educational workshops
- Aerial control
- Damage and control surveys



Focus Areas in WPP

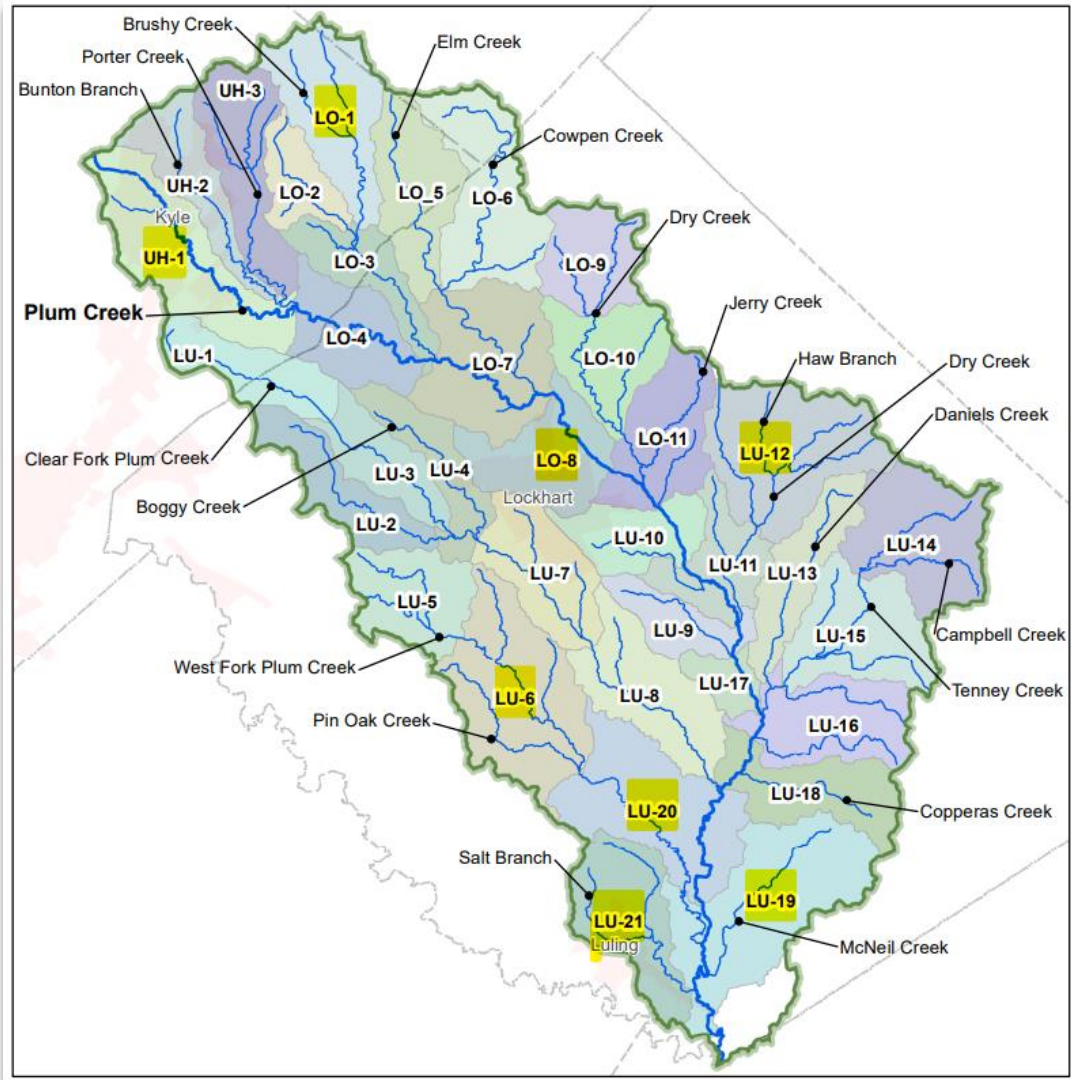
2020 Update

- 8 Focus areas throughout watershed
- BST results & local knowledge
- Reduce potential urban and agricultural *E. coli* sources

Upper: LO-1 and UH-1

Mid: LO-8, LU-12, and LU-6

Lower: LU-20, LU-19, and LU-21



Urban Sources

Wildlife

- Feral hogs, Deer, Sm. Mammals

Domestic Animals

- Pets, Livestock

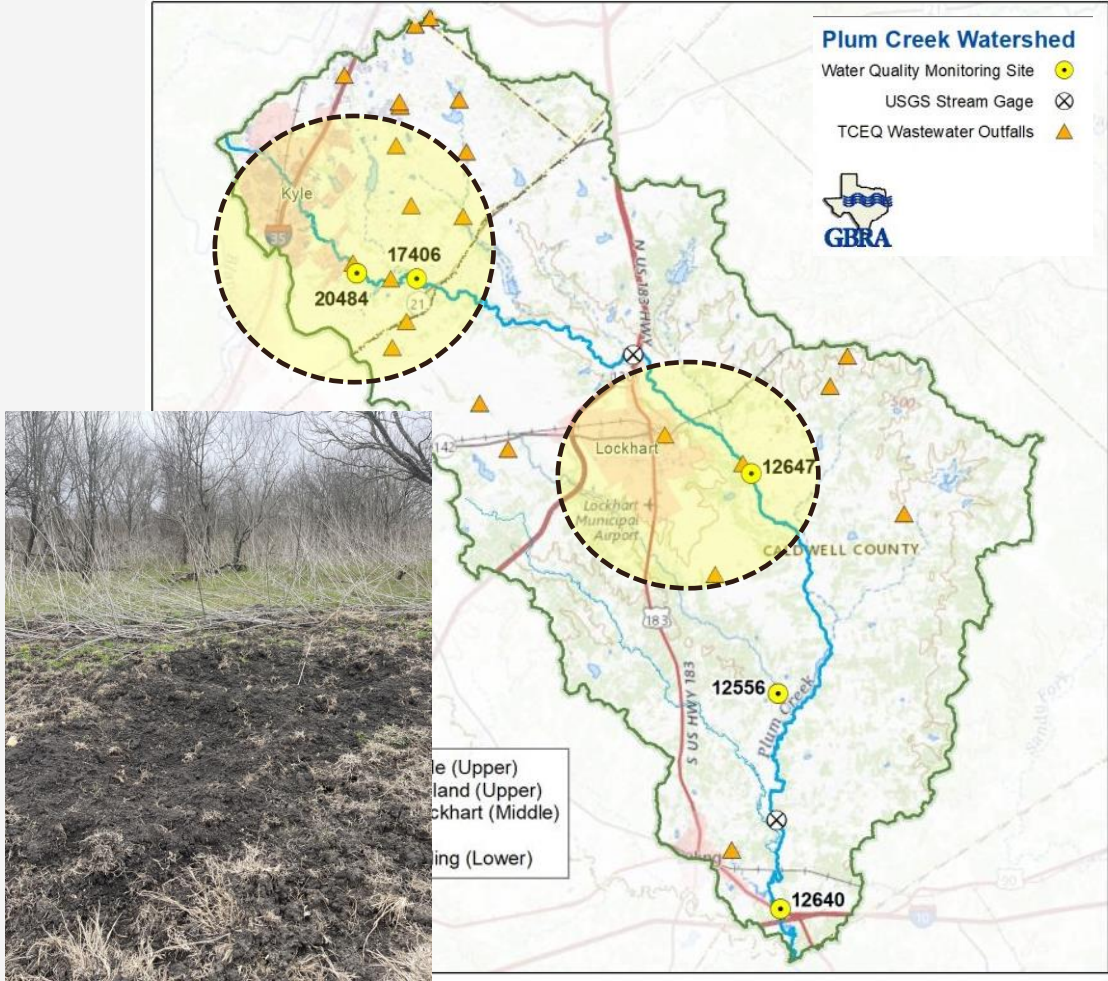
Human

- Wastewater Treatment Plants
- Septic

Urbanization + 3.4%
Population + 209%

Recommendations:

- Low Impact Development
- Stormwater Management



Urban Areas – Projects and Improvements



City of Kyle

WWTP – Expansion and upgrades
New Ordinance - **Stream buffer** or green infrastructure stormwater techniques

Lockhart Area

Town Branch Restoration (2017-20)
Low Impact Development + Rain Garden
Caldwell County Justice Center



Agricultural Sources

Wildlife

- Feral hogs, Deer, Sm. Mammals

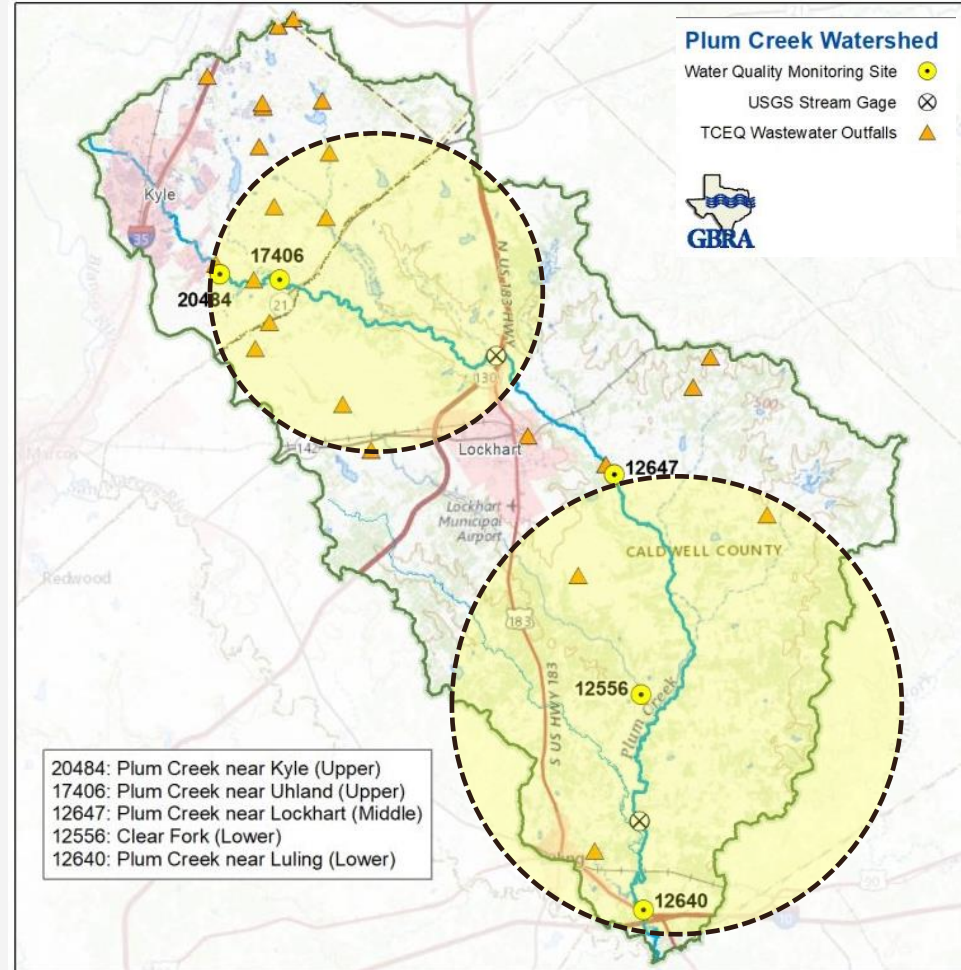
Domestic Animals (increase downstream)

- Pets, **Livestock** (cattle)

Forest Cover - 9%
Pasture/hay + 16.8%
Cultivated Crops 0%

Recommendations:

- Water Quality Management Plans
- Best Management Practices



Education and Outreach

URBAN SOURCES

- Pet Waste Education Campaigns
- 50+ Stations
- Healthy Lawns, Healthy Waters

LIVESTOCK/AG SOURCES

- Lone Star Healthy Streams
- WQ Management Plans
- Riparian Trainings

WASTEWATER SOURCES

- Monitoring of Treatment Plants
- On-Site Sewer Facility Workshops

WILDLIFE SOURCES

- Bounty Claim for Feral Hogs
- Feral Hog Workshops + Webinars

In the Works



Plum Creek Wetland Preserve

Guadalupe-Blanco River Trust

Restoration of native species & watershed
Removal of hogs

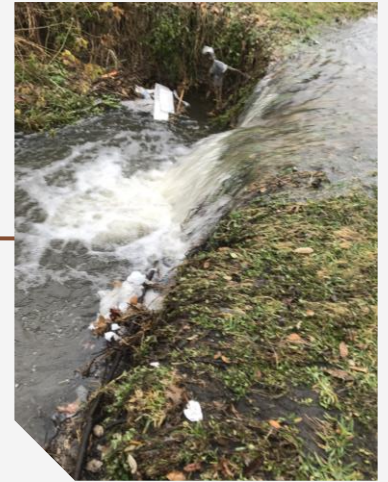
Stormwater and Soil Health

Lion's Park, Lockhart

Slope protection

Headcutting stabilization

Community engagement



Summary

E. coli Sources

- Feral hogs + wildlife
- Livestock
- Human
- Pets

Adaptive Management

- Guides WPP Updates
- Central Texas Feral Hog Task Force
- Focus Areas
- Targeted Outreach and Education
- Population and Landuse Change
- Restoration Projects



Texas State University volunteer, Wren Vogel, planting at the Plum Creek Wetlands Preserve “Releaf” Event in November 2021

THANK YOU!

Christina Lopez
clopez@plumcreekwatershed.org
830-557-7358
Plumcreekwatershed.org