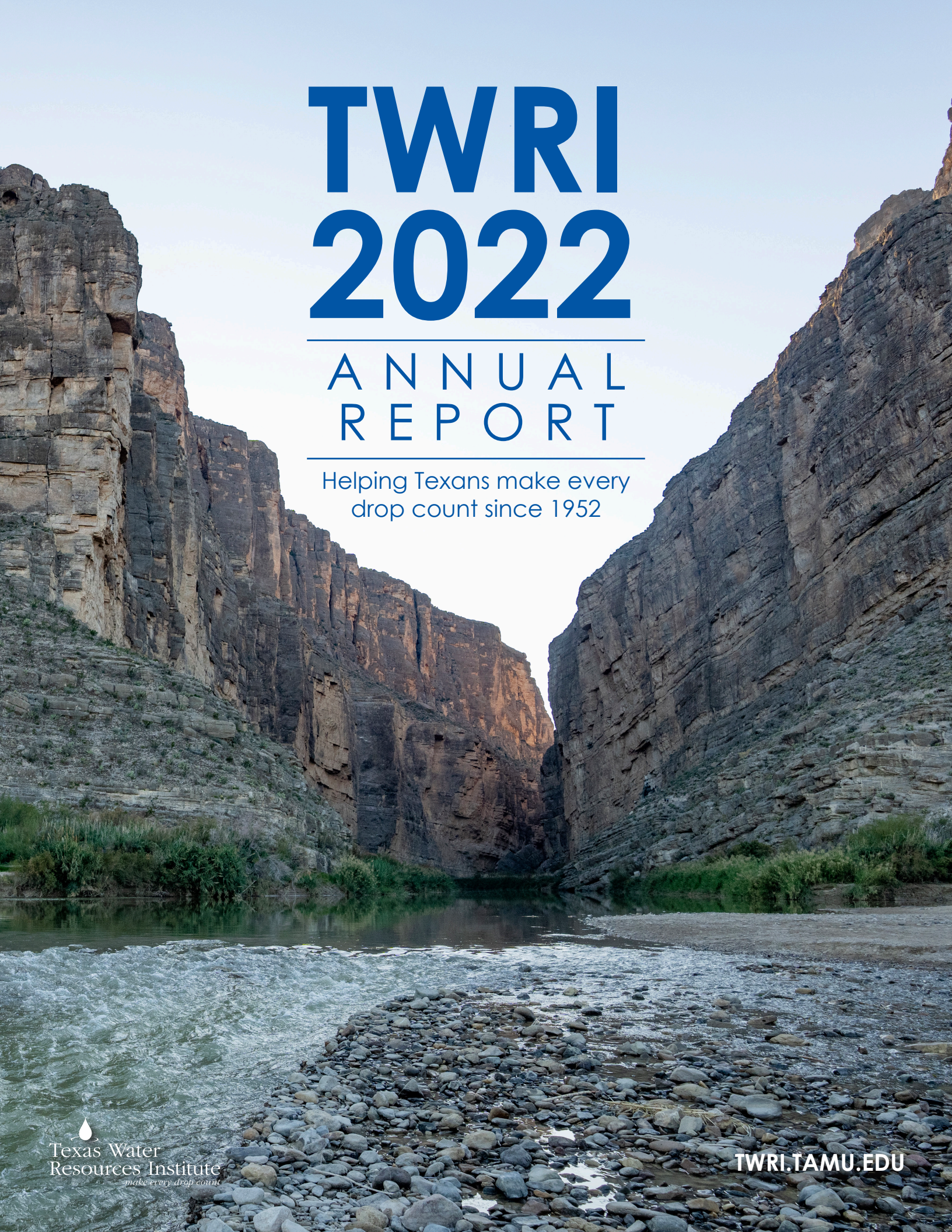


TWRI 2022

ANNUAL REPORT

Helping Texans make every drop count since 1952

Texas Water Resources Institute
make every drop count

TWRI.TAMU.EDU

WHO WE ARE

The Texas Water Resources Institute (TWRI) has helped solve Texas' water issues through research, education and outreach for more than 70 years.

Established in 1952, TWRI became the state's official water resources institute in 1964. We are one of 54 institutes within the National Institutes for Water Resources and are supported, in part, by the U.S. Geological Survey.

We deliver science-based, community-supported solutions for the state's pressing water quantity and quality challenges through internal expertise and external collaborations.

Our focus areas:

- Project development and management
- Stakeholder engagement
- Watershed and aquifer assessment and planning
- Water sample collection and data analysis
- Water conservation research
- Geospatial analysis
- Professional training
- Public outreach

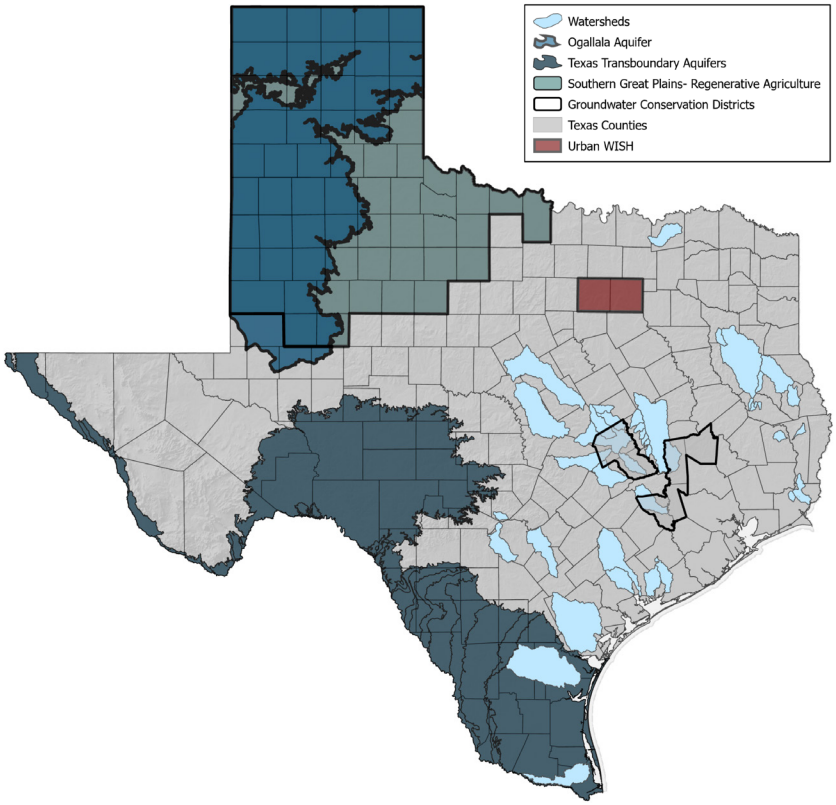
CONNECTING COMMUNITY NEEDS TO SCIENTIFIC EXPERTISE & FUNDING OPPORTUNITIES

We connect multidisciplinary expertise, communities and funding opportunities together — serving as a gateway to a national network of water institutes, water experts in the Texas A&M University System, and other universities and water resources organizations.

We are a unit of Texas A&M AgriLife Research, Texas A&M AgriLife Extension Service and the College of Agriculture and Life Sciences at Texas A&M University.

We collaborate with all Texas A&M System units engaged in water resources research and outreach, maintaining strong collaborations with Texas A&M's College of Engineering, College of Arts and Sciences, and Water Management and Hydrological Science Program, as well as the Texas A&M Engineering Experiment Station (TEES).

IMPACTS & ENGAGEMENTS



$3,760,962
— in new external grants —

Project collaborations

33 internal TAMU System

46 external collaborators

4 regional colleges

83 total collaborators on 70 projects

Social media followers

Twitter: 4,473 (1% increase)

Facebook: 2,415 (12% increase)

Instagram: 1,383 (6% increase)

LinkedIn: 421 (26% increase)

8,692 total followers

8 technical reports

30 news releases

53 media mentions

59 presentations to **1,845** people in attendance

15 students supported

4,798 *txH$_2$O* magazine subscribers

14,139 subscribers to 3 newsletters

47,236 Facebook users reached

PROGRAM HIGHLIGHTS

RESTORING & PROTECTING:

Neches River Basin work in 10 watersheds produces measured water quality improvements

Since 2009, TWRI has partnered with the Angelina and Neches River Authority, Stephen F. Austin State University and other local partners to understand and address excessive bacteria concentrations in the Neches River Basin.

Water quality monitoring, watershed characterization, pollutant loading estimation, bacteria source tracking, stakeholder engagement and educational events were conducted in the basin.

These efforts increased knowledge of water quality issues and their underlying causes. This enabled the project team to inform watershed stakeholders of water quality concerns and lead them through public planning processes to develop water quality restoration plans. To date, work was completed or is underway in 10 watersheds across the basin, resulting in measurable water quality improvements. Part of the Attoyac Bayou meets water quality standards and was removed from the Clean Water Act Section 303(d) list of impaired waters in 2016. This improvement was attributed to the implementation of conservation practices that protect water quality.

This partnership will continue to collectively address water quality concerns, produce sound science and engage stakeholders in efforts to plan out and implement conservation measures across the basin to improve water quality.

SUSTAINING & ENHANCING:

First-ever complete map of borderlands aquifers has international impact

Worldwide, natural resource agencies and officials had previously counted the number of shared groundwater aquifers flowing beneath the U.S.-Mexico border at 11. But new TWRI-led research has revealed a more complicated picture: there are, in fact, 72 shared groundwater aquifers in the region.

TWRI scientists recently published the first-ever complete map of the transboundary aquifers by combining years of geological and hydrological research. The researchers found 45% of the 72 aquifers to be in “good to moderate” condition. Surface water supplies in the region are under increasing pressure from population growth, drought, climate change, and possible legal and governmental attention. We continue to partner with the Permanent Forum of Binational Waters and lead the Transboundary Aquifer Assessment Act program for the state of Texas.

ENGAGING & EDUCATING:

Direct mailing outreach projects prove effective

Reaching target audiences directly and with succinct information is imperative for effective outreach. Social media is an excellent tool, but targeting precise audiences on social media is difficult due to the various platforms’ policies and limitations, and in many projects our target audience does not use social media as frequently as other groups. As direct mail is still used for targeted advertising in many other industries, TWRI is measuring on its effectiveness for reaching landowners and increasing adoption of conservation practices.

We initiated our mailing education program in Lavaca County, where 4,921 landowners owning 10 acres or more received an educational post card four times in six months, with information about cattle stocking rates, and a call to action of reaching out to the local NRCS office. This resulted in a 300% increase in the adoption of practices at NRCS in one year.

Because of this success, we have replicated the message in watersheds across Texas, mailing to septic system owners encouraging septic pump outs and row-crop producers encouraging soil testing. We will soon begin a soil health mailing campaign reaching 50,000 landowners and agricultural producers six times in three years, for a total of 400,000 points of contact.

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EXPANDING OUR IMPACT BY COORDINATING WATER RESEARCH & OUTREACH

FACULTY FELLOWS PROGRAM

The TWRI Faculty Fellows Program began in the Winter of 2020, and the first awards were made in Spring 2021. USGS funds provide recipients with resources that support development and submission of further project proposals seeking external funding.

Three faculty from the Texas A&M AgriLife Research Center in Lubbock, Texas A&M AgriLife Research Center in El Paso and the Texas A&M University School of Public Health were selected for the one-year funding, each receiving $15,000, which also required non-federal matching support.

From the first round of Faculty Fellows' proposal submissions, a $10 million proposal to the U.S. Department of Agriculture's National Institute of Food and Agriculture was awarded to TWRI Faculty Fellow Katie Lewis, Ph.D., principal investigator, associate professor of soil chemistry and fertility at the Lubbock center. This project focuses on sustainable agricultural intensification and enhancement, using regenerative agricultural management practices. In addition to Lewis, 2021-2022 fellows also included:

- Saurav Kumar, Ph.D., assistant professor, formerly with Texas A&M AgriLife Research Center at El Paso, Texas A&M Department of Biological and Agricultural Engineering
- Itza Mendoza, Ph.D., assistant professor, Texas A&M School of Public Health

In the Fall of 2022 two more faculty were named fellows, and both are developing proposals on researching various aspects of understanding PFAS in the environment and treatment methods:

- Yina Liu, Ph.D., assistant professor, Department of Oceanography, Texas A&M University
- Xingmao 'Samuel' Ma, Ph.D., associate professor, Zachry Department of Civil and Environmental Engineering, Texas A&M

URBAN WISH PROGRAM

Launched in 2021, the Urban Water Innovation and Sustainability Hub (Urban WISH) is a growing and productive TWRI initiative of the Texas A&M AgriLife Research and Extension Center at Dallas.

Urban WISH is addressing North Texas' current and future challenges in urban water security and sustainability through numerous projects focused on blue-green infrastructure (BGI) and green stormwater infrastructure (GSI), hydrologic modeling and spatial analysis, and urban water systems in dynamic water-climate conditions.

The Community-Science Partnership to Enhance Stormwater Management and Equity project, funded by NSF's Civic Innovation Challenge (CIVIC) program, is developing a community of practice that will enhance urban adaptation to climate change. This effort is focused on BGI in Dallas-Fort Worth, a rapidly growing region facing increased stormwater flooding due to climate change impacts. The project team is growing community partnerships, while creating and assessing a BGI asset management tool.

Urban WISH staff are also making strides in education and outreach. The statewide education program Texas ACCESS Water is led by TWRI and includes the center, Texas A&M College of Engineering Spark! program, Texas A&M AgriLife Extension Service Department of Biological and Agricultural Engineering and Texas 4-H Water Ambassadors. ACCESS conducts workshops to increase knowledge of water quality, nonpoint source pollution and the environment for Texas educators and students. The PMAPS for Texas program provides professional learning experiences for educators by integrating GIS and geo-inquiry tools for collaborative citizen science. We combine hands-on training with evidence-based tools from National Geographic and ArcGIS Online, bringing environmental issues home in a uniquely impactful way. This team includes the Texas A&M AgriLife Extension Service, and university and school district partners.

Texas A&M AgriLife

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Texas A&M University

Photo credit: Sam Craft, Texas A&M AgriLife Marketing and Communications