Strategic Implementation of Green Infrastructure BMPs in the Double Bayou Watershed

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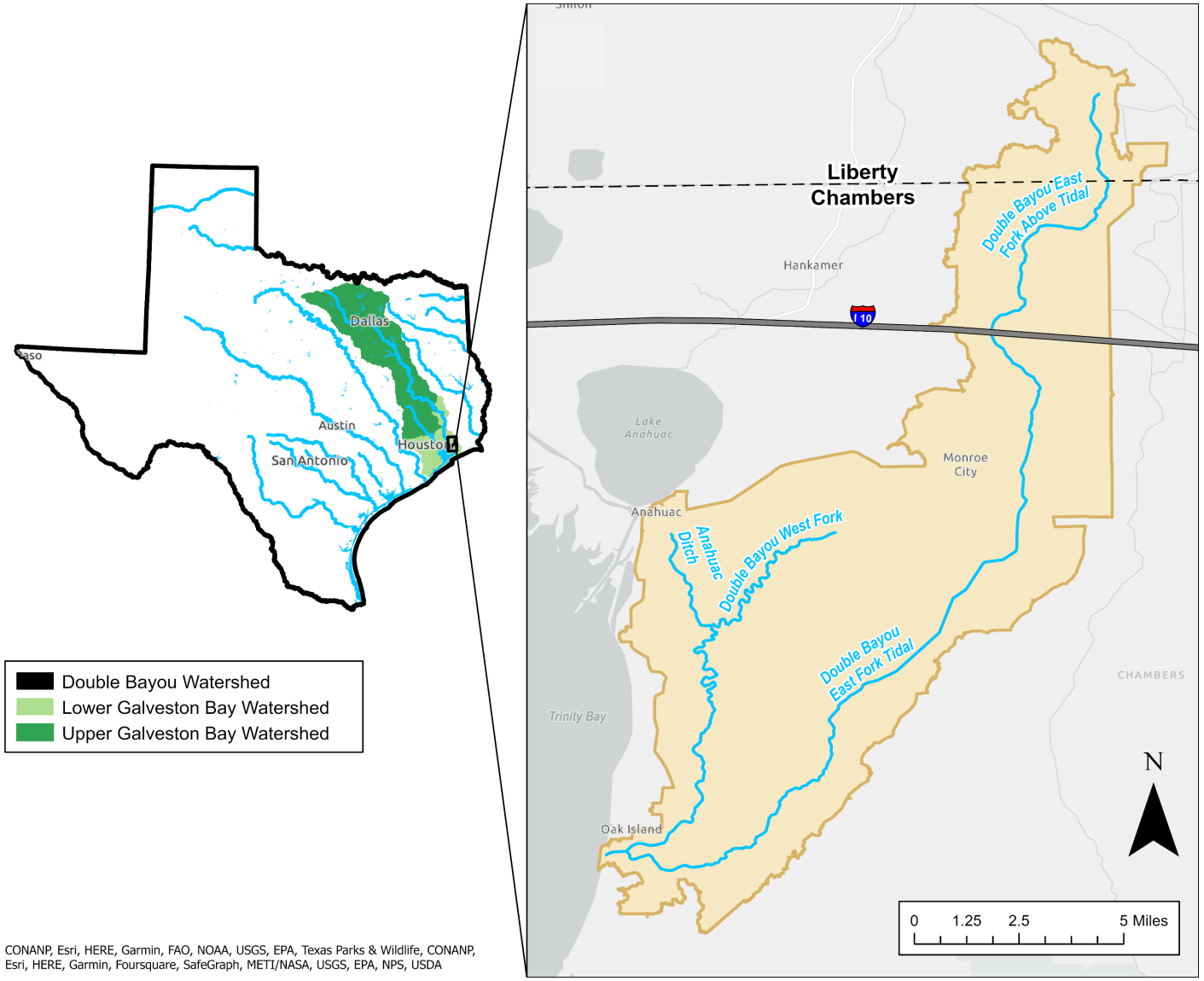
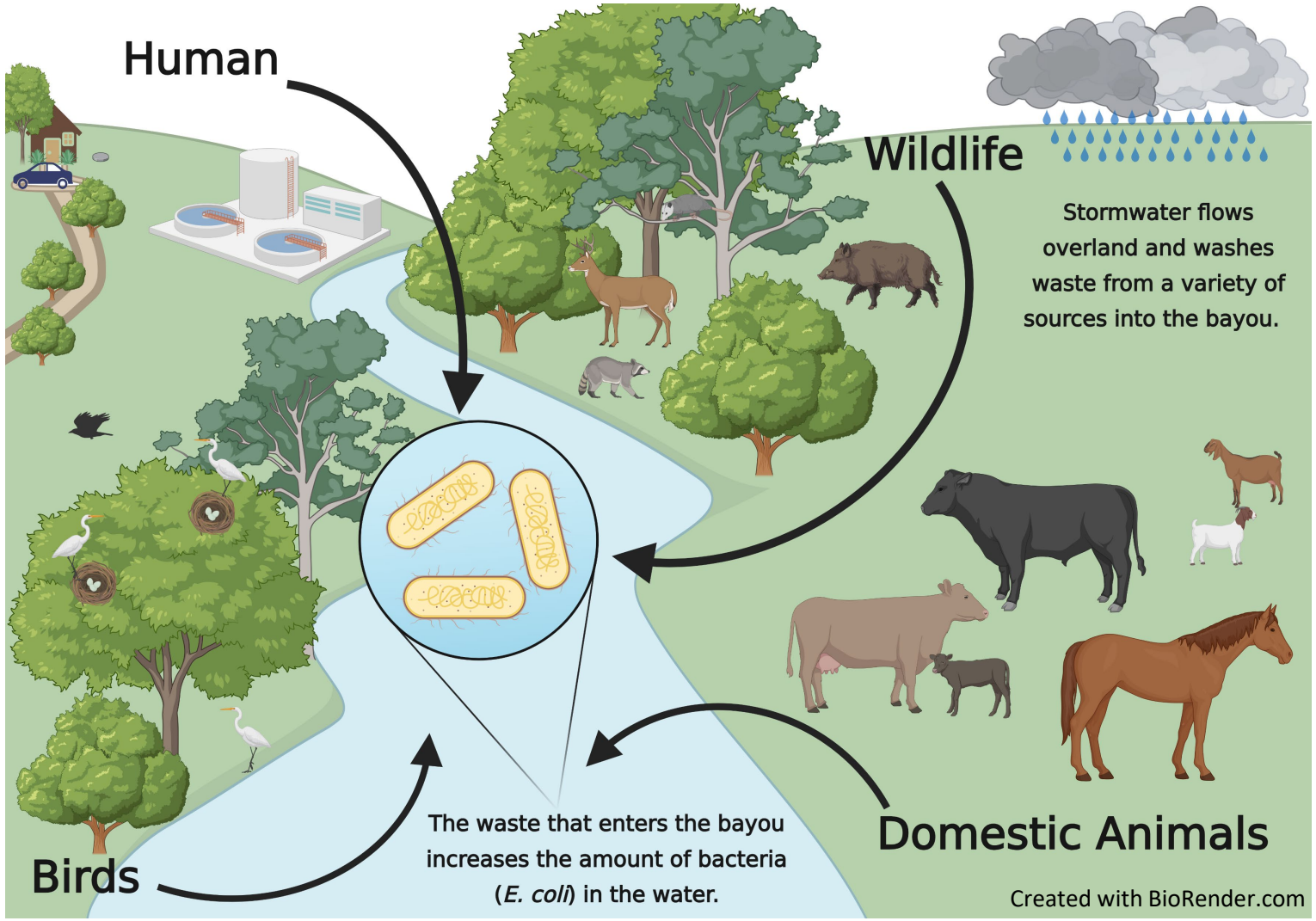
Funding for these efforts was provided through a Clean Water Act Nonpoint Source Grant administered by the Texas State Soil and Water Conservation Board from the U.S. Environmental Protection Agency and through a grant from the Texas Commission on Environmental Quality administered by the Galveston Bay Estuary Program.

Double Bayou Watershed Protection Plan



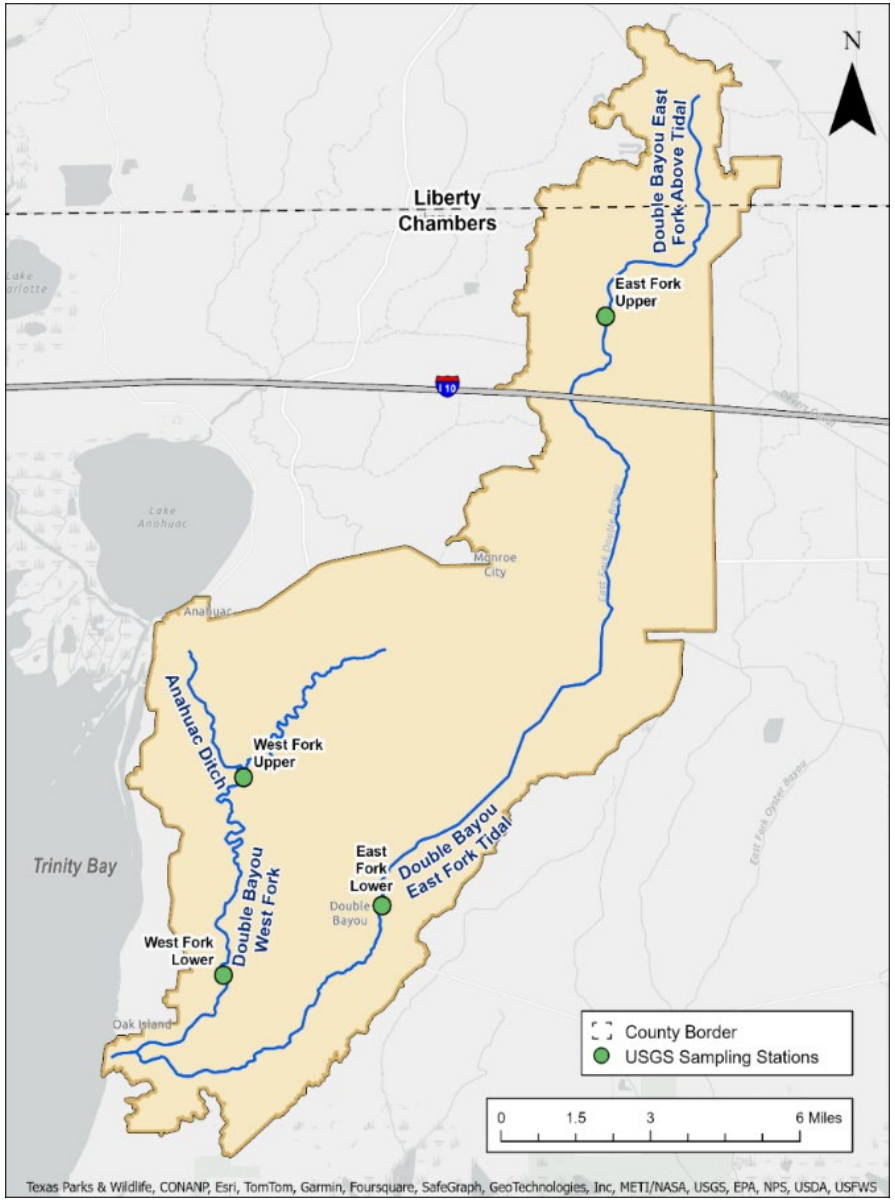
- Goal is to improve water quality utilizing a voluntary, collaborative, and stakeholder-driven approach
- Phase II implementation is underway…
- Bacterial Source Tracking (BST) was a stakeholder recommend management measure
- Recently completed BST Assessment

What is Bacterial Source Tracking?



- Many potential non-point sources of bacteria in a watershed
- Wildlife, human, domestic animals, and birds
- Identify sources and proportion in water
- Match the sources' DNA ("fingerprint") to a library of known sources
- Helps to identify solutions
- Focus on where and how to best to improve health of the bayous

Double Bayou Bacterial Source Tracking Study

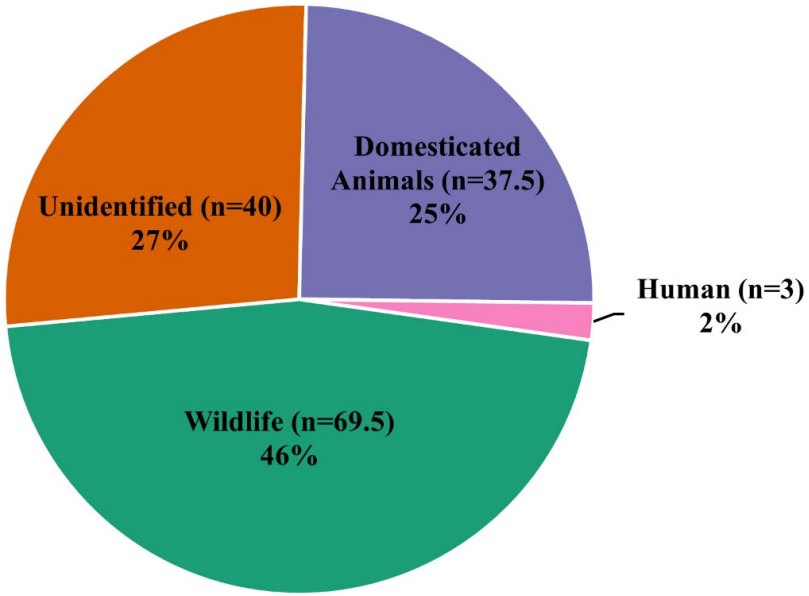


- Funding from the Texas State Soil and Water Conservation Board
- Study, started in July 2023 and ended February 2024, at four locations on the East and West Forks
- United States Geological Survey field-collected 20 routine (16) and event (4) water samples
- Analyzed by the Soil and Aquatic Microbial Laboratory at Texas A&M University using traditional ERIC-RP BST methods
- Identify solutions to reduce bacteria which exceed healthy levels in the East and West Forks of Double Bayou

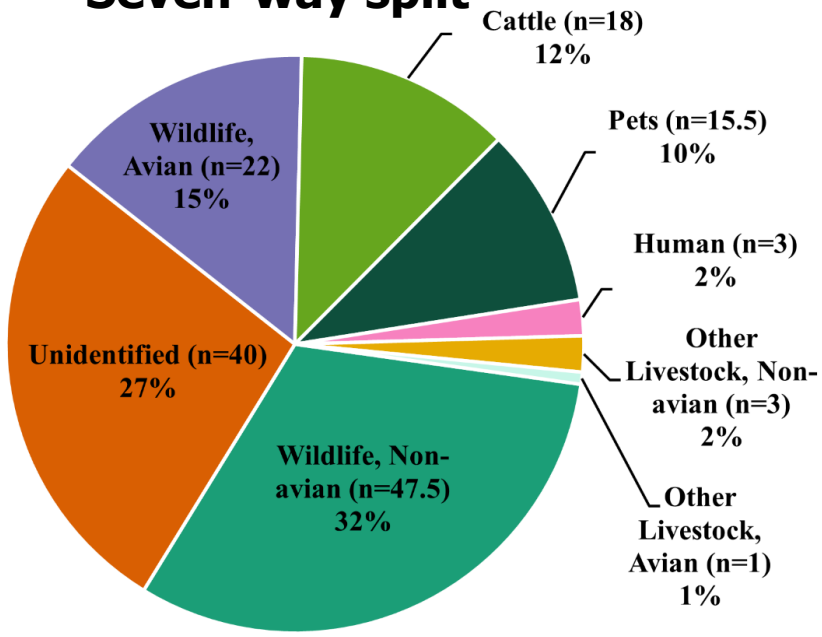
Bacterial Source Tracking Results

- 150 *E. coli* isolates fingerprinted using ERIC-PCR and RP and compared against the Texas *E. coli* BST Library (ver. 03-20) for source determination
- Major *E. coli* sources in the watershed include wildlife (non-avian & avian) and domesticated animals (cattle & pets)
- Human source contributions detected at some sites but represent a limited portion of *E. coli*
- Relatively high proportion of unidentified isolates could be 'unique' organisms or naturally occurring bacteria not represented in the library

Three-way split

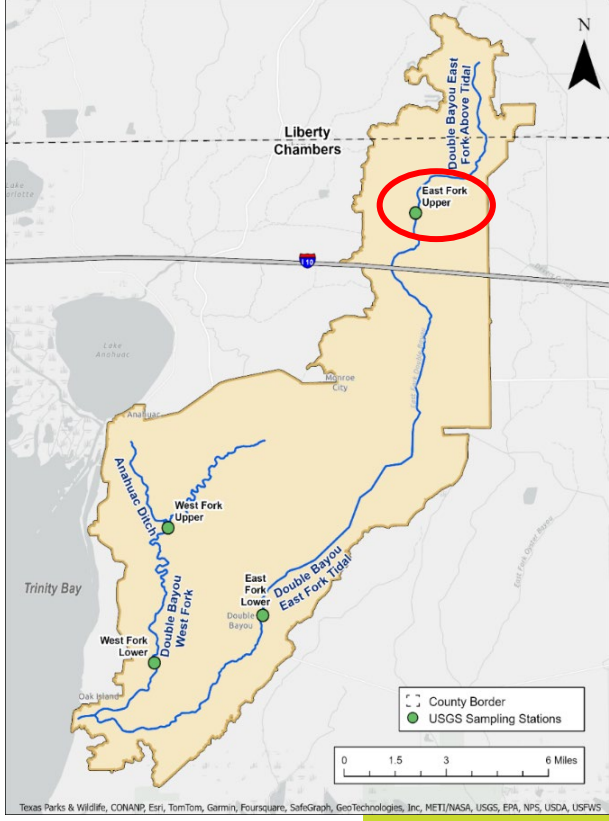


Seven-way split



Bacterial Source Tracking Assessment East Fork Upper Station

- Major *E. coli* sources include wildlife (non-avian & avian)
- Highest percentages as wildlife on East Fork, primarily non-avian
- Ambient sample with human source



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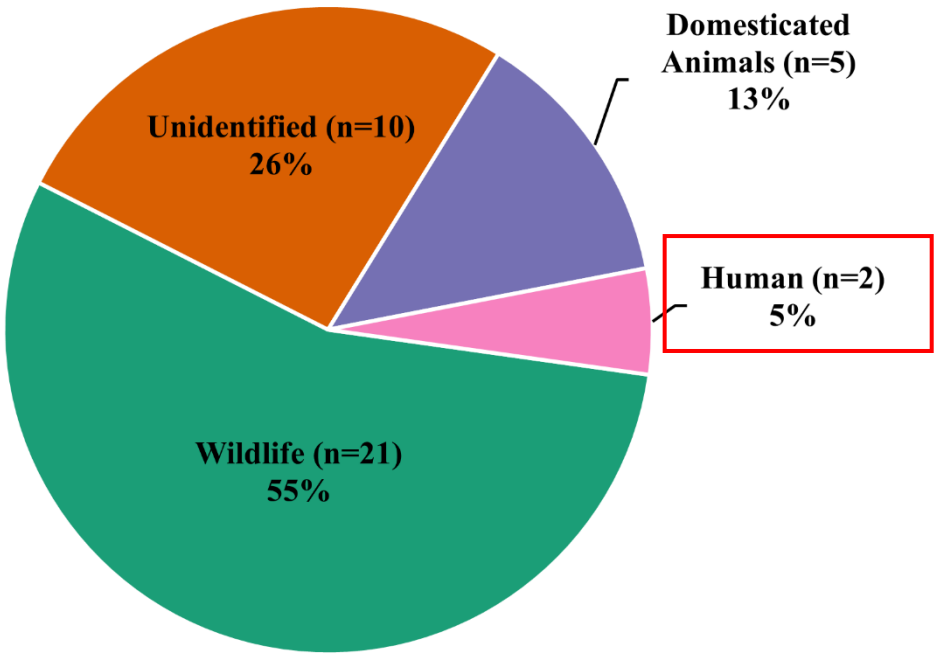

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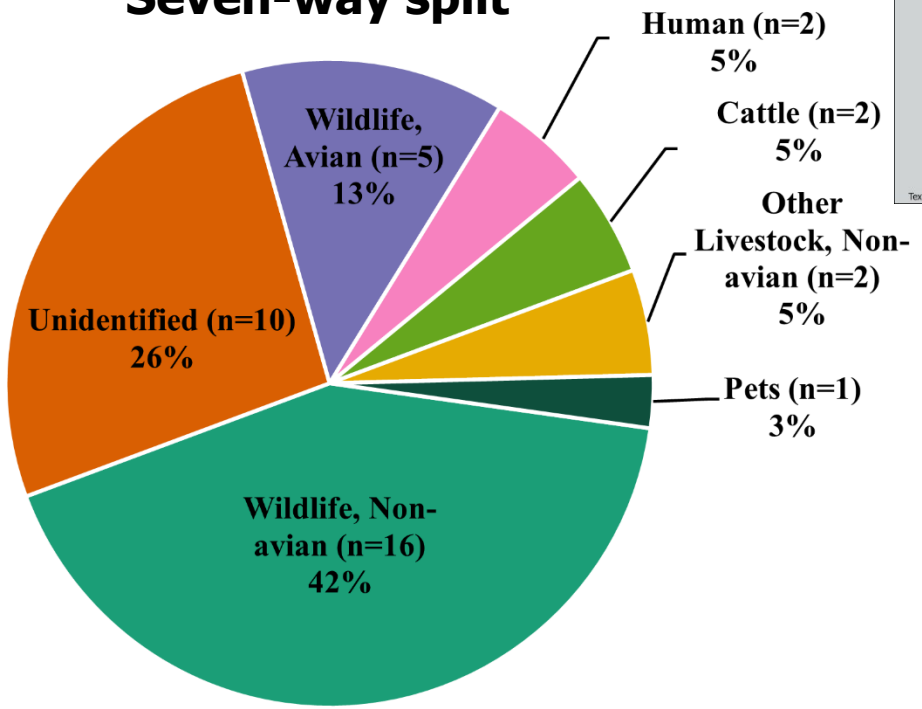
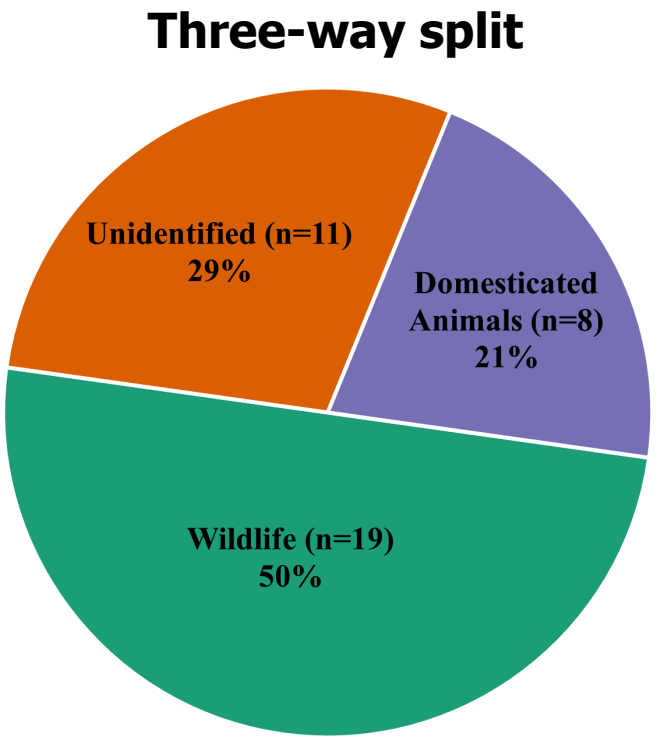
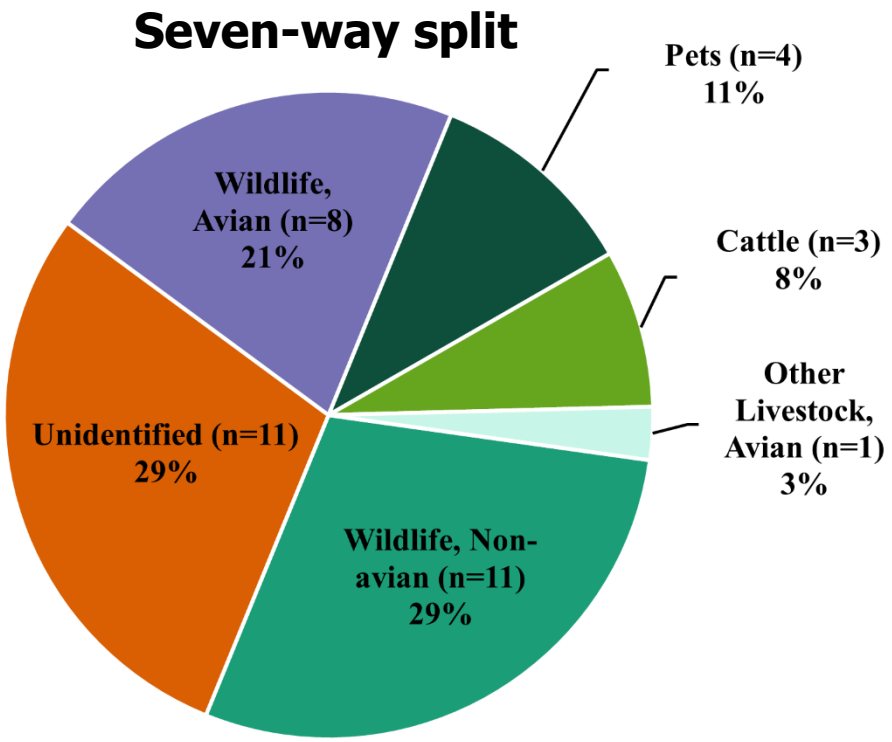
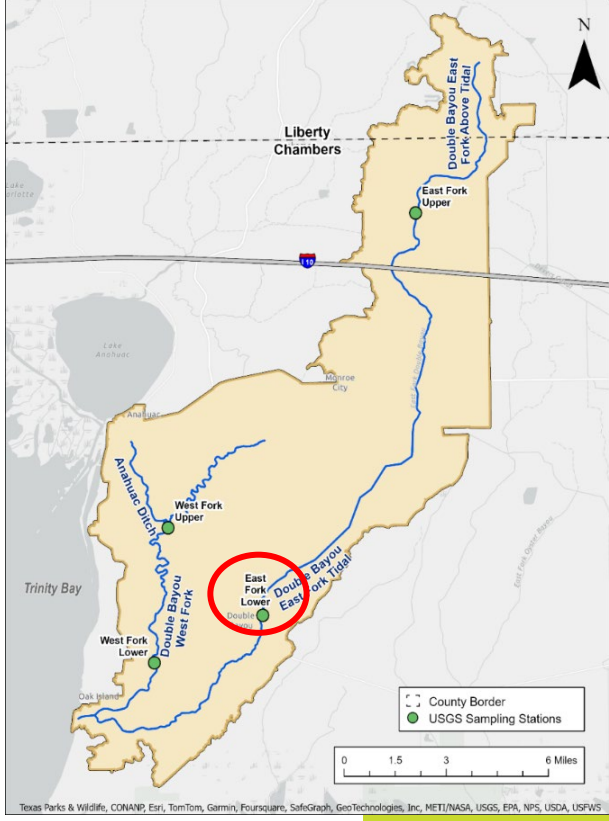


Bacterial Source Tracking Assessment East Fork Lower Station

- Major *E. coli* sources include wildlife (non-avian & avian)
- Highest percentages as wildlife on East Fork, primarily non-avian

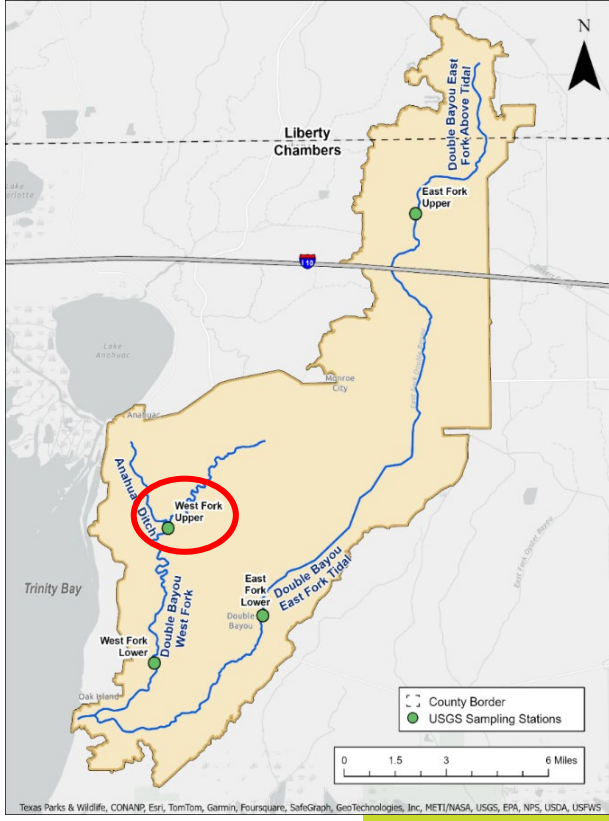




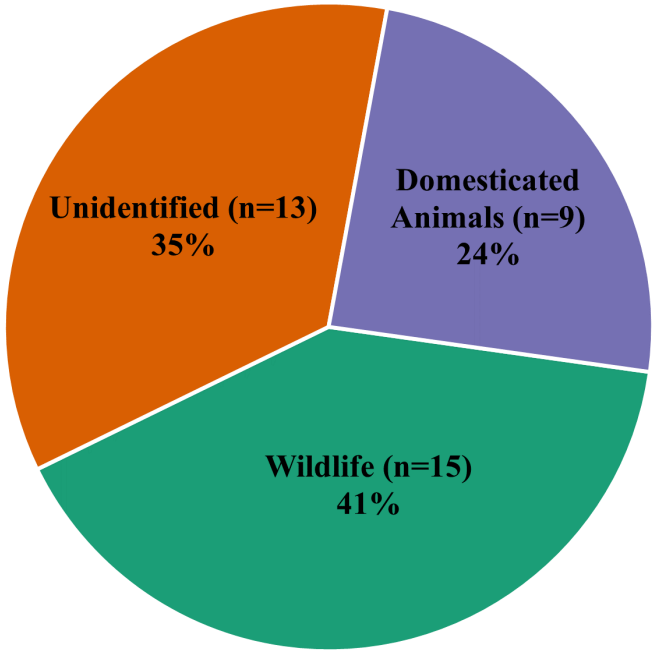


Bacterial Source Tracking Assessment West Fork Upper Station

- Major *E. coli* sources include wildlife (non-avian & avian)
- Highest percentages of domesticated animals (cattle & pets) on the West Fork



Three-way split



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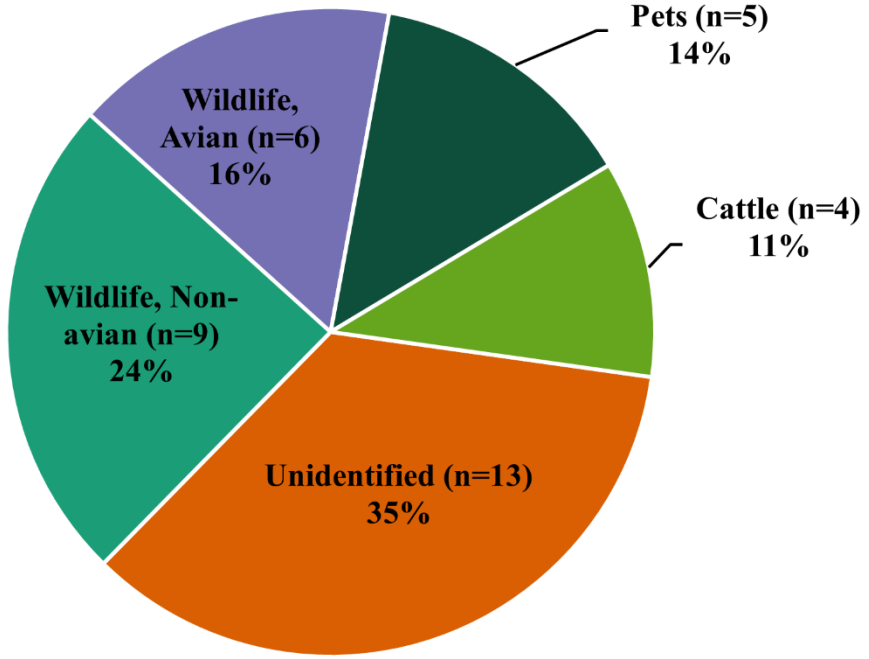
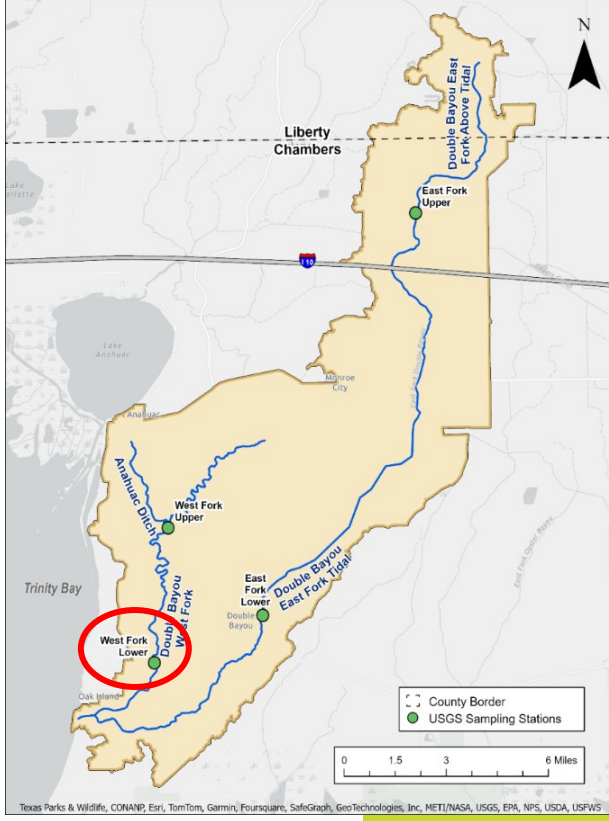


Bacterial Source Tracking Assessment
West Fork Lower Station

- Major *E. coli* sources include domesticated animals, primarily cattle and pets
- Highest percentages of domesticated animals (cattle & pets) on the West Fork
- Event sample with human source



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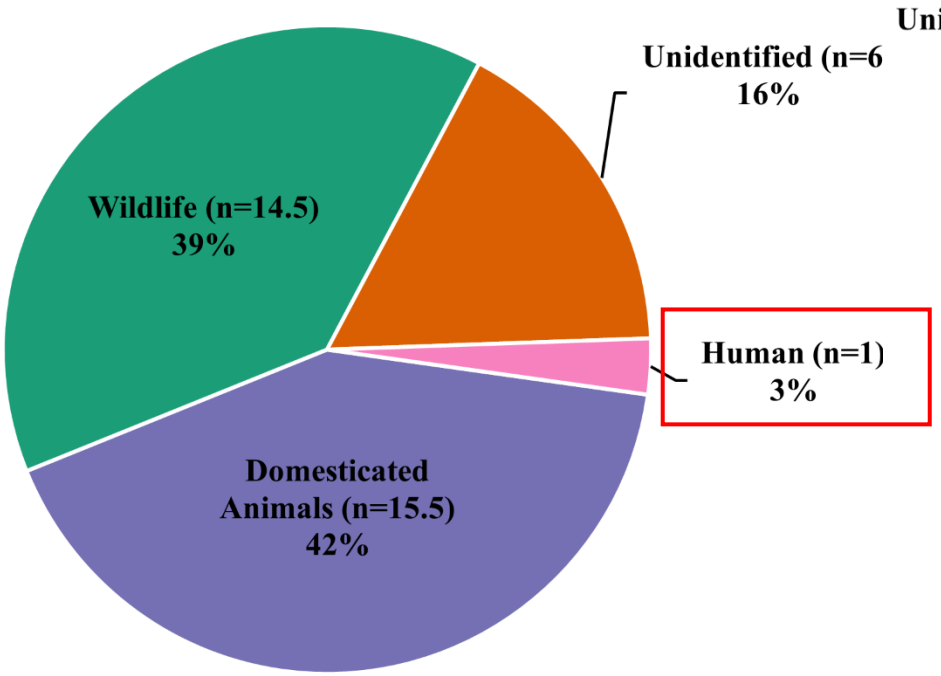

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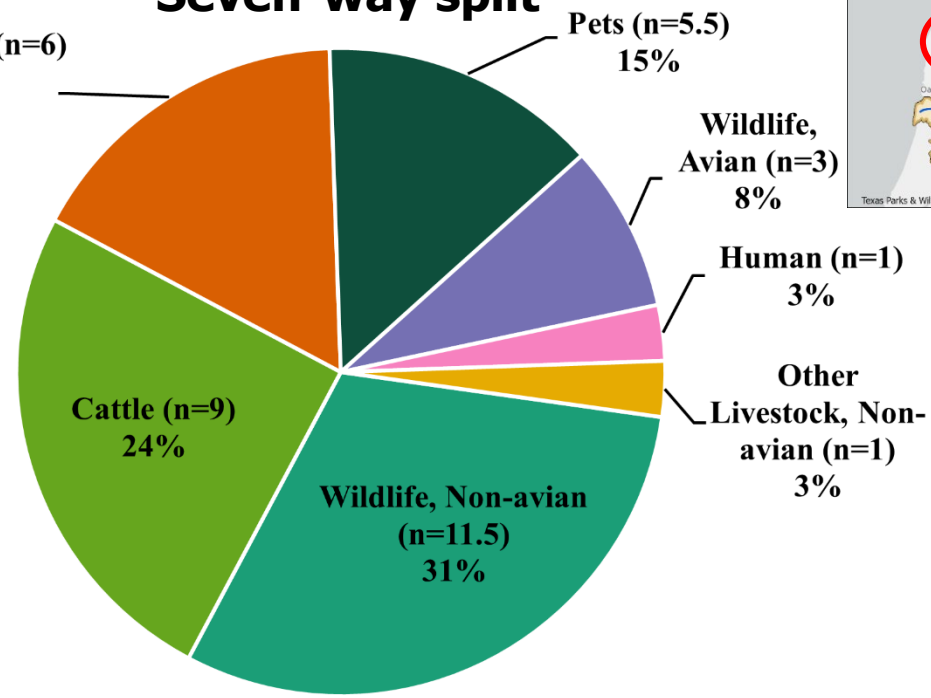

Next Steps

- Started summer 2024, funding from GBEP
- Using SWAT+ (Soil and Water Assessment Tool) to develop a watershed-based model of the Double Bayou Watershed to predict the associated water quality benefits (reduced NPS FIB loads) associated with different types of Green Infrastructure
- BST data will be used to improve model performance
- Develop scenarios of different locations and sizes of green infrastructure, such as wetlands, throughout the watershed that could improve water quality and inform decisions about where to strategically implement projects
- Goal is to develop a GI strategy with stakeholder input

Any questions?

For further information, email Kirsten Vernin at kvernin@harcresearch.org or visit www.HARCresearch.org.

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DOUBLE BAYOU WATERSHED PARTNERSHIP

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