

2023 Governors Water Conference

Industry Insights from GRDA

Innovate & Educate

Making the C.A.S.E.

The People we Serve need Innovation & Education

Clean

Accessible

Safe

Economical

2023 EFO

Frank Codon Award Winner



Insights from the Grand River Dam Authority's Microbial Source Tracking Program

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and Darrell Townsend



GRDA's Source Tracking Program



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Validating Microbial Source Tracking Markers and Assessing the Efficacy of Culturable *E. coli* and *Enterococcus* Assays in Ozark Streams, USA

[Open access](#) | [Published: 25 May 2023](#) | [234](#), Article number: 348 (2023)

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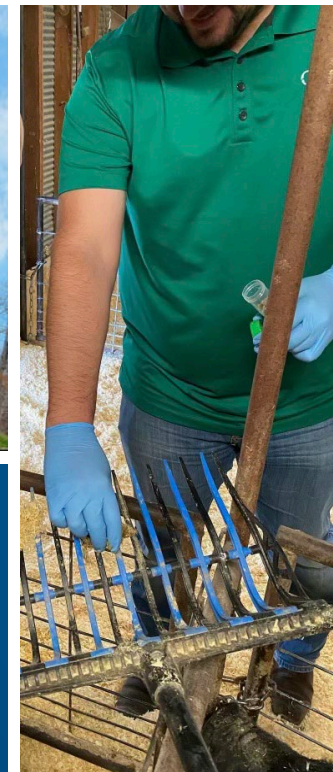
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Water, Air, & Soil Pollution

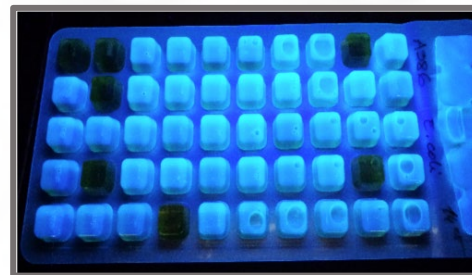
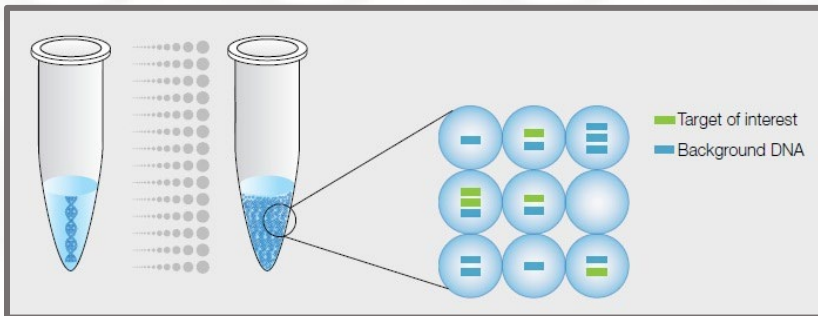
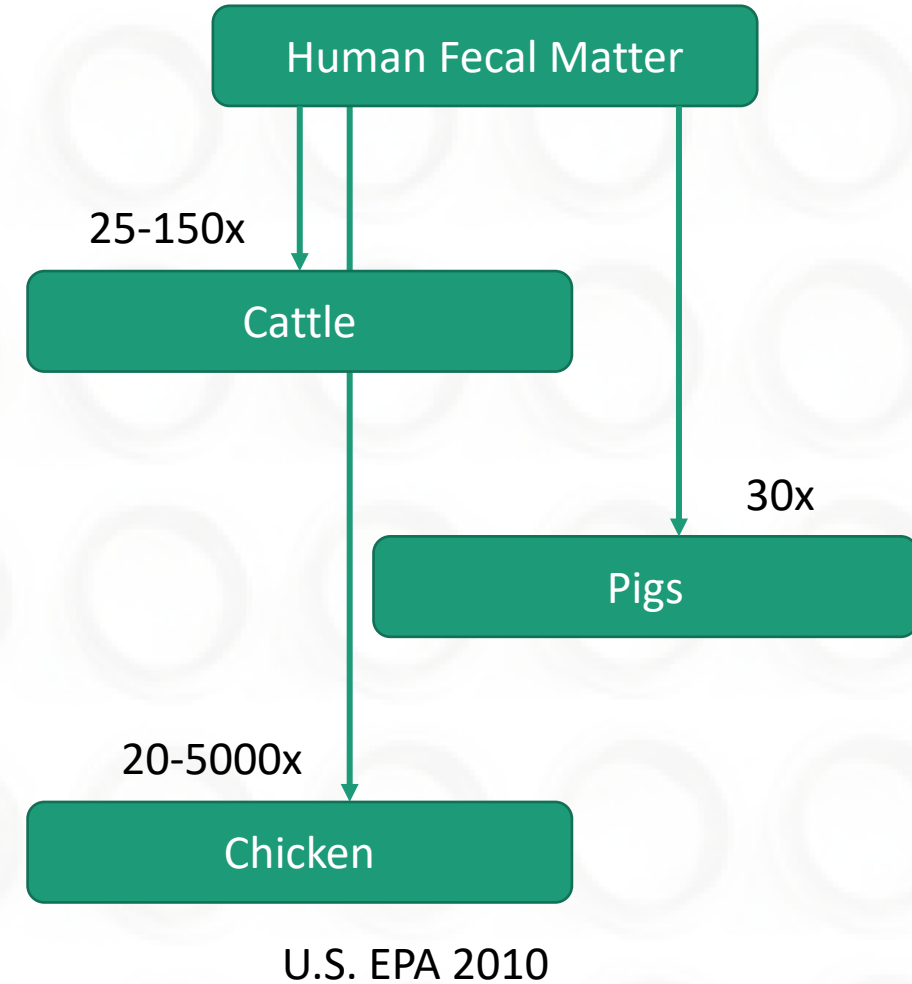
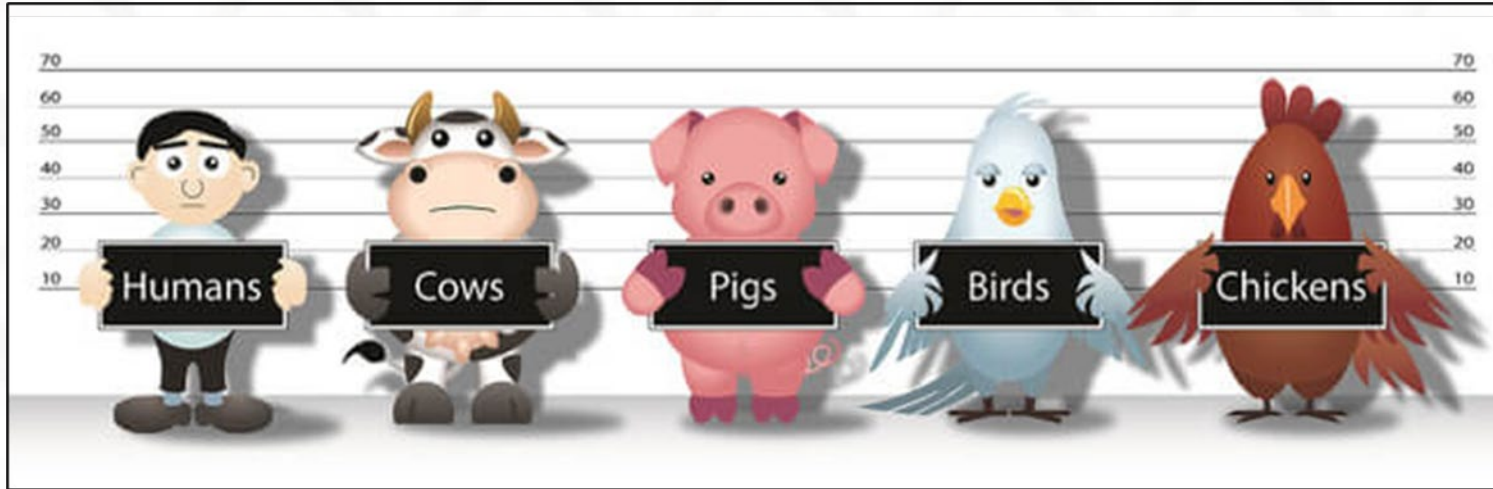
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What is Source Tracking? Why is it important?



MST Program Successes

Big Cabin Area

Located and are working to remediate WWTP issue

Duck Creek Area

Helped adjacent landowner and ODEQ with a marijuana grow sewer issue

Tahlequah Area

Located and remediated nonfunctional sewer system

Horse Creek Area

Has helped inform conservation easement selection and BMP usage

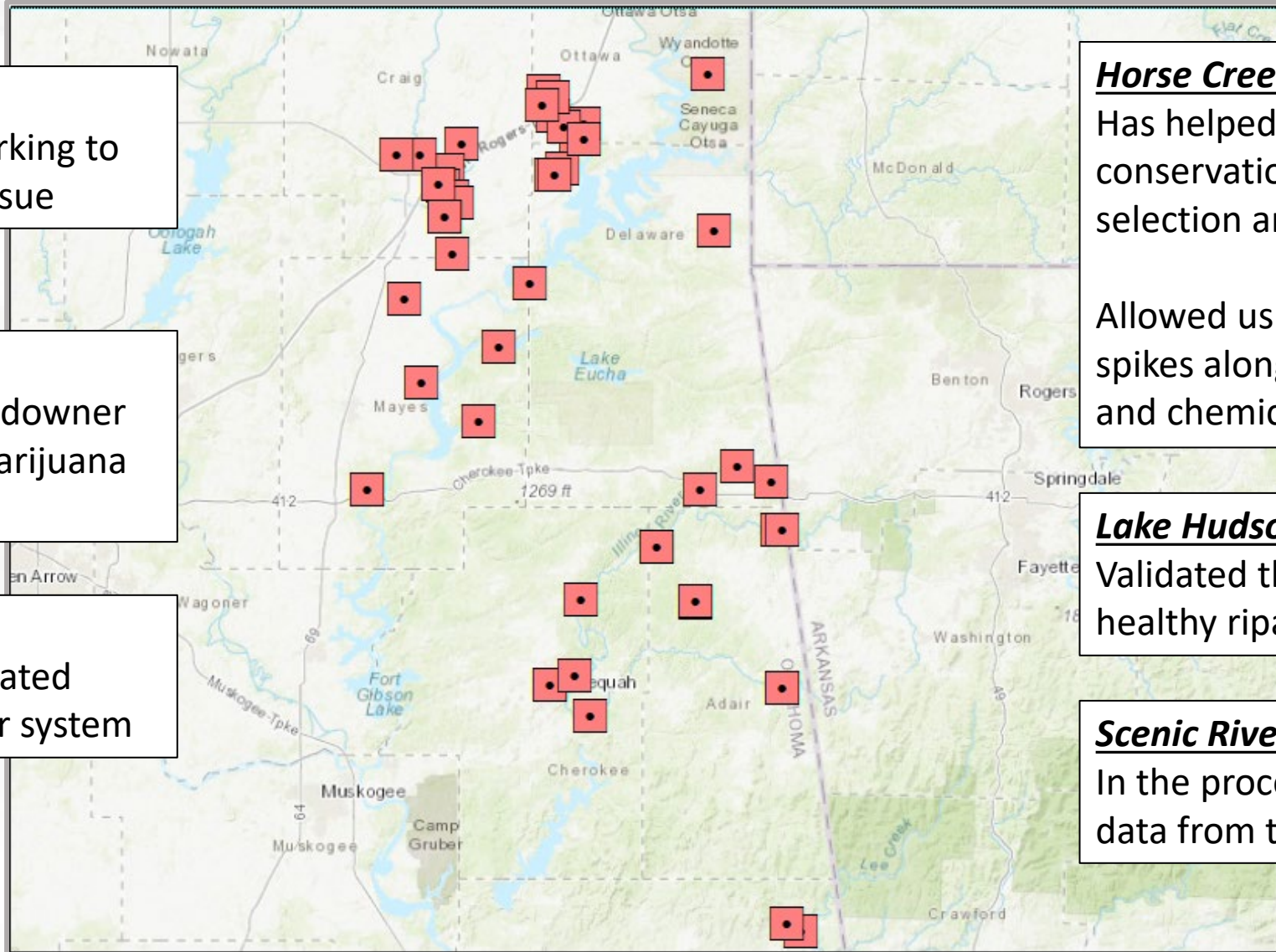
Allowed us to see nutrient spikes alongside poultry litter and chemical applications

Lake Hudson Area

Validated the importance of healthy riparian areas

Scenic Rivers Area

In the process of analyzing data from these sites



Educational Outreach

- Through many outlets, we provide outreach that is Educational (school focused) and Informational (public focused).
- Talks can be general or can be focused on specific needs (ex: Landscaping, Rain Barrels, etc..)
- Guard the Grand
 - The Guard the Grand program is a watershed education program designed to involve the public in improving water quality throughout the Grand Lake watershed.
- **Awards Won:**
 - Outstanding Stewards of Americas Waters (National Hydropower Association - 2023)
 - Best of the Environmental Best (Keep Oklahoma Beautiful – 2022)



University Partnerships

- Work with Students of all levels, Undergraduate and Graduate.
- Develops the next generation of natural resources professionals to find innovative solutions to water problems and educate others about water.



Thank You!

- Stephen Nikolai
- steve.nikolai@grda.com



Our Mission:

“We deliver affordable, reliable ELECTRICITY, with a focus on EFFICIENCY and a commitment to ENVIRONMENTAL STEWARDSHIP.

We are dedicated to ECONOMIC DEVELOPMENT, providing resources and supporting economic growth.

Our EMPLOYEES are our greatest asset in meeting our mission to be an Oklahoma Agency of Excellence.”



The Fecal Bacteria Problem

- 23% of Assessed stream miles in the United States are listed as impaired by fecal pollution.
- 74.5% of Assessed stream miles in Oklahoma are listed for not supporting Primary Body Contact
 - 71.9% are listed for *Enterococcus* Bacteria
 - 25.7% are listed for *E. Coli*
- This prevalence of streams being listed for *Enterococcus* suggests that the current method for evaluating *Enterococcus* may be too broad.
- *We also must understand the source of a problem to be able to fix it.*

Management Implications, Summary, and Conclusions:

- Since 2019 we have been able to validate multiple MST assays for use in Eastern Oklahoma.
- We have found that culturable methods and genetic methods only agreed well in urban areas with high levels of Human fecal pollution. *Enterococcus* (Enterolert) did not agree with any of makers when no human source was present.
- We have found that the most prominent source of fecal pollution in Oklahoma streams are Cows and Humans depending on the landscape usage.
- We support the continued use of E. Coli indicators, but it is crucial to use in conjunction with MST to identify the source of contamination so mitigative steps can be taken.