

Final Report 2014

Texas Stream Team



**THE MEADOWS CENTER
FOR WATER AND THE ENVIRONMENT**

TEXAS STATE UNIVERSITY



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Texas Stream Team

Final Report 2012 - 2014

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Executive Summary

This report serves as a summary of Texas Stream Team's (TST) efforts for the Fiscal Years 2012 through 2014 (September 1, 2011 – August 31, 2014). This report includes program activities funded under the Clean Water Act Section 319(b) grant provided by the Texas Commission on Environmental Quality (TCEQ) and United States Environmental Protection Agency (EPA). Texas Stream Team was operating under a two year grant from TCEQ for the years 2012 and 2013 when it received a \$410,000 grant from TCEQ to be used for 2013. A new scope of work was developed for the supplemental funding and the original two year grant funding was extended through 2014. This report summarizes the activities conducted under the original scope of work, and also the additional scope of work that was funded in 2013. Matching funds come from volunteer hours and time spent by TST partners participating in the program.

Since its formation in 1991, Texans have come to the Texas Stream Team program in search of answers to water quality questions and concerns. Resource managers have used TST's data as supplemental information to support their water quality studies. Citizens often ask, "How safe is my water?". Science teachers have come in search of real-world activities to enhance their presentations of scientific information and concepts.

Texas Stream Team has developed an extensive network of natural resource management agencies, natural resource experts, stakeholders, teachers, students, and citizen scientists with the overall goal of increasing stakeholder involvement in water resource related issues. Texas Stream Team achieves this goal through two major components of the program – citizen scientists water quality monitoring and environmental education.

Texas Stream Team is administered through The Meadows Center for Water and the Environment (formerly known as River Systems Institute) at Texas State University-San Marcos (TXSTATE). Texas Stream Team supports and enhances public outreach objectives identified by stakeholders and supports government priorities, including the federal Nonpoint Source Program (NPS), the state's Total Maximum Daily Load Program (TMDL), the Texas Clean Rivers Program (CRP), and the state's Surface Water Quality Monitoring Program (SWQM). This report reviews TST's activities during the 2012 - 2014 fiscal years, which reflects the program's efforts in meeting its long term and short term goals.

Meeting Texas Stream Team Goals

Short-term Goals

- Data Collection and Assessment
- Education and Outreach (With a focus on high priority nonpoint source pollution-impacted watersheds)

Long-term Goals

- Focus TST resources on impaired watersheds
- Support the implementation of state, regional, and local programs to prevent nonpoint source pollution through TST monitoring, assessment, and education
- Support state, regional, and local programs during the implementation of strategies defined in Total Maximum Daily Load Implementation Plans (TMDLs) and Watershed Protection Plans (WPPs)
- Develop partnerships to facilitate collective and cooperative approaches to manage nonpoint source pollution
- Increase overall public awareness of nonpoint source pollution issues and prevention strategies
- Enhance public participation and outreach by providing forums for citizens and industry to contribute their ideas and concerns about the water quality management process

Trainings and Education

- Conducted 93 Core Water Quality Trainings
- Certified 930 new Texas Stream Team Citizen Scientists
- Conducted 9 Advanced Trainings
- Certified 104 TST Citizen Scientists in Advanced Monitoring
- Participated in 50 Education and Outreach Events
- Gave water quality presentations to approximately 2,731 individuals
- Certified 19 new TST Water Quality Trainers

Resources for Teachers

- Participated in 11 Teacher Workshops
- Created a new TEKS aligned Curriculum with 23 aquatic science activities for K – 12 students

Citizen Scientists Water Quality Monitoring

Fiscal Year 2012

- Active Sites: 408
- Number of Participants: 3,716

Fiscal Year 2013

- Active Sites: 403
- Number of Participants: 4,724

Fiscal Year 2014

- Active Sites: 364
- Number of Participants: 3,467

Fiscal Years 2012 - 2014

- 5,780 monitoring events
- 6,987 hours spent sampling
- 71,615 miles traveled

Task 2: Publications

Objective

To develop and update publications and the program website to encourage communication with partners and citizen scientists, enhance partnerships with stakeholders and foster a public understanding of NPS pollution, watershed and water quality issues. The process will also help the public achieve a better understanding of land use activities and their impact on water quality.

Website

Texas Stream Team publications are prepared in cooperation with TCEQ and the EPA. Texas Stream Team maintains a website where all TST publications can be found. The website was part of the Rivers System Institute, and when RSI changed its name to The Meadows Center for Water and the Environment this year, a new website address was created. Texas Stream Team's new website address is <http://txstreamteam.meadowscenter.txstate.edu/>. Additionally, TST's Facebook page was absorbed into The Meadows Center's page. Texas Stream Team also maintains a Flickr account for posting photographs of TST events, and a Youtube channel with videos demonstrating water quality testing.

Newsletters

Texas Stream Team published 9 newsletters, titled *Headwaters*, between 2012 and 2014. The newsletters contained information on TST activities during the past quarter. There were also articles on TST partnerships across the state, and each newsletter contained a citizen scientist spotlight that focused on an individual that participated with TST. In 2012, TST switched from mailing paper copies of *Headwaters* to a digital version that was emailed to a distribution list maintained by TST via constant contact. As of the end of FY 2014, the newsletter distribution list contained 1,787 contacts.

- *Headwaters* Fall 2011
- *Headwaters* Winter 2011
- *Headwaters* Spring/Summer 2012
- *Headwaters* Fall 2012
- *Headwaters* Winter 2012
- *Headwaters* Spring/Summer 2013
- *Headwaters* Winter 2013
- *Headwaters* Spring 2014
- *Headwaters* Summer 2014

TEXAS STATE UNIVERSITY SAN ANTONIO

Fall 2013 Headwaters Enewsletter Volume 5 No. 6

Headwaters

In This Issue
[Volunteer Spotlight](#)
[Six Days in the Field](#)
[Partner Spotlight](#)
[Aquatic Plant Series](#)
[TST Fun Facts](#)
[Web o' Water](#)

Dear Jennifer,

We hope you enjoy our Fall Headwaters newsletter. As always, we are open to receiving ideas for articles and submissions from our citizen scientist monitors, groups and partners. Thank you for your continued subscription and program support.

Texas Stream Team

Quick Links
[Find Water Quality Data](#)
[Upcoming Events](#)

Volunteer Spotlight
By: Lindsay Sansom

Patricia Wyman and the Creek Freeks!

Being a sixth grade teacher is hard enough without being labeled a freak. However, for Mrs. Wyman's class, that is exactly what the sixth grade Gateway Middle schoolers wanted to be called: Creek Freeks!



One of Patricia Wyman's Creek Freeks takes dissolved oxygen

Six Days in the Field: Texas Stream Team teaches Water Quality during Wetlands Expedition



Science Teachers test the water for nitrates aboard the *M/V Fling*.
Photograph by Travis Tidwell

By: Travis Tidwell

Morning came early on June 17 and the humid coastal air already started to warm up after the cool summer night. Twenty-three science teachers from Texas, Louisiana, and Mexico eagerly boarded the spacious *M/V Fling* the previous day for an overnight jaunt across the Gulf of Mexico. I happily boarded with the others, excited for the journey ahead.



The teachers begin to collect plants, seine for fish, and conduct water

The Fall 2013 issue of *Headwaters*

Published Material

In 2012, TST updated its Water Quality Monitoring Manual, which was originally published in 1994. The update included two addendums to the manual. The first addendum provided instructions on how to conduct the TST Advanced Non-Point Source Suite of water quality monitoring that included testing for nitrates, orthophosphate, turbidity, and stream flow. The second addendum provided instructions for the optional use of transparency tubes to measure water clarity as an alternative to using the Secchi disks. A one page laminated field reference guide was also published so that citizen scientists could have an easily accessible instruction sheet to take into the field when they do their monitoring, as opposed to the entire field manual.

In 2013, The Rivers System Institute formerly changed its name to The Meadows Center for Water and the Environment. TST publications were updated with the new name and logo of The Meadows Center. These publications included the Water Quality Manual, the Trainer's Manual, the

Quality Assurance Officer Manual, the Field Reference Sheet, the Water Quality Monitoring Datasheet, and the TST Brochure.

In 2014, TST created an infographic that told the story of Texas Stream Team through numbers and facts. The statistics used in the infographic included the number of people involved in TST, the number of sites monitored, the number of monitoring events, and the number of partners that collaborate with TST. These infographics were printed out as small posters and distributed to all partners. The infographics are also taken to education and outreach events to distribute to people who may be interested in participating with TST.

Texas Stream Team started a new citizen science project called *TST Paddlers* in order to encourage kayak and canoe enthusiasts to participate in citizen science. A new protocol was devised in order for paddlers to collect water quality data according to the approved Texas Stream Team Quality Assurance Project Plan from a watercraft. A laminated reference sheet was published and distributed to paddlers participating in water quality monitoring for TST.

Task 3: Partner Coordination and Development

Objective

To strengthen and enhance the partner network by conducting program planning and development activities, and participating in and attending partner meetings.

Annual Statewide Partner Meetings

Texas Stream Team conducted 3 Annual Statewide Partner Meetings. The objective of the meetings was to invite all TST partners to come together in order to gather input and feedback toward TST's advancement of program objectives and improvement of citizen science and partner support.

The first Annual Meeting was held in October 2011 in conjunction with the Annual Meeting of the Monitors. The event was held at the Hilton Houston NASA Hotel in Clear Lake, TX, and was co-hosted with TST's partner, the Houston-Galveston Area Council (H-GAC). Seventeen TST partners attended the event. Andrew Sansom, the Director of what was then The Rivers System Institute (now The Meadows Center for Water and the Environment) gave the welcoming address. H-GAC gave presentations on their Clean Waters Initiative, their Basin Summary Report, the San Bernard, Bastrop Bayou, and Cedar Bayou Watershed Protection Plans, and a program called the Bacteria Implementation Group, or BIG. Breakout sessions on the first day of the meeting included Solutions for Urbanizing Areas, The Importance of Volunteer Monitoring, Keeping Your Volunteers Monitoring, Stakeholder Facilitation and Conflict Resolution. The meeting wrapped up with an Eco Tour boat ride on Clear Lake and Galveston Bay. On the second day of the meeting, talks were given by the TST's Project Manager at TCEQ – Lauren Bilbe, Mike Bira from U.S. Environmental Protection Agency, and Neal Denton from TST. Breakout sessions on the second day included a Fisheries Workshop, Macro-invertebrate Workshop, Interpreting Your Data Workshop, Using the Enviroscope Watershed Model Workshop, Mussel Watch, and Texas Invasive Citizen Science Training.

The Second Annual Statewide Partner Meeting was held on April 11, 2013 at the San Marcos Recreation Hall in San Marcos, TX. The following agencies and partners were represented at the meeting:

- U.S. EPA
- TCEQ
- Houston-Galveston Area Council
- Lower Colorado River Authority
- Guadalupe Blanco River Authority
- San Marcos River Foundation
- Town of Flower Mound
- City of Grand Prairie
- Plum Creek Partnership

- San Marcos Watershed Initiative
- Cypress Creek Project
- San Marcos River Rangers

During the 2013 Annual Statewide Partner meeting, EPA Region 6 representative, Mike Bira, gave a presentation on Citizen Science projects across the nation. Texas Stream Team provided an update on the overall program to the partners. After lunch, a roundtable discussion was conducted where partners were able to share information on how they use TST as part of their local water quality restoration efforts. The meeting concluded with a walk along the newly renovated Spring Lake Trail followed by a Glass Bottom Boat tour of Spring Lake.

The 2014 Annual Statewide Partner Meeting was held at The Meadows Center for Water and the Environment on August, 21 2014. Partners that attended included:

- U.S. EPA
- TCEQ
- Houston-Galveston Area Council
- Galveston Bay Foundation
- Caldwell County Soil and Water Conservation District
- Guadalupe Blanco River Authority
- City of Waco
- Lower Colorado River Authority
- Lower Neches Valley Authority
- Coastal Bend Bays Foundation
- The Cypress Creek Project
- Baylor University
- The San Marcos River Foundation
- Texas Water Resource Institute
- Aquatic Alliance

The EPA gave an overview of the importance of citizen science. TCEQ gave a presentation on the 319 Program. The Meadows Center gave an update on Texas Stream Team, the San Marcos Watershed Initiative, and how to use social media. Partners from Aquatic Alliance, Houston Galveston Area Council, Galveston Bay Foundation, The Cypress Creek Project, and Texas Water Resource Institute gave talks on how their organizations use Texas Stream Team to achieve their goals.

Texas Clean Rivers Program: Steering Committee Meetings

Texas Stream Team conducted 8 presentations at Texas Clean Rivers Program (CRP) Steering Committee Meetings between FY 2012 and FY 2014. The purpose of these presentations was to keep CRP Partners abreast of citizen scientist water quality monitoring and watershed education activities in their area, to offer TST services to both the regulatory agencies and the stakeholders in attendance, to identify new opportunities, and to share available data with partners and stakeholders.

CRP Steering Committee Meetings

March 22, 2012 – Guadalupe Blanco River Authority

July 31, 2012 – Lavaca Navidad River Authority

March 21, 2013 – Guadalupe Blanco River Authority

April 22, 2013 – Houston-Galveston Area Council

April 30, 2013 – Trinity River Authority

March 20, 2014 – Guadalupe Blanco River Authority

April 17, 2014 – Houston-Galveston Area Council

June 26, 2014 – Angelina Neches River Authority

Watershed Protection Planning/TMDL Stakeholder Meetings

Texas Stream Team attended and presented at 16 Watershed Protection Plan or TMDL Stakeholder Meetings between FY 2012 and 2014. The purpose of the initial presentation at these meetings was to offer TST services to the stakeholder group. Subsequent presentations focused on collaborative planning for activities such as education and outreach events, creating citizen scientists water quality monitoring groups, and sharing available data to the stakeholders. These meetings also helped TST identify activities in which they may be of assistance. Texas Stream Team's attendance at stakeholder meetings strengthened the relations between TST, partner agencies conducting the TMDLs and WPPs, TCEQ, the Texas State Soil and Water Conservation Board.

WPP and TMDL Stakeholder Meetings

- Plum Creek Partnership
 - February 9, 2012
 - November 8, 2012
 - February 7, 2013
 - May 2, 2013
- Improving Austin Streams TMDL
 - November 28, 2012
 - February 11, 2013
- Upper San Antonio Watershed Protection Plan
 - November 30, 2012
- San Marcos Watershed Initiative
 - May 21, 2012
 - February 20, 2013
 - May 8, 2013
 - April 16, 2014
- Llano River Watershed Protection Plan
 - February 21, 2013
- Nolan Creek Watershed Protection Plan
 - September 5, 2013
- Lampasas River Watershed Protection Plan
 - February 20, 2014
- Cypress Creek Project
 - May 9, 2012
 - July 30, 2012
- Gilleland Creek TMDL
 - April 7, 2014
- Oso Creek TMDL
 - June 26, 2014

Quarterly Partner Update Packet

Each quarter, TST partners received an e-mail update of current activities and a Partner Activity Report form that partners filled out and submitted to TST. Partner Activity Reports provided summaries of the number of volunteer hours spent monitoring, as well as non-federally funded staff hours spent supporting TST activities. These records were utilized by TST as match documentation for the Clean Water Act Section 319 grant funds.

New Partners

Texas Stream Team continues to forge new partnerships with organizations across the state. The partnerships are focused on collaborations where TST Citizen Scientists Water Quality Monitoring and TST educational materials are in line with the partner's goals of increasing awareness of water resources. These partnerships, as well as the existing partners, are critical to reaching the maximum number of stakeholders possible. The following are new partnerships that were initiated during the FY 2012 – 2014.

The Collins Academy

The Collins Academy in Jefferson, TX was established to create community-focused education and professional development opportunities in the Jefferson area. The Collins Academy has partnered with Texas Stream Team in order to offer a citizen science program for the area in which the academy will serve as the hub. Staff from the Collins Academy were trained on September 15, 2012 in Texarkana, TX by Delores McCright with the Texarkana College. Gary Endsley, a staff member with the Collins Academy, and a long-time TST citizen scientist became a certified instructor. The Collins Academy is also participating in other watershed stewardship activities, such as paddlefish re-introduction, and will use TST's monitoring protocol in conjunction with those projects.

Texas Water Resources Institute, City of College Station, City of Bryan

The Texas Water Resources Institute is the facilitator of the Carters Creek TMDL/I-Plan. Texas Stream Team collaborated with TWRI to create a citizen water quality monitoring group, in order to fulfill the goals of the implementation plan to increase stakeholder engagement and increase water quality data for the creek. Texas Stream Team staff conducted three trainings in College Station. Lucas Gregory, the watershed coordinator for the TMDL, became a certified TST trainer and continues to hold water quality monitoring trainings. Lucas has also trained two graduate students to be TST Certified Instructors, who also hold water quality trainings. Most of the Citizen Scientists that these instructors train are Texas A&M students who then monitor the 10 monitoring sites in the Carters Creek Watershed once a month.

John Bunker Sands Wetland Center

The John Bunker Sands Wetland Center is a constructed wetlands project on the Trinity River in Seagoville, Texas. Treated wastewater is sent to ponds where the wastewater is naturally filtered through the wetlands and is then pumped sixty miles upriver to Lavon Lake where the process is

repeated. The wetlands have boardwalks for nature viewing and bird watching. There is also an interpretive center with a wet lab where TST can conduct trainings and other workshops. The JBS Wetland Center wanted TST water quality monitoring to be a part of their work, so that they can demonstrate to visitors how the wetlands improve the quality of water as it is filtered through the ponds. The wet lab and the close proximity to water make the JBS Wetland Center an excellent location for conducting water quality trainings in North Texas.

The River Legacy

The River Legacy is a nature center along the Trinity River in Arlington, Texas. The River Legacy's partnership with TST creates a central hub for water quality monitoring in Arlington. The monitoring plan for the River Legacy is designed to increase visitors' knowledge of water quality and nonpoint source pollution on the Trinity River, and to provide opportunities for volunteers to participate in activities at the nature center.

Boy Scouts of America

The Capital Area Boy Scouts have partnered with TST to create a monitoring plan for the Lost Pines Boy Scout Camp in Bastrop, Texas. The camp holds an annual Nature, Ecology, and Conservation (Nat-E-Con) program each summer. Texas Stream Team certified the Nat-E-Con staff so that they can conduct water quality monitoring at the camp, and demonstrate to the visiting scouts how and why is important to collect water quality data. Texas Stream Team also worked with the Boy Scouts to use TST resources to create activities designed to fulfill the requirements for Environmental Sciences and Soil and Water Conservation Merit Badges.

The Texas Conservation Alliance

The Texas Conservation Alliance is a non-profit organization dedicated to protecting Texas' rivers, forests, coastlines, wildlife, and other habitats. Texas Stream Team has partnered with TCA in order to increase citizen science in East Texas, particularly the Neches River Basin. The Texas Conservation Alliance recruited 18 of its members to participate in Texas Stream Team, and on August 17, 2013, the first core water quality training was held in Beaumont. Subsequent trainings were held in Lufkin and White Oak in 2014. In addition to recruiting new citizen scientists, TCA created a monitoring plan on the Neches that includes monitoring in the Big Thicket National Preserve. Texas Stream Team is supporting this new partnership by conducting trainings, and loaning kits until TCA can procure their own. The long term goal of this collaboration is to have a local TCA member be a TST certified trainer that can conduct trainings and expand the group across East Texas.

University of Texas Pan American

Dr. Jungseok Ho with the University of Texas Pan American in Edinburg, TX created a Stream Team with UT-Pan Am students to monitor the Rio Grande and the Arroyo Colorado. The

purpose of the Stream Team is to provide long term monitoring as part of a project under the EPA's Region 6 Border 2020 Program. A core and an advanced water quality training were held at UT-Pan Am on October 2, 2013. Dr. Ho has applied for a National Science Foundation grant to support the UT-Pan Am Stream Team.

Austin Canoe and Kayak

Austin Canoe and Kayak is working with Texas Stream Team as part of the TST Paddlers Program. ACK purchased water quality monitoring kits that will be kept at their stores in Austin and Houston. Texas Stream Team will train groups of kayakers and canoers that will monitor water bodies near these cities. The paddlers will check out the monitoring equipment from the stores in these locations and return them after monitoring.

Task 4: Project Planning

Objective

To coordinate a planning and development process that maximizes the effectiveness of TST, its citizen science and partner efforts, and maintains open communication with TCEQ, the U.S. EPA, and program partners, in particular, NPS, TMDL, and CRP Program partners and stakeholders.

Project planning was a continuous activity that was incorporated into all program areas. Each staff member played a crucial role in coordinating and planning activities, which ensured TST's mission and ensured that the partners' interests were integrated into the program.

The Program Manager was responsible for overall planning of the program. The major planning priorities for FY 2012 - 2014 were the development of a sponsorship program, the application for the next Clean Water Act Section 319 Grant Cycle, and collaborating with partners, in addition to groups of citizen scientists, on grant applications for additional funding.

Funding from TCEQ is essential for the success of TST because it serves as the "anchor" grant that maintains program consistency and supports the long-term staff needed to implement the program. A major goal of TST is to use the stability of the 319 Grant in order to search for additional sources of funding that will allow the program to expand, while also ensuring program sustainability.

Upcoming Clean Water Act Section 319(h) Grant

Texas Stream Team submitted the draft Clean Water Act Section 319(h) Grant Work Plan to TCEQ in the summer of 2013. The grant application is for continued funding after the current grant funds are expended at the end of the 2014 fiscal year. The scope of work for the grant was approved, and the 319(h) grant will be the primary source of funding for the program for fiscal years 2015 and 2016.

Statewide and National Conferences and Training Events

Texas Stream Team participated in the Watershed Protection Planning Short-Course in Bandera, Texas in September of 2012, and October of 2013. Texas Stream Team staff demonstrated water quality monitoring to the watershed coordinators who were participating in the short course. Texas Stream Team was also able to communicate to the coordinators how TST can be incorporated into their Watershed Protection Plans.

Texas Stream Team staff attended TWRI Watershed Roundtable Meetings where TST gave a presentation on the upcoming events for the year and met with watershed coordinators to discuss the creation of citizen scientist water quality monitoring groups for their watershed protection plans. The meetings were held in Temple, TX on January 25, 2012, College Station, TX on July 26, 2012, Temple, TX on January 22, 2013, and Dallas, TX on July 30, 2013.

Discretionary Fund

The TST Discretionary Fund was used to cover expenses that are not paid for by the TCEQ grant. Texas Stream Team reports all contributions to the discretionary fund to TCEQ.

Sponsorship Program

Texas Stream Team submitted a draft Sponsorship Program to TCEQ. The Sponsorship Program will be an expansion of the Discretionary Fund. The creation of a Sponsorship Program will help fulfill the goals of TST to expand programming and improve long-term sustainability for the program.

Additional Funding and Grant Activities

Identifying new funding sources for TST was a high priority. Texas Stream Team was awarded a \$20,000 grant from the Communities Foundation of Texas to support water quality monitoring in North Texas. The money from the grant was used to pay for travel for TST citizen scientist trainers to conduct trainings and to purchase new monitoring kits/supplies for the North Texas monitoring groups.

Additionally, TST collaborated with the Gulf of Mexico Foundation to apply for a NOAA B-WET grant. The goal of the grant was to provide funding for high school science classes to conduct water quality monitoring along the Texas Coast. The grant was not accepted, but TST and the Gulf of Mexico Foundation have discussed re-applying for the grant during the next funding cycle.

Texas Stream Team is subcontracted by the Wimberley Valley Watershed Association to collect water quality data for the GBRA's Clean Rivers Program on Cypress Creek and the Blanco River. The data is collected according to GBRA's Quality Assurance Project Plan under the Clean Rivers Program. Texas Stream Team reports its CRP monitoring activities to TCEQ in the Quarterly Progress Reports under Task 4.6.

Task 6: Data Management

Objective

All submitted data collected under the QAPP is entered into the citizen scientists database and is included in the Data Viewer. Data are assessed in data summary reports that inform on the status of water quality at reported monitoring sites.

Dataviewer

Texas Stream Team at The Meadows Center for Water and the Environment at Texas State University is the receptacle for all of the TST citizen scientist water quality monitoring that comes in from around the state. The data undergo quality assurance by a Quality Assurance Officer and are then displayed on the Dataviewer. The Dataviewer is an SQL Server database that has an interactive Google Maps-based interface where the general public can go and look at TST activity across Texas. Each monitoring site is represented on the map and viewers can click on a site to see the historical water quality data for that area. Citizen scientists can also log on to the Dataviewer and submit their water quality data to TST online, making the process from data collection to public dissemination of the data quicker and more efficient. The Dataviewer went online in 2012 and as of 2014; eighty percent of TST citizen scientists now submit their data online.

Data Summary Reports

Data Summary Reports are watershed wide analyses of TST citizen water quality data. These reports look at the average values of the parameters collected for the watershed as well as provide an analysis of each site monitored. The reports cite the Texas Surface Water Quality Standards to give the reader a reference as to the quality of the water in the watershed, but these reports are not used as an assessment of water quality by the state. Instead, these reports are used to notify the public about the quality of water in Texas, provide long-term baseline data, and to provide resource managers with supplemental data that can help with the decision-making process. Once a Data Summary Report is completed, it is sent to TCEQ for review. It is then distributed to partners and TST citizen scientists, after addressing TCEQ comments. All TST Data Summary Reports are posted on the TST website and are available to the public.

Data Reports Completed:

- Plum Creek Watershed Data Summary Report, April 2013
- Pedernales River Watershed Data Summary Report, June 2013
- San Bernard River Watershed Data Summary Report, July 2013
- White Rock Lake Data Summary Report, July 2013
- Upper San Marcos Watershed Data Summary Report, December 2013
- Medina River Watershed Data Summary Report, December 2013
- Nolan Creek Watershed Data Summary Report, June 2014
- Cypress Creek Watershed Data Summary Report, June 2014
- Gilleland Creek Watershed Data Summary Report, July 2014
- Canyon Lake Watershed Data Summary Report, August 2014
- Blanco River Watershed Data Summary Report, August 2014
- Lake Livingston Watershed Data Summary Report, August 2014
- Cibolo Creek Watershed Data Summary Report, August 2014
- Lower San Marcos River Watershed Data Summary Report, August 2014
- White Rock Creek Watershed Data Summary Report, August 2014
- Wilson Creek Watershed Data Summary Report, August 2014

Pedernales River Watershed Data Report

June 2013



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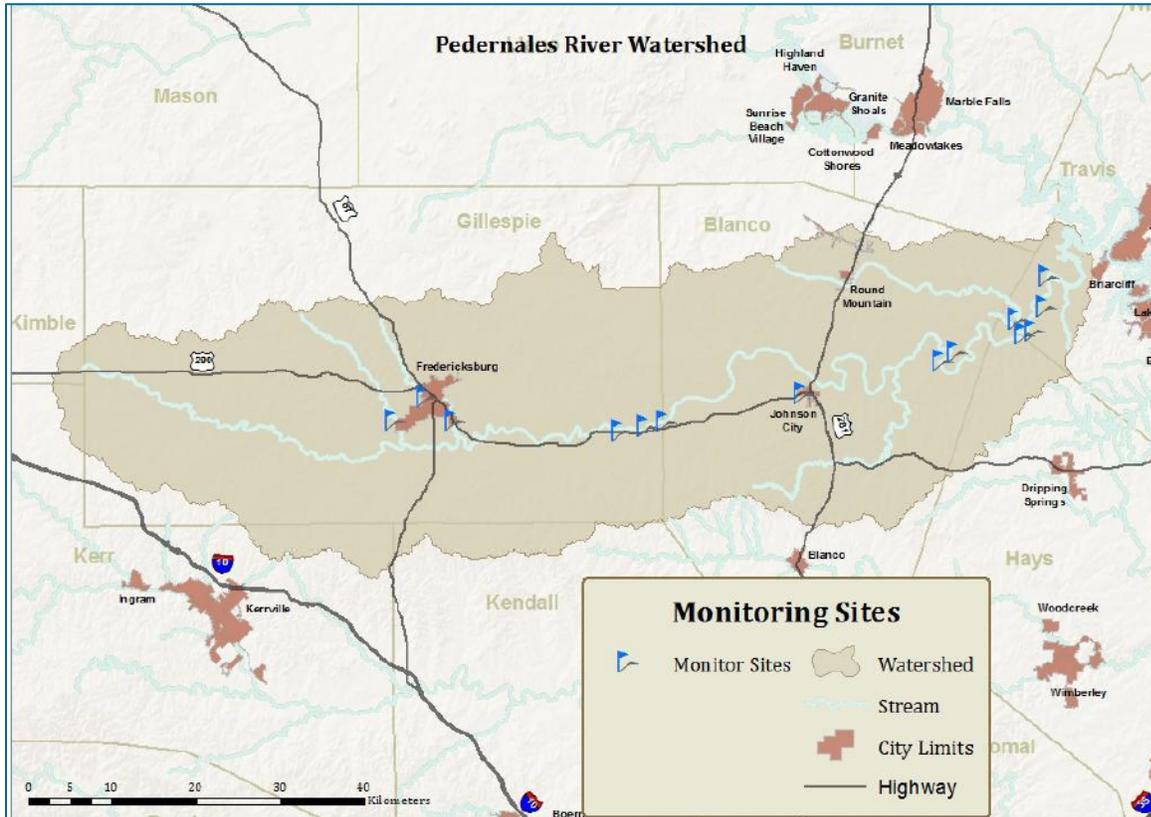


Datasets

Texas Stream Team is also organizing water quality monitoring data into watershed datasets that will be made available to the public. The datasets are Excel files that can be downloaded from the TST website. The purpose of the datasets is to provide raw TST monitoring data for the public to view, graph, and analyze. Teachers can incorporate the datasets into their classroom discussions on water quality and citizen science groups can also use the datasets to bring attention to certain water quality issues throughout the watershed planning process.

GIS Watershed Maps

Texas Stream Team has created watershed maps where TST monitoring efforts are currently ongoing. These maps are incorporated into the Data Summary Reports, but they are also made available via the TST website in high resolution. The maps contain the watershed boundaries and political boundaries, such as county borders and city limits. Several of the other maps included in each Data Report represent the analyses of the TST water quality data, such as average conductivity of sites along a river.



Task 7: Statewide Citizen Scientists Support and Activities

Objective

Texas Stream Team will work with existing and new partners on a statewide level to identify opportunities to engage volunteers with applied partner network water quality monitoring and watershed/NPS education projects. TST will provide the necessary volunteer training and certification through direct training or through network-based group members who are trained with the TST Trainer and Quality Assurance Officer Certification

Texas Stream Team trains, equips, supports, and coordinates water quality citizen scientists in watersheds across Texas. While some areas have a well-established TST Partner to support local citizen scientists, other areas do not and Texas Stream Team directly supports citizen scientists in those areas.

Texas Stream Team encourages its citizen scientists to seek involvement with other interested people to form monitoring groups. Monitoring groups can range from a handful of interested citizens organizing on a grass-roots level, to existing groups of volunteers, such as the Texas Master Naturalists, that want to make water quality monitoring a part of their program. Texas Stream Team seeks to work with, and recruit, already existing groups whenever possible.

Aside from the above-mentioned recruiting mechanism, word-of-mouth has been TST's best way to reach audiences. Texans continue to contact TST daily to enquire about becoming a certified water quality monitor and about local strategies to protect specific streams, creeks, rivers, and lakes. Since TST receives more requests for trainings than can be held, the program coordinates with partner agencies and Certified Trainers across the state to help hold training workshops for individuals or groups interested in becoming certified water quality citizen scientist. If no partner or trainer is in the area, TST works with those who want to join the program to recruit more people into monitoring groups, after which TST staff will conduct a Water Quality Monitoring training workshop. Texas Stream Team then works with these groups to create a monitoring plan and assign leadership positions, such as group leaders, equipment managers, and quality assurance officers. Texas Stream Team staff also recruits highly motivated members within groups to go through a Trainer Certification Process, so that newly formed groups can then offer more training workshops to individuals in their respective areas. This on-going effort helps to expand monitoring activities across the state.

Core Water Quality Monitoring Training

Texas residents become certified citizen scientists with TST by undergoing the Core Water Quality Monitoring Training. This is a three phase training process during which the trainee learns how to measure water quality parameters including temperature, dissolved oxygen, pH, and conductivity. The trainee also learns why these parameters are important and how non-point source pollution can impact the quality of water. Ninety-three Core Water Quality Monitoring Trainings were conducted in FY 2012 - 2014, and 930 people became certified Texas Stream Team Water Quality Citizen Scientists. Texas Stream Team Staff conducted 25 Core Water Quality Monitoring Trainings. These

trainings were focused on developing new partnerships with organizations including The Texas Water Resources Institute, The John Bunker Sands Wetlands, The River Legacy, The Boy Scouts of America, and The Texas Conservation Alliance. The trainings helped create new monitoring groups that were then supported by these partners. Once certified, some of these citizen scientists were then put on the track to become Certified Trainers who could help conduct trainings for new members in order to expand their groups. Certified Trainers with TST conducted 68 Core Water Quality Trainings.

Core Water Quality Monitoring Trainings by TST Staff

- February, 15, 2012 – Riverside Nature Center, Kerrville, TX
- March 8, 2012 – Government Canyon State Natural Area, San Antonio, TX
- June 16, 2012 – Estero Llano Grande State Park, Weslaco, TX
- October 27, 2012 – Texas Master Naturalists Annual Meeting, Navasota, TX
- November 3, 2012 – John Bunker Sands Wetland Center, Seagoville, TX
- November 16, 2012 – Texas Water Resources Institute, College Station, TX
- January 11, 2013 – Texas Water Resources Institute, College Station, TX
- January 30, 2013 – The Meadows Center for Water and the Environment, San Marcos, TX
- January 31, 2013 – Houston-Galveston Area Council, Houston TX
- March 2, 2013 – Cypress Creek Stream Team, Wimberley, TX
- March 7, 2013 – Texas Water Resources Institute, College Station
- June 11, 2013 – Boy Scouts of America, Lost Pines Nat-E-Con Camp, Bastrop, TX
- July 13, 2013 – Ecology Action of Texas, Austin, TX
- August 17, 2013 – Texas Conservation Alliance, Beaumont, TX
- October 5, 2013 – Tarleton University, Stephenville, TX
- November 2, 2013 – University of Texas-Pan American, Edinburg, TX
- November 9, 2013 – Trinity River Audubon Center, Dallas, TX
- February 22, 2014 – Ellen Trout Zoo, Lufkin, TX
- May 10, 2014 – Central Texas Master Naturalists, Georgetown, TX
- May 17, 2014 – Indian Trails Master Naturalists, Cleburne, TX
- June 21, 2014 – Rio Grande Valley Master Naturalists, Harlingen, TX
- June 27, 2014 – Greater Lake Palestine Council, Lake Palestine, TX
- July 14, 2014 – Cypress, TX
- August 2, 2014 – Texas Canoe and Kayak Racing Association San Marcos, TX
- August 22, 2014 – Highland Lakes Master Naturalists, Bertram, TX



Core Water Quality Monitoring Trainings by TST Certified Trainers

- February 4, 2012 – Healthy Habitats, Dallas, TX
- February 4, 2012 – Texarkana Earth Club, Texarkana, TX
- February 11, 2012 – Texas State University, San Marcos, TX
- February 14, 2012 – Texarkana Earth Club, Texarkana, TX
- February 21, 2012 – City of Denton, Denton, TX
- March 24, 2012 – Trinity River Audubon Center, Dallas, TX
- April 13, 2012 – San Marcos River Rangers, San Marcos, TX
- May 19, 2012 – Baylor University, Waco, TX
- June 13, 2012 – Trinity River Audubon Center, Dallas, TX
- June 19, 2012 – Hill Country Master Naturalist, Bandera, TX
- September 1, 2012 – San Marcos River Rangers, San Marcos, TX
- September 15, 2012 – Texarkana College Earth Club, Texarkana, TX
- September 22, 2012 – Baylor University, Waco, TX
- September 30, 2012 – San Marcos River Rangers, San Marcos, TX
- October 4, 2012 – Amarillo ISD, Amarillo, TX
- October 23, 2012 – Town of Flower Mound, Flower Mound, TX
- November 21, 2012 – City of Irving, Irving, TX
- December 5, 2012 – Presidio River Rangers, Presidio, TX
- December 14, 2012 – Galveston Bay Foundation, Galveston, TX
- January 19, 2013 – Cross Timbers Master Naturalists, Fort Worth, TX
- January 21, 2013 – San Marcos River Rangers, San Marcos, TX
- January 23, 2013 – Town of Flower Mound, Flower Mound, TX
- February 9, 2013 – Texarkana Earth College, Texarkana, TX
- February 12, 2013 – Galveston Bay Foundation, Galveston, TX
- February 15, 2013 – Hill Country Master Naturalists, Kerrville, TX
- February 24, 2013 – Galveston Bay Foundation, Galveston, TX
- March 8, 2013 – San Marcos River Rangers, San Marcos, TX
- March 10, 2013 – Aquatic Alliance, Dallas, TX
- March 15, 2013 – City of Irving, Irving, TX
- March 18, 2013 – Aquatic Alliance, Dallas, TX
- March 30, 2013 – Aquatic Alliance, Dallas, TX
- April 14, 2013 – San Marcos River Rangers, San Marcos, TX

Core Water Quality Monitoring Trainings by TST Certified Trainers (continued)

- June 15, 2013 – San Marcos River Rangers, San Marcos, TX
- June 16, 2013 – Texas Water Resources Institute, College Station, TX
- June 24, 2013 – Galveston Bay Foundation, Webster, TX
- June 25, 2013 – San Marcos River Rangers, San Marcos, TX
- July 24, 2013 – Aquatic Alliance, Dallas, TX
- July 27, 2013 – Aquatic Alliance, Dallas, TX
- September 11, 2013 – City of Flower Mound, Flower Mound, TX
- September 28, 2013 – Cibolo Nature Center, Boerne, TX
- October 1, 2013 – Texarkana Earth Club, Texarkana, TX
- October 23, 2013 – Texas Water Resource Institute, College Station, TX
- October 29, 2013 – Texarkana Earth Club, Texarkana, TX
- October 29, 2013 – San Marcos River Rangers, San Marcos, TX
- November 14, 2013 – Aquatic Alliance, Dallas, TX
- November 16, 2013 – Bob Jones Nature Center, Southlake, TX
- December 12, 2013 – San Marcos River Rangers, San Marcos, TX
- January 17, 2014 – Town of Flower Mound, Flower Mound, TX
- January 20, 2014 – Texas Water Resource Institute, College Station, TX
- January 23, 2014 – San Marcos River Rangers, San Marcos, TX
- January 26, 2014 – Texarkana Earth Club, Texarkana, TX
- February 9, 2014 – Aquatic Alliance, Dallas, TX
- February 13, 2014 – Texas State University, San Marcos, TX
- February 16, 2014 – City of Irving, Irving, TX
- March, 29, 2014 – Texarkana Earth Club, Texarkana, TX
- April 5, 2014 – City of Waco, Waco, TX
- April 12, 2014 – City of Waco, Waco, TX
- April 23, 2014 – Galveston Bay Foundation, Webster, TX
- April 27, 2014 – San Marcos River Rangers, San Marcos, TX
- May 1, 2014 – Texas Water Resource Institute, College Station, TX
- May 10, 2014 – Galveston Bay Foundation, Webster, TX
- June 3, 2014 – Galveston Bay Foundation, Webster, TX

Core Water Quality Monitoring Trainings by TST Certified Trainers (continued)

- June 21, 2014 – City of Irving, Irving, TX
- June 26, 2014 – City of Dallas, Dallas, TX
- August 1, 2014 – San Marcos River Rangers, San Marcos, TX
- August 10, 2014 – San Marcos River Rangers, San Marcos, TX
- August 15, 2014 – Collins Academy, Jefferson, TX
- August 24, 2014 – San Marcos River Rangers, San Marcos, TX

Advanced Non-Point Source Suite Training

Texas Stream Team citizen scientists can increase involvement with TST by taking the Advanced Non-Point Source (NPS) Suite Training. Once certified, an advanced monitor can begin taking samples to test for nitrates, phosphates, turbidity, *E. coli* bacteria, and streamflow. These measurements, in addition to the core water quality parameters, provide a more complete profile of the quality of water at a monitor's site. Texas Stream Team conducted 9 Advanced NPS Suite Trainings and certified a total of 104 citizen scientists. Six of these trainings were conducted by TST staff, and 3 were conducted by a Certified Trainer.

Advanced NPS Suite Trainings

- February 22, 2012 – City of Denton, Denton, TX
- March 1, 2012 – Utopia High School, Utopia, TX
- June 17, 2012 – Arroyo Colorado, Edinburg, TX
- October 25, 2012 – Aquatic Alliance, Dallas, TX
- November 9, 2012 – Hill Country Master Naturalists, Kerrville, TX
- December 1, 2012 – John Bunker Sands Wetland Center, Seagoville, TX
- June 22, 2013 – Aquatic Alliance, Dallas, TX
- September 7, 2013 – Waco Wetlands, Waco, TX
- November 2, 2013 – University of Texas – Pan American, Edinburg, TX

Certified Trainers' Training

Texas Stream Team's ability to monitor water bodies across the state is due, in large part, to its ever-expanding network of TST Certified Trainers. Certified Trainers are citizen scientists who have undergone official "Train the Trainer" Certification. The first phase of the certification is to assist a Certified Trainer in a training workshop. The second phase is to lead a training workshop under the supervision of a Certified Trainer. Once certified as a Trainer, a new Certified Trainer can then schedule and conduct trainings at their convenience. Texas Stream Team staff supports Certified Trainers by loaning kits, when necessary, assisting in monitoring plans, and entering the newly certified citizen scientists' information into the database. Nineteen TST Citizen Scientists became Certified Trainers during FY 2012 to 2014.

Equipment Support

Providing new water quality citizen scientists with sufficient equipment was essential to ensuring long-term commitment to monitoring with TST. The TCEQ provided TST with a generous equipment budget that allowed the program to support citizen scientists with kits, reagents, and bacteria monitoring supplies in areas where there were no partner organizations. In cases where there were active groups, but no local partner to support their efforts, TST placed monitoring equipment in public locations including libraries, fire stations, and activity centers for the citizen scientists to check out.

Task 8: Statewide Education Activities and Support

Objective

Texas Stream Team will continue to support teachers, schools, and partner organizations to increase awareness and disseminate information about watersheds and NPS pollution issues. Texas Stream Team will prioritize activities under this task to coordinate with similar TCEQ efforts toward increasing public awareness and/or recruiting partners and stakeholder support in TCEQ identified priority watersheds as well as Spring Lake (Formerly the Aquarena Center) in San Marcos. These projects will be reviewed and approved by the TCEQ Project Manager (and other appropriate TCEQ staff as necessary). Emphasis will be placed on training educators to perform outreach functions.

NPS Pollution Prevention Presentations

Texas Stream Team increases public awareness of watersheds, NPS pollution, and water quality by participating in educational events across the state including festivals, science fairs, and environmental programs. The most common TST water quality presentations are nonpoint source pollution prevention presentations using the Enviroscape Watershed Model, demonstrating water quality monitoring procedures, and powerpoint presentations. Texas Stream Team participated in 44 education and outreach events across the state and reached an estimated audience of 2,264 individuals during the FY 2012 – 2014.

Education Trainers Training

Texas Stream Team trains both formal and informal educators on how to use TST educational materials, including the Enviroscape Watershed Model, the macro-invertebrates educational materials, and the Stream Table. Texas Stream Team loans this equipment out to educators on a short-term and long-term basis. This function is especially important for increasing the utilization of these educational materials by the community, as TST staff time is limited.



NPS Pollution Prevention Presentations by TST Staff

- January 5, 2012 – Pedernales Watershed Workgroup – 20 individuals
- January 27, 2012 – Plum Creek Elementary – 18 individuals
- February 10, 2012 – Kyle and Science Hall Elementary – 121 individuals
- February 14, 2012 – Hemphill Elementary – 45 individuals
- February 16, 2012 – Water Aid, Texas State University, San Marcos, TX – 17 individuals
- February 28, 2012 – Woodridge Elementary – 196 individuals
- March 8, 2012 – Science Hall Elementary – 117 individuals
- March 30, 2012 – Pflugerville Earth Pfair – 148 individuals
- April 11, 2012 – Earth Day Dallas
- April 21, 2012 – Earth Day Fair, Canyon Lake – 28 individuals
- March 30, 2012 – Lockhart S.P. – 86 individuals
- April 27, 2012 – Lockhart S.P.- 89 individuals
- May 4, 2012 – Lockhart S.P. – 104 individuals
- May 5, 2012 – Pedernales Landowner Watershed Workshop – 20 individuals
- May 5, 2012 – NRCS Riparian Workshop – 38 individuals
- May 18, 2012 – Jacob’s Well Elementary – 140 individuals
- May 25, 2012 – Texas River School, Kerrville, TX – 27 individuals
- September 22, 2012 – Keep Lockhart Beautiful Environmental Fair, Lockhart, TX – 40 individuals
- September 29, 2012 – Discover Texas State, San Marcos, TX – 60 individuals
- October 16, 2012 – Georgetown Nature Club, Sun City, Texas – 50 individuals
- October 18, 2012 – Lockhart State Park, Lockhart, TX – 88 individuals
- October 20, 2012 – Texas Outdoor Family Event, Pedernales Falls State Park – 77 individuals
- October 27, 2012 – Edith Moore Nature Sanctuary Girl Scouts, Houston, TX – 8 individuals
- November 13, 2012 – Wimberley Outdoor Educators’ Blue Hole Field Trip, Wimberley, TX – 90 individuals
- March 13, 2013 – Spring Lake Girl Scouts Field Trip, San Marcos, TX – 10 individuals

NPS Pollution Prevention Presentations by TST Staff (continued)

- April 20, 2013 – Earth Day Dallas, Dallas, TX
- May 21, 2013 – Lady Bird Johnson Earth Day Festival, Austin, TX – 60 individuals
- May 23, 2013 – Bowie Elementary Science Fair, San Marcos, TX – 125 individuals
- May 31, 2013 – Kerrville Folk Festival Canoe Tour, Kerrville, TX – 20 individuals
- June 3, 2013 – Aquarena Springs Water Quality Demonstration, San Marcos, TX – 24 individuals
- June 7, 2013 – Kerrville Folk Festival Canoe Tour, Kerrville, TX – 15 individuals
- June 12, 2013 – Aquarena Springs Water Quality Demonstration, San Marcos, TX - 22 individuals
- June 13, 2013 – McKinney Falls S.P. Junior Ranger Camp, - Austin, TX – 8 individuals
- June 20, 2013 – McKinney Falls S.P. Junior Ranger Camp, - Austin, TX – 20 individuals
- June 28, 2013 – McKinney Falls S.P. Junior Ranger Camp, - Austin, TX – 12 individuals
- September 11, 2013 – Spring Lake, San Marcos, TX – International School of the Americas 121 individuals
- September 28, 2013 – Spring Lake, San Marcos, TX – Capitol Area Master Naturalists 22 individuals
- October 8, 2013 – Belton, TX Central Texas Master Naturalists – 35 individuals
- November 12, 2013 – Spring Lake, San Marcos, TX– 40 individuals
- November 19, 2013 – Blue Hole, Wimberley, TX – 110 individuals
- March 3, 2014 – Spring Lake, San Marcos, TX – Comfort Middle School - 80 individuals
- March 20, 2014 – Spring Lake, San Marcos, TX – Magellan International School - 12 individuals
- March 26, 2014 – Spring Lake, San Marcos, TX – TCEQ Staff - 40 individuals
- April 24, 2014 – Weslaco, TX – TWRI Riparian Workshop - 20 individuals
- April 27, 2014 – Johnson City, TX – Pedernales Landowner Gathering - 70 individuals
- April 30, 2014 – Spring Lake, San Marcos, TX – Harmony Science Academy – 92 individuals

NPS Pollution Prevention Presentations by TST Staff (continued)

- May 6, 2014 – Spring Lake, San Marcos, TX – Olmos Elementary – 11 individuals
- May 10, 2014 – Jacobs Well Nature Center, Wimberley, TX – 75 individuals
- June 24, 2014 – Spring Lake, San Marcos, TX – Hays County Master Naturalists – 35 individuals
- August 5, 2014 – Seguin, TX – Guadalupe Master Naturalist – 25 individuals

Education Trainers Training

- May 2, 2013 – Teachers at St. Stephens Episcopal School in Wimberley were trained on how to conduct a water quality lesson for school kids using the EnviroScape Watershed Model.
- June 12, 2013 – Boy Scouts of America Camp Counselors were trained how to use the EnviroScape Watershed Model and a Rainfall Simulator to present to campers at the Lost Pines Nat-E-Con Camp in Bastrop, TX.
- November 16, 2013 – Teachers at Northside High School in San Antonio, TX were trained on how to use the EnviroScape Watershed Model.

NPS Pollution Prevention Presentations by Trained Educator Partners

- April 21, 2012 – Texas Stream Team Monitoring Demo, City of Irving – 15 individuals
- January 13, 2013 – Julie Westerlund, professor of Biology at Texas State University, borrowed TST monitoring kits to demonstrate water quality testing procedures to her students.
- January 28, 2013 – Julie Westerlund, professor of Biology at Texas State University, borrowed the EnviroScape Watershed Model to demonstrate NPS pollution to her students.
- February 7, 2012 – Jennifer Lickert, elementary teacher at Plum Creek Elementary in Lockhart, TX, borrowed the EnviroScape Watershed Model to demonstrate NPS pollution to her students.
- May 3, 2013 – Teachers at St. Stephen Episcopal School in Wimberley, TX borrowed the EnviroScape Watershed Model to demonstrate NPS pollution to their students.
- July 20, 2013 – Josh Oyer with Lockhart S.P. in Lockhart, TX borrowed the EnviroScape Watershed Model to demonstrate NPS pollution to park visitors.
- January 28, 2014 – Julie Westerlund, professor of Biology at Texas State University borrowed the monitoring kits for a water quality testing lab.
- June 18, 2014 – Maureen Lemke, a professor at Texas State University borrowed the monitoring kits for a water quality lab.

Teacher Workshops



Texas Stream Team participated in 11 teacher workshops where TST demonstrated how to incorporate the program into their classrooms. Teachers who completed all three phases of Core Water Quality Training received nine hours of TEEAC Credit, in addition to becoming certified Texas Stream Team Citizen Scientists. Teachers who completed the *E. coli* monitoring workshop received three hours of TEEAC Credit.

River Systems Institute – June 12, 2012

Central Texas teachers and Hays County Master Naturalists participated in a teacher workshop at the Rivers Systems Institute (now The Meadows Center for Water and the Environment) in San Marcos, TX. The participants learned how to use the Enviroscope Watershed Model and the stream table in a classroom setting.

Teaching Environmental Science Workshop – Lamar University: July 9, 2012

Texas Stream Team participated in the Teaching Environmental Science Workshop at Lamar University in Beaumont, TX. Texas Stream Team staff gave a presentation to eleven teachers on *E. coli* bacteria, and how it moves through a watershed as a nonpoint source pollutant. The teachers also learned how to collect, plate, and analyze *E. coli* samples. Teachers received three hours of TEEAC Credit for participating in the workshop.

Environmental Health Sciences Summer Institute: July 18– July 19, 2013

Texas Stream Team participated in two workshops at the Environmental Health Sciences Summer Institute teacher workshop in Austin, TX. Texas Stream Team staff conducted two Core Water Quality Monitoring Trainings. In addition to becoming certified Texas Stream Team Citizen Scientist, the teachers received nine hours of TEEAC Credit.

Intracoastal Waterways Wetland Expedition: June 16 – June 21, 2013

Texas Stream Team collaborated with the Gulf of Mexico Foundation on the Intracoastal Waterways Wetland Expedition. Twenty-four teachers boarded the M/V *Fling* for a five day cruise out of Freeport, TX. The *Fling* crossed the Gulf of Mexico, over to western Louisiana, and worked its way back to Freeport along the Intracoastal Waterway. During the cruise, the teachers learned about the flora and fauna of the wetlands and estuaries they were visiting along the way. Texas Stream Team was on board to give lessons on water quality and to educate teachers on how the wetland's water was impacted by the land use in the watershed. Water quality was tested by the teachers every day to see the changes as the ship moved from freshwater estuaries into more saline estuaries. A presentation on NPS pollution was given by TST on the ship, and the teachers also learned how to use the Enviroscope Watershed Model in their classrooms.

Teaching Environmental Science Workshop – Lamar University: July 8 – July 9, 2013

Texas Stream Team participated in the Teaching Environmental Science Workshop at Lamar University in Beaumont, TX. Texas Stream Team staff gave a presentation to eleven teachers on *E. coli* bacteria, and how it moves through a watershed as a nonpoint source pollutant. The teachers also learned how to collect, plate, and analyze *E. coli* samples. Teachers received three hours of TEEAC Credit for participating in the workshop. On the second day of the workshop, the teachers went on a canoe tour along the Neches River in the Big Thicket Preserve. A water quality monitoring demonstration was performed on the river bank during the canoe tour.

Environmental Health Sciences Summer Institute: July 24 – July 25, 2013

Texas Stream Team participated in the Environmental Health Sciences Summer Institute teacher workshop in Cypress, TX, where TST staff conducted two Core Water Quality Monitoring Trainings. In addition to becoming certified Texas Stream Team Citizen Scientist, the teachers received nine hours of TEEAC Credit.

Teaching Environmental Science Workshop – Lamar University: July 7, 2014

Texas Stream Team participated in the Teaching Environmental Science Workshop at Lamar University in Beaumont, TX. Texas Stream Team staff gave a presentation to eleven teachers on *E. coli* bacteria, and how it moves through a watershed as a nonpoint source pollutant. The teachers also learned how to collect, plate, and analyze *E. coli* samples. Teachers received three hours of TEEAC Credit for participating in the workshop.

Environmental Health Sciences Summer Institute: July 14, 2014

Texas Stream Team participated in the Environmental Health Sciences Summer Institute teacher workshop in Cypress, TX, where TST staff conducted one Core Water Quality Monitoring Training. In addition to becoming certified Texas Stream Team Citizen Scientist, the teachers received nine hours of TEEAC Credit.

The Meadows Center for Water and the Environment Teacher Workshop: August 8, 2014

Texas Stream Team hosted a teacher workshop at the Meadows Center for Water and the Environment. Five secondary science teachers attended the workshop. The goals of the workshop were to: A) Introduce teachers to Spring Lake and the Meadows Center for future field trips and collaborations. B) Introduce the teachers to Texas Stream Team and get them and their students involved in citizen science. C) Provide them with the TEKS aligned Texas Stream Team Aquatic Science Curriculum and demonstrate some of activities in the curriculum.

TEEAC and SBEC Credit

The Texas Environmental Education Advisory Committee (TEEAC) was established by the Texas Legislature to assist and advise the Commissioner of Education on environmental education. TEEAC offers a Certificate of Recognition to encourage teachers to learn about the environment. In order to earn the Certificate of Recognition, TEEAC requires teachers to complete 45 hours of TEEAC endorsed instruction relating to environmental education.

Teachers may receive credits for continuing professional education through TEEAC by participating in meetings, trainings, and teacher workshops offered by TST. Teachers who complete all three phases of TST Certified Water Quality Monitoring Training receive nine hours of TEACC Credit. Teachers attending other TST meetings and workshops may receive State Board Educator Certification (SBEC) endorsed continuing professional education credits. These are typically single day meetings that provide eight hours of SBEC Credit.

Texas Stream Team maintains TEEAC accreditation by attending the annual TEEAC Conference in Austin, TX in January of each year.

Task: 9: Statewide Citizen Monitoring and NPS Education Events

Objectives

To support and enhance program partners and stakeholders by recognizing ongoing efforts and volunteer service, supplementing education and coordination efforts, and targeting other priority information and coordination gaps identified by the TCEQ's Federal Clean Water Act 319(b) NPS Program

Meeting of the Monitors

An annual Meeting of the Monitors was held in conjunction with the Annual Statewide Partner Meeting from September 29 to October 1, 2011. The meeting was co-hosted by TST's partner, The Houston-Galveston Area Council and was held at the Hilton Houston NASA Hotel in Clear Lake, TX. There were 131 people in attendance representing 37 different organizations. Andrew Sansom, the Director of what was then The Rivers System Institute (now The Meadows Center for Water and the Environment) gave the welcoming address. H-GAC gave presentations on their Clean Waters Initiative, their Basin Summary Report, the San Bernard, Bastrop Bayou, and Cedar Bayou Watershed Protection Plans, and a program called the Bacteria Implementation Group, or BIG. Breakout sessions on the first day of the meeting included Solutions for Urbanizing Areas, The Importance of Volunteer Monitoring, Keeping Your Volunteers Monitoring, Stakeholder Facilitation and Conflict Resolution. The meeting wrapped up with an Eco Tour boat ride on Clear Lake and Galveston Bay. On the second day of the meeting, talks were given by the TST's Project Manager at TCEQ – Lauren Bilbe, Mike Bira from U.S. Environmental Protection Agency, and Neal Denton from TST. Breakout sessions on the second day included a Fisheries Workshop, Macro-invertebrate Workshop, Interpreting Your Data Workshop, Using the Enviroscope Watershed Model Workshop, Mussel Watch, and Texas Invasives Citizen Science Training.

After the 2011, the idea of one annual Meeting of the Monitors was replaced by offering several smaller regional meetings, so that citizen scientists would not have to travel long distances in order to participate. Three regional meetings were held in 2014. The first one was hosted by The City of Dallas. Thirty people were in attendance and included North Texas Partners, and Citizen Scientists. Sue Alvarez with the City of Dallas gave a presentation on what Dallas plans on working on with citizen scientists in the coming year. The City's Stormwater Department gave a presentation on their monitoring sites in the city and the types of parameters they collect. Travis Tidwell gave an update on Texas Stream Team activities in North Texas and around the state.

The second regional meeting was hosted by the Houston-Galveston Area Council in Houston, TX. Texas Stream Team staff gave an update on the statewide program. Will Merrell with H-GAC gave an update on the local Stream Team. Aubin Phillips with H-GAC gave an update on H-GAC WPPs and TMDLs, Katie McCann with the Galveston Bay Foundation gave an update on how GBF uses TST. There were 30 people in attendance. H-GAC and GBF passed out certificates in recognition of several citizen scientists' commitment to environmental stewardship, and their participation in Texas Stream Team.

The third regional meeting was held at The Collins Academy in Jefferson, TX. Texas Stream Team gave an update on the statewide program. Gary Endsley with the Collins Academy gave a presentation on the education and outreach that the Collins Academy is providing to local schoolchildren, such as Texas Stream Team and the Paddlefish Restoration. Lee Eisenburg gave a presentation on Giant Salvinia control on Caddo Lake, and Delores McCright gave a presentation on how Texarkana Earth Club uses Texas Stream Team. There were 18 people in attendance.

Task 10: Watershed Services

A major goal of TST is to become more integrated into the Watershed Protection Plans (WPP) and Total Maximum Daily Load (TMDL) Implementation Plans that are occurring in watersheds across the state. In order to accomplish that goal, TST has developed a suite of watershed services that the program can offer stakeholders to assist them in their watershed protection efforts. Examples of these services include intensive monitoring studies, participation in special events, assisting in watershed planning facilitation and communication, and small-scale community action projects that are designed to increase stakeholder engagement. Texas Stream Team spent the 2013 Fiscal Year, offering its services to three watershed protection partnerships: The Plum Creek Partnership responsible for the Plum Creek WPP, The San Marcos Watershed Initiative responsible for the Upper San Marcos WPP, and the Petronila Creek I Plan Committee responsible for the implementation of the Petronila Creek TMDL.



Plum Creek Partnership

Texas Stream Team staff regularly attended the Plum Creek Partnership WPP Stakeholder Meetings in Lockhart, TX. Throughout these meetings, TST staff became involved in the Keep Lockhart Beautiful Plum Creek Cleanup and Environmental Fair that was held in September of 2012. Texas Stream Team was represented on the planning committee for the cleanup and fair. Texas Stream Team also encouraged the Plum Creek citizen scientists to participate in the river cleanup by coordinating them to be volunteer group leaders. These group leaders led groups of school age children as they picked up trash in various locations throughout the watershed.

The Plum Creek Partnership notified TST about an ongoing problem with sewage overflows from a waste water treatment plant on the creek. Texas Stream Team provided data to the Plum Creek Partnership that indicated that the conductivity readings and *E. coli* numbers were high downstream of the treatment plant's effluent. This data corroborated the Guadalupe Blanco River Authority's

water quality data that it collects as part of the Clean Rivers Program. Texas Stream Team participated in a conference call between the Plum Creek Partnership, Texas Parks and Wildlife's Kills and Spills Program, and TCEQ to discuss the matter.

The San Marcos Watershed Initiative

Texas Stream Team has offered its services to The San Marcos Watershed Initiative in their development of a WPP for the Upper San Marcos watershed. The San Marcos River's close proximity to TST's headquarters at Texas State University makes this an ideal location for the program to increase local stakeholder involvement. Texas Stream Team coordinated the creation of a Demonstration Garden at Spring Lake, the headwaters of the San Marcos River.

Texas Stream Team supervised volunteers from the Texas State University Student Body, who came to help build a Demonstration Garden. The garden provides visitors with examples of xeriscaping techniques that are ideal for water conservation in the Central Texas Area. Native plants are used in the garden and interpretive signs indicate what types of plant they are and why it is important to use drought resistant native plants for landscaping. Water harvesting methods are also demonstrated in the garden. The Demonstration Garden provides an example to local stakeholders of how they can use native plants to conserve water and rain harvesting techniques to prevent runoff and improve water quality.

Texas Stream Team staff has been assisting the San Marcos Watershed Initiative by participating in subcommittee meetings as staff liaisons. The San Marcos Watershed Initiative has created several subcommittees that are tasked with developing certain aspects of the WPP. The job of the TST staff liaisons is to attend these subcommittee meetings and offer assistance. The liaisons distribute the agendas for the subcommittees' monthly meetings, record minutes for the meetings, relay comments and requests from the subcommittees to the watershed coordinator, and maintain an online forum where committee members can post comments, questions, or links to resources related to their tasks.

Petronila Creek I-Plan

Petronila Creek is listed by TCEQ as impaired for total dissolved solids and chloride. A TMDL was completed by TCEQ and implementation of the plan began in 2008. Texas Stream Team staff members were involved in the creation of the I-plan back in 2008. The TCEQ requires stakeholder committees to reconvene and review the progress of their plans after five years. The Nueces River Authority, the lead in the implementation of the Petronila Creek I-Plan, invited Texas Stream Team to the review the plan, as TST was part of the original stakeholder committee. Texas Stream Team staff members are now represented on the water quality monitoring subcommittee and attend meetings in Robstown, TX, or by conference call. Texas Stream Team has assisted the I-Plan committee by reviewing and providing statistical analysis of water quality data for the creek. A watershed tour was conducted in October 2013 where Texas Stream Team staff conducted a water quality monitoring demonstration on the creek during the tour and encouraged landowners who

serve on the committee to become TST citizen scientists and collect water quality data to assist the I-Plan.

Conclusion

Texas Stream Team was able to accomplish all of the deliverables for the FY 2012 – 2014 scope of work. The additional funding for the FY 2013 allowed Texas Stream Team to increase its scope of work for an additional year. As a result, more citizen scientists became trained, more people learned about NPS pollution reduction, and new partners joined the TST network. The approval of 319 funding for FY 2015 through 2016 will allow TST to continue its mission of enhancing watershed stewardship through citizen science and education and outreach. As TST begins its new scope of work, a greater emphasis will be placed on incorporating TST resources into the implementation of programs in Watershed Protection Plans, and TMDL I-Plans. Texas Stream Team has 23 years of experience in educating the public on water quality and NPS pollution, and the integration of this program into these watershed protection efforts occurring across the state will be crucial in accomplishing the goals of TCEQ, and the U.S. EPA.