Implementation of the Middle and Lower Cibolo Creek Watershed Protection Plan

Texas Water Resources Institute
make every drop count

TEXAS STATE Soil & Water CONSERVATION BOARD

Texas Water Resource Institute

Texas Water Resources Institute
make every drop count

The Texas Water Resource Institute provides science-based, community-supported solutions for the state's pressing water quantity and quality challenges through internal expertise and external collaborations

Our *Water Quality Improvement Program* works to restore many of the more than 400 impaired water bodies in Texas, while also proactively protecting unimpaired watersheds

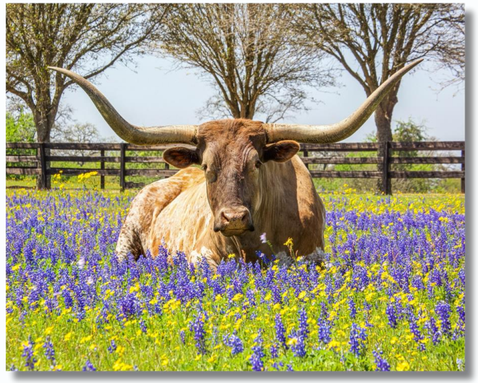
Our *Water Resources Outreach and Training Program* targets both interested citizens and water professionals because understanding water issues today is critical

Water Quality

MANAGEMENT IN TEXAS

Barriers to Water Management and Monitoring

- Data gaps
  - Texas is BIG, y'all
  - 90-95% privately owned
- Water Quality Impairments
  - Diverse use scenarios and climates
  - Management strategies rely on data and broad participation



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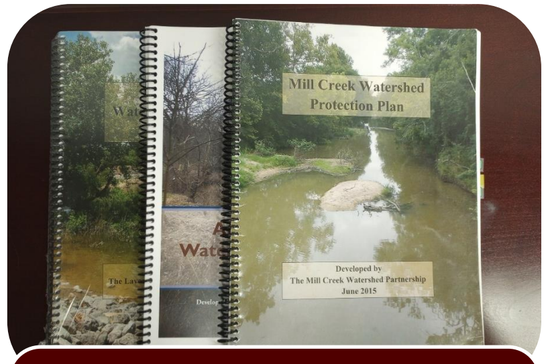
Middle and Lower Cibolo Creek Watershed Protection Plan

2004
Impairment Identified

Water quality sampling found *E. coli* bacteria and dissolved oxygen in the creek exceeding the recreational use standard

2017
WPP Initiated

TSSWCB, TCEQ and Texas A&M AgriLife Extension worked with a local steering committee to create the WPP



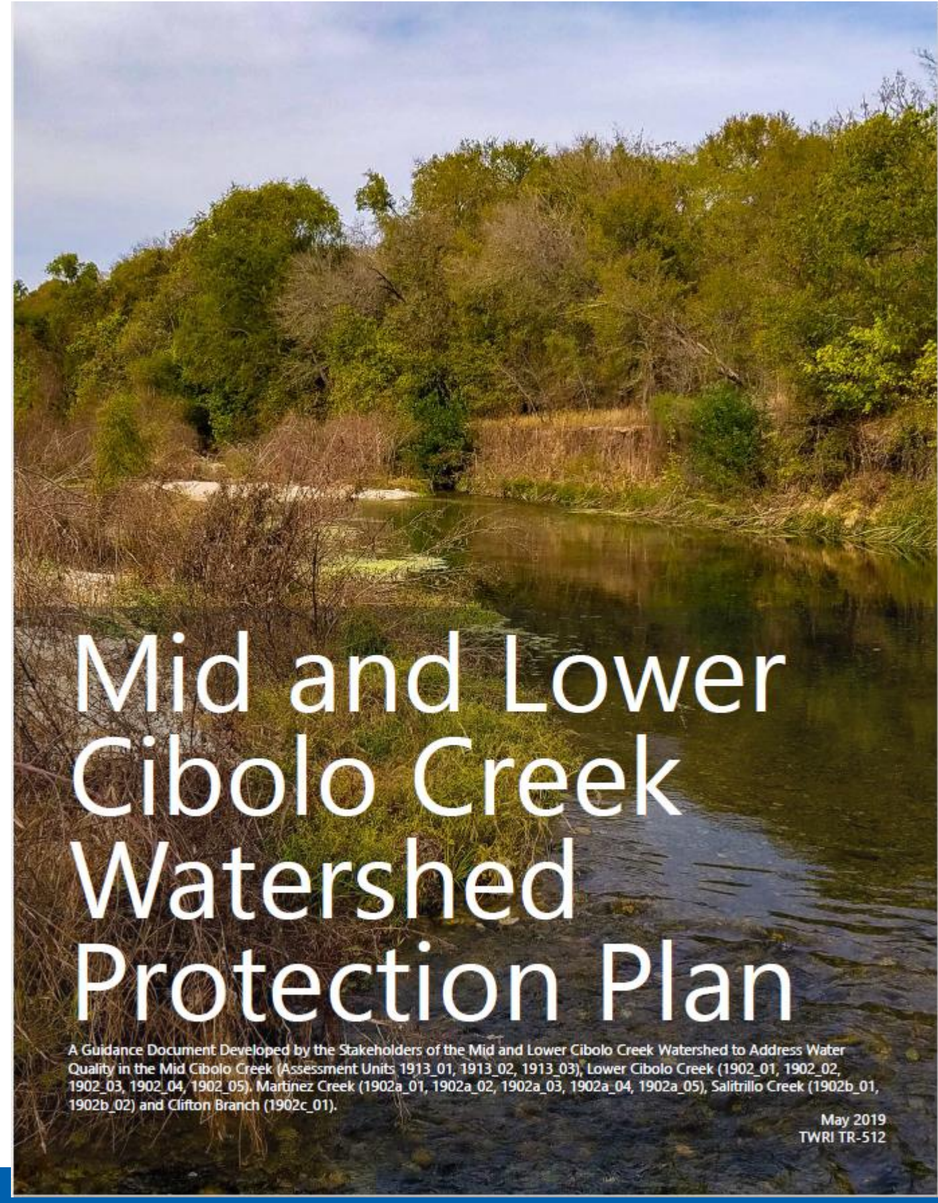
2019
WPP Accepted

WPP was accepted by the EPA as a watershed-based plan and became eligible for grant funding

Watershed Protection Plan

- Published in 2019
- Stakeholder Driven Strategy for Restoring Water Quality
- Strategies for Plan Implementation Include:

1. Developing and Implementing Conservation Plans in Priority Areas
2. Feral Hog Removal and Management
3. Identify problematic OSSF's and work to bring systems into compliance
4. Reduction of illicit Dumping and proper disposal of Animal Carcasses
5. Urban Stormwater Planning and Management
6. Installation of Urban Best Management Practices
7. Implementation of Pest Waste Program
8. Planning and Implementation of Wastewater Reuse
9. Sanitary Sewer Overflow - Infrastructure maintenance and replacements



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The TWON program is for Texas residents who depend on household wells for their drinking water needs.

Lone Star Healthy Streams

Protecting Texas waterways from bacterial contamination

Healthy Lawns
Healthy Waters

The Healthy Lawns and Healthy Waters Program aims to improve and protect surface water quality by enhancing awareness and knowledge of best management practices for residential landscapes.

TEXAS Watershed Steward

Provides science-based, watershed education to help citizens identify and take action to address local water quality impairments.

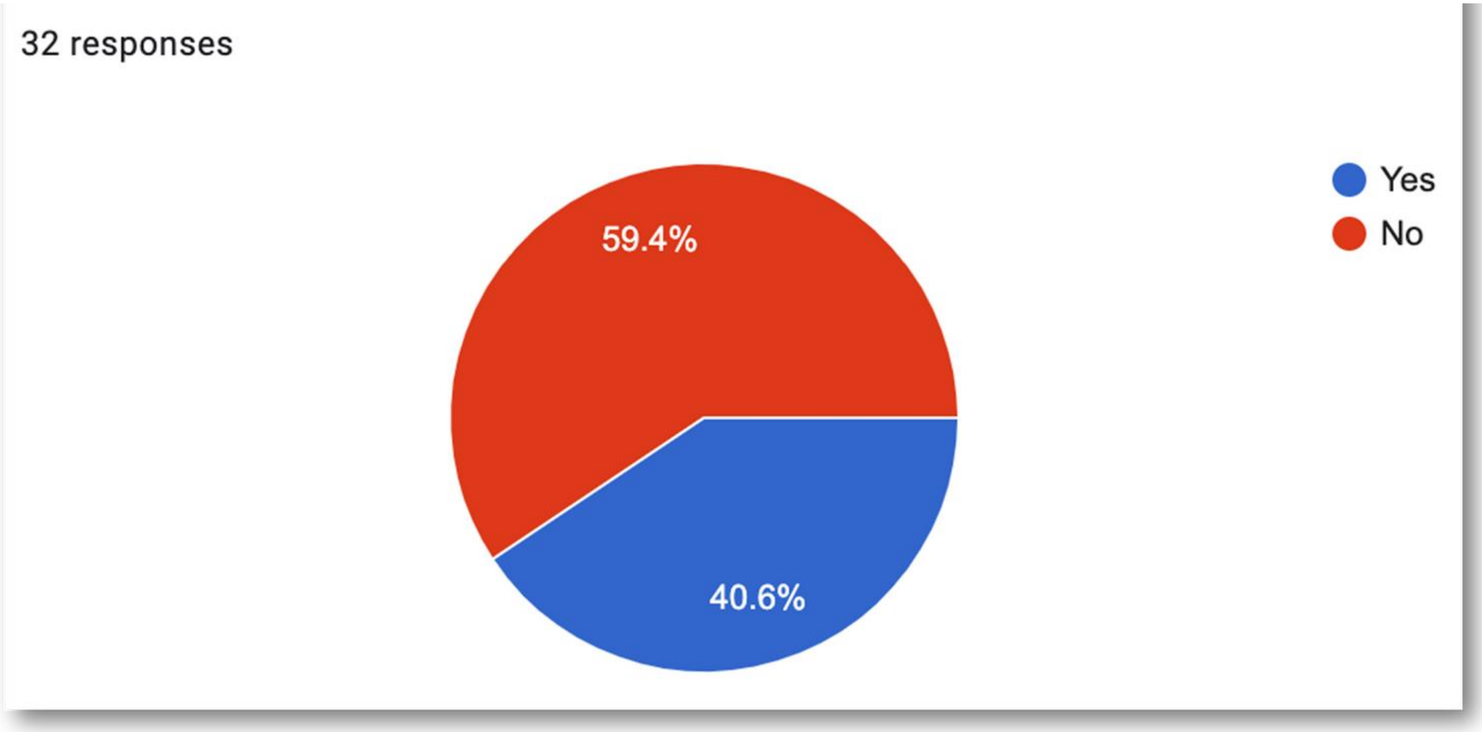
Active Engagement in Education and Outreach

Date	Program	Location
June 1st , 2022	Lonestar Health Streams	Seguin
February 22nd , 2023	Texas Watershed Stewards Program	Floresville
March 27th , 2024	Lonestar Healthy Streams	Floresville
Spring 2025, 2025	Texas Well Owners Network	Floresville

Do water education & outreach programs have an impact?

Are they reaching the right audiences?

POLL: ARE YOU PART OF A WATERSHED?



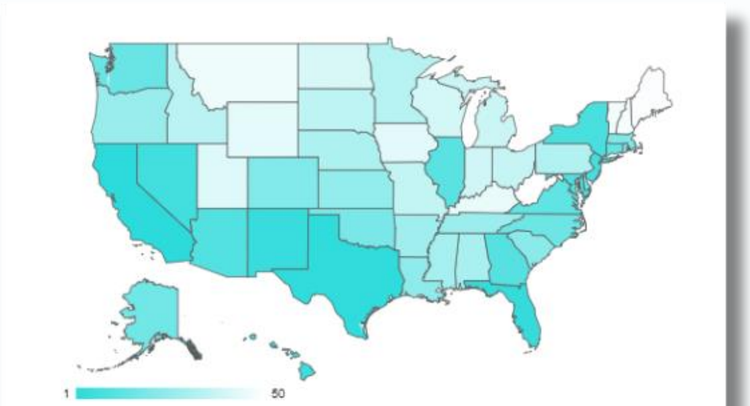
THE NOT "MY" PROBLEM PROBLEM

FUTURE OF TEXAS

- Growth
- Diversification
- Water and land use shifts

NEED TO REACH NEW AUDIENCES - BUT HOW?

Source: American City Business Journals, accessed from Texas A&M Texas Real Estate Research Center article: "Exploding population growth puts Texas cities in Top 10" (Accessed: 9/20/24)



EMBED ON YOUR WEBSITE

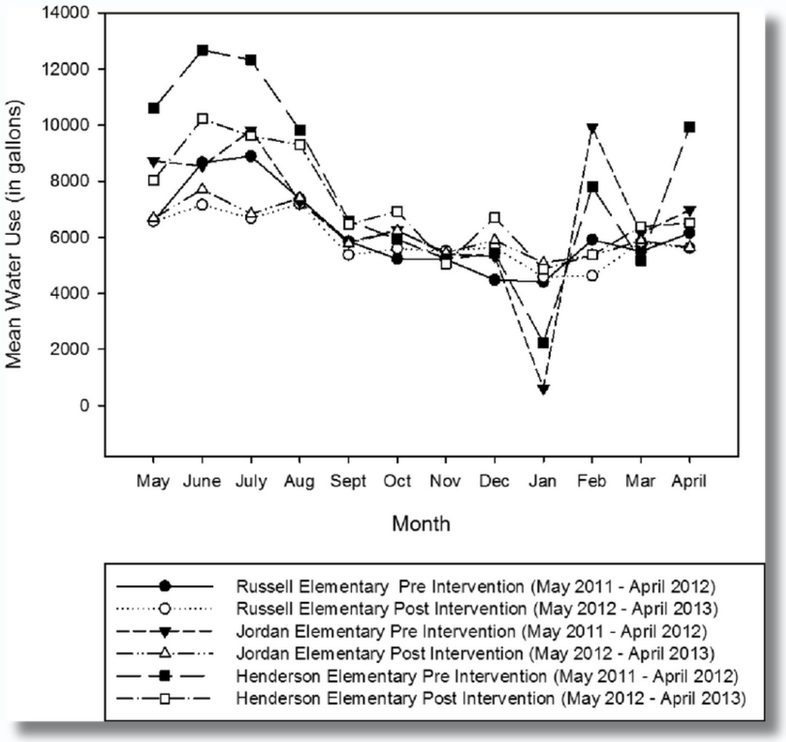
Most & Least Diverse States in the U.S.

Overall Rank	State	Total Score	Socioeconomic Diversity Rank	Cultural Diversity Rank	Economic Diversity Rank	Household Diversity Rank
1	California	70.77	3	1	13	8
2	Texas	70.48	4	6	12	27
3	Florida	69.88	20	5	33	7
4	New Mexico	69.83	34	7	3	2
5	Hawaii	69.77	35	3	5	15
6	Nevada	69.72	26	2	32	1
7	New Jersey	69.71	12	4	42	39
8	New York	69.62	1	8	43	4

Source: WalletHub, "Most & Least Diverse States in America" (2024)
Adam McCann, WalletHub Financial Writer. Sep 17, 2024

Water Education in Public Schools

- Broad audiences represent changing populations
- “Intergenerational transfer” = wider community impact
- Recruitment and skill-building for future water workforce
- State standards



Effects of a water conservation education program on water use in single-family homes in Dallas, Texas

Victoria Faubion Serna
Published 1 December 2014
Environmental Science, Education

The **City of Dallas Environmental Education Initiative (EEI)** **is a hands-on, inquiry-based, K-12 water conservation education program** that teaches students concepts about water and specific water conservation behaviors.

The results showed that over a period of one calendar year the water use in the single-family homes within each school zone and throughout the entire research area in this study experienced a statistically significant decrease in water use of approximately 501 gallons per home per month (independent, t-test, p>0.001).

Data from this research suggests that EEI is playing a role in decreasing the amount of water used for residential purposes.

K-12 Teacher Education

THROUGH A WATER LENS

Each teacher trained = 100–200 students/year

- Local examples
  - Hands-on
  - Action
- Personal connections
- Processes and Methods
- Careers

How to increase water education impacts?

CITIZEN SCIENCE

Case Study: ACCESS WATER PROGRAM

PROFESSIONAL DEVELOPMENT WORKSHOPS FOR EDUCATORS

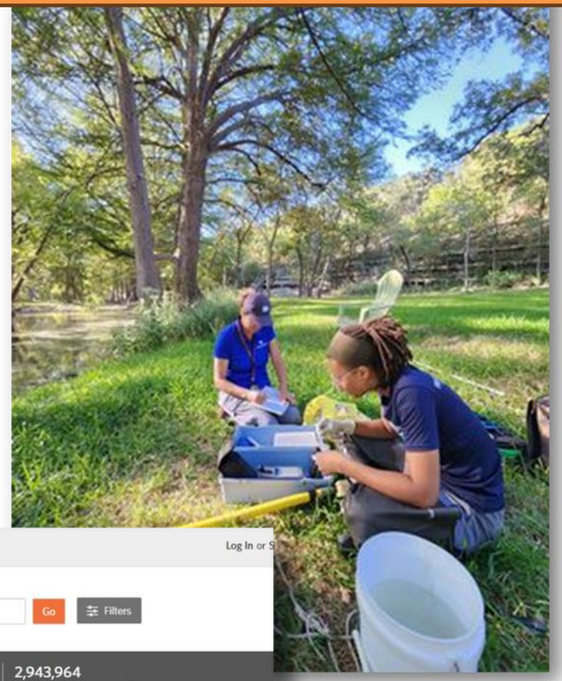
Empower educators with citizen science tools for water investigation

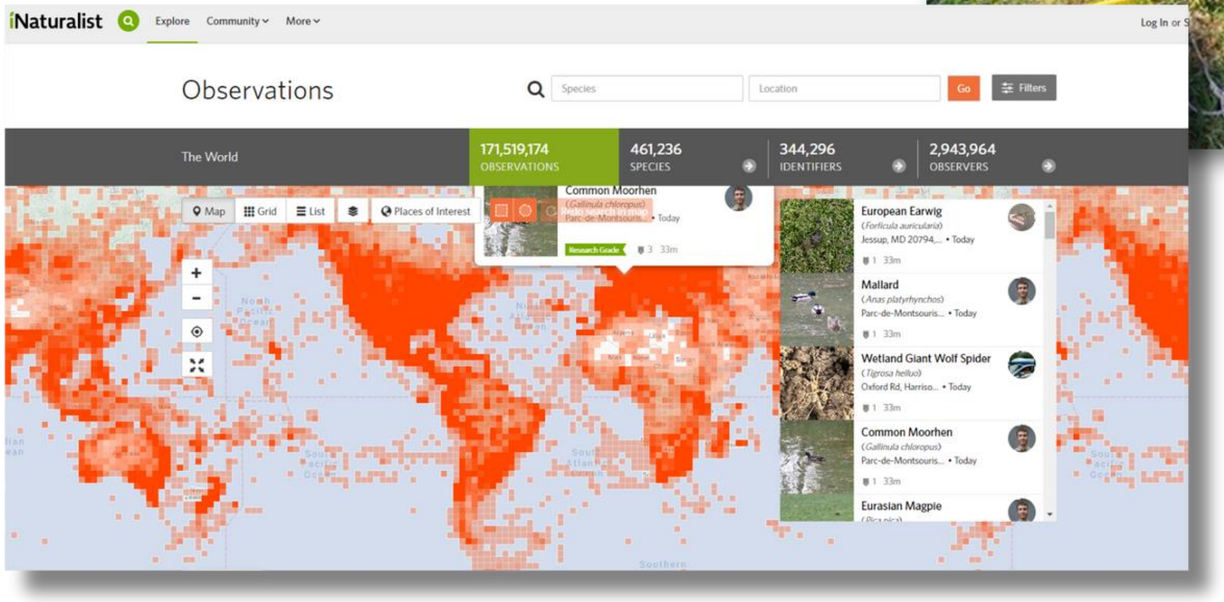
Meeting Community Needs:

- Water Quality Education - Human Impacts
  - MS, HS, Undergraduate
  - Research and Career Prep
    - Geographic Information Systems (GIS)
    - Student-led, open-ended inquiry
- Diversifying student population
- Rapid development leading to increased water impacts

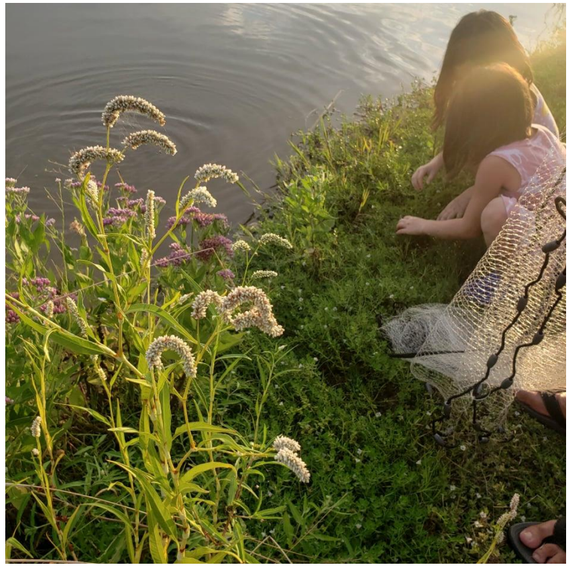
WHAT ELSE?

CITIZEN SCIENCE Learning by doing





scistarter
Science we can do together.

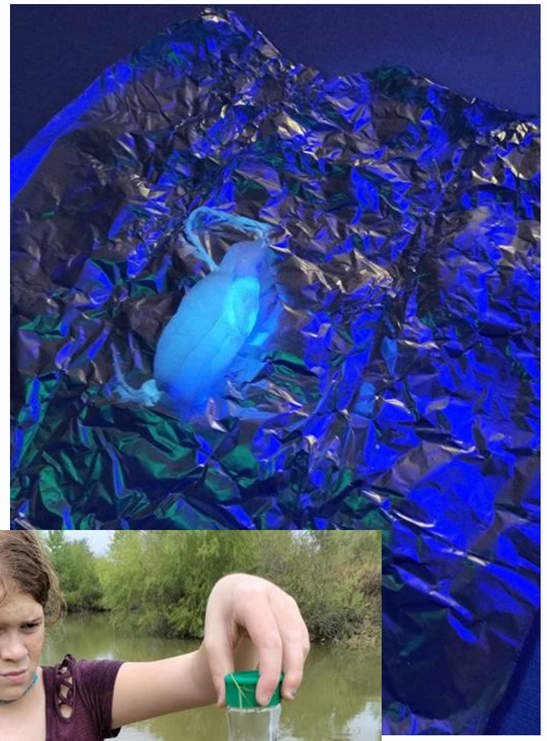


OB Monitoring ("Tampling")

Optical Brighteners (OBs):

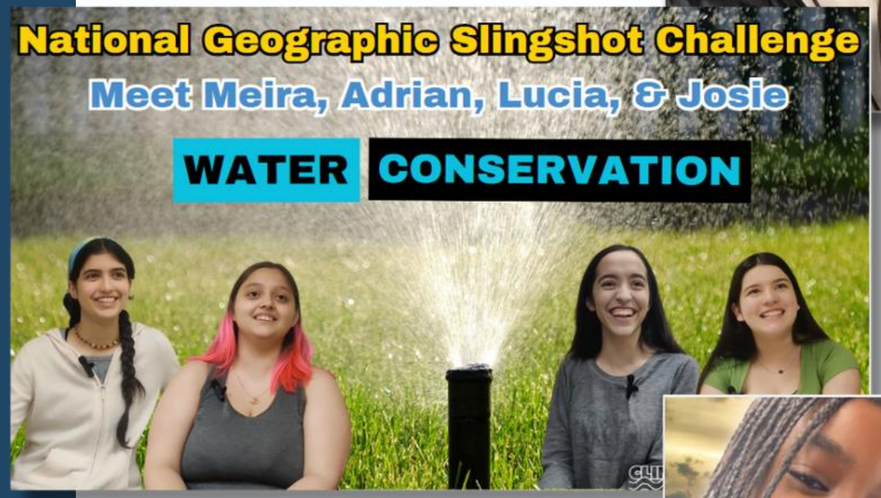
- Found in detergents and soaps, don't break down quickly
- Should be removed in wastewater treatment process
- Presence of OB's in waterways can alert to the presence of human sewage contamination as a proxy to bacterial sampling
- Fluoresce under a black light – glow ***blue***
- Adsorb to COTTON

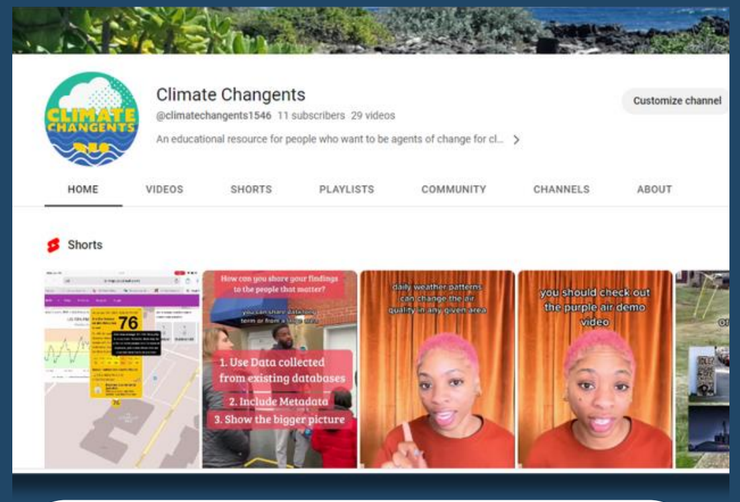
Perfect for classrooms?



VIDEO & SOCIAL MEDIA: EMPOWERING YOUTH AMBASSADORS

SOCIETY SLINGSHOT CHALLENGE





CLIMATE CHANGE AGENTS

climatechangents

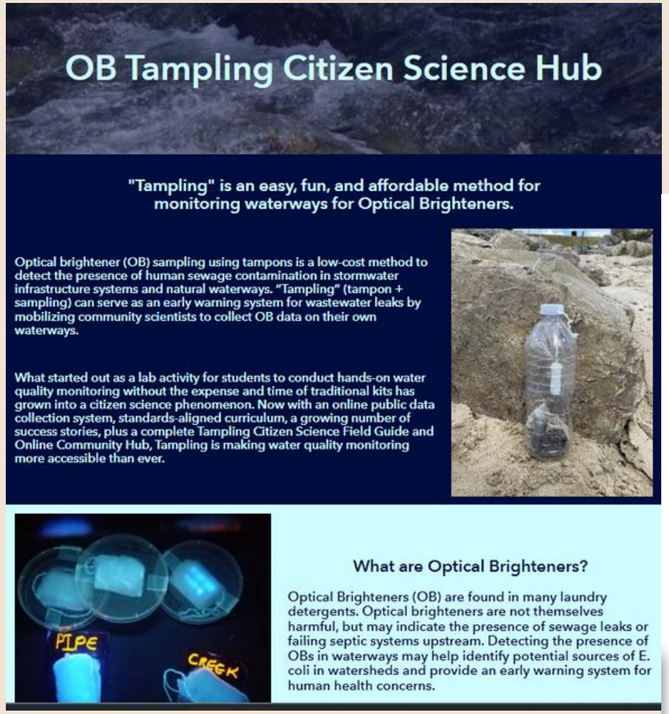
climate_changents

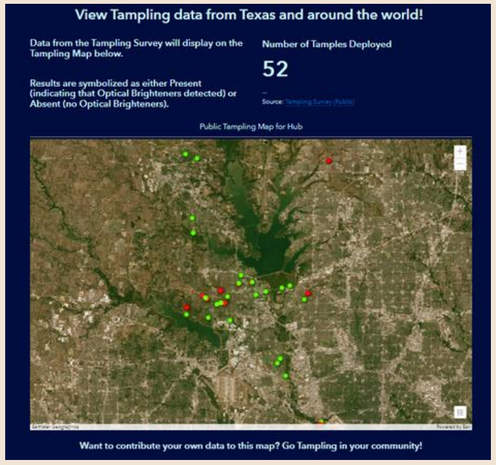
@climatechangents1546

FOLLOW US ON SOCIAL MEDIA!

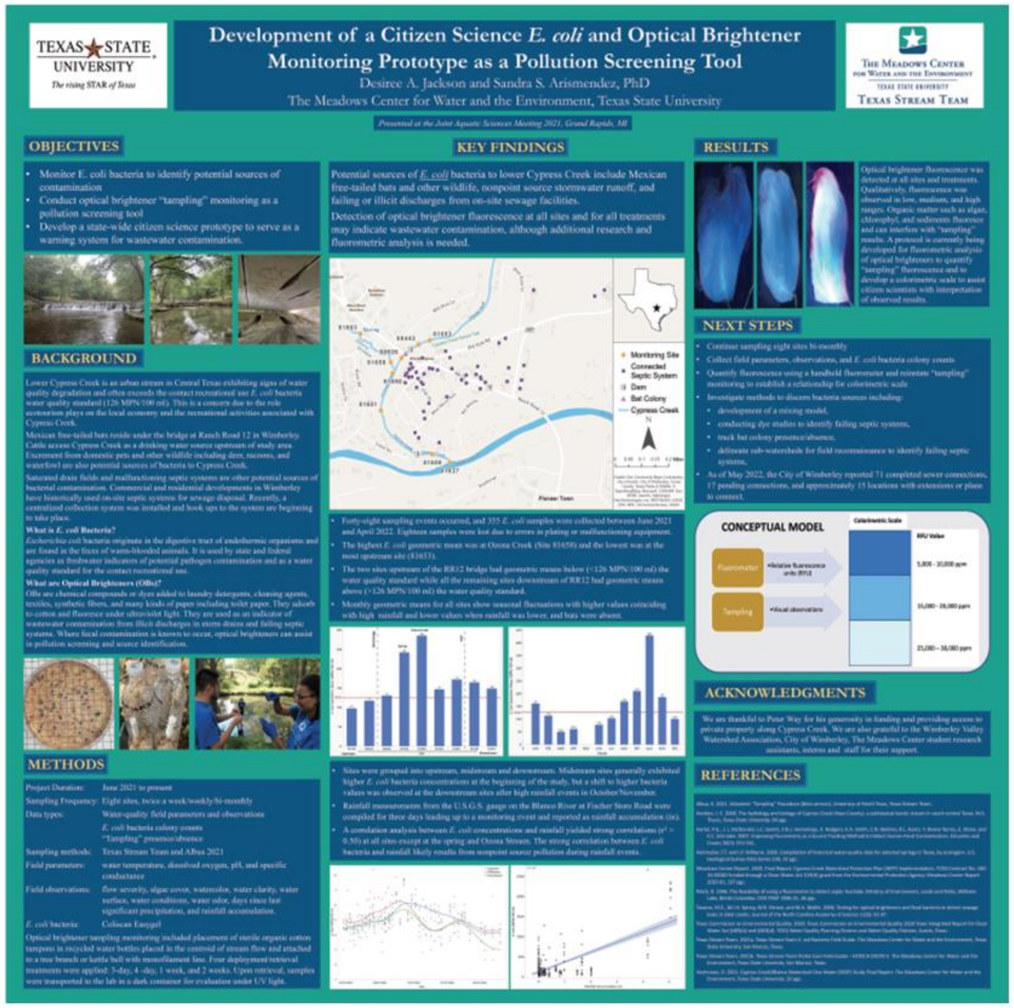
CO-CREATED MATERIALS TO MEET COMMUNITY NEEDS:

- Interactive Online Community Hubs for transparency
- Local partnerships to learn local concerns
- Connection with existing programs
- Fill gaps

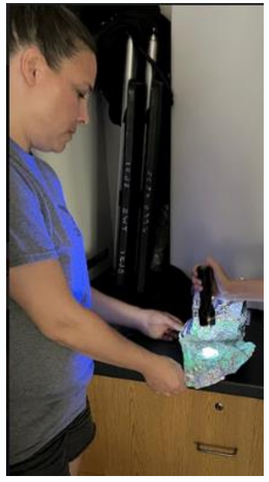


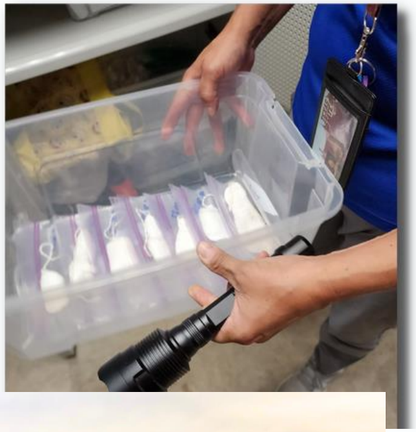


THE MEADOWS CENTER FOR WATER AND THE ENVIRONMENT
TEXAS STATE UNIVERSITY
TEXAS STREAM TEAM




CREDITS
FILMING -Chase
SPEAKING -Chase, Evelyn
DIRECTING -Evelyn
EDITING -Evelyn
0:55 / 0:59

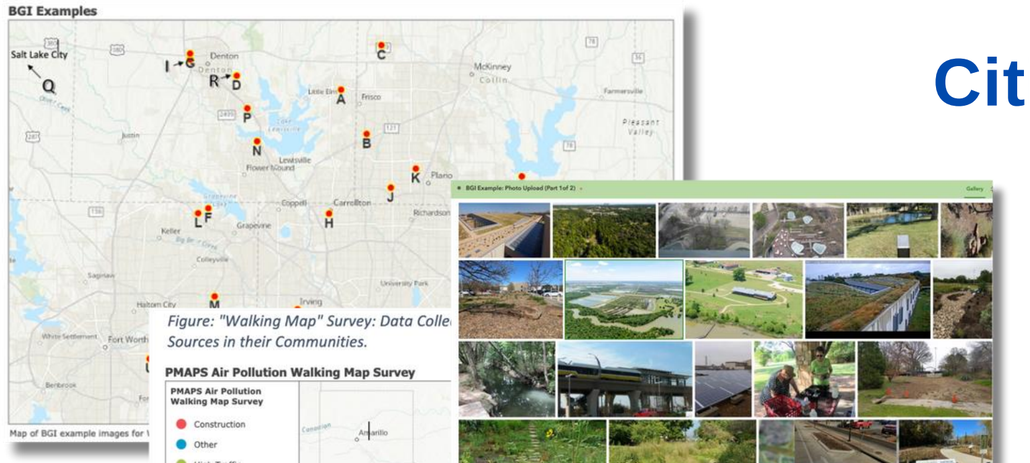





mpling Story: The Bats at Cypress Creek
The waterway under this bridge has a bacteria problem
YouTube


Optical Brightener Contamination in North Texas Watersheds
Example student research project StoryMap for Optical Brightener Tampling
Ben Hendrickson (PhD Student, University of North Texas) - PMAPS for Texas Intern
June 9, 2022

Using Citizen Science for data collection



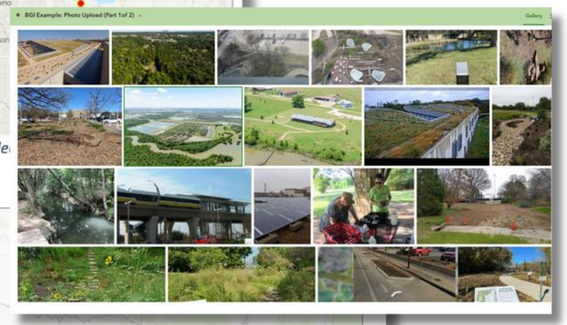
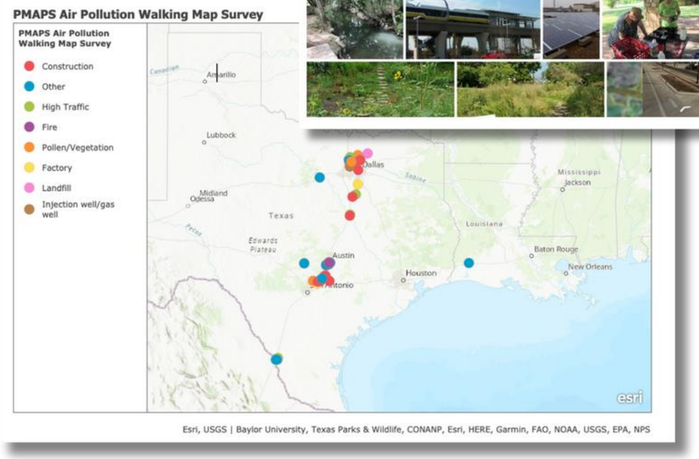
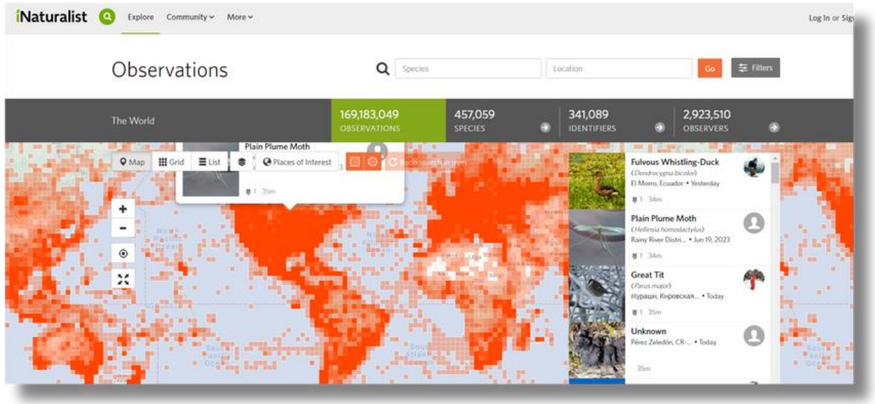


Figure: "Walking Map" Survey: Data Colle
Sources in their Communities.





Citizen Science:

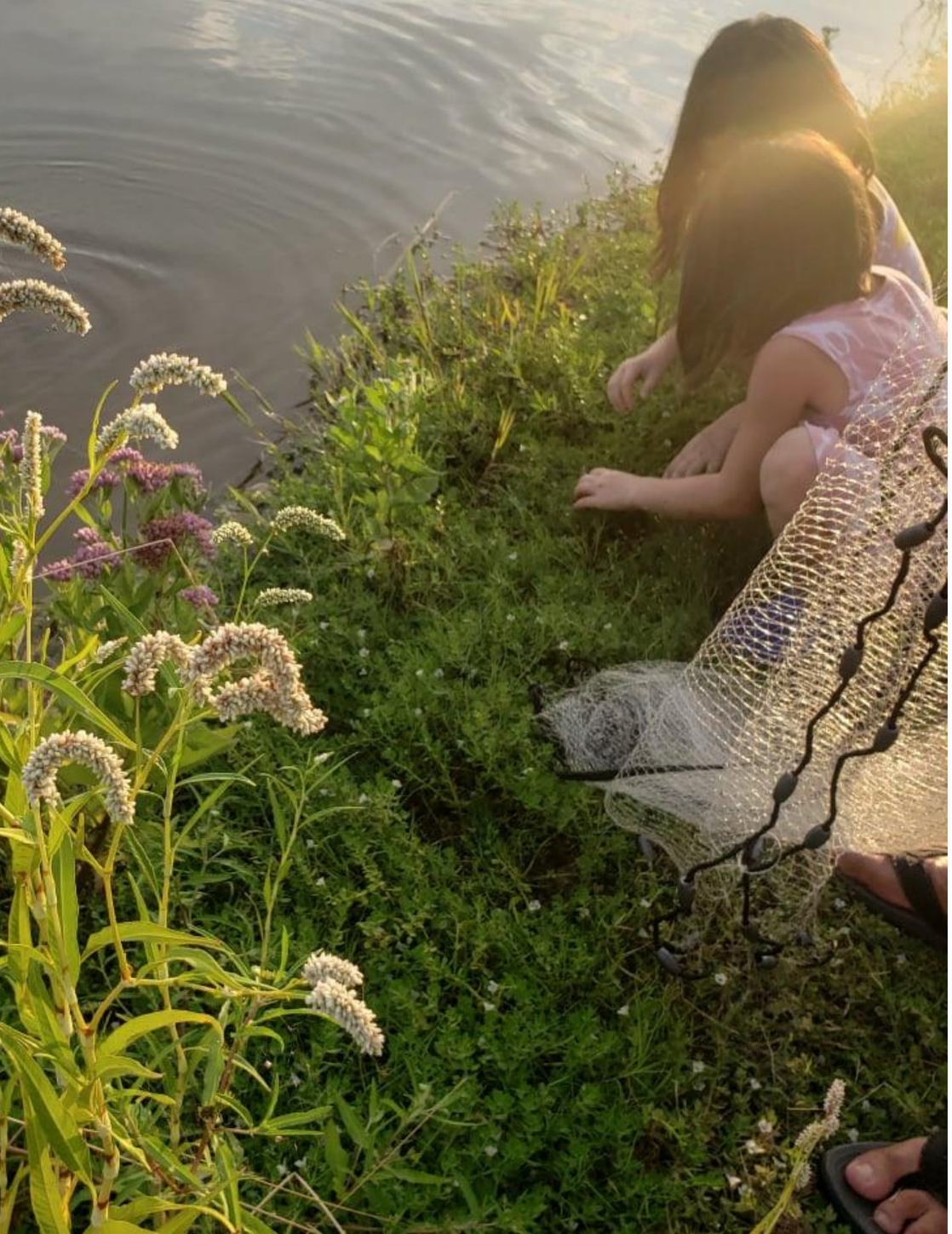
- Multi-disciplinary tool for educating and collecting data
- Track engagement, impacts
  - Importance of geo-spatial data collection apps
  - Today‘s Survey
  - **Favorite Tool: ArcGIS Online**

* **TIP: Use data that already exists, or is being collected for other purposes**

- iNaturalist, Texas Stream Team, SWQM, etc.

- **Citizen Science Evaluation Resources**
  - Citizen Science Assoc. (now AAPS)
  - citizenscience.org/resources/research-evaluation/

Also helps with next step: Sharing findings



THANK YOU!

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TEXAS A&M AGRILIFE

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