Final Stakeholder Meeting: Double Bayou Watershed Protection Plan – Phase II

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June 3rd, 2025

Funding for this effort was provided through a Clean Water Act Nonpoint Source Grant administered by the Texas State Soil and Water Conservation Board from the U.S. Environmental Protection Agency.

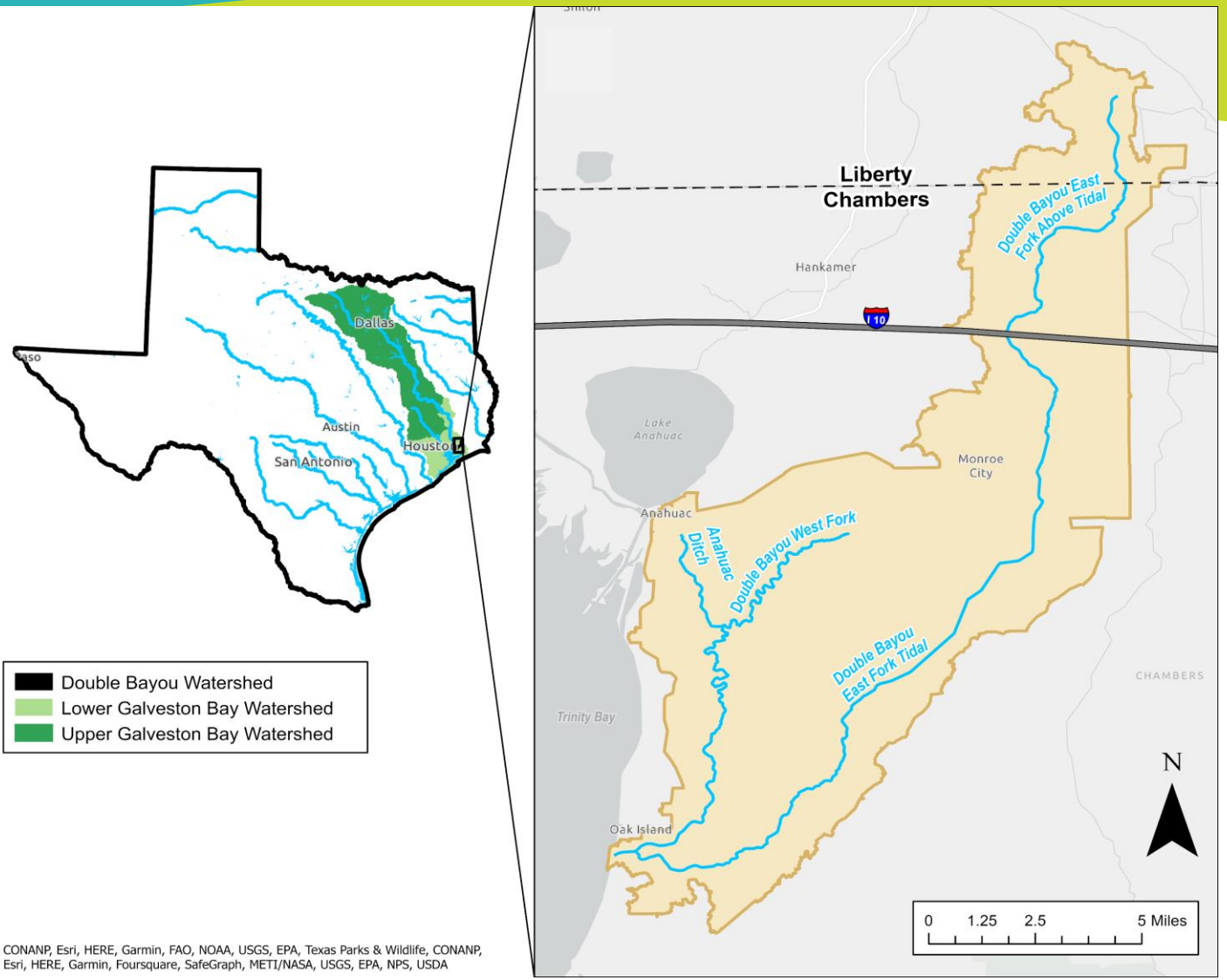
Funding for this effort was provided through a grant from the Texas Commission on Environmental Quality administered by the Galveston Bay Estuary Program.

Double Bayou Final 2025 Meeting

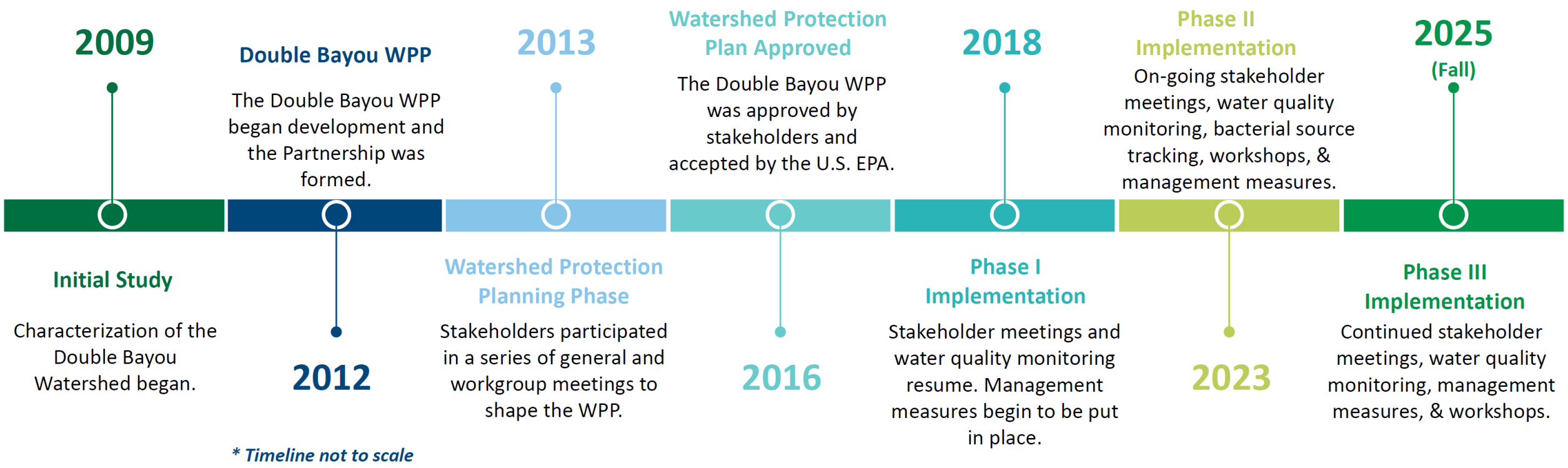
5:30	Welcome, Overview, and Agenda
5:35	SWAT & Green Infrastructure
5:45	Double Bayou Watershed and Water Quality
6:15	Wildlife Habitat Federation – Schlyer Rhea
6:35	SWAT Stakeholder Discussion Activity
6:50	Water Quality Management Plan Update - Brian Koch and Jimmy Weaver
7:00	Final Wrap-up, Adjourn

Double Bayou Watershed Protection Plan

- Goal is to improve water quality utilizing a voluntary, collaborative, and stakeholder-driven approach
- Stakeholder-approved Double Bayou Watershed Protection Plan accepted by the U.S. Environmental Protection Agency in 2016
- Management measures, practices that reduce nonpoint source pollution, suggested by stakeholders to address water quality issues



Watershed Protection Plan - Timeline



** Timeline not to scale*

Green Infrastructure in the Double Bayou Watershed

Kirsten Vernin, Research Associate

June 3rd, 2025

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A Potential Solution: Green Infrastructure

- **Key question: How might we reduce bacteria concentrations?**
- Soil and Water Assessment Tool (SWAT) is being used to simulate the watershed to estimate how different green infrastructure practices could improve water quality by reducing bacteria
- Goal is to inform what type of and where to place these practices as part of the Watershed Protection Plan strategy

SWAT Soil & Water Assessment Tool

Information Included

A variety of datasets such as soils, weather, elevation and…

Stakeholder insights from the Fall 2024 WPP Meeting

- Agricultural watershed – cattle & rice
- Canal system for irrigation
- Rice crop management

Types of Green Infrastructure

1. Forest Restoration
2. Prairie Restoration
3. Vegetated Filter Strips
4. Wetland Restoration

Water Quality in the Double Bayou Watershed

Ryan Bare, Sr. Research Scientist

June 3rd, 2025

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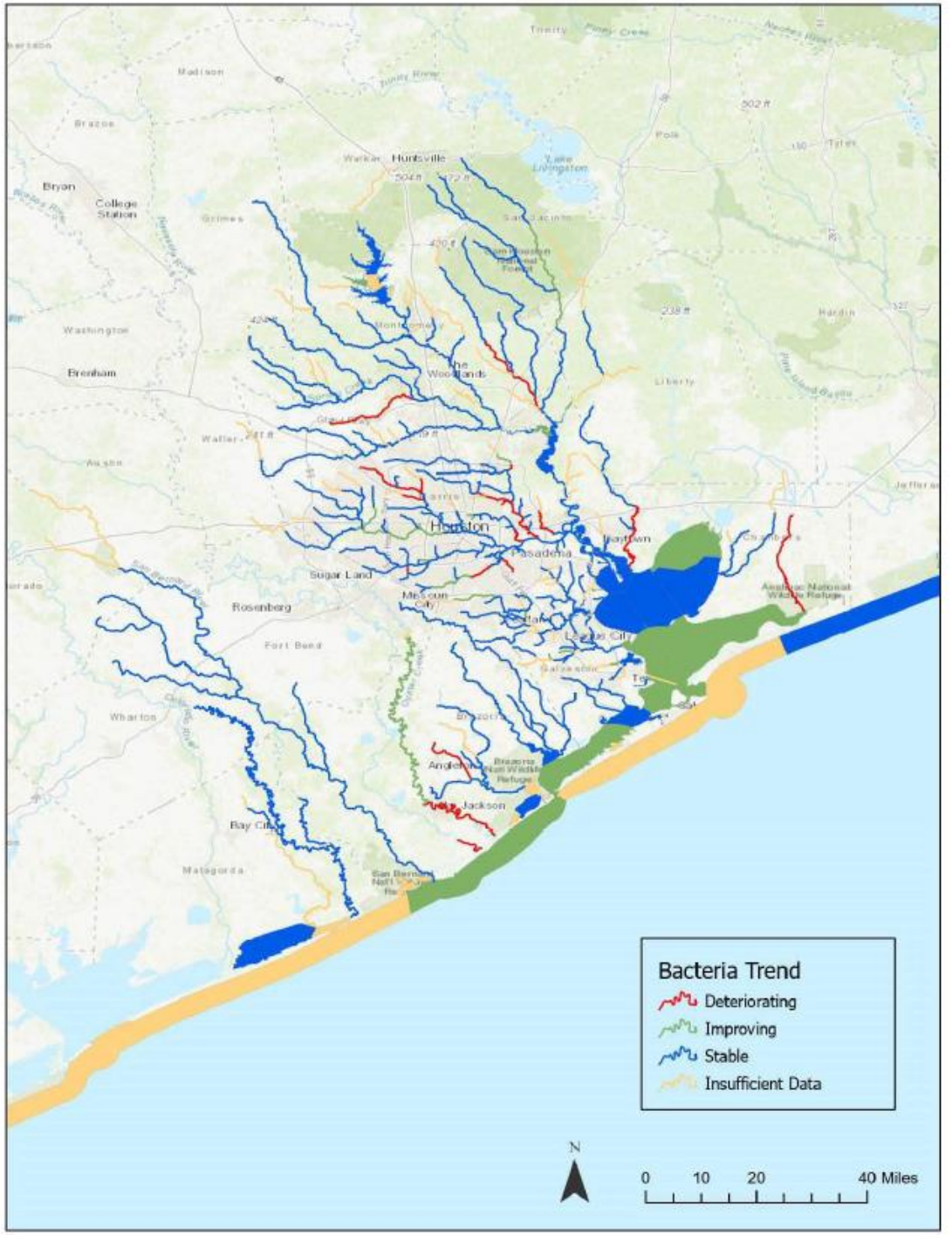
How does Double Bayou compare?

- Fecal indicator bacteria, primary benchmark for water quality
- Houston-Galveston Area Council conducts an assessment called the Regional Trends of Water Quality
- **44%** of the region's waterways have high levels of fecal indicator bacteria
- **18%** of waterways have improved bacteria levels, while **5%** have worsened (data 2015 to 2022)
- The East and West Forks of Double Bayou have remained stable over the seven-year period assessed - 2015 to 2022.

**Findings from the Houston-Galveston Area Council (H-GAC) Regional Trends of Water Quality – Bacteria Implementation Group (BIG) Report*



Water Quality Monitoring Program

- United States Geological Survey has been collecting water quality data over the last **fifteen years**
- Extensive dataset, including **over 10,000** sample results
- Completed **82 rounds** of sampling at five sites
  - WFL – Eagle Ferry Rd
  - WFU – Sykes Rd (2936)
  - EFL – Carrington Rd
  - EFU – FM 1663
  - Waste Water Treatment Plant
- Continues to be a key management measure

Double Bayou Impairments

- Tidal portions of the East and West Fork are considered impaired for recreation use –
  - **How are you using the bayous for recreation – Fishing? Boating/Kayaking? Swimming?!**
- Water quality results in the next slides include the portions of the bayous in **red**

How is the water quality compared to the standard?

- A snapshot of typical "daily" conditions
- East Fork is in better shape – fewer samples over the standard
- West Fork has more frequent samples over the standard
- Water may be unsafe for recreational contact when samples over standard

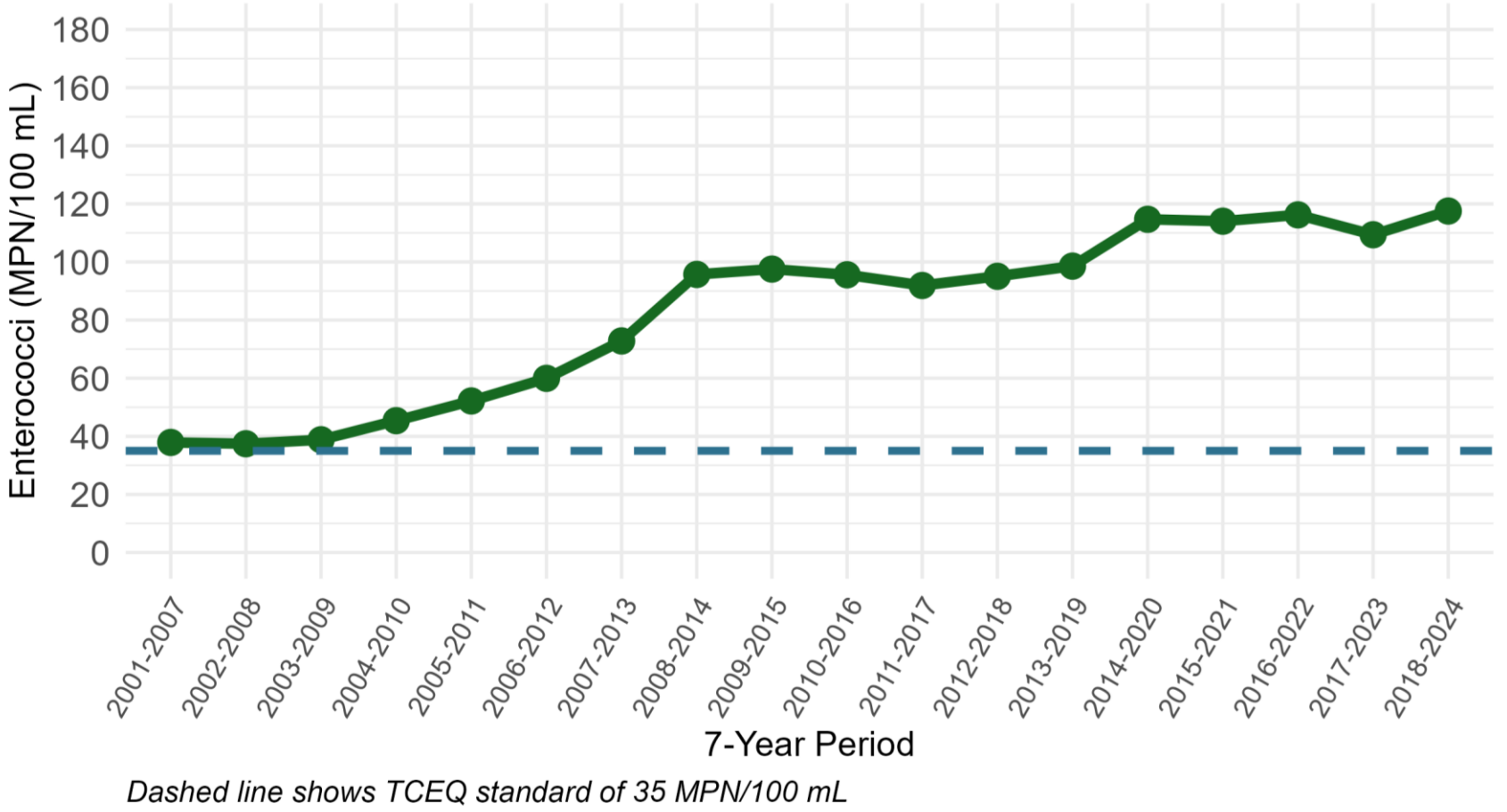
Single Samples Compared to Standard
(Enterococci bacteria in West Fork and Lower Portion of East Fork)

Stream Segment	Stream Type	Number of Samples	Over Standard (number)	Over Standard (percent)
East Fork	Tidal	131	32	24%
West Fork	Tidal	217	93	43%

Data from 2001 to 2024. The TCEQ standard for a single sample is 130 MPN/ 100 mL.

How is water quality doing over time?

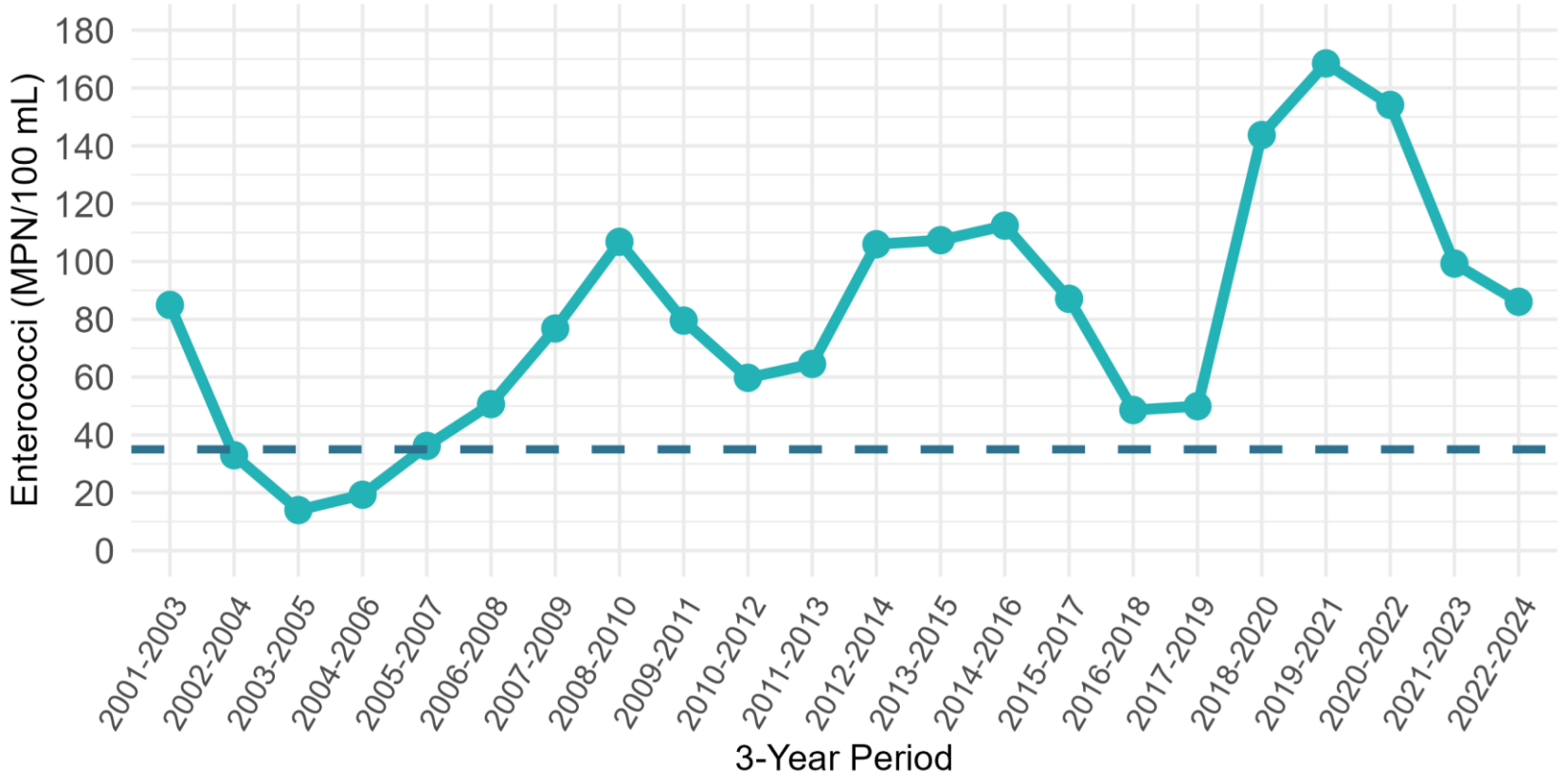
- Points represent 7-year period average (geomean)
  - Changes are slow to occur
  - Smooths out the overall pattern
- Impression of long-term conditions
- Upward trend in bacteria over time



Dashed line shows TCEQ standard of 35 MPN/100 mL

How is the water quality changing over time?

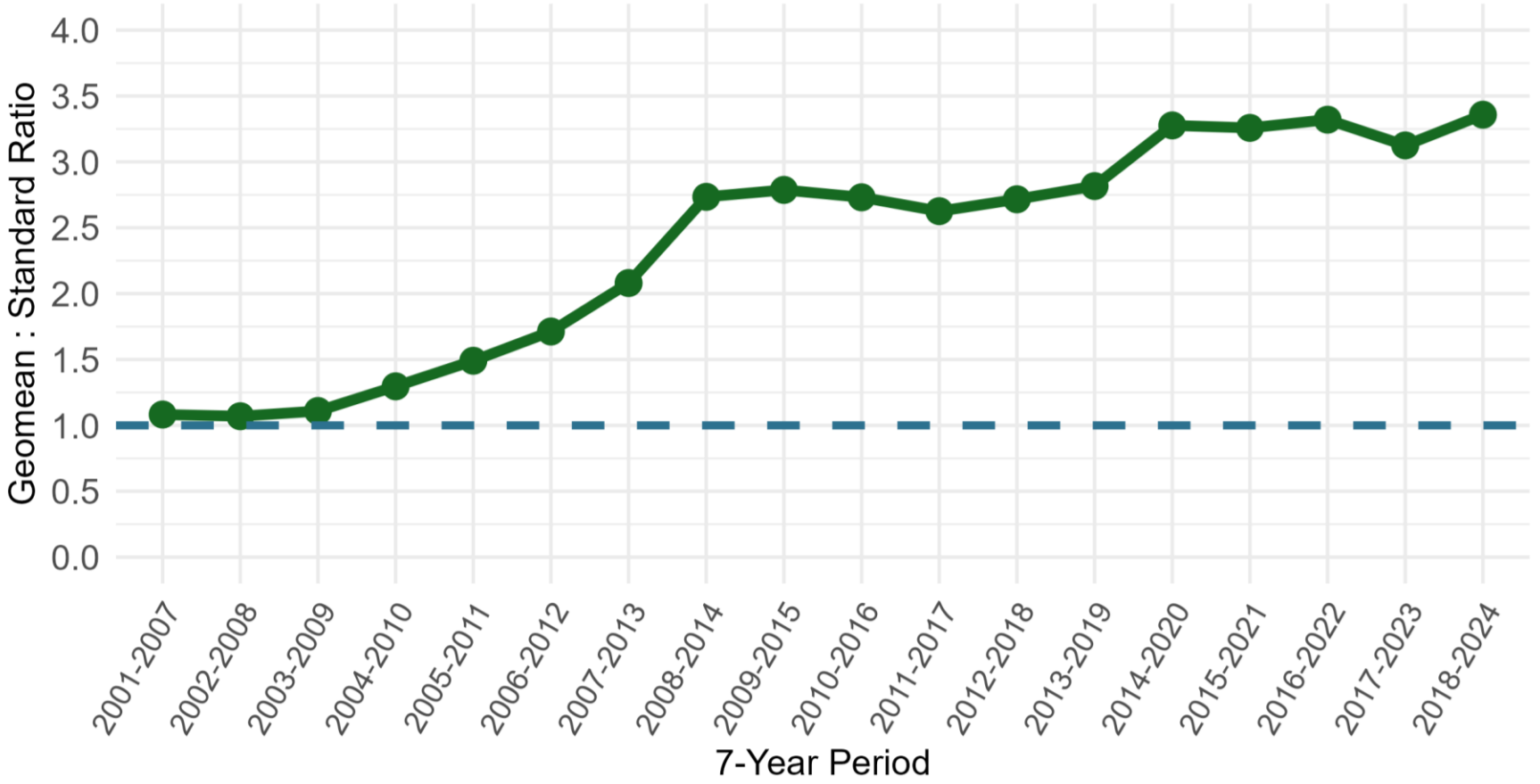
- Points represent 3-year period average (geomean)
  - Changes occur more quickly
  - Bacteria bounces up and down
- Majority are over the standard
- Most recent results have dipped
- More data will fill in the pattern



Dashed line shows TCEQ standard of 35 MPN/100 mL

How is the water quality compared to the standard over time?

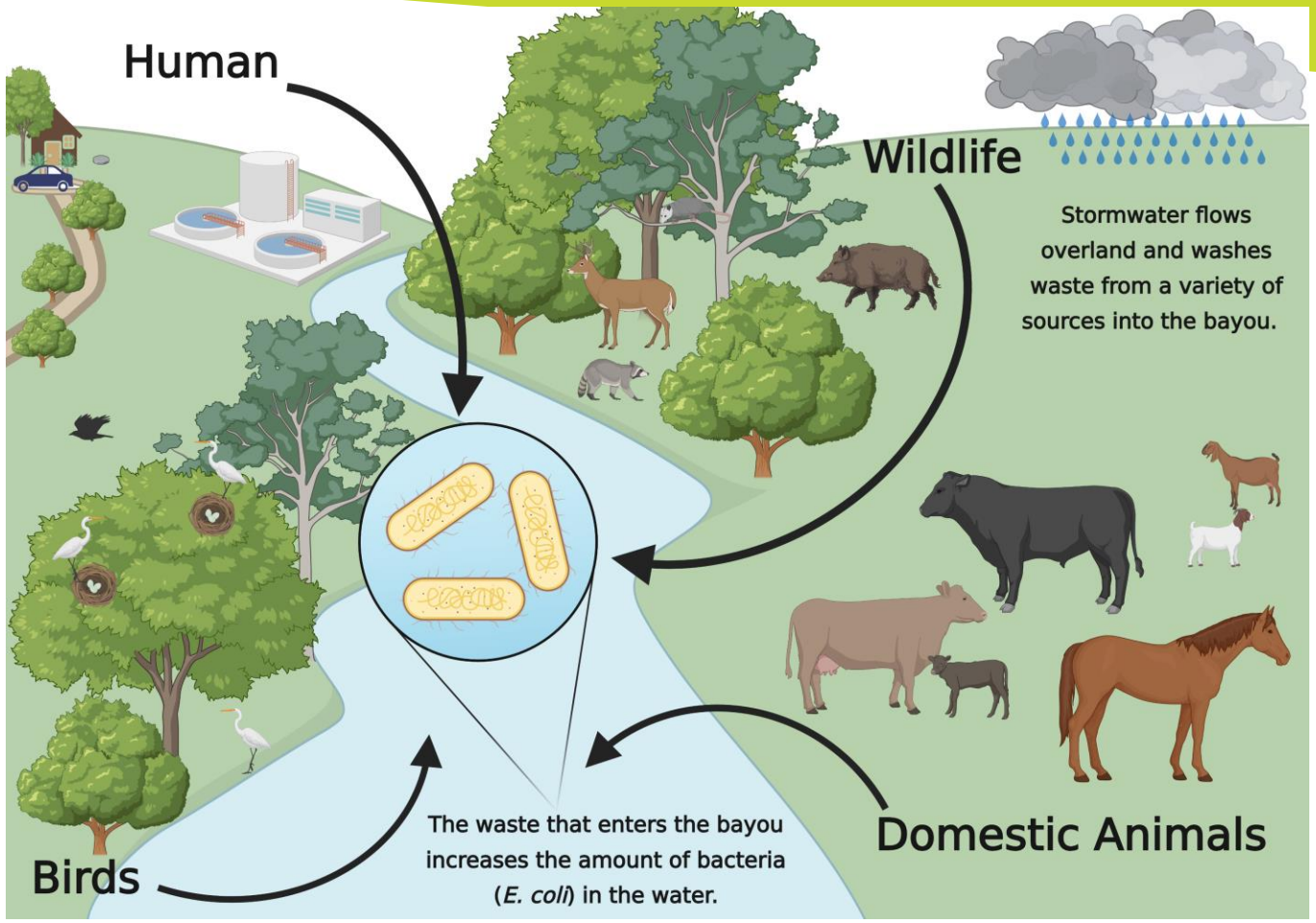
- 7-year period
- Shows how many times higher than standard
  - Example – 2.0 is twice the standard
- Over time bacteria has ranged from close to the standard to about 3-3.5 times higher



Dashed line represents a ratio of 1.0 (equal to standard)

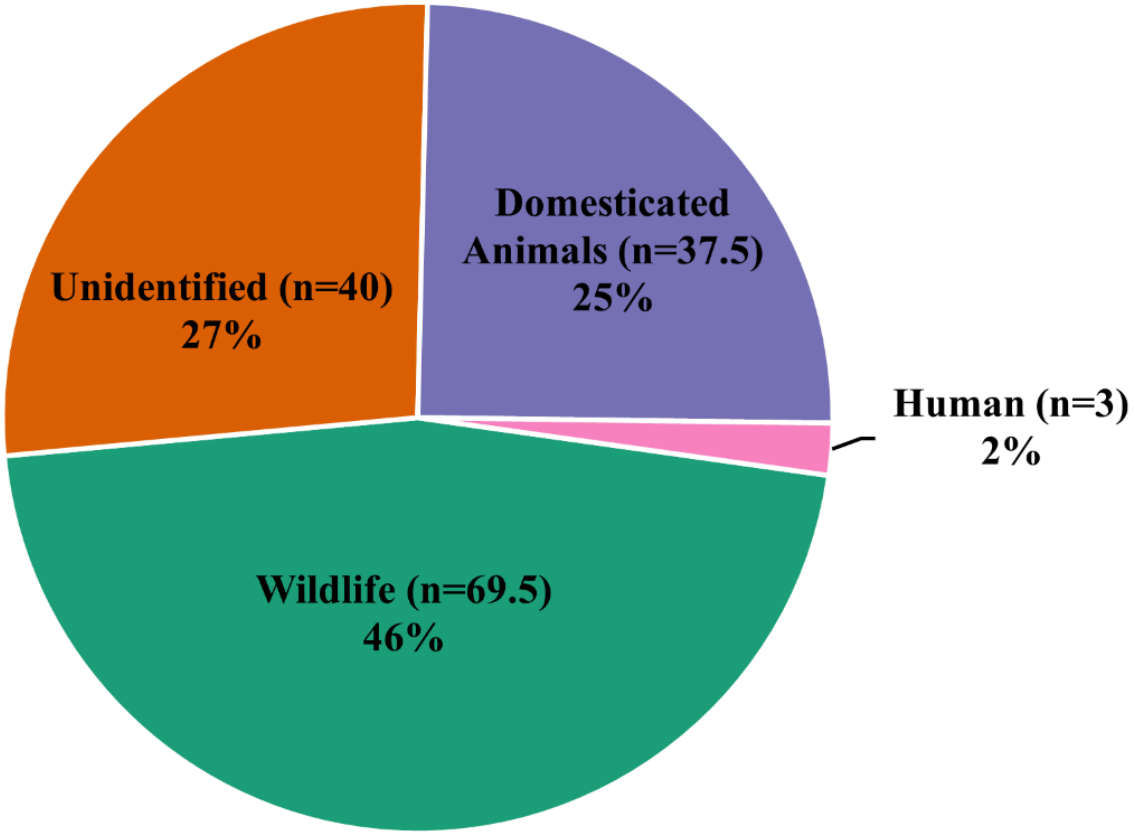
Where is the bacteria coming from?

- Bacterial Source Tracking key management measure completed in 2024
- 71% of the **total** sources Wildlife (46%) and domestic animals (25%)
- The **total** domesticated animal category
  - Primarily cattle (12%) & pets (10%)
- **West Fork** – domesticated animals
  - Agricultural and residential sources are primary contributors (pets and cattle)
- **East Fork** is dominated by Wildlife

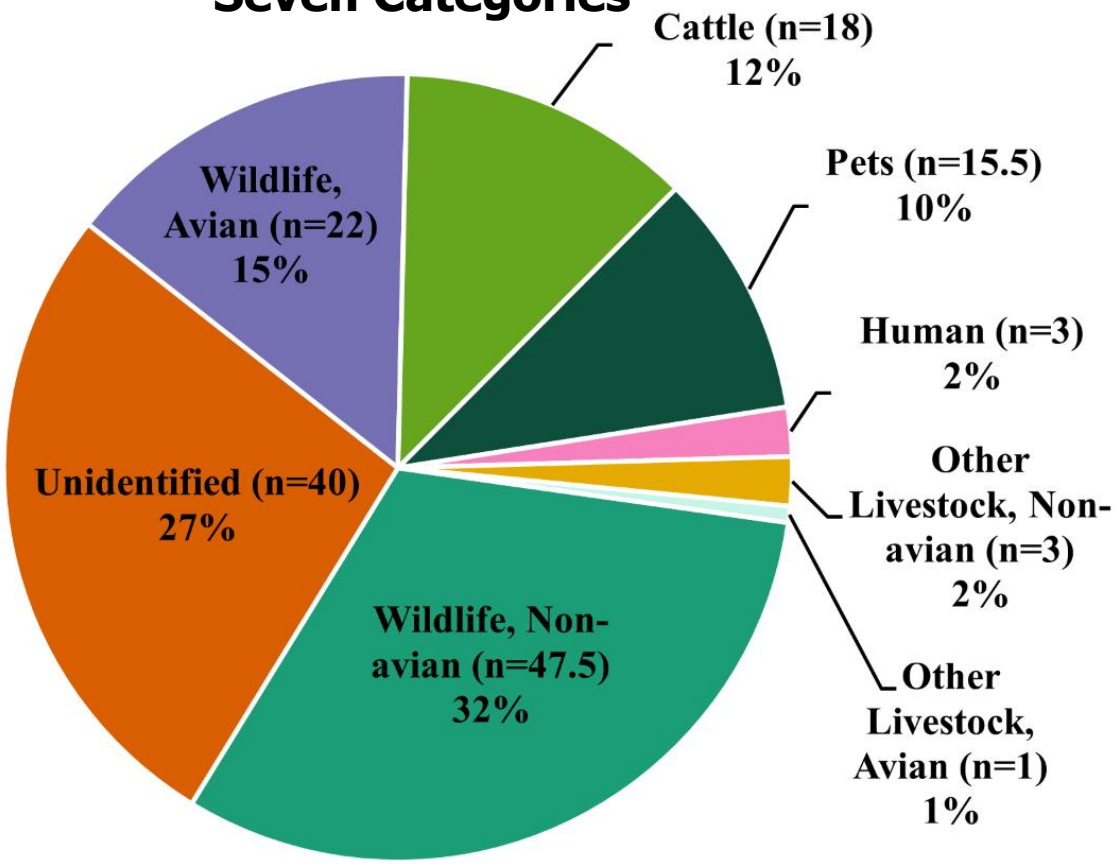


Bacterial Source Tracking

Three Categories



Seven Categories



Bringing it Together

- **Water quality (bacteria)**
  - Upward trend over time
  - Recent periods are in decline
  - Remains to be about 3.5 times the standard
- **The West Fork needs extra attention**
  - Bacteria levels are noticeably higher so could be a priority area for targeted solutions.
- **Bacteria is coming from a variety of sources including wildlife, domestic animals, and us!**
  - Cattle and pets are almost equal – could tackle both sources to improve water quality.
- **Even low levels of human waste matter**
  - While typically low this source carries higher health risks and should be managed carefully.

Working with Nature: Creating Sustainable Solutions for All

Schlyer Rhea, Wildlife Habitat Federation – Conservationist

June 3rd, 2025

Let’s discuss!

- Where do you see the biggest opportunities? Think about different types of land—like yards, pasture, school grounds, public spaces and parks, or even along the bayous or canal systems.
- Where do you think green infrastructure could have the biggest impact?
- What solutions seem most doable?
- Which green practices do you think would be the easiest to start using?
- Which green infrastructure practices should we focus on first?

If you prefer to write down your ideas, please use the index cards and handouts provided at your table.

Water Quality Management Plan Update

Brian Koch, Regional Watershed Coordinator – Texas State Soil and Water Conservation Board

Jimmy Weaver, Trinity Bay Conservation District – District Technician

June 3rd, 2025

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Water Quality Management Plans in the Double Bayou Watershed

Year	New Producer (Number)	Recertifications (Number)	Status Reviews (Number)	Active Implementation (Number)	Planning Area (East or West Fork)
2017	0	3	3		1,069.7
2018	2	2	1		1,236.6
2019	2		1	2	2,118.9
2020	0		1		
2021	4		3	1	3,714.1
2022	2		2		1,056.2
2023	1				1,047.0
2024	3				11,555.8
2025	3				11,608.0
Total	**17**	**5**	**11**	**3**	**33,406.30**

Where We are Going

- Implementation of the Double Bayou Watershed Protection Plan – Phase III!
- Stakeholders meeting will resume next year
- Two years, 2026 to 2027, continued collection of water quality data
- Human specific marker, microbial source tracking
- Onsite Septic Facility Repair and Replacement
- Water Quality Management Plans
- Workshops and learning opportunities

Thank you for coming!

www.DoubleBayou.org
Contact The Double Bayou Watershed Partnership at
doublebayouwpp@harcresearch.org

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BST – What is our role?

- Human contributions vary by station and weather conditions, they pose a significant health risk and should be prioritized for management.
  - Human-derived bacterial loads were detected at the West Fork Lower site during storm
    - WWTF or OSSF are contributing to contamination with rainfall
- East Fork Upper, detection of human sources during dry weather
  - Potential presence of an unidentified point source or contamination from overland runoff or groundwater seepage related to OSSF