Sustained Delivery of the Texas Watershed Steward Program

Final Report

TSSWCB Project 18-05

December 31, 2022

Prepared by:
Michael Kuitu, P.G., CFM and Dr. Jake Mowrer
Texas A&M AgriLife Extension Service
Department of Soil and Crop Sciences
College Station, Texas

Funding provided through a federal Clean Water Act §319(h) Nonpoint Source Grant
administered by the Texas State Soil and Water Conservation Board
from the U.S. Environmental Protection Agency

THIS PAGE INTENTIONALLY LEFT BLANK.

EXECUTIVE SUMMARY

Texas Watershed Stewards (TWS) is a science-based training program designed to educate stakeholders about watersheds, types and sources of water pollution, water law, state and federal water agencies and organizations, best management practices (BMPs) that minimize or prevent water impairment, and community-driven watershed planning. The program was developed through a collaborative effort between the Texas A&M AgriLife Extension Service and the Texas State Soil and Water Conservation Board, in cooperation with other state and federal water and natural resource management and planning agencies, including the Texas Commission on Environmental Quality, local Soil and Water Conservation Districts, Texas Water Development Board, state River Authorities, Texas Forest Service, Texas Department of Agriculture, United States Department of Agriculture, Natural Resources Conservation Service, and others. TWS is delivered as an intensive, single day training that utilizes a variety of teaching aids (PowerPoint slides, videos, hands-on stations) and group participation to engage participants in the learning process. Most importantly, the program empowers citizens to become actively involved in local watershed planning efforts to improve and protect their water resources.

To date, a total of 138 workshops have been delivered in watersheds across the state of Texas. Through these events, 5,622 individuals have received a combined total of approximately 27,068 hours of training in topics specifically focused on watershed management and protection. In addition, over 7,258 hours of continuing education units have been provided by the program for a variety of professional certifications. Specifically regarding Project 18-05, 33 TWS workshops were delivered with a total attendance of 1,172 persons. To enhance flexibility and program access to all interested individuals, an interactive on-line version of the training was also developed and launched in February 2011, redesigned in August 2015, and again under Project 18-05. The original version of the online course was completed by more than 123 individuals, and the redesigned version of the online course under Project 18-05 has been completed by more than 1,048 individuals, 364 of which receiving certificates of completion.

Intensive publicity efforts employing key media tools and outlets were utilized to market each event. This included the use of news releases distributed state-wide (targeting absentee landowners and other watershed resource users) and to local outlets, radio, television, e-mail list-serves, brochures, and direct contacts with key individuals and partners. In addition, direct contact was made with key local watershed groups, homeowner associations, local city and county officials, Master Gardeners, Master Naturalists and other groups and organizations located in target watersheds. Local County AgriLife Extension Agents provided direct support for planning, organization, publicity, and delivery of all programs.

Program effectiveness was evaluated using pre- and post-tests at TWS events to determine changes in knowledge and understanding, as well as intentions to adopt appropriate BMPs. A 6-month follow-up evaluation was employed to assess actions taken and to verify BMP adoption.

Overall, knowledge gained by individuals participating in the training was an impressive 30.3% under Project 18-05 and 33.2% since program inception. Additionally, over 50% of participants reported an intention to adopt BMPs to help protect their watershed, and 95% believed the TWS program enabled them to be a better steward of their watershed. Results of the 6-month, follow-up evaluation showed that 80% of respondents had participated or planned to participate in at least one community cleanup, 67% had participated or planned to participate in local planning/zoning decisions, and 78% indicated that they had or would communicate with their elected officials regarding water quality issues.

Over 86% of respondents indicated they now more closely monitor individual actions that might impact water quality, and 80% have either adopted or maintained management practices that have a positive impact on water quality. Finally, an overwhelming 95% of respondents were satisfied with the TWS training materials, and 82% have used those resources since the training.

TABLE OF CONTENTS

INTRODUCTION

Every watershed in Texas is affected to some extent by nonpoint source pollution. Resulting water quality impairments lead to negative impacts including unsafe water supplies, degraded fisheries, constrained recreation, reservoir siltation, and habitat loss. These consequences affect communities, businesses, and individual citizens in and around the watershed, and successful management efforts depend on significant local input. As a result, current philosophies in watershed management are based heavily upon securing active stakeholder involvement to restore and protect water resources. This approach to developing watershed based improvement strategies demands a sustained, elevated level of participation by local citizens to achieve success. However, the vast majority of potential stakeholders are not equipped with sufficient understanding of watershed concepts to engage effectively in the decision-making and action processes.

To address this challenge, the Texas A&M AgriLife Extension Service (Extension) collaborated with the Texas State Soil and Water Conservation Board (TSSWCB), and numerous other water resource management entities in Texas, to develop a program designed to engage both rural and urban stakeholders and better enable them to become actively and effectively involved in watershed planning efforts (i.e., Watershed Protection Plan (WPP) and Total Maximum Daily Load (TMDL) development). With funding from both the TSSWCB, and Clean Water Act §319(h) grant funds from the TSSWCB, the project sought to continue the watershed-based training program, which was initiated with TSSWCB Project 05-05 entitled, *A Community Based Water Quality Curriculum Which Enhances Stakeholder Involvement in Watershed Protection Initiatives: A Pilot Project.* The program, now known as the Texas Watershed Steward (TWS) program, has been continued by the TSSWCB under Projects 07-09, entitled *Statewide Implementation of the Texas Watershed Steward Program;* 11-05, entitled *Continued Statewide Delivery of the Texas Watershed Steward Program*; 15-05, entitled *Extended Delivery of the Texas Watershed Steward Program;* 15-55, entitled *Additional Delivery of the Texas Watershed Steward Program*; and 18-05, entitled *Sustained Delivery of the Texas Watershed Steward Program*, the latter being the subject of this final report. The success of the TWS program is attributable to the program's design to develop and deliver science-based, community-responsive watershed education tailored to water quality issues in target watersheds. The curriculum has been employed to educate and train local stakeholders and to facilitate active involvement in current or planned water quality improvement projects in their watershed.

RESULTS BY TASK

TASK 1: Project Administration

Subtask 1.1*: Extension will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 1st of January, April, July and October. QPRs shall be distributed to all Project Partners.*

Extension has submitted the required QPRs to the TSSWCB and all project partners for Project 18-05. The QPRs remain on file with the TSSWCB.

Subtask 1.2: *Extension will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.*

Extension has performed the required accounting functions for TWS program-related funds and submitted applicable Reimbursement Forms to the TSSWCB.

Subtask 1.3: *Extension will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. Extension will develop lists of action items needed following each project coordination meeting and distribute to project personnel.*

Extension hosted the required coordination meetings and/or conference calls between the TSSWCB and other project partners. The TWS program schedule, deliverables, and other program needs and requirements were coordinated and revised as needed.

Subtask 1.4: *Extension will develop a Final Report that summarizes activities completed and conclusions reached during the project. The report will also include the extent to which project goals and measures of success have been achieved.*

The submittal of this Final Report for TSSWCB Project 18-05 constitutes the required summary of all project activities.

TASK 2: Coordinate and deliver watershed-based TWS trainings in selected watersheds throughout Texas

Subtask 2.1: *Extension will employ an Extension Program Specialist who will serve as the full-time TWS Program Coordinator and will be responsible for the general oversight and coordination of all project activities and for promoting, coordinating, and delivering the TWS watershed-based training events and computer-based tools.*

Throughout the duration of Project 18-05, Extension employed an Extension Program Specialist to serve as the full-time TWS Program Coordinator.

Collaboration with a multi-disciplinary, multi-agency team of project partners was maintained from the initiation of the program in order to better facilitate these efforts. The team consisted of Extension personnel in the Departments of Soil and Crop Sciences, Biological and Agricultural Engineering, Wildlife and Fisheries, Rangeland Ecology and Management, and Agricultural Leadership Education and Communications; the Texas Water Resources Institute (TWRI), the Spatial Sciences Laboratory, the TSSWCB, Texas Commission on Environmental Quality (TCEQ), Texas Department of Agriculture (TDA), Texas Parks and Wildlife (TPWD), Texas Forest Service (TFS), USDA Natural Resources Conservation Service (NRCS), state River Authorities and the United States Environmental Protection Agency (EPA).

Subtask 2.2: *Extension will work in concert with state and local organizations to select locations for the watershed-based TWS training events. Extension will coordinate efforts with state agencies and organizations involved in WPP/TMDL processes or who are planning future WPP/TMDL processes in specific watersheds. Additional watersheds may be selected based on impairment status, environmental sensitivity, and/or other priority issues identified by a partner agency or organization. Extension and TSSWCB will periodically make a collaborative decision to re-prioritize and add to/remove from the list of watersheds.*

Extension and TSSWCB held quarterly teleconferences to prioritize workshop locations. Watersheds were selected for program implementation based on the status of local WPP and/or TMDL projects, as well as steering committee and workgroup development in certain watersheds. Regular communication was conducted via telephone and email between Extension and TSSWCB regarding prioritization of workshop locations. A working schedule of planned and potential future events was developed and revised as needed (Appendix A).

TWS team collaborators, river authorities, watershed coordinators, and others involved in the development and implementation of water quality projects throughout the state were consulted with on a routine basis to obtain suggestions for potential TWS workshop locations. Local interest in the program was also considered when prioritizing watersheds for implementation and input from all stakeholder groups was welcomed and encouraged throughout the prioritization process. Resulting stakeholder requests were discussed in the quarterly watershed prioritization calls held between Extension and TSSWCB.

Subtask 2.3: *Extension will actively market watershed-based TWS trainings through news releases (A&M AgriLife News and local media outlets), Internet postings, newsletter announcements, public/conference presentations, flyers, etc., to enhance awareness and utilization.*

Each TWS training event was aggressively publicized and marketed to maximize participation by local stakeholders. Marketing materials were designed to appeal to a full range of watershed stakeholders but were written for a non-technical audience.

Press releases and flyers were developed and distributed approximately one to two months prior to an event (Appendix B). Workshop flyers were posted in Extension offices, local businesses, and public areas. To amplify efforts, materials were sent to media outlets with a wide range of audiences in the attempt to reach the largest stakeholder base possible. Outlets for distribution included newspapers, television, radio, newsletters, and others. County Extension Agents (CEAs) working both within the targeted watershed and in surrounding counties were solicited to assist with distribution of marketing materials. Furthermore, numerous newsletter articles were also distributed through the TSSWCB, local CEAs, Master Naturalist and Master Gardener programs, and other local associations.

Email lists obtained from CEAs, local watershed coordinators, councils of government, municipalities, chambers of commerce, and local organizations were commonly used to promote and announce events. In some more rural watersheds, invitations were mailed to landowners and agricultural producers containing personalized correspondence and information regarding upcoming TWS trainings in their area (Appendix C).

Presentations and announcements regarding the TWS program were made at various watershed stakeholder meetings, regional conferences, other Extension education events, and to various small groups advocating and raising awareness about the TWS program. Examples include public meetings in the target watershed, the Texas Watershed Planning Short Course, Texas Forest Service roundtable meetings, and other Extension education events. In addition, program updates delivered every six months at the biannual state watershed coordinators roundtable meeting included information regarding future workshop locations.

Extension maintained and routinely updated a website posted at https://tws.tamu.edu for the program. The website includes all resources related to the program, offers online pre-registration for events, and provides access to the online training courses.

TWS program materials, which included access to other references and associated web addresses, were provided to workshop participants. Attendees were encouraged to use and display the materials publicly as a means of advertising the program. This was an effective method of creating a sense of community among participants, and materials have been displayed by many Texas Watershed Stewards at many other unrelated events and on television.

Subtask 2.4: *Extension will deliver at least 10, 4-hour or 7-hour TWS training events in selected watersheds annually.*

Watershed-based trainings were delivered as one day events and focused on enhancing understanding of watershed systems, watershed impairments, methods for improving watershed function, and community-driven watershed protection and management.

The agenda and PowerPoint modules for the event were crafted to integrate pertinent TWS handbook information and the interactive learning stations, leading to a facilitated discussion of local watershed issues (Appendix D). Participants were also given a copy of the TWS handbook and supplemental literature from Extension and TCEQ (Appendix E).

Training events were conducted by a team of Extension Specialists and included a mixture of PowerPoint slides, videos, and hands-on demonstrations. Much of the information included in the training is applicable to all watersheds and provides a common base of information for participants. However, each event was carefully tailored to the target watershed by incorporating specific information on land use and cover, water body impairments, and potential pollutant sources. Development of a more intimate understanding of, and connection to, the target watershed is a major strength, and the ultimate goal, of the TWS program.

TSSWCB Project 18-05, which began on November 1, 2018, was originally scheduled to have an end date of October 31, 2021. However, by means of collaborative efforts between stakeholders in target watersheds, other project partners, and the TWS program itself, two no-cost extensions totaling 14 months were performed for the Project 18-05 Workplan. The no-cost extensions were executed in response to the COVID-19 pandemic, which slowed anticipated workshop delivery. Nonetheless, 33 TWS workshops were delivered under Project 18-05; three more than required by the original Workplan. The workshops attributable to Project 18-05 were attended by 1,172 persons. Since development of the TWS program, 138 workshops have been delivered, resulting in a total of 5,622 attendees, averaging 41 persons per workshop. A photograph taken at a TWS workshop is provided below along with a list of all TWS workshops delivered under TSSWCB Project 18-05.

CONTINUED ON NEXT PAGE

Photograph of a Texas Watershed Steward Workshop

Dates, locations, and associated watersheds of conducted TWS Workshops

- Lists of TWS Workshops completed prior to TSSWCB Project 18-05 are provided in the Final Reports for TSSWCB Project 11-05; TSSWCB Project 15-55; and online at https://tws.tamu.edu/workshops/upcoming-workshops/.

----------Beginning of TSSWCB Project 18-05----------

- December 11, 2018: Jonesboro, TX (Leon River Watershed)
- March 5, 2019: New Braunfels, TX (Geronimo & Alligator Creeks Watersheds)
- March 6, 2019: Harker Heights, TX (Nolan Creek Watershed)
- April 25, 2019: Houston, TX (Cypress Creek Watershed)
- May 21, 2019: Jasper, TX (Lower Neches River Watersheds)
- May 22, 2019: Lufkin, TX (Middle Neches River and Angelina River Watersheds)
- July 17, 2019: Weslaco, TX (Arroyo Colorado Watershed)
- September 17, 2019: San Marcos, TX (Upper San Marcos River Watershed)
- October 8, 2019: Corpus Christi, TX (Lower Nueces River Watershed)
- November 7, 2019: Decatur, TX (Eagle Mountain Lake Watershed)
- November 19, 2019: Georgetown, TX (Lake Granger & San Gabriel River Watershed)

- January 31, 2020: Tyler, TX (Angelina River Watershed)
- February 12, 2020: Beaumont, TX (Neches River Tidal & Hillebrandt Bayou Watershed)
- March 3, 2020: McKinney, TX (Lavon Lake Watershed)
- September 2, 2020: Luling, TX (Plum Creek Watershed)
- September 15, 2020: Mansfield, TX (Joe Pool Lake Watershed)
- November 17, 2020: Livingston, TX (Lake Livingston Watershed)
- January 28, 2021: Virtual–Lampasas, TX (Lampasas River Watershed)
- May 5, 2021: Edna, TX (Lavaca River Watershed)
- June 30, 2021: Bonham, TX (Bois d'Arc Lake Watershed)
- July 20, 2021: Granbury, TX (Lake Granbury Watershed)
- September 8, 2021: Blanco, TX (Blanco River Watershed)
- October 21, 2021: Orange, TX (Sabine River/Adams & Cow Bayous Watersheds)
- December 8, 2021: Bellville, TX (Mill Creek Watershed)
- February 16, 2022: Chandler, TX (Kickapoo Creek Watershed)
- February 26, 2022: Virtual-San Antonio, TX (San Antonio Urban Watersheds)
- March 3, 2022: Kingsville, TX (Petronila Creek, San Fernando Creek, and Baffin Bay Watersheds)
- April 5, 2022: Pearland, TX (Clear Creek Watershed)
- May 25, 2022: Seguin, TX (Geronimo & Alligator Creeks Watersheds)
- July 28, 2022: Dallas, TX (Rowlett Creek Watershed)
- August 23, 2022: Groesbeck, TX (Lake Limestone Watershed)
- September 7, 2022: Nacogdoches, TX (La Nana Bayou Watershed)
- October 5, 2022: Graford, TX (Possum Kingdom Lake Watershed)

The TWS program obtained/maintained certification to provide continuing education units (CEUs) for a variety of professional affiliations. Providing CEUs was a valuable added incentive for participation of many professionals, and CEU offerings were utilized as a part of the marketing effort. The maximum number of qualified/authorized CEUs provided by the TWS program include:

- 7 AICP (American Institute of Certified Planners) CM hours for planners (5.5 CM credits, 1.5 CM Law)
- 7 CCA (Certified Crop Advisor) CEUs in Soil & Water Management
- 7 TBPE (Texas Board of Professional Engineers) CEPs for professional engineers
- 7 SBEC (State Board for Educator Certification) CPEs in Science
- 3 TDA (Texas Department of Agriculture) general CEUs for private pesticide license holders
- 3 TFMA (Texas Floodplain Management Association) CECs for Certified Floodplain Managers

- 4 TBPG (Texas Board of Professional Geoscientists) PDHs for professional geoscientists
- 4 TCEQ (Texas Commission on Environmental Quality) Occupational License continuing education credits for each of the following: Landscape Irrigators, On-site Sewage Facility Installers, Public Water System Operators, and Wastewater System Operators

At the conclusion of TWS trainings, participants received a personalized Certificate of Completion. Certificates include the participant's name, date and location of the event, as well as CEU information. Combined with the event sign-in sheets, certificates also served as proof of attendance for those requesting continuing education.

Subtask 2.5: *Extension will foster the establishment of local watershed action groups spawned by the TWS program. Extension will work with state and local organizations to develop and/or provide more detailed, resource specific education and training resources and action oriented activities that can be delivered and/or undertaken in watersheds where those issues are identified as most significant.*

One key component of the training program is Community-based Watershed Involvement. Participants were provided examples of how to become involved in local activities aimed at protecting and improving water resources. In addition, all existing programs provided through Extension and other agencies and organizations were highlighted at each training event. Members of stakeholder groups, water quality monitoring groups, Keep Texas Beautiful, Master Gardeners, Master Naturalists, and other community groups were encouraged to attend and provide information regarding their activities and programs in the watershed.

In addition, each event included an update from the local watershed coordinator, or other appropriate individual, providing the status of local watershed planning and management activities. These presentations served as an introduction to facilitate discussion geared toward promoting dialogue among participants, bolstering support for existing WPP/TMDL efforts and stakeholder groups, creation of new watershed groups, and initiation of community watershed events and activities.

Following completion of workshops, Extension has received additional requests from workshop participants to conduct presentations related to TWS and water quality. Requests received include those from Master Gardener and Master Naturalist groups, Teachers, Concerned Community Members, and other individuals and organizations. Extension will continue to serve as an information source to all workshop participants regarding helpful publications and educational materials, upcoming stewardship activities (i.e., stream cleanups, etc.), upcoming project meetings and workshops, etc.

Subtask 2.6: *Extension will attend and participate in meetings, as appropriate, in order to communicate project goals, activities and accomplishments to affected parties. Such meetings may include, but are not limited to, Clean Rivers Program Basin Steering Committees, the Texas*

Watershed Planning Short Course, Texas Watershed Coordinator Roundtables, and the TSSWCB Regional Watershed Coordination Steering Committee.

The TWS Program Coordinator, and co-presenters of the TWS Program, attended the meetings required by Subtask 2.6 of the Workplan for TSSWCB Project 18-05 in addition to the Universities Council on Water Resources Annual Conference. At each meeting/event, the TWS Program was highlighted and discussed.

TASK 3: Distribute and manage computer-based training tools for the TWS program

Subtask 3.1: *Extension, with assistance from SSL, will manage and update web-based versions of the TWS program. Program information will be reviewed every six months and updates made as needed.*

Using Toolbook Instructor 9.5, the original interactive training version of the TWS program was created and made available online. Since that time, the online course has undergone several iterations to improve aesthetics, course navigability, and conveyance of information. Significant redevelopment of the online course occurred in 2015 and 2018 with the most recent replatforming occurring in 2022 (Appendix F). The online course materials were made accessible from the program website at https://tws.tamu.edu/online-training-course/.

The online based versions allow those unable to attend a watershed-based workshop to complete the course curriculum, providing more flexible and widespread access to the program. The online TWS courses were designed to be an interactive experience, providing videos, user activated animations, and the ability to navigate course material freely. TWS curriculum can be accessed anonymously; however, in order to receive a certificate of completion participants must enroll in the for-credit course and complete the pre- and post-test evaluations. Enrollment in the courses is open to all, and require users to submit their country, state, and city of residence along with a valid email address.

Separately from the online, self-paced TWS course offerings, which are accessible 24-7, a virtual attendance option for live, in-person TWS workshops was developed in response to COVID-19.

Subtask 3.2: *Extension will actively market computer-based TWS resources through news releases (AgriLife News and local media outlets), Internet postings, newsletter announcements, public/conference presentations, flyers, etc., to enhance utilization of the computer-based tools.*

Participants at watershed-based TWS trainings were made aware of the online course availability and were encouraged to pass that information along. Press releases were distributed, announcing the availability of the TWS online courses, and were published through a number of media outlets. Additionally, videos produced by the TWS program were created, highlighting course

curriculum content and access to the online course (Appendix G). An example of the aforementioned video is available via the TWS website (https://tws.tamu.edu).

Extension coordinated with TWRI information technology specialists so that the TWS website would be more visible in internet search results. As a result, internet searches containing combinations of keywords such as "Texas," "Watershed," and "Online Course" would readily produce a link to the TWS website.

Subtask 3.3: *Extension will track website usage and on-line course completion.*

The host platform used to support the online course has built in mechanisms for tracking usage. Online course administrators are able to view participant information and their activity. A separate platform provides reports for pre- and post-test responses as well as course access data from those enrolled in the course (Appendix H). The TWS website allows users to view curriculum content without enrolling in an online course; however, only individuals enrolled in a TWS online course are able to complete the pre/post tests and receive a certificate of completion. In total, 1,048 individuals completed an online, self-paced TWS course under Project 18-05. Of the aforementioned participants, 364 received certificates of completion. Additionally, 260 persons virtually attended a live, in-person TWS workshop during the pandemic.

Google Analytics was used to track overall website traffic (Appendix I). Since the TWS website went live in 2008 it has been visited over 36,000 times. Specifically regarding Project 18-05, the TWS website has been visited more than 13,560 times and included more than 55,800 individual page views. The vast majority of visits originated from users in the United States; however, the website received traffic from more than 60 different countries on 6 continents.

TASK 4: Evaluate the effectiveness of watershed- and computer-based TWS training tools

Subtask 4.1: *Extension will conduct pre-/post-test evaluations of watershed- and computer-based trainings to measure knowledge gained by participants regarding watershed principles, impairments, and appropriate BMPs to reduce NPS pollution; to determine participant's intentions to change their behavior as a result of the program; and to evaluate participant satisfaction with the program.*

Working with faculty in Agricultural Leadership Education & Communications (ALEC) and Organizational Development, Extension made several revisions to the pre- and post-tests and to methods by which the data are analyzed. The original versions of the pre- and post-tests, developed in 2007, were updated to remove select questions and replace them with questions to more accurately gauge knowledge gained. The revised version of the pre/post-test was first used in October 2008 and has been the version used thereafter (Appendix J). Furthermore, analysis of individual questions from October 2008 until 2016 revealed that 7 of the 18 knowledge questions

were answered correctly sufficiently often as to be considered common knowledge for almost 80% of participants as described in Subtask 4.3. These 7 questions were therefore excluded from the final analysis, as was also the case under TSSWCB Project 15-55, and the remaining eleven questions were used to calculate knowledge gain. Additional questions on the post-test evaluate participant satisfaction of the program along with a participant's intentions to adopt BMPs.

The pre- and post-test evaluation instruments were delivered at TWS workshops. Following the workshops, the pre- and post-tests were mailed to the ALEC Department at Texas A&M University to be assessed. Results from the TWS workshop pre- and post-tests conducted through December 2022 have been analyzed. While the results are provided in Appendix L, a discussion regarding them is provided below in the TSSWCB Project 18-05 Final Report discussion of *Subtask 4.3*.

Subtask 4.2: *Extension will administer a 6-month follow-up evaluation to assess actions taken and practice adoption by participants.*

Six months after each workshop, follow-up post-evaluations were distributed to workshop participants, and responses were received electronically via Qualtrics software platform (Appendix K). The post-evaluation itself assesses the watershed stewardship actions, such as adoption of one or more BMPs, taken by previous workshop attendees. Following receipt of completed 6-month post-evaluations, the data was compiled and analyzed. While the results are provided in Appendix M, a discussion regarding them is provided below in the TSSWCB Project 18-05 Final Report discussion of *Subtask 4.3*.

Subtask 4.3: *Extension will analyze results obtained from Phase 1 (pre-/post-tests) and Phase 2 (6-month follow-up) evaluations using descriptive, correlational, and analysis of variance statistical procedures. Results will be used to periodically evaluate and modify TWS program materials and incorporated into the final report.*

Assessment of completed pre- and post-test (Phase 1 evaluations) and six month follow-up evaluations (Phase 2 evaluations) through December 2022 was performed. Results from the analysis of Phase 1 and Phase 2 evaluations are discussed below and provided in Appendix L and Appendix M, respectively.

Phase 1

With the assistance of personnel in Organizational Development, Phase 1 pre- and post-test data were collected and analyzed using Qualtrics software (Appendix L). Individual questions were analyzed for pre/post-test comparison and were cross-tabulated for better interpretation of results. Knowledge gain was derived from 18 pre- and post-test questions pertaining to watersheds, fresh water, pollution, and policy and government. The same 18 questions were used on both evaluations. Knowledge gain for each question was calculated from the difference in percentage points between number of questions answered correctly on the pre-test versus the

number answered correctly on the post-test. For example, if a valid pre-correct response of 70% is reported and the reported valid post-correct response is 96.7%, the knowledge gain for such a question would be 26.7%; i.e., the difference between the valid percent of pre-correct and post-correct responses.

Individual question analysis indicated that almost 80% of all participants answered the same 7 questions correctly on both the pre- and post-tests. These 7 questions were therefore considered to be common knowledge for the majority of participants and were excluded from the final knowledge gain calculation. The exclusion was the same practice performed under TSSWCB Project 15-55 via the guidance of ALEC and Organizational Development. The 7 questions excluded are pre/post-test questions 1, 4, 5, 6, 11, 12, and 13 (Appendix J).

An overall knowledge gain of 30.3% was reported for participants. For questions relating to watersheds there was an overall knowledge increase of 21.3%, and for questions relating to fresh water there was an increase of approximately 31.5%. Furthermore, there was a knowledge increase of over 35.6% for pollution questions and an increase of 37.1% for policy and government questions regarding water quality.

Pre/post-test data indicated a high percentage of participants intended to engage in activities aimed at improving water quality. Out of all respondents, 21.2% left trainings with the intention to participate in community cleanup activities and 15.6% wanted to get involved in local planning/zoning decisions. Furthermore, 30.8% intended to communicate water issues with elected officials, 14.8% intended to help develop a plan for their watershed, and 16.3% intended to help form or become a member of a local watershed group. Most importantly, more than 50 percent of participants reported an intent to adopt BMPs to help protect their watershed and 95.4% felt that the TWS program provided them with the ability to be a better steward of their watershed.

Phase 2

Phase 2 evaluations were sent out electronically approximately six months after a training event via email addresses collected through event registrations and sign-in sheets. The survey consisted of 15 multiple choice questions relating to adoption of BMPs and utilization of education materials following a training event. Since there was no corresponding pre-test or any correct/incorrect answers to Phase 2 questions, complex analysis was not required. Responses were compiled into a summarized report for analysis and interpretation (Appendix M).

Six-month follow-up evaluations continued to indicate positive impacts, even several months after the training. Among respondents, 37.7% had participated in at least one community cleanup in the past six months, and another 42.4% indicated that they had plans to participate in a future cleanup. Approximately 36% of respondents had participated in local planning/zoning decisions, and another 31% planned to get involved in those types of activities in the near future.

Furthermore, 51% stated that they had communicated with their elected officials regarding water quality issues and an additional 26.6% planned to do so.

Another positive result of TWS trainings, as indicated in the follow-up evaluation data, is the resulting level of TWS attendee involvement in volunteer water quality monitoring programs. Approximately 27% of respondents had participated in such programs and 25.5% planned to get involved.

One of the most desired impacts of the program is to encourage participants to engage in their own community and actively share the knowledge they gained at the trainings. Within six months of receiving TWS training, 33% of respondents had given a water quality presentation to a school class or community group and an additional 22% planned to do so. Evaluations also showed that 67% of respondents had encouraged others to participate in the training.

Over 87% of respondents indicated they now more closely monitor individual actions that might impact water quality and 80% have either adopted or maintained management practices that protect water quality. For example, approximately 29% had adopted soil testing practices, and another 39% indicated they plan to conduct soil testing in the future to better manage fertilizer application.

In regard to satisfaction, an overwhelming 94.6% of respondents were satisfied with the TWS training materials, with 82.4% having used those resources since the training. Lastly, nearly 60% of respondents had already shared the materials with their peers at the time of the 6-month follow-up evaluation, further indicative of the continued interest among the general public in the TWS program.

CONCLUSIONS

In close coordination with the TSSWCB, and other state, federal, and local partners, the Texas A&M AgriLife Extension Service has conducted 138 Texas Watershed Steward workshops across the state of Texas. The 5,622 stakeholders in attendance at these workshops were educated in the disciplines of water quality and watershed management through approximately 27,068 combined contact hours. Thirty three of the aforementioned workshops were completed under Project 18-05 to an audience of 1,172 persons. In addition to face-to-face workshops, online training resources have been developed and delivered to citizens to provide flexible access to science-based watershed management information. Over 1,000 persons have taken advantage of self-paced online TWS programing, which became all the more valuable during the COVID-19 pandemic.

Although it is often challenging to measure the impact of educational programs, the success of this project has been demonstrated by measured increases in knowledge, understanding, and adoption of water quality management practices. In addition, the program has documented greater citizen involvement in local watershed programs and activities as a result of the training.

Continued statewide implementation of the TWS program under TSSWCB Project 22-12 will support and enhance current and future watershed management and protection efforts undertaken by water resource management agencies and organizations in Texas. In doing so, local citizens will be engaged and empowered to be the driving force for protection of their watershed from nonpoint sources of pollution.

Appendix

Appendix A

Example re-prioritized list of future TWS workshop locations (this schedule originated from the FY-2022, fourth-quarter QPR submitted to the TSSWCB in October 2021)

Completed TWS Training
Confirmed Watershed, Date Scheduled
Obligated Watershed, Date Not Yet Scheduled
Suggested Watershed

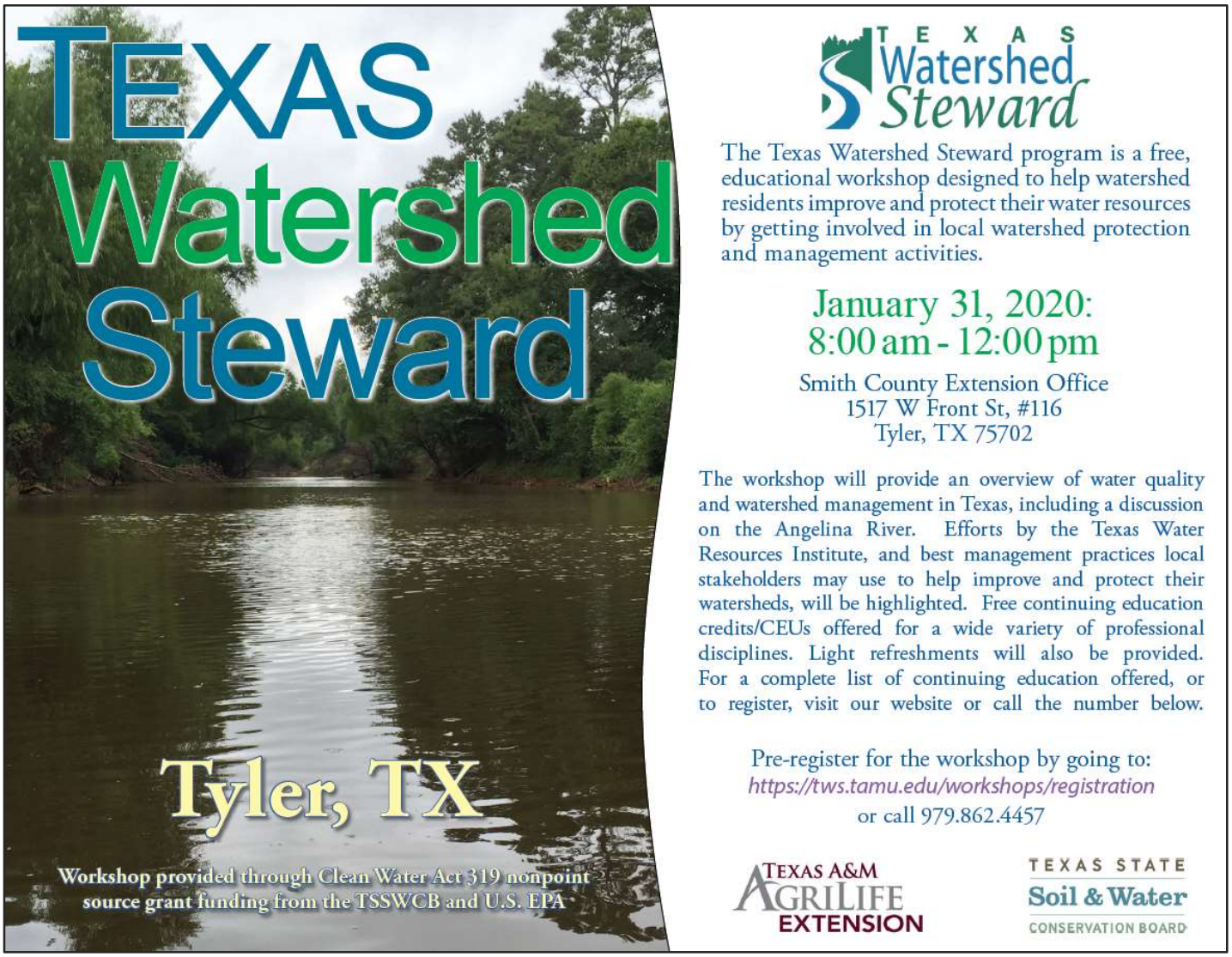
Texas State Soil & Water Conservation Board **Texas Watershed Steward Program**

Texas A&M AgriLife Extension Service Tentative Schedule—Revised 9/30/2021

Watershed	Type	FY	Q	Date	City	County	Contact Name	Affiliation	Attendance (in person)	Attendance (online)
Angelina River Above Sam Rayburn Reservoir	WPP	2020		1/31/2020	Tyler	Smith	Anna Gitter	TWRI	37	
Neches River Tidal/Hillebrandt Bayou	WPP/I-plan	2020		2/12/2020	Beaumont	Jefferson	Michael Schramm	TWRI	34	
Lake Lavon	WPP	2020		3/3/2020	McKinney	Collin	David Cowan	NTMWD	41	
Plum Creek 4	WPP	2021		9/2/2020	Luling	Caldwell	Stephen Risinger	Plum Creek Watershed Partnership	13	14
Joe Pool Lake	WPP	2021		9/15/2020	Mansfield	Tarrant	Heather Firn	Trinity River Authority, TCEQ	10	24
Lake Livingston	Other	2021		11/17/2020	Livingston	Polk	Matt March	AgriLife Extension	10	21
Lampasas River	WPP	2021		1/28/2021	Lampasas/Virtual	Lampasas	Lisa Prcin	AgriLife Research - Blackland		28
Lavaca River	WPP	2021		5/5/2021	Edna	Jackson	Emily Monroe	TWRI	22	6
Bois d'Arc Lake	WPP	2021		6/30/2021	Bonham/Virtual	Fannin	David Cowan	NTMWD	28	24
Lake Granbury 3	WPP	2021		7/20/2021	Granbury	Hood	Tiffany Malzahn	Brazos River Authority	50	7
Blanco/Little Blanco River	Other	2022		9/8/2021	Blanco	Blanco	Nick Dornak	Meadows Center for Water and the Environment	23	7
Adams/Cow Bayous/Sabine River	TMDL	2022		10/21/2021	Orange	Orange	Jerry Wiegreffe	Sabine River Authority		
Mill Creek 3	WPP	2022		12/8/2021	Bellville	Austin	Evgenia Spears	AgriLife Extension		
Urban Watersheds in City of San Antonio	Other	2022		2/19/2022	San Antonio	Bexar	Angela Paskell	San Antonio ISD		
Kickapoo Creek	WPP	TBD		TBD	TBD	TBD	Leah Taylor	TIAER, Angelina & Neches River Authority		
Petronila & San Fernando Creeks	WPP	TBD		TBD	TBD	TBD	Lucas Gregory, Ph.D.	TWRI		
Rowlett Creek	TBD	TBD		TBD	TBD	TBD	Heather Firn	Trinity River Authority		
Possum Kingdom Lake	Other	TBD		TBD	TBD	TBD	Tiffany Morgan	Brazos River Authority		
Spring Creek	WPP	TBD		TBD	TBD	TBD	Justin Bower	H-GAC		
Cypress Creek	WPP	TBD		TBD	TBD	TBD	Nick Dornak	Meadows Center for Water and the Environment		
Big Creek	TMDL	TBD		TBD	TBD	TBD	Justin Bower	H-GAC		
Garcitas and Arenosa Creeks	WPP	TBD		TBD	TBD	TBD	Lucas Gregory, Ph.D.	TWRI		
Bosque River	Other	TBD		TBD	TBD	TBD		Bosque River Coalition		
Watersheds of West Texas	Other	TBD		TBD						

Appendix B

Example TWS event flyer and press release from TSSWCB Project 18-05



Click for a hub of Extension resources related to the current COVID-19 situation.
COVID-19 Resources (https://agrilifeextension.tamu.edu/coronavirus/)

(https://agrilifetoday.tamu.edu/)

Water quality training will focus on Lavaca River

In-person and virtual attendance options offered on May 5 program in Edna

April 7, 2021

A Texas Watershed Steward (https://tws.tamu.edu/) workshop on water quality related to the Lavaca River will be held from 1-5 p.m. May 5.

The workshop will be held at the Texas A&M AgriLife Extension (https://agrilifeextension.tamu.edu/) Service office in Jackson County, 411 N Wells, Edna. A virtual attendance option will also be available for those unable to attend in-person.

Lavaca River near Hallettsville. (Texas A&M AgriLife photo)

The event will be presented by AgriLife Extension and the Texas State Soil and Water Conservation Board (https://www.tsswcb.texas.gov/tsswcb-home-page) in cooperation with the Texas Water Resources Institute (https://twri.tamu.edu/), TWRI.

"This workshop is designed to help watershed residents learn about their water resources and how they may become involved in local watershed protection and management activities," said Michael Kuitu, AgriLife Extension program specialist and coordinator for the Texas Watershed Steward program, Bryan-College Station. "The workshop is free and open to anyone interested in improving water quality in the region."

To attend in person or virtually, participants must preregister (https://tws.tamu.edu/workshops/registration/) at the Texas Watershed Steward website or call 979-862-4457.

"Once registered, additional meeting information, including social distancing measures and sanitation practices we plan to perform, will be provided," Kuitu said.

Workshop content

The workshop will include a discussion on watershed systems along with types and sources of water pollution. There also will be a group discussion on community-driven watershed protection and management.

"The workshop will provide an overview of water quality and watershed management in Texas with an emphasis on area water quality," Mike Hiller, AgriLife Extension agent for Jackson County, said. "It will address local water resources but will be applicable to all waters in the region."

"The Lavaca River is an important water resource," said Emily Monroe, TWRI program specialist. "The Lavaca is a treasured natural resource of the State of Texas for such activities as fishing and is essential wildlife habitat."

Attendees of the workshop will receive a copy of the Texas Watershed Steward Handbook and are eligible to earn a certificate of completion. The Texas Watershed Steward program offers continuing education for multiple professional disciplines. However, the quantity of continuing education offered does vary for select disciplines, depending on whether one attends in-person or virtually.

Continuing education credits

For those who attend in-person, four hours of continuing education is offered for the following professional disciplines: soil and water management for crop advisers; professional engineers; American Institute of Certified Planners members; teachers; professional geoscientists; landscape architects; and floodplain managers.

Each of the following Texas Commission on Environmental Quality occupational licensees: wastewater system operators, public water system operators, on-site sewage facility installers and landscape irrigators.

In addition, three general continuing education units are offered to in-person attendees for Texas Department of Agriculture pesticide license holders, and two credits are offered for nutrient management specialists. For questions regarding professional continuing education afforded to virtual attendees, contact Kuitu.

"Participating in the Texas Watershed Steward program is a great opportunity to get involved and make a difference in your watershed," Hiller said.

Funding for this effort is provided through a federal Clean Water Act nonpoint source grant administered by the Texas State Soil and Water Conservation Board from the U.S. Environmental Protection Agency.

For more information on the Texas Watershed Steward program, and to preregister, go to the website, email Kuitu at mkuitu@ag.tamu.edu or call 979-862-4457; or email Hiller at mhiller@ag.tamu.edu or call 361-782-3312.

For information on watershed protection efforts for the Lavaca River watershed, email Monroe at Emily.monroe@ag.tamu.edu or call 979-458-3154.

-30-

Paul Schattenberg
Cell: 210-859-5752; MSTeams: 210-890-4548
paschattenberg@ag.tamu.edu

Paul is a communications and media relations specialist with Texas A&M AgriLife Communications. Based in San Antonio, Paul is responsible for writing advances, news releases and feature stories for Texas A&M AgriLife agencies, as well as providing any media relations support needed.

Contact: 979-458-6341 | news@ag.tamu.edu

Appendix C

Example TWS workshop invitation letter

Mr. Anyone
1111 Somewhere St.
Anytown, USA 11111

TEXAS A&M AGRILIFE EXTENSION

Dear Mr. Anyone,

Are you interested in the quality of water in your local streams, rivers and lakes? Would you like to learn about how to protect these important water resources? If so, join us at the Texas Watershed Steward workshop to be held at *VENUE NAME* located at *Address* in *CITY*, TX on *MONTH DAY* from *START TIME* to *END TIME*.

Texas Watershed Stewards is a one-day educational program sponsored by the Texas A&M AgriLife Extension Service, and Texas State Soil and Water Conservation Board, in coordination with the *LISTER OTHER EVENT/PROJECT PARTNERS*. The program is designed to improve the quality of Texas' water resources by educating and informing local stakeholders about their watershed, potential impairments, and steps that can be taken to help improve and protect water quality.

The focus of the workshop on *DATE* will be the *NAME OF WATERSHED* Watershed which includes parts of *COUNTY NAMES* Counties. *WATERSHED NAME* first appeared on the State's list of impaired waters in *DATE* for elevated levels of *IMPAIRMENT*.

Clean water is important to us all and as a landowner you play a key role in protecting local water resources for future generations. We hope you will take this opportunity to learn more about the water quality issues in your area and what you can do to help.

The training is free and you can pre-register for this event by visiting our website at http://tws.tamu.edu or by calling 979-862-4457.

As a part of the free training, we also offer Continuing Education Units for a variety of professions ranging from TDA (Texas Department of Agriculture) CEUs for pesticide license holders to select TCEQ (Texas Commission on Environmental Quality) Occupational license holders. For a complete list of CEUs offered, such as Professional Engineers, Certified Crop Advisors, Certified Planners, and more, visit our website or contact Michael Kuitu via the information given below.

If you have any questions or need more information about the workshop, please contact Michael Kuitu or *COUNTY AGENT'S NAME*.

We hope to see you there.

Michael Kuitu
Extension Program Specialist
979-862-4457
michael.kuitu@ag.tamu.edu

COUNTY AGENT'S NAME
COUNTY NAME County Extension Agent
PHONE NUMBER
EMAIL

Appendix D

Sample agenda for a TWS workshop

TEXAS WATERSHED STEWARD WORKSHOP: AGENDA

TUESDAY– AUGUST 23, 2022

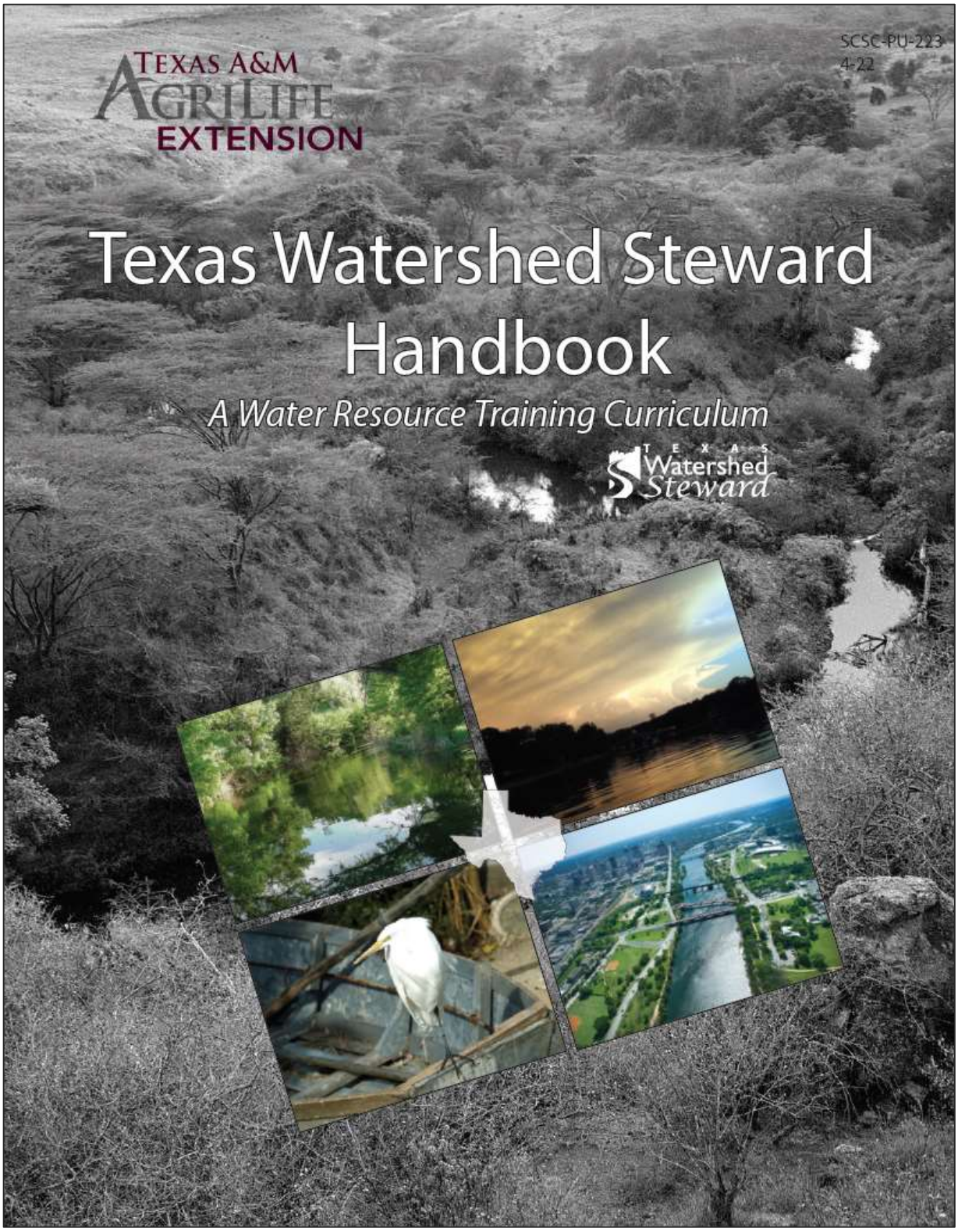
LAKE LIMESTONE WATERSHED

GROESBECK, TX

Sign-In   ***Pre-test***
Introductions (of speakers and participants)   ***Module 1: Program Introduction***
Module 2: Overview of Watershed Systems   What is a Watershed?   Watersheds in Texas   How do Texans Use Watersheds?   Principles of Watershed Hydrology   Natural Watershed Features   Natural Watershed Functions
Module 3: Overview of Watershed Impairments   Water Quantity and Quality
BREAK
Module 3: Overview of Watershed Impairments   Point and Nonpoint Sources of Pollution   Consequences of Impaired Water Quality   Water Quality Law and Policy in Texas   Water Quality Testing, Monitoring and Regulation
Module 4: Managing to Improve Watershed Function   Using a Watershed Approach   Water Quality Improvement Projects   Agricultural Best Management Practices   Water Quality Stewardship on Small Acreages   Management of Non-domestic Animals and Wildlife   Urban Best Management Practices   Protecting Water Quality Around the Home
Module 5: Community-Driven Watershed Protection and Management   Importance of Local Watershed Involvement   Forming and Sustaining Community Watershed Organizations and Partnerships
Questions, Discussions, Conclusions
Post-Test

Appendix E

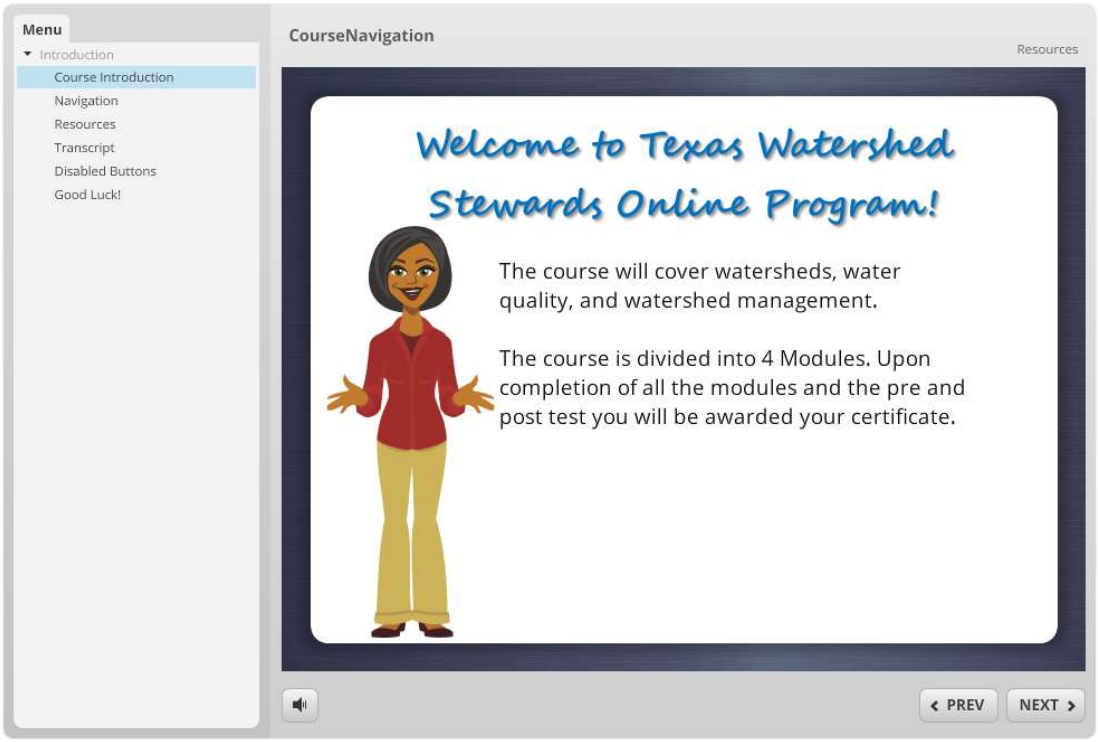
Cover page of TWS Curriculum Handbook



Appendix F

Above: Beginning of TWS Junior online course.

Below: Screenshot of video presentation during Module 3 of for-credit TWS online course

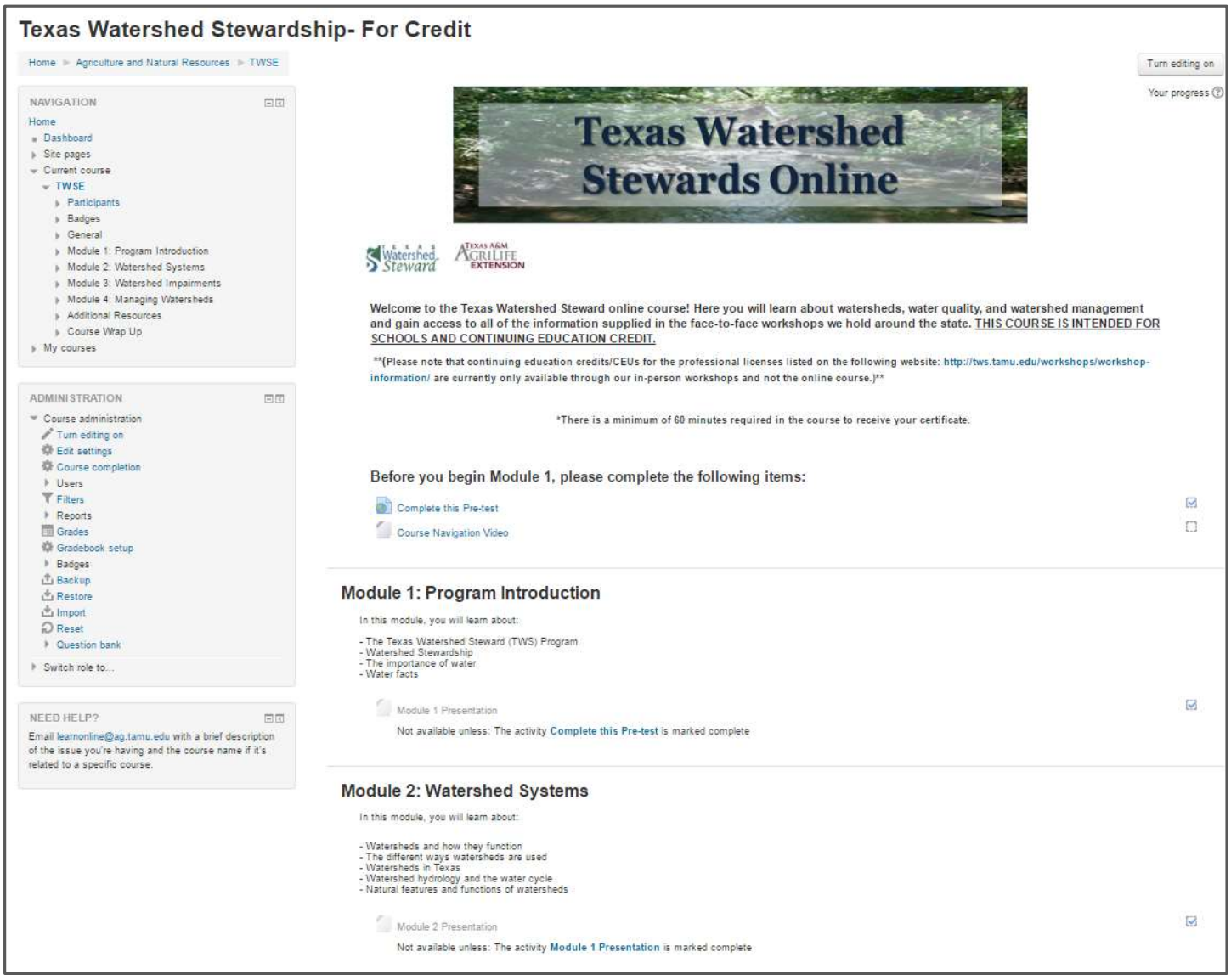


Appendix G

Clip from nonpoint source pollution video produced by the TWS program (tws.tamu.edu)

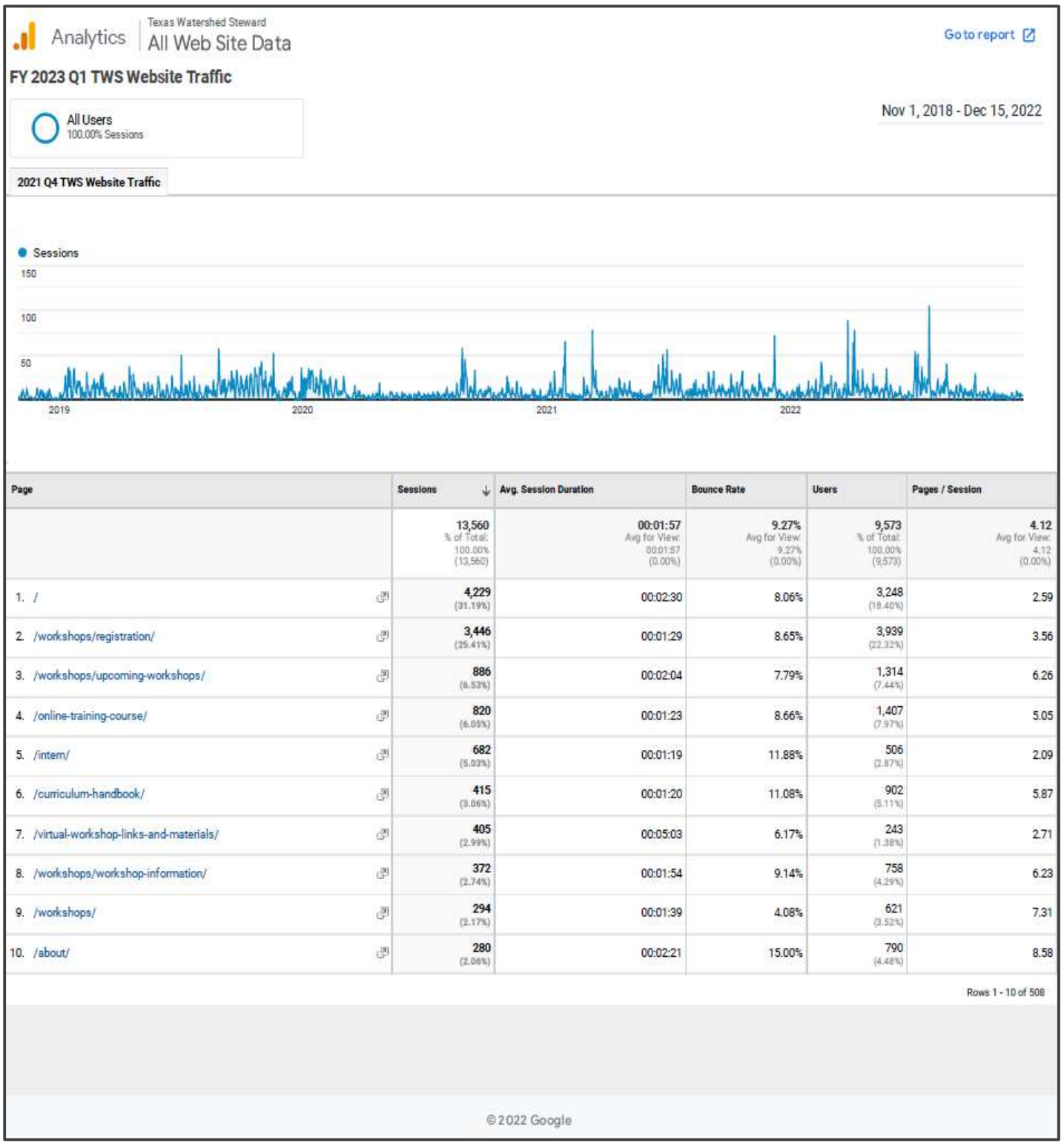
Appendix H

Instructor portal for online course



Appendix I

Example cover page from Google Analytics report for TWS website



Page	Sessions	Avg. Session Duration	Bounce Rate	Users	Pages / Session
	13,560 % of Total: 100.00% (13,560)	00:01:57 Avg for View: 00:01:57 (0.00%)	9.27% Avg for View: 9.27% (0.00%)	9,573 % of Total: 100.00% (9,573)	4.12 Avg for View: 4.12 (0.00%)
1. /	4,229 (31.19%)	00:02:30	8.06%	3,248 (19.40%)	2.59
2. /workshops/registration/	3,446 (25.41%)	00:01:29	8.65%	3,939 (22.32%)	3.56
3. /workshops/upcoming-workshops/	886 (6.53%)	00:02:04	7.79%	1,314 (7.44%)	6.26
4. /online-training-course/	820 (6.05%)	00:01:23	8.66%	1,407 (7.97%)	5.05
5. /intern/	682 (5.03%)	00:01:19	11.88%	506 (2.87%)	2.09
6. /curriculum-handbook/	415 (3.06%)	00:01:20	11.08%	902 (5.11%)	5.87
7. /virtual-workshop-links-and-materials/	405 (2.99%)	00:05:03	6.17%	243 (1.38%)	2.71
8. /workshops/workshop-information/	372 (2.74%)	00:01:54	9.14%	758 (4.29%)	6.23
9. /workshops/	294 (2.17%)	00:01:39	4.08%	621 (3.52%)	7.31
10. /about/	280 (2.06%)	00:02:21	15.00%	790 (4.48%)	8.58

Rows 1 - 10 of 508

Appendix J

TWS program Pre- and Post-Tests

TEXAS A&M AGRILIFE EXTENSION

TEXAS Watershed Steward

Last 4 digits of your home phone number: | | | | |

Location of Training: _____

TEXAS WATERSHED STEWARD PROGRAM

Pretest

The purpose of this pretest is to help us learn more about you and to determine baseline data on watershed related information. Please read the following questions and circle the answer you think is correct . Please do not worry if you do not know the answer, simply circle "unsure." THANKS!!!

MARKING INSTRUCTIONS
CORRECT: ● INCORRECT: ⊘ ⊙ ⊖ ⊜

1. **Watershed hydrology is the study of how:**
   - O Water interacts with various parts of a watershed including the land, the sea, and the sky
   - O Water quality and quantity are affected by point and nonpoint source pollution
   - O Chemical, physical, and biological water quality parameters change over time
   - O Water is formed on the Earth
   - O Unsure

2. **pH is measured on a scale of:**
   - O 1-5
   - O 1-12
   - O 0-10
   - O 0-14
   - O 0-20
   - O Unsure

3. **All of the following are natural features found in healthy, functioning watersheds EXCEPT:**
   - O Upland
   - O Erosion zone
   - O Floodplain
   - O Riparian zone
   - O Water body
   - O Unsure

4. **The most commonly tested fecal bacteria indicator in freshwater is:**
   - O E. coli
   - O Cyanobacteria
   - O Streptococcus
   - O Giardia
   - O Cryptosporidium
   - O Unsure

30855

MARKING INSTRUCTIONS
CORRECT: ● INCORRECT: ⊘ ⊗ ⊖ ⊙

5. _____ is a term used to describe the chemical, physical, and biological characteristics of water.
   - O Water quantity
   - O Water clarity
   - O Water quality
   - O Water availability
   - O Unsure

6. Point source pollution refers to pollution that is discharged from a clearly defined, fixed point such as a pipe, ditch, channel, sewer, or tunnel.
   - O True O False O Unsure

7. The most common nonpoint source impairment in Texas is:
   - O Bacteria
   - O Dissolved oxygen
   - O Sediment
   - O Hazardous and Toxic Substances
   - O Unsure

8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:
   - O Bacteria
   - O Nutrients
   - O Algae
   - O Sediment
   - O Toxic Chemicals
   - O Unsure

9. Which nutrients most commonly cause water quality concerns?
   - O Nitrogen and Potassium
   - O Phosphorus and Sulfur
   - O Nitrogen and Sulfur
   - O Nitrogen and Phosphorus
   - O Phosphorus and Potassium
   - O Unsure

10. The over-enrichment of water with nutrients is called:
    - O Apnea
    - O Anoxia
    - O Aeration
    - O Eutrophication
    - O Hyperhydrosis
    - O Unsure

11. The Clean Water Act of 1972 was passed to:
    - O Protect the water quality of all of the nation's waterbodies
    - O Protect threatened and endangered plant and animal species
    - O Enable dredging in water bodies to prevent sedimentation and erosion
    - O Increase the funding for water treatment plants
    - O Unsure

30855

MARKING INSTRUCTIONS
CORRECT ● INCORRECT ⊘ ⊘ ⊘ ⊘

12. Water quality standards exist for surface water, wastewater effluent, and drinking water.

O True O False O Unsure

13. Which state agency is the primary water quality agency in Texas?

O Environmental Protection Agency (EPA)
O Texas Water Development Board (TWDB)
O Texas Commission on Environmental Quality (TCEQ)
O Texas State Soil and Water Conservation Board (TSSWCB)
O Unsure

14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:

O Environmental planning
O Watershed approach
O Restoration strategy
O Pollution control strategy
O Community action plan
O Unsure

15. Which of the following are important types of water quality improvement projects in Texas?

O A. Watershed protection plans (WPP)
O B. Water quality standards assessment
O C. Total maximum daily loads (TMDL)
O A and C
O B and C
O Unsure

16. Structural and non-structural practices used to protect water quality are referred to as:

O Environmental protection practices
O Best management practices
O Water restoration practices
O Unsure

17. The Clean Water Act Section _____ List is a list of streams and lakes that are impaired for one or more pollutants causing them to not meet state water quality standards.

O 404(a) O 303(d) O 615(b) O 208(b) O 503(b) O Unsure

18. The primary regulatory water quality monitoring program in Texas is:

O Texas Coastal Management Program
O Texas Stream Team
O Texas Coordinated Monitoring Program
O Texas Clean Rivers Program
O Texas Bay Monitoring Program
O Unsure

30855

MARKING INSTRUCTIONS
CORRECT: ● INCORRECT: ⊘ ⊗ ⊖ ⊙

19. Please tell us if any of the following items interest you.

ITEM	Not Interested	Possibly Interested	Probably Interested	Definitely Interested
A. Protecting my watershed	O	O	O	O
B. Participating in additional watershed education workshops or seminars	O	O	O	O
C. Becoming active in a local watershed group	O	O	O	O
D. Having a leadership role in a local watershed group	O	O	O	O
E. Participating in a volunteer water quality monitoring program	O	O	O	O

20. Please answer the following questions by marking YES or NO related to where you have received water quality information. If the question does, not apply, select "NA."

Have you received water quality information from the following sources?	Yes	No	NA
A. Television	O	O	O
B. Newspapers	O	O	O
C. Internet	O	O	O
D. Texas AgriLife Extension Service (formerly Texas Cooperative Extension)	O	O	O
E. Texas AgriLife Research (formerly Texas Agricultural Experiment Station)	O	O	O
F. Universities	O	O	O
G. Environmental Agencies (government)	O	O	O
H. Environmental groups (citizens groups)	O	O	O

21. How did you hear about the Texas Watershed Steward Program?

O Extension
O Newspaper
O Newsletter
O Internet
O Texas Coop Magazine
O Utility insert
O Friend
O Other: _____

22. How would you best describe yourself? (fill in one only)

O Agency professional
O City/county official/employee
O Non-governmental organization member/employee
O Teacher / educational professional
O Small business owner
O Other: _____

23. You are . . . O Female O Male

24. Your age? O 18 - 24 O 25 - 29 O 30 - 34 O 35 - 39 O 40 - 44 O 45 - 49 O 50 - 54 O 55 - 59 O 60 - 64 O 65 - 69 O 70 - 74 O 75+

25. Place of residence?
O Farm or ranch 0 - 100 acres
O Farm or ranch > 100 acres
O Rural area, not a farm / ranch
O Town under 10,000
O Town or city between 10,000 and 50,000 persons
O City between 50,000 and 250,000 persons
O City over 250,000 persons

26. Highest level of education obtained?

O Some high school or less
O High school graduate or GED
O Vocational or technical degree
O Some college
O Bachelor degree
O Post-graduate degree(s)

30855

THANK YOU!

TEXAS A&M AGRILIFE EXTENSION

TEXAS Watershed Steward

Last 4 digits of your home phone number: | | | | |

Location of Training: _____

TEXAS WATERSHED STEWARD PROGRAM
Post Test

Your views on the quality and effectiveness of Extension programs are extremely important. Please take a few minutes to tell us about your experience with this program. Your answers to the following questions will help us better meet your needs in the future. Thank you!

MARKING INSTRUCTIONS
CORRECT: ● INCORRECT: ⊘ ⊠ ⊖ ⊜

Overall, how satisfied are you with this activity?

○ Not at all ○ Slightly ○ Somewhat ○ Mostly ○ Completely

If not "Completely Satisfied," please tell us what we could have done better in order for you to be "Completely Satisfied?"

How satisfied are you with the following aspects of the activity?	Not at all	Slightly	Somewhat	Mostly	Completely
a. Quality of course materials	○	○	○	○	○
b. Location of the activity	○	○	○	○	○
c. Accuracy of information	○	○	○	○	○
d. Information being new to you	○	○	○	○	○
e. Information being easy to understand	○	○	○	○	○
f. Range of topics covered	○	○	○	○	○
g. Completeness of information given	○	○	○	○	○
h. Timeliness of information (being received in time to be useful)	○	○	○	○	○
i. Helpfulness of the information in decisions about your own situation	○	○	○	○	○
j. Instructor's knowledge level of subject matter	○	○	○	○	○
k. Instructor's responses to questions	○	○	○	○	○

Based on the information and technical assistance you received today, what is the likelihood that you would recommend Texas AgriLife Extension Service to your family and friends as a contact for information and assistance on water-related issues? ***Mark only one number below with 1 = not likely and 10 = likely.***

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10

Not Likely **Likely**

49705

Please read the following questions and mark the answer you think is correct. Please do not worry if you do not know the answer, simply mark "unsure." THANKS!!!

MARKING INSTRUCTIONS
CORRECT ● INCORRECT ⊘ ⊗ ⊖ ⊙

1. **Watershed hydrology is the study of how:**
   - O Water interacts with various parts of a watershed including the land, the sea, and the sky
   - O Water quality and quantity are affected by point and nonpoint source pollution
   - O Chemical, physical, and biological water quality parameters change over time
   - O Water is formed on the Earth
   - O Unsure

2. **pH is measured on a scale of:**
   O 1-5 O 1-12 O 0-10 O 0-14 O 0-20 O Unsure

3. **All of the following are natural features found in healthy, functioning watersheds EXCEPT:**
   O Upland O Erosion zone O Floodplain O Riparian zone O Water body O Unsure

4. **The most commonly tested fecal bacteria indicator in freshwater is:**
   O E. coli O Cyanobacteria O Streptococcus O Giardia O Cryptosporidium O Unsure

5. **_____ is a term used to describe the chemical, physical, and biological characteristics of water.**
   O Water quantity O Water clarity O Water quality O Water availability O Unsure

6. **Point source pollution refers to pollution that is discharged from a clearly defined, fixed point such as a pipe, ditch, channel, sewer, or tunnel.**
   O True O False O Unsure

7. **The most common nonpoint source impairment in Texas is:**
   - O Bacteria
   - O Dissolved oxygen
   - O Sediment
   - O Hazardous and Toxic Substances
   - O Unsure

8. **All of the following are examples of major sources of nonpoint source pollution, EXCEPT:**
   O Bacteria O Nutrients O Algae O Sediment O Toxic Chemicals O Unsure

9. **Which nutrients most commonly cause water quality concerns?**
   - O Nitrogen and Potassium
   - O Phosphorus and Sulfur
   - O Nitrogen and Sulfur
   - O Nitrogen and Phosphorus
   - O Phosphorus and Potassium
   - O Unsure

10. **The over-enrichment of water with nutrients is called:**
    O Apnea O Anoxia O Aeration O Eutrophication O Hyperhydrosis O Unsure

49705

MARKING INSTRUCTIONS
CORRECT ● INCORRECT ⊘ ⊗ ⊖ ⊙

11. The Clean Water Act of 1972 was passed to:

- O Protect the water quality of all of the nation's waterbodies
- O Protect threatened and endangered plant and animal species
- O Enable dredging in water bodies to prevent sedimentation and erosion
- O Increase the funding for water treatment plants
- O Unsure

12. Water quality standards exist for surface water, wastewater effluent, and drinking water.

O True O False O Unsure

13. Which state agency is the primary water quality agency in Texas?

- O Environmental Protection Agency (EPA)
- O Texas Water Development Board (TWDB)
- O Texas Commission on Environmental Quality (TCEQ)
- O Texas State Soil and Water Conservation Board (TSSWCB)
- O Unsure

14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:

- O Environmental planning
- O Watershed approach
- O Restoration strategy
- O Pollution control strategy
- O Community action plan
- O Unsure

15. Which of the following are important types of water quality improvement projects in Texas?

- O A. Watershed protection plans (WPP)
- O B. Water quality standards assessment
- O C. Total maximum daily loads (TMDL)
- O A and C
- O B and C
- O Unsure

16. Structural and non-structural practices used to protect water quality are referred to as:

- O Environmental protection practices
- O Best management practices
- O Water restoration practices
- O Unsure

17. The Clean Water Act Section _____ List is a list of streams and lakes that are impaired for one or more pollutants causing them to not meet state water quality standards.

O 404(a) O 303(d) O 615(b) O 208(b) O 503(b) O Unsure

18. The primary regulatory water quality monitoring program in Texas is:

- O Texas Coastal Management Program
- O Texas Stream Team
- O Texas Coordinated Monitoring Program
- O Texas Clean Rivers Program
- O Texas Bay Monitoring Program
- O Unsure

49705

MARKING INSTRUCTIONS
CORRECT: ● INCORRECT: ⊘ ⊗ ⊖ ⊙

19. Please indicate your intentions to do the following:

Practice related to . . .	Definitely Will Not	Probably Will Not	Undecided	Probably Will	Definitely Will	Already Adopted
A. Participate in community cleanup activities	O	O	O	O	O	O
B. Get involved in local planning / zoning decisions	O	O	O	O	O	O
C. Communicate water issues with elected officials	O	O	O	O	O	O
D. Help develop a plan for my watershed (WPP)	O	O	O	O	O	O
E. Help form or become a member of a local watershed group	O	O	O	O	O	O

20. Are there any Best Management Practices (BMPs) that you plan to adopt to help protect your watershed?

O Yes O No O Unsure

if yes, please list the ones you plan to adopt in the space below

21. Do you feel what you learned in the program provided you the ability to be a better steward of your watershed?

O Yes O No O Unsure

22. What is the most significant thing you learned during the program (feel free to list more than one)?

23. How much would you be willing to pay for this program?

O $0 - $9 O $30 - $39 O $60 - $69 O $90 - $100
O $10 - $19 O $40 - $49 O $70 - $79
O $20 - $29 O $50 - $59 O $80 - $89

24. What other information do you need pertaining to these topics?

49705

THANK YOU!

Appendix K

TWS 6-month Follow-up Evaluation questions

Have you:

Participated in at least one community cleanup event?

Gotten involved in local planning/zoning decisions?

Communicated water issues with elected officials?

Helped develop a plan for your watershed (Watershed Protection Plan)?

Helped form or become a member of a local watershed group?

Gotten involved in a volunteer water quality monitoring program?

Given a presentation to a school class or other community group on watershed stewardship/water quality?

Encouraged others in your community to attend a TWS workshop?

More closely monitored individual actions that can impair water quality?

Adopted/maintained Best Management Practices (BMPs) on your property or in your community related to water quality/conservation/management?

Adopted soil testing practices?

Have you used the resourced/materials provided to you at the workshop?

Have you shared the resources/materials provided to you at the workshop with others?

Were you satisfied with the resources/materials provided to you at the workshop?

Have you used the TWS on-line modules available at http://tws.tamu.edu/?

Appendix L

Phase 1 Evaluation (Pre/Post-Test) Data Reports for 2018-2022 and 2008-2022

TEXAS A&M AGRILIFE EXTENSION

Texas Watershed

November 1, 2018 to December 2022

Progress Report for Program Implementation

(2018 –2022)

Summary provided by Paul Pope (ppope@tamu.edu)

Summary. Listed below are some of the highlights of the pretest and posttest from the Texas Watershed Program.

KNOWLEDGE (using designated knowledge gain questions only)

- There was an overall knowledge increase of ***+30.3*** percentage points from the pretest and post test for questions (original and revised questions combined).
- For *watersheds* questions, there was an overall knowledge increase of ***+21.3*** percentage points from the pretest and post test (original and revised questions combined).
- For *fresh water* questions, there was an overall knowledge increase of ***+31.5*** percentage points from the pretest and post test (original and revised questions combined).
- For *pollution* questions, there was an overall knowledge increase of ***+35.6*** percentage points from the pretest and post test (original and revised questions combined).
- For *policy and government* questions, there was an overall knowledge increase of ***+37.1*** percentage points from the pretest and post test (original and revised questions combined).

INTENTIONS TO CHANGE

- **22 of 104 (21.2%)** said they intend to participate in community cleanup activities. **24 (23.1%)** said they have already done this before the program.
- **17 of 107 (15.62%)** said they intend to get involved in local planning / zoning decisions. **16 (15.0%)** said they already done this before the program.
- **33 of 107 (30.8%)** said they intend to communicate water issues with elected officials. **13 (12.1%)** said they already done this before the program.
- **16 of 107 (14.8%)** said they intend to help develop a plan for my watershed. **13 (12.0%)** said they already done this before the program.
- **17 of 104 (16.3%)** said they intend to help form or become a member of a local watershed group. **12 (11.5%)** said they have already done this before the program.

OTHER POST-EVENT MEASURES

- **55 of 108 (50.9%)** said there were Best Management Practices (BMPs) that they plan to adopt to help them be a better steward of their watershed.
- **103 of 108 (95.4%)** felt what they learned provided them with the ability to be a better steward of their watershed.

Table 1. Pretest and post test results from trainings.

Question	Pretest Correct Response	Post Test Correct Response	Pct. Point Diff[1]
1. Watershed hydrology is the study of how:	54 of 108 (50.0%)	64 of 108 (59.3%)	+9.3
2. pH is measured on a scale of:	49 of 108 (45.4%)	58 of 108 (53.7%)	+8.3
3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:	33 of 108 (30.6%)	74 of 108 (68.5%)	+37.9
4. The most commonly tested fecal bacteria indicator in freshwater is:	84 of 108 (77.8%)	100 of 108 (92.6%)	+14.8
5. _____ is a term used to describe the chemical, physical, and biological characteristics of water.	87 of 108 (80.6%)	94 of 108 (87.0%)	+6.4
6. Point source pollution refers to pollution that is discharged from a clearly defined, fixed point such as a pipe, ditch, channel, . . .	94 of 108 (87.0%)	104 of 108 (96.3%)	+9.3
7. The most common nonpoint source impairment in Texas is:	30 of 108 (27.8%)	71 of 108 (65.7%)	+37.9
8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:	20 of 108 (18.5%)	59 of 108 (54.6%)	+36.1
9. Which nutrients most commonly cause water quality concerns?	59 of 108 (54.6%)	89 of 108 (82.4%)	+27.8
10. The over-enrichment of water with nutrients is called:	37 of 108 (34.3%)	51 of 108 (47.2%)	+12.9
11. The Clean Water Act of 1972 was passed to:	92 of 108 (85.2%)	101 of 108 (93.5%)	+8.3
12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.	86 of 108 (79.6%)	102 of 108 (94.4%)	+14.8
13. Which state agency is the primary water quality agency in Texas	74 of 108 (68.5%)	90 of 108 (83.3%)	+14.8
14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:	45 of 108 (41.7%)	73 of 108 (67.6%)	+25.9
15. Which of the following are important types of water quality improvement projects in Texas?	48 of 108 (44.4%)	82 of 108 (75.9%)	+31.5
16. Structural and non-structural practices used to protect water quality are referred to as:	43 of 108 (39.8%)	87 of 108 (80.6%)	+40.8
17. The Clean Water Act Section _____ List is a list of streams and lakes that are impaired for one or more pollutants causing them to not meet state water quality standards.	29 of 108 (26.9%)	90 of 108 (83.3%)	+56.4
18. The primary regulatory water quality monitoring program in Texas is:	35 of 108 (32.4%)	54 of 108 (50.0%)	+17.6
OVERALL	999 of 1,944 (51.4%)	1,443 of 1,944 (74.2%)	+22.8
KNOWLEDGE GAIN QUESTIONS (2, 3, 7-10, 14-18)	428 of 1,188 (36%)	788 of 1,188 (66.3%)	+30.3

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 2. Pretest and post test results from questions pertaining to "Watersheds."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
1. Watershed hydrology is the study of how:	54 of 108 (50.0%)	64 of 108 (59.3%)	+9.3
2. pH is measured on a scale of:	49 of 108 (45.4%)	58 of 108 (53.7%)	+8.3
3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:	33 of 108 (30.6%)	74 of 108 (68.5%)	+37.9
10. The over-enrichment of water with nutrients is called:	37 of 108 (34.3%)	51 of 108 (47.2%)	+12.9
14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:	45 of 108 (41.7%)	73 of 108 (67.6%)	+25.9
OVERALL – Watersheds	218 of 540 (40.4%)	320 of 540 (59.3%)	+18.9
KNOWLEDGE GAIN QUESTIONS (2, 3, 10, 14)	164 of 432 (38%)	256 of 432 (59.3%)	+21.3

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 3. Pretest and post test results from questions pertaining to "Fresh Water."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
4. The most commonly tested fecal bacteria indicator in freshwater is:	84 of 108 (77.8%)	100 of 108 (92.6%)	+14.8
5. _____ is a term used to describe the chemical, physical, and biological characteristics of water.	87 of 108 (80.6%)	94 of 108 (87.0%)	+6.4
15. Which of the following are important types of water quality improvement projects in Texas?	48 of 108 (44.4%)	82 of 108 (75.9%)	+31.5
OVERALL – Fresh Water	219 of 324 (67.6%)	276 of 324 (85.2%)	+17.6
KNOWLEDGE GAIN QUESTIONS (15)	48 of 108 (44.4%)	82 of 108 (75.9%)	+31.5

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 4. Pretest and post test results from questions pertaining to "Pollution."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
6. Point source pollution refers to pollution that is discharged from a clearly defined, fixed point such as a pipe, ditch, channel, . . .	94 of 108 (87.0%)	104 of 108 (96.3%)	+9.3
7. The most common nonpoint source impairment in Texas is:	30 of 108 (27.8%)	71 of 108 (65.7%)	+37.9
8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:	20 of 108 (18.5%)	59 of 108 (54.6%)	+36.1
9. Which nutrients most commonly cause water quality concerns?	59 of 108 (54.6%)	89 of 108 (82.4%)	+27.8
16. Structural and non-structural practices used to protect water quality are referred to as:	43 of 108 (39.8%)	87 of 108 (80.6%)	+40.8
OVERALL – Pollution	**246 of 540 (45.6%)**	**410 of 540 (75.9%)**	**+30.3**
KNOWLEDGE GAIN QUESTIONS (7-9, 16)	**152 of 432 (35.2%)**	**306 of 432 (70.8%)**	**+35.6**

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 5. Pretest and post test results from questions pertaining to "Policy and Govt."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
11. The Clean Water Act of 1972 was passed to:	92 of 108 (85.2%)	101 of 108 (93.5%)	+8.3
12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.	86 of 108 (79.6%)	102 of 108 (94.4%)	+14.8
13. Which state agency is the primary water quality agency in Texas	74 of 108 (68.5%)	90 of 108 (83.3%)	+14.8
17. The Clean Water Act Section _____ List is a list of streams and lakes that are impaired for one or more pollutants causing them to not meet state water quality standards.	29 of 108 (26.9%)	90 of 108 (83.3%)	+56.4
18. The primary regulatory water quality monitoring program in Texas is:	35 of 108 (32.4%)	54 of 108 (50.0%)	+17.6
OVERALL - Policy and Government	316 of 540 (58.5%)	437 of 540 (80.9%)	+22.4
KNOWLEDGE GAIN QUESTIONS (17, 18)	64 of 216 (29.6%)	144 of 216 (66.7%)	+37.1

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 6. Intentions to change[1].

Statement	Probably Will	Definitely Will	Combined Percent
Your intentions to participate in community cleanup activities (n= *104*).	(29.8%)	(21.2%)	51.0%
Your intentions to get involved in local planning / zoning decisions (n= *107*)	(24.3%)	(15.9%)	40.2%
Your intentions to communicate water issues with elected officials (n= *107*)	(32.7%)	(30.8%)	63.5%
Your intentions to help develop a plan for my watershed (n= *108*)	(32.4%)	(14.8%)	47.2%
Your intentions to help form or become a member of a local watershed group (n= *104*)	(21.2%)	(16.3%)	37.5%

[1]Likert scale defined as 1 = *definitely will not*, 2 = *probably will not*, 3 = *undecided*, 4 = *probably will*, and 5 = *definitely will*.

Table 7. Satisfaction[1].

Statement	Mostly	Completely	Combined Percent
Overall, how satisfied are you with this activity? (n= *109*)	(24.8%)	(73.4%)	98.2%
How satisfied were you with the quality of course materials? (n= *116*)	(17.2%)	(81.0%)	98.2%
How satisfied were you with the location of activity? (n= *116*)	(19.0%)	(78.4%)	97.4%
How satisfied were you with the accuracy of information? (n= *112*)	(19.6%)	(78.6%)	98.2%
How satisfied were you with the information being new to you? (n= *113*)	(31.0%)	(40.7%)	71.7%
How satisfied were you with the information being easy to understand? (n= *115*)	(27.8%)	(68.7%)	96.5%
How satisfied were you with the range of topics covered? (n= *113*)	(27.4%)	(72.6%)	100%
How satisfied were you with the completeness of information given? (n= *115*)	(28.7%)	(69.6%)	98.3%
How satisfied were you with the timeliness of information (being received in time to be useful)? (n= *114*)	(29.8%)	(67.5%)	97.3%
How satisfied were you with the helpfulness of the information in decisions about your own situation? (n= *115*)	(34.8%)	(58.3%)	93.1%
How satisfied were you with the instructor's knowledge level of subject matter? (n= *116*)	(11.2%)	(88.8%)	100%
How satisfied were you with the instructor's responses to questions? (n= *112*)	(15.2%)	(83.0%)	98.2%

[1]Likert scale defined as 1 = *not at all*, 2 = *slightly*, 3 = *somewhat*, 4 = *mostly*, and 5 = *completely*.

Other Data

- **41.4%** said they have received water quality information from television.
- **48.0%** said they have received water quality information from newspapers.
- **74.0%** said they have received water quality information from the Internet.
- **67.3%** said they have received water quality information from Texas A&M AgriLife Extension Service.
- **45.2%** said they have received water quality information from Texas A&M AgriLife Research.
- **46.7%** said they have received water quality information from universities.
- **65.3%** said they have received water quality information from Environmental Agencies (government).
- **49.0%** said they have received water quality information from Environmental groups (citizens)

TEXAS A&M AGRILIFE EXTENSION

Texas Watershed – As of December 2022

Progress Report for Program Implementation

(2008 –2022)

Summary provided by Paul Pope (ppope@tamu.edu)

Summary. Listed below are some of the highlights of the pretest and posttest from the Texas Watershed Program.

KNOWLEDGE (using designated knowledge gain questions only)

- There was an overall knowledge increase of *+33.2* percentage points from the pretest and post test for questions (original and revised questions combined).
- For *watersheds* questions, there was an overall knowledge increase of *+27.5* percentage points from the pretest and post test (original and revised questions combined).
- For *fresh water* questions, there was an overall knowledge increase of *+38.3* percentage points from the pretest and post test (original and revised questions combined).
- For *pollution* questions, there was an overall knowledge increase of *+36.3* percentage points from the pretest and post test (original and revised questions combined).
- For *policy and government* questions, there was an overall knowledge increase of *+36.1* percentage points from the pretest and post test (original and revised questions combined).

INTENTIONS TO CHANGE

- **400 of 1,821 (22.0%)** said they intend to participate in community cleanup activities. **361 (19.8%)** said they have already done this before the program.
- **362 of 1,813 (20.0%)** said they intend to get involved in local planning / zoning decisions. **244 (13.5%)** said they have already done this before the program.
- **539 of 1,824 (29.6%)** said they intend to communicate water issues with elected officials. **268 (14.7%)** said they already done this before the program.
- **400 of 1,816 (22.0%)** said they intend to help develop a plan for my watershed. **187 (10.3%)** said they already done this before the program.
- **357 of 1,817 (19.6%)** said they to help form or become a member of a local watershed group. **225 (12.4%)** said they already done this before the program.

OTHER POST-EVENT MEASURES

- **1,143 of 1,799 (63.5%)** said there were Best Management Practices (BMPs) that they plan to adopt to help them be a better steward of their watershed.
- **1,812 of 1,857 (97.6%)** felt what they learned provided them with the ability to be a better steward of their watershed.

Table 1. Pretest and post test results from trainings.

Question	Pretest Correct Response	Post Test Correct Response	Pct. Point Diff[1]
1. Watershed hydrology is the study of how:	850 of 1,535 (55.4%)	1,105 of 1,535 (72%)	+16.6
2. pH is measured on a scale of:	967 of 1,535 (63.0%)	1,377 of 1,535 (89.7%)	+26.7
3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:	640 of 1,535 (41.7%)	1,161 of 1,535 (75.6%)	+33.9
4. The most commonly tested fecal bacteria indicator in freshwater is:	1,191 of 1,535 (77.6%)	1,427 of 1,535 (93.0%)	+15.4
5. _____ is a term used to describe the chemical, physical, and biological characteristics of water.	1,215 of 1,535 (79.2%)	1,381 of 1,535 (90.0%)	+10.8
6. Point source pollution refers to pollution that is discharged from a clearly defined, fixed point such as a pipe, ditch, channel, . . .	1,312 of 1,535 (85.5%)	1,481 of 1,535 (96.5%)	+11.0
7. The most common nonpoint source impairment in Texas is:	321 of 1,535 (20.9%)	1,036 of 1,535 (67.5%)	+46.6
8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:	403 of 1,535 (26.3%)	1,069 of 1,535 (69.6%)	+43.3
9. Which nutrients most commonly cause water quality concerns?	879 of 1,535 (57.3%)	1,285 of 1,535 (83.7%)	+26.4
10. The over-enrichment of water with nutrients is called:	812 of 1,535 (52.9%)	1,167 of 1,535 (76.0%)	+23.1
11. The Clean Water Act of 1972 was passed to:	1,302 of 1,535 (84.8%)	1,491 of 1,535 (97.1%)	+12.3
12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.	1,206 of 1,535 (78.6%)	1,433 of 1,535 (93.4%)	+14.8
13. Which state agency is the primary water quality agency in Texas	947 of 1,535 (61.7%)	1,324 of 1,535 (86.3%)	+24.6
14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:	835 of 1,535 (54.4%)	1,236 of 1,535 (80.5%)	+26.1
15. Which of the following are important types of water quality improvement projects in Texas?	641 of 1,535 (41.8%)	1,230 of 1,535 (80.1%)	+38.3
16. Structural and non-structural practices used to protect water quality are referred to as:	885 of 1,535 (57.7%)	1,328 of 1,535 (86.5%)	+28.8
17. The Clean Water Act Section _____ List is a list of streams and lakes that are impaired for one or more pollutants causing them to not meet state water quality standards.	667 of 1,535 (43.5%)	1,447 of 1,535 (94.3%)	+50.8
18. The primary regulatory water quality monitoring program in Texas is:	644 of 1,535 (42.0%)	973 of 1,535 (63.4%)	+21.4
OVERALL	**15,717 of 27,630 (56.9%)**	**22,951 of 27,630 (83.1%)**	**+26.2**
KNOWLEDGE GAIN QUESTIONS (2, 3, 7-10, 14-18)	**7,694 of 16,885 (45.6%)**	**13,309 of 16,885 (78.8%)**	**+33.2**

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 2. Pretest and post test results from questions pertaining to "Watersheds."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
1. Watershed hydrology is the study of how:	850 of 1,535 (55.4%)	1,105 of 1,535 (72%)	+16.6
2. pH is measured on a scale of:	967 of 1,535 (63.0%)	1,377 of 1,535 (89.7%)	+26.7
3. All of the following are natural features found in healthy, functioning watersheds EXCEPT:	640 of 1,535 (41.7%)	1,161 of 1,535 (75.6%)	+33.9
10. The over-enrichment of water with nutrients is called:	812 of 1,535 (52.9%)	1,167 of 1,535 (76.0%)	+23.1
14. A flexible framework for managing the quantity and quality of water resources found within specified watershed boundaries is referred to as:	835 of 1,535 (54.4%)	1,236 of 1,535 (80.5%)	+26.1
OVERALL – Watersheds	**4,104 of 7,675 (53.5%)**	**6,046 of 7,675 (78.8%)**	**+25.3**
KNOWLEDGE GAIN QUESTIONS (2, 3, 10, 14)	**3,254 of 6,140 (53.0%)**	**4,941 of 6,140 (80.5%)**	**+27.5**

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 3. Pretest and post test results from questions pertaining to "Fresh Water."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
4. The most commonly tested fecal bacteria indicator in freshwater is:	1,191 of 1,535 (77.6%)	1,427 of 1,535 (93.0%)	+15.4
5. _____ is a term used to describe the chemical, physical, and biological characteristics of water.	1,215 of 1,535 (79.2%)	1,381 of 1,535 (90.0%)	+10.8
15. Which of the following are important types of water quality improvement projects in Texas?	641 of 1,535 (41.8%)	1,230 of 1,535 (80.1%)	+38.3
OVERALL – Fresh Water	**3,047 of 4,605 (66.2%)**	**4,038 of 4,605 (87.7%)**	**+21.5**
KNOWLEDGE GAIN QUESTIONS (15)	**641 of 1,535 (41.8%)**	**1,230 of 1,535 (80.1%)**	**+38.3**

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 4. Pretest and post test results from questions pertaining to "Pollution."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
6. Point source pollution refers to pollution that is discharged from a clearly defined, fixed point such as a pipe, ditch, channel, . . .	1,312 of 1,535 (85.5%)	1,481 of 1,535 (96.5%)	+11.0
7. The most common nonpoint source impairment in Texas is:	321 of 1,535 (20.9%)	1,036 of 1,535 (67.5%)	+46.6
8. All of the following are examples of major sources of nonpoint source pollution, EXCEPT:	403 of 1,535 (26.3%)	1,069 of 1,535 (69.6%)	+43.3
9. Which nutrients most commonly cause water quality concerns?	879 of 1,535 (57.3%)	1,285 of 1,535 (83.7%)	+26.4
16. Structural and non-structural practices used to protect water quality are referred to as:	885 of 1,535 (57.7%)	1,328 of 1,535 (86.5%)	+28.8
OVERALL – Pollution	**3,800 of 7,675 (49.5%)**	**6,199 of 7,675 (80.8%)**	**+31.3**
KNOWLEDGE GAIN QUESTIONS (7-9, 16)	**2,488 of 6,140 (40.5%)**	**4,718 of 6,140 (76.8%)**	**+36.3**

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 5. Pretest and post test results from questions pertaining to "Policy and Govt."

Question	Pretest Correct	Post Test Correct	Pct. Point Chg[1]
11. The Clean Water Act of 1972 was passed to:	1,302 of 1,535 (84.8%)	1,491 of 1,535 (97.1%)	+12.3
12. The three types of water quality standards established by the Clean Water Act are surface water, effluent, and drinking water quality standards.	1,206 of 1,535 (78.6%)	1,433 of 1,535 (93.4%)	+14.8
13. Which state agency is the primary water quality agency in Texas	947 of 1,535 (61.7%)	1,324 of 1,535 (86.3%)	+24.6
17. The Clean Water Act Section _____ List is a list of streams and lakes that are impaired for one or more pollutants causing them to not meet state water quality standards.	667 of 1,535 (43.5%)	1,447 of 1,535 (94.3%)	+50.8
18. The primary regulatory water quality monitoring program in Texas is:	644 of 1,535 (42.0%)	973 of 1,535 (63.4%)	+21.4
OVERALL - Policy and Government	**4,766 of 7,675 (62.1%)**	**6,668 of 7,675 (86.9%)**	**+24.8**
KNOWLEDGE GAIN QUESTIONS (17, 18)	**1,311 of 3,070 (42.7%)**	**2,420 of 3,070 (78.8%)**	**+36.1**

[1]Percentage point change was calculated by the following formula: After % – Before %

Table 6. Intentions to change[1].

Statement	Probably Will	Definitely Will	Combined Percent
Your intentions to participate in community cleanup activities (n= *1,821*).	(40.6%)	(22.0%)	62.6%
Your intentions to get involved in local planning / zoning decisions (n= *1,813*)	(33.7%)	(20.0%)	53.7%
Your intentions to communicate water issues with elected officials (n= *1,824*)	(34.2%)	(29.6%)	63.8%
Your intentions to help develop a plan for my watershed (n= *1,816*)	(34.4%)	(22.0%)	56.4%
Your intentions to help form or become a member of a local watershed group (n= *1,817*)	(32.9%)	(19.6%)	52.5%

[1]Likert scale defined as 1 = *definitely will not*, 2 = *probably will not*, 3 = *undecided*, 4 = *probably will*, and 5 = *definitely will*.

Table 7. Satisfaction[1].

Statement	Mostly	Completely	Combined Percent
Overall, how satisfied are you with this activity? (n= *1,754*)	(28.1%)	(70.0%)	98.1%
How satisfied were you with the quality of course materials? (n= *1,886*)	(22.5%)	(76.2%)	98.8%
How satisfied were you with the location of activity? (n= *1,888*)	(20.7%)	(72.9%)	93.6%
How satisfied were you with the accuracy of information? (n= *1,859*)	(22.8%)	(75.5%)	98.3%
How satisfied were you with the information being new to you? (n= *1,871*)	(32.7%)	(27.5%)	60.2%
How satisfied were you with the information being easy to understand? (n= *1,879*)	(31.3%)	(64.8%)	96.1%
How satisfied were you with the range of topics covered? (n= *1,880*)	(32.1%)	(64.5%)	96.6%
How satisfied were you with the completeness of information given? (n= *1,880*)	(31.5%)	(65.1%)	96.6%
How satisfied were you with the timeliness of information (being received in time to be useful)? (n= *1,877*)	(28.5%)	(66.2%)	94.7%
How satisfied were you with the helpfulness of the information in decisions about your own situation? (n= *1,872*)	(34.1%)	(56.4%)	90.5%
How satisfied were you with the instructor's knowledge level of subject matter? (n= *1,879*)	(16.0%)	(83.0%)	99.0%
How satisfied were you with the instructor's responses to questions? (n= *1,876*)	(18.8%)	(79.5%)	98.3%

[1]Likert scale defined as 1 = *not at all*, 2 = *slightly*, 3 = *somewhat*, 4 = *mostly*, and 5 = *completely*.

Other Data

- **51.9%** said they have received water quality information from television.
- **62.2%** said they have received water quality information from newspapers.
- **73.8%** said they have received water quality information from the Internet.
- **63.3%** said they have received water quality information from Texas A&M AgriLife Extension Service.
- **41.8%** said they have received water quality information from Texas A&M AgriLife Research.
- **51.7%** said they have received water quality information from universities.
- **71.3%** said they have received water quality information from Environmental Agencies (government).
- **54.3%** said they have received water quality information from Environmental groups (citizens)

Appendix M

Phase 2 Evaluation (6-month Follow-up Evaluation) Data Reports (Pre-2020 and 2020-2022)

Phase 2 Evaluation (6-month Post-Evaluation through 2019) Data Report

Total Respondents
352

For questions one through eleven, given below, please tell us if you adopted any of the following practices based on what you learned at the Texas Watershed Steward Workshop.

1. **Participated in at least one community cleanup event**

Choice	Answer	Bar	Response	%
A	I am still undecided		33	9.38%
B	NO, and I don't plan to		39	11.08%
C	NO, but I still plan to		146	41.48%
D	YES, I did		134	38.07%
	Total		352	100.00%

1

2. **Gotten involved in local planning/zoning decisions**

Choice	Answer	Bar	Response	%
A	I am still undecided		43	12.22%
B	NO, and I don't plan to		76	21.59%
C	NO, but I still plan to		103	29.26%
D	YES, I did		130	36.93%
	Total		352	100.00%

3. **Communicated water issues with elected officials**

Choice	Answer	Bar	Response	%
A	I am still undecided		30	8.52%
B	NO, and I don't plan to		49	13.92%
C	NO, but I still plan to		89	25.28%
D	YES, I did		184	52.27%
	Total		352	100.00%

4. **Helped develop a plan for your watershed (Watershed Protection Plan)**

Choice	Answer	Bar	Response	%
A	I am still undecided		49	13.92%
B	NO, and I don't plan to		82	23.30%
C	NO, but I still plan to		132	37.50%
D	YES, I did		89	25.28%
	Total		352	100.00%

5. **Helped form or become a member of a local watershed group**

Choice	Answer	Bar	Response	%
A	I am still undecided		58	17.01%
B	NO, and I don't plan to		74	21.70%
C	NO, but I still plan to		96	28.15%
D	YES, I did		113	33.14%
	Total		341	100.00%

6. **Gotten involved in a volunteer water quality monitoring program**

Choice	Answer	Bar	Response	%
A	I am still undecided		61	17.89%
B	NO, and I don't plan to		96	28.15%
C	NO, but I still plan to		88	25.81%
D	YES, I did		96	28.15%
	Total		341	100.00%

7. **Given a presentation to a school class or other community group on watershed stewardship/water quality issues**

Choice	Answer	Bar	Response	%
A	I am still undecided		44	12.90%
B	NO, and I don't plan to		101	29.62%
C	NO, but I still plan to		72	21.11%
D	YES, I did		124	36.36%
	Total		341	100.00%

8. **Encouraged others in your community to attend a TWS workshop**

Choice	Answer	Bar	Response	%
A	I am still undecided		22	6.45%
B	NO, and I don't plan to		17	4.99%
C	NO, but I still plan to		72	21.11%
D	YES, I did		230	67.45%
	Total		341	100.00%

9. **More closely monitored individual actions that can impair water quality**

Choice	Answer	Bar	Response	%
A	I am still undecided		11	3.25%
B	NO, and I don't plan to		13	3.85%
C	NO, but I still plan to		17	5.03%
D	YES, I did		297	87.87%
	Total		338	100.00%

10. **Adopted/maintained Best Management Practices (BMPs) on your property or in your community related to improving water quality**

Choice	Answer	Bar	Response	%
A	I am still undecided		16	4.73%
B	NO, and I don't plan to		15	4.44%
C	NO, but I still plan to		35	10.36%
D	YES, I did		272	80.47%
	Total		338	100.00%

11. **Adopted soil testing practices**

Choice	Answer	Bar	Response	%
A	I am still undecided		42	12.43%
B	NO, and I don't plan to		65	19.23%
C	NO, but I still plan to		131	38.76%
D	YES, I did		100	29.59%
	Total		338	100.00%

For questions twelve through fifteen, given below, please answer *Yes* or *No*.

12. **Have you used the resources/materials provided to you at the workshop?**

Choice	Answer	Bar	Response	%
A	Yes		277	82.44%
B	No		59	17.56%
	Total		336	100.00%

13. **Have you shared the resources/materials provided to you at the workshop with others?**

Choice	Answer	Bar	Response	%
A	Yes		200	59.52%
B	No		136	40.48%
	Total		336	100.00%

14. **Were you satisfied with the resources/materials provided to you at the workshop?**

Choice	Answer	Bar	Response	%
A	Yes		316	94.05%
B	No		20	5.95%
	Total		336	100.00%

15. **Have you used the TWS on-line modules available at https://tws.tamu.edu/?**

#	Answer	Bar	Response	%
1	Yes		43	12.80%
2	No		293	87.20%
	Total		336	100.00%

Default Report

Texas Watershed Steward 6-month Evaluation

December 5, 2022 2:54 PM MST

Q1 - In which city did you attend a Texas Watershed Steward workshop?

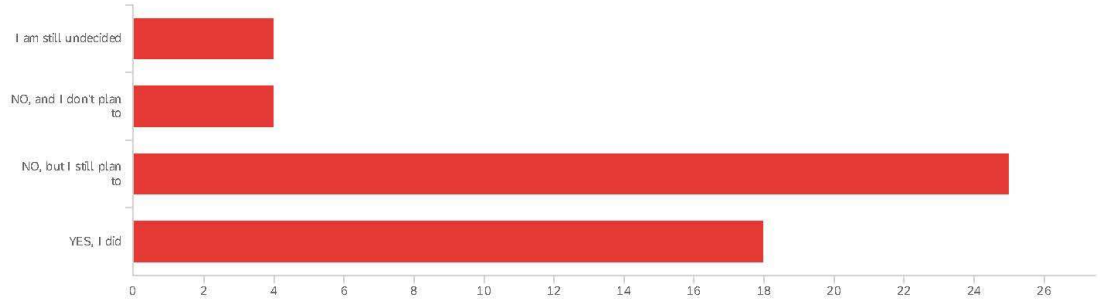
In which city did you attend a Texas Watershed Steward workshop?
Seguin, TX
Seguin
Seguin, Texas
Seguin
Seguin
Seguin
Houston
Pearland
Pearland
Pearland
Pearland
Houston Area
Kingsville
Kingsville
Kingsville, Texas
Chandler
Murchison
Chandler
Chandler, Texas
online

In which city did you attend a Texas Watershed Steward workshop?
Online Montgomery TX
Chandler
Bellville
Virtual Bellville
Bellville
Bellville
Cat Springs
San Marcos
Orange
Orange
Orange
Orange
Orange Texas
virtual/Blanco
Blanco
Blanco
Blanco
Blanco
Blanco
Granbury
Granbury
Granbury
Granbury
Granbury

In which city did you attend a Texas Watershed Steward workshop?

Granbury
Granbury
Granbury
Granbury
Online
Nevada
BONHAM
Bonham
Bonham
Bonham
Edna
Markham
Edna
test
Online
Livingston
Fort Worth
Livingston
Online

Q2 - Participated in at least one community cleanup event

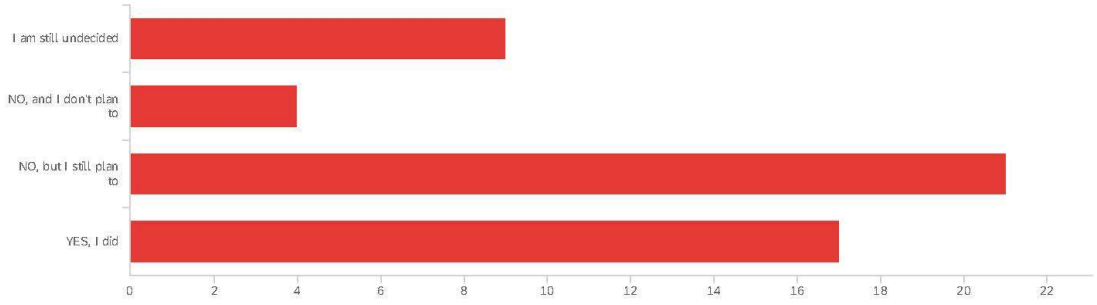


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Participated in at least one community cleanup event	1.00	4.00	3.12	0.86	0.73	51

#	Field		Choice Count
1	I am still undecided	7.84%	4
2	NO, and I don't plan to	7.84%	4
3	NO, but I still plan to	49.02%	25
4	YES, I did	35.29%	18
			51

Showing rows 1 - 5 of 5

Q3 - Gotten involved in local planning/zoning decisions?

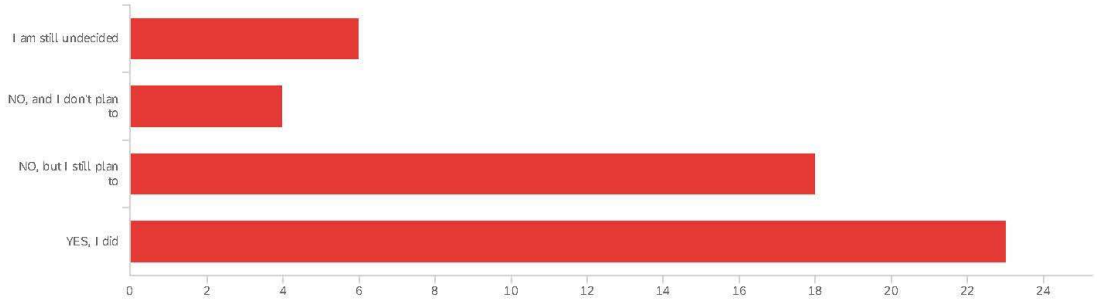


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Gotten involved in local planning/zoning decisions?	1.00	4.00	2.90	1.05	1.11	51

#	Field		Choice Count
1	I am still undecided	17.65%	9
2	NO, and I don't plan to	7.84%	4
3	NO, but I still plan to	41.18%	21
4	YES, I did	33.33%	17
			51

Showing rows 1 - 5 of 5

Q4 - Communicated water issues with elected officials?

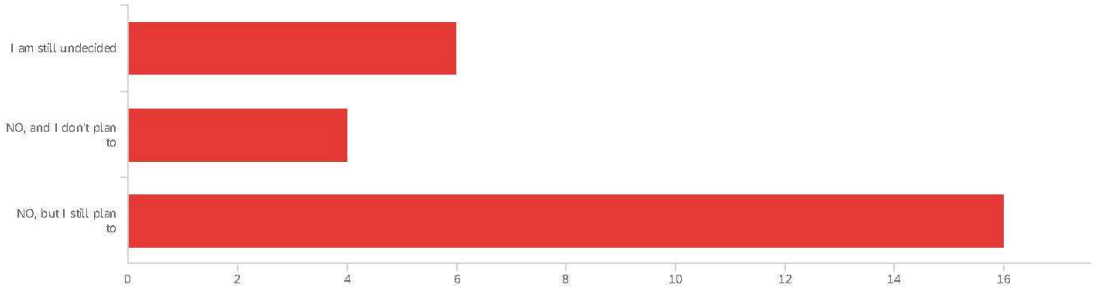


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Communicated water issues with elected officials?	1.00	4.00	3.14	0.99	0.98	51

#	Field		Choice Count
1	I am still undecided	11.76%	6
2	NO, and I don't plan to	7.84%	4
3	NO, but I still plan to	35.29%	18
4	YES, I did	45.10%	23
			51

Showing rows 1 - 5 of 5

Q5 - Helped develop a plan for your watershed (Watershed Protection Plan)?

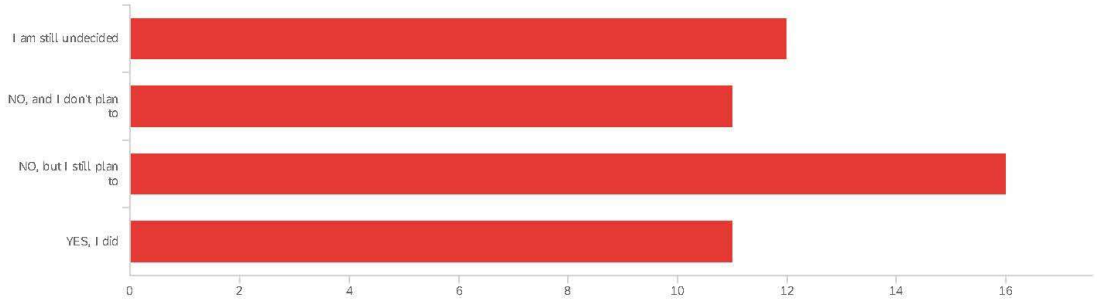


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Helped develop a plan for your watershed (Watershed Protection Plan)?	2.00	4.00	3.38	0.84	0.70	26

#	Field		Choice Count
2	I am still undecided	23.08%	6
3	NO, and I don't plan to	15.38%	4
4	NO, but I still plan to	61.54%	16
			26

Showing rows 1 - 4 of 4

Q6 - Helped form or become a member of a local watershed group?

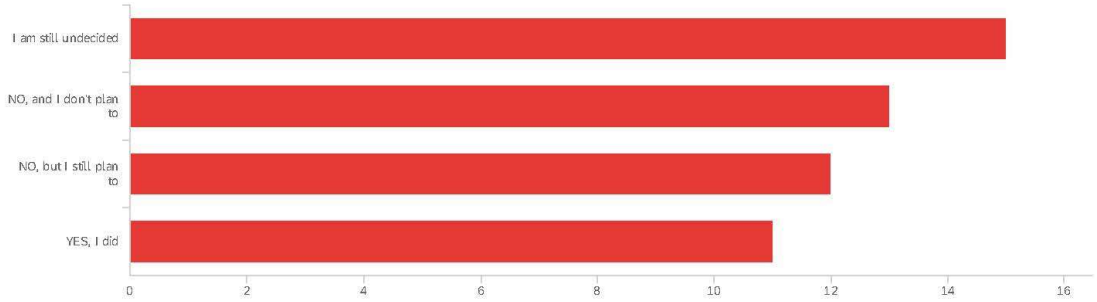


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Helped form or become a member of a local watershed group?	1.00	4.00	2.52	1.08	1.17	50

#	Field		Choice Count
1	I am still undecided	24.00%	12
2	NO, and I don't plan to	22.00%	11
3	NO, but I still plan to	32.00%	16
4	YES, I did	22.00%	11
			50

Showing rows 1 - 5 of 5

Q7 - Gotten involved in a volunteer water quality monitoring program?

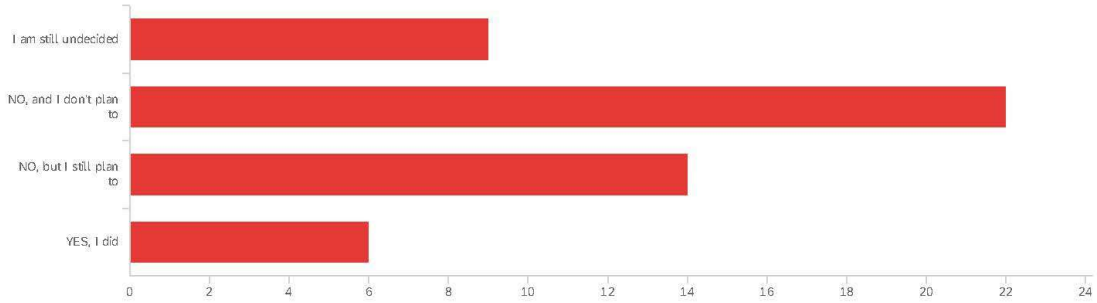


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Gotten involved in a volunteer water quality monitoring program?	1.00	4.00	2.37	1.12	1.25	51

#	Field		Choice Count
1	I am still undecided	29.41%	15
2	NO, and I don't plan to	25.49%	13
3	NO, but I still plan to	23.53%	12
4	YES, I did	21.57%	11
			51

Showing rows 1 - 5 of 5

Q8 - Given a presentation to a school class or other community group on watershed stewardship/water quality?

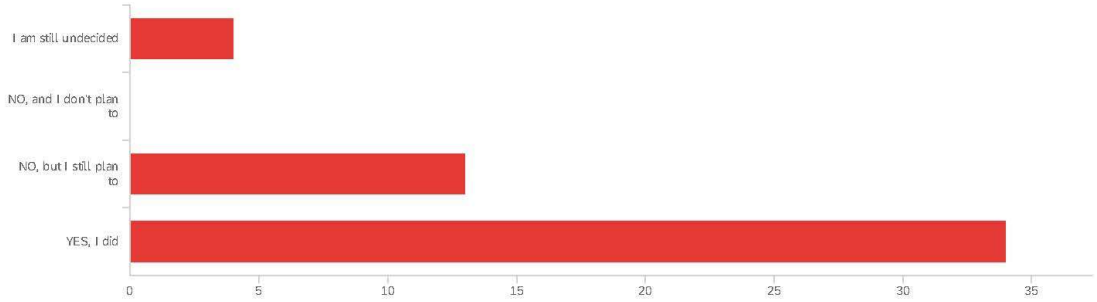


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Given a presentation to a school class or other community group on watershed stewardship/water quality?	1.00	4.00	2.33	0.90	0.81	51

#	Field		Choice Count
1	I am still undecided	17.65%	9
2	NO, and I don't plan to	43.14%	22
3	NO, but I still plan to	27.45%	14
4	YES, I did	11.76%	6
			51

Showing rows 1 - 5 of 5

Q9 - Encouraged others in your community to attend a TWS workshop?

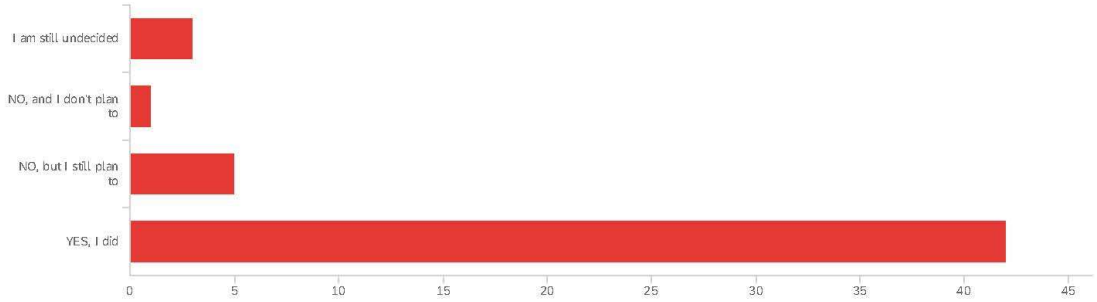


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Encouraged others in your community to attend a TWS workshop?	1.00	4.00	3.51	0.85	0.72	51

#	Field		Choice Count
1	I am still undecided	7.84%	4
2	NO, and I don't plan to	0.00%	0
3	NO, but I still plan to	25.49%	13
4	YES, I did	66.67%	34
			51

Showing rows 1 - 5 of 5

Q10 - More closely monitored individual actions that can impair water quality?

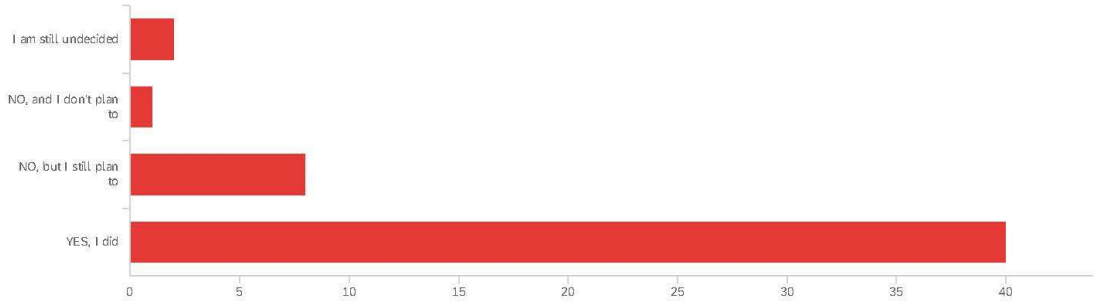


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	More closely monitored individual actions that can impair water quality?	1.00	4.00	3.69	0.78	0.61	51

#	Field		Choice Count
1	I am still undecided	5.88%	3
2	NO, and I don't plan to	1.96%	1
3	NO, but I still plan to	9.80%	5
4	YES, I did	82.35%	42
			51

Showing rows 1 - 5 of 5

Q11 - Adopted/maintained Best Management Practices (BMPs) on your property or in your community related to water quality/conservation/management?

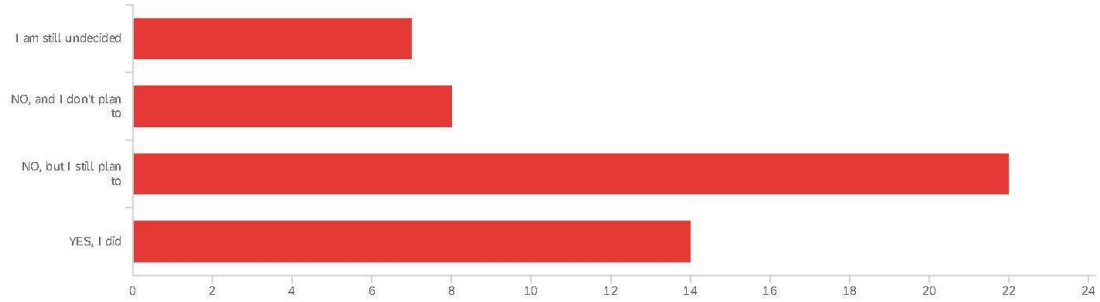


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Adopted/maintained Best Management Practices (BMPs) on your property or in your community related to water quality/conservation/management?	1.00	4.00	3.69	0.70	0.49	51

#	Field		Choice Count
1	I am still undecided	3.92%	2
2	NO, and I don't plan to	1.96%	1
3	NO, but I still plan to	15.69%	8
4	YES, I did	78.43%	40
			51

Showing rows 1 - 5 of 5

Q12 - Adopted soil testing practices?

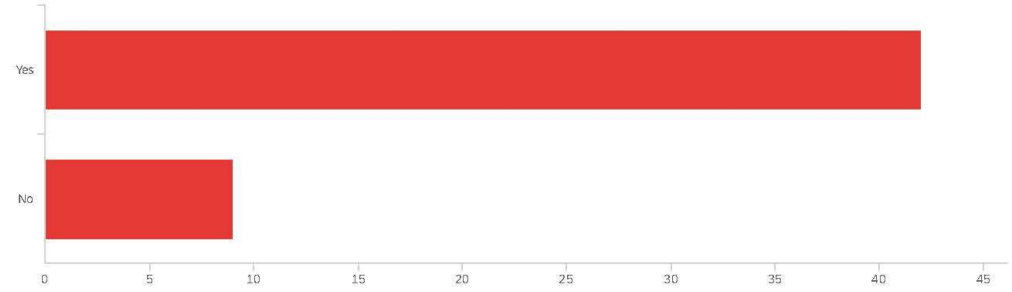


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Adopted soil testing practices?	1.00	4.00	2.84	0.98	0.96	51

#	Field		Choice Count
1	I am still undecided	13.73%	7
2	NO, and I don't plan to	15.69%	8
3	NO, but I still plan to	43.14%	22
4	YES, I did	27.45%	14
			51

Showing rows 1 - 5 of 5

Q13 - Have you used the resources/materials provided to you at the workshop?

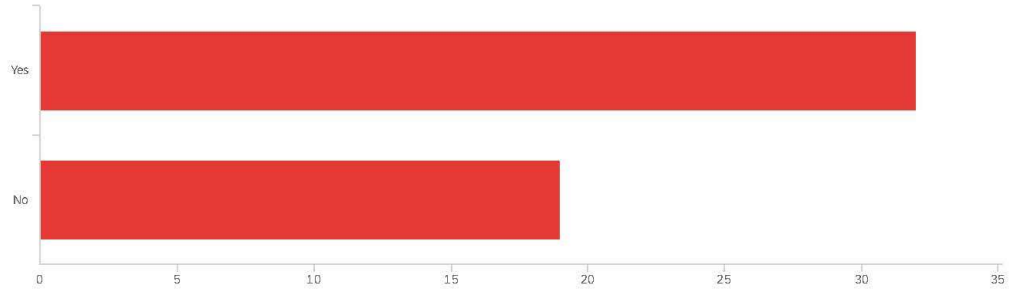


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Have you used the resources/materials provided to you at the workshop?	1.00	2.00	1.18	0.38	0.15	51

#	Field		Choice Count
1	Yes	82.35%	42
2	No	17.65%	9
			51

Showing rows 1 - 3 of 3

Q14 - Have you shared the resources/materials provided to you at the workshop with others?

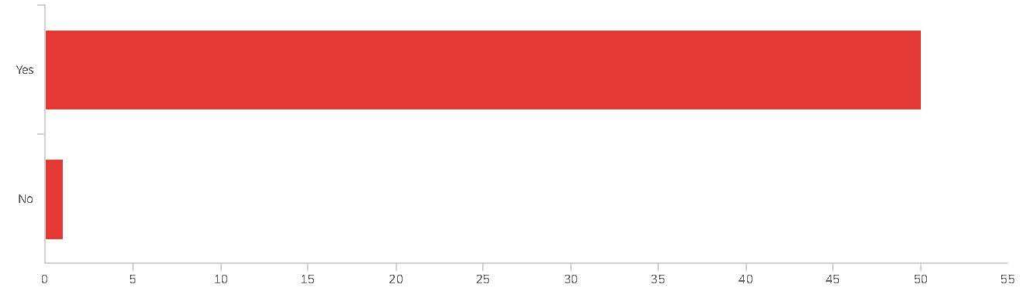


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Have you shared the resources/materials provided to you at the workshop with others?	1.00	2.00	1.37	0.48	0.23	51

#	Field		Choice Count
1	Yes	62.75%	32
2	No	37.25%	19
			51

Showing rows 1 - 3 of 3

Q15 - Were you satisfied with the resources/materials provided to you at the workshop?

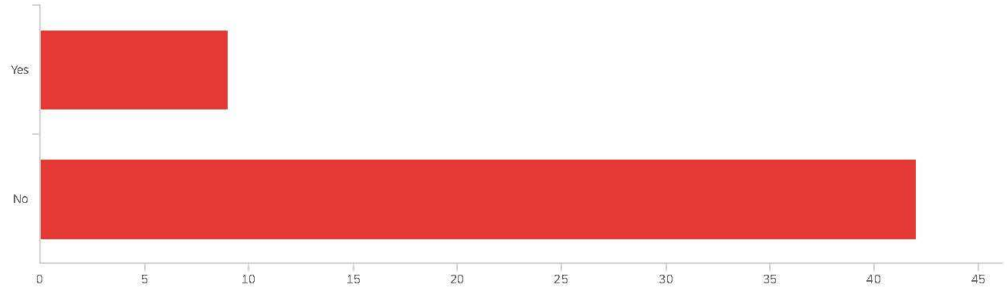


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Were you satisfied with the resources/materials provided to you at the workshop?	1.00	2.00	1.02	0.14	0.02	51

#	Field		Choice Count
1	Yes	98.04%	50
2	No	1.96%	1
			51

Showing rows 1 - 3 of 3

Q16 - Have you used the TWS on-line modules available at https://tws.tamu.edu/?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Have you used the TWS on-line modules available at https://tws.tamu.edu/?	1.00	2.00	1.82	0.38	0.15	51

#	Field		Choice Count
1	Yes	17.65%	9
2	No	82.35%	42
			51

Showing rows 1 - 3 of 3

End of Report